

CROWD CRUSH

HOW THE LAW LEAVES AMERICAN CROWDS UNPROTECTED

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“The age we are about to enter will in truth be the Era of Crowds.”¹
-Gustave Le Bon, 1895

Crowd-related injuries and deaths are startlingly common both in the United States and worldwide. They occur in a wide range of situations and at a vast array of venues: at music concerts, sporting events, and retail holiday sales, and in and around airports, subway platforms, and parking lots, among other locations. These “crowd crush” incidents, however, are extremely underreported and rarely litigated, masking the seriousness of this issue and making it difficult for the few victims who pursue legal recourse to recover damages. Given that there is virtually no statutory law in the United States pertaining to crowd management and control, crowd crush cases are based entirely in common law, most often in the law of negligence. Unfortunately, courts have consistently made a number of analytical errors in these cases, creating a line of jurisprudence that is both scientifically and legally problematic and that reduces incentives for venue owners and event managers to take steps to reduce the likelihood of future crowd injuries. In this paper, I (a) identify the most significant of these errors, (b) explain why they contravene crowd science, and (c) make a series of recommendations designed to bring crowd crush jurisprudence in line with modern science and level the playing field between plaintiffs and defendants in these cases.

It was a typical Monday night at E2, a popular Chicago nightclub, on February 17, 2003.² Patrons were enjoying the dance floor, the DJ, the bar, and wandering in between the club and the restaurant downstairs.³ As the night wore on, a small fistfight broke out on the dance floor, an unfortunate but not uncommon occurrence at a nightclub.⁴ At the DJ’s request, a security guard

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¹ GUSTAVE LE BON, *THE CROWD: A STUDY OF THE POPULAR MIND* at xv (2d ed. 1897).

² See Jodi Wilgoren, *21 Die in Stampede of 1,500 at Chicago Nightclub*, N.Y. TIMES, February 17, 2003, <http://www.nytimes.com/2003/02/18/us/21-die-in-stampede-of-1500-at-chicago-nightclub.html>.

³ See *id.*

⁴ See *id.*

stepped in and attempted to stop the skirmish.⁵ His initial efforts unsuccessful, the guard then escalated his response by spraying pepper spray at the combatants.⁶ This action proved to be disastrous.⁷

The pepper spray lingered in the crowded room, choking the patrons, and triggering a mass exodus.⁸ The club had three exits, but one was obstructed and one was locked, so the entire crowd was forced to leave through the front entrance of the club.⁹ As it attempted to do so, however, crowd members became trapped in the narrow front stairwell when the front door at the bottom of the steps failed to open.¹⁰

The crowd that night was large: approximately 1,152 people.¹¹ Some of the individuals towards the front of the crowd fell as they descended the stairs and were trampled to death.¹² Others became trapped against the front door.¹³ As bodies piled up at the bottom of the stairwell, growing higher than six feet at one point, the patrons at the top of the stairs kept pushing downward, “unaware people below were being crushed to death as they did so.”¹⁴ By the end of the incident, 21 people had died and more than 50 had been injured.¹⁵

Three days later, at The Station nightclub in West Warwick, Rhode Island, 100 people were killed and over 200 were injured under similar circumstances.¹⁶ Over 400 people entered the club that evening to attend a concert of the 1980s band, Great White.¹⁷ Several seconds into the band’s first song, however, pyrotechnics set off by the band’s tour manager ignited the foam insulation in the walls and ceiling surrounding the stage, and a fire began to spread.¹⁸ Although the club contained four exits, two of them were chained shut, and a bouncer initially stopped audience members from using the third, the

⁵ *E2 Nightclub Tragedy 9th Anniversary: It’s Not Over Until It’s Over*, CROWD MANAGEMENT STRATEGIES (Feb. 17, 2012), <http://www.crowdsafe.com/new.asp?ID=2128>.

⁶ *Id.*

⁷ *See id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ Eric Herman, *Some Laughed in E2 Stampede: Patrons Did Not Know They Were Shoving Others to Their Deaths*, THE CHICAGO SUN-TIMES, Jan. 9, 2007, at 9.

¹² *Id.*

¹³ *Id.*

¹⁴ Herman, *supra* note 11, at 9.

¹⁵ *Fifth Anniversary Of The E2 Nightclub Tragedy; All But Forgotten In Chicago?*, CROWD MANAGEMENT STRATEGIES (Feb. 17, 2008), <http://www.crowdsafe.com/new.asp?ID=1934>.

¹⁶ *Great White Concert Tragedy: Tenth Anniversary*, CROWD MANAGEMENT STRATEGIES (Feb. 20 2013), <http://www.crowdsafe.com/new.asp?ID=2195>.

¹⁷ Bernie Augustine, *The Station Nightclub Fire 10 Years Later: Healing Continues as West Warwick, Rhode Island, Takes Next Step in Recovery*, NEW YORK DAILY NEWS (Feb. 20, 2013), <http://www.nydailynews.com/news/national/ten-years-station-nightclub-fire-town-recovering-article-1.1269044>.

¹⁸ Pat Pemberton, *The Great White Nightclub Fire: Ten Years Later*, ROLLING STONE, July 15, 2013, <http://www.rollingstone.com/music/news/the-great-white-nightclub-fire-ten-years-later-20130715>.

stage exit. These blockages forced the vast majority of the crowd to attempt to exit via the front door, creating a deadly bottleneck.¹⁹

While these two incidents are somewhat unusual because of their high numbers of fatalities, crowd-related injuries and deaths are troublingly common, both in the United States and throughout the rest of the world.²⁰ While exact numbers are hard to come by, one recent study calculated that, in the ten-year period between 1992 and 2002, there were 232 deaths and over 66,000 injuries in crowd-related incidents worldwide.²¹ Another crowd expert estimates that the annual number of people who receive medical attention for crowd-related injuries “ranges between 20,000 to 40,000.”²² These injuries and fatalities occur in a wide range of situations: at Black Friday sales,²³ music concerts,²⁴ sporting events,²⁵ and large festivals²⁶, as well as on subway platforms²⁷ and in casino parking lots.²⁸ They occur among spectators in “traditionally rougher crowd sports,” such as basketball and ice hockey, and among spectators in “more subdued sports,” such as golf and horse racing.²⁹ And they occur at boisterous rock concerts³⁰ as well as in the seemingly more genteel corridors of Radio City Music Hall.³¹

¹⁹ *Id.*

²⁰ See, e.g., Victoria C. Dawson, *Who is Responsible When You Shop Until You Drop?: An Impact on the Use of the Aggressive Marketing Schemes of ‘Black Friday’ Through Enterprise Liability Concepts*, 50 SANTA CLARA L. REV. 747, 748 (2010); Dirk Helbing, Anders Johansson, H.E. Habib Z. Al-Abideen, *Crowd Turbulence: The Physics of Crowd Disasters*, THE FIFTH INTERNATIONAL CONFERENCE ON NONLINEAR MECHANICS (ICNM-V) 967, 969 (June 2007).

²¹ Steven A. Adelman, *Won’t Get Fooled Again: Overcrowding at Concerts Causes Injury and Death—Despite Industry Denials*, 40 TRIAL 18, 18 (2004).

²² *20 Die at Concerts and Festivals in 2002*, CROWD MANAGEMENT STRATEGIES (Mar. 24, 2003), <http://crowdsafe.com/rcss11nr.pdf>.

²³ Dawson, *supra* note 20, at 749.

²⁴ See *Chicago Fans Sue Beyoncé After Being “Trampled” at Concert*, NBC CHICAGO (April 2, 2014), <http://www.nbcchicago.com/news/local/Chicago-Fans-Trampled-at-Beyonce-Concert-File-Suit-253585421.html>; *20 Die at Concerts and Festivals*, *supra* note 22.

²⁵ See Cynthia Schuster, *20 Years Later, Lessons Still Relevant From Camp Randall Stampede*, WISCONSIN PUBLIC RADIO (Oct. 25, 2013, 2:00 AM), <http://www.wpr.org/20-years-later-lessons-still-relevant-camp-randall-stampede>; Phil Scraton et al., NO LAST RIGHTS: THE DENIAL OF JUSTICE AND THE PROMULGATION OF MYTH IN THE AFTERMATH OF THE HILLSBOROUGH DISASTER, SUMMARY AND REPORTS 3 (Alden Press, 1995); Joseph Berger, *The Crush at City College; An Inquiry Spreads Blame for Deaths at a New York Gym*, N.Y. TIMES (Jan. 16, 1992), <http://www.nytimes.com/1992/01/16/nyregion/the-crush-at-city-college-an-inquiry-spreads-blame-for-deaths-at-a-new-york-gym.html>.

²⁶ *Crowd Quakes’ Were a Key Factor In LoveParade Disaster*, MIT TECHNOLOGY REVIEW (June 28, 2012), <http://www.technologyreview.com/view/428367/crowd-quakes-were-a-key-factor-in-loveparade-disaster/>.

²⁷ *Alexopoulos v. Metro. Transp. Auth.*, 41 A.D.3d 171, 171 (N.Y. App. Div. 2007).

²⁸ *DiMauro v. Trump Castle Assocs. Ltd. P’ship*, 300 A.D.3d 171, 171 (N.Y. App. Div. 2002).

²⁹ Gil Fried & Robert Metchick, *Camp Randall Memorial Stadium Case Study: University of Wisconsin – October 30, 1993*, 15 J. LEGAL ASPECTS OF SPORT 139, 143 (2005).

³⁰ John J. Fruin, *The Causes and Prevention of Crowd Disasters*, ELSEVIER SCIENCE PUBLISHERS B.B., 1993 (Originally presented at the First International Conference on Engineering for Crowd Safety, London, England, March 1993), <http://www.crowdsafe.com/fruincauses.pdf>.

³¹ *Custini v. Radio City Prod., LLC*, No. 604084/2006, 2009 WL 2459852 at 3-4 (N.Y. Super. Ct., July 27, 2009).

Regardless of how and where they occur, scientists and scholars are in agreement about two things: crowd-related injuries are both (1) vastly unreported and (2) increasing in frequency.³² One scholar estimates that only one out of every ten crowd injuries associated with “doorbuster sales” at popular stores is reported.³³ Another notes that “the vast number of concert injuries . . . go unreported” because of “the inadequate measures used to gather concert-injury information,” even though concerts “have undoubtedly become more dangerous in recent years.”³⁴ Others worriedly point to the uptick in crowd injuries and deaths in the last few decades.³⁵ This increase is not particularly surprising given both a growing population in urban centers and the resulting increase in the size and usage of modern venues and public spaces. For instance, “[a] major sporting or entertainment event can attract 70,000 avid fans [and] [l]arge transportation terminals such as New York Grand Central Terminal and Pennsylvania Station accommodate 200,000 passengers each weekday.”³⁶

The United States has an unusually high number of crowd crush incidents for a country in the developed world.³⁷ One expert notes that the United States is responsible for 37% of the concert-related crowd injuries worldwide alone.³⁸ The United States’ relationship with such incidents, moreover, is a long and storied one. Even a brief search yields cases of crowd injuries in the United States dating back to the 1920s, and crowd disasters such as the 1942 Coconut Grove fire have lingered in public consciousness.³⁹ Despite the frequency of crowd crush injuries and deaths in the United States, however, the common law jurisprudence that has developed around liability for these incidents is remarkably problematic and worth examining for two reasons. First, courts in the United States have consistently made a number of serious analytical errors when purporting to analyze liability in these cases. These errors, in turn, make it overly difficult for plaintiffs to recover. Second, unlike many of its peers in the developed world, the United States has taken virtually no legislative steps to address the growing number of crowd injuries within its borders, and so common law remains the *only* source of law with regard to crowd crush.⁴⁰

In this paper, I examine the current state of common law as it applies to crowd-related injuries and deaths (“crowd crush” injuries). I argue that the

³² See, *infra* notes 33-36.

³³ Dawson, *supra* note 20, at 764.

³⁴ Luke Ellis, *Talking About My Generation: Assumption of Risk and the Rights of Injured Concert Fans in the Twenty-First Century*, 80 TEX. L. REV. 607, 608 (2002).

³⁵ See, e.g., *id.* (“The number of concert-goers seriously injured or killed at concerts in recent years has increased drastically.”); James L. Curtis et al., *Holiday Shopping and Crowd Management Safety Guidelines for Retailers*, LEXOLOGY (Nov. 13, 2012), <http://www.lexology.com/library/detail.aspx?g=75b485d0-6f3e-4dda-8ce4-0214ab918648> (“Holiday shopping is increasingly becoming associated with violence and hazards.”).

³⁶ Fruin, *supra* note 30.

³⁷ See *A Trust Betrayed: Safety Became The Twelfth Victim*, CROWD MANAGEMENT STRATEGIES, <http://www.crowdsafe.com/cafe/who20.html> (last visited Feb. 21, 2015).

³⁸ *Id.*

³⁹ Lawrence M. Friedman & Joseph Thompson, *Total Disaster and Total Justice: Responses to Man-Made Tragedy*, 53 DEPAUL L. REV. 251, 276 (2003).

⁴⁰ See Luke Ellis, *supra* note 34, at 629.

jurisprudence arising out of crowd crush incidents is incredibly troublesome because it (1) is riddled with assumptions and analysis that contravene basic principles of crowd science, (2) makes recovery overly difficult for plaintiffs, and (3) does nothing to either incentivize or require venue owners or events managers to employ even simple crowd management techniques that would drastically reduce the chances of such incidents occurring in the future. In Part I of this paper, I examine the science of crowd dynamics and explain why this science should provide central guiding principles for courts tasked with hearing crowd crush cases. In Part II, I address the common law jurisprudence of crowd crush cases and identify several common errors courts make when analyzing these cases and explain why those errors run afoul of the science discussed in Part I. In Part III, I make a series of recommendations for courts faced with crowd crush litigation. These recommendations are aimed at bringing crowd crush jurisprudence in line with modern science and creating a more even playing field between plaintiffs and defendants in these cases.

I. THE SCIENCE OF CROWD INCIDENTS

While virtually everyone probably has of an intuitive sense of what a crowd is—we know one when we see one, as the saying goes—defining the term from an academic perspective is surprisingly difficult and “has not been completely resolved in the relevant literature.”⁴¹ Broadly speaking, however, a crowd can be defined as a number of individuals “in the same area in physical proximity to one another.”⁴² While a “definite numerical minimum [of individuals] cannot be stipulated,”⁴³ four interacting elements are present in any crowd: time, space, information, and energy:

The time is simply the period during which the crowding occurs; space, the size and configuration of the area occupied; information, the perceptions by those in the crowd, real or imagined, that cause it to take some group action; and energy, the pressures created by massed pedestrians that can result in accidents and death. Analysis of more than a dozen serious crowd incidents has shown that in all cases these elements have played a critical role, and that management strategies based on one or more of these elements could have averted or significantly reduced crowd effects.⁴⁴

All of these elements are important considerations when assessing and preventing crowd crush injuries, as discussed below. From a scientific perspective, however, crowd *density* is the single most important predictor of

⁴¹ Eugene Trivizas, *Crowd Dynamics and the Prevention and Control of Collective Disorders*, 56 *POLICE J.* 142, 143 (1983).

⁴² *Id.*

⁴³ *Id.*

⁴⁴ John J. Fruin, *Crowd Dynamics and Auditorium Management*, *AUDITORIUM NEWS*, May 1984.

crowd-related injuries and deaths and thus the linchpin of crowd-disaster analysis.⁴⁵

A. Crowd Density

Crowd density is a measurement of the number of people per square meter in a given crowd.⁴⁶ It is an extremely good predictor of the likelihood of crowd crush injuries or death occurring in a given crowd.⁴⁷ At a crowd density of two people per square meter, for instance, individuals are completely “decoupled” — they can move about freely without making physical contact with each other — and thus the likelihood of a crowd-related injury is virtually zero.⁴⁸ Crowd densities of three and four people per square meter are similarly low-risk from a crowd-injury perspective.⁴⁹ At five people per square meter, however, the likelihood that an injury will occur begins to increase.⁵⁰ At that density, “there is still ample space between people to allow movement, though it is limited.”⁵¹ One study, moreover, identifies five people per square meter as “[t]he critical density for an accident involving trampling”: there is a high risk of injury from falling and being stepped on in a crowd of this density.⁵²

At crowd densities of roughly seven people per square meter or more, the risk of crowd-related injuries or deaths is extremely high.⁵³ At this density, a “surprising transition”⁵⁴ occurs: the ability of individuals to control their own movement is lost almost completely and “shock waves” begin to ripple back and forth through the crowd.⁵⁵ These waves are “characterized by random displacements of [crowd members] into all possible directions up to twelve meters or more.”⁵⁶ Scientists studying crowd dynamics note that principles of fluid dynamics best describe and predict crowd movements at this density.⁵⁷ One

⁴⁵ See Mehdi Moussid et al., *How Simple Rules Determine Pedestrian Behavior and Crowd Disasters*, 108-17 PNAS 6884, 6885 (2011); Helbing, *supra* note 20, at 968; Ris S. C. Lee & Roger L. Hughes, *Exploring Trampling and Crushing in a Crowd*, 131(8) J. TRANSP. ENG. 575, 578-79 (2005); Fruin, *supra* note 30; Fruin, *supra* note 44.

⁴⁶ G. Keith Still, *Static Crowd Density (General)*, CROWD RISK ANALYSIS AND CROWD SAFETY, www.gkstill.com/Support/crowd-density/CrowdDensity-1.html (last visited Feb. 9, 2015).

⁴⁷ Lee, *supra* note 45, at 579-81.

⁴⁸ Dirk Oberhagemann, *Static and Dynamic Crowd Densities at Major Public Events*, VFPD TECHNICAL REPORT (Mar. 2012), www.vfdb.de/download/TB_13_01_Crowd_densities.pdf.

⁴⁹ Lee, *supra* note 45, at 576.

⁵⁰ See *id.* at 581.

⁵¹ Oberhagemann, *supra* note 48.

⁵² Lee, *supra* note 45, at 581.

⁵³ See Fruin, *supra* note 30. There is some variability with regard to the density at which a crowd becomes likely to experience a crowd crush. Variations in the average size of the crowd members themselves and the extent to which crowd members are dressed in bulky clothing may shift this number up or down. See Lee, *supra* note 45, at 579.

⁵⁴ Helbing, *supra* note 20, at 968.

⁵⁵ Fruin, *supra* note 30, at 4; see also Helbing, *supra* note 20, at 967.

⁵⁶ Helbing, *supra* note 20, at 968.

⁵⁷ Soo Chin Pin et al., *Applying TRIZ Principles in Crowd Management*, 49-2 SAFETY SCIENCE 286, 287 (2011).

notes that “[p]eople caught in a crowd crush behave as a liquid. No individual can control his or her movement or assist others close by.”⁵⁸ Another states:

At occupancies of about 7 persons per square meter the crowd becomes almost a fluid mass. Shock waves can be propagated through the mass sufficient to lift people off of their feet . . . People may be literally lifted out of their shoes, and have clothing torn off. Intense crowd pressures, exacerbated by anxiety, make it difficult to breathe. The heat and thermal insulation of surrounding bodies cause some to be weakened and faint. Access to those who fall is impossible. Removal of those in distress can only be accomplished by lifting them up and passing them overhead to the exterior of the crowd.⁵⁹

The forces produced by crowds at this density are deadly and “almost impossible to stop.”⁶⁰ Indeed, “[e]vidence of bent steel railings after several fatal crowd incidents” shows that dense crowds can exert forces of more than 1,000 pounds at a time.⁶¹ Accordingly, the largest risk to crowd members in these situations is a medical phenomenon known as “compressive asphyxiation”: being suffocated to death while on one’s feet by the forces exerted by the surrounding crowd.⁶²

This horrifying phenomenon is precisely what occurred on December 3, 1979, when eleven people were asphyxiated in a crowd crush at a Cincinnati, Ohio rock concert by The Who.⁶³ Arena managers opened only two doors into the venue and 8,000 people remained outside waiting to enter when a warm-up band started playing on the main stage.⁶⁴ Thinking the concert had begun, the fans outside begin to push towards the two entrances, increasing the crowd’s density to dangerous levels and creating the type of shock waves discussed above.⁶⁵ One scholar who has extensively studied the incident reports:

The crowd was tightly packed within the space outside the arena doors . . . with the greatest crush near the doors to the right (south) of the lobby . . . The crowd density became so great that one person reported that he could not raise his arm to scratch his head . . . and another said he could not reach to his pocket for his wallet . . . Others referred to being lifted from the pavement and carried along by the crowd's movement, unable to get their feet back on the concrete surface.⁶⁶

⁵⁸ Adelman, *supra* note 21, at 19.

⁵⁹ Fruin, *supra* note 30, at 4.

⁶⁰ Fruin, *supra* note 44.

⁶¹ Fruin, *supra* note 30.

⁶² Lee, *supra* note 45, at 581.

⁶³ Fruin, *supra* note 30, at 3.

⁶⁴ *Id.*

⁶⁵ *See id.*

⁶⁶ Norris R. Johnson, *Panic at “The Who Concert Stampede”: An Empirical Assessment*, 34-4 SOCIAL PROBLEMS 362, 365 (1987).

A concertgoer remembers:

A wave swept me to the left and when I regained my stance I felt that I was standing on someone. The helplessness and frustration of this moment sent a wave of panic through me. I screamed with all my strength that I was standing on someone. I couldn't move. I could only scream. Another wave came and pushed me further left towards the door. I felt my leg being pulled to the right. The crowd shifted again and I reached down and grabbed an arm at my leg. I struggled for a while and finally pulled up a young girl who also had a young boy clinging to her limbs. They were barely conscious and their faces were filled with tears.⁶⁷

Similar phenomena have been reported in virtually every other major crowd crush incident on record.⁶⁸

Crowd density is thus not only an excellent predictor of crowd-related injuries and deaths, awareness of it is a central component of keeping crowds safe: keeping crowd densities below critical levels drastically reduces the chances that injury or deaths will occur.⁶⁹ Managing crowd density, in turn, requires careful attention to another key component of crowd science analysis: assessment of the physical space through which a crowd must move.⁷⁰

B. Physical Space

A large number of people alone is insufficient to create a dangerous crowd density. A gathering of over 50,000 people could stay at a very low crowd density if spread out over two square miles of open space, as, for instance, at the popular Burning Man festival that occurs each year in the Nevada desert. Instead, it is “[t]he configuration, capacity, and traffic processing capabilities of assembly facilities” rather than the sheer number of attendees that determines crowd density and thus the degree of crowding.⁷¹ Two types of physical space configurations, in particular, drastically increase the risk of a crowd crush occurring: bottlenecks and festival seating.

⁶⁷ *About the Who Concert Tragedy Task Force Report*, CROWD MANAGEMENT STRATEGIES, <http://www.crowdsafe.com/taskrpt/> (last visited Feb. 20, 2015).

⁶⁸ See, e.g., Fried, *supra* note 29, at 140 (2005) (Camp Randall Memorial Stadium crowd crush); MILTON MOLLEN, A FAILURE OF RESPONSIBILITY”: REPORT TO MAYOR DAVID N. DINKINS ON THE DECEMBER 28, 1991 TRAGEDY AT CITY COLLEGE OF NEW YORK 11 (Jan. 1992) (City College crowd crush); Lord Justice Taylor, *Hillsborough Stadium Disaster Inquiry – Interim Report*, SOUTH YORKSHIRE POLICE (April 15, 1989), <http://www.southyorks.police.uk/sites/default/files/Taylor%20Interim%20Report.pdf> (Hillsborough crowd crush).

⁶⁹ See Lee, *supra* note 45, at 581.

⁷⁰ See Kathryn M. Zeitz et al., *Crowd Behavior at Mass Gatherings: A Literature Review*, 24-1 PREHOSPITAL AND DISASTER MEDICINE 32, 37 (2009).

⁷¹ Fruin, *supra* note 30, at 5.

1. Bottlenecks

Venues, spaces, and corridors that allow individuals to distribute themselves “uniformly over the domain” reduce the likelihood that crowds will reach a high-risk density and thus minimize the risk of injury.⁷² Conversely, spaces and architectural features that “rigidly confine people within an inadequate space” or force crowds to move through “bottlenecks” drastically increase the likelihood that a crowd will reach a critical density and trigger a crowd crush.⁷³ In bottleneck situations, though a portion of the crowd is slowed and compressed at a precarious location, the crowd behind it “continues to press ahead because it has no knowledge of what conditions are at the bottleneck.”⁷⁴ This ongoing forward movement of the back portion of the crowd can, in turn, result in a dangerous amount of pressure being exerted on the portion of the crowd already tightly packed at the bottleneck.

Problematic physical spaces that may result in bottleneck phenomena include narrow hallways and stairwells, insufficient numbers of entrances and exits, the use of escalators (which force crowds to funnel themselves into the narrow entryways onto escalator steps), and corridors that require crowds to make tight turns.⁷⁵ They may also include smaller and more temporary features of a facility: barricades, holiday decorations, trashcans, concession tables, artistic sculptures, or even random pieces of trash or debris that a crowd must move around. As one crowd expert notes, even “[m]inor design deficiencies that present no apparent problems under normal traffic conditions can be accentuated in crowds, potentially triggering more dangerous, ‘domino effect’ accidents.”⁷⁶

A series of bottlenecks was a significant cause of the December 28, 1991 crowd crush at the City College of New York during which eight people died and scores more were injured (a ninth victim died several days later as a result of injuries sustained during the incident).⁷⁷ Over 5,000 people showed up for a celebrity basketball game that day and began to enter a City College gymnasium.⁷⁸ Unfortunately, in so doing, the crowd had to work its way through at least four bottlenecks. First, even though the gymnasium had several main entrances, all except one—the 138th Street entrance—remained closed, forcing the entire crowd to enter through one set of doors.⁷⁹ Second, once inside the

⁷² See Ris S.C. Lee & Roger L. Hughes, *Minimisation of the Risk of Trampling in a Crowd*, 74 MATHEMATICS AND COMPUTERS IN SIMULATION 29, 37 (2007).

⁷³ Moussid, *supra* note 45, at 6885; Fruin, *supra* note 44.

⁷⁴ Fruin, *supra* note 44.

⁷⁵ *Id.*; see also *Haley v. May Dept. Stores Co.*, 287 S.W.2d 366, 367 (Mo. Ct. App. 1956) (discussing a crowd crush that occurred in and around an escalator).

⁷⁶ Fruin, *supra* note 44.

⁷⁷ Fruin, *supra* note 30, at 2.

⁷⁸ Berger, *supra* note 26.

⁷⁹ MOLLEN, *supra* note 68, at 25. After the situation in and around the 138th Street entrance became desperate, officials opened one addition entrance — the 136th Street entrance — but that, too, became quickly overwhelmed by the large number of people attempting to enter the facility. *Id.* at 29-30.

main doors, the crowd had to enter a small interior vestibule and negotiate a second set of doors in order to enter into the larger main lobby of the gymnasium.⁸⁰ Third, once through the lobby, the crowd had to descend a 12 x 7 foot stairwell into the gym, forcing the crowd to funnel itself through yet another narrow corridor.⁸¹ Fourth, while four metal fire doors were positioned at the bottom of the stairwell (all of which could be opened only *into* the stairwell rather than into the gymnasium), only a single door at the far left-hand side of the bottom of the stairwell had been opened, forcing the crowd to compress itself even further.⁸²

This last bottleneck proved to be the deadliest. As the crowd surged into the stairwell, individuals at the bottom of the stairs were pushed up against the three closed doors of the gymnasium.⁸³ Those at the front perished as “the crowd continued to push forward and force themselves into [the] already crowded stairwell.”⁸⁴ The chief medical examiner concluded that the cause of death for each of the victims was compressive asphyxiation.⁸⁵ This incident sadly confirms the findings of crowd scientists that “[g]enerally, the highest pressures are felt by those pedestrians near any barrier that is checking the advance of the crowd. These people may be crushed to death against barriers or between one another. With the air squeezed from their lungs, they suffocate.”⁸⁶

Once a crowd negotiates a physical space in order to reach its destination, there may still be high risks of crowd crush even if there are no longer any bottlenecks to be traversed. Situations involving “festival” seating, in particular, pose such a heightened risk of crowd injuries and deaths.

2. Unassigned (“Festival”) Seating

Venues that host music concerts and other large performance events often utilize one of two forms of unassigned seating (although both forms are often collectively referred to as “festival seating” arrangements): (1) festival “seating” in which the entire event is standing room only and there are either no or only a limited number of reserved seats for attendees, and (2) general admission seating, in which there are seats available for crowd members but most or all of them are unreserved.⁸⁷ In both of these arrangements, valuable space within a given venue is “up for grabs.”⁸⁸ When the doors to the event are opened, the waiting crowd must rush to get the best positions inside, usually those up front

⁸⁰ *Id.* at 23-24.

⁸¹ *Id.*

⁸² *Id.* at 24, 26. One report suggested that this lone open door actually became shut at some point during the crowd crush. Berger, *supra* note 26.

⁸³ Fruin, *supra* note 30.

⁸⁴ Berger, *supra* note 25.

⁸⁵ MOLLEN, *supra* note 68, at 42.

⁸⁶ Lee, *supra* note 45, at 580; *see also* Moussid, *supra* note 45, at 6885 (“A further analysis of the phenomenon reveals areas of serious body compression occurring close to the bottleneck”).

⁸⁷ *Who Concert Tragedy*, *supra* note 67.

⁸⁸ Adelman, *supra* note 21, at 18.

closest to the entertainment.⁸⁹ Many entertainers strongly prefer such arrangements. U2, for instance, “will not sign a contract with any venue unless it permits festival seating,” and Bruce Springsteen has noted that he likes the “energy” and “vibe” of such shows, where fans are packed in close to the stage where he is performing.⁹⁰

Despite its appeal to industry performers, however, festival seating arrangements pose a very high risk of crowd-related injuries.⁹¹ The National Fire Protection Administration has stated that festival seating at live entertainment events should be “expected to result in overcrowding and high audience density that may compromise public safety,”⁹² and a number of crowd science experts have named festival seating as the “the principal culprit in most crowd crush cases.”⁹³ Indeed, “[o]ne estimate suggests that ninety percent of all concert injuries occur at festival-seating and general-admission concerts.”⁹⁴ The high likelihood of injuries in these scenarios arises from two factors.

First, in festival seating situations, crowd members must “compe[te] for favorable seats or standing positions close to entertainers,” creating a “rush to obtain some highly valued objective.”⁹⁵ This sense of competition may induce large crowds to gather hours before an event is scheduled to begin in hopes of securing a spot at the front of the line (thus seemingly increasing the chances that a preferred spot within the venue will be attained when the doors finally open).⁹⁶ These gatherings, in turn, can create high density crowds both *outside* the venue and in entryways and corridors when venue doors are opened and the crowd pushes through the entrance(s) in a rush to get the best positions.⁹⁷ The Who concert disaster discussed above involved exactly this scenario:

For more than 14,000 fans—out of approximately 18,500—the only viewing options inside [the venue] were festival seating . . . or general admission. That is why thousands of loyal Who fans came to the concert hours early to stand in the chilled wintry evening. They knew that the best concert viewing positions would be up for grabs once the doors opened. Anticipation ran high as the friendly crowd amassed.⁹⁸

⁸⁹ *Id.*; Fruin, *supra* note 30, at 4.

⁹⁰ Adelman, *supra* note 21, at 19-20.

⁹¹ See Helbing, *supra* note 20, at 967; Je’Anna Lanza Abbott & Morgan W. Geddie, *Event and Venue Management: Minimizing Liability Through Effective Crowd Management Techniques*, 6 *EVENT MANAGEMENT* 259, 260 (2000).

⁹² NATIONAL FIRE PROTECTION ADMINISTRATION, *LIFE SAFETY CODE HANDBOOK* 2003 at 3.3.188.1 (Ron P.E. Cote & Gregor E. Harrington eds., 9th ed. 2003).

⁹³ Adelman, *supra* note 21, at 18.

⁹⁴ Ellis, *supra* note 34, at 611.

⁹⁵ Fruin, *supra* note 30, at 8.

⁹⁶ See *Who Concert Tragedy*, *supra* note 67.

⁹⁷ See *id.*; Adelman, *supra* note 21, at 18.

⁹⁸ *Who Concert Tragedy*, *supra* note 67.

Once the doors opened, “the waiting crowd rushed the entrance to get the best positions inside.”⁹⁹ The result, as described above, was pandemonium and a deadly crowd crush.¹⁰⁰

More recently, two concertgoers allege that a similar incident occurred at an April 2014 Beyoncé concert in Chicago, Illinois.¹⁰¹ General admission ticket holders assembled outside the arena hours before the concert was slated to begin, and “[a]s the hours passed, the group became larger, more dense and more anxious about how, when and where the gate(s) would be released”¹⁰² When the gates were finally opened, the crowd allegedly rushed into the arena and trampled the plaintiffs, leaving them with broken bones and other injuries.¹⁰³ The resulting lawsuit is still pending.¹⁰⁴

Second, once inside the venue and in place (at least theoretically), crowd crushes can occur when crowd members push forward towards the stage (or other location of the entertainment) once a performance begins.¹⁰⁵ The density towards the front of the crowd can reach dangerous levels quickly, and crowd members at the very front may be pinned against the stage itself. A crowd crush incident arising out of a 2002 Eminem performance at RFK Stadium in Washington, DC, provides an unfortunate yet clear demonstration of this phenomenon in action. The Baltimore Sun reports:

Rap star Eminem was on the stage at about 7:40 p.m. when fans started pushing toward him. He stopped playing at least once and cautioned fans to calm down and stop pushing, witnesses said. But the surging crowd continued to push, crushing some against the stage “There was nowhere we could go; everybody was pushing down, trying to get out,” said Justin Kronmeyer, 17, of Hanover, Pa. “People were screaming. There were girls getting trampled. People came from every direction.”¹⁰⁶

Thirty people were injured, including one young crowd member who went into cardiac arrest.¹⁰⁷

⁹⁹ *Id.*

¹⁰⁰ Adelman, *supra* note 2, at 18.

¹⁰¹ Eliana Dockterman, *Beyoncé Sued By Fans ‘Trampled’ At Concert*, TIME, Apr. 2, 2014, <http://time.com/46879/fans-sue-beyonce-after-being-trampled-before-concert/>.

¹⁰² Complaint at 3, *Castellanos v. United Ctr. Joint Venture*, 2014-L-003667 (Ill. Cir. Ct., Cook County, April 1, 2014).

¹⁰³ *Id.* at 5.

¹⁰⁴ *See* Docket, *Castellanos v. United Ctr. Joint Venture*, 2014-L-003667 (Ill. Cir. Ct., Cook County, April 1, 2014).

¹⁰⁵ ROBERT LIND, ET AL., ENTERTAINMENT LAW 3D: LEGAL CONCEPTS AND BUSINESS PRACTICES § 10:36 (West 2012) (“More often than not, the fans choose to get as close to the performers on stage as possible. This can result in the crowd attempting to get closer to the stage, crushing the fans towards the front of the crowd.”).

¹⁰⁶ Tanika White, *30 Hurt in Concert Crush at Washington Stadium*, BALTIMORE SUN, May 26, 2002, http://articles.baltimoresun.com/2002-05-26/news/0205260206_1_eminem-fans-crush.

¹⁰⁷ *Id.*

C. Crowd Psychology

Despite what the incidents described above may suggest to people not well versed in crowd science, studies have consistently shown that crowd behavior is rarely irrational or “crazed.”¹⁰⁸ Instead, scientists have found the opposite: “that an unorchestrated crowd behaves rationally”¹⁰⁹ Scientists assert that this rationality is present in crowds because, in most situations, “members of the crowds have clear knowledge of what and where their goals lie”: entering a stadium, moving closer to the entertainment, returning to the parking lot, etc.¹¹⁰

Furthermore, there is very little evidence suggesting that crowds are prone to panic or unreasonable behavior. Not only are documented cases of true crowd panic “surprisingly scarce in the literature,”¹¹¹ closer investigation of such incidents usually reveals both (a) that the crowd responded rationally to a real or perceived threat,¹¹² and (b) that “unregulated [competition], which is crucial to most explanations of panic, did not occur,” but rather “cooperative behavior continued throughout the course of the event.”¹¹³ Indeed, even in situations in which crowds have reacted dramatically to a real or perceived threat, subsequent investigations have almost always shown that “flight was a reasonable group reaction under the perceived circumstances” and that “mutual cooperation and assistance” rather than “destructive behavior” was the norm among individuals within the group.¹¹⁴

However, crowds are often unfairly deemed irrational or “out of control,” because of a characteristic that is inherent in almost every crowd, particularly those of high densities: the lack of communication between the front of the crowd and the back.¹¹⁵ “People in a crowd do not have a broad view of what is happening around them,” notes one crowd expert.¹¹⁶ Instead, “[p]sychologists have likened a crowd to a series of intermeshing behavioral cells. Each cell is comprised of a small group of surrounding people, with limited communication between them.”¹¹⁷ As a result, when crowds reach high-risk densities, people at the back of the crowd may continue to press forward even though individuals at the front of the crowd are in severe distress.¹¹⁸ Indeed, unless the venue has some way of both overseeing and addressing the entire crowd, members at the back of the crowd have virtually no way of knowing that a crisis is occurring up front.¹¹⁹ Moreover, in many situations, “[t]he collapsing of the front ranks” of the crowd gives the false perception of forward movement so that individuals at

¹⁰⁸ See Lee, *supra* note 45, at 575.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ Johnson, *supra* note 66, at 371.

¹¹² Fruin, *supra* note 30, at 4.

¹¹³ Johnson, *supra* note 66, at 370.

¹¹⁴ Fruin, *supra* note 30, at 4.

¹¹⁵ See *id.*

¹¹⁶ Fruin, *supra* note 44.

¹¹⁷ Fruin, *supra* note 30, at 4.

¹¹⁸ *Id.*

¹¹⁹ *Id.*

the back of the crowd may reasonably believe that all is well and that the crowd is continuing to move forward smoothly.¹²⁰ Thus, contrary to frequent allegations that crowd members behaved badly during crowd crushes, the overwhelming bulk of available evidence suggests that crowd members behaved rationally under the circumstances in virtually every crowd crush incident on record.

This rational behavior on the part of crowds is scientifically significant because it means that crowds are highly predictable—even in emergency situations—and that “the motion of a crowd can therefore be modeled using engineering principles.”¹²¹ This predictability is also highly significant to the legal notions of breach and causation (and thus liability overall), as discussed below.

II. CROWD CRUSH IN THE COURTS

Despite the frequency with which crowd crush injuries occur, the jurisprudence surrounding liability for these injuries is remarkably sparse and inconsistent.¹²² Even though crowd crush cases date back to the early 1930s, courts have largely failed to establish a body of legal standards or even guidelines to assist in assessing liability in these cases.¹²³ Instead, courts have taken a mostly *ad hoc* approach to crowd crush cases,¹²⁴ using a combination of conventional wisdom about crowds and general principles of tort law to rule on liability. Courts have also almost entirely ignored the body of science that has emerged in recent decades to predict and explain crowd dynamics and management.¹²⁵

¹²⁰ *Id.*

¹²¹ Lee, *supra* note 45, at 575.

¹²² See, e.g., Dawson, *supra* note 20, at 808-09 (“The inconsistencies between the individual negligence cases – with sufficient cohesiveness among the plaintiffs and injuries derived out of the same type of event or course of conduct by the retailers – all resulted in different outcomes under the negligence regime.”); Ellis, *supra* note 34, at 609; 8-42 FRUMER & FRIEDMAN, PERSONAL INJURY ACTIONS, DEFENSES, AND DAMAGES 42.01 (Matthew Bender, Rev. Ed.) (“Courts in Illinois and New York have reached the same result on similar facts. This view is not unanimous, however, as the courts of other states have denied liability on analogous facts.”).

¹²³ See Ellis, *supra* note 34, at 609 (“Unfortunately, the relevant case law and literature do not provide much guidance in suggesting a legal paradigm to handle modern concert injuries . . . making this a relatively unexplored area of the law.”). The one exception is New York, where courts have established a fairly vague standard for assessing liability in crowd crush cases: plaintiffs in these cases must establish that they were “unable to find a place of safety or that [their] free movement was restricted due to the alleged overcrowding conditions.” *Palmieri v. Ringling Bros. Barnum & Bailey Combined Shows*, 237 A.D.2d 589, 589 (N.Y. App. Div., 1997) *citing* *Benanti v. Port Authority of N.Y. and N.J.*, 176 A.D. 2d 549, 547 (N.Y. App. Div. 1991).

¹²⁴ FRUMER, *supra* note 122 (“Cases of injury caused by a panicking crowd demonstrate how often crowd control matters are decided on their facts.”).

¹²⁵ See Fruin, *supra* note 44 (“Frequently, [crowd crush] accidents result in liability claims based on allegations of negligence in facility design or management. Most of these accidents are found to be caused by personal carelessness, but a few reveal lack of understanding of the dynamics of crowds.”).

The law's "underdevelopment" in crowd crush cases, though problematic for the reasons discussed herein, is not particularly surprising for several reasons.¹²⁶ First, as discussed above, crowd crush injuries are severely underreported.¹²⁷ Additionally, only a small percentage of the crowd injuries that are, in fact, reported result in litigation, and the vast majority of the few cases that *are* brought settle, leaving only a small handful of opportunities for courts to develop the common law jurisprudence in this area.¹²⁸ Second, there are virtually no statutory laws to guide courts in these cases; only one state has passed *any* law pertaining to crowd management and safety.¹²⁹ These two factors make crowd crush litigation unpredictable and arguably unappealing to potential plaintiffs who, at least in the case of concert-related crowd crush injuries, are usually faced with defendants who are "media behemoths that can spend lavishly to defend their policies."¹³⁰ These obstacles, in turn, perpetuate the weakness and inconsistency of the jurisprudence in this area: potential plaintiffs are often deterred from filing suit, those that do file suit feel pressured to settle because of the unpredictability of litigation in this area, and so courts "miss the opportunity to establish guiding precedent."¹³¹

As a result of this situation, the common law jurisprudence surrounding crowd crush is a veritable mixed bag of standards and rulings.¹³² Cases dating back to the 1940s, if not earlier, are often the only published decisions relating to crowd-related injuries in many jurisdictions, and thus many decisions that we would now find problematic from a scientific perspective are still binding precedent.¹³³ Moreover, courts are currently split on, among other critical legal issues, whether crowd crushes are foreseeable,¹³⁴ whether the acts of individual crowd members are intervening, superseding causes of plaintiffs' injuries,¹³⁵ and

¹²⁶ Ellis, *supra* note 34, at 609.

¹²⁷ Dawson, *supra* note 20, at 764; Ellis, *supra* note 34, at 608.

¹²⁸ Ellis, *supra* note 34, at 609.

¹²⁹ *See id.* at 629.

¹³⁰ Adelman, *supra* note 21, at 18.

¹³¹ Ellis, *supra* note 34, at 609.

¹³² *See* Dawson, *supra* note 20, at 808-09; Ellis, *supra* note 34, at 609.

¹³³ *See* Phoenix Amusement Co. v. White, 306 Ky. 361 (1948); Sims v. Strand Theatre, 150 Pa. Super. 627 (1942); Klish v. Alaskan Amusement Co., 153 Kan. 93 (1941); Pridgen v. S.H. Kress & Co., 213 N.C. 541 (1938); Bell v. Feibleman & Co., Inc., 164 So. 273 (La. Ct. App. 1935); Myers v. Kan. City Junior Orpheum Co., 228 Mo. App. 840 (1934); Greeley v. Miller's Inc., 111 Conn. 584 (1930).

¹³⁴ *Compare* Haley, 287 S.W.2d at 368 ("But even if the crowd did become unruly after plaintiff boarded the escalator, defendant cannot be held to have been negligent in failing to anticipate such conduct."), *with* Rotz v. City of N.Y., 143 A.D.2d 301, 304 (N.Y. App. Div. 1988) ("Our point of departure with the IAS Court is its summary determination that the danger here was not foreseeable . . .").

¹³⁵ *Compare* Rotz, 143 A.D.2d at 301-02 (N.Y. App. Div. 1988) (lower court finding that acts of individual crowd members were intervening, superseding causes of plaintiff's crowd crush injuries), *with* Myers, 73 S.W. 2d at 321 ("The plaintiff's testimony, in its entirety, is not open to the construction that she was pushed over the rope, not by the pressure of the crowd, but merely by one or two persons who began pushing in an effort to get next to the door into the theater or auditorium proper. But even if the pressure against plaintiff was by the pushing of two or more, yet if that was the result of the pressure of the congested crowd in the roped-off space, it would

whether individuals assume the risk of injury when they enter a crowd.¹³⁶ Crowd science arguably provides extremely clear and straightforward answers to these questions in most cases and yet, as noted above, this body of science has been almost entirely overlooked by courts in the United States.

In this section, after providing a brief overview of the underlying torts issues in crowd crush cases, I highlight several of the issues on which courts are currently split, identify a number of scientific errors that courts have consistently made in crowd crush cases, and demonstrate how crowd science can provide definitive answers to some of the issues with which courts struggle.

A. An Overview of Negligence Claims

Crowd crush cases are “grounded in basic tort law”¹³⁷ and are virtually always centered on negligence claims.¹³⁸ Defendants may include the owner and operator of the venue in which the crowd crush injury occurred, the promoter or producer of any event occurring on the premises at the time, the security company on duty during the incident, and/or the performer on stage if the injury occurred during a concert or festival.¹³⁹ Plaintiffs, in turn, must prove that “they are in the class of people to whom any defendant has a duty of care; that the defendant breached its duty; that there is a causal link unbroken by a third party in the crowd; and that [crowd members] were harmed as a result.”¹⁴⁰

An examination of each of these elements reveals both important trends in crowd crush litigation and analytical mistakes that courts in these cases have made repeatedly.

B. Duty

Duty is usually fairly easy for plaintiffs to establish in crowd crush cases. Under “traditional premises liability law,” those who enter venues as paying customers or audience members (*e.g.* concertgoers, sports spectators, etc.) are considered invitees to whom a duty of a reasonable care is owed:

not exculpate defendant, since those coming directly in contact with plaintiff under those circumstances could be regarded as merely an intervening, though not an independent, cause.”).

¹³⁶ Compare *Klish*, 109 P.2d at 76 (“Crowds are common at theaters and other places of amusement. That there may be some jostling in such crowds is inevitable. That someone may fall and sustain injury, or cause injury to others, always is a possibility. These conditions are so common that those who attend such places are presumed to know of them.”), with *Rossman v. K Mart Corp.*, 701 F. Supp. 1127, 1132 (M.D. Pa. 1988) *aff’d*, 866 F.2d 1413 (3d Cir. 1988) (“While Mrs. Rossman became part of a crowd that ultimately became testy and unruly, there is no evidence that she subjectively knew that K Mart Corporation would fail to take proper precautions to control the crowd, or to provide a reasonably safe method for distribution of the dolls. Nor could Mrs. Rossman have anticipated that K Mart employees would take actions that would cause the unruly crowd to stampede.”).

¹³⁷ Adelman, *supra* note 21, at 19.

¹³⁸ FRUMER, *supra* note 122.

¹³⁹ Adelman, *supra* note 21, at 18, 20.

¹⁴⁰ *Id.* at 19.

The venue owner and operator have a duty to provide reasonably safe means of ingress and egress, a duty to use ordinary care to keep the premises safe, a duty to discover and correct or warn of any dangerous conditions and a duty to protect attendees from negligent activities.¹⁴¹

For these reasons, venues bear dual burdens for crowd safety: they are liable for (1) “any injuries caused by a hazard the venue itself creates and [2] for negligently failing to remove a hazard created by others, once [they have] either express or implied notice of the hazard.”¹⁴²

Because plaintiffs in crowd crush cases were almost always clearly invitees of the defendant(s) during crowd crush incidents, duty has virtually never been a significant source of contention in crowd crush litigation. The few cases in which duty *has* been an issue are those in which plaintiffs have sued performers or promoters rather than (or not merely in addition to) the owners and operators of the venue. In *Pooser v. Cox Radio, Inc.*, for instance, the plaintiff sued a radio station after sustaining a head injury in a standing-room-only section of a concert.¹⁴³ The radio station had merely promoted the concert and lacked control over the amphitheater, the seating arrangements, or the amphitheater’s security.¹⁴⁴ The lower court granted the radio station’s motion for summary judgment, holding that the radio station did not owe the plaintiff a duty.¹⁴⁵

However, in *Cunningham v. D.C. Sports & Entm’t Comm’n*, the case arising out of the Eminem concert injury discussed above, the plaintiff sued, among other defendants, the performer, Marshall Mathers (a.k.a. Eminem) and his touring company.¹⁴⁶ Mathers and company responded with a motion for summary judgment arguing (1) that they did not owe a duty to the defendant because Mathers “did nothing more than take the stage to perform” and (2) that Mathers’ touring company “was not involved with crowd control or management.”¹⁴⁷ The court disagreed.¹⁴⁸ The plaintiff “offered evidence that the Mathers defendants failed to stop the performance until more than five minutes after the [crowd crush] incident in question was apparent.”¹⁴⁹ This failure, in the court’s view, created an “unreasonable risk of harm” that was “sufficient to establish a duty between a performer or touring company and a concertgoer.”¹⁵⁰

¹⁴¹ LIND, *supra* note 105; *see also* RESTATEMENT (SECOND) OF TORTS § 344 (1965).

¹⁴² Adelman, *supra* note 21, at 20.

¹⁴³ *Pooser v. Cox Radio, Inc.*, No. 04-08-00270-CV, 2009 WL 200449, at *1 (Tex. App. Jan. 28, 2009).

¹⁴⁴ *See id.* at 2-3.

¹⁴⁵ *Id.* at 1.

¹⁴⁶ *Cunningham v. D.C. Sports & Entm’t Comm’n*, No. CIV. A. 03-839RWRJMF, 2005 WL 3276306, at *1-2 (D.D.C. Nov. 30, 2005).

¹⁴⁷ *Id.* at 6.

¹⁴⁸ *Id.* at 7.

¹⁴⁹ *Id.* at 6.

¹⁵⁰ *Id.*

It bears repeating, however, that both *Pooser* and *Cunningham* are unique within reported crowd crush cases for containing such extensive discussions of duty. As discussed, when the primary defendant in a crowd crush case is, as it usually is, the owner or operator of the facility or venue in which the injury occurred, duty is virtually never an issue. When, as in *Pooser* or *Cunningham*, the defendant is another type of entity, the duty issue may be thornier although certainly not a fatal blow to a plaintiff's case. Indeed, as one scholar notes, “[t]here is no categorical bar against imposing a duty on a singer to a concertgoer,” and if the *Cunningham* decision is of any indication, the modern trend may be towards finding a duty fairly readily in cases where a performer is aware of a burgeoning crowd crush incident but does not intervene.¹⁵¹

C. Breach

Once duty has been established, plaintiffs must prove by a preponderance of the evidence that the defendant(s) breached their duty of care. In a premises liability scenario where the plaintiff is an invitee of the defendant(s) (as in most crowd crush cases), proving breach entails demonstrating that the defendant(s) failed to exercise reasonable care in eliminating both known hazards *and* hazards that were unknown but could have been discovered through reasonable inquiry.¹⁵² In crowd crush cases, plaintiffs may attempt to satisfy this element of their claim by proving that defendant(s) failed to “guard customers, patrons, and others from injury by either a crowd or one of its members through the use of ushers, guards, or other attendants, or by means of physical devices such as barricades, ropes, or railings”¹⁵³ They may also attempt to show that the defendants breached their duty of care by failing to keep multiple entrances and exits open, eliminate bottlenecks, use reserved rather than festival or general admission seating arrangements, or employ one or more of the other forms of crowd control discussed below.

While crowd science arguably demonstrates quite clearly what reasonable care entails in crowd management situations, courts analyzing crowd crush cases have made a number of analytical errors in assessing breach in crowd crush cases.¹⁵⁴ Two errors, in particular, are worth highlighting.

1. Misplaced Reliance on Capacity Numbers

Courts (and investigators after crowd crush disasters) often err in conducting breach analyses in crowd crush cases by relying on maximum capacity numbers in determining whether defendants breached their duty of care by allowing a venue to become unreasonably overcrowded.¹⁵⁵ For example, in

¹⁵¹ Adelman, *supra* note 21, at 20.

¹⁵² *Id.*

¹⁵³ FRUMER, *supra* note 122.

¹⁵⁴ See *infra* notes 155-96.

¹⁵⁵ See, e.g., *Lazarus v. Skouras Theatres Corp.*, 11 A.D.2d 680, 680 (N.Y. App. Div. 1960); *Schwartz v. Madison Square Garden Corp.*, 283 A.D. 385, 387, (N.Y. App. Div. 1954); *Prettyman v. Trenton Transp. Co.*, 73 Pa. Super. 353, 356 (1920).

Lazarus v. Skouras Theatres Corp., the plaintiff was injured when she collided with another patron in the inner lobby of a movie theater.¹⁵⁶ The court unanimously reversed a judgment for the plaintiff in a one-paragraph decision, noting that “the highest estimate given during the trial, one that was patently excessive, was that the theatre was filled to half its capacity.”¹⁵⁷ The court found that the fact that the theater had not been filled to its official capacity meant that the lobby could not have been “dangerously crowded” and thus that the defendant had not been negligent.¹⁵⁸ Similarly, in *Schwartz v. Madison Square Garden Corp.*, the court found that there was no evidence of breach in a crowd crush case because the records of the defendant showed that the balcony of Madison Square Garden, where the injury had occurred, “had a maximum capacity of 5,867 persons,” and on the day that the plaintiff was injured “had 761 under the maximum.”¹⁵⁹

At first glance, there is an appealing logic to these decisions. If the maximum capacity for a concert hall is 500 people, it seems to follow that, if the hall only contains 300 people, a crowd crush is unlikely to occur. Further, it also seems logical that the owners or managers of the concert hall would be reasonable (and thus not negligent) in allowing anything up to 500 people enter their venue. This is the rationale that courts seem to be relying on in these decisions.¹⁶⁰

This logic is fundamentally flawed, however, because it relies on a faulty assumption: that individuals within a venue evenly distribute themselves throughout the space such that a crowd below the capacity of a venue could not reach a high-risk density. This assumption is flawed for two reasons. First, as discussed above, individuals rarely distribute themselves evenly throughout a given space.¹⁶¹ Instead, crowds tend to push forward and assemble tightly towards locations of value within a venue, like the main stage, restrooms, or concession stands.¹⁶² Thus, high-risk crowd densities can—and often do—develop within a smaller area of a given venue even though the venue, as a whole, is under its maximum capacity at the time.¹⁶³ There appears to be only one crowd crush case on record in the United States where a court has understood this principle and applied it correctly.¹⁶⁴

¹⁵⁶ *Lazarus*, 11 A.D.2d at 680.

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Schwartz*, 283 A.D. at 387, *rev'd sub nom.* *Schwartz v. Madison Square Garden Corp.*, 123 N.E.2d 573 (1954). Notably, this decision was reversed and remanded, the appellate court finding that there were enough facts presented to permit a finding of liability by a jury.

¹⁶⁰ *See Lazarus*, 11 A.D.2d at 680; *Schwartz*, 283 A.D. at 387; *Prettyman*, 73 Pa. Super. at 356; *MOLLEN*, *supra* note 68, at 23-24.

¹⁶¹ *See supra* notes 105-07.

¹⁶² *See Custini v. Radio City Productions, LLC*, 2009 WL 2459852 at 3-4; *LIND*, *supra* note 105.

¹⁶³ This was precisely the situation during the crowd crush at the 2002 Eminem concert discussed above. RFK Stadium has a maximum capacity of approximately 50,000 people but only “20,000 to 30,000 were present during the incident.” *White*, *supra* note 106.

¹⁶⁴ *Custini*, 2009 WL 2459852 at *3-4.

In *Custini v. Radio City Productions, LLC*, the plaintiff and several of her family members went to Radio City Music Hall to attend a show.¹⁶⁵ Approximately ten minutes after the show was scheduled to begin, managers of the Hall announced to the audience that the show was postponed due to a musician's union strike and asked audience members to leave.¹⁶⁶ Even though plaintiff and her family members remained in their seats for several minutes after the announcement, they became immersed in a dense crowd within the inner lobby of the venue when they finally emerged from the concert hall.¹⁶⁷ The plaintiff testified that large numbers of people were gathered around the concession stands attempting to return items that they had bought for the now-cancelled show.¹⁶⁸ While trying to exit the Hall, plaintiff was pushed by the forces of the crowd, fell down, and had her legs trampled.¹⁶⁹

In the resulting litigation, Radio City Music Hall argued, among other things, that it had not breached its duty of care because the Hall had been only approximately 60% full during the incident in question and thus could not have been overcrowded.¹⁷⁰ The court rejected this argument and correctly noted:

[T]he question that arises from the testimony of plaintiff and her son is not whether the Music Hall, as a whole, was overcrowded, but whether *the area around the concession stand* was dangerously overcrowded and chaotic as a result of defendant's decision to cancel the show when it did, and whether defendants failed to adequately control the people that were seeking to return their purchases to the concession stand or exit.¹⁷¹

This analysis is sound because the court does not rely on the misguided assumption that crowd members within the Hall evenly distributed themselves throughout the venue, but rather recognizes that individual areas within the larger venue could have become dangerously crowded even when the venue itself was under capacity.¹⁷² Unfortunately, as mentioned, this case appears to be the only one in which a court has demonstrated a clear understanding of this principle.

Second, courts err when they rely on maximum capacity numbers because high-risk crowd densities can emerge in under-capacity crowds when crowds are forced to negotiate bottlenecks within a given space.¹⁷³ This scenario is precisely what occurred during a November, 2013 country music festival in County

¹⁶⁵ *Id.* at *1.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at *2.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.* at *3.

¹⁷⁰ *Id.* at *3-4.

¹⁷¹ *Id.* at *4 (emphasis added).

¹⁷² *See id.*

¹⁷³ *See* Fruin, *supra* note 44.

Tyrone, Ireland.¹⁷⁴ Even though the venue was below its maximum capacity, an estimated sixty to seventy percent of the total crowd arrived within a forty-five minute period and had to move through a narrow entryway and courtyard.¹⁷⁵ Dozens of people were crushed or trampled in the ensuing efforts of the crowd to negotiate these spaces and enter the main music hall.¹⁷⁶

One crowd expert explains why set maximum capacity numbers do not necessarily protect against crowd crushes in bottleneck situations:

Architects and engineers typically give minimal attention to the movement of people in initial building design, beyond compliance with local building codes . . . Designing for crowd management requires that projected maximum occupancy levels of a space be correlated with the movement capabilities of all corridors, stairs, ramps, escalators, and other facilities.¹⁷⁷

Designing venues around crowd management principles, however, rarely occurs, leading to the types of crowd crush incidents described above.

Thus, capacity numbers are of exceedingly little value in assessing whether a set of defendants breached their duty of care by allowing a given venue to become dangerously overcrowded. At best, capacity numbers are a weak stand-in for the more relevant inquiry—the density of the crowd at the moment of the plaintiff’s injuries—and only then in extreme scenarios in which official capacity numbers have been grossly exceeded. In such scenarios, a gross violation of official capacity numbers may strongly point to the existence of a high crowd density.¹⁷⁸ As discussed above, however, the inverse of that statement is *not* also true: compliance with official capacity numbers does not mean that a crowd within given value cannot reach a high-risk density.¹⁷⁹

2. *Misplaced Reliance on Building Code Compliance*

For virtually identical reasons, courts would err if they hold that the defendants in a crowd crush did not breach their duty of care because their

¹⁷⁴ *Complaints of ‘Crush’ at Fintona Country Music Concert*, BBC NEWS (Nov. 4, 2013), <http://www.bbc.com/news/uk-northern-ireland-foyle-west-24801333> (describing the incident as a “bottleneck”).

¹⁷⁵ *Promoter Pledges to Review Safety After Concert Goers Hurt at Music Festival*, ULSTER HERALD (Nov. 4, 2013), <http://ulsterherald.com/2013/11/04/promoter-pledges-to-review-safety-after-concert-goers-hurt-at-music-festival/#sthash.nBB8LpFt.dpuf>; *Complaints of ‘Crush’*, *supra* note 174.

¹⁷⁶ *Complaints of ‘Crush’*, *supra* note 174.

¹⁷⁷ Fruin, *supra* note 30, at 8.

¹⁷⁸ For instance, with regard to the E2 crowd crush, discussed in the opening of this paper, the official capacity of the club was 240 people and yet 1,152 people were present during the incident. Herman, *supra* note 11, at 9. The fact that the club was over five times above its official capacity is strongly indicative of the fact that the density of the crowd was extremely high during the incident.

¹⁷⁹ See Custini, 2009 WL 2459852 at *1.

venues complied with state and local building codes. This error seems to be less prevalent than capacity errors in crowd crush jurisprudence, although at least one court has started down this line of analysis.¹⁸⁰ In *Prettyman v. Trenton Transp. Co.*, the plaintiff was knocked unconscious when a large crowd attempted to cross a wharf and board an excursion boat on the Delaware River.¹⁸¹ In reversing the lower court's judgment and holding for the defendant steamboat company, the court noted:

The boat was licensed to carry 1,100 persons, and there were 931 passengers that evening from the park to Philadelphia. The approach from the pier or landing wharf to the boat was by a gangplank 4 feet wide, 15 feet long, and the sides were protected by white oak handrails 2 by 2 1/2 inches. There was no intimation of defective construction of the pier, gangplank or boat, nor of inadequate accommodations for a crowd of the size described in the testimony . . . There was nothing to indicate that the wharf was unsafe . . . The gangplank was of ample proportion and was of the size and style then in use on all river excursion boats.¹⁸²

The court implied that the defendant did not breach its duty of due care because the physical facilities around which the crowd crush occurred were properly and “adequately” constructed. This reasoning, however, is clearly a *non sequitur* in light of the scientific principles discussed above. A venue may be constructed in accordance with state and local building codes and standards but still contain bottlenecks or other space arrangement deficiencies that only arise when large numbers of people attempt to utilize the space.¹⁸³ As one scholar explains, “[c]ode compliance does not guarantee that a building will function well during normal assembly use or emergency egress.”¹⁸⁴

An October, 1993 crowd crush at Camp Randall Stadium in Madison, Wisconsin, highlights the limited relevance of building code compliance in assessing breach. On October 30, 1993, the University of Wisconsin football team defeated their long time conference opponent, the University of Michigan, before a sell-out crowd of 77,745 spectators and became a possible Rose Bowl contender for that season.¹⁸⁵ That victory prompted the crowd crush disaster that came next. The New York Times reported:

As the game ended, thousands of jubilant spectators in the Wisconsin student sections behind one of the end zones began pouring out of the stands, where they confronted a chain-link fence

¹⁸⁰ See *Prettyman*, 73 Pa. Super. at 356.

¹⁸¹ *Id.* at 355-56.

¹⁸² *Id.* at 356-57, 360.

¹⁸³ Fruin, *supra* note 30, at 8.

¹⁸⁴ *Id.*

¹⁸⁵ Schuster, *supra* note 25; *Wisconsin Victory Celebration Turns Dangerous*, N.Y. TIMES (Oct. 31, 1993), <http://www.nytimes.com/1993/10/31/sports/college-football-wisconsin-victory-celebration-turns-dangerous.html>.

designed to keep fans off the playing field. The fence was only several feet high, and the students could have easily vaulted it if they were not held back by security officers and Madison police. But because the students were initially restrained behind the fence, a crush began to build up that rippled back into the stands.¹⁸⁶

By the end of the crowd crush, the force of which twisted metal railings and bent fences, three people were critically injured, five were seriously hurt, and more than seventy people were taken to the hospital.¹⁸⁷

The post-crush investigation assessed, among other issues, whether the stadium complied with relevant building codes.¹⁸⁸ The investigation revealed that the stadium was inspected by the Madison Fire Department twice a year and had been inspected three months prior to the crowd crush.¹⁸⁹ That inspection revealed only minor violations relating to blocked aisles within the stadium's interior, violations that seemingly had little to do with the incident.¹⁹⁰ A court would err, however, if it concluded from the lack of major violations that the stadium owners could not possibly have breached their duty of care with regard to crowd control because their facility complied with relevant building codes. Indeed, the two have little to do with one another. The biannual inspections of the stadium were conducted "when the facility was empty" and were based on building code requirements that had been written in the 1970s.¹⁹¹ Little or no attention to crowd management issues seems to have been paid by the inspectors even though there were physical characteristics of the facility that should have raised crowd-injury concerns: "the stadium's egress (exiting direction) capabilities were poor. While there were four exits, only two exits were available for fans to use and those exits were a mere 8 feet and 9.5 feet in width."¹⁹²

The code compliance of Camp Randall stadium thus had little bearing on whether the stadium's owners had taken reasonable precautions to prevent crowd injuries at their facility. As two legal scholars assert, even if there *had* been small or even moderate building code violations at the stadium, "any possible code violation would be only a minor issue when a crowd is surging uncontrollably down the stands."¹⁹³ With a sold-out crowd of well over 75,000 people, reasonable crowd management at Camp Randall stadium arguably demanded significantly more than mere compliance with building codes.¹⁹⁴

¹⁸⁶ *Wisconsin Victory Celebration Turns Dangerous*, *supra* note 185.

¹⁸⁷ *Id.*; Fried, *supra* note 29, at 140.

¹⁸⁸ See Fried, *supra* note 29, at 146-47.

¹⁸⁹ *Id.* at 147.

¹⁹⁰ *Id.*

¹⁹¹ *Id.* at 146, 147.

¹⁹² *Id.* at 146.

¹⁹³ *Id.* at 147.

¹⁹⁴ This was also true, I would assert, at the City University of New York during the celebrity basketball game crowd crush discussed above. There, after the incident, investigators determined that the stairwell on which the crowd crush occurred was "constructed within code

Indeed, after the October 1993 crowd crush, the university made a number of changes to the stadium and to its crowd management plans in order to reduce the likelihood of another incident.¹⁹⁵ These changes included increasing the number of security personnel stationed in the student sections during the game, better controlling “fan migration from other areas of the stadium into the student section,” increasing the number of speakers within the student section, constructing “5 more gates with fixed release exits . . . to allow for potential crowd surges to be released quicker,” and redesigning the chain-link fence between the field and the spectators “to avoid trapping fans.”¹⁹⁶

D. Causation

Once a plaintiff has established both duty and breach, they must prove both direct (“but for”) and proximate causation.¹⁹⁷ Direct causation does not appear to be a significant issue in crowd injury cases; extensive searching does not yield a single case in which this element has been a point of contention between the parties. Debate about proximate causation, however, is not only common in these cases, it is often the centerpiece of the dispute.¹⁹⁸ As one scholar notes, questions about “the foreseeability of [the] harm”¹⁹⁹ tend to be the linchpin of crowd crush litigation.²⁰⁰ If the plaintiff is unable to prove that her crowd crush injuries were foreseeable, her claim will necessarily fail because “a proprietor is not liable for injuries caused by the acts of patrons which were not reasonably foreseeable.”²⁰¹

As with the breach element of negligence, courts here again make problematic errors of analysis. Two errors, in particular, are noteworthy.

1. Crowd Demographics as a Red Herring

Both courts and venue owners often place great significance on the demographic characteristics of crowds, insinuating that those demographics have a strong relationship to the foreseeability of crowd crush injuries.²⁰² One concert industry insider, for instance, defended the band U2’s use of festival seating by arguing that U2 fans, unlike the fans of other rock bands, were capable of coping with such an arrangement safely: “If there is a band that can pull off festival seating safely, it is U2. Their crowd isn’t going to be as volatile

provisions” but clearly failed from a crowd management perspective. MOLLEN, *supra* note 68, at 23-24.

¹⁹⁵ *See id.* at 163.

¹⁹⁶ *Id.*

¹⁹⁷ 20 A.L.R.2d 8, 96 (Originally published in 1952).

¹⁹⁸ Adelman, *supra* note 21, at 19 (“Crowd crush cases are grounded in basic tort law, especially the foreseeability of harm.”).

¹⁹⁹ *See id.*

²⁰⁰ *See id.* at 18.

²⁰¹ Frumer, *supra* note 122, at 11.

²⁰² *See Heenan v. Comcast Spectacor & Spectrum Arena Ltd. P’ship.*, 2006 Phila. Ct. Com. Pl. LEXIS 138, *10 (Pa. C.P. 2006); *Phoenix Amusement Co.*, 208 S.W.2d at 66; *Prettyman*, 73 Pa. Super. at 358.; Adelman, *supra* note 21, at 19.

as, say, a Red Hot Chili Peppers crowd.”²⁰³ Similarly, after the 1979 The Who crowd crush, experts were quick to point to the youth of the crowd members, their “hedonistic attributes,” and their susceptibility to the “hypnotic effects” of rock ’n roll music as having heightened the risk of injuries occurring and “exaggerated the usual crowd effects.”²⁰⁴ Courts have also considered demographics in analyzing the foreseeability of crowd injuries, although a bit more subtly.²⁰⁵

In *Heenan v. Comcast Spectacor & Spectrum Arena Ltd. Partnership*, the court was tasked with reviewing a jury’s decision finding venue owners liable for crowd crush injuries that occurred at a Philadelphia arena after a Guns ’N Roses concert was unexpectedly cancelled after the crowd had already been seated. As the plaintiff attempted to exit the arena after the cancellation, “the crowd grew dense around her” and, in the resulting confusion, she fell and sustained a number of injuries.²⁰⁶ In assessing whether the jury could have reasonably found that plaintiff’s injuries were foreseeable, the court noted that it was not merely a dense crowd during the relevant incident, it was a crowd of “nearly 14,000 *Guns ’N Roses* fans, all disappointed, some angry and some violent.”²⁰⁷ While the court did not explicitly state what was to be inferred from the fact that the crowd members were Guns ’N Roses fans, it noted later in the opinion that this was a “hard rock crowd which required additional security even under normal circumstances” and thus that venue owners had advance warning that “this particular crowd could be problematic.”²⁰⁸ The court concluded by affirming the trial court’s order entering judgment for the plaintiff.

In *Prettyman*, however, the court used the demographic characteristics of crowd members to reach the *opposite* conclusion about the foreseeability of the crowd crush injuries.²⁰⁹ The court thought that it was significant that the crowd was primarily composed of three church groups who had rented the excursion boats for a church picnic:

The fact that it was a picnic conducted under church influence, would certainly not indicate that such a disturbance would be likely to occur, or that the defendant company should be put on notice of any unusual demonstration of force and lawlessness. This part of the crowd was law-abiding and orderly²¹⁰

²⁰³ Adelman, *supra* note 21, at 19.

²⁰⁴ Johnson, *supra* note 66, at 362 (internal brackets omitted).

²⁰⁵ See, e.g., Heenan, 2006 Phila. Ct. Com. Pl. LEXIS at *10; Phoenix Amusement Co., 208 S.W.2d at 66; *Prettyman*, 73 Pa. Super. at 358.

²⁰⁶ Heenan, 2006 Phila. Ct. Com. Pl. LEXIS at *10.

²⁰⁷ *Id.* at *5 (emphasis added), see also *id.* at *6 (again noting that the crowd was composed of “14,000 Guns ’N Roses fans”).

²⁰⁸ *Id.* at *5, *6.

²⁰⁹ See *Prettyman*, 73 Pa. Super. at 358.

²¹⁰ *Id.*

The court goes on to note that “the sole cause of the disturbance was from *other* visitors in the park who had no right to get on the boat.”²¹¹ The court described these “others” as “colored people, who were visitors at the park, but not of the excursion party” and who had apparently forced themselves onto the boat prior to the crush.²¹² The court thus impliedly found that (a) it was entirely unforeseeable that a crowd crush could occur amongst white churchgoers, but (b) that perhaps it could have been foreseeable that a crowd crush could occur among African-Americans causing a “false clamor,” but that (c) the injuries here were still unforeseeable because the African-Americans were “intruders” rather than paying guests.²¹³

Courts err, however, when they look to the demographic characteristics of crowd members in assessing the foreseeability of crowd crush injuries because this type of analysis is scientifically unsound. While demographic data may be relevant in assessing the foreseeability of *public order* injuries—injuries arising from fights that break out among crowd members, drunken behavior, rioting, etc.—demographic data is decidedly irrelevant when assessing the foreseeability of injuries that occur when crowds reach high-risk densities.²¹⁴ This is precisely the mistake that the court made in *Heenan*: conflating the likelihood of a fight breaking out among a hard rock crowd (in which demographics are certainly relevant) with the likelihood of a crush incident (in which they decidedly are not). In fact, ironically, the fact that a crowd crush has occurred almost necessarily means that the demographics of the crowd members are no longer relevant. One scientist explains:

“At even higher densities . . . the interaction forces in the crowd add up [and] intentional movements of pedestrians are replaced by unintentional ones. Hence, the well-coordinated motion among pedestrians suddenly breaks down, particularly around bottlenecks This breakdown results in largely fluctuating and uncontrollable patterns of motion, called crowd turbulence The related, unbalanced pressure distribution results in sudden stress releases and earthquake-like mass displacements of many pedestrians in all possible directions.”²¹⁵

Another states more simply, “[c]rowds create equality.”²¹⁶ As explained above, one of the hallmarks of a crowd crush is that the crowd as a whole takes on a life of its own and individual crowd members lose control over their own

²¹¹ *Id.* (emphasis added).

²¹² *Id.*

²¹³ *See id.* at 356-58.

²¹⁴ This is precisely the mistake made by the court in *Heenan*. In noting that the audience was composed of “a hard rock crowd which required additional security even under normal circumstances,” the court conflated the risk of public order injuries, in which demographic data is relevant, with the risk of crowd crush injuries, in which demographic data is decidedly not. *Heenan*, 2006 Phila. Ct. Com. Pl. LEXIS at *5.

²¹⁵ Moussid, *supra* note 45, at 6885.

²¹⁶ Helbing, *supra* note 20, at 967.

movements.²¹⁷ When crowds reach such states, scientists have found that crowd behavior is “best describe[d] and predict[ed]” by the principles of fluid dynamics rather than the behavior of individual crowd members.²¹⁸ Indeed, scientists have noted that the only demographic characteristics of crowd members that have any bearing on the foreseeability of a crowd crush incident are (a) the physical size of the crowd members themselves and/or (b) whether crowd members are wearing bulky clothing.²¹⁹ A crowd of larger or more heavily dressed individuals will reach a high-risk density at fewer people per square meter than a crowd of smaller or more lightly dressed individuals.²²⁰

In crowd crush scenarios, therefore, it matters little whether the crowd members are Guns 'N Roses fans or U2 fans, churchgoers or atheists, or rock 'n roll aficionados or classical music lovers. Since the crowd members themselves have virtually no ability to control either their own movements or the movements of the individuals around them once the crowd reaches a high-risk density, crowd demographics are almost entirely irrelevant, at least for purposes of determining whether the crowd crush was foreseeable. Instead, courts should focus on the scientific causes of crowd crush when conducting these inquiries into foreseeability: bottlenecks within the venue, the use of festival seating, and other aspects of the physical environment of a given venue that have the tendency to increase crowd density. When such features are present in a given space, particularly one in which large numbers of people must move over a relatively short period of time, the potential for crowd crush is foreseeable from a scientific perspective and thus should be from a legal one, as well.

Notably, these same demographic judgments on the part of venue owners, managers, and security officers may actually *increase* the likelihood of crowd crush injuries and deaths. Such a phenomenon has occurred at least several times in recent decades with catastrophic results.²²¹ In 1989, for instance, ninety-six people died in a crowd crush that occurred during a soccer match at the Hillsborough stadium in Sheffield, England.²²² Immediately prior to the start of the match, over 5,000 fans of the Liverpool team were crowded outside of their designated entrance into the stadium.²²³ Concerned that the outside crowd had become unmanageable, an official ordered the exit gates to be opened to allow for easier entry into the stadium.²²⁴ Thousands of fans streamed through the now-opened gates, through a tunnel, and into two, already crowded, standing-room-only pens.²²⁵ As these fans pushed into the pens from the back, crowd members at the front of the pens were pressed with great force up against

²¹⁷ *Id.*; Adelman, *supra* note 21, at 19; Fruin, *supra* note 30, at 4.

²¹⁸ Pin, *supra* note 57, at 287.

²¹⁹ Lee, *supra* note 45, at 579.

²²⁰ *Id.*

²²¹ See *infra* note 212-217.

²²² John Seabrook, *Crush Point: When Large Crowds Assemble, is There a Way to Keep Them Safe*, THE NEW YORKER, Feb. 7, 2011, <http://www.newyorker.com/magazine/2011/02/07/crush-point>.

²²³ Taylor, *supra* note 68, at 11.

²²⁴ *Id.* at 11-12.

²²⁵ *Id.* at 13.

the barrier between the pens and the pitch.²²⁶ Evidence shows that, even though the fans at the front were clearly in great distress, police officers on the scene were so concerned about “hooliganism” on the part of crowd members “that alternative explanations for observed crowd behaviors were not considered.”²²⁷ Two scholars observe: “prior assumptions about antisocial behavior led police to ignore fans’ cries for help. Similarly when fans were seen climbing the perimeter fences to escape the crushing, it was assumed they were invading the pitch and so perimeter gates were not opened.”²²⁸ Essentially, assumptions about the likelihood of this *type* of fan to cause “trouble” led officials to ignore otherwise clear and troubling signs of a crowd crush and to make misguided decisions that ultimately exacerbated the disaster.²²⁹ Similarly misguided decision-making also occurred during The Who concert disaster with similarly bad results:

Although most patrons who were interviewed [after the crowd crush] defined the efforts to get through the doors as flights to safety, police officers and security guards continued to see them as gate-crashing efforts after the surge had begun. For instance, two officers reported trying to secure a door . . . forced open by gate-crashers . . . but a 27-year-old male patron described in detail how the door was opened from the inside by two men trying to prevent injury to ‘two young girls [who] had been banging on that door for 20 minutes’ Similarly, a couple referred to a friend who, once inside, ‘tried to shove open some more doors with his foot and immediately two ushers came up, one of them grabbed him, shoved him back in line and told him to either get in line or get back out. He then began to beg and plead with the usher, he said, " people are getting hurt, people were down". . . .’²³⁰

Courts, venue owners, event planners, and law enforcement forces alike should learn from these incidents and reject the popular yet problematic assumption that the demographics of crowd members provide useful information about the likelihood of a crowd incident occurring. Because this assumption is scientifically flawed, it is neither legally relevant nor helpful in reducing the likelihood of crowd crushes. In fact, as just discussed, it may actually heighten the risk of injury and death in precarious situations.

2. *Errors in Intervening, Superseding Cause Analysis*

Many courts have also made a second error in assessing causation in crowd crush cases: they find that the movements of the crowd members themselves are—or at least could be—intervening, superseding causes of

²²⁶ *Id.*

²²⁷ Rose Challenger & Chris W. Clegg, *Crowd Disasters: A Socio-Technical Systems Perspective*, 6(3) CONTEMPORARY SOC. SCI. 343, 348-49 (2011).

²²⁸ *Id.* at 349.

²²⁹ *See id.* at 348-49.

²³⁰ Johnson, *supra* note 66, at 369-70.

plaintiffs' injuries thus defeating a finding of proximate causation.²³¹ Defendants raise this argument frequently in crowd crush cases,²³² asserting that the acts of "the extraordinarily rude crowd . . . intervened to create the dangerous circumstances" independently of the acts or omissions of the defendants.²³³ Thus, they conclude, the crowd crush was unforeseeable, "breaking the chain of causation."²³⁴

Use of this defense—and courts' acceptance of it—is not particularly surprising in light of how both the American media and the general public commonly react after a crowd crush has occurred: by blaming the crowd members themselves for the incident and painting them as "barbarians,"²³⁵ "thugs,"²³⁶ or "animals."²³⁷ After The Who concert disaster, for example, a "leading national columnist" referred to the crowd members as "barbarians who stomped 11 persons to death [after] having numbed their brains on weeds, chemicals, and Southern Comfort . . ."²³⁸ More recently, after the now-infamous November 2008 Black Friday crowd crush that occurred at a Long Island, New York, Wal-Mart, killing one individual and injuring four others, crowd members were described as "savages" who had behaved badly.²³⁹ Even government officials have joined in the crowd-blaming act: the City of New York's official review of the City College crowd crush discussed above faulted, among other groups, "the spectators themselves" for "surging towards the gymnasium doors with a total disregard for their fellow attendees and school property."²⁴⁰

Arguably the best example of the use of this type of crowd-blaming defense comes from *Rotz v. City of New York*, a case arising out of a truly strange crowd crush incident that occurred in Central Park in 1983²⁴¹. In late July of that year, Diana Ross held a free concert in the park.²⁴² A "tremendous crowd" showed up and people were "jammed in like sardines."²⁴³ At some point during the

²³¹ See FRUMER, *supra* note 122, at 9 ("[I]f the defendant is negligent, the movement of the crowd cannot be held as a matter of law to be an independent superseding force which relieves the defendant from liability for misconduct. In practice, however, most panic cases have been decided in favor of the proprietor, usually because the crowd's actions were not reasonably foreseeable or because the defendant was not negligent."); see also *Rotz*, 143 A.D.2d at 306; *Glatfelter*, 558 S.E.2d at 796-97.

²³² Robert S. Kelner & Gail S. Kelner, *Crowds, Violence, and Tort Liability*, KELNER & KELNER, <http://www.kelnerlaw.com/pages/crowds-violence-and-tort-liability> (last visited Feb. 21, 2015).

²³³ Dawson, *supra* note 20, at 811.

²³⁴ L. Stacy Weaver, Jr., *Department Store Liability in Rush Sales*, 2 DUKE BAR J. 90, 90 (1951).

²³⁵ Michael Pravica, *A Black Friday Sale Shouldn't Make Us Barbarians* (Letter to the Editor), N.Y. TIMES (Dec. 1, 2008), <http://www.nytimes.com/2008/12/02/opinion/02walmart.html>.

²³⁶ Associated Press, *On Long Island, Black Friday Crowd Kills Wal-Mart Employee*, Comments of "Festivus," SI LIVE Nov. 28, 2008, http://www.silive.com/news/index.ssf/2008/11/on_long_island_black_friday_cr.html.

²³⁷ Berger, *supra* note 25, at 1.

²³⁸ Johnson, *supra* note 66, at 362 (1987).

²³⁹ Robert D. McFadden & Angela Macropoulos, *Wal-Mart Employee Trampled to Death*, N.Y. TIMES (Nov. 28, 2008), <http://www.nytimes.com/2008/11/29/business/29walmart.html?fta=y>.

²⁴⁰ Berger, *supra* note 25, at 1, 3 (internal quotations omitted).

²⁴¹ *Rotz*, 143 A.D.2d at 301-02.

²⁴² *Id.* at 301.

²⁴³ *Id.* at 302 (internal quotations omitted).

performance, a rumor rippled through the crowd that a lion was on the loose and a large portion of the crowd attempted to flee.²⁴⁴ The plaintiff explained that there were shouts of “get out of the way, there’s a lion, a lion” and that “everybody started running and . . . just ran on top of everybody [else].”²⁴⁵ In the course of the stampede, the plaintiff was knocked down, trampled, and injured.²⁴⁶ He then sued the City of New York, the producer of the concert, and Paramount Pictures Corporation, the company that held a license to create and broadcast footage of the event.²⁴⁷

Among other defenses it raised, Paramount argued that “the precipitating cause of the stampeding—*i.e.*, the yelling to get out of the way because a lion was coming—was an unforeseeable intervening event that precluded liability.” The lower court agreed and granted summary judgment for the defendants, finding that “the danger here was not foreseeable and that, as a matter of law, the injuries to the plaintiff were caused by an unforeseeable, intervening event.”²⁴⁸

Yet again, however, this type of defense (and court acceptance thereof), runs contrary to the basic tenets of crowd science and for virtually the same reasons discussed in the section above. This defense, by necessity, relies on an assumption that the intervening, superseding movements of the crowd were volitional. Indeed, if the defense were *not* premised on this assumption, it would fail as a matter of law. As one legal scholar aptly explains:

Reflex reactions, involuntary motor movements . . . and the like are all less than wholly voluntary because they are less than wholly free. Such less than wholly voluntary behavior is typically excused because in such cases my freedom to have acted otherwise was totally or partially impaired . . . [B]ehavior that is the expression of such impaired freedom does not constitute an intervening cause; after all, being totally or partially caused itself, it could not represent a fresh causal start breaking causal chains. Such unfree, nonvoluntary behavior is just another link in the causal chain, no different than other caused events.²⁴⁹

But crowd science demonstrates that this is precisely what occurs during crowd crush incidents:²⁵⁰ the movements and actions of crowd members are “unfree, nonvoluntary behavior.”²⁵¹ As explained at length above, once crowd density

²⁴⁴ *Id.*

²⁴⁵ *Id.*

²⁴⁶ *Id.*

²⁴⁷ *Id.*

²⁴⁸ *Id.* at 304.

²⁴⁹ Michael S. Moore, *The Metaphysics of Causal Intervention*, 88 CALIF. L. REV. 827, 867-68 (2000) (internal quotations omitted).

²⁵⁰ See Moussid, *supra* note 45, at 6885 (“Indeed, at extreme densities, it is necessary to distinguish between the intentional avoidance behavior of pedestrians adapting their motion according to perceived visual cues and unintentional movements resulting from interaction forces caused by collision with other bodies.”).

²⁵¹ Helbing, *supra* note 20, at 967; Adelman, *supra* note 21, at 19; Moore, *supra* note 249, at 868.

enters a high-risk zone, “individual control of movement becomes impossible, and phenomena such as shock waves will be propagated through the crowd mass and cause the sudden uncontrolled surges that unleash the crowd’s destructive force.”²⁵² Thus, the lower court in *Rotz* committed both a legal and a scientific error in accepting the defendant’s defense that the intervening, superseding causes of the plaintiff’s injury were the acts of the crowd around her. Given that the crowd was “jammed in like sardines” around her, it seems virtually certain that the crowd movements which caused her injuries were wholly involuntary on the part of individual crowd members.²⁵³

Fortunately, on appeal, the Supreme Court of New York, First Department, analyzed this issue correctly:

In the instant case[,] the inquiry as to what risks were reasonably to be perceived must be framed in terms of what risks or dangers should reasonably have been anticipated by the city from the gathering of an extremely large crowd to hear a free concert by a renowned entertainer in Central Park on a summer evening. In light of common contemporary experience a jury could certainly find that, in the absence of adequate supervision and control of that crowd, it was reasonably foreseeable that disorder . . . could erupt from some cause ignited by the vagaries of myriad individuals “jammed together” in a heightened atmosphere A jury here could reasonably find that the risk of a riot or a stampede could have been averted, or its consequences contained, by adequate crowd-control measures . . . and that defendant city failed to exercise the reasonable care necessary under the circumstances to avoid that foreseeable risk.²⁵⁴

The court concluded that whether the conduct was an intervening, superseding cause of plaintiff’s injuries was “a fact question . . . which should be resolved at a trial and not as a matter of law on this motion for summary judgment.”²⁵⁵ The appellate court’s analysis of the intervening, superseding cause defense is far more accurate and far less scientifically problematic.²⁵⁶ The court correctly noted that the risk most relevant to the proximate cause inquiry in this case was the risk of a crowd injury arising from the assembly of a highly dense crowd, not the far more narrowly defined risk of a crowd stampede arising from a rumor about a lion on the loose.²⁵⁷ The court explained:

The [lower court] court focused solely upon the foreseeability of the exact manner in which the disturbance was precipitated and concluded, as a matter of law, that it was an unforeseeable

²⁵² Fruin, *supra* note 44.

²⁵³ *Rotz*, 143 A.D.2d at 302.

²⁵⁴ *Id.* at 305.

²⁵⁵ *Id.* at 306.

²⁵⁶ *See id.*

²⁵⁷ *See id.*

intervening event which relieved defendant of liability. The law, however, is to the contrary. That defendant could not anticipate the precise manner of the accident or the exact extent of injuries, however, does not preclude liability as a matter of law where the general risk and character of injuries are foreseeable.²⁵⁸

Indeed, if the plaintiff's description of the density of the crowd immediately prior to her injuries is correct, it was highly foreseeable that a crowd-related injury would occur and thus proximate cause was clearly satisfied in that case.²⁵⁹

E. Defenses: Assumption of the Risk

In negligence cases, “[t]he principle that one who voluntarily assumes the risk of injury from a known danger is barred from recovery for injuries is generally recognized,”²⁶⁰ and thus assumption of the risk is a commonly raised defense.²⁶¹ To prove that a plaintiff assumed the risk of the injury that she suffered, the defendant(s) must prove that the plaintiff either (a) expressly assumed the risk (for example, by signing a waiver or release of liability) or (b) kn[ew] of the existence of the risk and appreciate[d] its unreasonable character” (“implied assumption of the risk”).²⁶² Here, too, courts have made analytical errors in crowd crush cases.

1. Express Assumption of the Risk

In crowd crush cases arising out of injuries sustained at concerts, sporting events, or other paid performances, defendants may raise an express assumption of the risk defense if the tickets purchased by the plaintiff contained exculpatory language.²⁶³ This type of defense is usually unsuccessful for two reasons. First, generally speaking, “the law skeptically views a party’s attempt to exculpate itself from its own negligence,” and so courts tend to closely scrutinize both the language and location of the relevant exculpatory clause to assess whether it provided “reasonable notice” to the plaintiff.²⁶⁴ This often means “that an exculpatory clause with no signature will . . . be held unenforceable.”²⁶⁵

²⁵⁸ *Id.* at 305-06 (internal quotations omitted).

²⁵⁹ Helbing, *supra* note 20, at 968; Lee, *supra* note 45, at 581.

²⁶⁰ 20 A.L.R.2d 8, 91.

²⁶¹ To be fair, referring to assumption of the risk as a “defense” to negligence claims is a misnomer. In cases where assumption of the risk applies, “the plaintiff is prevented from making out even a *prima facie* case of liability.” WARD FARNSWORTH & MARK F. GRADY, TORTS: CASES & QUESTIONS 596 (2d ed. 2009). The assumption of the risk doctrine thus “amounts to a way of saying that the defendant had no duty to protect the plaintiff from the harm he has suffered, or that the defendant did not breach whatever duty existed.” *Id.* For purposes of this paper, assumption of the risk will be discussed in the way that it is commonly described by legal practitioners: as a defense to a negligence claim.

²⁶² RESTATEMENT (SECOND) OF TORTS § 496D (1965).

²⁶³ Ellis, *supra* note 34, at 614.

²⁶⁴ *Id.* at 617.

²⁶⁵ *Id.*

Second, “courts will invalidate express assumption of risk in cases in which it would directly contravene public policy.”²⁶⁶ In crowd crush cases, this could be true where, for instance, a court finds that event promoters or organizers could have done “something more in the way of precautions” to prevent a crowd crush from occurring, particularly where such precautions could have been as simple and inexpensive as opening more entrances or exit doors.²⁶⁷ Accordingly, there do not appear to be any cases in which an express presumption of the risk defense has prevailed in a crowd crush case.

2. *Implied Assumption of the Risk*

Overcoming an *implied* assumption of the risk defense poses a greater obstacle to crowd crush plaintiffs. Though defendants must prove that the plaintiff had “full knowledge and appreciation of the risk and voluntary encountering of it,”²⁶⁸ a long line of cases supports the notion that individuals that “freely [become] part of [a] crowd . . . assume . . . the risk of the hazard it produce[s].”²⁶⁹ In *Klish v. Alaskan Amusement Co.*, for instance, the plaintiff purchased a ticket to a hockey game at a theater called the Alaskan Ice Palace.²⁷⁰ She was seated immediately adjacent to an aisle²⁷¹ that became “overcrowded by patrons and spectators who apparently were unable to find seats.”²⁷² A concessionist attempting to sell programs in the crowded aisle was jostled by the crowd, lost his balance, and fell, hitting and severely injuring the plaintiff in the process.²⁷³ In the resulting litigation, the court ruled for the defendant on an assumption of the risk theory, reasoning:

Crowds are common at theaters and other places of amusement. That there may be some jostling in such crowds is inevitable. That someone may fall and sustain injury, or cause injury to others, always is a possibility. These conditions are so common that those who attend such places are presumed to know of them.²⁷⁴

Under the court’s logic, virtually any negligence claim arising out of a crowd injury or death at an entertainment venue would fall to an assumption of the risk defense.²⁷⁵ Other legal scholars have argued that this should be a bright

²⁶⁶ *Id.* at 615.

²⁶⁷ See Adelman, *supra* note 21, at 18 (internal quotations omitted); see also Ellis, *supra* note 34, at 624 (“A bright-line rule barring the fan from any recovery . . . seems overly harsh and would further encourage venue owners to disregard adequate measures to protect spectators.”).

²⁶⁸ Weaver, *supra* note 234, at 97.

²⁶⁹ Little v. Butner, 348 P.2d 1022, 1030 (Kan. 1960), *citing* Klish, 109 P.2d 75; George v. Ayeshe, 295 P.2d 660 (Kan. 1956); Glenn v. Montgomery Ward & Co., 163 P.2d 427 (Kan. 1945); Hickey v. Fox-Ozark Theatres Corp., 131 P.2d 671 (Kan. 1942); Snyder v. Salwen, 177 A. 789 (Pa. 1935); Rincon v. Berg Co., 60 S.W.2d 811 (Tex. Civ. App. 1933); Fenasci v. S. H. Kress & Co., 134 So. 779 (La. Ct. App. 1931); F. W. Woolworth & Co. v. Conboy, 170 F. 934 (8th Cir. 1909).

²⁷⁰ *Klish*, 109 P.2d at 75.

²⁷¹ *Id.*

²⁷² *Id.* at 75-76.

²⁷³ *Id.* at 76.

²⁷⁴ *Id.*

²⁷⁵ See *id.*

line rule: spectators injured by crowds at entertainment venues are barred from recovery “because the dangerous risks are inherent and obvious.”²⁷⁶

Such a stark view of implied assumption of the risk in a crowd crush context is both unwarranted and problematic. Indeed, crowd science demonstrates that the risks of crowd crush injuries are neither (a) inherent in crowds nor (b) obvious to individuals joining a crowd, the two required elements of a successful implied assumption of the risk defense.²⁷⁷ First, not every crowd carries with it an inherent danger of crowd crush injuries. As discussed above, crowds with a density of between one and four individuals per square meter have a very low risk of crowd crush injuries associated with them.²⁷⁸ To the extent that an individual is joining a lower-density crowds, therefore, that individual is not voluntarily taking on an inherent risk of crowd crush injuries because such injuries are extremely unlikely to occur.²⁷⁹

In this way, crowd crush cases are decidedly different than the classical realms in which implied assumption of the risk defenses tend to prevail: cases “deal[ing] with places of amusement or sport.”²⁸⁰ For example, a substantial body of case law denies recovery to fans hurt by baseballs that fly into the stands at stadiums because courts have concluded that “the risk of being hit by a ball is a ‘customary part of the sport.’”²⁸¹ Baseball necessarily involves fast-moving projectiles that often stray from the formal, bounded area of play, and so live baseball spectatorship virtually always carries with it the possibility of harm from encountering one of them.²⁸² However, joining a crowd does not necessarily carry with it the risk of “getting crushed . . . to the point of asphyxiation” and crowd crushes do not occur “with the frequency, or fair warning, of getting hit by a foul ball.”²⁸³ Instead, most crowds encountered by most people most of the time are of a low enough density as to pose almost no risk of crowd crush injury at all.

Moreover, even if all crowds *did* carry with them an inherent risk of crowd crush injuries, that inherent risk alone should not bar a finding of liability in crowd crush cases where a defendant raises an assumption of the risk defense. One scholar explains why in the context of crowd crush injuries at concerts:

The era of modern concert injuries is relatively new. In this way, it most resembles baseball and auto racing spectator issues of the early 1900s, when those sports were relatively young. Early professional baseball games lacked backstops or screens, and early auto races provided inadequate barriers to withstand the impact of

²⁷⁶ Ellis, *supra* note 34, at 624.

²⁷⁷ See Hubner v. Spring Valley Equestrian Ctr., 1 A.3d 618, 628 (2010) (setting forth the elements of an implied assumption of the risk defense).

²⁷⁸ Dirk Oberhagemann, *supra* note 48; Lee, *supra* note 45, at 576.

²⁷⁹ See *id.*

²⁸⁰ Drechsler, *supra* note 187, at 92.

²⁸¹ Adelman, *supra* note 21, at 22 (quoting Gallagher v. Cleveland Browns Football Co., 638 N.E.2d 1082, 1089 (Ohio Ct. App. 1994)).

²⁸² See *id.*

²⁸³ *Id.*

crashing cars and flying debris. Increased litigation altered the minimum standard in each of these sports and paved the way for reasonable screening and adequate fencing. Courts did not view injured spectators as having assumed the risk. Instead, because these events were so inherently dangerous without the reasonable protections, courts refused to accept the defendant's primary assumption-of-risk defense as a bar to the plaintiff's recovery.²⁸⁴

In situations where crowds are likely to assemble, venue owners and event managers are best positioned to reduce the likelihood of crowd injuries.²⁸⁵ Indeed, “[a]nalysis of more than a dozen serious crowd incidents has shown that in all cases . . . management strategies . . . could have averted or significantly reduced crowd effects.”²⁸⁶ These strategies, moreover, need not be expensive or sophisticated. Rather, crowd incident modeling and experience has shown that even “simple advance planning” and basic crowd management techniques can drastically reduce the likelihood of injury.²⁸⁷ Courts should thus treat crowd crush cases, particularly those arising out of crowd incidents in formal entertainment or athletic venues, like they treated professional baseball and auto racing in the early 1900s: by requiring organizers and venue owners to take the minimal steps needed to reduce the risk of crowd injuries and deaths rather than allowing them to hide behind implied assumption of the risk defenses when such injuries occur.²⁸⁸ Ruling otherwise would be “overly harsh and would further encourage venue owners to disregard adequate measures to protect [crowd members].”²⁸⁹

Second, even assuming *arguendo* that all crowds did carry an inherent risk of crowd crush injuries, the risk of such injuries are not necessarily obvious, the second element of a successful implied assumption of the risk defense. For this element to be satisfied, defendants must show that the risk taken on by the plaintiff were readily apparent and that plaintiffs were thus able to make an “informed choice” about taking it on.²⁹⁰ In a baseball context, for example:

[C]ourts have concluded that the risk of harm is so “open and obvious” that anyone watching a game should know that he or she risks being hit by a ball. Since spectators can ensure their safety by staying in the screened area behind home plate, sitting anywhere

²⁸⁴ Ellis, *supra* note 34, at 619-20.

²⁸⁵ Fruin, *supra* note 30, at 9; Fruin, *supra* note 44.

²⁸⁶ Fruin, *supra* note 44.

²⁸⁷ Fruin, *supra* note 30; *see also* Fried, *supra* note 29, at 163-64 (detailing a number of inexpensive and easy ways for venue owners to have prevented the Camp Randall Stadium crowd crush).

²⁸⁸ Adelman, *supra* note 21, at 22 (“Yet even if concert disasters were more common and well publicized, that would still not relieve organizers or performers of their duty of care. On the contrary, when the parties putting on the concert should anticipate an unreasonable risk of harm to the invitee notwithstanding his knowledge, warning, or the obvious nature of the condition, something more in the way of precautions may be required.”) (internal quotations omitted).

²⁸⁹ Ellis, *supra* note 34, at 624.

²⁹⁰ Adelman, *supra* note 21, at 22.

else in the ballpark implies that the fan weighed the odds and made an informed choice. The defendant in that scenario bears no further duty.

The risks of crowd crush in a crowd scenario, however, are not nearly as apparent for a number of reasons.

To start, low risk, low-density crowds may unexpectedly (from an individual crowd member's point of view) become high risk, high-density crowds as the crowd moves through physical space, particularly space that features bottlenecks. For example, in the November 2013 crowd crush at the country music festival in County Tyrone, Ireland, an individual that joined the crowd while still *outside* of the venue (and thus likely of low density) may have had little reason to know that that same crowd would become packed incredibly tightly and thus reach a very high—and risky—density as it attempted to negotiate the narrow entryway and courtyard once *inside* the venue.²⁹¹ Furthermore, changes in scheduled events may come as a surprise to spectators and cause the sudden development of a high density crowd. Thus, the plaintiffs in *Custini*, the case arising out of the crowd crush at Radio City Music Hall, almost certainly had no reason to believe that were taking on the risk of crowd crush injuries by attending a show at that venue. Such risks arose out of an unexpected event: the cancellation of the show and the rush of audience members to return items to the Hall's concession stands.²⁹²

Next, while the absolute number of crowd crush injuries in the United States is troubling, from a relative perspective, the rate of crowd crush injuries is extremely low given the frequency with which most people encounter and participate in crowds.²⁹³ Crowd crush injuries are also severely underreported.²⁹⁴ Discussing the crowd crush injuries that have arisen just out of Black Friday sales, for instance, one scholar notes:

The abundance of Black Friday injuries dictates that consumers are not aware of the challenges that face them when they participate in the sale events. They do not have the information necessary, such as numbers of reported injuries, to make an informed decision about whether to participate. The news media reported some incidences during the 2005 and 2006 sales event; however, by 2007, reports of injuries were extremely limited and hard to find . . . Thus, consumers are unable to assume the risk because the risk has not been made clear or publicized in a manner that suggests danger.²⁹⁵

²⁹¹ See *Promoter Pledges to Review Safety*, *supra* note 175; *Complaints of 'Crush'*, *supra* note 174.

²⁹² *Custini*, 2009 WL 2459852 at *2.

²⁹³ Adelman, *supra* note 21, at 22.

²⁹⁴ Dawson, *supra* note 20, at 764; Ellis, *supra* note 34, at 608.

²⁹⁵ Dawson, *supra* note 20, at 793-94.

Thus, an individual confronted with a crowd at a store, a music performance, a sporting event, or arguably in any other context in the United States, has no reason to believe that they are risking crowd-related injuries or death.²⁹⁶

In sum, upholding assumption of the risk defenses in crowd crush cases makes little sense from either a legal or a policy standpoint. Crowd crush injuries are not an inherent and obvious part of joining a crowd. Furthermore, allowing defendants to prevail on this defense disincentivizes venue owners and event managers from taking steps to reduce the likelihood of crowd injuries and deaths, even though these parties are best situated to do so.

III. RECOMMENDATIONS

In light of the myriad judicial errors of analysis set forth above—and the conflicting and confusing jurisprudence that has resulted—it is worth setting forth several recommendations for courts and practitioners tasked with handling crowd crush litigation in the future.

1. The Importance of Crowd Density Calculations

The logical first step in conducting a legal analysis of a crowd crush case is to determine, if possible, the density of the crowd at the time of the plaintiff's alleged injuries. As discussed above, crowd density is the single best predictor of crowd crush incidents:²⁹⁷ crowds with densities lower than five people per square meter have a very low likelihood of crowd-related injuries and deaths whereas crowds with densities of five people per square meter or more have a very high likelihood of such harms occurring.²⁹⁸ Accordingly, if an analysis revealed that the crowd surrounding a plaintiff at the time of her alleged injuries was of a density below five people per square meter, the plaintiff's resulting negligence claim would, as initial matter, be relatively weak and one of two possibilities would likely be true.²⁹⁹ The first possibility would be that the plaintiff's injuries were caused by something other than the forces of the crowd around them (*i.e.* her injuries were not truly crowd crush injuries but were caused instead by something else such as a public order disturbance or the volitional or accidental movements of another crowd member.). In such a case, the plaintiff's negligence claim would be exceedingly difficult to prove, at least to the extent that her central assertion posited that a crowd crush caused her injuries. Dismissal or summary judgment against the plaintiff would almost certainly be warranted in such a case.

²⁹⁶ See *id.*; see also Adelman, *supra* note 21, at 18 (“Entering the festival seating area to get close to the band does not mean that the person who is injured when doing so assumes the risk of severe injury or death.”).

²⁹⁷ See Lee, *supra* note 45, at 579.

²⁹⁸ *Id.* at 581.

²⁹⁹ There is one additional, significantly more remote possibility that does not warrant extensive discussion in this piece: the possibility that the plaintiff is lying about having sustained injuries at all.

The second possibility would be that the density analysis itself was flawed. If, for instance, the party conducting the analysis looked at too large a segment of the crowd in calculating the density, the resulting number could be artificially low and not accurately reflect the density of the crowd *immediately surrounding the plaintiff* at the moment of their alleged injuries. In *Custini*, for example, the evidence suggested that the density of the crowd in the music hall as a whole was fairly low but that the density of the crowd in the area around the concession stands (and thus the plaintiff) was dangerously high.³⁰⁰ Someone calculating the density of the entire crowd would have generated results that did not adequately capture the risk of injury to the plaintiff in the moments immediately preceding her injury.³⁰¹ Similarly, if the party conducting the density analysis looked at the wrong segment of the crowd or assessed the density of the crowd at a moment too far removed from the plaintiff's injuries, the results would be of dubious value, as well.

However, if a density analysis revealed that the crowd surrounding the plaintiff at the time of her alleged injuries was of a high density, the plaintiff's negligence claim would be a very strong one³⁰² and attention should turn to the extent to which the crowd crush was foreseeable by the defendant(s).³⁰³ Here, evidence regarding the defendant(s) crowd management strategies, if any, would be highly probative, as would evidence about the use of festival seating, prior crowd incidents at the relevant venue, and the physical layout of the space through which the crowd was required to move. Courts should look with a wary eye, however, upon other types of circumstantial evidence on this issue: the demographics of the crowd, compliance with the official capacity for the venue, and compliance with building codes, as discussed at greater length below.

Calculating the relevant crowd density at the moment of a plaintiff's alleged injuries is likely to be challenging in most crowd crush cases. However, courts should recognize two possible ways of doing so. First, many crowd science experts use scientific modeling techniques to calculate crowd density based on available information about the relevant incident.³⁰⁴ One highly regarded crowd science expert (and experienced expert witness), for example, uses such mathematic modeling techniques to calculate crowd density from video footage of the relevant event when such footage is available.³⁰⁵ He notes that “[w]hen we see shockwaves [on camera], we *know* the crowd is well above safe limits ([shockwaves] only occur when the crowd is physically touching[,]) so the density must be above safe limits.”³⁰⁶ Other scholars have used modeling techniques that assess both the physical dimensions of the relevant space and the estimated number of individuals present during the alleged crowd crush to predict crowd

³⁰⁰ *Custini*, 2009 WL 2459852 at *2.

³⁰¹ *See id.*

³⁰² *See Lee, supra* note 45, at 581.

³⁰³ *See Adelman, supra* note 21, at 18.

³⁰⁴ *See Pin, supra* note 57, at 287; Moussid, *supra* note 45, at 6885; Lee, *supra* note 45, at 578.

³⁰⁵ E-mail from G. Keith Still, Professor of Crowd Science, Manchester Metropolitan University, to author (Feb. 17, 2015, 11:43 AM CST) (on file with author).

³⁰⁶ *Id.* (emphasis in original).

density.³⁰⁷ These sophisticated, science-based techniques can yield very helpful and precise calculations of crowd density in crowd crush cases.

Second, circumstantial evidence can also be used to estimate crowd density at the moment of a plaintiff's alleged injuries. Here, evidence about a number of factors can be highly probative of the existence of either a high- or low-density crowd: the number of open entrances and exits in the relevant venue, the use of festival or general admission seating during the event at issue, and the presence of bottlenecks such as narrow corridors or stairwells within the relevant space. Eyewitness testimony may also be valuable in estimating crowd density. Witness answers to questions such as "Could you lift your arms in the crowd," "Were the people around you in close physical contact," and "How much space did you feel you had around you?" can help crowd experts "define the local density."³⁰⁸ Even if such circumstantial evidence does not permit crowd science experts to calculate a precise crowd density for a given incident, it can certainly provide enough information to allow them to draw conclusions about whether the relevant crowd's density was high or low at the moment of the plaintiff's alleged injuries.

2. *The Need for Expert Testimony*

The existence of a robust body of crowd science—and the need to calculate crowd density in crowd crush cases—strongly suggests that the use of expert testimony is highly warranted in crowd crush cases. The United States District Court for the District of Columbia held as such in a 2006 case, *Brisbin v. Washington Sports & Entertainment, Ltd.* In that case, the plaintiff brought suit against the owner and operator of the MCI Center in downtown Washington, DC, for injuries sustained during a hockey game when he was bumped by another spectator and fell while attempting to leave his seat in order to procure refreshments.³⁰⁹ The plaintiff contended that the defendant had breached its duty by "failing to use reasonable care in maintaining, supervising and managing the dangers in its facility; and failing to supervise and control its patrons."³¹⁰ The plaintiff failed, however, to provide expert testimony on the appropriate standard of care "by which to gauge the defendant's actions."³¹¹ The court found that the lack of an expert on this issue was fatal to the plaintiff's case:

Plaintiff asserts that testimony . . . regarding the narrow aisles and close proximity of the seats to each other, supports her negligence claim and thereby creates an issue of fact for the jury Fatal to this assertion is the fact that plaintiff has not filed a Rule 26(b)(4) statement identifying an expert prepared to establish the appropriate standard of care Washington Sports should have met

³⁰⁷ See Pin, *supra* note 57, at 287; Moussid, *supra* note 45, at 6885; Lee, *supra* note 45, at 578.

³⁰⁸ E-mail from G. Keith Still, *supra* note 305.

³⁰⁹ *Brisbin v. Washington Sports & Entm't, Ltd.*, 422 F. Supp. 2d 9, 11 (D.D.C. 2006).

³¹⁰ *Id.*

³¹¹ *Id.* at 13.

based on the Center's physical layout. On the record before the Court, it is clear that it is beyond the common knowledge of jurors to determine, based on evidence of the Center's physical layout, what standard of care Washington Sports had a duty to exercise in the maintenance, supervision and management of its facility Without an appropriate standard of care being delineated by an engineering or safety expert familiar with arena seating, the jury would be forced to engage in speculation as to how Washington Sports was deficient in managing the alleged dangers in their facility.³¹²

Accordingly, the court granted the defendants' motion for summary judgment.

Similarly, in *Hill v. Metropolitan African Methodist Episcopal Church*, the District of Columbia Court of Appeals found it necessary to have expert testimony regarding the proper standard of care for crowd control in a case involving a crowd injury that occurred when over a thousand people attempted to exit a church at roughly the same time.³¹³ The plaintiff contended that the defendants breached their duty of care by failing to put ushers "in charge of crowd control for the departure process" but, like the plaintiff in *Brisbin*, failed to provide expert testimony on the issue.³¹⁴ The court granted the defendants' motion for summary judgment, stating:

The court finds plaintiff's assertion that '[t]he issue of providing ushers for church services where attendance is approximately seventeen hundred to two thousand persons is within the common knowledge and experience of the reasonable juror' to be erroneous [T]he court remains firm in its belief that the duty to provide crowd control in a church setting is sufficiently unique such that the law requires some sort of expert testimony in order to establish a basic standard of care that defendants could have breached.³¹⁵

The court of appeals affirmed³¹⁶, noting that "without the expert testimony of one familiar with [crowd management] considerations, the jury would be left to sheer speculation as to the various types of crowd control" and what was appropriate under the circumstances.³¹⁷ The court strongly believed that this knowledge was "beyond the ken of the average layperson."³¹⁸

All courts should reach similar conclusions about the need for expert testimony in crowd crush cases and reject the notion that common sense and

³¹² *Id.* (internal quotations and citations omitted).

³¹³ *Hill v. Metro. African Methodist Episcopal Church*, 779 A.2d 907, 907 (D.C. 2001).

³¹⁴ *Id.*

³¹⁵ *Id.* at 908.

³¹⁶ *Id.* at 910.

³¹⁷ *Id.*

³¹⁸ *Id.* (internal quotations omitted).

conventional wisdom are sufficient tools to analyze the legal and factual issues in these cases.

3. *Excluding Problematic Evidence*

Lastly, courts should exclude the type of evidence they have previously relied on in crowd crush cases: evidence about official capacity numbers, building code compliance, and the demographic characteristics of individual crowd members. Such evidence should be excluded for two reasons. First, for the reasons discussed at length above, this type of evidence is virtually always irrelevant in crowd crush cases and thus its admission would almost certainly violate the rules of evidence within a given jurisdiction.³¹⁹ For instance, consideration of the demographic characteristics of a given crowd – say, that the crowd was primarily composed of middle-aged women – neither “has a tendency to make a fact more or less probable than it would be” in the absence of such evidence, nor is it of any “consequence in determining the action”³²⁰ because, as explained above, demographic data has little, if any, bearing on whether a crowd crush is likely to occur.³²¹ Thus, such evidence is of no consequence in determining the action (the test of relevancy under Federal Rule of Evidence 401 and most equivalent state rules): it has no legal significance with regard to duty, breach, or causation.³²²

Second, the type of evidence heretofore considered by many courts in crowd crush cases is also arguably prejudicial and thus in further violation of the relevant rules of evidence within a given jurisdiction.³²³ Evidence about the official capacity numbers of venues, for example, is incredibly deceptive but also likely to appeal to juries (and to judges, if prior cases are any guide).³²⁴ Venues that are under capacity can—and often do—experience crowd crush incidents for the reasons set forth above, but a jury of laypeople unfamiliar with crowd science might be unfairly swayed by a venue’s compliance with capacity numbers because such compliance provides the illusion that overcrowding could not

³¹⁹ See, e.g., FED. R. EVID. 401 (“Evidence is relevant if: (a) it has any tendency to make a fact more or less probable than it would be without the evidence; and (b) the fact is of consequence in determining the action.”); TEX. R. EVID. (“Evidence is relevant if: (a) it has any tendency to make a fact more or less probable than it would be without the evidence; and (b) the fact is of consequence in determining the action.”).

³²⁰ FED. R. EVID. 401.

³²¹ Pin, *supra* note 57, at 287. There are limited exceptions to this principle with regard to demographic data pertaining to the physical size of crowd members and whether they were wearing bulky clothing during the relevant incident. Lee, *supra* note 45, at 579.

³²² See *id.*

³²³ See, e.g., FED. R. EVID. 403 (“The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.”); N.C. R. EVID. 403 (“Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.”).

³²⁴ See, e.g., Lazarus, 11 A.D.2d at 680; Schwartz, 283 A.D. at 387; Prettyman, 73 Pa. Super. at 356.

possibly have occurred. Thus, such evidence is not probative of any of the issues in typical crowd crush litigation and is also likely to insert unfair prejudice into the proceedings and “confus[e] the issues” in clear contravention of Federal Rule of Evidence 403 (and equivalent state rules) and should be excluded as such.³²⁵

In sum, courts should only admit evidence in crowd crush cases that is firmly rooted in crowd science and its fundamental principles. Conversely, courts should look with a wary eye upon evidence that arises instead from conventional wisdom about the nature of crowds or crowd disasters as such evidence tends to be based on assumptions that have been disproven repeatedly by crowd scientists. Accordingly, such evidence likely violates evidentiary rules pertaining to both relevance and prejudice and ought to be excluded from crowd crush litigation.

IV. CONCLUSION

Despite what might appear to be true from the discussion above, crowd crush cases “are fundamentally simple, based on facts that should be self-evident: Overcrowding leads to injuries [and] a party that can reasonably foresee harm has a duty to prevent it”³²⁶ However, the combination of “powerful interests insist[ent] on pursuing . . . dangerous practice[s] like festival seating” and courts either ignoring or overlooking basic tenets of crowd science has led to a situation in which “victims are truly protected only by their lawyers” in these cases.³²⁷

Crowd science has repeatedly proven two fundamental principles of crowd dynamics: (1) crowd density is the single best predictor of crowd-related injuries and deaths, and (2) physical space and spectator configurations such as bottlenecks and festival seating drastically increase the likelihood that a crowd will reach a high risk density. A multitude of real-life crowd crush incidents in the United States over the last few decades have provided repeated and tragic illustrations of these principles in action. Venue owners and event managers, therefore, should not be able to hide behind weak and scientifically unsound arguments such as compliance with set capacity numbers or the notion that individual crowd members were intervening, superseding causes of the plaintiff’s injuries to escape what crowd science has already made clear: crowd crush injuries are eminently foreseeable when crowds are permitted to reach high risk densities (or are forced to by physical space configurations).

Furthermore, venue owners and event managers are the *only* parties that can prevent crowd crushes from occurring. As discussed at length above, both the lack of communication between the fronts and backs of crowds and the extremely limited ability of crowd members to influence the events around them mean that crowd members themselves cannot protect crowds as a whole from

³²⁵ See FED. R. EVID. 403.

³²⁶ Adelman, *supra* note 21, at 22.

³²⁷ *Id.*

reaching high risk densities. The preventative measures that owners and managers should take, moreover, need not be expensive or sophisticated. Basic precautions such as opening more entrance and exit doors, removing physical objects that could create bottlenecks from within the venue, and eliminating the use of festival or general admission seating arrangements can go a tremendously long way in reducing, if not eliminating, the chances of a crowd crush occurring.

In the absence of a statutory fix, courts must reform their common law crowd crush jurisprudence to provide greater protection for plaintiffs and to give venue owners and event managers a stronger incentive to take preventative measures against crowd injuries. A central part of this reform must entail incorporating the use of crowd science into the legal analysis of these cases and calling on crowd scientists to serve as expert witnesses. Reform also requires excluding the type of scientifically unsound evidence that courts have relied on in past cases. Only after such reforms are undertaken will the United States begin to get a handle on this troubling, inexplicably overlooked, and growing issue.