Quick, which country do you think has the highest reported rate of so-called acid attacks, where attackers throw caustic substances that may permanently disfigure, blind, or kill their victims?

It’s not India, Pakistan, or Bangladesh, though the tactic has a long and horrifying history in each.1

In 2018, the most recent year for which comprehensive data is available, the UK reported the most such attacks per capita, with multiple incidents each day.2 (There is good reason to think attacks are significantly underreported in South Asia, but their prevalence in the UK is nonetheless striking.) Most of these attacks were not perpetrated by immigrants from South Asia or for that matter anywhere else, nor were they mostly male on female violence, as in South Asia. Instead, a majority appear to have been male on male attacks, often criminally motivated. They arose in an environment where firearms are highly restricted and copied the examples provided by earlier attacks. Responding effectively to the attacks has challenged government officials, as their escalating frequency suggests.

Acid attacks are not new, but the tactic appears to be proliferating.3 To date, the motivation has been mostly personal, but to a lesser extent due to organised criminal purposes. To a lesser extent, attacks have also been carried out by organised criminals, especially where other forms of violence are less accessible and/or carry more severe repercussions. To date, there have been some, albeit relatively limited, acid attacks for political ends, in the form of terrorism.

Historically, acid attacks have long been used in personal vendettas. Reports date back several centuries, with periodic surges.4 In the late 19th century, there was a rash of vitrioleuse or ‘acid thrower’ attacks in the UK and continental Europe, where spurned women targeted their former lovers or those lovers’ new paramours.5 To a lesser extent, attacks have also been carried out by organised criminals, especially where other forms of violence are less accessible and/or carry more severe repercussions. To date, there have been some, albeit relatively limited, acid attacks for political ends, in the form of terrorism.

In many cases eco-radical and other groups have used caustic substances simply for vandalism and food contamination, while deploying them against people less often. Two of the best known eco-radical groups, the Animal Liberation Front (ALF) and sister organisation Earth Liberation Front (ELF), made at least two acid attacks in the early 2000s, but to vandalise vehicles and buildings rather than cause bodily harm.6 In November 2013, radical animal rights groups claimed to have contaminated jars of Kiwi Mink oil with cyanic acid.7 In December 2017, an eco-radical anarchist group in Greece disseminated images of injecting popular food products with hydrochloric acid and returning them to supermarket shelves in Athens and Thessaloniki.8 This echoed threats made by a Greek anarchist group in 2013 and 2016, causing multinationals to recall their products from Greece.9 While many of these cases aimed for disruption, in some instances eco-radicals used acid against individuals. In the early 2000s, the animal rights organisation Stop Huntingdon Life Sciences (SHAC) sprayed Andrew Gay, marketing director of Huntingdon Life Sciences, in the face with an unidentified chemical spray (sometimes identified as an acid), leaving him temporarily blinded and writhing on the ground.10 Anti-whaling environmentalists attacked a Japanese whaling vessel in 2007 by throwing butyric acid onto sailors.11 More recently a pair of eco-radicals caused bodily harm by throwing acid onto an executive of a coal mining company subsidiary in Germany.12 Both left and right wing extremists have long used or threatened use of acid reign of terror
acid to cause bodily harm in attacks in Western Europe and the US. A rightwing paramilitary group attempted to assassinate German socialist leader and former secretary of foreign affairs, Philipp Scheidemann, by using prussic acid in 1922. A member of the May 19 Communists threw acid into a crowd while targeting police at an anti-apartheid protest in New York in 1981. Anti-abortionists increasingly used acid in attacks on abortion clinics in the 1990s, mainly by pouring butyric acid at clinic entrances and nauseating victims. Reports emerged in 2012 that federal authorities and law enforcement were concerned about credible threats by anarchists to use what were described as ‘acid-filled eggs’ to attack the Republic National Convention in Florida. The anti-migrant rightwing terrorist group FTL/360 was charged in 2015 with conducting a hybrid attack with explosives and butyric acid against refugees at a housing project in Germany.

Attacks by anti-liberalist radicals also appear to be a recent, growing trend in Eastern Europe and Russia. Opposition members, reformists, journalists, and anti-corruption activists have suffered acid attacks in Russia, Ukraine and Bulgaria. A common household antiseptic in Eastern Europe and Russia known as Zelyonka (Brilliant Green), has been used in many of these attacks. In 2017 reports emerged of Russian activists being drenched in a green liquid resembling Zelyonka and suffering significant and often irreversible eye and skin damage. Leading opposition activist Aleksei Navalny was almost blinded in one eye after an attack by the anti-liberalist South East Radical Bloc (SERB), and doctors treating him believed that a mixture of Zelyonka with a caustic chemical was used. A day later, an activist for the Russian opposition party Yabloko was attacked with an unknown chemical. Navalny attributed the assault as being in the ‘trademark style’ of the Federal Security Service (FSB). Copycat attacks appear to have taken place in Russia, Ukraine and Bulgaria, including with more dangerous chemicals such as sulphuric acid.

Acid attacks have not been widely used by militant Islamists operating in Western countries, unlike in many parts of the Middle East, South Asia and Africa, where such attacks are probably significantly under reported. This is due to weaker civil society and a predominance of rural attacks against women for being ‘immodestly’ dressed or violating religious code. Such motivation has fuelled attacks in Iraq, Iran, Yemen, Afghanistan, Pakistan, Tanzania and Nigeria, by groups including Al Qaeda, the Taliban, and ISIS. Islamist militants have also attempted to use acid against perceived enemies of Islam, notably in Israel and the UK.

Accessible and horrific
The particular characteristics of acid attacks make them appealing to some terrorists, but not others. They are ineffective for targeting larger numbers and a poor way to kill smaller numbers (though some victims die). But the horrific disfigurement of survivors is likely to terrify the broader population profoundly, especially those with less prior exposure to it. Fake acid attacks have also emerged as a phenomenon, especially in hate crimes and robberies, where a harmless liquid is either threatened or thrown, terrifying victims and/or bystanders. The likely public response could well galvanize further attacks. The suffering and permanent disfigurement of victims is likely to appeal to certain terrorists, especially those who regard their victims as sinful, for instance by immodestly exposing their bodies and faces. The fact that attacks don’t usually kill, but cause suffering and send a message to those targeted, and to broader...
communities, may also appeal to some actors. The tactic is extremely accessible, and easily adopted by individuals and small groups of less skilled individuals.

Acid attacks involve throwing caustic chemicals onto the victim’s face and/or body. The chemicals can be transported in various inconspicuous vessels, which can be discarded after the attack. More sophisticated delivery methods are possible, and could facilitate the exposure of more individuals at greater distances, or without requiring an attacker to be present. But acid attacks are invariably crude, and attackers capable of more sophisticated delivery might well gravitate toward other attack modes, more sophisticated chemical agents, conventional explosives and guns.

The most suitable agents for acid attacks are corrosive liquid acids and basic chemicals that can cause significant damage to skin and eyes. Some vapourise upon release, posing a respiratory threat, and other toxic substances can affect the central nervous system. Acids are more commonly used than base or alkaline chemicals or other toxic substances, though a recent study suggests that the majority of caustic chemical attacks in the US to date have involved base family chemicals. The most used acids are sulphuric acid (found in household products like drain cleaner and fertiliser), nitric acid (used in making many different products, from cleaning agents and inks to explosives and ammunition), and hydrochloric acid (industrially produced in large quantities and with various household and educational applications). The major base family chemicals used in attacks include potassium hydroxide (found in drain cleaners and bleaching agents), sodium hydroxide (also found in industrial and household cleaning products), ammonia, and chlorine. All these chemicals are widely available in most countries, via sources where they may be regulated, or are easily procured through globally diffuse e-commerce platforms.

**Government deterrence**

Many government responses to acid attacks focus on personally, criminally, or politically motivated attacks. But with acid attacks on the rise globally, some governments, like the UK, are beginning to grapple with how to respond, while others with longer histories of acid attacks, like Pakistan and India, are learning from the experience. Some governments may choose to ignore attacks or stall incident investigations for the sake of supporting religious or national prerogatives, while others may simply be unaware of the volume of incidents or lack resources and capabilities to promulgate and enforce legislation. For example, Iran may suppress or hinder investigations of acid attacks either because of inefficient management or because open defence of women’s rights runs counter to its leaders’ religious views. Some speculate that elements of the Russian government are reluctant to investigate incidents that could further legitimise those claiming to be victims of acid attacks. In countries where national enforcement resources are scarce and attacks often happen in rural areas, attacks may be under reported, or simply accepted as cultural. Still, the primary response of most governments has been to try to deter acid attacks by punishment or by denial, and these policies have met varying degrees of success.

The UK appeared to respond first by developing, promulgating, and harmonising punitive measures for acid attackers and possessors, and second by devising new ways to regulate the sale of caustic chemicals, making them harder to obtain. Many observers criticised actions taken by the UK government in 2015, which some alleged had relaxed controls and weakened activities aimed at curbing the spread of acid to nefarious users at a time when acid attacks were clearly increasing. The Deregulation Act 2015 amended requirements in the 1972 Poisons Act, no longer requiring sellers of dangerous substances to register annually with their local council and rather asking them to report suspicious transactions or customers, for transactions involving caustic chemicals and sulphuric acid.

Amid widespread dismay over the sharp rise in caustic chemical attacks from 2015 to 2016, the UK government announced in July 2017 that the Home Office and industry would review harsher punishments for such attacks, given that many offences imposed lasting and irreversible damages on victims. One concern was that perpetrators could only be arrested for carrying acid if the police could prove that the suspect intended to cause harm, unlike the stricter policies related to acquiring or possessing guns and knives. The review also sought to task research for understanding perpetrator motivation, assess whether the 1972 Poisons Act should cover more caustic chemicals, conclude an agreement among retailers to restrict the sale of such substances, and develop and synchronise prosecution and emergency response capabilities and guidelines. Within one year, UK retailers established a voluntary agreement to ban the sale of caustic and dangerous chemical products to juveniles, with commitments directed by the Home Office and supported by industry. Additionally, the government classified acid as a potentially dangerous weapon for the first time along with ‘bladed articles’, and ruled that anyone in possession of such items in a public space without legitimate reason would be imprisoned for at least six months. Per this mandate, offenders threatening to use or using caustic chemicals may be sentenced to a life term depending on the potential damage assessment based on the threat or use.

As these new laws were announced, some reported that acid attacks...
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attacks in London in the first half of 2018 had actually decreased by about 40% compared to the first half of 2017. Near the end of 2018, the government introduced new regulations criminalising the possession of sulphuric acid above 15% concentration by members of the public without a licence and requiring retailers to check for licences during sales or face two years’ imprisonment and a fine. Although acid attacks, including some with sulphuric acid, have continued, the frequency of such attacks appears to have declined significantly.

Presumably, the UK authorities were trying to learn from the challenges and successes of governments in South Asia, and particularly India and Pakistan, in dealing with acid attacks. Both of those countries faced growing pressures for regulations in the early 2010s, around the time acid attacks were just beginning to boom in the UK.

Although Pakistan passed the 2010 Acid Control and Acid Crime Prevention Bill, making acid attacks illegal and potentially incurring a life sentence, attacks seemed to increase for several years. Some argued that the new law was ineffective insofar as it was hardly enforced in rural regions and prosecutors often faced slow or stalled trials. However, subsequent progress has largely been attributed to Pakistan’s adoption and implementation of the Acid and Burn Crimes Criminal Amendment of 2011, supported heavily by the caustic chemical offence-focused Acid Survivors Foundation Pakistan (ASFP). Pakistan’s national assembly later promulgated the Acid and Burn Crime Bill of 2017, which sought to establish “provisions to specifically criminalise acid and burn-related violence by providing a fair and speedy trial in such offences.” Data analysed by some observers indicates that the conviction rate for perpetrators has increased steadily since 2014, and that reported cases of acid attacks also steadily declined by about 50% year on year in the same period.

While some attacks appear to have been deterred through punitive legislation and procedures, acid seems to remain easily accessible to would-be offenders in Pakistan. Around the time parliament was considering the Acid and Burn Crime Bill 2017, local non-governmental organisations (NGOs) urged parliament to revise acid sale regulations by tasking an administrative agency to issue licences and specifying who can buy and sell acid. Some note that while extant laws already ban public acid transactions, they are often not enforced. Pakistan’s government has had some success in reducing acid violence through adoption and enforcement of punitive measures, but regulation of acid sales remains weak.

Like Pakistan’s challenge years ago, a significant obstacle to India combating acid attacks is the slowness of trials and large backlog of cases. The governments of India and Pakistan were both galvanised by graphic and widely disseminated reports of acid attacks in the early 2010s, and India’s parliament and supreme court moved to enact new legislation in 2013 to address punitive measures for acid violence and regulate the sale of acid. Just as in Pakistan before its recent reforms, India previously categorised most acid attacks with other prosecutable acts that cause “grievous hurt”, which would incur a maximum prison sentence of seven years. The Criminal Laws Amendment Act of 2013 classified acid attacks as a separate category of violence, making perpetrators face a minimum 10 year sentence and maximum life term.

Additionally, the Model Poisons Possession and Sales Rules, 2013, required that anyone buying or selling caustic chemicals commonly used in acid violence (as listed in the schedules to the 2013 model rules) would require a licence, that the district magistrate of each state should function as a licensing authority, and that juveniles are barred from such transactions. The licensing system was thus decentralised, with enforcement depending on the capabilities of each district magistrate.

Despite these new regulations, India’s government has been widely criticised for poor implementation. Acid violence steadily increased each year until 2018, when there was a slight decline. Still, there exists a significant backlog in trials and verdicts for acid attacks, where perpetrators often await trial for years and may make bail. Additionally, chemicals listed in the schedules to the 2013 model rules remain widely accessible, and enforcement varies significantly by state. The states with the highest rates of acid attacks are the most dense in terms of population size and bear the highest administrative burdens. Attacks in rural areas are likely also underreported. Many critics in India have lauded progress in Pakistan, as well as in other South and Southeast Asian countries, such as Bangladesh, that have even more stringent punitive and regulatory measures.

After Pakistan promulgated more punitive measures for the use or intended use of acid to attack people, and also improved the efficiency of its legal system for trials and verdicts related to such attacks, it experienced a significant decrease in frequency of attacks. Bangladesh enacted legislation in 2002 mandating sentences up to capital punishment for acid attacks as they were steadily increasing in frequency. Since that measure was enacted and as it was rapidly and robustly enforced, acid attacks have greatly declined.

Countries that are still grappling with or until recently have faced growth in acid attacks have begun to incorporate acid-specific punitive measures, particularly Pakistan, India, and the UK. Pakistan has experienced a significant decline since mandating harsher punishments for acid attacks, and India may shift its focus to regulating the sale of substances given the hurdles it has faced in successfully punishing caustic chemical violence. The UK experienced a decline in attacks as the government moved to concurrently enact and implement punitive and regulatory measures. The greatest determinant for success in countries that have been successful in this strategy, in the view of some observers, was the accelerated rate of prosecution for acid attacks.
Nonetheless, acid attacks continue in all these countries, and there is a growing body of information that points to the efficacy of such attacks as terror tactics.

**Decon challenges and opportunities**

Just as many deterrence and denial measures apply equally to all acid attacks, however motivated, so do response capabilities, especially decontamination. As governments experiment with curbing acid attacks through legal instruments, emergency response and decontamination remain a formidable challenge for any country plagued by caustic chemical attacks.

Many analyses of disaster preparedness and response contend that government attention and assets focus on the ‘left of boom’ stage, or preparation, to ensure an attack does not occur, rather than on the ‘right of boom’ stage, or responses after an attack. For acid attacks, the ‘right of douse’ stage offers a very short timeline for reducing the seriousness of injury to victims, and is intensive in both resource allocation and awareness-raising to ensure effective emergency response.

As the UK started to consider preventive and punitive measures in July 2017, the government issued 1,000 acid attack response kits to London’s police. The kits apparently contained several bottles of water, goggles, gloves, and gauze. The government also announced a trial commissioned by the Defence Science and Technology Laboratory for developing test kits that could identify caustic chemicals, prior to their being used in an attack, with fewer false positives than those involving pH litmus paper. Police response cars in East London, where the majority of London’s acid attacks occurred, were already equipped with acid attack response kits, but authorities decided to issue more throughout London after several high profile attacks invoked a broader government response. Since acid attacks were already rising dramatically years before this response, and the acid attack response kits only contained a few bottles of water and common first aid supplies, it is unclear why authorities were reluctant to deploy these kits to more emergency response units.

Even when kits are widely deployed, the speed at which caustic chemicals inflict lifelong wounds may still render them less effective if first responders cannot reach the scene in time or administer aid fast enough. According to Dr Robert Chilcott of the University of Hertfordshire in a recent interview for CBRNe World’s mitigation newsletter, the timeframe for significantly reducing the amount of damage caused by potent caustic chemicals such as sulphuric acid is under 10 seconds, or “the time [it] would take to find a bottle of water and take the lid off.” Dr Chilcott forecast that the short response times necessitated by these attacks would inevitably mean that the general public may be required to administer immediate first aid, and that alternative solutions should be explored. Some civilians and NGOs have sought to make these potential necessities more tenable.

Shortly after the UK government deployed acid attack response kits to police units in August 2017, the National Health Service issued first aid guidance for caustic chemical attacks to the public and provided decontamination advice to police. As parliament convened in December 2017 to discuss new ways of curbing caustic chemical violence, one member urged that emergency services carry bottles of a specialist rinse, such as Diphoterine, which he contended were more effective than water in removing acid from skin and neutralising it, though which he contended were more effective than water in removing acid from skin and neutralising it, though more expensive and less likely to be rapidly available.

For decades the industrial sector has demonstrated the effectiveness of Diphoterine in decontaminating and irrigating chemical splashes, when used as a water-soluble washing solution capable of quickly neutralising acidic and basic chemicals. Hypertonic, amphoteric chelating agents are more effective at neutralising caustic chemicals than hypotonic water, and data indicates that serious injury rates are far lower when using chelating agents such as Diphoterine instead of water. The solution is commercially available in various volumes and dispersal mechanisms, such as 50 to 500ml eyewashes, 100 to 200ml spray bottles, and 5litre canisters. A pack of ten 50ml eyewash bottles can be purchased online for £22.6, or roughly £2.3 per bottle, and a 500ml eyewash bottle can be found for £1.25. A 100ml spray canister can be purchased for about £3.2, while a 200ml spray canister would cost approximately £5.0. While bottles of water are cheaper, the solutions are significantly more effective and only modestly increase the total cost of kits containing them.

News reports throughout the UK in 2019 suggested local funders and community organisers were arranging for business establishments to acquire acid attack response kits, nearly two years after similar kits were first deployed to police cars in London. Community groups in England and Wales began distributing to clubs, pubs, and organisations commercially acquired kits that often included bottles of water, gloves, face masks, coveralls, goggles, shears and bandages, and cost around £60. Similar kits can be acquired from various ecommerce platforms for £60-90. It is noteworthy that communities are stepping up to ensure enhanced response capability to acid attacks, and that such kits modelled after those advertised by the government are readily available. Yet, it is equally worth pointing out that accessible and more effective solutions...
such as Diphoterine do not appear to be included in these kits or advertised by such community groups.

Nonetheless, the work of these groups is commendable, and demonstrates that NGOs can help fill the gap in emergency response preparedness where state resources and attention may be lacking, particularly in less developed countries such as India. With the support of UK-based Acid Survivors Trust International, which heavily informed responses to caustic chemical violence in the UK, a similar NGO in India began disseminating care kits to communities in India in 201577. The kits included emergency response unit contact information and first aid guidance, though lacking in items such as those in acid attack response kits distributed in the UK78. Private donations may help make emergency response goods more available to impoverished communities. While bottled water may seem less appropriate to store in anticipation of an acid attack in an already water-stressed community, there is an opportunity to provide more effective, chelating solutions instead, as information about the efficacy of these substances disseminates further.

Bottom-up approaches to emergency response may complement efforts to deter and deny, both by helping to reduce serious injury resulting from acid attacks and strengthening societal norms against such violence. If approaches are not executed carefully, however, there is the risk of disseminating information to would-be attackers who may view caustic chemical violence as a serious way of exploiting societal vulnerabilities and delivering terrorism.

A significant threat likely to persist. Caustic chemicals are readily available in many Western countries, and as attacks are increasing and widely reported, the risk of prompting terrorists to use acid attacks tactically grows as well. Violent extremists from various milieus have already utilised this tactic, especially in recent years.

While terrorist groups may vary in their willingness to adopt the tactic depending on their ideology, none of the milieus described above appear to have a taboo against the violent use of caustic chemicals. It is worth noting that many of those pledging allegiance to a particular group or cause and that have been involved in acid attacks in recent years have often acted alone or in a small group. This is likely due in large part to the nature of acid attacks, which can readily be carried out by an individual or small group.

There is little information to suggest that extremist groups or ideologies have either admonished or endorsed acid violence in their strategic thought. So individual actors and subgroups would seem likely to have chosen the tactic based on their own cost-benefit analysis, much as criminals in the UK shifted from guns and knives to acid as the former became harder to obtain and carried harsher punishments. Limited efforts to grapple with this challenge in many Western countries to date may encourage future attacks, though significant government responses seem more likely to follow rather than precede the more widespread emergence of such attacks’ more.

It is easy to imagine terrorist tactics that have not yet, but might someday, emerge, or whose current prevalence might worsen. Acid attacks are worth taking seriously now, before they worsen and especially before they proliferate in terrorist milieus, because they seem likely to do so and because responding effectively to them is so challenging.

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