

# Changing Patterns of Violence Pose New Challenges to Public Surface Transportation in the United States

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During the past two decades, the threat of attacks on public surface transportation passengers and staff has changed significantly. While developing countries, especially in South Asia, continue to account for most of the attacks that result in most of the fatalities, countries with advanced economies account for a growing percentage of the incidents. The numbers of such incidents are small, but these countries have also seen an upward trend in the number of fatalities. Since 2016, the United States has taken the lead among the economically advanced countries in total number of incidents and number of incidents with fatalities, and it now ranks third in the number of fatalities.

Many of these incidents are low-level attacks involving primitive weapons such as stabbings and most are carried out by a lone attacker. There are few bombings. Many of the attacks are not ordinary criminal activities such as armed robberies; most have no political nexus. This new phenomenon could be more prevalent.<sup>1</sup> The increase in violence at transportation venues appears to parallel a general increase in random public violence. Some observers blame the behavior on the pandemic, but the trends precede COVID-19. The changes in the threat oblige us to rethink current security strategies.

## The MTI Database

The observations presented in this report emerge from a new configuration of the Mineta Transportation Institute (MTI) database of Terrorist and Serious Criminal Attacks Against Public Surface Transportation. MTI began its chronology of attacks in 1997 and developed a more robust platform of off-line analysis in 2008 and on-line analysis in 2011. The database draws from a variety of media reports and other sources, including the RAND Corporation's chronology of terrorism, which contains incidents occurring from 1968 to 2009, the Global Terrorism Database maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland, and the National Counterterrorism Center's Worldwide Incident Tracking System, as well as extensive media searches and direct contacts with transportation operators.

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1. While we noted the surge in random violence against passengers in all countries, including but not limited to the United States, the structure of MTI's database simply did not lend itself to proper analysis of the phenomenon. And the sources of data were inadequate and unreliable. Fearing that partial reporting would result in incomplete and potentially misleading conclusions, in 2021 we decided to cease counting these events in our database while we explored new data sources and database configurations that would allow us to better capture, analyze, and portray the events. What this means is that the shift from terrorist to anti-social violence throughout the world, but particularly in the United States and perhaps some of the other economically advanced countries, is far greater than what we include in this report. which is why we call for a more robust accounting, and better strategies, for dealing with this problem.

The MTI database contains incidents occurring between January 1, 1970, and July 15, 2022. It documents 5,611 attacks worldwide between 1970 and 2021 targeting passenger trains and train stations; buses and bus stations; passenger ferries and terminals; rail and highway infrastructure, facilities, and offices; and operating personnel and security staff. These attacks resulted in a total of 12,837 deaths and 41,950 injuries. (Including highway, freight train, and miscellaneous transportation targets brings the total to 6,017 attacks resulting in 12,881 fatalities and 42,208 injuries.)

Each of the incidents in the database is catalogued according to date, time (including whether in peak or off-peak hours), place (city, region, country), fatalities and injuries, and whether a suicide was involved. The attacks are categorized according to 74 different targets, consolidated into 11 target groups and 77 attack methods (similarly consolidated into 13 attack method groups).

Bombings are categorized by 11 different types of explosives, whether they were used alone or in combination, and their particular purpose (e.g., derailment, kidnapping, robbery, or hijacking). The database also indicates the number of explosive devices used, how they were concealed or where they were placed (within 46 categories, such as “placed on vehicle road, bridge or tunnel”), and whether they were placed above or below ground, along with one of 8 outcomes, including “detonated on target and on time”; whether multiple devices were used to kill responding forces; and whether the attack was detected and stopped, and if so, by whom. Perpetrators are categorized into one of more than 85 specific attacker groups (e.g., individuals who were apparently mentally disturbed).

(We wish to note that we do not offer nor have any specific diagnoses; the term “mentally disturbed” is used because of descriptions offered in public accounts or court records. Nor do we hold that these individuals should be harmed or incarcerated; rather, that intervention and help is needed earlier)

## **A New Perspective**

The analysis presented in this report reflects a new reconfiguration of the data. It does not consider events before 2004, only those occurring between 2004 and the end of 2021. In its early years, the MTI chronology was more illustrative than comprehensive, and although it is continually being improved (with the addition of missed events and new details to existing entries), concentrating on the recent decades allows more detailed analysis with greater confidence. The elimination of the earlier period also reduces the weight of the early events, thereby allowing the research to more easily discern recent trends. Finally, considering only the more recent incidents avoids the analytical problems arising from the division of Europe into Western and Eastern zones with very different political experiences.

The 18 years examined are divided into nine two-year increments (2004–2005, 2006–2007, etc.), ending with 2020–2021, to smooth out some of the sharp peaks and valleys in the charts and graphs.

The analysis focuses on events occurring in countries with advanced economies, which we label Group 1; the trends are then compared with those seen in countries with developing economies, which we label Group 2. Group 1 includes the United States, Canada, Europe (excluding Russia),

East Asia (Japan, the Republic of Korea, Taiwan, and Hong Kong), Australia, New Zealand, Singapore, and three Latin American countries (Chile, Costa Rica, and Mexico). These countries, along with Colombia and Turkey, constitute the membership of the Organization for Economic Co-operation and Development (OECD). Colombia and Turkey are not included in this analysis because of their histories of political violence. Colombia joined the OECD in 2020, but the high levels of political violence recorded in previous years—an insurgency was ended (at least partially) in 2016—would distort the analysis. Turkey has experienced continued terrorist violence as a consequence of an on-going insurgency. Israel is also excluded from Group 1 because of the high levels of terrorist violence occurring there over the past two decades.

The division of countries into Group 1 and Group 2 is not intended to be a political statement; rather, it allows us to more precisely portray the threat faced by the countries with advanced economies. The levels and patterns of attacks on public surface transportation in the two groups differ significantly. A number of the countries in Group 2 face long-running insurgencies that have produced much higher volumes of violence with far more casualties. The tactics used by the attackers also differ, with Group 2 countries experiencing far more bombings. Group 2 has experienced more than seven times the number of attacks on Group 1 countries and would thereby overwhelm the statistics, distorting the threat landscape faced by Group 1. (A planned future report will explore trends in the Group 2 countries.)

Finally, this analysis focuses on a subset of target groups: passenger trains; passenger train stations; passenger buses (including tourist, school, and chartered buses); bus stations and stops; all rail infrastructure, including railway tracks, tunnels and bridges, and signaling, control and power systems; and operating personnel and facilities and security personnel—persons deployed to operate, service, and protect the public surface transport services.

The following transportation targets are not included: freight trains and stations; vehicle highways, tunnels, and bridges (most attacks against these targets occur in Group 2 countries); UN convoys; and miscellaneous targets or multiple targets not clearly identified with a specific target group. This eliminates 727 attacks, or 16% of the 4,564 attacks that occurred between 2004 and the end of 2021.

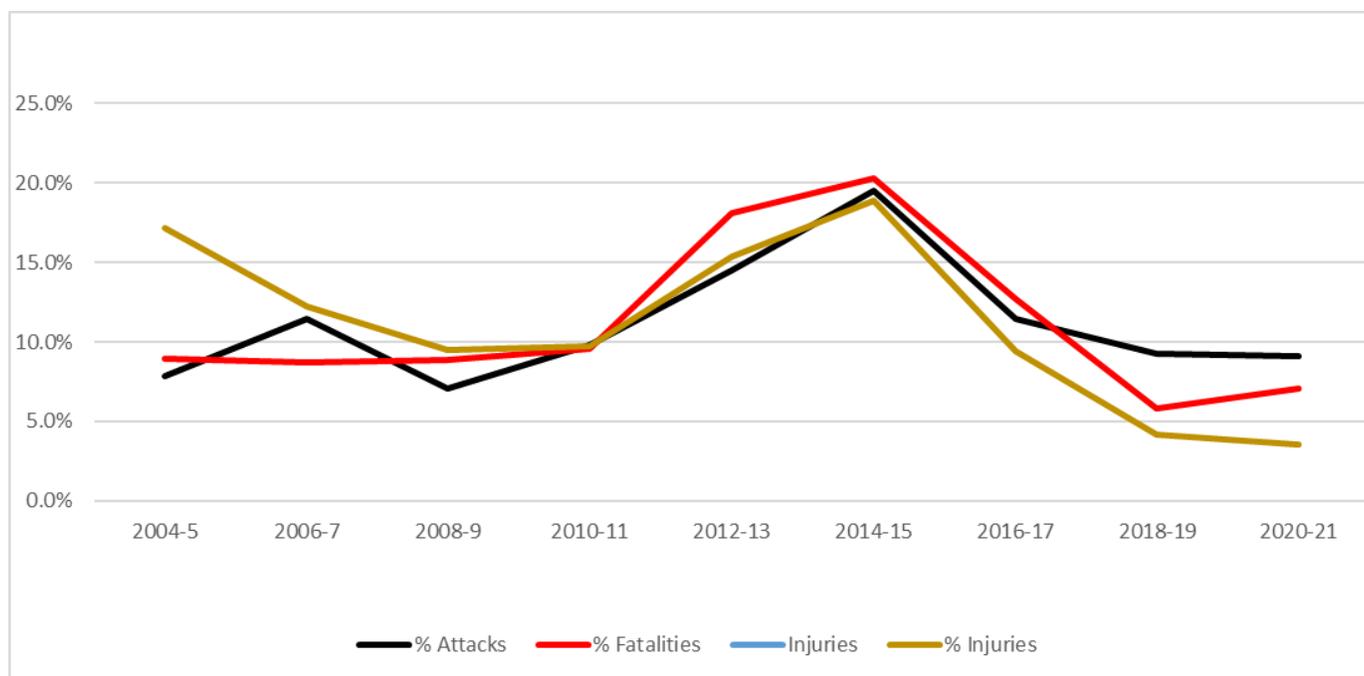
## **Global Trends**

Between January 1, 2004, and December 31, 2021, there were a total of 3,837 attacks on the targets considered here (Table 1). These attacks resulted in 7,406 fatalities and 22,715 injuries. The overall lethality rate was 1.9 fatalities per attack (FPA).

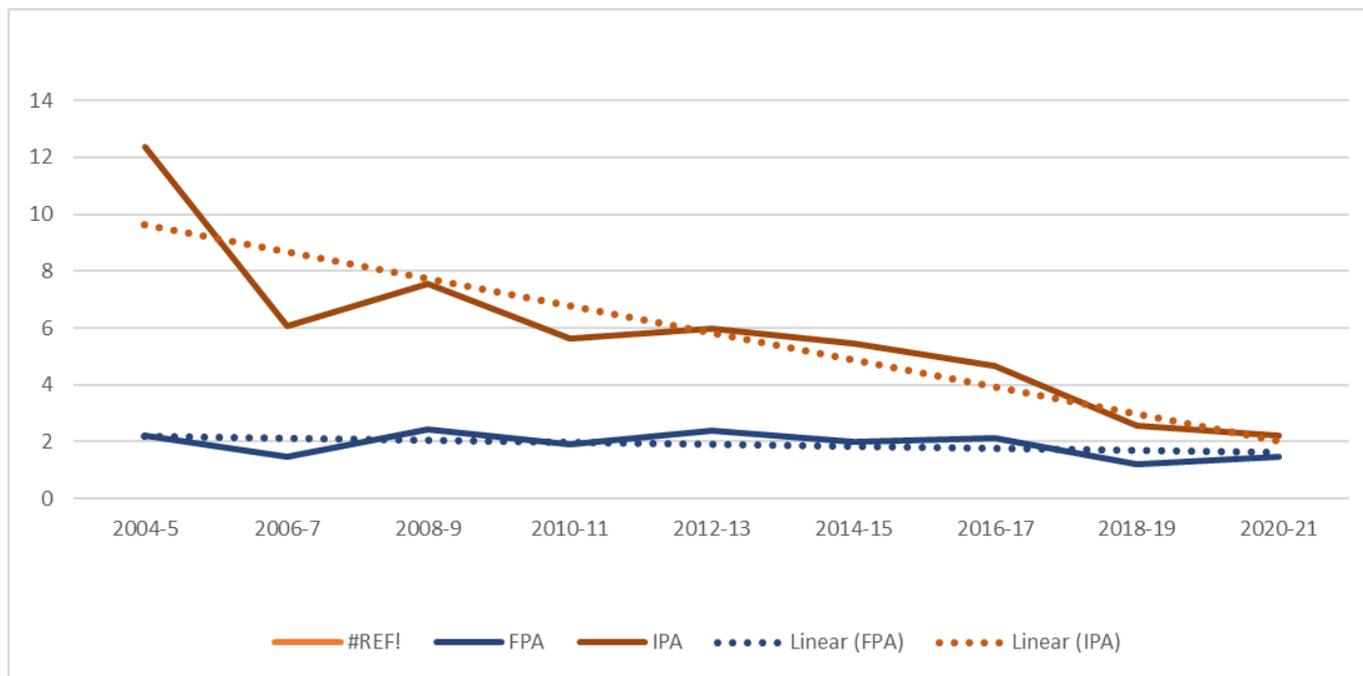
**Table 1. Total Attacks, Fatalities, and Injuries in Selected Target Groups**

Time Period	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
2004-5	302	7.9	664	9.0	3730	17.2	2.2	12.4
2006-7	438	11.4	642	8.7	2658	12.2	1.5	6.1
2008-9	272	7.1	656	8.9	2059	9.5	2.4	7.6
2010-11	375	9.8	710	9.6	2109	9.7	1.9	5.6
2012-13	556	14.5	1340	18.1	3336	15.4	2.4	6.0
2014-15	749	19.5	1502	20.3	4097	18.9	2.0	5.5
2016-17	440	11.5	941	12.7	2044	9.4	2.1	4.6
2018-19	355	9.3	429	5.8	914	4.2	1.2	2.6
2020-21	350	9.1	522	7.0	769	3.5	1.5	2.2
Total/Percentages/Averages	3837	100.0	7406	100.0	21715	100.0	1.9	5.7

Figure 1 shows a decline in the number of attacks, fatalities, and injuries between 2004–2005 and 2008–2009, then an increase to a high point in 2014–2015. Figure 2 shows a very gradual decline in FPA.



**Figure 1. Attacks and Casualties Over Time**



**Figure 2. Lethality of Attacks Over Time**

Table 2 compares events in the Group 1 and Group 2 countries. For the entire 18-year period, Group 2 countries account for nearly 88% of the attacks and 95.3% of the fatalities. But while there have been far more attacks and fatalities in the Group 2 countries, there has been a significant change in the trend in recent years: *The percentage of the total number of attacks in Group 1 countries has increased steadily, from 4.5% of the total in 2012-2013 to 35.4% of the total in 2020–2021.*

**Table 2. Comparison of Attacks and Fatalities in Group 1 and Group 2 Countries**

Time Period	Group 1 Attacks		Group 1 Fatalities		Group 2 Attacks		Group 2 Fatalities		Lethality	
	#	% of All	#	% of All	#	% of All	#	% of All	Group 1 FPA	Group 2 FPA
2004-5	23	7.6	243	36.6	279	92.38	421	63.4	10.6	1.5
2006-7	25	5.7	0	0.0	413	94.29	642	100.0	0.0	1.6
2008-9	20	7.4	0	0.0	252	92.65	656	100.0	0.0	2.6
2010-11	18	4.8	4	0.6	357	95.20	706	99.4	0.2	2.0
2012-13	25	4.5	3	0.2	531	95.50	1337	99.8	0.1	2.5
2014-15	47	6.3	6	0.4	702	93.7	1496	99.6	0.1	2.1
2016-17	87	19.8	62	6.6	353	80.2	879	93.4	0.7	2.5
2018-19	99	27.9	20	4.7	256	72.1	409	95.3	0.2	1.6
2020-21	124	35.4	14	2.7	226	64.6	508	97.3	0.1	2.2
Total/Percentages/Averages	468	12.2	352	4.8	3369	87.8	7054	95.2	0.8	2.1

The percentage of fatalities in Group 1 countries also increased, from 0.2% in 2012–2013 to 6.6% in 2016–2017; the percentage of fatalities declined to 2.7% in 2020–2021, but this is still a significant increase over the 2006–2013 period. Group 1 countries had 36.6% of the total fatalities in 2004–2005, but this high figure reflects two large-scale attacks—the Madrid train bombings in 2004 and the London tube and bus bombings in 2005—which resulted in 243 deaths. While tragic, these appear to be statistical outliers.

There is always a concern that the percentages may reflect a reporting bias—the news media pay much more attention to attacks occurring in the economically advanced countries and may ignore low-level attacks in the developing countries. In order to test the validity of the trend, we also examined only incidents with fatalities, thereby eliminating the low-level events recorded in Group 1 countries. The results are shown in Table 3. The percentage of attacks with fatalities occurring in Group 1 is less than it is for all attacks—4.0% of the attacks with fatalities, as opposed to 12.2% of all attacks for the entire period. However, the proportion still increased from 0.5% in 2012–2013 to 12.6% 2020–2021. Therefore, while there may be some bias in the reporting, the overall upward trend holds.

**Table 3. Comparison of Attacks with Fatalities in Group 1 and Group 2 Countries**

Time Period	Group 1 Attacks		Group 1 Fatalities		Group 2 Attacks		Group 2 Fatalities		Lethality	
	#	% of All	#	% of All	#	% of All	#	% of All	Group 1 FPA	Group 2 FPA
2004-5	2	2.9	243	36.6	67	97.1	421	63.4	121.5	6.3
2006-7	0	0.0	0	0.0	101	100.0	642	100.0	0.0	6.4
2008-9	0	0.0	0	0.0	71	100.0	656	100.0	0.0	9.2
2010-11	1	1.0	4	0.6	99	99.0	706	99.4	4.0	7.1
2012-13	1	0.5	3	0.2	221	99.5	1337	99.8	3.0	6.1
2014-15	3	1.1	6	0.4	264	98.9	1496	99.6	2.0	5.7
2016-17	16	11.0	62	6.6	130	89.0	879	93.4	3.9	6.8
2018-19	11	12.2	20	4.7	79	87.8	409	95.3	1.8	5.2
2020-21	13	12.6	14	2.7	90	87.4	508	97.3	1.1	5.6
Total/Percentages/Averages	47	4.0	352	4.8	1122	96.0	7054.2	95.2	7.5	6.3

The lower percentage of attacks with fatalities in Group 1 countries also reflects the nature of attacks on surface transportation in those countries: Many of the attacks are focused on environmental and related issues and are intended to be symbolic or disruptive rather than deadly. Attacks in Group 2 countries remain far more lethal (if we remove the London and Madrid fatalities in the 2004-5 period, the overall FPA for Group 1 countries would fall from 7.5 to 2.3).

Comparing trends in the two groups, Figure 3 shows that the number of attacks in the Group 2 countries climbs to a high point in 2014–2015, then declines sharply. The trend in the Group 1 countries is gradually upward. Correspondingly, as shown in Figure 4, the percentage of attacks in Group 2 countries declines as the percentage in Group 1 countries increases.

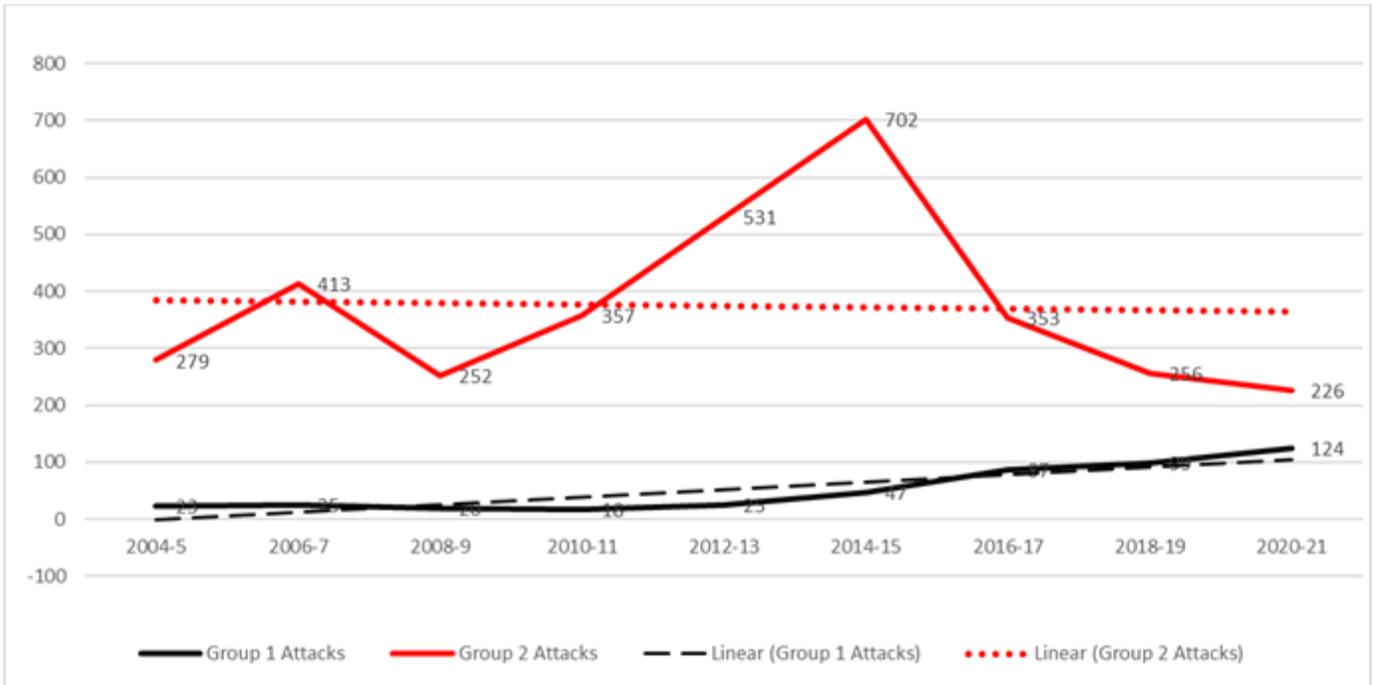


Figure 3. Number of Attacks in Country Groups Over Time

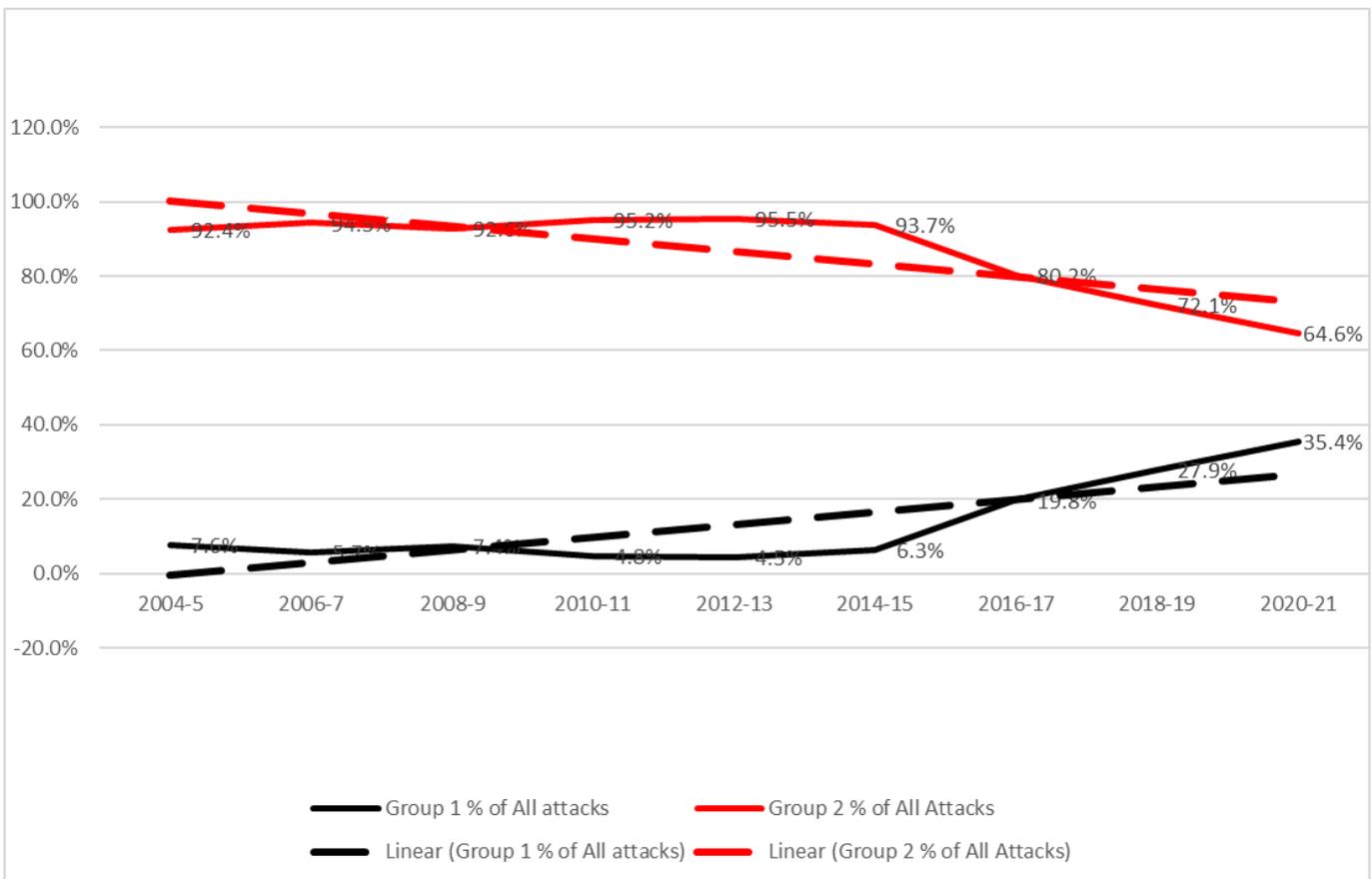
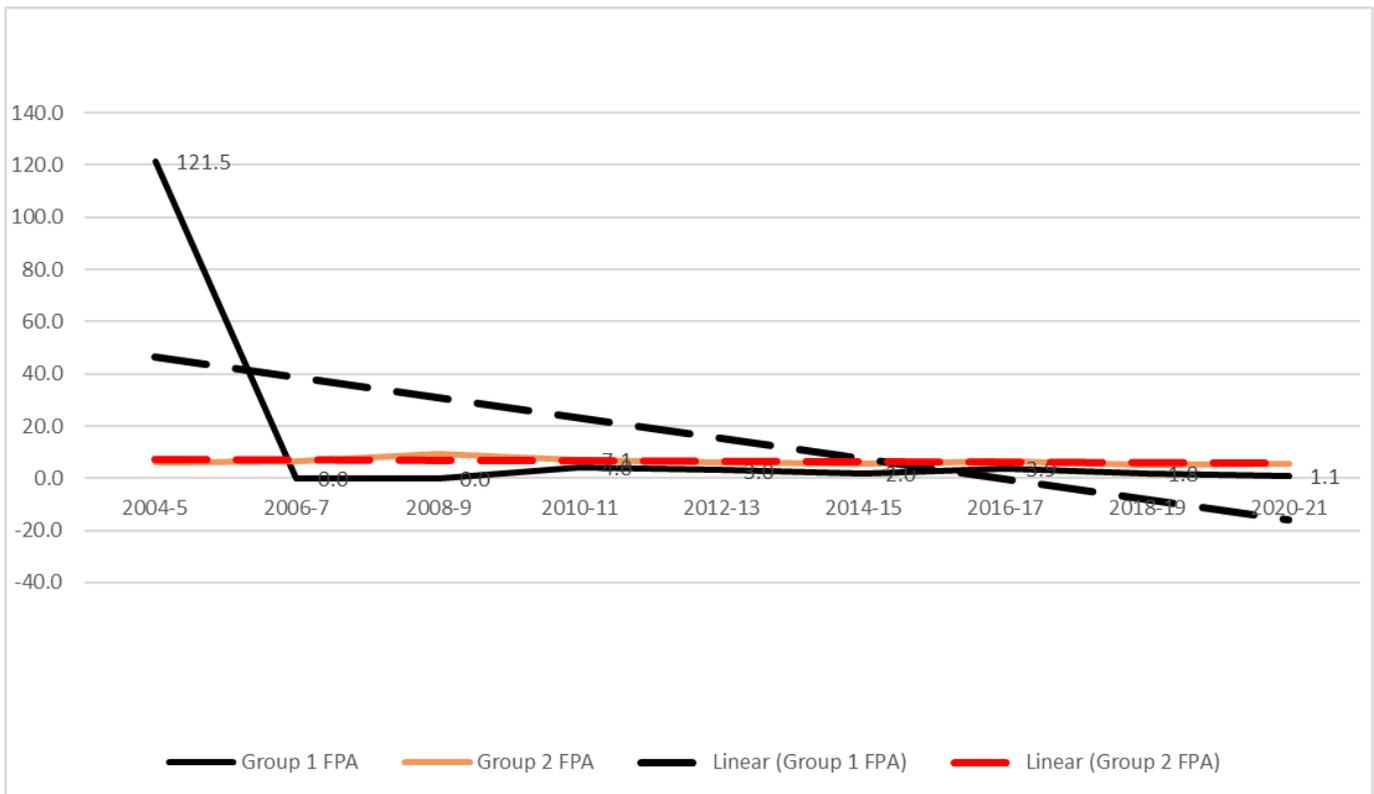


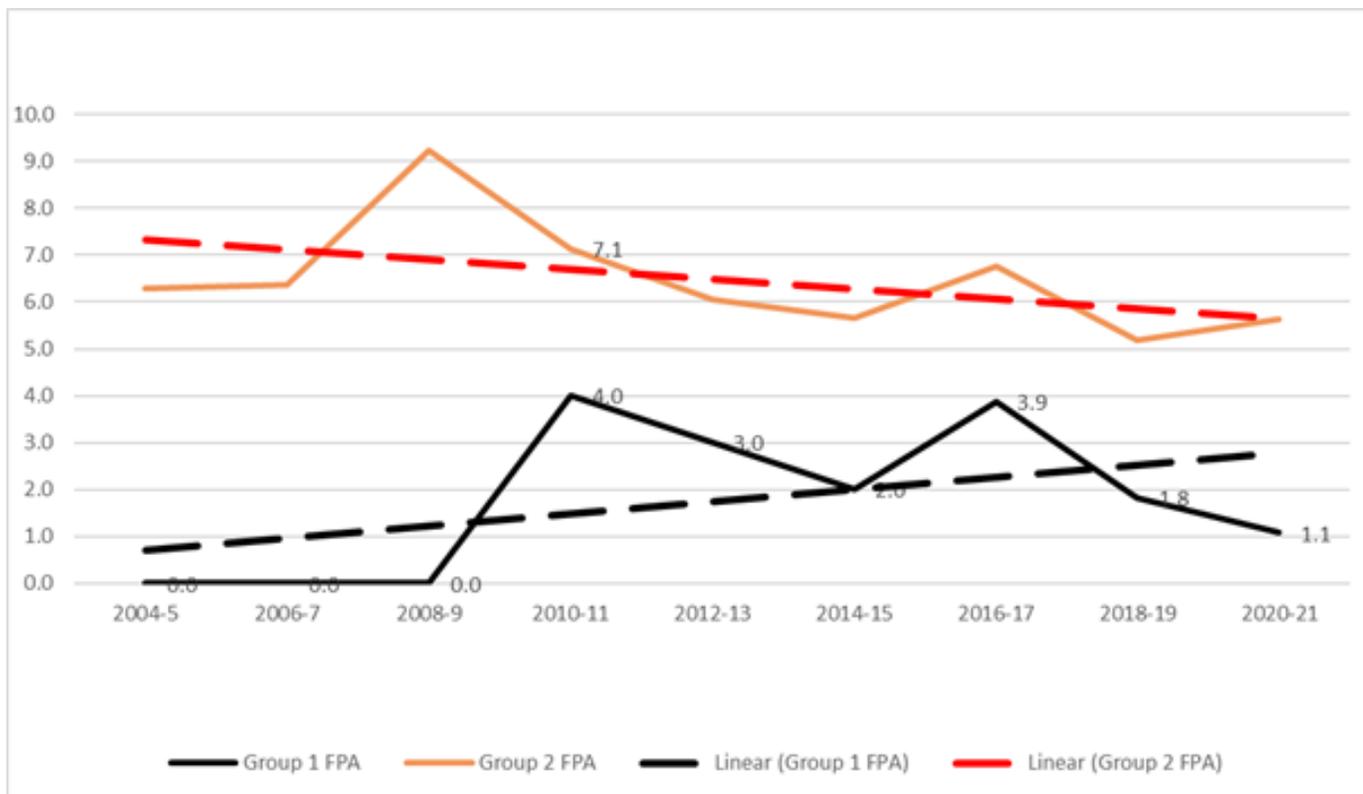
Figure 4. Percentage of Attacks in Country Groups Over Time

Total fatalities in Group 1 countries declined during the 18-year period covered in this analysis, but again this is due to the two statistical outliers (the Madrid and London attacks). Excluding these attacks, the number of fatalities reached another peak in 2016–2017 period, then declined. Putting aside this one peak, the trend line gradually ascends. When we consider only incidents with fatalities, there is a gradual increase in both Group 1 and Group 2 countries over time, but there is a gradual decline in the percentage of attacks in Group 2 countries and a gradual increase in the percentage in Group 1 countries.

As shown in Figure 5, the lethality of incidents with fatalities declined in Group 1 countries and increased very gradually in the Group 2 countries. If, however, the attacks in Madrid and London are excluded (see Figure 6), there is a trend toward greater lethality in the Group 1 countries.



**Figure 5. Lethality of Fatal Attacks by Country Group**



**Figure 6. Lethality of Fatal Attacks by Country Group (Excluding Madrid and London bombings)**

In sum, *Group 1 countries are accounting for an increasing percentage of the total number of attacks and fatalities in the world—and the increase appears real. The lethality of attacks in Group 1 countries, excluding the two outliers, is also increasing.* In the following sections, we explore these trends in greater detail, concentrating on patterns and trends in the Group 1 countries.

### Patterns and Trends in the Group 1 Countries

Limiting the analysis to the Group 1 countries results in much smaller numbers—a total of 468 attacks—but some patterns and trends can still be readily discerned. As Table 4 shows, Europe has been the theater of most activity, accounting for 51.9% of the attacks.

**Table 4. Attacks in Group 1 Countries by Region**

Region	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Europe	243	51.9	289	82.1	3014	89.9	1.2	12.4
North America	168	35.9	28	8.0	159	4.7	0.2	0.9
East Asia	26	5.6	33	9.4	140	4.2	1.3	5.4
South America	19	4.1	0	0.0	18	0.5	0.0	0.9
Australasia & Oceania	10	2.1	2	0.6	21	0.6	0.2	2.1
Southeast Asia	2	0.4	0	0.0	2	0.1	1.2	14.6
TOTAL/PERCENTAGES/AVERAGES	468	100.0	352	100.0	3354	100.0	0.8	7.2

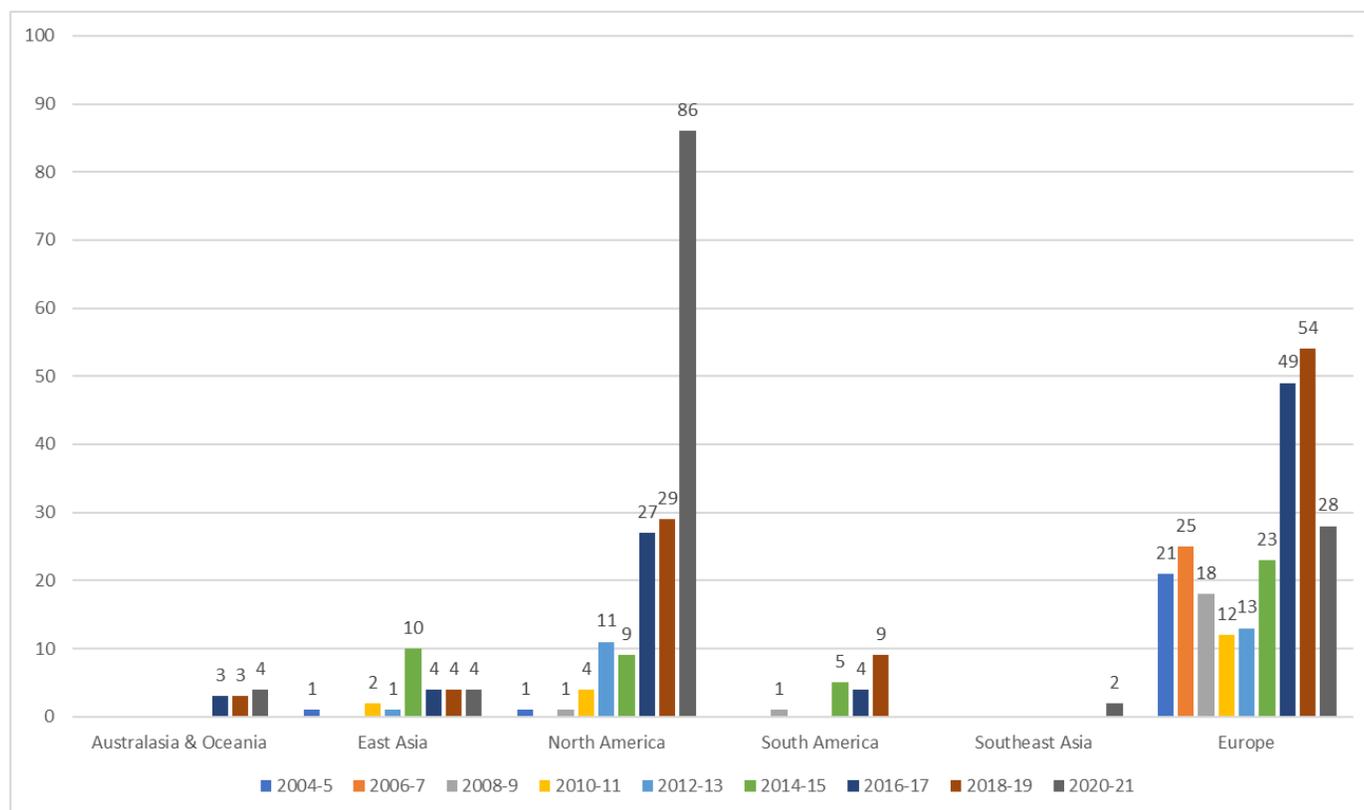
Many of these attacks were disruptive or symbolic acts of sabotage—only 10% of them resulted in fatalities. If we consider only incidents with fatalities, North America has the greatest number and percentage of attacks (Table 5).

**Table 5. Fatal Attacks in Group 1 Countries by Region**

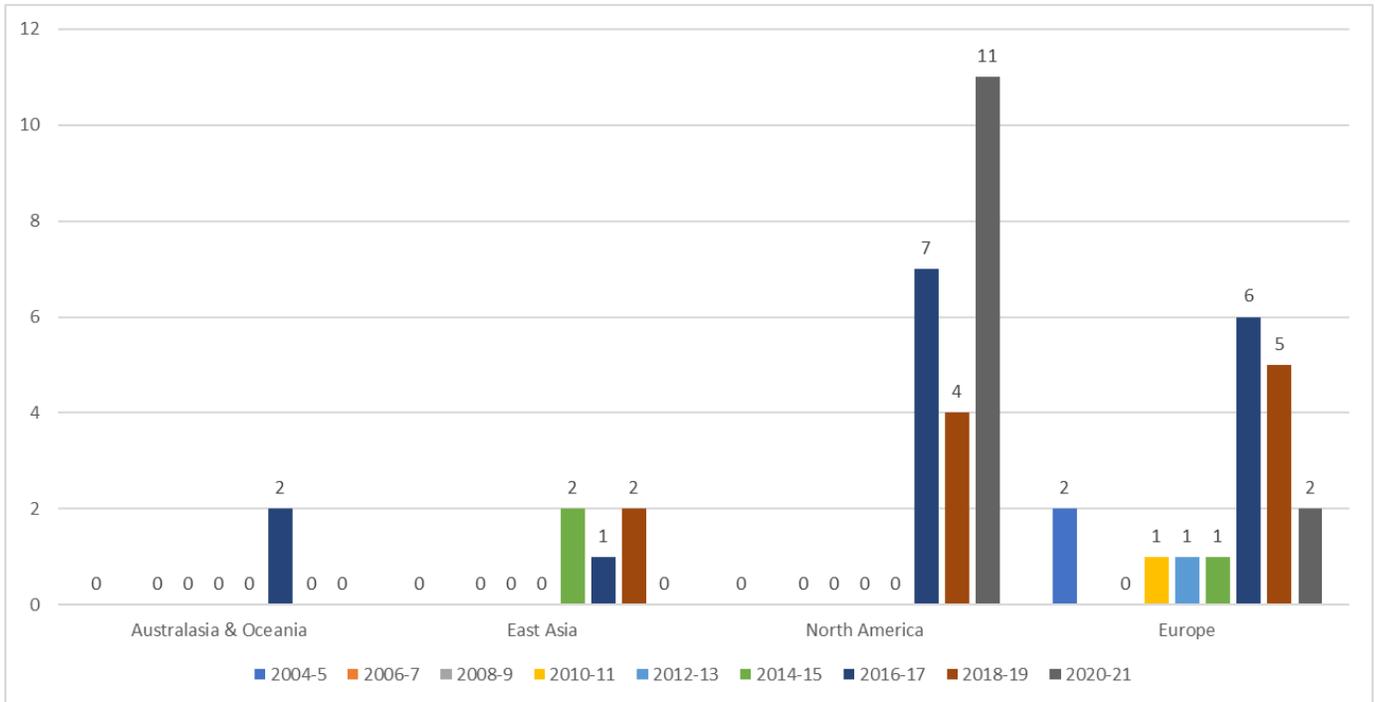
Region	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
North America	22	46.8	28	8.0	37	1.3	1.3	1.7
Europe	18	38.3	289	82.1	2823	96.5	16.1	156.8
East Asia	5	10.6	33	9.4	66	2.3	6.6	13.2
Australasia & Oceania	2	4.3	2	0.6	0	0.0	1.0	0.0
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>47</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>2926</b>	<b>100.0</b>	<b>7.5</b>	<b>62.3</b>

Europe has the highest lethality rate, owing to three attacks—the 2004 attack in Madrid, which killed 191 people; the 2005 attack in London, which killed 52; and a 2016 attack in Brussels, which killed 20. East Asia’s high lethality rate is driven by a single deadly arson attack in Taiwan in July 2016, which resulted in 25 fatalities. If these four attacks are not considered, the lethality rates for these regions drop to 1.3 for Europe and 1.4 for East Asia, close to or at the general lethality rate for all of Group 1 countries, which is 1.3 drop to 1.3 fatality per attack,

Figure 7 shows that the volume of attacks is increasing in Europe and is increasing even more sharply in North America. This is not simply the reflection of a reporting bias. If we consider only incidents with fatalities, there is still a significant increase in the number of attacks in North America (Figure 8).



**Figure 7. Attacks in Group 1 Regions**



**Figure 8. Fatal Attacks in Group 1 Regions**

## Individual Country Data

Since 2004, 80% of all the attacks in the Group 1 countries have occurred in just eight nations: the United States, the United Kingdom, Germany, Spain, France, Canada, Chile, and Italy. As shown in Table 6, 29.7% of all the attacks in Group 1 occurred in the United States.

**Table 6. Attacks by in Group 1 Countries**

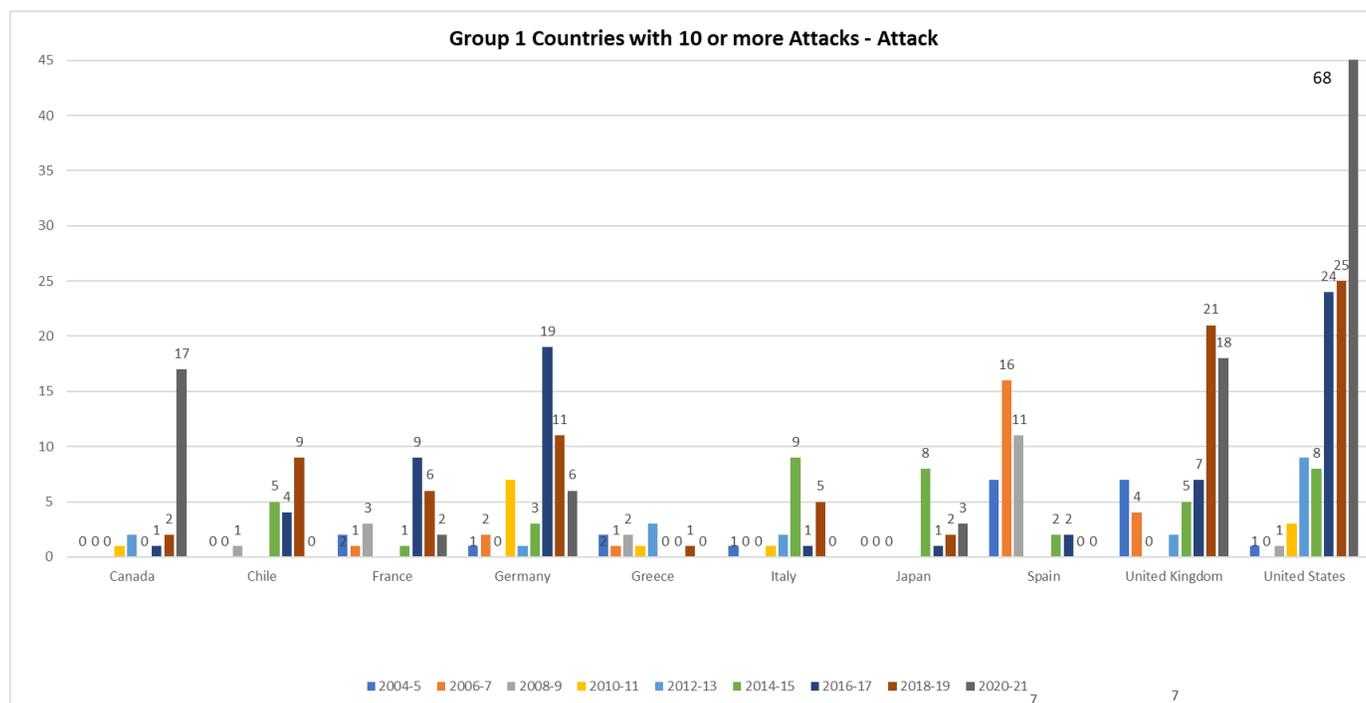
Country	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
United States	139	29.7	22	6.3	153	4.6	0.2	1.1
United Kingdom	64	13.7	53	15.1	749	22.3	0.8	11.7
Germany	50	10.7	4	1.1	72	2.1	0.1	1.4
Spain	38	8.1	191	54.3	1834	54.7	5.0	48.3
France	24	5.1	6	1.7	28	0.8	0.3	1.2
Canada	23	4.9	1	0.3	4	0.1	0.0	0.2
Chile	19	4.1	0	0.0	18	0.5	0.0	0.9
Italy	19	4.1	0	0.0	7	0.2	0.0	0.4
Japan	14	3.0	4	1.1	73	2.2	0.3	5.2
Greece	10	2.1	0	0.0	0	0.0	0.0	0.0
Australia	8	1.7	2	0.6	20	0.6	0.3	2.5
Belgium	7	1.5	24	6.8	301	9.0	3.4	43.0
Ireland	7	1.5	0	0.0	0	0.0	0.0	0.0
Mexico	6	1.3	5	1.4	2	0.1	0.8	0.3
Taiwan	6	1.3	29	8.2	49	1.5	4.8	8.2
Hong Kong	4	0.9	0	0.0	18	0.5	0.0	4.5
Finland	3	0.6	0	0.0	0	0.0	0.0	0.0
Sweden	3	0.6	2	0.6	0	0.0	0.7	0.0
Switzerland	3	0.6	2	0.6	4	0.1	0.7	1.3
Netherlands	2	0.4	4	1.1	3	0.1	2.0	1.5
New Zealand	2	0.4	0	0.0	1	0.0	0.0	0.5
Norway	2	0.4	3	0.9	0	0.0	1.5	0.0
Poland	2	0.4	0	0.0	13	0.4	0.0	6.5
Singapore	2	0.4	0	0.0	2	0.1	0.0	1.0
Slovenia	2	0.4	0	0.0	0	0.0	0.0	0.0
South Korea	2	0.4	0	0.0	0	0.0	0.0	0.0
Austria	1	0.2	0	0.0	2	0.1	0.0	2.0
Croatia	1	0.2	0	0.0	0	0.0	0.0	0.0
Cyprus	1	0.2	0	0.0	0	0.0	0.0	0.0
Czech Republic	1	0.2	0	0.0	0	0.0	0.0	0.0
Denmark	1	0.2	0	0.0	0	0.0	0.0	0.0
Hungary	1	0.2	0	0.0	0	0.0	0.0	0.0
Luxembourg	1	0.2	0	0.0	1	0.0	0.0	1.0
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>468</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>3354</b>	<b>100.0</b>	<b>0.8</b>	<b>7.2</b>

Again, the disparity does not reflect a reporting bias. Limiting the data to incidents with fatalities, the United States still leads, with 42.6% of the total number of attacks, almost four times more attacks than in France, which is in second place, and five times more than in Germany, in third place (Table 7).

**Table 7. Fatal Attacks in Group 1 Countries**

Country	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
United States	20	42.6	22	6.3	36	1.2	1.1	1.8
France	5	10.6	6	1.7	12	0.4	1.2	2.4
Germany	4	8.5	4	1.1	11	0.4	1.0	2.8
Japan	3	6.4	4	1.1	45	1.5	1.3	15.0
United Kingdom	2	4.3	53	15.1	700	23.9	26.5	350.0
Taiwan	2	4.3	29	8.2	21	0.7	14.5	10.5
Belgium	2	4.3	24	6.8	295	10.1	12.0	147.5
Australia	2	4.3	2	0.6	0	0.0	1.0	0.0
Spain	1	2.1	191	54.3	1800	61.5	191.0	1800.0
Mexico	1	2.1	5	1.4	1	0.0	5.0	1.0
Norway	1	2.1	3	0.9	0	0.0	3.0	0.0
Sweden	1	2.1	2	0.6	0	0.0	2.0	0.0
Switzerland	1	2.1	2	0.6	4	0.1	2.0	4.0
Canada	1	2.1	1	0.3	0	0.0	1.0	0.0
Netherlands	1	2.1	4	1.1	1	0.0	4.0	1.0
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>47</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>2926</b>	<b>100.0</b>	<b>7.5</b>	<b>62.3</b>

Figure 9 shows trends in the countries with 10 or more attacks, illustrating the dramatic recent increase in the United States.



**Figure 9. Trends in Group 1 Countries with 10 or More Attacks**

The United States is fourth among the Group 1 countries in terms of total fatalities, when the deadly attacks in Madrid, London, and Taiwan are included. *If these attacks are not included, the United States is in first place.* Most of the incidents in the United States resulted in a single fatality. Two passengers were fatally stabbed and a third was injured on a Portland, Oregon, light rail train in

2017, and two persons were shot to death and five more wounded in a 2021 attack on partygoers aboard a chartered bus in Oakland, California.

### Trends in the United States

The ascent of the United States into first place in number of incidents and fatalities is a relatively recent phenomenon. The 20 attacks in the United States, which resulted in 22 fatalities, all occurred between 2016 and 2021; 7 of them occurred in 2016-17, 3 in 2018-20, and 10 in 2020–2021.

Table 8 shows the combination of attacker, weapon, and target in the 20 fatal attacks in the United States: 12 of the attacks involved firearms and caused 13 of the 22 fatalities; 7 persons died in the 6 stabbing attacks, 1 attack involving arson or IIDs killed 1, and 1 person died in an unarmed bus hijacking.

**Table 8. Attacker, Weapon, and Target Group in Fatal Attacks in the United States**

United States : Attacker Group, Attack Methods and Target Groups in Fatal Attacks	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Criminal Using Automatic or Semi Automatic Weapons Against Operating or Security Personnel and Facilities	5	25.0	5	22.7	1	2.8	1.0	0.2
Criminal Using Automatic or Semi Automatic Weapons Against Passenger Train Stations	2	10.0	2	9.1	3	8.3	1.0	1.5
Mentally Disturbed Individual Using Automatic or Semi Automatic Weapons Against Buses	2	10.0	2	9.1	6	16.7	1.0	3.0
Unknown Group or Individuals Using Stabbings Against Operating or Security Personnel and Facilities	2	10.0	2	9.1	0	0.0	1.0	0.0
Criminal Using Arson & IIDs Against Passenger Trains	1	5.0	1	4.5	16	44.4	1.0	16.0
Criminal Using Automatic or Semi Automatic Weapons Against Buses	1	5.0	2	9.1	5	13.9	2.0	5.0
Mentally Disturbed Individual Using Automatic or Semi Automatic Weapons Against Operating or Security Personnel and Facilities	1	5.0	1	4.5	2	5.6	1.0	2.0
Mentally Disturbed Individual Using an Unarmed Assault to hijack buses	1	5.0	1	4.5	1	2.8	1.0	1.0
Mentally Disturbed Individual Using Stabbings Against Operating or Security Personnel and Facilities	1	5.0	1	4.5	0	0.0	1.0	0.0
Mentally Disturbed Individual Using Stabbings Against Passenger Train Stations	1	5.0	1	4.5	1	2.8	1.0	1.0
Mentally Disturbed Individual Using Stabbings Against Passenger Trains	1	5.0	2	9.1	1	2.8	2.0	1.0
Right Wing Groups Using Stabbings Against Bus Stations or Stops	1	5.0	1	4.5	0	0.0	1.0	0.0
Unknown Group or Individuals Using Automatic or Semi Automatic Weapons Against Passenger Train Stations	1	5.0	1	4.5	0	0.0	1.0	0.0
Totals/Percentages/Averages	20	100.0	22	100.0	36	100.0	1.1	1.8

Table 9 shows the target groups for all 139 of the attacks in the United States, not just the 20 fatal attacks. Attacks against rail infrastructure account for 36.7% of all attacks, but no fatalities. We know from examining the attack methods that 45 of those rail infrastructure attacks (88%) were sabotage, 5 involved explosives, and 1 involved arson or improvised incendiary devices (IIDs). Operating or security personnel or their facilities were the targets of 24% of the attacks, which resulted in 9 fatalities.

**Table 9. Target Groups for All Attacks in the United States**

Target Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
All Rail Infrastructure	51	36.7	0	0.0	0	0.0	0.0	0.0
Operating or Security Personnel and Facilities	33	23.7	9	40.9	36	23.5	0.3	1.1
Buses	28	20.1	5	22.7	68	44.4	0.2	2.4
Passenger Train Stations	13	9.4	4	18.2	16	10.5	0.3	1.2
Passenger Trains	12	8.6	3	13.6	29	19.0	0.3	2.4
Bus Stations or Stops	2	1.4	1	4.5	4	2.6	0.5	2.0
TOTAL/PERCENTAGES/AVERAGES	139	100.0	22	100.0	153	100.0	0.2	1.1

The attack methods used in attacks against all target groups other than rail infrastructure—and therefore against or potentially against people—are shown in Table 10. The greatest number of attacks involved automatic or semi-automatic weapons, stabbings, or the use of physical force

or something like a blunt object; there were 14 cases of hijacking or robbery, 4 of which involved automatic or semi-automatic weapons; 9 attacks were by unarmed attackers, and 1 attacker used a knife or sharp object.

**Table 10. Table 10: Attack Methods Used in Non-Infrastructure Attacks in the United States**

Attack Method	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Automatic or Semi Automatic Weapons	26	29.5	13	59.1	47	30.7	0.5	1.8
Stabbings	15	17.0	7	31.8	18	11.8	0.5	1.2
Unarmed/Other Assaults	15	17.0	0	0.0	49	32.0	0.0	3.3
Kidnapping, Hijacking, Robbery	14	15.9	1	4.5	10	6.5	0.1	0.7
Explosives	7	8.0	0	0.0	4	2.6	0.0	0.6
Arson & IIDs	3	3.4	1	4.5	16	10.5	0.3	5.3
Derailment	2	2.3	0	0.0	3	2.0	0.0	1.5
Sabotage	2	2.3	0	0.0	0	0.0	0.0	0.0
Unknown or Miscellaneous	2	2.3	0	0.0	1	0.7	0.0	0.5
Vehicle Ramming	2	2.3	0	0.0	5	3.3	0.0	2.5
TOTAL/PERCENTAGES/AVERAGES	88	100.0	22	100.0	153	100.0	0.3	1.7

As shown in Table 11, very few of the 88 attacks on non-infrastructure targets in the United States had *any* political nexus—this is not a terrorism problem. Only 2 were classified as jihadist, and 3 were classified as right-wing. These 5 accounted for just 1 fatality. The rest of the attacks were by unknown individuals or groups, mentally disturbed individuals, or criminals, and of the 41 criminal attackers, only 9 had a specific criminal objective (hijacking or robbery).

**Table 11. Attacker Groups in Non-Infrastructure Attacks in the United States**

Attacker Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Criminal	41	46.6	10	45.5	59	38.6	0.2	1.4
Mentally Disturbed Individual	31	35.2	8	36.4	85	55.6	0.3	2.7
Unknown Group or Individuals	11	12.5	3	13.6	1	0.7	0.3	0.1
Right Wing Groups	3	3.4	1	4.5	0	0.0	0.3	0.0
Jihadist	2	2.3	0	0.0	8	5.2	0.0	4.0
TOTAL/PERCENTAGES/AVERAGES	88	100.0	22	100.0	153	100.0	0.3	1.7

An increasing number of attacks appear to be antisocial actions. Although some may be motivated by racial, religious, or ethnic prejudice, most appear to be random and unprovoked. Individuals who were apparently mentally disturbed were responsible for 31 of the total attacks and 8 of the fatal attacks, causing 8 of the 22 fatalities.

Also, an increasing number of attacks are targeting operating and security personnel: 33 of the 139 attacks resulted in 9 of the 22 fatalities; 3 took place in 2016-17, 5 in 2018-19, **and 26 in 2020-21**. This is a growing problem that is receiving increasing attention in the transit industry.

## **An Increase in Random Public Violence**

There is a growing problem of violence against passengers and staff of public transportation systems in the United States—physical attacks, stabbings, shootings, people being pushed off train platforms, and other acts of random violence. This is an imprecisely defined phenomenon, and good statistics are lacking. The MTI database is not configured to capture the full extent of this problem, and other data sources are incomplete, inconsistent, and lack sufficient detail to allow the kind of analysis that is applied to terrorism and other serious criminal attacks.

Since the majority of the violence appears to be random, risk reflects exposure. Passengers are more numerous than operating personnel and are exposed for shorter periods. Their risk is lower, although well-publicized events contribute to an atmosphere of fear. There are far fewer operating personnel, and they spend longer times on the job; therefore, the risk they face is greater.

Although this analysis is limited to public surface transportation environments, the phenomenon of increasing violence appears to be much broader. There are incidents at airports and unruly, sometimes violent passengers are a growing problem in civil aviation. The attacks have little to do with the mode of transportation or transportation in general. These are merely crowded venues where strangers come together. Public surface transportation is easily accessible.

Transportation venues are also defined domains where incidents can be counted. Similar violence may be occurring on the streets and elsewhere, but crimes are recorded by the statute violated, not the circumstances. We suspect that what is taking place on buses, aboard trains, in stations, or on subway platforms is merely the most countable portion of a broader societal trend.

Many explanations for this trend are put forth. The stress of modern society, growing violent crime, coarser public behavior, increases in the number of mentally disturbed individuals, and fewer police have all been mentioned. Some blame the effects of the pandemic, although the trend appears to have preceded COVID-19. This is a topic that merits further research.

## **Targets that are Being Attacked in Group 1 Countries**

Rail infrastructure was targeted in 27.9% of the attacks on public transportation in Group 1 countries (Table 12). As in the United States, none of these attacks involved fatalities. Attacks on buses accounted for 22% of the attacks and 9.9% of the fatalities. Passenger train stations were the next most frequently attacked target, accounting for 17.1% of the targets, but these were the deadliest attacks, accounting for 63.6% of the fatalities and a lethality rate—2.8 deaths per attack—that is 3 times higher than the overall average of 0.8. Passenger trains were targeted in 15.2% of the attacks and account for 19.0% of the fatalities; they also have a higher-than-average lethality rate. Operating and security personnel were the targets in 13.5% of the attacks and resulted in 1.7% of the fatalities, followed by bus stations or stops with 3.4% of the attacks and 4.8% of the fatalities.

**Table 12. Targets of Attacks in Group 1 Countries**

Target Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
All Rail Infrastructure	135	28.8	0	0.0	0	0.0	0.0	0.0
Buses	103	22.0	35	9.9	103	3.1	0.3	1.0
Passenger Train Stations	79	16.9	204	58.0	1947	58.1	2.6	24.6
Passenger Trains	72	15.4	87	24.7	1084	32.3	1.2	15.1
Operating or Security Personnel and Facilities	63	13.5	11	3.1	58	1.7	0.2	0.9
Bus Stations or Stops	16	3.4	15	4.3	162	4.8	0.9	10.1
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>468</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>3354</b>	<b>100.0</b>	<b>0.8</b>	<b>7.2</b>

As shown in Table 13, most of the fatal attacks occurred in passenger train stations, and these attacks resulted in the majority of all fatalities. Table 13 also shows that *23.4% of the fatal attacks targeted operating or security personnel, underscoring the growing risk to public transportation employees.*

**Table 13. Targets of Fatal Attacks in Group 1 Countries**

Target Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Passenger Train Stations	12	25.5	204	58.0	1819	62.2	17.0	151.6
Operating or Security Personnel and Facilities	11	23.4	11	3.1	4	0.1	1.0	0.4
Passenger Trains	9	19.1	87	24.7	941	32.2	9.7	104.6
Buses	8	17.0	35	9.9	12	0.4	4.4	1.5
Bus Stations or Stops	7	14.9	15	4.3	150	5.1	2.1	21.4
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>47</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>2926</b>	<b>100.0</b>	<b>7.5</b>	<b>62.3</b>

The large number of casualties in train station attacks is largely the result of the four deadliest attacks—those in Madrid, London, Brussels, and Taiwan. If these attacks are not included, train station attacks *are now tied with attacks on operating or security personnel, with only two more fatalities.* Attacks on passenger trains had the same FPA as attacks on buses, and bus stations and stops (Table 14).

**Table 14. Targets of Fatal Attacks in Group 1 Countries (Excluding the attacks in Madrid, London, Taiwan, and Brussels)**

Target Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Operating or Security Personnel and Facilities	11	25.6	11	15.9	4	1.1	1.0	0.4
Passenger Train Stations	11	25.6	13	18.8	19	5.3	1.2	1.7
Bus Stations or Stops	7	16.3	15	21.7	150	42.1	2.1	21.4
Buses	7	16.3	15	21.7	12	3.4	2.1	1.7
Passenger Trains	7	16.3	15	21.7	171	48.0	2.1	24.4
<b>TOTAL/PERCENTAGES/AVERAGES</b>	<b>43</b>	<b>100.0</b>	<b>69</b>	<b>100.0</b>	<b>356</b>	<b>100.0</b>	<b>1.6</b>	<b>8.3</b>

This is not to say that large-scale attacks should be dismissed as a potential threat. Bombings and shootings remain a possibility and may still result in mass casualties. But even if these large-scale events are not included in the analysis, there is a continuing problem of fatal attacks on passenger trains and stations, buses and bus stations, and transportation employees.

## The Decline of Bombings

In the decade following the 9/11 attacks, people charged with the security of public surface transportation systems were understandably worried most about large-scale bombings. Bombings were the most common terrorist tactic during the last decades of the 20<sup>th</sup> century. The Irish Republican Army (IRA) bombed London train stations in the 1990s. A massive IRA bombing in 1996 at an East London commuter rail station killed two persons, injured more than 100, and caused widespread damage. In 1995 and 1996, Algerian extremists set off bombs at Paris commuter rail and metro stations. Basque separatists waged a continuing bombing campaign against rail targets in Spain. A suicide bombing attack on a New York subway was narrowly avoided in 1997 when police learned of the plot from an apprehensive witness. Bus bombings in Israel during the Second Intifada (2000–2006), bombings in Madrid in 2004 and London in 2005, and a number of foiled bombing plots targeting trains, subways, and stations confirmed the concerns.

Bombings continue to constitute 55.6% of all attacks on public surface transportation in Group 2 countries and a majority of the attacks in Group 1 and Group 2 countries combined. Examining Group 1 separately, however, offers a somewhat different picture (Table 15). Attacks with explosives comprise 16% of all attacks between 2004 and 2021, although they resulted in 75.3% of the fatalities, owing to the bombings in Madrid, London, and Brussels. If these three bombings are excluded from the analysis, bombings resulted in only two deaths.

**Table 15. Attack Methods in Group 1 Countries**

Group 1 Attack Method	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Arson & IIDs	122	26.1	28	8.0	64	1.9	0.2	0.5
Sabotage	81	17.3	0	0.0	0	0.0	0.0	0.0
Explosives	75	16.0	265	75.3	2778	82.8	3.5	37.0
Stabbings	64	13.7	25	7.1	165	4.9	0.4	2.6
Automatic or Semi Automatic Weapons	35	7.5	18	5.1	63	1.9	0.5	1.8
Unarmed/Other Assaults	35	7.5	2	0.6	63	1.9	0.1	1.8
Kidnapping, Hijacking, Robbery	27	5.8	1	0.3	13	0.4	0.0	0.5
Derailment	13	2.8	0	0.0	16	0.5	0.0	1.2
Vehicle Ramming	6	1.3	2	0.6	39	1.2	0.3	6.5
Unknown or Miscellaneous	5	1.1	0	0.0	4	0.1	0.0	0.8
Multiple Weapons	4	0.9	6	1.7	148	4.4	1.5	37.0
Executions	1	0.2	5	1.4	1	0.0	5.0	1.0
TOTAL/PERCENTAGES/AVERAGES	468	100.0	352	100.0	3354	100.0	0.8	7.2

Table 15 also shows that the most common form of attack in Group 1 countries is arson and the use of IIDs. However, this is primarily a mode of sabotage and accounts for far fewer fatalities than improvised explosive devices (IEDs). Generally, IIDs—gasoline in a bottle with a cloth, the iconic “Molotov cocktail”—are easier to fabricate than IEDs.

Bombers are increasingly unsuccessful. Controls on explosives and precursor chemicals have been strengthened, especially in Group 1 countries. Dynamite and commercial blasting caps were once easily obtained in the United States and accounted for most of the bombings in the 1970s. Their use required minimal skill. In contrast, buying black powder from a gun store entails risks of attracting attention. Small quantities of explosives can be removed from fireworks, but it is difficult to amass large amounts. Purchases of fertilizer in large quantities by unknown customers are monitored.

With commercial explosives more highly controlled, would-be bombers must manufacture the explosive components, which is technically more challenging. In addition, traveling to obtain bombmaking skills has become more perilous. Finally, since most of the attacks in Group 1 countries are one-offs that are planned, prepared, and carried out by a single attacker rather than a group, there is no learning curve to improve skills. Each would-be bomber begins with the skills he has and can learn from the Internet or other available sources. Not surprisingly, the success rate of bombings has declined.

Table 16 shows the results of attacks using 115 explosive devices, 110 of which were used alone, 4 of which were used in attempts to derail a train (causing no fatalities), and in 1 of which was used in combination with weapons (resulting in 4 fatalities). Thirty-seven percent of the devices were successful in that they detonated or were released on target; 42.6% were discovered and rendered safe. Others failed to detonate or release or detonated during unsuccessful attempts to render them safe.

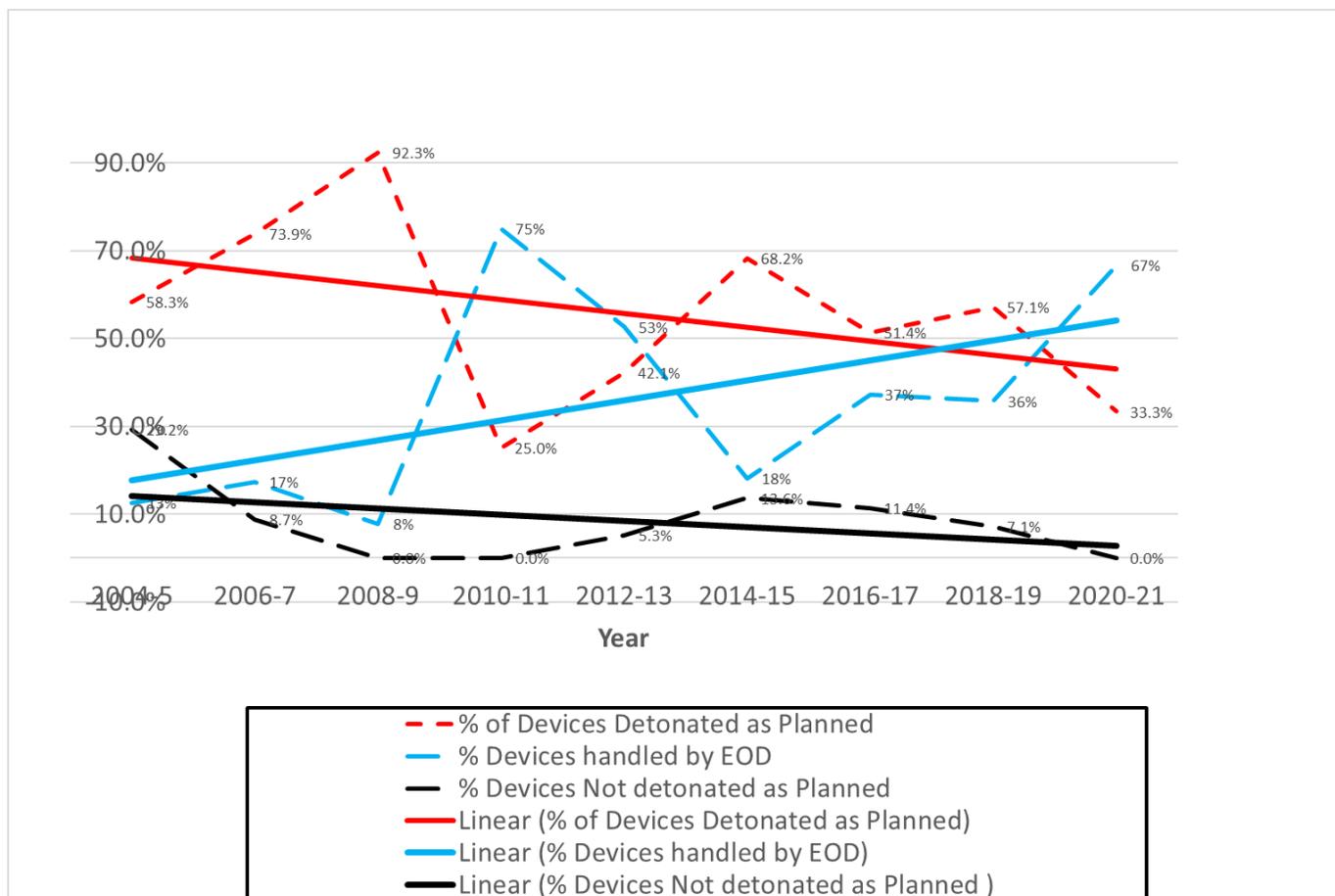
**Table 16. Outcomes of Attacks Using Explosive Devices**

Group 1: Explosive Device Outcomes	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Detonated or Released on Target	42	36.5	136	50.7	1586	54.6	3.2	37.8
EOD Successful, Rendered Safe	49	42.6	0	0.0	0	0.0	0.0	0.0
Detonated Early or Away from Target, or Malfunctioned	14	12.2	86	32.1	901	31.0	6.2	64.4
Failed to Detonate or Release	7	6.1	44	16.4	415	14.3	6.3	59.3
Unknown	2	1.7	2	0.7	0	0.0	1.0	0.0
Detonated during Unsuccessful EOD	1	0.9	0	0.0	0	0.0	0.0	0.0
Total/Percentages/Averages	115	100.0	269	100.0	2903	100.0	2.3	25.2

Group 1: Explosive Device Outcomes - Simplified	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Attacker Succeeded: Device Detonated as Planned	42	36.52	136	51.5	1586	54.6	3.2	37.8
Attacker failed: Device Found or Did Not Detonate as Planned	71	61.74	131	49.3	1317	45.4	1.8	18.5
Unknown	2	1.74	2	0.8	0	0.0	1.0	0.0
Total/Percentages/Averages	115	100.0	265	100.0	2903	100.0	2.3	25.2

This, however, is a static depiction of the entire 18-year period from 2004 to 2021. As shown in Figure 10 attacker successes declined, while failures, owing to disposal by the authorities, increased.



**Figure 10. Trends in Bomber Success and Failure in Group 1 Countries**

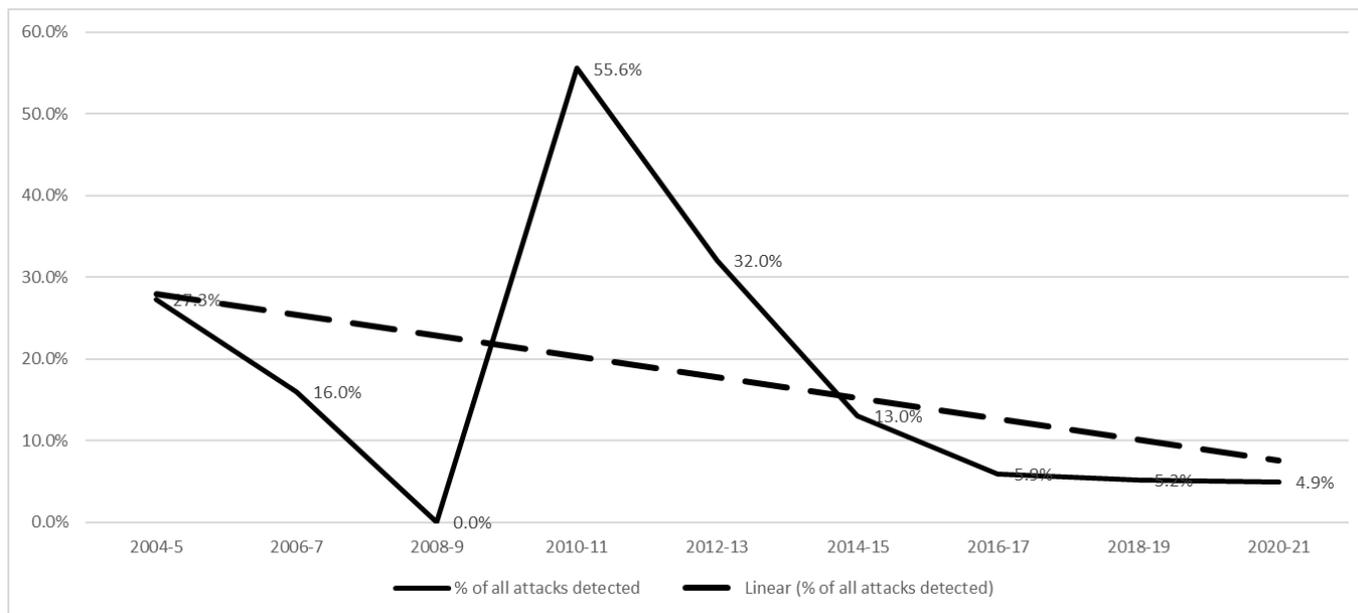
Despite the decline in successes, bombings cannot be excluded as a threat. As we have seen in the past, lone bombers can make powerful and deadly devices. The bomb inside an RV that exploded in downtown Nashville, Tennessee, on December 25, 2020, caused massive destruction, but the explosion was preceded by a warning to evacuate and therefore caused no fatalities other than that of the bomber himself. An IED detonated by a suicide bomber in Manchester, England, in 2017, however, killed 17 people. Homegrown jihadists plotted or attempted to carry out bombings in the United States on several occasions. In 2013, bombings by two brothers killed three people and injured in hundreds at the Boston Marathon. Another bombing injured 35 people in 2016, and a suicide bomber partially detonated a bomb in a New York subway station in 2017, wounding four people.

**Fewer Attacks are Being Detected**

Our December 2018 Report Entitled Does ‘See Something, Say Something’ Work?<sup>2</sup> noted passengers, staff, or security personnel detecting suspicious devices or behavior thwarted 14.2% of all attacks in Group 1 countries. Most of the detections involved explosives. An additional 4% of the devices used in attacks were detected after they failed to detonate or were found after the attack had started and therefore were not counted as detections. Detections in Group 1 countries improved between 1980 and 2017, with the trend line climbing above 20% by 2017.

2. <https://transweb.sjsu.edu/research/SP1118-See-Something-Say-Something>

However, as Figure 11 shows, the detection/prevention rate has significantly declined, dropping from a high point of 55.6% in 2010–2011 to 32% in 2012–2013, to 13% in 2014–2015, to less than 6% in 2020–2021.



**Figure 11. Percentage of Attacks Detected Between 2004–2005 and 2020–2021**

This would appear to contradict the findings of the 2018 report. However, the data in the present analysis are in fact consistent with the data in that report, which ended with 2017. When the data from 2018–2021 are included, the percentage of attacks prevented drops after 2017. Using a start date of 2004 instead of 1980 changes the trajectory of the trend line.

This difference could not be explained by the fact that recent attacks (e.g., attacks by mentally disturbed individuals on operating or security personnel, or sabotage in remote track areas by environmentalist extremists) are more spontaneous. When we exclude those attacks, the results remain the same. The trend is downward—device detection and attack prevention rates in Group 1 simply have gone down, which is a significant finding for the transit, police, and regulatory communities.

## Who are the Attackers?

The MTI database records perpetrators by name (if known) or by group identity (if claimed or confirmed). In this study, we have used judgment to create 19 generic attacker groups. In a few cases (such as attacks in the southern provinces of Thailand where there is an ongoing Islamist insurgency, in Spain where Basque separatist groups are active, or in the so-called “red belt” of Indian states where Naxalites or Communist Party of India-Maoist insurgencies predominate), we assigned attacks where the attackers are unknown to those generic groups. A considerable amount of judgment calls was made in all of these attributions.

Attacks by mentally disturbed individuals are designated as such on the basis of either a publicly revealed history of mental illness, a court determination of the need for mental health treatment, or available narrative descriptions suggesting mental issues. Once again, we emphasize that we

are not mental health professionals, we believe that people with mental illness need help and not punishment, and we do not attempt any specific diagnoses.

It's also important to note that we define jihadists as persons who claim to operate as part of a group that subscribes to jihadist ideologies exemplified by al Qaeda or Islamic State. (This category does not include Hamas or Hezbollah.)

As Table 17 illustrates, just under 70% of the attacks were conducted by unknown groups or individuals, criminals, or mentally disturbed individuals. The other 30% were carried out by individuals or groups with political programs or ideologies—“anarchist or environmental,” other left-wing extremists, right-wing extremists, Basque separatists, IRA or Protestant extremists, jihadists—and a few miscellaneous groups. The greatest lethality was achieved by jihadists.

**Table 17. Attacker Groups in All Attacks**

Attacker Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Unknown Group or Individuals	130	27.8	7	2.0	26	0.8	0.1	0.2
Criminal	100	21.4	19	5.4	81	2.4	0.2	0.8
Mentally Disturbed Individual	96	20.5	60	17.0	476	14.2	0.6	5.0
Anarchist or Environmental Groups	72	15.4	0	0.0	15	0.4	0.0	0.2
Jihadist	18	3.8	265	75.3	2722	81.2	14.7	151.2
Basque Groups	16	3.4	0	0.0	34	1.0	0.0	2.1
Left-Wing Groups	14	3.0	0	0.0	0	0.0	0.0	0.0
Irish Republican or Protestant Groups	12	2.6	0	0.0	0	0.0	0.0	0.0
Miscellaneous Groups	6	1.3	0	0.0	0	0.0	0.0	0.0
Right Wing Groups	4	0.9	1	0.3	0	0.0	0.3	0.0
TOTAL/PERCENTAGES/AVERAGES	468	100.0	352	100.0	3354	100.0	0.8	7.2

In attacks with fatalities, individuals with apparent mental issues predominate, followed by ordinary criminals (Table 18). Again, the greatest lethality was achieved by jihadists.

**Table 18. Attacker Groups in Attacks with Fatalities**

Attacker Group	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
Mentally Disturbed Individual	25	53.2	60	17.0	229	7.8	2.4	9.2
Criminal	13	27.7	19	5.4	26	0.9	1.5	2.0
Jihadist	4	8.5	265	75.3	2670	91.3	66.3	667.5
Unknown Group or Individuals	4	8.5	7	2.0	1	0.0	1.8	0.3
Right Wing Groups	1	2.1	1	0.3	0	0.0	1.0	0.0
TOTAL/PERCENTAGES/AVERAGES	47	100.0	352	100.0	2926	100.0	7.5	62.3

Figure 12 shows the changes among attacker groups over time. As a result of political settlements, attacks associated with the conflict in Northern Ireland and Basque separatism have largely disappeared. However, between 2018 and 2021, especially in the last two years, there has been a spike in activity by unknown groups or individuals, criminals, the mentally disturbed, and anarchists and environmental extremists.

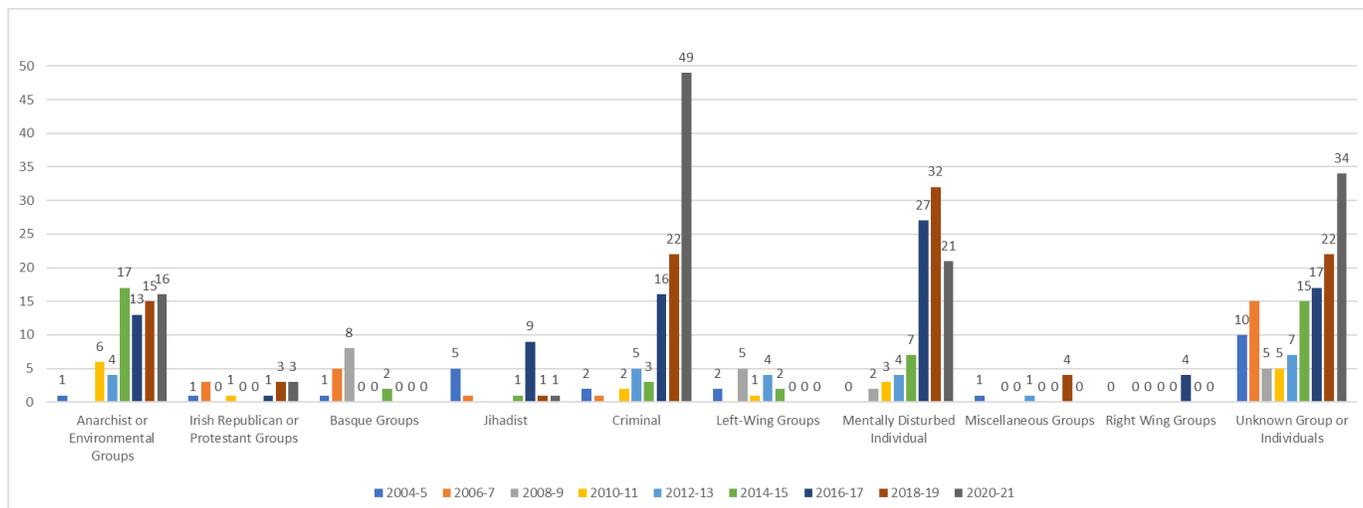


Figure 12. Changing Patterns of Attacker Groups

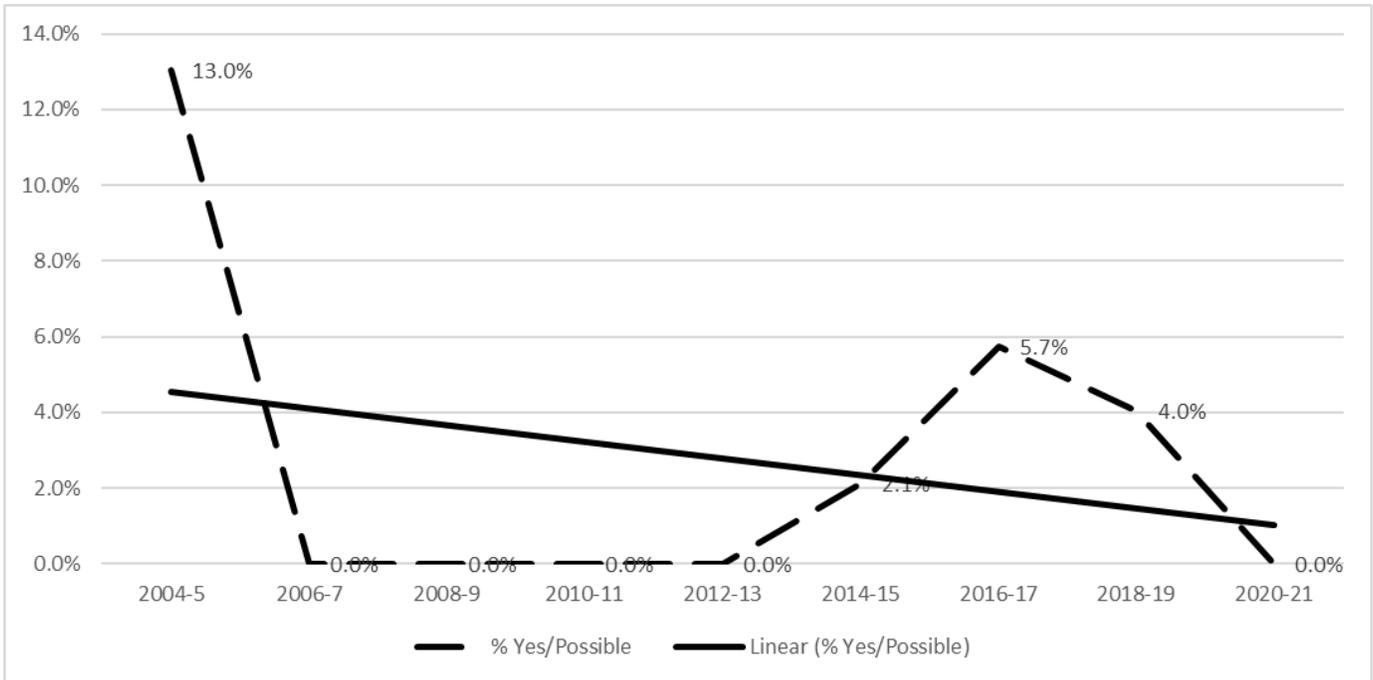
### Suicide Attacks

Although they attract the most attention and cause the greatest concern, confirmed or possible suicide attacks account for only about 3% of the total number of attacks on public surface transportation targets in the Group 1 countries. However, they account for 77.6% of the fatalities (Table 19). The deadliest attack, in Madrid in 2004, was not a suicide attack.

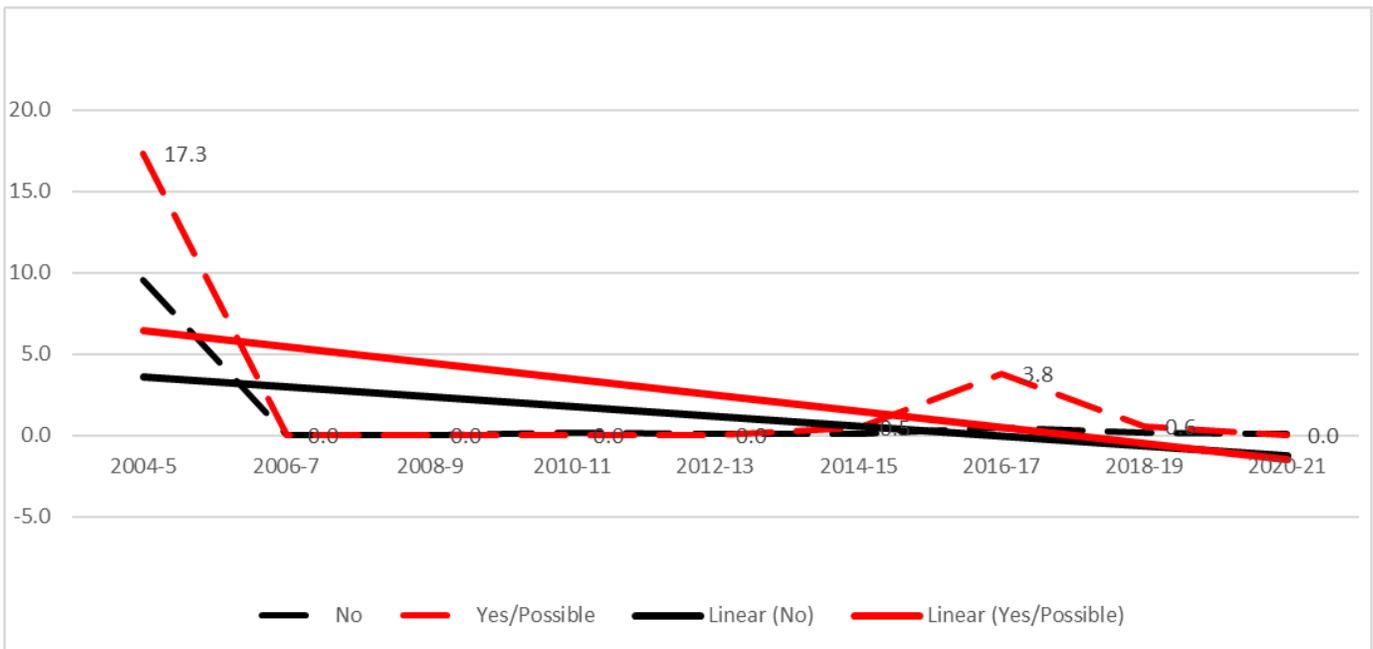
Table 19. Suicide Attacks

Suicide Attacker(s)?	Attacks		Fatalities		Injuries		Lethality	
	#	%	#	%	#	%	FPA	IPA
No	452	96.6	273	77.6	2379	70.9	0.6	5.3
Yes	13	2.78	79	22.4	932	27.8	6.1	71.7
Possible	3	0.64	0	0.0	43	1.3	0.0	14.3
TOTAL/PERCENTAGES/AVERAGES	468	100.00	352	100.0	3354	100.0	0.8	7.2

As shown in Figure 13, the percentage of suicide attacks has been trending downward, and their lethality has also declined (Figure 13). There is a tendency to focus on suicide bombers, but suicide stabbing attacks have also taken place. As shown in Figure 13 suicide attacks most recently peaked in 2016–2017, but their lethality was very low.



**Figure 13. Declining Percentage of Suicide Attacks**



**Figure 14. Declining Lethality of Suicide Attacks**

## A Fundamental Shift in the Threat Matrix

Together, the trends identified in this analysis indicate a fundamental shift in the threat facing public surface transportation. At the beginning of the decade, the people charged with security were worried about suicide attackers, particularly those motivated by jihadist ideologies and bent upon causing mass casualties. Large-scale bombings, as well as the possibility of chemical or biological attacks, were the greatest concern.

This dimension of the threat has not disappeared, but security planners now face a more complicated and insidious threat in the form of increasing attacks by individual criminals, persons described as mentally disturbed, or, in many cases, unknown attackers. The violence is increasingly random. At the same time, there has been an increase in incidents of sabotage by anarchists and environmentalist extremists.

Death tolls from these attacks are fortunately small, but the volume of activity is growing, especially in the Group 1 countries, with the United States in the unenviable lead. What is happening in transportation venues reflects broader societal developments. Random violence on surface transportation has contributed to a sense of insecurity, which suppresses ridership, adding to economic difficulties for transportation operators and reduced resources for facility improvements, service, and security. The fact that there are fewer riders may further contribute to a sense of insecurity—it is possible that increased ridership actually contributes to security.

Transportation employees, invariably among the casualties in large-scale attacks, are on the front line in dealing with violent incidents—often on their own—or as targets of the violence. They require protection and training.

The increasingly individual and spontaneous nature of attacks on surface transportation targets makes such attacks less predictable and harder to detect. Intelligence operations, while essential, are less likely to obtain warnings. “See Something, Say Something” campaigns are identifying fewer attacks. Attacks are identified only when they begin. Rapid intervention is required to prevent or mitigate casualties, but that in turn requires a greater security presence, which is costly to maintain.

We need to rethink our security strategies. And that will require data, which we, at present, do not have.

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