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Crowd Crush: How the Law Leaves American Crowds Unprotected

Tracy Hresko Pearl¹

"The age we are about to enter will in truth be the Era of Crowds."²
-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, retail holiday sales, 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

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² GUSTAVE LE BON, *THE CROWD: A STUDY OF THE POPULAR MIND* 14 (Ernest Benn Ltd. 20th prtg. 1952) (1896).

series of recommendations designed to bring crowd crush jurisprudence in line with modern science and to 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, 2003.³ Patrons were enjoying the dance floor, the DJ, the bar, and wandering in between the club and the restaurant downstairs.⁴ As the night wore on, a small fistfight broke out on the dance floor, an unfortunate but not uncommon occurrence at a nightclub.⁵ At the DJ's request, a security guard stepped in and attempted to quell the skirmish.⁶ His initial efforts unsuccessful, the guard then escalated his response by spraying pepper spray at the combatants.⁷ This action proved to be disastrous.⁸

The pepper spray lingered in the crowded room, choking the patrons and triggering a mass exodus.⁹ 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.¹⁰ As the crowd attempted to do so, however, members became trapped in the narrow front stairwell when the front door at the bottom of the steps failed to open.¹¹

The crowd that night was large: approximately 1,152 people.¹² Some of the individuals toward the front of the crowd fell as they descended the stairs and were trampled to death.¹³ Others became trapped against the front door.¹⁴ 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."¹⁵ By the end of the incident, twenty-one people had died and more than fifty had been injured.¹⁶

³ See Jodi Wilgoren, *21 Die in Stampede of 1,500 at Chicago Nightclub*, N.Y. TIMES, Feb. 18, 2003, at A1.

⁴ See *id.* at A1, A20.

⁵ *Id.*

⁶ *E2 Nightclub Tragedy 9th Anniversary: It's Not Over Until It's Over*, CROWD MGMT. STRATEGIES (Feb. 17, 2012), <http://www.crowdsafe.com/new.asp?ID=2128> [hereinafter *E2 Nightclub Tragedy*].

⁷ See Wilgoren, *supra* note 3, at A1.

⁸ See *E2 Nightclub Tragedy*, *supra* note 6.

⁹ *Id.*

¹⁰ *Id.*

¹¹ See *id.*

¹² Eric Herman, *Some Laughed in E2 Stampede: Patrons Did Not Know They Were Shoving Others to Their Deaths*, CHI. SUN-TIMES, Jan. 19, 2007, at 9.

¹³ See *id.*; see also Wilgoren, *supra* note 3, at A1 (describing the stampede in the stairwell).

¹⁴ See Herman, *supra* note 12, at 9.

¹⁵ *Id.*

¹⁶ Wilgoren, *supra* note 3, at A1.

Three days later, at The Station nightclub in West Warwick, Rhode Island, 100 people were killed and over 200 were injured under similar circumstances.¹⁷ Over 400 people entered the club that evening to attend a concert of the 1980s band, Great White.¹⁸ 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.¹⁹ Although the club contained four exits, two of them were chained shut, and a bouncer initially stopped audience members from using the third, the stage exit. These blockages forced the vast majority of the crowd to attempt to exit via the front door, creating a deadly bottleneck.²⁰

While these two incidents are somewhat unusual due to their high number of fatalities, crowd-related injuries and deaths are troublingly common, both in the United States and throughout the rest of the world.²¹ 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.²² 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."²³ These injuries and fatalities occur in a wide range of situations: at Black Friday sales,²⁴ music concerts,²⁵ sporting events,²⁶ and large festivals,²⁷ as

¹⁷ *Great White Concert Tragedy: Tenth Anniversary*, CROWD MGMT. STRATEGIES (Feb. 20 2013), <http://www.crowdsafe.com/new.asp?ID=2195>.

¹⁸ Bernie Augustine, *The Station Nightclub Fire 10 Years Later: Healing Continues as West Warwick, Rhode Island, Takes Next Step in Recovery*, N.Y. DAILY NEWS (Feb. 21, 2013), <http://www.nydailynews.com/news/national/ten-years-station-nightclub-fire-town-recovering-article-1.1269044>.

¹⁹ 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>.

²⁰ *Id.*

²¹ 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, 748-49 (2010); Dirk Helbing et al., *Crowd Turbulence: The Physics of Crowd Disasters*, Fifth International Conference on Nonlinear Mechanics 969 (June 11-14, 2007), <http://arxiv.org/pdf/0708.3339.pdf>.

²² Steven A. Adelman, *Won't Get Fooled Again*, TRIAL, June 2004, at 18, 18.

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

²⁴ See, e.g., Dawson, *supra* note 21, at 749.

²⁵ See, e.g., *Chicago Fans Sue Beyoncé After Being "Trampled" at Concert*, NBC CHI. (Apr. 2, 2014, 11:50 AM), <http://www.nbcchicago.com/news/local/Chicago-Fans-Trampled-at-Beyonce-Concert-File-Suit-253585421.html>; *20 Die at Concerts and Festivals*, *supra* note 23.

²⁶ See, e.g., PHIL SCRATON ET AL., NO LAST RIGHTS: THE DENIAL OF JUSTICE AND THE PROMOTION OF MYTH IN THE AFTERMATH OF THE HILLSBOROUGH DISASTER iiiv-iv (Alden Press 1995); Joseph Berger, *An Inquiry Spreads Blame for Deaths at a New York Gym*, N.Y. TIMES, Jan. 16, 1992, at A1; Cynthia Schuster, *20 Years Later, Lessons Still Relevant from Camp Randall Stampede*, WIS. PUB. RADIO (Oct. 25, 2013, 2:00 AM), <http://www.wpr.org/20-years-later-lessons-still-relevant-camp-randall-stampede>.

well as on subway platforms²⁸ and in casino parking lots.²⁹ 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.”³⁰ They occur at boisterous rock concerts,³¹ as well as in the seemingly more genteel corridors of Radio City Music Hall.³²

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.³³ One scholar estimates “that only one out of every ten [crowd] injuries associated with doorbuster sales” at popular stores is reported.³⁴ 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.”³⁵ Commentators worriedly point to the uptick in crowd injuries and deaths in the last few decades.³⁶ 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.”³⁷

The United States has an unusually high number of crowd crush incidents for a country in the developed world.³⁸ One expert notes that the United States is responsible for thirty-seven percent of the concert-related crowd injuries

²⁷ E.g., ‘Crowd Quakes’ Were a Key Factor in LoveParade Disaster, MIT TECH. REV. (June 28, 2012), <http://www.technologyreview.com/view/428367/crowd-quakes-were-a-key-factor-in-loveparade-disaster/>.

²⁸ E.g., *Alexopoulos v. Metro. Transp. Auth.*, 41 A.D.3d 171, 171 (N.Y. App. Div. 2007).

²⁹ *DiMauro v. Trump’s Castle Assocs.*, 300 A.D.2d 432, 433 (N.Y. App. Div. 2002).

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

³¹ E.g., John J. Fruin, *The Causes and Prevention of Crowd Disasters*, CROWDSAFE 3 (Jan. 2002), <http://www.crowdsafe.com/fruincauses.pdf> [hereinafter Fruin, *Causes and Prevention*].

³² *Custini v. Radio City Prods., LLC*, No. 604084/2006, slip op. at 2–4 (N.Y. Sup. Ct., July 27, 2009).

³³ See *infra* text accompanying notes 34–37.

³⁴ Dawson, *supra* note 21, at 764.

³⁵ Luke Ellis, Note, *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).

³⁶ 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*, SEYFARTH SHAW ENVTL. & SAFETY LAW UPDATE (Nov. 13, 2012), <http://www.environmentalsafetyupdate.com/osha-enforcement/holiday-shopping-and-crowd-management-safety-guidelines-for-retailers> (“Holiday shopping is increasingly becoming associated with violence and hazards.”).

³⁷ Fruin, *Causes and Prevention*, *supra* note 31, at 1.

³⁸ See *A Trust Betrayed: Safety Became the Twelfth Victim*, CROWD MGMT. STRATEGIES, <http://www.crowdsafe.com/cafe/who20.html> (last visited Oct. 15, 2015).

worldwide.³⁹ 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 1900s, and crowd disasters such as the 1942 Cocoanut Grove fire have lingered in public consciousness.⁴⁰ 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, so common law remains the *only* source of law with regard to crowd crush.⁴¹

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 jurisprudence arising out of crowd crush incidents is incredibly troublesome because (1) it is riddled with assumptions and analyses that contravene basic principles of crowd science, (2) it makes recovery overly difficult for plaintiffs, and (3) it 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 Article, 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, 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 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

³⁹ *Id.*

⁴⁰ Lawrence M. Friedman & Joseph Thompson, *Total Disaster and Total Justice: Responses to Man-Made Tragedy*, 53 DEPAUL L. REV. 251, 256–76 (2003); see *The Cocoanut Grove Fire*, BOS. FIRE HIST. SOC'Y, <http://www.bostonfirehistory.org/firestory11281942.html> (last visited Oct. 15, 2015).

⁴¹ See Ellis, *supra* note 35, at 629.

relevant literature.”⁴² Broadly speaking, however, a crowd can be defined as a number of individuals “in the same area in physical proximity to one another.”⁴³ While “[a] definite numerical minimum [of individuals] cannot be stipulated,”⁴⁴ 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.⁴⁵

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 crowd-related injuries and deaths and thus the linchpin of crowd-disaster analysis.⁴⁶

A. Crowd Density

Crowd density is a measurement of “the number of people per square met[er]” in a given crowd.⁴⁷ It is an extremely good predictor of the likelihood of crowd crush injuries or death occurring in a given crowd.⁴⁸ 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.⁴⁹ Crowd densities of three and four people per square meter are similarly low-risk from a crowd-injury

⁴² Eugene Trivizas, *Crowd Dynamics and the Prevention and Control of Collective Disorders*, 56 POLICE J. 142, 143 (1983).

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ John J. Fruin, *Crowd Dynamics and Auditorium Management*, CROWD SAFETY & RISK ANALYSIS (Mar. 1, 2015, 2:42 PM), <http://www.gkstill.com/Support/crowd-flow/fruin/Fruin3.html> [hereinafter Fruin, *Crowd Dynamics*].

⁴⁶ See Helbing, *supra* note 21, at 1–3, at 967–68; Fruin, *Causes and Prevention*, *supra* note 31, at 4, 6; Fruin, *Crowd Dynamics*, *supra* note 45; Ris S.C. Lee & Roger L. Hughes, *Exploring Trampling and Crushing in a Crowd*, 131 J. TRANSP. ENGINEERING 575, 581 (2005); Mehdi Moussaïd et al., *How Simple Rules Determine Pedestrian Behavior and Crowd Disasters*, 108 PNAS 6884, 6884, 6886 (2011).

⁴⁷ G. Keith Still, *Static Crowd Density (General)*, CROWD SAFETY & RISK ANALYSIS (Apr. 12, 2014, 9:23 AM), www.gkstill.com/Support/crowd-density/CrowdDensity-1.html.

⁴⁸ Lee & Hughes, *supra* note 46, at 581.

⁴⁹ See Dirk Oberhagemann, *Static and Dynamic Crowd Densities at Major Public Events*, VFDB TECHNICAL REP. (Mar. 2012), www.vfdb.de/download/TB_13_01_Crowd_densities.pdf.

perspective.⁵⁰ At five people per square meter, however, the likelihood that an injury will occur begins to increase.⁵¹ At that density, “there is still ample space between people to allow movement, though it is limited.”⁵² 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.⁵³

At crowd densities of roughly seven people per square meter or more, the risk of crowd-related injuries or deaths is extremely high.⁵⁴ At this density, a “surprising transition”⁵⁵ 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.⁵⁶ These waves are “characterized by random displacements of [crowd members] into all possible directions up to twelve meters or more.”⁵⁷ Scientists studying crowd dynamics note that principles of fluid dynamics best describe and predict crowd movements at this density.⁵⁸ One 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.”⁵⁹ 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.⁶⁰

The forces produced by crowds at this density are deadly and “almost impossible to stop.”⁶¹ Indeed, “[e]vidence of bent steel railings after several fatal crowd incidents” shows that dense crowds can exert forces of more than 1,000

⁵⁰ See *id.* (indicating that there is no real increase in the likelihood of a crowd crush event between two people per square meter and under five people per square meter).

⁵¹ Lee & Hughes, *supra* note 46, at 581.

⁵² Oberhagemann, *supra* note 49, at 11.

⁵³ Lee & Hughes, *supra* note 46, at 581.

⁵⁴ See Fruin, *Causes and Prevention*, *supra* note 31, at 4. 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 & Hughes, *supra* note 46, at 579.

⁵⁵ Helbing, *supra* note 21, at 968.

⁵⁶ Fruin, *Causes and Prevention*, *supra* note 31, at 4; see also Helbing, *supra* note 21, at 967–68.

⁵⁷ Helbing, *supra* note 21, at 968.

⁵⁸ See Soo Chin Pin et al., *Applying TRIZ Principles in Crowd Management*, 49 SAFETY SCI. 286, 287 (2011).

⁵⁹ Adelman, *supra* note 22, at 19.

⁶⁰ Fruin, *Causes and Prevention*, *supra* note 31, at 4.

⁶¹ Fruin, *Crowd Dynamics*, *supra* note 45.

pounds at a time.⁶² 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.⁶³

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.⁶⁴ Arena managers opened only two doors into the venue despite the fact that 8,000 people were outside the arena waiting to enter.⁶⁵ When a warm-up band began to play on the main stage, these fans began to push toward the two entrances thinking the performance had begun, increasing the crowd’s density to dangerous levels and creating the type of shock waves discussed above.⁶⁶ 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.⁶⁷

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.⁶⁸

Similar phenomena have been reported as having occurred in virtually every other major crowd crush incident on record.⁶⁹

⁶² Fruin, *Causes and Prevention*, *supra* note 31, at 5.

⁶³ *Id.*

⁶⁴ *Id.* at 3.

⁶⁵ *Id.*

⁶⁶ *See id.*

⁶⁷ Norris R. Johnson, *Panic at “The Who Concert Stampede”: An Empirical Assessment*, 34 SOC. PROBS. 362, 365 (1987).

⁶⁸ *About The Who Concert Tragedy Task Force Report*, CROWD MGMT. STRATEGIES, <http://www.crowdsafe.com/taskrpt/> (last visited Oct. 15, 2015) [hereinafter *About The Who Concert Tragedy*].

⁶⁹ *See, e.g.*, MILTON MOLLEN, “A FAILURE OF RESPONSIBILITY”: REPORT TO MAYOR DAVID N. DINKINS ON THE DECEMBER 28, 1991 TRAGEDY AT CITY COLLEGE OF NEW YORK 23–35 (1992) (describing the City College crowd crush); Fried & Metchick, *supra* note 30, at 140 (2005)

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.⁷⁰ 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.⁷¹

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.⁷² Two types of physical space configurations in particular drastically increase the risk of a crowd crush occurring: bottlenecks and festival seating.

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.⁷³ 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.⁷⁴ 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.”⁷⁵ 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 together at the bottleneck.

(describing the Camp Randall Memorial Stadium crowd crush); Lord Justice Taylor, *Hillsborough Stadium Disaster Inquiry—Interim Report*, SOUTH YORKSHIRE POLICE 11–15 (Apr. 15, 1989), available at <http://www.southyorks.police.uk/sites/default/files/Taylor%20Interim%20Report.pdf> (describing the Hillsborough crowd crush).

⁷⁰ See Lee & Hughes, *supra* note 46, at 581.

⁷¹ See Kathryn M. Zeitz et al., *Crowd Behavior at Mass Gatherings: A Literature Review*, 24 PREHOSPITAL AND DISASTER MED. 32, 37 (2009).

⁷² Fruin, *Causes and Prevention*, *supra* note 31, at 5.

⁷³ See Lee & Hughes, *supra* note 46, at 37.

⁷⁴ Fruin, *Crowd Dynamics*, *supra* note 45; Moussaïd et al., *supra* note 46, at 6886.

⁷⁵ Fruin, *Crowd Dynamics*, *supra* note 45.

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.⁷⁶ 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.”⁷⁷

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).⁷⁸ Over 5,000 people showed up for a celebrity basketball game that day and began to enter a City College gymnasium.⁷⁹ 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.⁸⁰ Second, once inside the 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.⁸¹ Third, once through the lobby, the crowd had to descend a twelve-by-seven foot stairwell into the gym, forcing the crowd to funnel itself through yet another narrow corridor.⁸² 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.⁸³

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.⁸⁴ Those at the front perished as “the crowd

⁷⁶ *Id.*; see also, e.g., *Haley v. May Dept. Stores Co.*, 287 S.W.2d 366, 367 (Mo. Ct. App. 1956) (discussing a crowd crush that occurred on an escalator).

⁷⁷ Fruin, *Crowd Dynamics*, *supra* note 45.

⁷⁸ MOLLEN, *supra* note 69, at 1; Fruin, *Causes and Prevention*, *supra* note 31, at 2.

⁷⁹ Berger, *supra* note 26, at A1, B8.

⁸⁰ MOLLEN, *supra* note 69, at 25. After the situation in and around the 138th Street entrance became desperate, officials opened one additional 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.

⁸¹ See *id.* at 23–24.

⁸² *Id.*

⁸³ *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, at A1, B8.

⁸⁴ See MOLLEN, *supra* note 69, at 33–34.

continued to push forward and force themselves into [the] already overcrowded stairwell.”⁸⁵ The chief medical examiner concluded that the cause of death for each of the victims was compressive asphyxiation.⁸⁶ 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.”⁸⁷

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.⁸⁸ In both of these arrangements, valuable space within a given venue is “up for grabs.”⁸⁹ When the doors to the event are opened, the waiting crowd must rush to get the best positions inside, usually those up front closest to the entertainment.⁹⁰ 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.⁹¹

Despite its appeal to industry performers, however, festival seating arrangements pose a very high risk of crowd-related injuries.⁹² 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

⁸⁵ *Id.* at 55.

⁸⁶ *Id.* at 42.

⁸⁷ Lee & Hughes, *supra* note 46, at 580; *see also* Moussaïd et al., *supra* note 46, at 6886 (“A further analysis of the phenomenon reveals areas of serious body compression occurring close to the bottleneck.”).

⁸⁸ CROWD MGMT., REPORT OF THE TASK FORCE ON CROWD CONTROL AND SAFETY 28 (1980), available at <http://www.crowdsafe.com/taskrpt/whoii-seating.pdf>.

⁸⁹ *See* Adelman, *supra* note 22, at 18.

⁹⁰ *Id.*; Fruin, *Causes and Prevention*, *supra* note 31, at 4.

⁹¹ Adelman, *supra* note 22, at 19.

⁹² *See* Helbing, *supra* note 21, at 967; Je’Anna Lanza Abbott & Morgan W. Geddie, *Event and Venue Management: Minimizing Liability Through Effective Crowd Management Techniques*, 6 EVENT MGMT. 259, 260 (2000).

may compromise public safety,”⁹³ and a number of crowd science experts have named festival seating as the “the principal culprit in most crowd crush cases.”⁹⁴ Indeed, “[o]ne estimate suggests that ninety percent of all concert injuries occur at festival-seating and general-admission concerts.”⁹⁵ The high likelihood of injuries in these scenarios arises from two factors.

First, in festival seating and general admission situations, crowd members must “compete for favorable seats or standing positions close to entertainers,” creating a “rush to obtain some highly valued objective.”⁹⁶ 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).⁹⁷ 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.⁹⁸ 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.⁹⁹

Once the doors opened, “the waiting crowd rushed the entrance to get the best positions inside.”¹⁰⁰ The result, as described above, was pandemonium and a deadly crowd crush.¹⁰¹

More recently, two concertgoers allege that a similar incident occurred at a December 2013 Beyoncé concert in Chicago, Illinois.¹⁰² 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.”¹⁰³ When the gates were

⁹³ NAT’L FIRE PROTECTION ASS’N, LIFE SAFETY CODE HANDBOOK 2003 § A.3.3.188.1 (9th ed. 2003).

⁹⁴ Adelman, *supra* note 22, at 18.

⁹⁵ Ellis, *supra* note 35, at 611.

⁹⁶ Fruin, *Causes and Prevention*, *supra* note 31, at 4.

⁹⁷ See *About The Who Concert Tragedy*, *supra* note 68.

⁹⁸ See Adelman, *supra* note 22, at 18; *About The Who Concert Tragedy*, *supra* note 68.

⁹⁹ *About The Who Concert Tragedy*, *supra* note 68.

¹⁰⁰ Adelman, *supra* note 22, at 18.

¹⁰¹ See *id.*

¹⁰² 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/>.

¹⁰³ Complaint at 3, *Castellanos v. United Ctr. Joint Venture*, 2014-L-003667 (Ill. Cir. Ct. Apr. 1, 2014).

finally opened, the crowd allegedly rushed into the arena and trampled the plaintiffs, leaving them with broken bones and other injuries.¹⁰⁴ The resulting lawsuit is still pending.¹⁰⁵

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.¹⁰⁶ 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."¹⁰⁷

Thirty people were injured, including one young crowd member who went into cardiac arrest.¹⁰⁸

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."¹⁰⁹ Instead, scientists have found the opposite: "that an unorchestrated crowd behaves rationally."¹¹⁰ 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.¹¹¹

¹⁰⁴ *Id.* at 5.

¹⁰⁵ See Docket, *Castellanos v. United Ctr. Joint Venture*, 2014-L-003667 (Ill. Cir. Ct., Apr. 1, 2014).

¹⁰⁶ ROBERT LIND ET AL., ENTERTAINMENT LAW 3D: LEGAL CONCEPTS AND BUSINESS PRACTICES § 10:36, Westlaw (database updated May 2014) ("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.").

¹⁰⁷ Tanika White, *30 Hurt in Concert Crush at Washington Stadium*, BALT. SUN (May 26, 2002), http://articles.baltimoresun.com/2002-05-26/news/0205260206_1_eminem-fans-crush.

¹⁰⁸ *Id.*

¹⁰⁹ See Lee & Hughes, *supra* note 46, at 575.

¹¹⁰ *Id.*

¹¹¹ *Id.*

Furthermore, despite what media accounts of crowd incidents may suggest, there is very little evidence suggesting that crowds are prone to panic or unreasonable behavior.¹¹² Not only are documented cases of true crowd panic “surprisingly scarce in the literature,”¹¹³ closer investigation of such incidents usually reveals both (a) that the crowd responded rationally to a real or perceived threat,¹¹⁴ and (b) that “[u]nregulated competition, which is crucial to most explanations of panic, did not occur,” but rather “cooperative behavior continued throughout the course of the event.”¹¹⁵ 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.¹¹⁶

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.¹¹⁷ “People in a crowd do not have a broad view of what is happening around them,” notes one crowd expert.¹¹⁸ 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.”¹¹⁹ 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.¹²⁰ 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.¹²¹ Moreover, in many situations, “[t]he collapsing of the front ranks [of the crowd] gives a false perception of forward movement” so that individuals at the back of the crowd may reasonably believe that all is well and that the crowd is continuing to move forward smoothly.¹²² 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.

¹¹² G. KEITH STILL, INTRODUCTION TO CROWD SCIENCE 29 (2013) (“Since 2001, the headlines continue to attribute blame by the constant, and inappropriate, use of the words ‘panic’ and ‘stampede.’”).

¹¹³ Johnson, *supra* note 67, at 371.

¹¹⁴ Fruin, *Causes and Prevention*, *supra* note 31, at 4.

¹¹⁵ Johnson, *supra* note 67, at 370.

¹¹⁶ Fruin, *Causes and Prevention*, *supra* note 31, at 4.

¹¹⁷ *See id.*

¹¹⁸ Fruin, *Crowd Dynamics*, *supra* note 45.

¹¹⁹ Fruin, *Causes and Prevention*, *supra* note 31, at 4.

¹²⁰ *Id.*

¹²¹ *See id.*

¹²² *Id.*

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 “[t]he motion of a crowd can therefore be modeled using engineering principles.”¹²³ 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.¹²⁴ 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.¹²⁵ Instead, courts have taken a mostly *ad hoc* approach to crowd crush cases,¹²⁶ 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.¹²⁷

The law’s “underdevelopment” in crowd crush cases, though problematic for the reasons discussed herein, is not particularly surprising for several reasons. First, as discussed above, crowd crush injuries are severely underreported.¹²⁸ 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

¹²³ Lee & Hughes, *supra* note 46, at 575.

¹²⁴ See, e.g., Dawson, *supra* note 21, 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 35, at 609; see also 8 FRUMER & FRIEDMAN, PERSONAL INJURY ACTIONS, DEFENSES, AND DAMAGES § 42.01 (Matthew Bender, rev. ed. 2015) (“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.”).

¹²⁵ See Ellis, *supra* note 35, at 607–09 (“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 Auth.*, 176 A.D.2d 549, 549 (N.Y. App. Div. 1991)).

¹²⁶ See FRUMER & FRIEDMAN, *supra* note 124 (“Cases of injury caused by a panicking crowd demonstrate how often crowd control matters are decided on their facts.”).

¹²⁷ See Fruin, *Crowd Dynamics*, *supra* note 45 (“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.”).

¹²⁸ Dawson, *supra* note 21, at 764; Ellis, *supra* note 35, at 608.

jurisprudence in this area.¹²⁹ 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.¹³⁰ 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."¹³¹ These obstacles, in turn, perpetuate the weakness and inconsistency of the jurisprudence in this area; potential plaintiffs are often deterred from filing suit and those that do file suit feel pressured to settle because of the unpredictability of litigation in this area, so courts "miss the opportunity to establish guiding precedent."¹³²

As a result of this situation, the common law jurisprudence surrounding crowd crush is a veritable mixed bag of standards and rulings.¹³³ Cases dating back to the 1940s and earlier are often the only published decisions relating to crowd-related injuries in many jurisdictions;¹³⁴ thus, many decisions that we would now find problematic from a scientific perspective are still binding precedent. Moreover, courts are currently split on, among other critical legal issues, whether crowd crushes are foreseeable,¹³⁵ whether the acts of individual crowd members are intervening, superseding causes of plaintiffs' injuries,¹³⁶ and whether individuals assume the risk of injury when they enter a crowd.¹³⁷ Crowd science arguably

¹²⁹ Ellis, *supra* note 35, at 609.

¹³⁰ *See id.* at 629–31.

¹³¹ Adelman, *supra* note 22, at 18.

¹³² Ellis, *supra* note 35, at 609.

¹³³ *See* Dawson, *supra* note 21, at 808–09; Ellis, *supra* note 35, at 609.

¹³⁴ *See* Greeley v. Miller's Inc., 150 A. 500, 500–01 (Conn. 1930); Klish v. Alaskan Amusement Co., 109 P.2d 75, 75–76 (Kan. 1941); Phoenix Amusement Co. v. White, 208 S.W.2d 64, 65 (Ky. 1948); Bell v. Feibleman & Co., 164 So. 273, 273 (La. Ct. App. 1935); Myers v. Kan. City Junior Orpheum Co., 73 S.W.2d 313, 313 (Mo. Ct. App. 1934); Pridgen v. S.H. Kress & Co., 196 S.E. 821–22 (N.C. 1938); Sims v. Strand Theatre, 29 A.2d 208, 209 (Pa. Super. Ct. 1942).

¹³⁵ *Compare* Haley v. May Dept. Stores Co., 287 S.W.2d 366, 368 (Mo. Ct. App. 1956) ("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 New York, 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.").

¹³⁶ *Compare* Rotz, 143 A.D.2d at 303–04 (explaining that the lower court found 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 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.").

¹³⁷ *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

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”¹³⁸ and are virtually always centered on negligence claims.¹³⁹ 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.¹⁴⁰ Plaintiffs, in turn, must prove that “they are in the class of people to whom any defendant has a duty of care; that defendant breached its duty; that there is a causal link unbroken by a third party in the crowd; and that the [plaintiffs] were harmed as a result.”¹⁴¹

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:

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

(M.D. Pa.), *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.”).

¹³⁸ Adelman, *supra* note 22, at 19.

¹³⁹ FRUMER & FRIEDMAN, *supra* note 124.

¹⁴⁰ Adelman, *supra* note 22, at 20.

¹⁴¹ *Id.* at 19.

discover and correct or warn of any dangerous conditions and a duty to protect attendees from negligent activities.¹⁴²

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.”¹⁴³

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.¹⁴⁴ The radio station had merely promoted the concert and lacked control over the amphitheater, the seating arrangements, or the amphitheater’s security.¹⁴⁵ The lower court granted the radio station’s motion for summary judgment, holding that the radio station did not owe the plaintiff a duty.¹⁴⁶

However, in *Cunningham v. D.C. Sports & Entertainment Commission*, 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.¹⁴⁷ Mathers and company responded with a motion for summary judgment arguing (1) that they did not owe a duty to the plaintiff 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.”¹⁴⁸ The court disagreed.¹⁴⁹ 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.”¹⁵⁰ 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.”¹⁵¹

¹⁴² LIND ET AL., *supra* note 106; *see also* RESTATEMENT (SECOND) OF TORTS § 344 (AM. LAW INST. 1965).

¹⁴³ Adelman, *supra* note 22, at 20.

¹⁴⁴ *Pooser v. Cox Radio, Inc.*, No. 04-08-00270-CV, 2009 WL 200449, at *1 (Tex. Ct. App. Jan. 28, 2009).

¹⁴⁵ *See id.* at *2–3.

¹⁴⁶ *Id.* at *1.

¹⁴⁷ *Cunningham v. D.C. Sports & Entm't Comm'n*, No. Civ.A.03-839RWRJMF, 2005 WL 3276306, at *1–3 (D.D.C. Nov. 30, 2005).

¹⁴⁸ *Id.* at *6.

¹⁴⁹ *Id.* at *7.

¹⁵⁰ *Id.* at *6.

¹⁵¹ *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.¹⁵²

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.¹⁵³ 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 other invitees 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."¹⁵⁴ 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.¹⁵⁵ Two errors, in particular, are worth highlighting.

1. *Misplaced Reliance on Capacity Numbers*—Courts (and investigators of crowd crush disasters) often err when 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

¹⁵² Adelman, *supra* note 22, at 20.

¹⁵³ *Id.* at 20.

¹⁵⁴ FRUMER & FRIEDMAN, *supra* note 124.

¹⁵⁵ See *infra* text accompanying notes 156–97.

overcrowded.¹⁵⁶ For example, in *Lazarus v. Skouras Theatres Corp.*, the plaintiff was injured when she collided with another patron in the inner lobby of a movie theater.¹⁵⁷ 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.”¹⁵⁸ 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.¹⁵⁹ 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.”¹⁶⁰

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.¹⁶¹

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.¹⁶² Instead, crowds tend to push forward and assemble tightly around locations of value within a venue, like the main stage, restrooms, or concession stands.¹⁶³ 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

¹⁵⁶ 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), *rev'd*, 123 N.E.2d 573 (N.Y. 1954); *Prettyman v. Trenton Transp. Co.*, 73 Pa. Super. 353, 356 (Pa. Super. Ct. 1920).

¹⁵⁷ *Lazarus*, 11 A.D.2d at 680.

¹⁵⁸ *Id.*

¹⁵⁹ See *id.*

¹⁶⁰ *Schwartz*, 283 A.D. at 387. 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. *Schwartz v. Madison Square Garden Corp.*, 123 N.E.2d 573, 573 (N.Y. 1954).

¹⁶¹ See *Lazarus*, 11 A.D.2d at 680; *Schwartz*, 283 A.D. at 387; *Prettyman*, 73 Pa. Super. at 356; see also MOLLEN, *supra* note 69, at 62.

¹⁶² See *supra* text accompanying notes 106–08.

¹⁶³ See e.g., *Custini v. Radio City Prods., LLC*, No. 604084/2006, slip op. at 2–4 (N.Y. Sup. Ct., July 27, 2009); LIND ET AL., *supra* note 106.

maximum capacity at the time.¹⁶⁴ 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.¹⁶⁵

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.¹⁶⁶ 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 union's strike and asked audience members to leave.¹⁶⁷ 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.¹⁶⁸ 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.¹⁶⁹ While trying to exit the Hall, plaintiff was pushed by the forces of the crowd, fell down, and had her legs trampled.¹⁷⁰

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 sixty percent full during the incident in question and thus could not have been overcrowded.¹⁷¹ 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.¹⁷²

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.¹⁷³ Unfortunately, as mentioned, this case appears to be the only one in which a U.S. court has demonstrated a clear understanding of this principle.

¹⁶⁴ This was precisely the situation during the crowd crush at the 2002 Eminem concert discussed above. See White, *supra* note 107. RFK Stadium has a maximum capacity of approximately 50,000 people but only "20,000 to 30,000 were present during the incident." *Id.*

¹⁶⁵ *Custini*, slip op. at 3–4.

¹⁶⁶ *Id.* at 1.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 2.

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 3.

¹⁷¹ *Id.* at 4.

¹⁷² *Id.* (emphasis added).

¹⁷³ See *id.* at 7.

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.¹⁷⁴ This scenario is precisely what occurred during a November 2013 country music festival in County Tyrone, Ireland.¹⁷⁵ 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.¹⁷⁶ Dozens of people were crushed or trampled in the ensuing efforts of the crowd to negotiate these spaces and enter the main music hall.¹⁷⁷

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.¹⁷⁸

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.¹⁷⁹ 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.¹⁸⁰

¹⁷⁴ See Fruin, *Crowd Dynamics*, *supra* note 45.

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> [hereinafter *Promoter Pledges to Review Safety*]; see also *Complaints of 'Crush' at Fintona Country Music Concert*, BBC NEWS (Nov. 4, 2013), <http://www.bbc.com/news/uk-northern-ireland-foyle-west-24801333> [hereinafter *Complaints of 'Crush'*] (describing the incident as a "bottleneck").

¹⁷⁶ *Promoter Pledges to Review*, *supra* note 175.

¹⁷⁷ See *Complaints of 'Crush'*, *supra* note 175.

¹⁷⁸ Fruin, *Causes and Prevention*, *supra* note 31, at 8.

¹⁷⁹ 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 12, 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.

¹⁸⁰ See *Custini v. Radio City Prods., LLC*, No. 604084/2006, slip op. at 4 (N.Y. Sup. Ct., July 27, 2009).

2. *Misplaced Reliance on Building Code Compliance*—For virtually identical reasons, courts would err if they held that the defendants in a crowd crush did not breach their duty of care because their 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.¹⁸¹ In *Prettyman v. Trenton Transportation Co.*, the plaintiff was knocked unconscious when a large crowd attempted to cross a wharf and board an excursion boat on the Delaware River.¹⁸² 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.¹⁸³

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.¹⁸⁴ 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.¹⁸⁵ As one scholar explains, “Code compliance does not guarantee that a building will function well during normal assembly use or emergency egress.”¹⁸⁶

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 its longtime conference opponent, the University of Michigan, before a sell-out crowd of 77,745 spectators and became a possible Rose Bowl contender for

¹⁸¹ See *Prettyman v. Trenton Transp. Co.*, 73 Pa. Super. 353, 356 (Pa. Super. Ct. 1920).

¹⁸² *Id.* at 355–56.

¹⁸³ *Id.* at 356–57.

¹⁸⁴ *Id.* at 360.

¹⁸⁵ Fruin, *Causes and Prevention*, *supra* note 31, at 8.

¹⁸⁶ *Id.*

that season.¹⁸⁷ 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 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.¹⁸⁸

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.¹⁸⁹

The post-crush investigation assessed, among other issues, whether the stadium complied with relevant building codes.¹⁹⁰ 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.¹⁹¹ 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.¹⁹² 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.¹⁹³ 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 eight feet and nine and a half feet in width."¹⁹⁴

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

¹⁸⁷ Schuster, *supra* note 26; *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>.

¹⁸⁸ *Wisconsin Victory Celebration Turns Dangerous*, *supra* note 187.

¹⁸⁹ Fried & Metchick, *supra* note 30, at 140; *Wisconsin Victory Celebration Turns Dangerous*, *supra* note 187.

¹⁹⁰ *See* Fried & Metchick, *supra* note 30, at 147.

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ *See id.* at 146–47.

¹⁹⁴ *See id.* at 146.

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.”¹⁹⁵ 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.¹⁹⁶ 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.¹⁹⁷ 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.”¹⁹⁸

D. Causation

Once a plaintiff has established both duty and breach, he or she must prove both direct (“but for”) and proximate causation.¹⁹⁹ 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.²⁰⁰ As one scholar notes, questions about the foreseeability of the harm tend to be the linchpin of crowd crush litigation.²⁰¹ 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.”²⁰²

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

¹⁹⁵ *Id.* at 147.

¹⁹⁶ 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 provisions” but clearly failed from a crowd management perspective. See MOLLEN, *supra* note 69, at 23–24.

¹⁹⁷ See Fried & Metchick, *supra* note 30, at 162–63.

¹⁹⁸ *Id.* at 163.

¹⁹⁹ See C.T. Drechsler, Annotation, *Liability of Proprietor for Injury to Customer or Patron Caused By Pushing, Crowding, etc. of Other Patrons*, 20 A.L.R.2d 8, 86 (1952).

²⁰⁰ See Adelman, *supra* note 22, at 19 (“Crowd crush cases are grounded in basic tort law, especially the foreseeability of harm.”).

²⁰¹ See *id.* at 18–19.

²⁰² FRUMER & FRIEDMAN, *supra* note 124.

that those demographics have a strong relationship to the foreseeability of crowd crush injuries.²⁰³ 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 as, say, a Red Hot Chili Peppers crowd."²⁰⁴ 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."²⁰⁵ Courts have also considered demographics in analyzing the foreseeability of crowd injuries, although a bit more subtly.²⁰⁶

In *Heenan v. Comcast Spectacor & Spectrum Arena Ltd. Partnership*, the court was tasked with reviewing a jury decision that found 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.²⁰⁷ 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."²⁰⁸ 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."²⁰⁹ The court concluded by affirming the trial court's order entering judgment for the plaintiff.²¹⁰

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.²¹¹ The court thought that it was significant that the crowd was

²⁰³ See *Phoenix Amusement Co. v. White*, 208 S.W.2d 64, 66 (Ky. 1948); *Prettyman v. Trenton Transp. Co.*, 73 Pa. Super. 353, 358 (Pa. Super. Ct. 1920); *Heenan v. Comcast Spectacor & Spectrum Arena Ltd. P'ship.*, No. 00980, 2006 Phila. Ct. Com. Pl. LEXIS 138, *10 (Pa. C.P. Mar. 6, 2006), *aff'd*, 915 A.2d 155 (Pa. Super. Ct. 2006); Adelman, *supra* note 22, at 19.

²⁰⁴ Adelman, *supra* note 22, at 19.

²⁰⁵ Johnson, *supra* note 67, at 362, 371.

²⁰⁶ See, e.g., *Phoenix Amusement Co.*, 208 S.W.2d at 66; *Prettyman*, 73 Pa. Super. at 358; *Heenan*, 2006 Phila. Ct. Com. Pl. LEXIS at *10.

²⁰⁷ *Id.* at *4.

²⁰⁸ *Id.* at *15 (emphasis added); see also *id.* at *16-17 (again noting that the crowd was composed of "14,000 Guns N' Roses fans").

²⁰⁹ *Id.* at *10, *19.

²¹⁰ *Id.* at *30.

²¹¹ See *Prettyman*, 73 Pa. Super. at 358.

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 orderly . . .²¹²

The court went 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.”²¹³ 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.²¹⁴ The court thus implicitly 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.²¹⁵

However, courts err 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. 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).²¹⁶ 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,

²¹² *Id.*

²¹³ *Id.* (emphasis added).

²¹⁴ *Id.* at 355–56.

²¹⁵ *See id.* at 356–58.

²¹⁶ *Heenan v. Comcast Spectator & Spectrum Arena Ltd. P'ship.*, 2006 Phila. Ct. Com. Pl. LEXIS 138, at *10 (Pa. C. P.), *aff'd*, 915 A.2d 155 (Pa. Super. Ct. 2006).

unbalanced pressure distribution results in sudden stress releases and earthquake-like mass displacements of many pedestrians in all possible directions.²¹⁷

Another states more simply, “[c]rowds create equality.”²¹⁸ 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 movements.²¹⁹ 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.²²⁰ 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.²²¹ 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.²²²

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 a 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 had 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. 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.²²³ Immediately prior to the start of the match, over

²¹⁷ Moussaïd et al., *supra* note 46, at 6886.

²¹⁸ PETER E. TARLOW, *EVENT RISK MANAGEMENT AND SAFETY* 90 (2002).

²¹⁹ *Id.*; Adelman, *supra* note 22, at 19; Fruin, *Causes and Prevention*, *supra* note 31, at 4.

²²⁰ Pin et al., *supra* note 58, at 287.

²²¹ Lee & Hughes, *supra* note 46, at 579.

²²² *Id.*

²²³ John Seabrook, *Crush Point*, *THE NEW YORKER* (Feb. 7, 2011), <http://www.newyorker.com/magazine/2011/02/07/crush-point>.

5,000 fans of the Liverpool team were crowded outside of their designated entrance into the stadium.²²⁴ 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.²²⁵ Thousands of fans streamed through the now-opened gates, through a tunnel, and into two, already crowded, standing-room-only pens.²²⁶ 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 the barrier between the pens and the pitch.²²⁷ 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.”²²⁸ 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.”²²⁹ 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.²³⁰ 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. . . .”²³¹

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

²²⁴ Taylor, *supra* note 69, at 11.

²²⁵ *Id.* at 11–12.

²²⁶ *Id.* at 12–13.

²²⁷ *Id.* at 13.

²²⁸ Rose Challenger & Chris W. Clegg, *Crowd Disasters: A Socio-Technical Systems Perspective*, 6 CONTEMPORARY SOC. SCI. 343, 348–49 (2011).

²²⁹ *Id.* at 349.

²³⁰ *See id.* at 348–49.

²³¹ Johnson, *supra* note 67, at 369–70.

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 plaintiffs' injuries, thus defeating a finding of proximate causation.²³² Defendants raise this argument frequently in crowd crush cases,²³³ asserting that the acts of "the extraordinarily rude crowd . . . intervened to create the dangerous circumstances" independently of the acts or omissions of the defendants.²³⁴ Thus, they conclude, the crowd crush was unforeseeable, arguing that this breaks the chain of causation.²³⁵

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,"²³⁶ "thugs,"²³⁷ or "animals."²³⁸ 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 h]aving numbed their brains on weeds, chemicals, and Southern Comfort."²³⁹ 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.²⁴⁰ 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

²³² See FRUMER & FRIEDMAN, *supra* note 124 ("[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 v. New York*, 143 A.D.2d 301, 306 (N.Y. App. Div. 1988); *Glatfelter v. Delta Air Lines*, 558 S.E.2d 793, 796–97 (Ga. Ct. App. 2002).

²³³ 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 Oct. 16, 2015).

²³⁴ Dawson, *supra* note 21, at 811.

²³⁵ L. Stacy Weaver, Jr., *Department Store Liability in Rush Sales*, 2 DUKE B.J. 90, 90, 92–95 (1951).

²³⁶ Michael Pravica, Letter to the Editor, *A Black Friday Sale Shouldn't Make Us Barbarians*, N.Y. TIMES (Dec. 1, 2008), <http://www.nytimes.com/2008/12/02/opinion/02walmart.html>.

²³⁷ Festivus, Comment to *On Long Island, Black Friday Crowd Kills Wal-Mart Employee*, SI LIVE (Nov. 29, 2008), http://www.silive.com/news/index.ssf/2008/11/on_long_island_black_friday_cr.html.

²³⁸ Berger, *supra* note 26, at A1, B8.

²³⁹ Mike Royko, Opinion, *The New Barbarians: A Glimpse into the Future*, CIN. POST, Dec. 6, 1979, at 7; see also Johnson, *supra* note 67, at 362.

²⁴⁰ 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>.

faulted, among other groups, “the spectators themselves” for “surging towards the gymnasium doors with a total disregard for their fellow attendees and school property.”²⁴¹

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 1983.²⁴² In late July of that year, Diana Ross held a free concert in the park.²⁴³ A “tremendous crowd” showed up and people were “jammed in like sardines.”²⁴⁴ At some point during the performance, a rumor rippled through the crowd that a lion was on the loose and a large portion of the crowd attempted to flee.²⁴⁵ 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].”²⁴⁶ In the course of the rush, the plaintiff was knocked down, trampled, and injured.²⁴⁷ 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.²⁴⁸

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.”²⁴⁹ 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.”²⁵⁰

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

²⁴¹ Berger, *supra* note 26, at A1, B8.

²⁴² *Rotz v. New York*, 143 A.D.2d 301, 301–02 (N.Y. App. Div. 1988).

²⁴³ *Id.*

²⁴⁴ *Id.* at 302.

²⁴⁵ *Id.*

²⁴⁶ *Id.*

²⁴⁷ *Id.*

²⁴⁸ *Id.*

²⁴⁹ *Id.* at 303.

²⁵⁰ *Id.* at 304.

start breaking causal chains. Such unfree, nonvoluntary behavior is just another link in the causal chain, no different than other caused events.²⁵¹

But crowd science demonstrates that this is precisely what occurs during crowd crush incidents:²⁵² the movements and actions of crowd members are “unfree, nonvoluntary behavior.”²⁵³ As explained at length above, once crowd density 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.”²⁵⁴ 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 him.²⁵⁵ Given that the crowd was “jammed in like sardines” around him, it seems virtually certain that the crowd movements that caused his injuries were wholly involuntary on the part of individual crowd members.²⁵⁶

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.²⁵⁷

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.”²⁵⁸ The appellate court’s analysis of the intervening, superseding cause defense is far more accurate

²⁵¹ Michael S. Moore, *The Metaphysics of Causal Intervention*, 88 CAL. L. REV. 827, 867–68 (2000).

²⁵² See Moussaïd et al., *supra* note 46 at 2885 (“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.”).

²⁵³ Moore, *supra* note 251, at 868; see also Helbing, *supra* note 21, at 967; Adelman, *supra* note 22, at 19.

²⁵⁴ Fruin, *Crowd Dynamics*, *supra* note 45.

²⁵⁵ *Rotz*, 143 A.D.2d at 301, 304–05.

²⁵⁶ See *id.* at 302.

²⁵⁷ *Id.* at 305.

²⁵⁸ *Id.* at 306.

and far less scientifically problematic.²⁵⁹ 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.²⁶⁰ The court explained:

The [lower] 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 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."²⁶¹

Indeed, if the plaintiff's description of the density of the crowd immediately prior to his injuries was correct, it was highly foreseeable that a crowd-related injury would occur, and thus proximate cause was clearly satisfied in that case.²⁶² This is a critical legal point in crowd crush litigation that courts often miss: from a scientific perspective, it is absolutely foreseeable that crowd crush-related injuries and deaths may occur when crowds reach high densities. Liability should turn on whether the defendants (a) knew or should have known that crowds within the relevant physical space could reach high densities, and (b) took reasonable steps to reduce that risk. Instead, as the cases above demonstrate, courts often overlook this analysis entirely.

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,"²⁶³ and thus assumption of the risk is a commonly raised defense.²⁶⁴ 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

²⁵⁹ *See id.*

²⁶⁰ *Id.*

²⁶¹ *See id.* at 305–06 (citing *Derdarian v. Felix Contr. Corp.*, 414 N.E.2d 666, 671 (N.Y. 1980)).

²⁶² *Id.* at 302; Helbing, *supra* note 21, at 968; Lee & Hughes, *supra* note 46, at 581.

²⁶³ Drechsler, *supra* note 199, at 38.

²⁶⁴ 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.

of the risk and appreciate[d] its unreasonable character" (implied assumption of the risk).²⁶⁵ 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.²⁶⁶ While courts generally uphold waivers made knowingly, voluntarily, and with a full appreciation for the significance of the waiver, 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.²⁶⁷ This scrutiny often means "that an exculpatory clause with no signature will likely be held unenforceable."²⁶⁸

Second, "courts will invalidate express assumption of risk in cases in which it would directly contravene public policy."²⁶⁹ 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.²⁷⁰ Accordingly, there do not appear to be any cases in which an express assumption 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,"²⁷¹ a long line of cases supports the notion that individuals who freely join a dense crowd automatically assume the risk of any hazard that joining the crowd produces.²⁷² 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.²⁷³ She was seated immediately adjacent to an aisle that became "overcrowded by patrons and spectators who apparently were unable to find

²⁶⁵ RESTATEMENT (SECOND) OF TORTS § 496D (AM. LAW INST. 1965).

²⁶⁶ Ellis, *supra* note 35, at 614–15.

²⁶⁷ *Id.* at 617.

²⁶⁸ *Id.*

²⁶⁹ *Id.* at 615.

²⁷⁰ See Adelman, *supra* note 22, at 22 (quotation omitted); see also Ellis, *supra* note 35, 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.").

²⁷¹ Weaver, *supra* note 235, at 97.

²⁷² Little v. Butner, 348 P.2d 1022, 1030 (Kan. 1960).

²⁷³ *Klish v. Alaskan Amusement Co.*, 109 P.2d 75, 75 (Kan. 1941).

seats.²⁷⁴ 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.²⁷⁵ In the resulting litigation, the court ruled for the defendant, 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.²⁷⁶

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.²⁷⁷ Other legal scholars have argued that this should be a bright line rule: spectators injured by crowds at entertainment venues are barred from recovery "because the dangerous risks are inherent and obvious."²⁷⁸

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 theories behind a successful implied assumption of the risk defense.²⁷⁹ 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.²⁸⁰ To the extent that an individual is joining lower-density crowds, that individual is not voluntarily taking on an inherent risk of crowd crush injuries because such injuries are extremely unlikely to occur.²⁸¹

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."²⁸² 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."²⁸³ Baseball necessarily involves fast-moving projectiles that often stray from the formal, bounded area of play, and so live baseball spectatorship virtually always

²⁷⁴ *Id.* at 75–76.

²⁷⁵ *Id.* at 76.

²⁷⁶ *Id.*

²⁷⁷ *See id.*

²⁷⁸ Ellis, *supra* note 35, at 624.

²⁷⁹ *See* Hubner v. Spring Valley Equestrian Ctr., 1 A.3d 618, 628 (N.J. 2010) (setting forth the theories behind an implied assumption of the risk defense).

²⁸⁰ Oberhagemann, *supra* note 49, at 11; Lee & Hughes, *supra* note 46, at 576.

²⁸¹ *See* Oberhagemann, *supra* note 49, at 13.

²⁸² Drechsler, *supra* note 199, § 38.

²⁸³ Adelman, *supra* note 22, at 22 (quoting *Gallagher v. Cleveland Browns Football Co.*, 638 N.E.2d 1082, 1089 (Ohio Ct. App. 1994)).

carries with it the possibility of harm from encountering one of them.²⁸⁴ 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."²⁸⁵ 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 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.²⁸⁶

In situations where crowds are likely to assemble, venue owners and event managers are best positioned to reduce the likelihood of crowd injuries.²⁸⁷ 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."²⁸⁸ 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.²⁸⁹ Courts should thus treat crowd crush cases, particularly those arising out of crowd incidents in formal entertainment or athletic venues, as 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.²⁹⁰ Ruling otherwise

²⁸⁴ See *id.*

²⁸⁵ *Id.*

²⁸⁶ Ellis, *supra* note 35, at 619–20.

²⁸⁷ See Fruin, *Causes and Prevention*, *supra* note 31, at 9; see also Fruin, *supra* note 45 (discussing the need for efficient crowd management).

²⁸⁸ Fruin, *Crowd Dynamics*, *supra* note 45.

²⁸⁹ Fruin, *Causes and Prevention*, *supra* note 31, at 9; see also Fried & Metchick, *supra* note 30, at 162–63 (detailing a number of inexpensive and easy ways for venue owners to have prevented the Camp Randall Stadium crowd crush).

²⁹⁰ See Adelman, *supra* note 22, 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,

would be “overly harsh and would further encourage venue owners to disregard adequate measures to protect [crowd members].”²⁹¹

Second, even assuming *arguendo* that all crowds did carry an inherent risk of crowd crush injuries, the risk of such injuries is 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 was readily apparent and that plaintiffs were thus able to make an “informed choice” about taking it on.²⁹² 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 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.²⁹³

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 spaces 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.²⁹⁴ Furthermore, changes in scheduled events may come as a surprise to spectators and cause the sudden development of a high density crowd. The plaintiffs in *Custini*, the case arising out of the crowd crush at Radio City Music Hall, for instance, almost certainly had no reason to believe that they were taking on the risk of crowd crush injuries by attending a show at that venue.²⁹⁵ Such risks arose out of an unexpected event: the cancellation of the show

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.”).

²⁹¹ Ellis, *supra* note 35, at 624.

²⁹² See Adelman, *supra* note 22, at 22.

²⁹³ *Id.*

²⁹⁴ See generally *Promoter Pledges to Review Safety*, *supra* note 175 (reporting on the 2013 crowd crush at the country music festival in County Tyrone, Ireland); see also *Complaints of ‘Crush’*, *supra* note 175 (detailing the concert-goers’ descriptions of the 2013 crowd crush).

²⁹⁵ *Custini v. Radio City Prods., LLC*, No. 604084/2006, slip op. at 1–2 (N.Y. Sup. Ct., July 27, 2009).

and the rush of audience members to return items to the Hall's concession stands.²⁹⁶

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.²⁹⁷ Crowd crush injuries are also severely underreported.²⁹⁸ 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.²⁹⁹

Thus, individuals confronted with a crowd at a store, a music performance, a sporting event, or arguably in any other context in the United States, have no reason to believe that they are risking crowd-related injuries or death.³⁰⁰

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.

²⁹⁶ *Id.*

²⁹⁷ See Adelman, *supra* note 22, at 22.

²⁹⁸ E.g., Dawson, *supra* note 21, at 764; Ellis, *supra* note 35, at 608.

²⁹⁹ Dawson, *supra* note 21, at 793–94.

³⁰⁰ See *id.*; see also Adelman, *supra* note 22, 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.”).

A. 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:³⁰¹ 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.³⁰² 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.³⁰³ 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.

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.³⁰⁴ Someone calculating the density of the entire crowd would have generated results that would not have adequately captured the risk of injury to the plaintiff in the moments immediately preceding her injury.³⁰⁵ 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

³⁰¹ See Lee & Hughes, *supra* note 46, at 579.

³⁰² See *id.* at 581.

³⁰³ See *id.* 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.

³⁰⁴ See *Custini v. Radio City Prods., LLC*, No. 604084/2006, slip op. at 2 (N.Y. Sup. Ct., July 27, 2009).

³⁰⁵ See *id.*

claim would be very strong,³⁰⁶ and attention should turn to the extent to which the crowd crush was foreseeable by the defendant(s).³⁰⁷ 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.³⁰⁸ 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 above.

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.³⁰⁹ 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.³¹⁰ 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)."³¹¹ 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 density.³¹² 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

³⁰⁶ See Lee & Hughes, *supra* note 46, at 581.

³⁰⁷ See Adelman, *supra* note 22, at 18.

³⁰⁸ See STILL, *supra* note 112, at 65.

³⁰⁹ See e.g., Pin et al., *supra* note 58, at 287; Moussaïd et al., *supra* note 46, at 6884–85; Lee & Hughes, *supra* note 46, at 575–78.

³¹⁰ E-mail from G. Keith Still, Professor of Crowd Science, Manchester Metro. Univ., to author (Feb. 17, 2015, 11:43 AM CST) (on file with author).

³¹¹ *Id.*

³¹² See Pin et al., *supra* note 58, at 287–88; Moussaïd et al., *supra* note 46, at 6885; Lee & Hughes, *supra* note 46, at 576–78.

you had around you?” can help crowd experts “define the local density.”³¹³ 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.

B. 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.*³¹⁴ 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.³¹⁵ 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.”³¹⁶ The plaintiff failed, however, to provide expert testimony on the appropriate standard of care “by which to gauge the defendant’s actions.”³¹⁷ 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 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.³¹⁸

³¹³ E-mail from G. Keith Still, *supra* note 310.

³¹⁴ *Brisbin v. Wash. Sports & Entm’t, Ltd.*, 422 F. Supp. 2d 9 (D.D.C. 2006).

³¹⁵ *Id.* at 11.

³¹⁶ *Id.*

³¹⁷ *Id.* at 13.

³¹⁸ *Id.* (citations omitted).

Accordingly, the court granted the defendant's motion for summary judgment.³¹⁹

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.³²⁰ 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.³²¹ The trial court granted the defendants' motion for summary judgment, stating:

The court finds plaintiff's assertion that "the 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. . . . The 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.³²²

The court of appeals affirmed,³²³ noting that "[w]ithout the expert testimony of one familiar with [crowd management] considerations, the jury would be left to sheer speculation as to various types of crowd control" and what was appropriate under the circumstances.³²⁴ The court strongly believed that this knowledge was "beyond the ken of the average layperson."³²⁵

All courts should reach similar conclusions about the need for expert testimony in crowd crush cases and reject the notion that common sense and conventional wisdom are sufficient tools to analyze the legal and factual issues in these cases.

C. 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

³¹⁹ *Id.* at 16.

³²⁰ See *Hill v. Metro. African Methodist Episcopal Church*, 779 A.2d 906, 907–08 (D.C. 2001).

³²¹ *Id.*

³²² *Id.* at 908.

³²³ *Id.* at 910.

³²⁴ *Id.*

³²⁵ *Id.*

within a given jurisdiction.³²⁶ For instance, consideration of the demographic characteristics of a given crowd—say, that the crowd was primarily composed of middle-aged women—neither “has any 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”³²⁷ because, as explained above, demographic data has little, if any, bearing on whether a crowd crush is likely to occur.³²⁸ 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.

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.³²⁹ 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).³³⁰ 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 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.³³¹

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 cast 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

³²⁶ 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. 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.”).

³²⁷ FED. R. EVID. 401.

³²⁸ See Pin et al., *supra* note 58, 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 & Hughes, *supra* note 46, at 579.

³²⁹ 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.”).

³³⁰ See, e.g., *Lazarus v. Skouras Theatres Corp.*, 11 A.D.2d 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 (Pa. Super. Ct. 1920).

³³¹ See FED. R. EVID. 403.

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."³³² 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.³³³

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 several 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 do so 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 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

³³² Adelman, *supra* note 22, at 22.

³³³ *Id.*

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.