INVESTIGATING THE USE OF POISON AS A METHOD OF POLITICAL REPRESSION:

Analysis of 78 cases of political criminal poisoning and recommendations for the public, governments, healthcare professionals, law enforcement, the media and individuals

BY SOPHIA BROWDER

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The Young Thought Leaders Programme is a new initiative by the Henry Jackson Society, which aims to identify and celebrate promising young talent in the world of thought leadership on security and foreign affairs. We work to promote new research from individuals of exceptional promise in our areas of focus: securing our societies at home; and advancing the free world.

This year, to inaugurate the Young Thought Leaders Programme, the Henry Jackson Society is delighted to publish a paper by Sophia Browder, a young student who has conducted a wide-ranging analysis of the rising levels of political criminal poisonings in recent years.

To save lives and prevent wider contamination risks, policymakers, dissidents and healthcare professionals need to take this threat more seriously and prepare for future cases.

Sophia's comprehensive paper offers a valuable resource to policymakers, with recommendations on how both dissidents and health systems can manage the dangers.

Since its foundation, the Henry Jackson Society has worked tirelessly for the principles and alliances that keep societies free. As we continue to carry this vital work forward, we are delighted to take this opportunity to celebrate the talent, passion and insight of a new generation.

Alan Mendoza
Executive Director, Henry Jackson Society

About the Author

Sophia Browder is a human rights activist, founder of the Global Poison Reporting Project, and an A Level student at St Paul's Girls' School in London. She was a scholar at the CEE Research Science Institute program at MIT. Sophia is also a founder of Chiron's Corner, an online STEM platform. Sophia created a website, **freekara-murza.org**, to support the campaign for Vladimir Kara-Murza's release from Russian prison. She is the chief-editor of the *iPaulina*, a school webzine, and a Gold Award recipient in the Cambridge Chemistry Challenge.

About The Henry Jackson Society

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Summary

Authoritarian and totalitarian regimes routinely assassinate or attempt to assassinate their critics, dissidents and independent journalists. Much attention has been paid to people being thrown off buildings, stabbed or shot, but poisoning has become one of the primary ways of eliminating people in recent years.

While other types of assassination attempts are obvious and can be responded to directly, poisoning is particularly pernicious for the following reasons:

- ➢ It often goes unnoticed by authorities and the public.
- ➢ Victims don't know what to do if they suspect they have been poisoned.
- ➢ Law enforcement and medical officials do not have established protocols to deal with political poisoning cases.

1) This report is based on examination of 78 cases of political poisonings that have occurred in the last 450 years, including both successful and attempted assassinations by political criminal poisoning that are a matter of public record. It identifies the poisons used and the antidotes applied; examines the responses and mistakes made by authorities and the medical establishment; and draws conclusions and recommendations for potential victims, governments, healthcare and law enforcement professionals, the media and potential victims, providing guidelines on how to deal with cases of suspected political criminal poisonings in the future. These recommendations are particularly significant due to the increased frequency of political criminal poisonings, with over three times as many cases occurring per year on average compared to 70 years ago.
2) Much of this increase in cases can be directly attributed to a series of poisonings suffered by critics of the Kremlin. The Russian Federation continues to deny poisoning opponents, but Western governments including the UK have repeatedly accused Russia under Vladimir Putin of using poison to assert its grip, employing a tactic once favoured by the KGB. Many of the victims in the cases in question are targeted within Europe.
3) A different response is required by medical professionals when treating cases of suspected political criminal poisoning, because they are not representative, and do not overlap with other poisoning cases.
4) The methodology and protocols for cases of chemical terrorist attacks can, and should, be translated into treatment for political criminal poisoning cases.

Ten key recommendations have been made:

1) Health cards should be introduced for dissidents of hostile regimes.
2) A resource should be created with a list of prescribed questions that medical professionals should ask a patient presenting to hospital when a case of political criminal poisoning is implied (i.e. upon seeing a dissident health card).
3) In cases where the victim of the attack is within a hostile country, every effort should be taken to remove and transport them to a hospital in a democratic country.
4) Tracking and detection systems at borders should be improved to limit global poison transportation.

5) More rapid use of antidotes in response to known cases of political criminal poisoning should be encouraged.
6) During medical treatment stages, political criminal poisonings should be viewed under the same protocol as chemical terrorist attacks (for which training is received), ensuring a timelier and more effective prospect for treatment of these cases.
7) Complete decontamination should occur in the wake of all political criminal poisonings to reduce the harmful effect of the poison and prevent a mass incident (and the involvement of civilians).
8) A greater emphasis should be placed on law enforcement roles in cases of political criminal poisoning, including more thorough post-mortem examinations.
9) Tougher punishments and sanctions should be imposed on countries that commit political criminal poisonings.
10) Maximised media attention is important for those under threat of political criminal poisonings.

1. General Criminal Poisonings vs Political Criminal Poisonings

Paracelsus, a 16th-century alchemist, is credited with the statement *"sola dosis facit venenum"* [1] ("the dose makes the poison"), making a valid point that all substances are capable of being toxic if administered in a sufficiently adverse dose. This is certainly true in cases of general criminal poisonings.

However, in the class of criminal poisonings inflicted on political activists, journalists, dissidents and unlucky civilians, poisons used have often been chosen for their potency, and thus only a small dosage is typically needed to induce a severe illness and death.

Due to their nature, political criminal poisonings are characterised by specific attributes and present a unique set of challenges for the victims, governments and public at large.

Criminal poisonings have been described throughout literature, from Snow White, Hansel and Gretel and other children's books to murder mystery novels to Shakespeare plays. Most infamously, poisoning has been used as a narrative in many popular detective novels, including those by Arthur Conan Doyle and Agatha Christie.

Historically, poison has also been used as a method for the most dramatic deaths. From the story of Cleopatra to the alleged use of Cantarella by the Borgias during the papacy of Pope Alexander VI in the 15-16th century (the Borgias were reported to have poisoned many people to increase their wealth and political clout), [2] there is no shortage of examples of this unique killing method.

An important distinction needs to be made for the sake of this report between generalised and political criminal poisonings.

General criminal poisonings

General criminal poisonings refers to illegal acts that are completed with a malicious intent and result in the harm to health and potentially homicide.

Political criminal poisonings

Unlike the instances of purely criminal poisoning, such as the fentanyl poisoning of spouses that are routinely reported, political criminal poisonings are more distinct and methodically targeted. The perpetrator is often skilled in the use of dangerous or prohibited chemical, biological or radioactive agents. The outcome is thus likely to be fatal.

Political criminal poisonings are increasingly being used as a method of assassination of those who oppose hostile regimes. Critics of Russia have been among the most notorious victims in recent years, although the Kremlin continues to deny its involvement. Cases include Litvinenko in 2006 in London and the Salisbury poisonings of 2018.

Four key differences between criminal poisonings and the subgroup of political criminal poisonings can be established, as follows:

1) Political criminal poisonings are completed with specific political motives to silence or kill a particular individual as a result of their activities or occupation, whereas motives in criminal poisonings can be more generalised.

[1] The dose makes the poison. Nature Nanotech 6, 329 (2011). https://doi.org/10.1038/nnano.2011.87.

[2] Karamanou M, Androutsos G, Hayes AW, Tsatsakis A. Toxicology in the Borgias period: The mystery of Cantarella poison. *Toxicology Research and Application*. 2018;2. doi:10.1177/2397847318771126.

2) Political criminal poisonings are carried out by skilled and knowledgeable perpetrators, whilst in criminal poisonings there are many cases of civilian-on-civilian attacks, such as spousal murder.

3) Political criminal poisonings often involve the use of more dangerous poisons, due to the attacks typically being orchestrated at a state or governmental level, with easier access to banned chemicals and resources of governmental laboratories, while in criminal poisonings, more common poisons are utilised.

4) In political criminal poisonings, there is a much greater potential for mass public health risks, and civilians being impacted by the poisoning attempt, due to the nature of the poisons used. In criminal poisonings, the attempt is usually targeting just one individual.

This report focuses on **political criminal poisonings** – instances of targeted poisonings ordered by a higher-up authority, that are driven by political motives against an individual or an opposition group to a particular government, organisation or group.

Current Challenges in Addressing Cases of Political Criminal Poisoning

There are a number of crucial challenges in addressing the cases of political criminal poisoning today:

1) Political criminal poisonings cause wide and varied symptoms, often leaving dissidents and other victims and their families feeling helpless and vulnerable, fearing for their own safety.

2) The extreme difficulty in detecting political criminal poisonings, coupled with the technical difficulties in providing appropriate and specific antidotes for treatment, means that poisonings can often be fatal.

3) The field of political criminal poisonings in the 20th and 21st centuries is a particularly unresearched area in the field of toxicology, with only three relevant articles published on the topic of 'political criminal poisonings' in the past 25 years.[3,4,5] What this shows is perhaps the lack of general social and scientific awareness of this pertinent and often fatal issue.

4) There is a sense of confusion and mass panic within medical settings in appropriately treating these cases, for which healthcare professionals have not been adequately trained in recognising or treating.

5) Law enforcement authorities are often unprepared and ill-equipped to deal with suspected cases of political poisoning.

To respond to the apparent challenges of dealing with cases of political criminal poisoning, this report examines the recent history of cases of this type of poisoning and develops recommendations for potential victims, the public, governments, healthcare and law enforcement professionals and media.

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[3] Brunka, Zuzanna, et al. "Selected Political Criminal Poisonings in the Years 1978–2020: Detection and Treatment". *Toxics* 10.8 (2022): 468.

[4] Bertomeu-Sánchez, José Ramón. "Poisons in the Twentieth Century: Unpunished crimes, slow violence and the role of history". *Cahiers François Viète* III-9 (2020): 105-122.

[5] Trestrail, John Harris. *Criminal poisoning: Investigational guide for law enforcement, toxicologists, forensic scientists, and attorneys*. Springer Science & Business Media, 2007.

2. Poisonreporting.org – Database of Political Criminal Poisonings

The report builds on a newly created proprietary database of political criminal poisonings, publicly available at: poisonreporting.org. [6]

The database presently comprises 78 cases of political poisonings in the past 450 years (1577-2023) that have been identified publicly, allowing us to draw conclusions about the circumstances and responses to the instances of these poisoning cases.

Whilst the understandable difficulties in the diagnostics, and the lack of documentation or proof in some cases, due to the very nature of political criminal poisonings, mean that it is unlikely that the data gathered is comprehensive and is therefore open for amplification and modification, the database does provide a good indication of the general patterns, warning signs and responses to these cases.

Method of Obtaining Case Study Data

The method of obtaining information for the database involved gathering publicly documented cases of political criminal poisonings.

The database spans well-known cases as well as cases of political criminal poisoning that are less prominent and well-covered by the media. Research for cases has included scouring news archives and interviewing victims/relatives. The poisonreporting.org database does not purport to be complete. Cases may be missing or disputed because of the nature of this field, and thus it is an avenue for further enquiry.

The database offers a streamlined way in which trends and patterns from an organised data set can be tracked and analysed. The poisonreporting.org portal also provides resources aimed at aiding those at risk of political criminal poisoning.

6 Sophia Browder. poisonreporting.org.

3. Trends in the Number of Political Criminal Poisoning Cases per Year

A review of the cases of political criminal poisoning over the last 120 years (we exclude the outlier case in our database in 1577 from this analysis) demonstrates that there has been a clear rise in the number of political criminal poisoning cases that occur per year, and the number of political criminal poisoning cases that occur in five-year periods.

In the last decade, political criminal poisoning has become a signature method utilised by hostile regimes to silence opposition figures.

Figure 1: A graph showing the number of political poisoning cases per year varying with time.

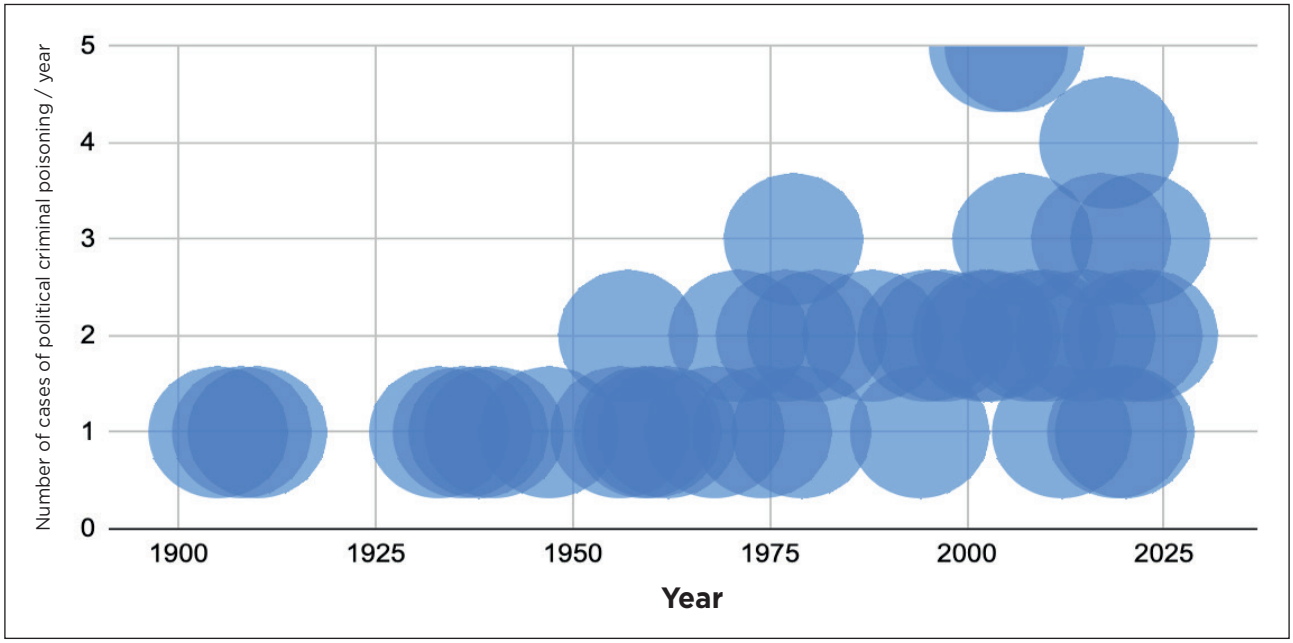
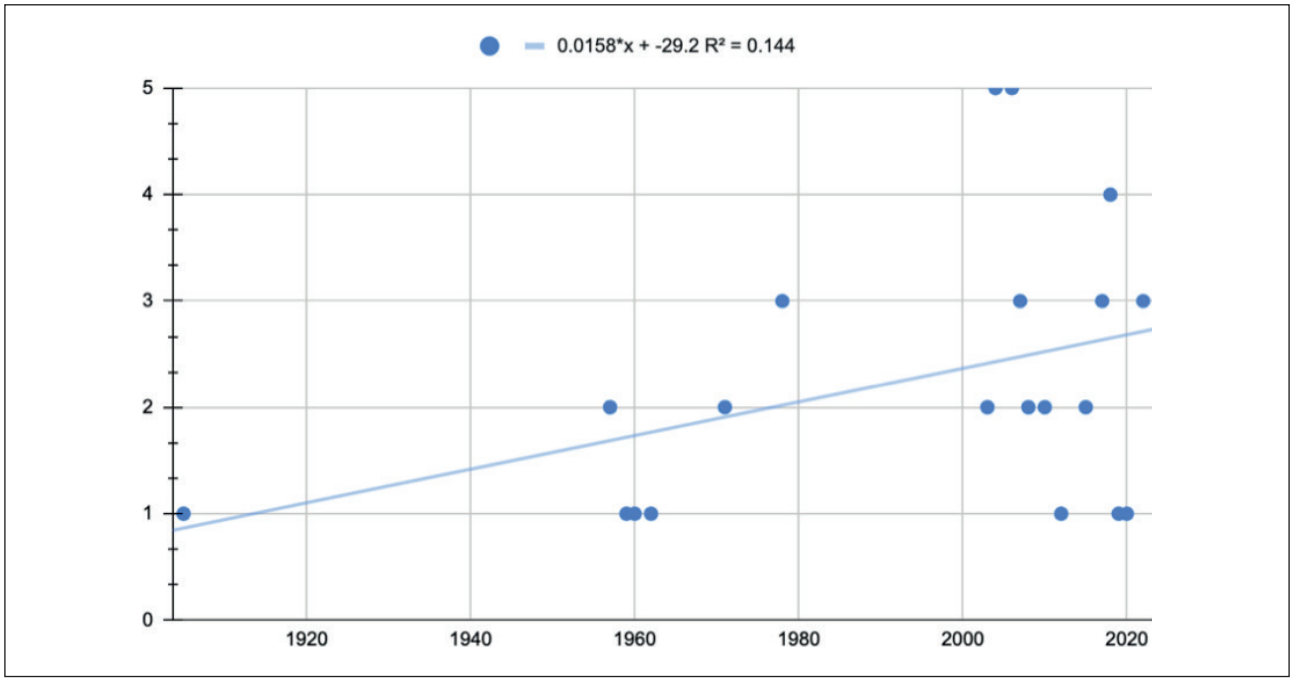


Figure 2: A scatter plot showing the number of political poisoning cases against time, with a positive correlation between year and number of political poisoning cases.



As seen on the graph above, there is a positive correlation between time passed since 1900 and the number of cases of political criminal poisoning, shown by the positive gradient on the scatter best fit line of 0.0158. We further observe that there are years in which the number of cases spikes upwards: namely during the 1980s and again around 2005. It is possible that these two jumps in case numbers are related to the formation of the KGB in 1954, [7] and later Putin's rise to power in 1999, [8] due to the close time proximity of these major events and the trends observed.

Throughout the 20th century, there was a maximum of three major cases reported per year, but recently larger numbers of poisonings were occurring per year in adjacent years (and the maximum number of cases has increased to five).

The most political poisonings per year occurred in the years 2004 and 2006, where five cases were recorded each, followed by 2018 (four cases) and 1978, 2007, 2017 and 2022, where there were three cases in each of those years.

The majority of these increased cases are directly related to poisonings of critics of the Russian regime.

Some of the most recent poisoning cases include Elvira Vikhareva, a Russian opposition politician, with potassium dichromate; [9] Andre De Ruyter in South Africa at the end of 2022; [10] and Natalia Arno, a Russian pro-democracy campaigner, and an unnamed journalist in Berlin in April 2023. [11]

The rising number of cases indicates that political criminal poisoning is becoming a preferred method of assassination, and thus should be considered a higher-priority issue both by individuals under threat and by governments.

It is worth noting that the absolute number of serious poisoning cases is also increasing, which may be related to the increase in cases of political criminal poisoning. For example, as recorded by the UK National Poisons Information Service (NPIS), fewer than 2000 telephone enquiries were referred to an NPIS consultant in 2015-2016, [12] in comparison to 2366 calls being referred to an NPIS clinical toxicologist in 2020-2021. [13] This is indicative of a general rise in serious poisonings, and thus medical professionals should aim to be more prepared in this area.

7 Pringle, Robert W. "KGB". *Encyclopaedia Britannica*, 23 June 2023, https://www.britannica.com/topic/KGB. Accessed 12 August 2023.

8 Britannica, The Editors of Encyclopaedia. "Vladimir Putin". *Encyclopaedia Britannica*, 12 August 2023, https://www.britannica.com/biography/Vladimir-Putin. Accessed 12 August 2023.

9 (Vasilyeva 2023) '"I was poisoned and my hair fell out" says Russian anti-war activist.' *The Telegraph*, 24 March 2023, https://www.telegraph.co.uk/world-news/2023/03/24/poisoned-hair-fell-says-russian-anti-war-activist/. Accessed 6 August 2023.

10 The Guardian. "South Africa police investigate alleged plot to poison CEO with cyanide". *The Guardian*, 8 January 2023, https://www.theguardian.com/world/2023/jan/08/south-africa-police-investigate-alleged-plot-poison-eskom-ceo-andre-de-ruyter. Accessed 6 August 2023.

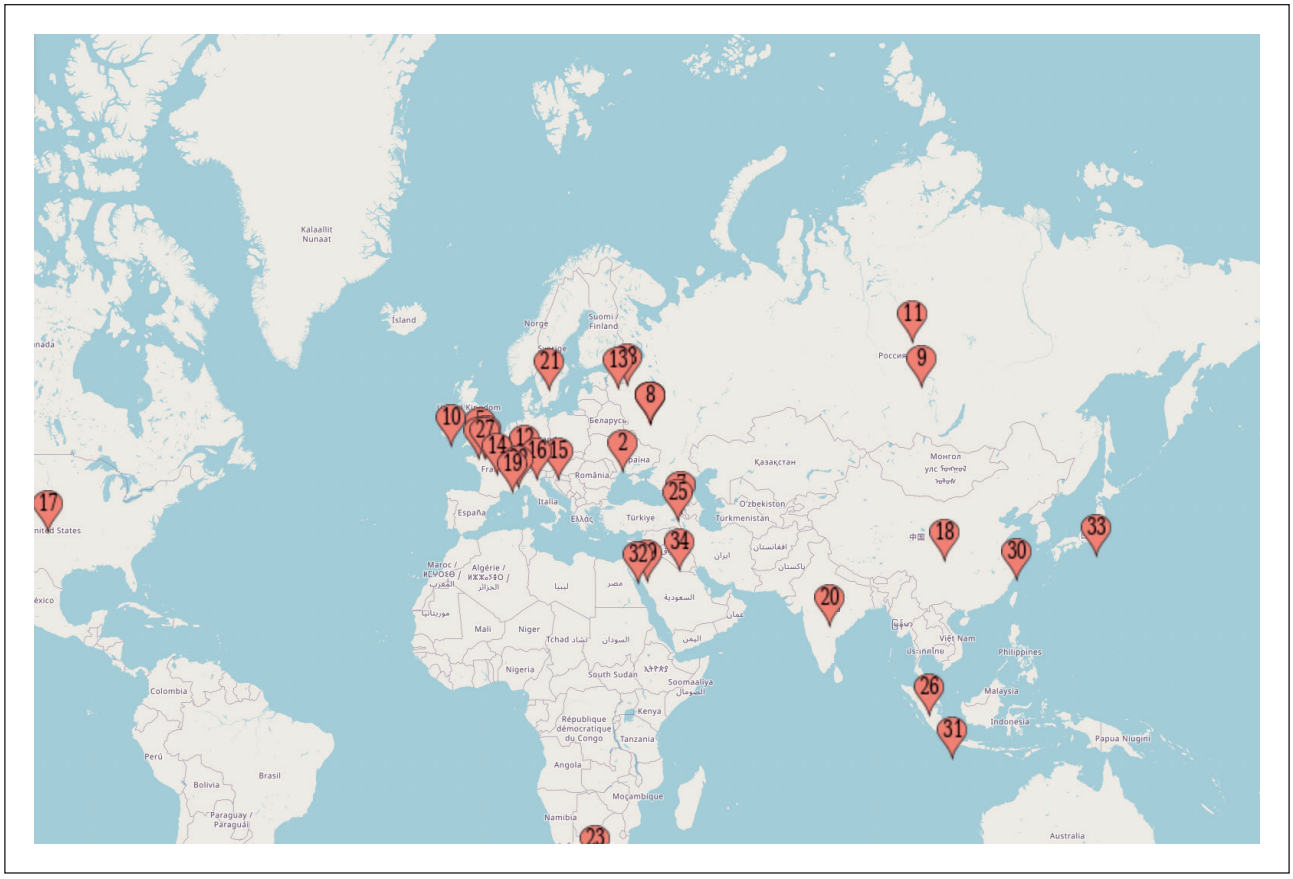
11 Martinez, Maria, and Alexandra Hudson. "German police investigate possible poisoning of two Russian exiles". *Reuters*, 21 May 2023, https://www.reuters.com/world/europe/german-police-investigate-possible-poisoning-two-russian-exiles-2023-05-21/. Accessed 6 August 2023.

12 Public Health England. 2016. "National Poisons Information Service Report 2015/2016". NPIS. https://www.toxbase.org/upload/Public%20Content/NPIS%20REPORT%202015-16.pdf.

13 Public Health England. 2021. "National Poisons Information Service Report 2020/21". NPIS. https://www.npis.org/Download/NPIS%20report%202020-21.pdf.

4. Geographical Spread of Political Criminal Poisoning Cases

Figure 3: Map showing geographical spread of 78 poisoning cases collected.



From the poisoning cases collected, there is a clear trend in that critics of the Russian government face poisoning as a method of assassination more frequently than critics of any other state or country, and that many of the victims of these cases are targeted within Europe.

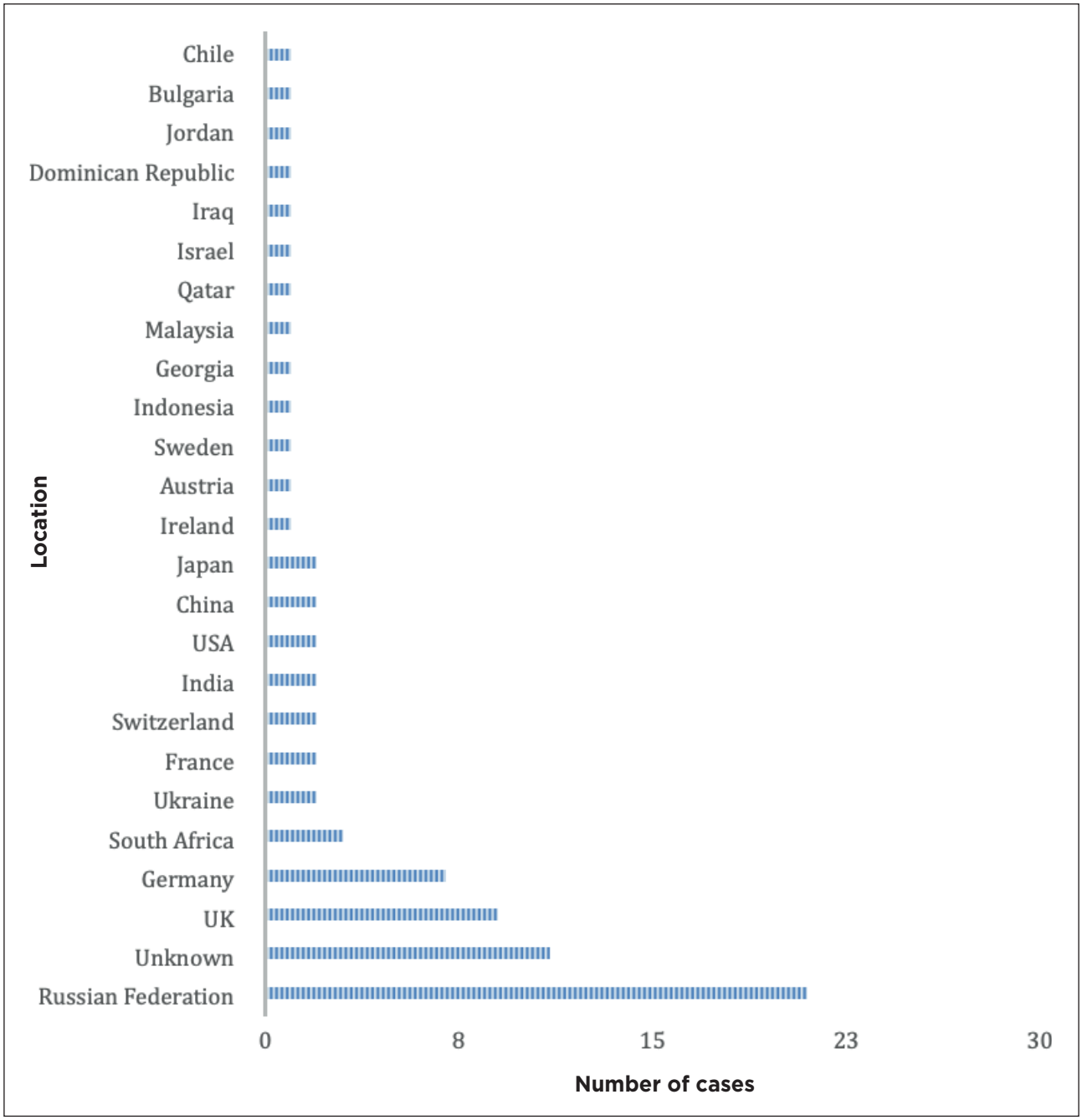
Of course, it is important to acknowledge that the poisoning cases known about in most dictatorships and totalitarian regimes are likely only a tiny fraction of the total number of cases, due to the majority being covered up and not reported in the mainstream media in the Western world. As a result, it is likely that the number of cases within China, North Korea and Russia is not representative of the true value: indeed, it is primarily in cases where the victim is able to be treated or to speak about their case outside of the regime's jurisdiction that it can be properly identified and investigated as a political criminal poisoning case.

This can be seen, for instance, in the 2020 poisoning of Alexei Navalny: when he was first treated in Russia, it was claimed his symptoms were a result of a metabolic disorder and high blood-glucose levels.[14] Only later, when he was transferred to Germany, was it established that he was poisoned with Novichok. Many other political criminal poisoning cases are likely to be covered up in a similar manner domestically.

The map of political criminal poisoning cases clearly shows that Europe appears to be a hotspot for reported cases of political criminal poisoning and that very few countries are immune.

[14] Zverev, Anton, and Gleb Stolyavrov. 2020. "Exclusive: Russian paramedics' accounts challenge Moscow's explanation for Navalny's coma – sources". *Reuters*. https://www.reuters.com/article/russia-politics-navalny-health-exclusive-idUSKBN265294.

Figure 4: Geographical spread of Poison cases.



Of the 78 poisoning cases, 21 occurred in the Russian Federation, 9 occurred in England, 7 occurred in Germany, 3 in South Africa, 2 occurred in France, 2 in Switzerland, 2 in Ukraine, 2 in India, 2 in the US, 2 in China, 1 in Austria and in several other countries (as well as 11 occurring in unknown locations). To highlight, the geographical statistics are highly skewed, due to the lack of information able to leave oppressive regimes, and thus conclusions cannot be accurately drawn in regions where the absolute number of cases are low.

It is unsurprising that the largest proportion of political criminal poisoning cases occurs in Russia. The nation is infamous for the Kremlin Poison Factory, established on the outskirts of Moscow under Vladimir Lenin, which was used to silence critics and traitors. [15]

[15] Harding, Luke. 2018. "Russia's Lab X: poison factory that helped silence Soviets' critics". *The Guardian*.

Twice-poisoned Russian opposition politician and Putin critic Vladimir Kara-Murza says about Russian leaders: "Poisoning has been a favored method of silencing dissenters… Its main advantage is plausible deniability." [16]

Every time there is a new instance of poisoning, the Kremlin's propaganda machine throws out alternative explanations, claiming the authorities have nothing to do with it. Shortly before his arrest, Vladimir Kara-Murza accused the regime in Russia today of not just being corrupt or kleptocratic, but "a regime that represses, murders". Poisoning is a particularly painful and sadistic method of killing one's enemies, potentially leading to a drawn-out period of death.

Surprisingly, despite the large number of cases that have occurred within Russia, it is primarily the poisonings that occur outside of Russia that attract the most media attention. Many of the victims of political criminal poisonings that occur within Russia remain unknown to this day.

Documented in the database, there are a staggering 28 instances of political criminal poisonings that are thought to have been carried out by Russian FSB (and formerly KGB and NKVD) agents. For the majority, whilst it is known that the perpetrators worked for the FSB, their names are unknown. It is only when independent investigations can be carried out, such as by Bellingcat, that the identity of these agents is revealed. For example, Soviet defector Bohdan Stashynsky admitted killing both Lev Rebet and Stepan Bandera and was convicted in West Germany of being an accessory to murder. But the identity of over half of them is still not known. The names of the FSB perpetrators are only ever uncovered via external investigations from other countries and other organisations (such as Bellingcat), [17] and even in these cases, it can be hard to trace the poisoning back to particular people and those who ordered it. For many hostile nations, part of the appeal of using poison as a weapon is that perpetrators are often able to walk away undiscovered and unnamed. [18]

Whilst Australia is a hotspot for generalised criminal poisonings such as the murdering of spouses, [19] to our best knowledge, there have been zero cases of political criminal poisonings occurring in Australasia. This is not unexpected, considering that the region is isolated enough that most dissidents do not flee there.

The database also lacks cases occurring in South America, despite the fact that regions within South America have some of the highest worldwide murder rates. [20] This is likely due to the fact that the majority of the prolific murdering occurs in plain sight, rather than being disguised and hidden as a poisoning attempt. Cases that may occur are also less likely to be reported on, due to the many other brutal acts that are occurring simultaneously, and thus political criminal poisoning is not a focus in many parts of South America.

Overall, the trends gathered from geographical spread are the most skewed statistic presented in this report, due to the limited resources and low sample size obtained from several countries. However, what this data does show is that political criminal poisonings occur in both hostile and democratic regions, and thus there is nowhere in the world where a dissident would be particularly safe, although simultaneously there are some totalitarian areas that are comparatively unsafe, due to the high levels of corruption meaning that poisoning cases both occur and are able to be covered up more easily.

16 Kara-Murza, Vladimir. 2021. "Opinion | I called up my would-be killer. He didn't want to talk". *The Washington Post*. https://www.washingtonpost.com/opinions/2021/02/23/vladimir-kara-murza-russia-fsb-poisoning/.

17 "Bellingcat". n.d. bellingcat – the home of online investigations. Accessed 16 July 2023. https://www.bellingcat.com/.

18 Anon. 2021. "I was poisoned – minister Moriku". *MONITOR*. https://www.monitor.co.ug/uganda/news/national/i-was-poisoned-minister-moriku-1743906.

19 Jenny Mouzos. "A Study of Homicide in Australia 1989-1999". https://www.aic.gov.au/sites/default/files/2020-05/rpp028.pdf. *Australian Institute of Criminology* (2000).

20 https://foreignpolicy.com/2022/05/20/homicide-murder-violence-united-states-latin-america-caribbean/.

5. Fatality Frequency

Overall, recovery from poisoning only occurred in 47% (37 cases) of the 78 political criminal poisoning cases collected, in comparison to an 84.4% recovery rate of admitted patients suffering from poisoning generally, as reported by the World Health Organization. [21] Thus, political criminal poisonings are a distinct subgroup within poisoning cases, and a novel medical approach must be used when tackling these cases.

This statistic may imply that cases of criminal poisonings which are politically motivated are often more fatal and difficult to treat than the mean poisoning case, hinting at the skilled, knowledgeable and resourceful nature of the perpetrators who carry out these attacks.

Thus, we show that those who challenge hostile, totalitarian regimes have a genuine reason to fear for their life, and that poisoning is not an impossibility.

One factor that increases the difficulty that dissidents face when trying to gain more information and advice about poisoning cases is the lack of personalised, tailored answers on how to deal with political criminal poisonings.

Major organisations such as www.poison.org display information about poisonings that would be **irrelevant and inaccurate when viewed through the lens of political poisonings**, and thus gives a **false representation** of what should be looked out for: as we demonstrate above, political criminal poisonings vastly differ from other forms of poisoning.

For example, the US National Poison Data System (NPDS) states analgesics (pain killers) as the most used substance in adult poisoning exposures (see Fig 5 below). [22] However, political poisoners increasingly use dangerous radioactive substances as well as organo-phosphorous compounds and chemical nerve agents. Notably, within the documented cases of political criminal poisonings collected for this study, no person was poisoned using analgesics.

Figure 5: List of most common substances implicated in adult poison exposures (20 years or older, NPDS, 2020).

Substance Category	No. of Cases	%
Analgesics	134,918	10.7
Sedative / Hypnotics / Antipsychotics	97,968	7.8
Cleaning Substances (Household)	91,678	7.3
Antidepressants	86,922	6.9
Cardiovascular Drugs	84,010	6.7
Alcohols	58,458	4.6
Anticonvulsants	47,714	3.8
Cosmetics / Personal Care Products	42,113	3.3
Antihistamines	41,581	3.3
Pesticides	38,140	3.0

[21] Jesslin, J., R. Adepu, and S. Churi. 2010. "Assessment of Prevalence and Mortality Incidences Due to Poisoning in a South Indian Tertiary Care Teaching Hospital". NCBI. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3116303/.

[22] "Poison Statistics National Data 2021". n.d. Poison Control. Accessed 16 July 2023. https://www.poison.org/poison-statistics-national.

Whilst analgesics do have some of the properties of an ideal poison, such as being transportable off-the-shelf drugs which are easy to access, a large dose must be given to act as an effective poison, and they are easily detectable within the human body, [23] making them primarily only used in non-political poisonings.

The lack of a streamlined portal where people at high risk of political poisoning can come for resources, information and advice is part of the problem in cases of political criminal poisonings, leading to confusion in the aftermath of registering symptoms, and the lack of prompt action by dissidents themselves and healthcare workers and law enforcement bodies.

[23] Bloom, Floyd E. "Analgesic". *Encyclopaedia Britannica*, 12 May 2023, https://www.britannica.com/science/analgesic.

6. Poisons Used: The Ideal Poison and the Big Ten

The compilation of 78 cases allows us to analyse the poisons that have been used for political motives more often than others.

The top ten most used substances in political criminal poisoning cases are displayed in the table below. The table specifies the properties that make those substances an effective poison choice, the primary symptoms of victims affected by them, and the known antidotes and applicable treatment protocols.

The Big Ten Poisons

Substance	Primary symptoms	Known Antidote	Treatment	Properties for use as a poison	Lethal Dose (mg / kg)
Thallium [a, b]	Delayed alopecia, skin lesions, abdominal pain, nausea / vomiting, diarrhoea / constipation, coma, seizures	FDA has approved Prussian blue (activated charcoal)	Tests: Complete blood count with differential Electrolyte Glucose Blood urea nitrogen Liver function test Calcium	Tasteless, odourless, water-soluble, highly toxic, non-specific symptomology to poisoning	15
Cyanide [c, d]	Weakness, vomiting, confusion, unconsciousness, convulsions, bitter almond odour may be detected	Hydroxocobalamin or sodium thiosulfate and sodium nitrite	Tests: Complete blood count Electrolytes Urinalysis Arterial blood gas Chest X-ray Plasma lactate > 8mmol/L 70% specific for cyanide toxicity	Fast acting	1.5
Arsenic (trisulphide LD50) [e]	Vomiting, abdominal pain, diarrhoea, burning of the mouth and throat, hypersalivation	Chelation therapy with either dimercaprol, DMSA or DMPS	Tests: Blood urea Creatinine Electrolytes Liver function Full blood count	Found in the burial environment	185
Novichok [f]	Chest tightening, difficulty breathing, pupil constriction, convulsions, vomiting, diarrhoea, asphyxiation	Atropine	Specific treatment protocols lacking, follow protocol of other well-known paralysing agents: - Intubation and mechanical ventilation - Diazepam for convulsions	Volatile, colourless liquid, does not need to be added to food/drink, rapid onset of symptoms	10

[a] AAT Bioquest. n.d. "2,3,7,8-Tetrachlorodibenzodioxin Toxicity (LD50)". AAT Bioquest.

[b] Yumoto, Tetsuya, Kohei Tsukahara, Hiromichi Naito, Atsuyoshi Lida, and Atsunori Nakao. 2017. "A Successfully Treated Case of Criminal Thallium Poisoning". NCBI. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5449837/.

[c] Graham, Jeremy, and Jeremy Traylor. 2023. "Cyanide Toxicity - StatPearls". NCBI.

[d] Leybell, Inna, and Michael A. Miller. 2021. "Cyanide Toxicity Treatment & Management: Approach Considerations, Prehospital Care, Emergency Department Care". Medscape Reference.

[e] National Poisons Information Service. n.d. "Arsenic trisulphide (UK PID)". INCHEM.

[f] Cotton, Simon. 2018. "Nerve Agents: What Are They and How Do They Work?". *Scientific American*.

Ricin [g, h]	Nausea, vomiting, abdominal pain, severe dehydration, shortness of breath, worsening respiratory symptoms	No antidote currently exists for ricin	Intravenous fluids Ventilators for breathing Medication for seizures/ low blood pressure Flushing stomach with activated charcoal	Lack of existing antidote, difficult to detect in the body, ingredients relatively easy to obtain from castor plant	10
Polonium-210	Vomiting, diarrhoea, hair loss, severe headaches	No current antidote	No curative measure currently exists	Contagious, extremely difficult to detect, easy transportation as alpha eradication cannot penetrate through glass	Trace (radioactive)
Dimethyl sulfate [i, j]	Corrosive, irritating and damaging eyes and respiratory system, build up of fluid in the lungs, headache, dizziness, nausea, vomiting and comas	No known antidote	Treatment consists of supportive measures primarily to treat symptoms	Colourless solid	25
TCDD dioxin [k]	Skin lesions, vomiting, diarrhoea, hypertension, neural system damage	No antidote currently	Adipose tissue and blood serum can be analysed for the presence of TCDD by gas chromatographymass spectrometry. Cholarcne may be an indicator of dioxin toxicity. Long-term topical treatment with dilute retinoic acid and administration of tetracyline to treat secondary pustular follicles, in addition to dermabrasion in extreme cases	Colourless crystalline solid at room temperature, stable in heat, acids and alkali, odourless	0.02
VX nerve agent [l, m, n] Liquid	Runny nose, watery eyes, blurred vision, drooling and excessive sweating, chest tightness, vomiting, drowsiness, headache, unconsciousness	Pralidoxime chloride (must be administered within minutes hours to be effective) or atropine	If the patient/victim's condition can be evaluated within 30 minutes after ingestion, in a hospital setting, consider gastric lavage. Gastric contents should be considered potentially hazardous and should be quickly isolated. Electrocardiogram (ECG), and adequacy of respiration and ventilation, should be monitored.	Odourless, tasteless, rapidly acting, mixes easily with water	0.14

g Centre for Disease Control and Prevention. 2018. "CDC | Questions and Answers About Ricin". CDC Emergency Preparedness.

h MOHR, HOLBROOK. 2013. "`The perfect poison': Ricin used in 3 recent cases". *The Seattle Times*.

i New Jersey Department of Health. n.d. "Hazardous Substance Fact Sheet: Dimethyl Sulfate". Hazardous Substance Fact Sheet.

j World Health Organisation. 1989. "Dimethyl sulfate (HSG 29, 1989)". INCHEM. https://www.inchem.org/documents/hsg/hsg/hsg029.htm.

k https://nap.nationalacademies.org/read/4795/chapter/25#344.

l Hayoun, Michael, Matthew Smith, Chelsea Ausman, Siva Naga Yarrarapu, and Henry Swoboda. 2022. "Toxicology, V-Series Nerve Agents – StatPearls". NCBI.

m Northeast Michigan's Community Health Department. n.d. "VX GAS". District Health Department #2.

n https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750005.html.

			Supplemental oxygenation, frequent suctioning of secretions, insertion of a tube into the trachea (endotracheal intubation), and assisted ventilation may be required. Diazepam (5 to 10 mg in adults and 0.2 to 0.5 mg/kg in children) may be used to control convulsions.		
Warfarin [o, p]	Rash-like red spots on skin, severe headache / dizziness, vomiting, abdominal pain, black or bloody bowel movements	Vitamin K1 (it takes several hours to reverse anticoagulation, although several doses may be required)	Initiate usual supportive measures, including intravenous (IV) access if any suggestion of remote or active bleeding is evident. After an acute intentional ingestion, activated charcoal should be considered for clinically significant ingestions if it can be administered within an hour or two of the ingestion. Infuse crystalloid solution if signs of significant blood loss are present	Colourless, odourless	6.667

Highlighting is used to make the known antidote used, or lack of known antidote, clear.

From this table, it becomes apparent that many of the major poisons listed have a very distinctive cluster of symptoms (mostly involving the body's natural response of trying to detoxify and remove poison) but that these symptoms can overlap between different poisons, due to their similar effect within the body. Hence, one of the greatest challenges for the future treatment of political criminal poisoning cases is not diagnosing an illness as a poisoning, but rather uncovering the specific poison used.

It can also be observed that the frequently encountered poisons can be divided into two categories: those for which a specific treatment and antidote regimen exists, and those for which it doesn't (and often treatment consists only of supportive measures). Only six of the ten most commonly used poisons currently have an antidote. It is likely that in future, new poisons will be chosen for their lack of current antidote, making the prognosis worse.

It is also fairly clear that cases of political criminal poisonings are often highly technical, and thus are typically carried out by skilled, trained individuals. Taking Novichok as an example, in addition to the complex method of obtaining such a chemical weapon, primarily developed in Russian state laboratories, there are dangerous methods involved in transporting and administering it. [24]

This table of the Big Ten poisons reflects those currently most often used by hostile regimes. However, it is important to look further when assessing cases of political criminal poisonings. Using these poisons as a springboard for trends, one can only predict that poisons utilised in the future will be similarly novel and unknown; this is similar to how Litvinenko was the first person to be poisoned by radiation (Po-210). As a result, unique, novel thinking is required for

[o] Hanley, JP. 2004. "Warfarin reversal – PMC". NCBI.

[p] https://emedicine.medscape.com/article/821038-treatment?form=fpf.

[24] Charejoo, Amirhosein et al. "A complete, evidence-based review on novichok poisoning based on epidemiological aspects and clinical management". Frontiers in Toxicology vol. 4 1004705. 25 January 2023, doi:10.3389/ftox.2022.1004705.

the diagnosis of political criminal poisonings, which may involve chemicals never used before. This is perhaps where the threat of new bioweapons being developed increases. [25, 26]

We will look at several of the most common poisons, although a more detailed list of the victims targeted by each poison can be found at poisonreporting.org.

1) Arsenic: We find that arsenic, one of the most infamous hallmark poisons, is the most frequently used poison, administered in 13 out of the 78 cases collected. Common symptoms include intense stomach pain and vomiting. Victims poisoned by arsenic also had the greatest spread geographically, including individuals in India, Sweden, China and South Africa. Notably, there was only one Russian victim among this list. Arsenic was commonly mixed into food as the method of administration in the cases where this detail is known.

2) Thallium: Of the 78 cases collected, thallium is the second most frequently used poison, known to have been administered in nine cases. The most common symptoms that overlapped between cases of thallium poisoning include hair loss (three cases), vomiting (two cases) and numbness in the extremities (two cases). One of the earliest recorded cases of thallium poisoning was that of Nikolai Khokhlov, a KGB officer who defected to the US and was able to recover after treatment in Frankfurt, Germany. This is often cited as the first external, international radiological attack by the KGB. Thallium was also used in the poisoning of East German defector Wolfgang Welsch, and in one of the several poisoning attempts of Cuban leader Fidel Castro.

3) Cyanide was used in four of the 78 cases collected: Andre De Ruyter, Abram Slutsky, Lev Rebet and Stepan Bandera. Andre De Ruyter was the only individual out of the four to survive, and his case was also the only one of the four not thought to have been ordered by Russia or the Soviet Union.

4) Ricin was administered in four of the 78 cases collected, all of which occurred in the 20th century (Vladimir Kostov, Boris Korczak, Georgi Markov and Aleksandr Solzhenitsyn). To our knowledge, ricin has not yet been used as an agent in political criminal poisonings in the 21st century. In three out of the four cases, the individuals poisoned with ricin were able to make a complete recovery.

5) Novichok is considered of the most infamous poisons and has been used to target two prominent Russian dissidents, Sergei Skripal and Alexei Navalny (as well as surrounding family members and civilians indirectly). It is also speculated to have been used in the poisoning of Natalia Arno, who had symptoms consistent with that of a nerve agent, and was used in the poisoning of Emilian Gebrev in 2015. Interestingly, despite the high-profile nature of the Skripal case, this symbolically loaded poison was also used when trying to assassinate Navalny, possibly because his poisoners weren't expecting that he would leave Russia. This also hints at the highly optimal and convenient nature of Novichok, through its repeated use, showing it has qualities valued by the perpetrators.

6) Polonium-210 is the only radioactive poison to be used historically to the best of our understanding. It has a different effect on bodily functions than the previous biological and chemical poisons listed – it ionises cells due to the highly penetrating power of the source upon exposure. This means that radioactive poisoning also forms the biggest public health burden due to the risk of large-scale contamination. Polonium-210 was used in the poisoning of Litvinenko in 2006, and has not been used again since, perhaps due to the high traceability and, thus, difficulty in transportation.

25 Frischknecht F. "The history of biological warfare. Human experimentation, modern nightmares and lone madmen in the twentieth century". EMBO Rep. 2003 Jun;4 Spec No (Suppl 1):S47-52. doi: 10.1038/sj.embor.embor849. PMID: 12789407; PMCID: PMC1326439.

26 Papang Hidayat. *A Decade of Injustice – Time to Find Munir's Real Killers*. Amnesty International. 8 September 2014. https://www.amnesty.org/en/latest/news/2014/09/a-decade-of-injustice-time-to-find-munir-s-real-killers/.

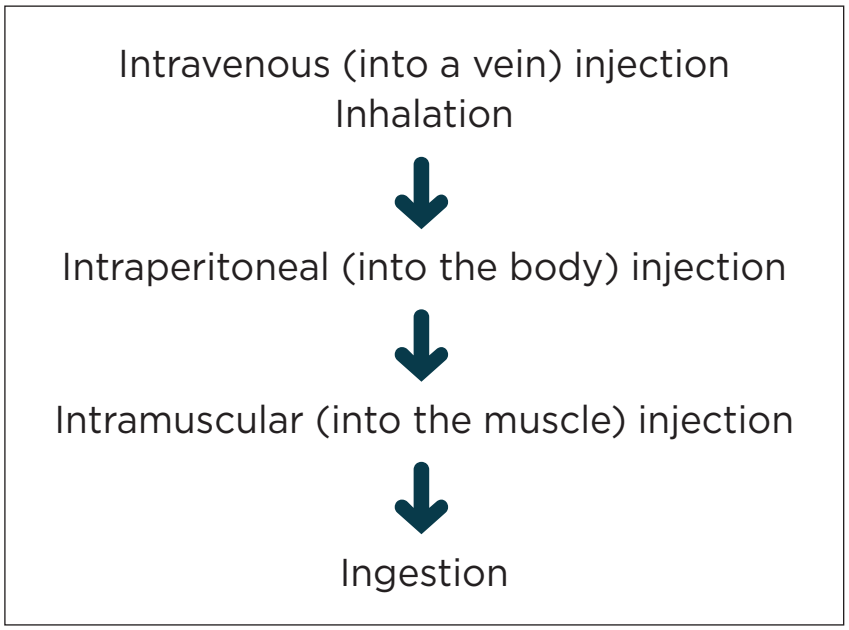
7. Administration of Poisons

There are four main pathways by which poisons can be administered into the body:

- Ingestion (gastrointestinal tract)
- Inhalation (lungs)
- Dermal/topical (skin)
- Injection (intravenous, intramuscular, intraperitoneal, etc.).

Not all pathways are equally effective. The speed with which a poison can act is dependent on the pathway it takes into the body. The pathways are presented below from fastest to slowest-acting:

Figure 6: Pathways for poison administration.



We thus use the database to gather trends about the circumstances of different routes of poison administration.

1) Spiked Drinks

From the 78 poisoning cases collected, spiked drinks was one of the most common methods for administering poison, occurring in eight cases of the 40 in which the poison consumption is known. The two most common spiked drinks in the investigation are, perhaps unsurprisingly, tea (four cases) and coffee (two cases), although vodka, and punch have also been used. In particular, Russian opposition figures have been poisoned using spiked drinks (5/8), including former or defected KGB officers. Spiking drinks is a straightforward method for poison administration because most poisons are odourless and tasteless, and thus remain undetected in the fluid.

Drinks such as coffee and tea also have a particularly strong and bitter aftertaste, which further works to mask the slightly bitter taste of common poisons like ricin, cyanide, saponin and progoitrin. Many of the most infamous, fatal poisonings in recent years have occurred via spiking, such as Alexander Litvinenko, Roman Tsepov and Andre De Ruyter, in addition

to many lesser-known instances, such as Abdullah Ali and Bela Lapusnyik. The fact that the majority of the Big Ten poisons are soluble in water and other solvents further makes spiked drinks a subtle and often effective method of poison administration.

As a result, whilst seemingly obvious, a key preventative measure for an individual feeling under threat from political criminal poisonings is to take care around consumption in public spaces. At events or places others know in advance that they are attending (not spontaneously) it is advisable to remain nil-by-mouth. This vastly reduces the chance of being poisoned, with only a select few poisons able to be inhaled as gases at room temperature.

In many cases, poisons are most potent when ingested, and able to do the most damage to internal organs, and thus this is the most dangerous form of poison administration (out of the four pathways through which poison can enter the body).

2) Food

Mixed into food was another frequent method of poison administration, occurring in nine of the known cases including those of Viktor Yushchenko, Vikram Sarabhai and Nestor Lakoba. Again, using food as a method of poison administration seems to be favoured by those targeting critics of Russia (5/9 cases). Similar to fluids, poison mixed into food is an innocuous and subtle method of administration, implying that the perpetrators aim to make the victims' symptoms appear as innocent as possible.

3) Direct

Poison may also be administered through direct forms of physical contact (ten cases), such as via the opening of a letter, as in the case of Samir Salah Abdullah, or being smeared onto a telephone for Ivan Kivelidi, in addition to vapours and mists such as aerosols, sprays and perfumes.

After oral administration, physical contact was the second most common from the cases gathered, and thus dissidents should be wary of strangers shaking their hands or getting too close to them in busy public settings. It is common for gaseous poisons to be administered as gas or mist sprays in the air (nine cases), including Khaled Mashal, where poison was sprayed into the victim's ear, and Natalia Arno, where it was also used in a gaseous form. Aleksandr Solzhenitsy was notably poisoned via injection, using an experimental gel-based delivery method in 1971, and Cy Oggins, a Russian prisoner, was injected with curare in 1947. Further, it is believed that Pablo Neruda was poisoned via an injection of clostridium botulinum bacteria into his stomach at the clinic where he was being treated.

We hypothesise that the low number of injection cases is due to the fact that this is the least subtle of the pathways for poison administration and thus would not align with the aims of political criminal poisoning, which should occur quickly and quietly. Injection is only used as a method of administration where the power dynamic is such that the perpetrator already has power over the victim.

4) Other notable forms of administration

Particularly for 20th-century poisoning cases, methods of administration are often much more inventive. A poison-laced umbrella was used by KGB agents to inject Georgi Markov with ricin in 1978; a ricin pellet was used to poison Vladimir Kostov; and in the poisoning of Karinna Moskalenko, mercury pellets were found on the roof of her car, thus causing her to have high exposure to the toxic substance.

8. Symptoms

Some of the symptoms of cases of political criminal poisoning are similar to those of other criminal poisoning cases, although due to the more potent nature of poisons used, they tend to be more extreme, and with a faster onset.

1) Unconsciousness

In the documented cases of political criminal poisonings used in this study, unconsciousness was the most common symptom, occurring in 19 of the 78 cases. Its occurrence in nearly a quarter of political criminal poisoning cases is, at the very least, a significant indicator for dissidents: sudden abnormal collapsing and drowsiness may be an early and immediate sign of poisoning, and hence should be used by relatives to immediately alert medical professionals to a poisoning possibility.

Unconsciousness is caused by a "temporary or permanent impairment of either the reticular activating system in the brainstem, both cerebral hemispheres or bilateral thalami." [27] Some forms of nerve-agent poisons are a systemic cause of unconsciousness. They work by disrupting the central nervous system, by binding to the enzyme acetylcholinesterase, preventing electrical impulses from being sent around the body, and thus nerves from carrying out bodily functions. [28] As a result, unconsciousness in dissidents should be treated as a clear sign that a poisoning case may have occurred, although it normally takes 15-60 minutes to occur, [29] which is already timely and late, and so one should aim not to use unconsciousness as a first signal. Unconsciousness is also a broad symptom and response to many different poisons and is thus unhelpful in differential diagnosis.

2) Vomiting

Vomiting was another common symptom in the cases of poisonings collected, occurring in 15 of the 78 cases. Vomiting was closely associated with unconsciousness and diarrhoea.

3) Chemotherapy-like symptoms

Symptoms commonly associated with chemotherapy treatment, [30] including extreme weight loss, fatigue or a sudden change in body biomarker levels, occurred in ten of the 78 cases. This is unsurprising considering that chemotherapy treatment could itself be considered a form of poisoning, killing any rapidly dividing cells, such as those in hair follicles.

4) Other notable symptoms

Acute kidney complications and kidney failure occurred in three cases (Boris Korczak, Anderson Mazoka and Vladimir Kara-Murza). Failure of any of the vital organs is a sign of acute, rapid deterioration, and should be one of the main signs that poisoning has occurred. Additionally, thickening of the heart muscle and arteries, progressively leading to a heart attack in the case of Nestor Lakoba (poisoned with an unknown substance), was a particularly prominent and distinctive set of symptoms. Fever and severe abdominal pain are also commonly associated symptoms of political criminal poisoning.

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27 Bauer, Z., De Jesus, O., & Bunin, J. (2023, February 12). *Unconscious Patient – StatPearls*. NCBI.

28 Wiercinski A, Jackson JP. "Nerve Agents". [Updated 24 October 2022]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; January 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK493158/.

29 Said Aki, Ehab, et al. "Toxicology in Emergency Medicine". Essentials of Accident and Emergency Medicine, IntechOpen, 10 January 2019. Crossref, doi:10.5772/intechopen.77011.

30 "Chemotherapy and Radiation Side Effects". 2022. Cleveland Clinic. https://my.clevelandclinic.org/health/articles/10257-chemotherapy-side-effects.

9. Antidotes

Antidotes are agents that negate the effect of a poison or toxin by preventing its absorption by the body and are chemically defined as an agent that "increases the mean lethal dose of a toxin". [31] They may bind to the poison, so it is not able to bind to cell receptors, thus neutralising the poison and reducing its effect on end-organs. Alternatively, they may inhibit the conversion of the poison/toxin to more toxic metabolites.

Reliable detection of toxic substances so that an antidote can be given is the most crucial aspect of treatment for poison-presenting cases. Without an antidote, there is a low probability of surviving a serious poisoning case, unless there was a mistake by the attacker, such as a too small dose given (for example, Lugovoy and Kovtun are accused of failing to poison Litvinenko twice before administering a lethal dose of the radioactive isotope [32]) but this is unlikely and cannot be counted on.

Antidotes should be delivered by intraosseous access (injected directly into the bone marrow), which provides easier access than intravenous delivery.

Less commonly known is chelation therapy for poisoning cases afflicted by metals, which involves compounds that can bind to toxic metals and promote their excretion from the body, such as arsenic, lead and mercury.

Figure 7: Table shows useful common poison antidotes. [33]

Naloxone	For treatment of opiate and opioid overdose, μ-receptor antagonist; reverses CNS and respiratory depression. Available over-the-counter.
Anti-venom	Available treatment for snake (rattlesnake/*Crotalidae*, coral/*Micrurus fulvius*) spider (black widow/*Latrodectus mactans*), scorpion, and other envenomations.
Atropine and pralidoxime (2PAM)	For procholinergic manifestations of organophosphate poisoning.
Botulinum antitoxin	For treatment of botulism, in complement with supportive care. Trivalent and heptavalent equine immunoglobulin fragments are available for adults, whereas a divalent human immune globulin may be preferable in infants.
Diazepam	For chloroquine overdose in complement with supportive care, reduces mortality.
Digoxin immune Fab (Digibind®)	For digoxin/digitoxin overdose. Digoxin-ab complexes result in persistent drug levels and may not be clear without sufficient kidney function, even with hemodialysis; rebound poisoning/ dissociation reported days after treatment in kidney failure patients. Also of clinical benefit with other cardiac glycosides, such as in poisoning due to oleander ingestion, and poisonous toad (*Bufo* species) encounters or venom containing Chinese medicine Chan Su or aphrodisiac compounds.
Flumazenil	For benzodiazepine overdose, not routinely recommended because of seizure risk.
Fomepizole/4MP	For methanol and ethylene glycol poisoning. As with ethanol, inhibits alcohol dehydrogenase, preventing the formation of toxic metabolites.
Glucagon	Treatment for ß-blocker overdose.
Glucarpidase	For methotrexate overdose or nephrotoxicity. Carboxypeptidase G2, provides enzymatic hydrolysis of methotrexate to metabolites, and nonrenal clearance.
Hydroxocobalamin, amyl nitrite, sodium nitrite, and sodium thiosulfate	For cyanide poisoning.
Methylene blue	For treatment of methemoglobinemia (Hgb-Fe3+) from oxidizing agents (eg, nitrates, sulfonamides, local anesthetics, rasburicase) and carbon monoxide and cyanide toxicity. Reducing agent.
NAC	For acetaminophen overdose/poisoning. Increases glutathione stores, preventing toxicity of
N-acetylcysteine	the *N*-acetyl-*p*-benzoquinone imine (NAPQI) metabolite.
Octreotide	For oral hypoglycemic overdose.
Phentolamine	For vasopressor extravasation treatment.
Physostigmine	For anticholinergic poisoning (atropine/*Belladonna* and *Datura).*
Phytonadione/VitK	For warfarin overdose.
Praxbind idarucizumab	For Pradaxa/dabigatran overdose. Monoclonal antibody, specific benefit only, not for overdose of other anticoagulants.
Prothrombin complex	For anticoagulant overdose. Can also give recombinant factor VIIa.
Pyridoxine	For isoniazid (INH) poisoning and a cofactor in the treatment of ethylene glycol poisoning.
Sodium bicarbonate	For tricyclic antidepressant (TCA) poisoning and ion trapping with salicylate poisoning.

[31] Chacko, Binila, and John Peter. 2019. "Antidotes in Poisoning – PMC". NCBI.

[32] Zhores Medvedev. "Polonium-210 in London". https://www.spokesmanbooks.com/Spokesman/PDF/96Medvedev.pdf.

[33] Screenshot retrieved on 7 March 2023 from https://www.nefro.nl/sites/www.nefro.nl/files/research/AdvChronKidneyDis2020_27-0005.pdf.

Treating acute poisoning cases is very different from the treatment of many other illnesses due to the high risk and intricate analysis required for the administration of antidotes. In the treatment involving antidotes, there is a risk of antidote overdose, which could be as harmful as the poison itself.

Despite this, there are currently many cases where victims were not given an antidote and died, but we have not been able to find a single political poisoning case where too much antidote was given and caused death; in political criminal poisoning cases, if an antidote is available, the first course of action is that it should be administered, and we propose that the administration of an antidote is more important than the complete precision of the dosage.

Notably, Kim Jong Nam was allegedly carrying 12 doses of atropine when he was swabbed by VX nerve agent in Kuala Lumpur International Airport in 2017. Despite the fact that the antidote was not administered, leading to Jong Nam's death, the situation made headlines, with experts such as senior pharmaceutics lecturer at Sydney University Nial Wheate saying: "If you know someone is coming after you with a nerve agent, atropine is a key drug you would want to carry." [34]

[34] Griffiths, James, and Salhan Ahmad. 2017. "Kim Jong Nam had antidote to VX nerve agent on him at time of murder". *CNN*.

10. Victims of Political Poisoning: Activities and Occupations

In the past 70 years, a growing number of political opponents, independent journalists, anti-corruption campaigners, defectors and other people undesirable to certain regimes have been targeted by poison. What they all have in common is opposing an ideology, organisation, party or power in some outspoken and attention-driven way, such as being a dissident, independent journalist, human rights activist or lawyer. In the majority of cases, victims are highly successful in their opposition, enough to warrant the order to be killed. Whilst it is impossible to predict with certainty who will be targeted in a case of political criminal poisoning, if an individual is opposing a powerful and oppressive regime, they are at risk of political criminal poisoning.

Examples of major cases of political poisonings of dissidents when a potent poison was used are described below.

Alexander Litvinenko.....

Background information	Litvinenko was a former FSB officer, who fled Russia and received political asylum in the United Kingdom. There, he criticised the Russian President Putin and the Russian Government, sharing information about the Russian mafia with British and Spanish intelligence. He continued to support the media campaign of Boris Berezovsky against the Russian Government.
Instance of poisoning	On 1 November 2006, Litvinenko met Andrey Lugovoy and Dmitry Kovtun, two Russian ex-KGB officers, at the Pine Bar of the Millennium Hotel in London. On the evening of 1 November, Litvinenko started vomiting and later developed bloody diarrhoea. His symptoms progressively worsened until he was hospitalised, at the Barnet Hospital, on 3 November 2006. It was later discovered that the poison used on Litvinenko was in a teapot at the Millennium Hotel's Pine Bar, where he drank green tea on 1 November. It is estimated, from Litvinenko's symptoms, that about 10 micrograms of Polonium-210 was administered.
First responses	The first response diagnosis for Litvinenko's poisoning was wrong, and he was initially treated for gastroenteritis. Due to his worsening condition, he was transferred to UCL Hospital in London, UK. There, he was diagnosed with thallium poisoning, which was also claimed by Scotland Yard; early tests appeared to confirm its presence, although symptoms didn't entirely match up and levels were not at the level you would expect to see in toxicity. In response to this, Litvinenko was treated for thallium poisoning and given Prussian blue (activated charcoal), the standard antidote. He was heavily sedated and put onto a ventilator after going into heart failure.
Investigations and treatment	Blood and urine samples were sent to the UK's Atomic Weapons Establishment to be tested for radioactive poison using gamma spectroscopy; initially, no discernible gamma rays were detected. However, a small gamma-ray spike was eventually noticed at an energy of 803keV (barely visible above background), which was a signal to the radioactive decay from gamma poisoning. Further tests on a larger urine sample detected alpha particles the following day.
Outcome and other measures	Litvinenko's heart failed on the evening of 22 November and he died at 9:21pm the following day. In his last statement about Putin, Litvinenko said: "You may succeed in silencing me but that silence comes at a price. You have shown yourself to be as barbaric and ruthless as your most hostile critics have claimed." The Greater London's Metropolitan Police Service Terrorism Unit investigated the poisoning, and a Polonium trail around London became apparent, with traces of contamination spreading far. Polonium trails were able to be differentiated to three different dates (and thus to failed attempts to administer poison, in one of which Litvinenko consumed less than the lethal dose, and was able to recover despite the symptoms). In 2021 the ECHR concluded that Lugovoy and Kovtun, who also had Polonium-210 trails, were the perpetrators.

Anna Politkovskaya.....

Background information	Anna Politkovskaya was a Russian journalist, writer and human rights activist, known for her opposition to the Chechen conflict and for criticism of Vladimir Putin. Her critical work against abuses by Russia, as an investigative journalist at the Novaya gazeta (an independent newspaper), earned her multiple death threats.
Instance of poisoning	In September 2004, Politkovskaya travelled to Beslan, Russia for negotiations with hostage-takers in the Beslan school hostage crisis. On the flight to Rostov, Politkovskaya declined the inflight meal but became severely ill and lost consciousness after drinking tea. She accused three FSB agents, disguised as ordinary business-class passengers, of poisoning her. She is believed to have been deliberately poisoned to prevent her from reporting on the seizure of a school in Southern Russia by Islamic Separatists. According to the airline Karat, the operator of the flight, her inflight tea was served from the same pot as other passengers, who did not become ill. The poison used remains unknown.
First responses	All the tests taken at the airport after the plane landed were destroyed upon command from a higher authority. Politkovskaya was treated at Rostov regional hospital and managed to recover, although her situation was "almost hopeless" when she was brought to the hospital. However, state prosecutors refused to open an attempted murder case, finding no evidence of crime in Politkovskaya's illness.
Investigations and treatment	The unknown toxin was supposedly prepared at a former Soviet secret police poison facility. The treatment of Politkovskaya remains unknown.
Outcome and other measures	Although Politkovskaya was able to recover from the poisoning attempt, two years later she was shot dead in the elevator of her apartment block in central Moscow

Viktor Yushchenko.....

Background information	Yushchenko is a Ukrainian politician, who was the third president of Ukraine from January 2005 to February 2010. He ran as the informal leader of the opposition coalition and was one of the two main candidates in the 2004 presidential election.
Instance of poisoning	In September 2004, before the Ukrainian election, Yushchenko became violently ill after eating dinner with the head of Ukraine's security service. When he arrived home and kissed his wife, she told him that his lips tasted "metallic". The investigation into his poisoning shows that he was fed dioxin, a chemical found in the herbicide Agent Orange, which was added to the rice he ate at dinner. The use of Agent Orange to poison Yushchenko is seen as symbolic by Russia, since he was a central figure in the Orange Revolution, leading Ukraine closer to Europe and away from Russia.
First responses	Yushchenko was rushed to Austria for emergency treatment. At Vienna's Rudolfinerhaus clinic, he was diagnosed with acute pancreatitis and a serious viral infection, as well as severe abdominal and back pain. His face was greatly deformed – jaundiced, bloated and pockmarked – and his left side was paralysed.
Investigations and treatment	Professor John Henry, a British toxicologist at St Mary's Hospital, declared the changes in Yushchenko's face were due to chloracne from dioxin (TCDD) poisoning. The dioxin levels in Yushchenko's blood were 6000 times above normal levels. Since 2005, Yushchenko has been treated at the University of Geneva hospital, led by Professor Jean Saurat. The team designed a strategy based on aggressive monitoring of poison, nature, distribution and elimination. A minor component of the treatment also involved the drug orlistat.
Outcome and other measures	By monitoring the concentrations of dioxin in blood, fatty tissue, faeces, skin, urea and sweat, the team recorded it took 15 months for half of the contaminant to be excreted. The lesions on Yushchenko's face were a result of the skin attracting and trying to metabolise the dioxin, clearing the body of poison. The poisoning did not stop Yushchenko from being elected the Ukrainian president in 2005.

Sergei Skripal and Yulia Skripal.....

Background information	Sergei Skripal is a British citizen who used to work as a Russian intelligence officer, but was recruited by the British as a spy in 1996, providing MI6 with information. He received a 13-year prison sentence in Russia in 2006, but was later released as part of a prisoner swap and sent to the UK.
Instance of poisoning	Yulia Skripal, the 33-year-old daughter of Sergei Skripal (66), flew into Heathrow Airport from Russia on 3 March 2018. On 4 March, the Skripals arrived at the Bishop's Mill pub in Salisbury at 13:40 and dined at Zizzi at 14:20. At 16:15 an emergency services call reported that Sergei and Yulia had been found unconscious on a public bench in the centre of Salisbury, foaming at the mouth. A declaration was issued by the Counter Terrorism Command and Prime Minister Theresa May that the Skripals had been poisoned with a "very rare" nerve agent – Novichok. It is thought that this poison was sprayed on a door handle.
First responses	The Skripals were taken separately to Salisbury District hospital by ambulance and air ambulance at 17:10, reported to be critically ill. They were rushed into intensive care and heavy sedation was used to limit possible brain damage. Initially, the reason for their health deterioration was unknown, with the hospital suspecting an opioid overdose at first and then an infectious outbreak. After realising that the symptoms were instead typical of a nerve agent poisoning, the hospital was not expecting them to survive.
Investigations and treatment	Advice, tests and treatments given by experts at Porton Down research facility (a laboratory internationally known for its chemical weapons expertise) were invaluable in the recovery of the Skripals. They were heavily sedated to allow them to tolerate intrusive medical equipment and to protect them from possible brain damage as a result of the nerve agent. Over time, ventilation was switched from mouth to trachea, and the hospital received input from international experts in how the key enzyme acetylcholinesterase could be re-established in the patients, which is crucial for normal body functions but was suppressed due to Novichok. It is uncertain whether antidotes for Novichok such as atropine and athene were used on the Skripals, although Professor Alastair Hay deems this likely.
Outcome and other measures	Yulia's condition was announced to be improving on 29 March, and Sergei regained consciousness one month after the attack, with doctors primarily indicating their miraculous recovery was a result of "good, generic, basic critical care" (Murray) and paramedics arriving on the scene very rapidly (Prof Hay). As a result of the poisoning, the UK Government expelled 23 Russian diplomats, with Boris Johnson declaring it "overwhelmingly likely" that the poisoning had been ordered directly by Russian President Vladimir Putin. Russian nationals Alexander Mishkin, Anatoliy Chepiga and Denis Sergeev were accused of the poisoning (which they continue to deny).

Vladimir Kara-Murza.....

Background information	Vladimir Kara-Murza is a Russian opposition politician, elected to the Coordinating Council of the Russian Opposition in 2012, and the deputy leader of the People's Freedom Party from 2015 to 2016. He is a director of the Open Russia Foundation, an organisation designed to promote civil society in Russia. Kara-Murza played a key role in the events that led to the passing of the Magnitsky Act by the US Congress in 2012, and later in convincing Canada to follow suit.
Instance of poisoning	Kara-Murza was poisoned twice: in 2015, and again two years later, in 2017. On 26 May 2015, Kara-Murza fell ill in Moscow after a meeting – he had eaten at a restaurant two hours prior. His symptoms severely worsened over a 15-minute period, and he was taken to hospital. On 2 February 2017, Kara-Murza was again hospitalised after the onset of the same symptoms from his previous illness and treated by the same medical team who had already saved his life. Kara-Murza was diagnosed by the hospital with "toxic influence of an unknown substance". An FBI assessment declared that Kara-Murza had been exposed to some form of biotoxin.
First responses	In 2015, at first Kara-Murza obtained treatment at a specialised cardiac clinic, but when symptoms were not able to be relieved, he was instead taken to hospital in Moscow. He was later diagnosed with kidney failure and treated for poison, after a sharp drop in blood pressure and a loss of consciousness. Evgenia, Vladimir Kara-Murza's wife, said that the haemodialysis he underwent to treat kidney failure "has not had any effect".
Investigations and treatment	In February 2021, a Bellingcat joint investigation with The Insider and Der Spiegel declared that before he fell ill, Kara-Murza had been followed by the same FSB unit that had allegedly poisoned Alexei Navalny. After Kara-Murza's poisoning, the FBI sought his permission to send blood samples to US government weapons-research laboratories for testing. Screenings for Polonium and Polonium-210 (following the poisoning of Litvinenko) and other radioactive materials were taken, which were under the permissible levels. Another laboratory ordered tests for dioxins (following the poisoning of Yushchenko) – it seems as though officials were learning from the poisonings of previous Russian dissidents.
Outcome and other measures	In both cases of poisoning, although Kara-Murza had less than a 5% survival rate, his physical and mental strength helped him recover. He went abroad for rehabilitation at the Virginia hospital in Washington suburbs, learning to do basic activities, like walking, from scratch. However, Kara-Murza was arrested on 11 April 2022 on charges of disobeying police orders and was later charged by the Russian court with spreading "false" information about the Russian military. He remains in jail today, and his condition is deteriorating due to polyneuropathy, a condition caused by the multiple poisoning attempts.

11. Treatment Facilities

In the majority of political criminal poisoning cases, the treatment facility has been either unknown or not applicable because the victim was not able to be treated before death. As a result, only the facilities used in the most publicised cases, which attracted lots of media attention, are typically known.

Whilst there is no absolute or objective knowledge about which hospital an individual should visit in a case of political criminal poisoning, two main factors should be considered:

1) Proximity to the treatment facility – in the early stages of treatment for poisoning, timing is crucial to give the opportunity to flush the poison out of the body before it is absorbed. [35]

2) The departments contained within the hospital – the ideal hospitals will have both an A&E ward and an intensive care unit to support victims from both the initial poisoning trauma and in case symptoms gain in severity. Facilities with specialist departments are additionally beneficial (e.g. a dermatology department in the case of Viktor Yushchenko). [36]

Below we describe several centres that have been involved in supporting victims of political criminal poisoning.

1) United Kingdom

(a) The Salisbury District Hospital in Salisbury was used to treat Sergei Skripal, Yulia Skripal and Nick Bailey, who had been poisoned with Novichok. They were all able to survive and recover. It was later also used to treat Dawn Sturgess and Charlie Rowley, who had been poisoned by Novichok which was disposed of by the perpetrators. Charlie Rowley survived but Dawn Sturgess sadly passed away.

The hospital seems well equipped to deal with cases of political criminal poisoning, with an A&E department and over 4000 staff. In the wake of the Salisbury poisonings, hospital staff have had rare real, hands-on and practical experience in this area.

(b) University College Hospital in London was used as the treatment facility for Alexander Litvinenko, who also sadly passed. The treatment process was associated with the slow recognition of the origins of his symptoms and the connection to the Russian state's poisoning capabilities. However, UCH does have a high-quality intensive care unit.

(c) St James' Hospital in Balham was used as the treatment facility for Georgi Markov for ricin poisoning until his death.

2) Russia

The European Medical Centre in Moscow, the Rostov Regional Hospital, the Omsk Hospital, the Moscow Central Clinical Hospital, the Moscow City Clinical Hospital and Hospital 31 in Saint Petersburg are the known hospitals where victims have been treated within Russia.

[35] World Health Organization and United Nations Environment Programme and International Labour Organisation. 1997. "Guidelines for poison control". International Programme on Chemical Safety. http://apps.who.int/iris/bitstream/handle/10665/41966/9241544872_eng.pdf;jsessionid=646B9E5A8288F0C6440BD80A23DADE16?sequence=1.

[36] Coghlan, Andy. 2009. "Skin growths saved poisoned Ukrainian president". *New Scientist*.

3) Austria

The Rudolfinerhaus Clinic in Vienna was used to treat Victor Yushchenko. The Clinic was criticised at the time for having been very fast to assert that Yushchenko had been poisoned, before any traces of poison had been found in his body. While false positives are a serious risk and normally seen as an extreme negative in medical cases, political criminal poisonings are one exception where this rapid response can actually be proactive and life-saving.

4) Charité Hospital, Berlin

The Charité Hospital in Berlin has been involved in the treatment and full recovery of five major political poisoning cases from 2010-2022 – the greatest number of instances at any single hospital on public record, and further a significantly high success record. As a result, it is useful to look at the treatment protocols in the cases and at the specialists who work at this hospital.

The Charité is one of Europe's largest university hospitals, and one of Germany's most research-intensive medical institutions. [37] It also has a specialist Poison Control Centre, which is available for 24/7 emergency telephone consultations, which are free of charge for the public. Those who feel under threat, particularly within Germany, are advised to seek information from the Poison Control Centre.

Vicktor and Marina Kalashnikov were the first two of the five cases known to be treated for political criminal poisoning at the Charité Hospital in 2010. Whilst the exact treatment protocol is unknown, doctors found high levels of mercury in the Kalashnikovs' systems, showing that adequate testing for poisoning had been carried out. Chelation therapy, the standard treatment for mercury poisoning, was perhaps carried out, allowing them to recover.

In the case of Navalny's poisoning, doctors at Charité were again prompt in diagnosing him as suffering from severe poisoning, despite the miscommunication from the treatment facility in Omsk, Russia, that his symptoms were a result of diabetes. They were further proactive in sending blood and urine samples to the Institute of Pharmacology and Toxicology of the Federal Armed forces in Munich for further examination. The Charité Hospital also asked specialist toxicologists from the Bundeswehr to test various samples from Navalny. Navalny was treated with the antidote atropine, an oxime and a range of other interventions. As a result, one major success of the Charité Hospital is in establishing and quickly diagnosing symptoms as those of political criminal poisoning and thinking beyond commonly presenting illnesses.

The Charité Hospital was chosen by Navalny's doctors in the hospital in Omsk after being researched as one of the best facilities in Europe for chemical poisoning.

[37] Vogel, Hugo. n.d. "Universitätsmedizin Berlin (Charité)". Wikipedia. Accessed 11 June 2023. https://en.wikipedia.org/wiki/Charit%C3%A9.

Figure 8: Screenshot from poisonreporting.org displaying the five poisoning cases which involved treatment at the Charité Hospital, Berlin, using the search function. Retrieved: 6 August 2023.

Name of victim	Symptoms after the instance of poisoning	Poison Used	Date of poisoning	Location of poisoning	Form poison administered
Alexei Navalny -	unconsciousness, vomiting, pain, near-fatal coma	Novichok nerve agent	20/08/2020	In Tomsk, before a flight to Moscow	Tea or flask of water
Pyotr Verzilov -	unconsciousness, loss of eyesight, lack of ability to speak, became delirious	unknown	12/09/2018	Moscow, Russia	unknown
Vicktor Kalashnikov -	extreme weight loss, high blood-mercury levels, restlessness, blinding headaches, spinal pain	mercury poisoning	??/??/2010	Germany	unknown
Marina Kalashnikov -	extreme weight loss, hair loss, high blood-mercury levels, restlessness, blinding headaches, spinal pain	mercury poisoning	??/??/2010	Germany	unknown
unknown journalist	unknown	unknown	21/05/23	Berlin, Germany	unknown

12. Treatment Protocols

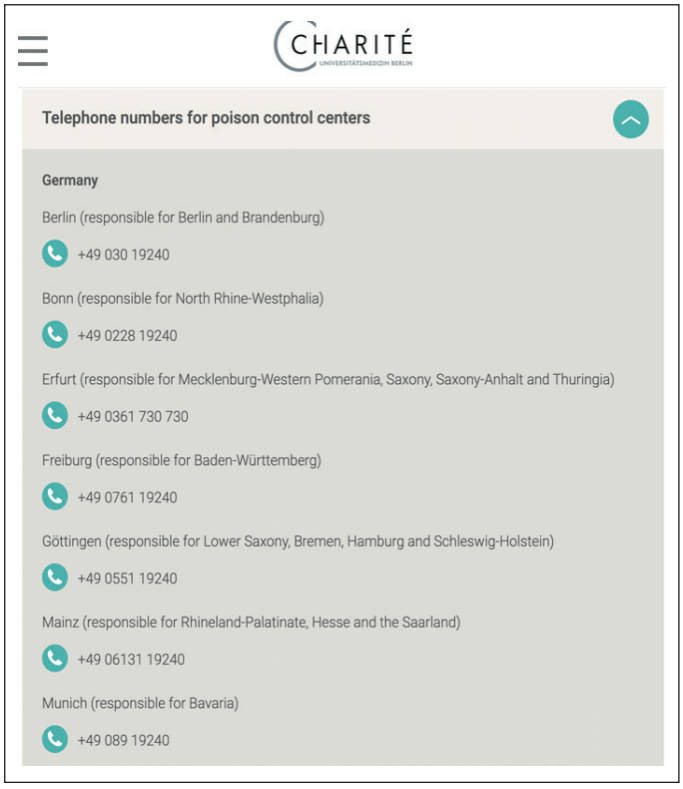
To look at what went well in the Charité Hospital in Berlin more generally, it may be best to look at the differences in nation-wide treatment protocols.

1) German treatment protocols for poisoning cases

Individuals can call their local Poison Control Centre; there are helplines for particular regions, and all are part of the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT).[38] The Charité Hospital in Berlin also has its own specific helpline for poison-related enquiries.[39]

The German helpline system differs from that of the UK and US because the telephone numbers for poison centres are regional, with different provinces having different specific telephone helpline numbers (in the US and UK, there is one helpline number for all individuals to phone). As a result, it is likely that calls are able to be answered more quickly and advice is more tailored to the individual and their location, increasing the efficacy of the helpline system in Germany, unlike the other countries which first go through a main operator.

According to the German Federal Statistical Office, activated charcoal plays a major role in treatment of severe poisoning cases, and was used in the treatment of 4.37% of the 178,425 poisoning cases in Germany in 2016. Activated charcoal (*activated carbon*) is thus likely to be used in cases of political criminal poisoning in Germany.



The most recent cases of political criminal poisonings in Germany occurred in May 2023 in Berlin and are being investigated and handled by the state security unit (a team that investigates inquiries specifically related to terrorism),[40] thus showing how Germany is effective as a model country in combining healthcare and law enforcement resources in these cases.

Germany also has a large national focus on cases of poisoning, such as creating a national app to raise awareness about cases of poisoning in children.

Once installed on a mobile phone, the BfR app can also be used without internet access and is available offline. It can be downloaded free of

[38] The European Association of Poison Centres and Clinical Toxicologists, https://www.eapcct.org/.

[39] Charité Hospital. n.d. "Services of the Poison Control Centre: Poison Emergency Call of the Charité - Charité – Universitätsmedizin Berlin". Giftnotruf Berlin.

[40] *Aljazeera*. 21 May 2023, https://www.aljazeera.com/news/2023/5/21/german-police-investigate-suspected-poisoning-of-russian-exiles.

charge for the operating systems Android and iOS. The BfR app "Cases of poisoning in children" was published in August 2013 as the first of its kind and has already been installed roughly 190,000 times. [41]

2) UK treatment protocols for poisoning cases

Currently in the UK, healthcare workers have access to the National Poisons Information Service (NPIS), which aims to provide 24-hour consultant toxicology advice, assisting "healthcare workers in their diagnosis and management of poisoned patients." [42] However, this service is greatly oversubscribed – there were 685,745 user logs during 2019-2020 [43] – meaning that dissidents with serious symptoms may not be able to get timely and effective help. Due to the large number of telephone enquiries and limited resources, most calls will be referred to the TOXBASE app, [44] a poison information database. Most information on this app is targeted at the general population, not political criminal poisonings which are more likely to involve rare and fatal poisons.

Table 3.2.1 Most commonly accessed product pages on TOXBASE online and the TOXBASE app and most common agents involved in telephone enquiries in 2019/20

	TOXBASE online	No. page views	TOXBASE app	No. accesses	Telephone enquiries	No. calls
1	Paracetamol	145,515	Paracetamol	16,296	Paracetamol	5,077
2	Ibuprofen	46,993	Sertraline	4,796	Ibuprofen	2,329
3	Sertraline	45,596	Ibuprofen	4,055	Cocodamol	1,300
4	Diazepam	29,313	Amitriptyline	3,945	Sertraline	883
5	Quetiapine	25,313	Diazepam	3,307	Multivitamins	673
6	Codeine	24,564	Quetiapine	3,196	Mirtazapine	655
7	Pregabalin	23,572	Mirtazapine	2,778	Naproxen	580
8	Mirtazapine	22,571	Codeine	2,773	Diazepam	561
9	Propranolol	21,918	Pregabalin	2,356	Quetiapine	558
10	Amitriptyline	21,027	Zopiclone	2,245	Pregabalin	501

In addition, "Emergency services and public health professionals can obtain further advice from Public Health England (Centre for Radiation, Chemical and Environmental Hazards) using the 24-hour chemical hotline number: 0344 892 0555." [45]

The National Poisons Information Service holds responsibility for maintaining the information about treating people who have ingested reportable poisons.

[41] The BfR app was awarded the German Prize for Online Communication in 2014 in the category "Mobiles and apps". It provides free information to any interested parties, such as doctors' practices and childcare centres which would like to draw attention to the BfR app "Cases of poisoning in children". The information comprises posters and memo cards in business card format.

[42] "Poisons in the Chemical hazards compendium". 2020. Public Health England.

[43] Public Health England. 2020. "National Poisons Information Service Report 2019/20". NPIS England. https://www.npis.org/Download/NPIS%20Report%202019-20.pdf.

[44] Pyper, Kate & Robertson, Chris & Eddleston, Michael & Sandilands, Euan & Bateman, David. (2020). "Use of the online poisons information database TOXBASE and admissions rates for poisoned patients from emergency departments in England and Wales during 2008 to 2015". Journal of the American College of Emergency Physicians Open. 1. 10.1002/emp2.12116.

[45] NHS. 2020. "Clinical Guidelines for major incidents and mass casualty events". NHS England.

3) US treatment protocols for poisoning cases

In the US, there are several helplines available at Poison.org at both federal and local levels for individuals who believe that they have been poisoned.

Additionally, private healthcare services may offer more personalised decentralised responses.

The Poison.org website also provides information and statistics that are up-to-date and timely. However, similar to the problem with the UK TOXBASE app, these resources are not representative or tailored towards cases of political criminal poisoning, and so are not useful to those under the threat of an attack. However, at the very least, the poison case statistics on poison.org can be viewed by all individuals within the population, and are not limited to healthcare professionals, unlike in the UK where summary case information can only be accessed by healthcare officials.

13. Public Health Impact

Criminal poisonings have a wide range of public health implications. There are three main areas to focus on for public health officials and governments – 1) decontamination of the victim and those associated with the victim; 2) decontamination of the surroundings; and 3) protection of the public at large.

1) Decontamination of the victim

Gastrointestinal decontamination must be carried out quickly to be useful. Activated charcoal, hailed by many as the 'universal antidote' in some cases (excluding radioactive poisoning), prevents enteric absorption if given within one hour of toxic ingestion by binding to poison that is still in the digestive tract. For example, in cyanide poisonings, decreased mortality rates in animal studies are reported when subjects were given activated charcoal which is able to absorb many toxins and prevent absorption in the GI tract. [46] A single dose of activated charcoal is recommended to be given at 50g in adults and 1g/kg up to a maximum of 50g in children. In the most serious cases, where poisons remain stuck in the digestive tract, are absorbed too slowly or are not absorbed by activated charcoal, the whole bowel irrigation should be used.

"Individuals should not rely solely upon antidotes... to provide complete protection from chemical nerve agents. Decontamination of the poisoned individual should occur as soon as possible" [47] according to Meridian Medical Technologies, an American company specialising primarily in developing and manufacturing antidotes for chemical weapons.

2) Decontamination of surroundings

Additionally, a wide-scale decontamination of the poisoning scene is needed to prevent further contamination and additional victims. This means that decontamination extends to first responders as well as victims; in cases where political criminal poisoning is suspected or likely, first responders should be wearing appropriate personal protective equipment.

3) Protection of the public at large

Another key focus in cases of suspected political criminal poisoning is protecting people in society at large. In cases of deliberate criminal poisonings, victims are specifically targeted due to their occupation in opposing hostile regimes and dictatorships. However, ruthless governments, such as the Russian Government, seem to hold no qualms in affecting civilians with poison in order to achieve their target of assassination. This can be seen in the cases of Dawn Sturgess and Charlie Rowley who were poisoned by the remainder of the bottle of Novichok used in the Salisbury poisonings of the Skripals, which had been randomly disposed of by the perpetrators.

Whilst some poisons are not contagious or able to contaminate others after initially being ingested, new forms of poison, particularly those utilising radiological substances, require thorough tracking, tracing and decontamination after the event to prevent mass infection.

46 Zellner, T., D. Prasa, E. Faber, P. Hoffmann-Walbeck, D. Genser, and F. Eyer. 2019. "The Use of Activated Charcoal to Treat Intoxications (03.05.2019)". *Deutsches Ärzteblatt*. https://www.aerzteblatt.de/int/archive/article/206972/The-use-of-activated-charcoal-to-treat-intoxications.

47 James Griffiths, Salhan Ahmad. "Kim Jong Nam had antidote to VX nerve agent on him at time of murder". 2017. https://www.cnn.com/2017/11/30/asia/kim-jong-nam-antidote-intl/index.html.

A response to a Freedom of Information request about the cases handled by the UK's Government Decontamination Service (GDS) in the 12 years from 2005 to 2017 showed that the GDS had only been involved in one deliberate criminal incident, which was the decontamination after the poisoning of Litvinenko ("the GDS was involved in the provision of decontamination"). [48]

This significantly highlights a true shortcoming – namely all of the alleged cases of political criminal poisonings where the GDS was not involved.

The GDS was not involved in the investigation of the suspected poisoning of Badri Patarkatsishvili in 2008, or in the sudden death of Aleksander Perepilichnyy in 2012.

The poisoning of the Skripals in Salisbury in 2018 involved decontamination of the affected sites by 800 specially trained military personnel. [49] The lack of complete decontamination in this case, however, even with professional decontamination services, is notable, although it is important to acknowledge that contamination was minimal for such a potent and contagious poison. Decontamination involved demolition of housing and items being removed in specialised containers from where the poisoning occurred, as well as deep-cleaning of locations the Skripals had visited. [50]

48 Government Decontamination Service. n.d. "Cases handled by the Government Decontamination Service (2005-2017)". Government Decontamination Service. Accessed 17 June 2023.

49 "Salisbury declared decontaminated after Novichok poisoning". 2019. *BBC News*. https://www.bbc.co.uk/news/uk-england-wiltshire-47412390.

50 https://www.theguardian.com/uk-news/2018/sep/07/decontamination-work-begins-skripal-home-salisbury.

14. Interview with Marina Litvinenko

An interview with Ms Marina Litvinenko, wife of Alexander Litvinenko, who was killed via radioactive Polonium-210 in a poisoning scheme (ruled by the European Court of Human Rights in 2021 to have been orchestrated by the Russian Government), was conducted on 28 March 2023.

Note: the full interview transcript can be found at poisonreporting.org.

We have looked at one of the most prominent cases of political criminal poisoning – the poisoning of Alexander Litvinenko – to examine:

- Symptoms;
- Failing of medical professionals;
- Failing of law enforcement;
- Advice and reflections.

One of the most obvious things noted at the start of the interview was the shocking suddenness and potent nature of the poison used against Alexander Litvinenko. Ms Litvinenko describes how her husband became "extremely ill, just extremely ill suddenly" and how she had never seen anything like it before. What was clear from the interview was that this case was completely outside routine and ordinary circumstances and, as with most political criminal poisonings, the quick onset of serious symptoms was a signal of this.

Additionally, the professionals who were handling the case of Alexander Litvinenko, from both a legal and a healthcare viewpoint, were not fully trained and equipped to deal with the political criminal poisoning case. By treating the symptoms as a normal illness, it was hard to properly diagnose Litvinenko.

Marina says: "When we tried to say, 'Check Sasha for poisoning', they just couldn't understand what we were asking for... It is difficult to say who was useless and who was helpful. I can't blame the people in the hospital who were trying to treat him as just an ordinary patient."

"Even the police after they started to investigate the case were so disoriented and one step behind what happened." It is important thus, that cases of political poisoning are treated as suspicious from the outset – otherwise it is likely that the legal investigation will always be behind, trailing the victims' symptoms.

It is also clear that there should be distinct differences in treatment protocols for cases of political criminal poisonings. They cannot be viewed under the same lens as a regular illness, or even other poisoning cases, because they are quite simply different.

Marina does acknowledge, however, that whilst the response to the case of her husband's poisoning was lacking, there was justification, and we cannot blame healthcare workers and legal professionals for their oversight, but rather only help in preparation for future cases.

"It was an absolutely unusual situation, where you could blame everybody for not doing something right or doing something wrong. I had a chance to see everybody doing what they would normally do, but this was an extraordinary circumstance."

When asked if Marina thought that lessons had been learnt from the case of her husband's poisoning, she replied: "All I will say is that after Polonium was discovered, when there were unexplained deaths in the future, like Boris Berezovsky and other Russian people in exile, the

first thing they checked for was radioactivity. It had never happened before, but now police have started to check for this."

I asked Marina about the change in protocols when it had been established that Polonium-210 had been administered, which is both radioactive and contagious. She said that when this occurred, "everything changed, and the hospital was all isolated and everybody started searching where Sasha had been."

Marina Litvinenko's advice for those under threat of political criminal poisoning was as follows:

> The only advice would be to help in any way to stop this regime being active. You can't stop the poisonings without stopping the regime. Even before Putin, the laboratory for poisoning was created many years ago under Stalin who used it against his enemies. It was the same during Soviet times, and unfortunately now it is the signature of modern Russia. Only after this all changes, and we will not have this Russian Security service, which is more like a murder-and-killing unit than security and protection, it is difficult to say how to protect yourself. Russia always promised to destroy chemical weapons but it has never happened. Only a fight against this regime might make you feel safer.

Marina's thoughts about governmental action were:

> From my experience, from 2006, when my husband was poisoned and died, there was a very small support of all international communities to the UK. The UK tried to do something but it is so difficult to do things alone. In 2006, everybody was trying to trade with Russia, getting cheaper gas and oil, or was afraid in case Russia would cut supplying gas and oil. And another example from 2004, when there was the first Orange Revolution in Ukraine, and Russia tried to show how they would behave if things didn't go in the direction they wanted. In 2018, when Skripal was poisoned, and the reaction of even the British Government was much faster than in my case, and European community gave more support, unfortunately it was still not enough, and the price we have to pay now is this Ukrainian war – it's because we didn't pay attention before. Now we must cut all business connections to Russia and try to find all the people who link to Putin or benefited from him and his business during the Putin regime. It's very hard because you have to do something once before it is fully accepted.

Marina also stressed the importance of the media and raising awareness about political criminal poisonings, which this report also aims to do.

> First of all you need to always talk about this: because it is not simply poisoning but also complicity in everything. For what happened in my case, every time I talk about this, people understand more about what this state is capable of. It explains what it really feels like when anyone who speaks out and tries to escape may be caught, punished and killed. This state is so ruthless and careless. Poisoning just needs to be stopped before it happens. It needs to be a scenario for spy movies, but not for real life.

15. Further Law Enforcement

Due to the fact that political criminal poisonings are crimes, suggested by their definition as intentionally motivated acts, law enforcement officials and agencies are, or should be, involved directly in these cases. Law enforcement is one area not covered heavily in the database of cases, due to the lack of available information for many cases, particularly for poisonings that occur in other countries where they are not recognised or treated as crimes. Thus, we are able to look at the law enforcement responses to only the most prominent of historical cases.

In the UK, the Litvinenko poisoning case prompted a much greater public focus on border detection. It led to Programme Cyclamen being rolled out at over 40 points of entry into the UK in August 2009. [51]

Programme Cyclamen is a joint initiative between UKBA and the Home Office. It forms a key element of the UK's Counter-Terrorism Strategy CONTEST (PROTECT) and represents a major step towards reducing the threat to the UK from a terrorist attack. Its purpose is to detect and deter the importation of radioactive or nuclear materials by terrorists or criminals.

Programme Cyclamen consists of both fixed and mobile capabilities, operated by Border Force officers. A number of fixed portals have been installed at major sea and airports, known as Early Capability sites, and are operating successfully. This is complemented by a fleet of Mobile Radiation Detection Units (MRDUs). SERCO, the system provider, installed the strategic fixed capability detection portals at over 40 selected points of entry throughout the UK.

Cyclamen screens a significant volume of sea and air traffic including containers, freight, vehicles and passengers that pass through the portals. If there is an alarm, trained Border Force officers will use handheld devices to further investigate the source of the radioactivity and the type of radiation present. Nevertheless, this program is not bulletproof. In the Skripal case, a banned nerve agent was transported across UK borders without being detected and stopped.

Overall responses by law enforcement are more difficult to make reasoned assumptions about, due to the privacy surrounding this area. However, it is clear that particularly in democratic countries, law enforcement officials are lacking in response, as seen in how the independent instigators Bellingcat uncovered the perpetrators of the Skripal poisonings before the police, despite having significantly less resources. [52]

[51] HMRC: The Control and Facilitation of Imports.17. 2009. "House of Commons - Public Accounts Committee - Minutes of Evidence". publications.parliament.uk /pa.

[52] Eliot Higgins. 2021. "How Bellingcat uncovered Russia's secret network of assassins". *WIRED*. https://www.wired.co.uk/article/russia-bellingcat-poison.

16. Role of Media

The media plays an integral role in the response to cases of political criminal poisonings. Indeed, this report was made challenging due to the sparse and unequal media coverage for the majority of political criminal poisonings, with only a few major cases publicly known.

Poisoning is, by its very nature, a subtle method of assassination, and is thus used by corrupt governments to more quietly and innocuously silence opposition figures. To combat political criminal poisonings, raising awareness and bringing attention to the issue is thus paramount, going against the aims that poisoning tries to achieve with the under-the-radar deaths. We believe it is likely that many political criminal poisoning cases are overlooked and numbers are underestimated, both due to hostile regimes covering them up but also because of investigative and medical missteps, and lack of attention in the news. This may be because it is often hard to initially prove a political criminal poisoning case unlike other assassination attempts such as stabbing or shootings, and thus there is less incentive to publish stories.

Admittedly, for several key cases of political criminal poisoning, there has been thorough media coverage, including:

- Litvinenko poisoning;
- Skripal Salisbury poisonings;
- Alexei Navalny poisoning;
- Vladimir Kara-Murza poisonings;
- Victor Yushchenko poisoning.

However, beyond these cases, the majority of political criminal poisonings are unrecognised or quickly forgotten by the media and society, typically only found in local or regional article sections. In this report, we argue that all cases of political criminal poisoning are significant enough to warrant a media story by an international news organisation, and that greater awareness and reach of information is important in ensuring that cases of political poisoning are not forgotten, instead helping to amplify the causes and work of the victim. Ample media coverage is necessary to directly oppose the murderous attempts on the lives of opponents and critics undertaken by hostile regimes.

17. Creation of the Protocols for Political Criminal Poisoning Cases Based on the Anti-terrorism Model

The treatment for political criminal poisoning cases is very similar to that for chemical terrorist attacks.

Fundamentally, this should not be surprising: the aims and motivations behind a terrorist attack are vastly similar to those of a targeted political assassination, and thus the resources used will be similar as well. As a result, due to the very niche area of political criminal poisonings, which occur in very rare and unusual circumstances, it is helpful for these cases to be viewed by healthcare professionals under the same bracket as chemical terrorist attacks, for which they will have undergone training.

The Global Terrorism Database (GTD), maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism, uses the following definition of terrorism to inform data inclusion:

> the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation. [53]

To be considered for the GTD, [54] a terror incident must meet three criteria, which are all applicable to cases of political criminal poisonings, as is shown in the table below.

Criteria for the GTD versus cases of political criminal poisonings

No.	Required criteria for inclusion in the GTD	Ways in which political criminal poisoning cases fulfil criteria
1	*"The incident must be intentional — the result of a conscious calculation on the part of a perpetrator"*	The very nature of political criminal poisonings mean that they are intentional attacks, with the victim specifically targeted by the perpetrator.
2	*"The incident must entail some level of violence or immediate threat of violence—including property violence, as well as violence against people"*	All poisonings, including political criminal poisonings, are, on some level, hugely violent and vicious crimes, with the end-goal being injury and death of the victim. If the poisoning case is not sufficiently violent, and the aim is not fully carried out, it is likely that the perpetrator will attempt to administer the poison another time (as seen, for example, in the cases of Alexander Litvinenko and Vladimir Kara-Murza).

[53] The European Agency for the Evaluation of Medicinal Products. 2003. "EMEA/CPMP Guidance Document on the Use of Medicinal Products for the Treatment of Patients Exposed to Terrorist Attacks with Chemical Agents". The European Agency for the Evaluation of Medicinal Products.

[54] DeLuca, M. A., Chai, P. R., Goralnick, E., & Erickson, T. B. (2021). Five Decades of Global Chemical Terror Attacks: Data Analysis to Inform Training and Preparedness. *Disaster medicine and public health preparedness*, 15(6), 750–761. https://doi.org/10.1017/dmp.2020.176.

3	*"The perpetrators of the incidents must be sub-national actors. The database does not include acts of state terrorism"*	In the cases where political criminal poisonings occur internationally (where the recognition of political criminal poisonings possessing terrorist status is most important), the perpetrators are sub-national actors, targeting specific individuals rather than acting against a state as a whole.

Furthermore, the global terrorism incident must meet two of three additional criteria.

Additional criteria for the GTD versus cases of political criminal poisonings

No.	Criteria	Ways in which political criminal poisoning cases fulfil criteria
1	*"The act must be aimed at attaining a political, economic, religious, or social goal…"*	Political criminal poisonings are, as their name and definition suggests, politically motivated acts, with their goal primarily being to eliminate a person who is viewed as threatening to a regime or ideology.
2	*"There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims…"*	Whilst less obvious, in some cases of political criminal poisonings, there may also be an element of deterrence (similar to the imprisonment of opposition figures). Political criminal poisoning cases have grown infamous in the past decade, and thus may be used to instil fear in those in similar situations in a multi-faceted effort to intimidate opposition.
3	*"The action must be outside the context of legitimate warfare activities. That is, the act must be outside the parameters permitted by international humanitarian law…"*	Political criminal poisonings lie outside the parameters permitted by international human law. They often use banned chemical poisons such as nerve-agents which are illegal, and thus not permitted to be used.

The European Agency for the Evaluation of Medicinal Products (EMEA) guidance document for the use of medicinal products for the treatment of patients exposed to terrorist attacks with chemical agents provides a helpful resource for the development of treatment protocols for victims of political criminal poisonings.

An advantage of the treatment protocols currently in place for terrorist attacks involving chemical agents is that they are clear, cohesive and involve multidisciplinary teams. The actions that must be taken are also methodically laid out in a guide, and all hospital staff have training in following the actions and knowledge about the procedure, making it easier for different specialties to work together.

Whilst the full procedures in response to these cases are described in the report mentioned above, a brief outline of the multidisciplinary approach is as follows. [55]

> Prompt removal of victim from exposure area and rapid decontamination of body. This should be followed by symptomatic treatment, involving assessment of supportive treatment (often involving intubation to increase oxygen supply and administration of fluids) and, where possible, specific antidotal treatment.

The EMEA document is invaluable in detailing the supportive treatment measures for many common symptoms of chemical poisoning, which would overlap with political criminal poisoning cases.

Indeed, using a terrorism model for the treatment of politically motivated crimes is not a new idea. In some European countries, such as Germany, political criminal poisoning cases are already handled by a state security unit, consisting of a specialised force that directly investigates terrorism-related or politically motivated crimes (such as most recently in May 2023). Germany is at the forefront of dealing with political criminal poisoning cases and provides a model that other governments should aim to follow.

[55] EMEA. "EMEA/CPMP Guidance Document on the Use of Medicinal Products for the Treatment of Patients Exposed to Terrorist Attacks with Chemical Agents". 2003. https://www.ema.europa.eu/en/documents/other/european-medicines-agency/committee-proprietary-medicinal-products-guidance-document-use-medicinal-products-treatment-patients_en.pdf.

18. Recommendations of the Study

From this report, it is clear that there must be a change in the response to cases of political criminal poisoning – to prevent these cases from occurring more frequently as a method of assassination and to provide prompt relief to victims, their associates and the affected public.

Based on the information obtained from the 78 cases of political criminal poisonings collected, below are ten recommendations for (a) individuals who may be at high risk of political criminal poisonings, (b) governments, (c) health professionals, (d) law enforcement, (e) media and (f) the general public. These recommendations should help to better protect both victims and the public.

Recommendation 1: Health cards should be introduced for dissidents of hostile regimes

First, we propose the introduction of Dissident Health Cards for those who are in opposition to hostile regimes or groups. This is envisioned to work in a similar way to the MediPAL Emergency ID cards, which are designed to instantly display a patient's health details such as current medication and medical history as well as emergency contact details. [56] A similar scheme is likely to work well in specialised political criminal poisoning cases such as those discussed throughout this report, with an emphasis on the importance of the timely provision of information to enable early recognition of the possibility of poisoning and the most effective treatment. This could involve the individual's occupation (ie. dissident), nationality, current medication (if any) as well as relative contact details and links to helpful political poisoning resources for medical professionals.

An early response is positively correlated with successful treatment in political criminal poisoning cases. For example, in the case of the poisoning of Alexei Navalny, the emergency landing in Omsk by the pilot of the S7 airlines flight No. 2614 allowed Navalny to receive initial treatment and is likely to have saved his life. It has been reported that Navalny was given 3 mg of atropine, put into an induced coma and was on a ventilator within ten minutes of his admission, which allowed his brain to be properly oxygenated. [57] This, in fact, was one of the most effective and rapid responses to a poisoning case, which is likely to have helped in the survival of Alexei Navalny.

A primary reason why Dissident Health Cards (or a similar status) would be beneficial at an individual level is in alerting healthcare professionals about a higher probability diagnostic cause for symptoms in presenting dissidents (than would be likely to be experienced by the average population). In a civilian situation, there is no expectation of encountering any of the rare chemical agents used in political criminal poisoning, and thus symptoms may be attributed to other factors, leading to a higher likelihood of an incorrect first diagnosis. For example, the symptoms of chest pain/tightening and diarrhoea together is a striking and unique combination which is likely to lead to a diagnosis of Whipple disease, rather than Novichok poisoning. By providing background around the occupation of the victim and the threat they are under, medical professionals will be able to more accurately assess the symptoms to include poisoning with rarer chemicals, something that may not be considered probable in the general public.

As discussed previously, a rapid first response is often crucial for a positive outcome in cases of political criminal poisonings in terms of decontamination and administering an antidote.

[56] https://www.medipal.org.uk.

[57] "Mandates of the Special Rapporteur on extrajudicial, summary or arbitrary executions; and the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression". 2020. Palais des Nations.

There is typically very little margin for error. Dissident Health Cards would allow more timely and relevant diagnoses to be made that take into account the dissident's high risk of being targeted by a hostile regime, where the scope of illness is much broader and more fatal than what would be experienced by an average patient. They would give additional clues to healthcare professionals, allowing them to make a more informed decision about a diagnosis, as well as ensuring more practically that the relatives of victims are able to be quickly involved.

Even if an officially recognised scheme is unable to be created for dissidents and those at higher risk of poisoning by hostile regimes, it would be advisable to keep an information sheet with one's personal belongings (such as in a wallet) in case there is ever the need to display background information to medical professionals. A full template can be found at poisonreporting.org. which has been designed with primary categories including the individual's name, occupation, date of birth and a definition and summary of the context of political criminal poisoning.

Recommendation 2: A resource should be created with a list of prescribed questions that medical professionals should ask a patient presenting to hospital when a case of political criminal poisoning is implied (i.e. upon seeing a dissident health card)

It is often hard for healthcare professionals who are not specialists in, or do not have background knowledge about, cases of political criminal poisonings to treat victims. We propose providing a specialised list of tailored questions that will ensure the most relevant information is obtained in the shortest time. This is important in allowing treatment to occur more effectively, particularly due to the high number of victims falling into a coma only hours after being poisoned. As much information as possible should be obtained from the victim whilst they are still alert and responsive.

In the short-term, it may be difficult to implement such questions as a national treatment protocol for cases of political criminal poisoning. However, the questions also serve another purpose: they may be used by dissidents themselves to provide a guide or checklist in order to give the most appropriate and useful insights to the healthcare professionals they are working with. Thus, the questions can be viewed as a resource for those under threat, as well as a protocol that could have beneficial live-saving effects if implemented at a national level.

Examples of questions to include can be seen below, although they are by no means comprehensive, and curating a list of the most significant questions is a task that could be carried out at a national level.

Template Questionnaire for Healthcare Professionals

1. What was the location of the victim when symptoms first appeared and prior to that day?
2. What are the symptoms and when did they start?
3. What did the victim do prior to onset of symptoms?
4. What did the victim eat/drink prior to onset of symptoms?
5. Who prepared and served food?
6. Did anyone else also consume food, and if so, how are they feeling?
7. Did the victim consume any food/drink after the onset of symptoms?
8. How is the victim's general health?
9. What is the victim's occupation?
10. Can the victim recall any situation/moment which may have triggered these symptoms?
11. Had the victim been in a busy/crowded place prior to the onset of symptoms?
12. If the victim is responsive, do they have any insight into anything being administered?

Recommendation 3: In cases where the victim of the attack is within a hostile country, every effort should be taken to remove and transport them to a hospital in a democratic country

In the past two decades, there has been a steep increase in the number of cases of political criminal poisoning, particularly those cases which occur outside of hostile regimes, and in democratic, law-abiding countries.

In the rare cases of poisonings of Kremlin opponents when we do know the exact cause of poisoning, we only know because of testing done by Western agencies. As a result, in cases of political criminal poisonings, if the victim is in a corrupt and hostile country, they should first aim to be transported out of the country and to a responsible and democratic country for treatment, where poisoning will be more likely to be uncovered and adequate treatment can be provided.

In terms of poisoning prevention within corrupt countries like Russia, the guidance is less clear: the West cannot replace Russia's law enforcement system. As a result, perpetrators in countries like Russia are unlikely to be tried accordingly for their crimes.

What, then, should the West do to support victims of political criminal poisoning? Urging these regimes to investigate cases of suspicious or sudden illness of prominent dissidents lacks effect – corruption runs too high.

What is more successful is the campaigning for the transportation of the victim to a democratic country, where they are able to be properly treated, if they are medically stable enough to enable transportation in the first instance. In other cases, access to victims and regular reports on the state of their health should be urged.

Recommendation 4: Better tracking and detection of poisons at borders – in previous instances, neither Polonium-210 nor Novichok were able to be detected

The burden of protecting victims and reducing the likelihood of poisoning should not be placed on those who are targeted or threatened, but rather much of the onus for preventing criminal poisonings must be on a larger, governmental scale. Regardless of the individual changes people make to their lifestyles, it is often much bigger systemic flaws that allow people to be targeted and poisoned in democratic countries such as the UK.

One key recommendation is the better detection of poisons at borders. In most cases, the poisons which are utilised in cases of political criminal poisonings are transported from foreign hostile regimes to democratic countries such as France and the UK. This is because the materials used in poisoning cases are rare and cannot be easily or naturally obtained. As a result, if a political poisoning case occurs in a democratic country, it is highly likely the poison used will have been transported across the border.

The Litvinenko poisoning provides clear evidence for this, due to the nature of radioactive Polonium-210 leaving a trace as it was transported. Radioactive traces of Polonium-210 were found on the Boeing 767 British Airways plane on which Andrey Lugovoy and Dmitry Kovtun, both charged by the Crown Prosecution Service with Litvinenko's murder, travelled to the UK. [58]

The lack of security could be seen as a disappointing failure. Indeed, a thorough report published by INTERPOL, EUROPOL, IAEA and WCO in 2002 highlighted the need and means for the detection of radioactive material at borders that was evidently not fully accounted for at the time. [59]

[58] Luke Harding. 2016 "Alexander Litvinenko and the most radioactive towel in history". *The Guardian*. https://www.theguardian.com/world/2016/mar/06/alexander-litvinenko-and-the-most-radioactive-towel-in-history.

[59] International Atomic Energy Agency. 2002. "Detection of radioactive materials at borders". Scientific, technical publications in the nuclear field | IAEA.

Despite this, one might argue that the border control situation has already begun to improve. Just recently, in January 2023, it was reported that a package of uranium that had been sent from Pakistan was discovered and stopped at Heathrow Airport, London. [60] It was considered to be one of the most serious radiological incidents since 2006, with Hamish de Bretton Gordon, former head of the British Army's chemical weapons, saying: "Where it comes from, who it appears to be going to and what it is. All that seems nefarious to me." [61] This development, however, highlights the success of the changes made to border control and security since 2006, meaning that radioactive materials are no longer able to be smuggled into the UK quite so easily.

In terms of further improvements, sensitivity of border control machines for radiation, and indeed other chemical poisons, needs to be improved. It is still unclear how these machines would respond to very small volumes of these materials – only several grams at most are needed in most cases for lethal poisoning (as seen in 'The Big Ten Poisons' table, earlier in the report).

Recommendation 5: More rapid use of antidotes in response to known cases of political criminal poisoning should be encouraged

The main issue currently in cases of political criminal poisonings is that the poisons used in these cases often have no known antidote, which makes them fatal. Treatment measures consist of treating individual symptoms, rather than the root poisoning cause itself, making patients less likely to fully recover. The common guidance within clinical toxicology to "treat the patient, not the toxin" [62] is problematic when applied to cases of political criminal poisonings: whilst arguably maintaining ventilation and heart rhythm is essential, often the only chance a victim has at complete recovery when a lethal dose of poison is administered is through the use of a curative and timely antidote.

In some political criminal poisoning cases, a poisoning diagnosis is also overshadowed by other symptoms, making diagnosis and recognition of a case as a political criminal poisoning more difficult. This is an area for further investigation. It is encouraging that antidotes exist for some of the most frequently used substances for political poisoning, and therefore, it is essential to increase awareness among public health professionals, including A&E personnel, about the range of available antidotes.

Recommendation 6: During medical treatment stages, political criminal poisonings should be viewed under the same protocol as chemical terrorist attacks (for which training is received), ensuring a timelier and more effective prospect for treatment of these cases

The treatment for political criminal poisoning cases can be greatly enhanced by utilising the protocol for treatment of patients exposed to terrorist attacks with chemical agents. [63] This protocol already contains relevant, helpful and specific advice for addressing cases of political criminal poisonings. This is because just like chemical terrorist attacks, the internal injuries in cases of political criminal poisonings are abnormal and "unlike those seen in day-to-day practice". [64]

If political criminal poisoning cases are able to be treated in a similar way, emergency first responders, medical professionals and law enforcement teams would be able to provide a more united and synchronised force, leading to better prognosis in cases of political criminal poisonings.

60 Waghorn, D. (11 January 2023). "Key questions remain after uranium discovered at Heathrow Airport". *Sky News*. Retrieved 17 June 2023, from https://news.sky.com/story/key-questions-remain-after-uranium-discovered-at-heathrow-airport-12784562.

61 https://news.sky.com/story/key-questions-remain-after-uranium-discovered-at-heathrow-airport-12784562.

62 Ornillo, Chiarra, and Nikolas Harbord. 2019. "Fundaments of Toxicology – Approach to the Poisoned Patient". Fundaments of Toxicology – Approach to the Poisoned Patient.

63 The European Agency for the Evaluation of Medicinal Products. 2003. "EMEA/CPMP Guidance Document on the Use of Medicinal Products for the Treatment of Patients Exposed to Terrorist Attacks with Chemical Agents". The European Agency for the Evaluation of Medicinal Products.

64 NHS. 2020. "Clinical Guidelines for major incidents and mass casualty events". NHS England.

Recommendation 7: Complete decontamination should occur in the wake of all political criminal poisonings to reduce the harmful effect of the poison and prevent a mass incident (and the involvement of civilians)

Whenever a harmful poison is used, mass decontamination of the surrounding area is important. Rapid decontamination reduces the effects and chances of absorption of poison by an individual, as well as preventing the spread of toxic substances to the general population.

An immediate decontamination of the victim's skin and clothes may remove any poison still present and prevent further contamination (although the victim should not be scrubbed).

A quick diagnosis of poisoning symptoms is also crucial in determining whether the patient poses significant risk of secondary contamination, in order to effectively control the spread of poison.

Some potent poisons, such as dimethyl sulphate, have no significant risk of secondary contamination, whilst others, such as Polonium-210 or Novichok, are able to spread and contaminate others.

Recommendation 8: A greater emphasis should be placed on law enforcement roles in cases of political criminal poisoning, including more thorough post-mortem examinations.

Whilst the initial focus in cases of political criminal poisonings should be on treating the victim to improve chances of recovery, there should also be a simultaneous effort by law enforcement officials to determine the nature and cause of their symptoms and the perpetrators involved. This ensures that the symptoms do not distract from political criminal poisonings being treated as a crime and regimes being held accountable for their actions.

There is a serious obstacle to investigating poisoning cases originating within hostile countries: for example, many political criminal poisonings within Russia remain unknown to the West, with symptoms reduced in the official reports to those of natural causes.

In cases of sudden death that are treated as suspicious, thorough post-mortem examinations should take place. The relatives of individuals who have a suspicious death anywhere in the world should aim to obtain samples of bodily biomarkers such as blood, hair and urine for testing externally in a democratic country to determine an impartial cause of death. [65] Victims and relatives are also able to contact poisonreporting.org for further advice and support in the aftermath of a political criminal poisoning. This is to ensure that perpetrators can be held to account and justice can be delivered and future cases be deterred.

If there are red flags present in a sudden death, the case should be treated as reasonably suspicious and specialist law enforcement personnel should be consulted.

The red flags for cases of political criminal poisonings include:

1. Nationality of the victim;
2. Activities and occupation of the victims;
3. Statements in social media and in the official media organisations;
4. Existence of a hostile state counter party;
5. Other instances of poisonings or death threats which bear similarities with the present instance.

[65] Police Radiation Protection Adviser. n.d. "Post Mortem Procedures for Alexander Litvinenko". Police Radiation Protection Adviser. Accessed 17 June 2023. https://www.whatdotheyknow.com/request/427166/response/1061699/attach/4/20171031%20FOI2017%2008296%20Post%20Mortem%20Procedures%20A%20Litvinenko.pdf?cookie_passthrough=1.

These red flags may indicate a higher risk of political criminal poisoning and thus could be approved as a justification for launching a specialist criminal investigation to rule out the poisoning as a cause of the attack on the victim.

Recommendation 9: Tougher punishments and sanctions should be imposed on countries that commit political criminal poisonings

Economic sanctions ("action taken by one country or group of countries to harm the economic interest of another country or group of countries, usually to bring about pressure for social or political change" [66]) are, and should be, used as an effective form of punishment for regimes and perpetrators committing political criminal poisonings. Sanctions also act as a deterrent to prevent political criminal poisonings from occurring again in the future by any hostile country (not just the singular country/people being targeted), displaying the clear consequences of carrying out these attacks. In order for sanctions to be effective, a rapid, harsh and universal response is necessary.

Rapid response means that the sanctions are imposed very quickly after the poisoning has occurred. This provides a clear global message that other countries condemn these brutal attacks, and means that the punishment is more streamlined as a clear response to the incident.

"Sanctions tend to work fast or never. They provoke a shock within the targeted economy," [67] says Agathe Demarais, global forecasting director at the Economist Intelligence Unit. The sanctions in March 2021, for example, imposed after the poisoning of Navalny in August 2020, were too slow-acting to have a maximum effect, and discussions about these sanctions took over six months before they were implemented. [68]

Harsh sanctions are needed to induce a hard-hitting punishment. The fundamental aim of economic sanctions is to impose severe consequences for the actions of individual perpetrators and governments responsible for ordering attacks. The harsher the penalty, the more effective a sanction is in preventing a similar political criminal poisoning in the future.

Historical failures at a governmental level to punish cases of political criminal poisoning are poignant. After the death from poisoning of Litvinenko in the UK in 2006, no formal action was taken by any country to punish Russia for over 11 years, when the US added the two individual perpetrators to a sanctions list, and it was only in 2021 that the European Court of Human Rights found Russia responsible for Litvinenko's death. [69] The fact that Russia was not held accountable for its actions (the Kremlin still denies involvement to this day) meant that Russia was more likely to be involved in political criminal poisoning again in the future (as seen in the UK Salisbury poisonings in 2018).

Sanctions need to be universal and multilateral to show a collective global response to a particular heinous action. As a result, there needs to be communication between different nations in the wake of political criminal poisonings: sanctions are not just the responsibility of the country where the crime took place, but all democratic countries, if we are to prevent these crimes occurring again.

66 "Economic sanctions". n.d. Oxford Reference. Accessed 12 July 2023. https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095741439.

67 Hirsch, Paddy. 2023. "Why sanctions don't work — but could if done right". *NPR*.

68 Holland, Steve, and Arshad Mohammed. 2021. "U.S., EU impose sanctions on Russia for Navalny poisoning, jailing". *Reuters*. https://www.reuters.com/article/us-russia-politics-navalny-wrap/u-s-eu-impose-sanctions-on-russia-for-navalny-poisoning-jailing-idUSKCN2AU27Y.

69 Neuman, Scott. 2021. "Russia Fatally Poisoned A Prominent Defector In London, A Court Concludes". *NPR*. https://www.npr.org/2021/09/21/1039224996/russia-alexander-litvinenko-european-court-human-rights-putin.

The true efficacy of sanctions as a punishment is still disputed among scholars. However, in political criminal poisoning, they are useful and necessary in showing a clear global stance that politically motivated criminal behaviour is not tolerated by any nation.

Recommendation 10: Maximised media attention is important for those under threat of political criminal poisonings

At an individual level, those who suspect that they may be suffering from a case of political criminal poisoning should aim to tell as many people as possible.

The wide-reaching audience of the internet and social media should also be utilised to spread the message via a social media account or a YouTube video. This is important in documenting the situation and means that hostile regimes are more likely to be held accountable for the politically motivated attack.

In order to further the work and ideals that outspoken dissidents represent, news organisations should make an effort to cover political criminal poisonings in further detail.

Furthermore, we recognise the need for a streamlined location where political criminal poisoning cases can be viewed, and that can act as a resource for journalists and those interested in the topic to learn about the cases that have occurred. Thus, we have created poisonreporting.org, a portal containing a database of political criminal poisoning cases. At the very least, all political criminal poisoning cases should be covered in the updates to this database. We have further created a questionnaire through which people can submit cases that may be seen as 'too small-scale' to be meaningfully covered in the news, in order to include these cases in the database and ensure that all are able to be registered and known.

19. Further Research Areas for Investigation and Extensions of the Study

1) Expanding the study of political criminal poisoning cases

Primarily, our study was limited by the small sample size of cases able to be collected (78) due to a lack of publicly available and reliable information about these sensitive instances. Further work should involve obtaining a larger sample set of cases of political criminal poisoning to validate our findings and observe trends with more degrees of freedom.

2) More thorough examination of the differences in treatment protocols between different hospitals that have treated victims of political criminal poisoning in the past

What is the difference in treatment protocols between the Charité Hospital in Berlin and other hospitals (e.g. UCL in London)? This question is pertinent because of the high success rate and low mortality of the Charité Hospital in successive cases of major, serious criminal political poisonings. Examining both the hospital's healthcare protocols and the work of specific individuals can aid in the adoption of new healthcare policies globally.

3) Rapid poison diagnosis

Research into new methods for more rapid poison diagnosis is also an important avenue for future investigation. A timely response is often crucial, and the use of an antidote is often what helps to keep victims alive. In common literature about poisonings, it is stated that "most poisoned patients who reach hospital can recover with supportive care alone". [70] However, this refers to the average patient; in cases of political criminal poisonings, where the poison dosage is intended to be lethal, a lack of diagnosis and antidote administration is typically the cause of preventable death.

4) Has anything been learnt from cases of previous criminal political poisoning?

It is difficult to say whether treatment protocols and prognosis in cases of political criminal poisoning have improved in the past 30 years, as a result of the increase in these cases, and whether democratic governments, police forces, hospitals and pharmacies have learnt from their prior mistakes. Further policy reports should aim to investigate changes that have been made as a result of past political criminal poisonings that show an improvement in response to these cases.

[70] Buckley, N. A., Dawson, A. H., Juurlink, D. N., & Isbister, G. K. (2016). Who gets antidotes? choosing the chosen few. *British journal of clinical pharmacology*, 81(3), 402–407. https://doi.org/10.1111/bcp.12894.

20. Conclusions

Overall, what has been observed thus far in cases of political criminal poisonings is the lack of a clear, streamlined response, often because these cases take place in different regions, under different jurisdictions. Cases are thus treated as separate events, and so mistakes in treatment and their outcomes are very rarely learnt from between nations, allowing the continued success of poison as a weapon to silence individuals.

In this report, we demonstrate the need for cases of political criminal poisonings to be separated and responded to using different protocols than used for criminal poisonings of civilians. We show that the strong motives, rare and dangerous poisons used and highly skilled perpetrators involved in these attacks mean that treatment for political criminal poisoning is more similar to treatment for patients of a chemical terrorist attack than treatment for ordinary criminal poisoning cases, driven by individual motive. We discuss how introducing a national political criminal poisoning register in different countries and creating uniform treatment guidelines is likely to improve clinical outcomes.

In the report, we also describe the trends and patterns of political criminal poisonings, having compiled the largest database of these cases to date (13 August 2023), and give advice for those under threat of attack based on these historical examples. We ensure that failings in the medical, legal and governmental systems in prior cases of political criminal poisonings will be accounted for and remembered, should another political criminal poisoning case occur. We also aim to raise awareness about political criminal poisonings, showing their difference from purely criminal poisonings, and to show the importance of global knowledge when they occur.

We give recommendations at both an individual, societal and governmental level that will help to improve the response to cases of political poisoning and lay out paths for further research to help solidify knowledge around cases of political criminal poisonings.

Ultimately, this report shows the need for a unified response from all different sectors – law enforcement, medical, media and governmental – in order to ensure the most effective response to cases of political criminal poisoning, both treating the victim and acting as a deterrent to further events. We prove there is a need for a universal response to cases of suspected political criminal poisoning, even though the treatment processes in these cases themselves will not be universal and generalised.

21. Further Important Resources

World Health Organization: Guidelines for Poison Control:
[https://apps.who.int/iris/rest/bitstreams/49969/retrieve]

Treatment of a patient with symptoms of chemical poisoning:
[https://www.ema.europa.eu/en/documents/other/european-medicines-agency/committee-proprietary-medicinal-products-guidance-document-use-medicinal-products-treatment-patients_en.pdf]

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