Attacks on Healthcare Workers and Infrastructure in the Ongoing Ukraine War

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Background

One of the hallmarks of the Russia's ongoing campaign to seize Ukrainian territory has been the deliberate targeting of non-combatants and civilian population centers. While collateral damage is often unavoidable, Russia's actions in Ukraine represent a clear violation of the Law of Armed Conflict (LOAC). Specifically, Russian attacks on healthcare workers and infrastructure are a violation of Article 19 of the Geneva Conventions, which state that *"medical units… hospitals and mobile medical facilities, may in no circumstances be attacked*.[7]" After the collapse of the Soviet Union, Russia declared itself the legal successor of the USSR and, therefore, recognized itself as a party to all international treaties signed by the Soviets- including the Geneva Conventions.

Figure 1 - Maternity Ward of a hospital in Mariupol that was targeted by Russian Forces on 09 March 22

These Ukrainian healthcare facilities have been carefully singled out, among other buildings within civilian areas, leading observers to the only logical conclusion- that they are specific targets of the Russian Ministry of Defense (MoD). On the road, civilian medical transports (ambulances) and protected casualty evacuation efforts are attacked on sight by elements of the Russian military. In the occupied towns and villages, Ukrainian healthcare workers are subject to assault, harassment, arrest, and even kidnapping by Russian forces.

As the invasion has thus far gone extremely poorly for Russia, the vast majority of their horrific crimes- the massacre at Bucha, widespread looting of homes, rape, child abduction at filtration camps[3], and other atrocities have played out in front of the world lens, for all to see. During this ongoing episode, Russia has suffered extremely significant losses of personnel and equipment. While estimates vary, one data source reports a total of over 170,000 Russians killed in action (KIA) between the initial invasion and 26 March 2023. Equipment losses are also extremely high, leading Russia to fall back on antiquated vehicles and aircraft from Soviet stockpiles.

The lack of concern on the part of the Russians for the documentation and publication of their crimes, combined with the fact that they continue to deliberately conduct attacks against Ukrainian healthcare workers and infrastructure, raises the suspicion that such unlawful attacks might be conducted out of spite, and that a correlation may exist between losses and attacks. It is also possible that in the fog of war either side may accidentally strike an unlawful target.

Research Question

Do Russian personnel and equipment losses in the War in Ukraine drive Russian attacks on Ukrainian healthcare workers and infrastructure?

The ongoing conflict between Russia and Ukraine has resulted in a humanitarian crisis, particularly in the healthcare sector. Russian military attacks on Ukrainian healthcare workers and infrastructure have not only caused significant damage to essential medical facilities but have also led to numerous civilian casualties. As mentioned, these attacks are in clear violation of the Article 19 of the Geneva Convention, which protects medical personnel and facilities during wartime.

Understanding the relationship between Russian battlefield losses and unlawful attacks on healthcare workers and infrastructure is crucial in gaining insights into the motivations behind these attacks and finding ways to prevent future violations. Data exploration is an essential step towards achieving this goal, as it can reveal patterns and trends that may not be immediately apparent. By analyzing relevant datasets and performing statistical analyses, researchers can gain a deeper understanding of the factors that contribute to these attacks and identify potential solutions to mitigate the harm caused to innocents. Therefore, data exploration is critical for advancing our knowledge of the conflict and ultimately promoting peace and stability in the region.

Through exploratory data analysis and visualization, I will examine the relationship between attacks on Ukrainian healthcare workers and infrastructure, including severity of the attack in terms of number of facilities damaged or destroyed, and also workers killed, kidnapped, arrested, injured, or assaulted. By comparing these events to Russian losses in personnel and equipment, I will determine if a relationship exists between the two.

As a potential hypothesis, I will test if Russian attacks on protected targets follow events of high battlefield losses, and if so attempt to quantify how long the typical time lag between losses and attack is. If the severity of the attack on healthcare workers and infrastructure is scaled to the severity of the loss, I will attempt to quantify that as well.

Literature Review

The literature review consisted of both primary and secondary data collection, including peer-reviewed journal articles, news articles from respected publications, and other information from respected sources. Information from Mil-bloggers and from the popular Telegram channels which follow the conflict were not used due to the level of inherent bias present.

The literature review yielded 14 relevant sources, of which 5 were used. Themes used to perform this downselect included discussion of attacks on civilian targets as well as attacks on healthcare workers and infrastructure, as well as any material linking Russian forces to Article 19 violations.

One particular source proved to be uniquely valuable in researching this topic- *Ambulances Under Siege in Syria*, by C. Hayes Wong and Christine Yen-Ting Chen[9]. This 2018 paper explores "repeated air strikes on hospitals and ambulances, and the largest death toll of health workers in any recorded conflict." It further discusses how Ambulances in Syria have been bombed, shot at, stolen, looted, and obstructed- significantly impeding their ability to safely evacuate the wounded and provide medical aid.

While attacks on civilian targets are typically the work of terror organizations rather than professional military units, Russia stands in stark contrast to the rest of the world in this area. The author's analysis of 204 recorded attacks on ambulances in Syria between 2016 and 2017 revealed the following data:

Perpetrator	Number of Attacks	Percentage of Attacks
Syrian Regime	123	60%
Russian Forces	60	29%
Islamic Extremist Groups	4	2%
Other Parties	1	0%
Unknown	16	8%
TOTAL	**204**	**100**

Figure 2 - Table of Attacks on Ambulances in Syria, 2016-2017

While fighting to bolster and preserve the regime of Bashar al Asad, Russian forces conducted dozens of attacks annually against ambulances, accounting for almost 30% of Article 19 violations of this type documented by the Syrian Network for Human Rights (SNHR). It is apparent from this data that while the world turned a blind eye to the conflict in Syria, Russian troops were targeting healthcare workers and infrastructure without consequence. In addition to numerous other examples from previous conflicts of a lack of professional standards and discipline within the Russian military, this particular data represents a direct link between the criminal actions of Russian Forces in Syria and in Ukraine. Many of the same combatants, especially in the early days of the invasion of Ukraine, had participated in the Syrian conflict.

Additionally, *Terrorist Attacks Against Healthcare Facilities: A Review* by Garrett A. Cavaliere, Reem Alfalasi, Gregory N. Jasani, Gregory R. Ciottone, and Benjamin J. Lawner proved to be a valuable source of information[5]. This research paper discussed how Healthcare facilities play an essential role in response to terrorist attacks, but are also "soft targets" due to their quick accessibility and limited security. The authors obtained data from the Global Terrorism Database (GTD) and conducted a search of terrorist attacks directed against hospitals and healthcare facilities between 1970 and 2018. Of particular relevance to this topic, the authors also found that the most common method of attack was bombing, followed by armed assaults.

Attack Type	Bombing/ Explosion	270	59%
	Armed Assault	77	17%
	Hostage Taking (Kidnapping)	38	8%
	Assassination	24	5%
	Facility/ Infrastructure Attack	16	4%
	Unknown	14	3%
	Hostage Taking (Barricade Incident)	11	2%
	Unarmed Assault	3	1%
	Hijacking	1	0%
	TOTAL	**454**	**100**

Figure 3 - Worldwide Terrorist Attacks against Hospitals, 1970-2019

Another helpful research paper was *Foreign Fighters, Rebel Command Structure, and Civilian Targeting in Civil War*, by Austin C. Doctor and John D. Willingham[4]. This study contained an analysis of sixty-nine rebel groups active between 1989 and 2015. It asserts that foreign fighters are associated with greater levels of anti-civilian violence only when active in groups with centralized command structures. This was interesting, and contradictory to my own experience in the Iraq War- where loose cellular networks were more likely to attack civilian targets than groups that retained more centralized command structures, who more typically attacked government targets and security forces.

With respect to the Russian way of waging war, I found useful the 2011 paper published by the U.S. Army War College's Strategic Studies Institute, *"The Russian Military And The Georgia War: Lessons And Implications,"* by Ariel Cohen and Robert E. Hamilton[1]. In this analysis, the authors examine the conflict in three different areas:

- The goals of war- which the authors claim were the annexation of Abkhazia, the weakening or toppling the Saakashvili regime, and the prevention of NATO enlargement in the Caucasus.
- Russia's military performance- and need of significant reforms.
- NATO and EU weakness- in relation to security assistance to countries of the former Soviet Union.

Attacks on civilian targets, including hospitals, were a major part of that conflict, perpetrated mostly by Russia's Vostok Battalion comprised of Chechens. In light of the current conflict (and what we have learned about Putin's objectives since the paper was written in 2018), I disagree with the authors that the goal was only to capture Abkhazia- it now seems clear that Putin would have happily conquered and annexed all of Georgia had that invasion not also gone badly for him.

Lastly, *Carrots, Sticks, and Insurgent Targeting of Civilians*, by Victor Asal, Brian J. Phillips, R. Karl Rethemeyer, Corina Simonelli, and Joseph K. Young was of particular interest in developing my method of analysis$_2$. This paper attempted to use statistical analysis and model development to draw insights, but was flawed in its logic and structure. The authors use "Terrorism" as a dichotomous variable and define several binary variables such as "Carrot" and "Stick" to describe actions. Among the conclusions based on output from the models generated are *"The coefficient associated with carrot is negatively signed and statistically significant, suggesting that governments that use conciliatory tactics toward a rebel group are less likely to see terrorism from that group in the following year."* This suggests support for a policy of appeasement would be effective in reducing terror attacks. While I only agree with very little of the material presented and conclusions drawn, it was very interesting to see how their analytical process and method was derived.

Methodology for Data Exploration

As a methodology for data exploration, time plots are a valuable tool to visualize trends and patterns in data over time. In this study, I created time plots to compare Russian battlefield losses and unlawful attacks on Healthcare workers and infrastructure. The time plots were created by plotting the number of Russian battlefield losses and unlawful attacks on Healthcare workers and infrastructure over time, respectively, using a consistent time interval.

To ensure that the time plots were valid representations of the data, I performed data cleaning and preprocessing steps. These steps included checking for missing values, outliers, and inconsistencies in the data. Verbal explanations and date ranges in the "ISODate" field were removed, appropriate data classes were coerced to ensure proper analytic processing, and Ukrainian language event descriptions were translated into English using the GoogleTrans library. For the datasets pertaining to Russian personnel and equipment losses, a "diff" function was used to calculate daily total losses rather than cumulative total losses across the date range sampled. I also ensured that the time plots accurately reflected the underlying data by using appropriate data visualization techniques, such as line plots and histograms, and by choosing appropriate scales for the axes as well as legends.

I then visually compared the time plots of Russian battlefield losses and unlawful attacks on Healthcare workers and infrastructure in order to identify any potential relationships or correlations between the two variables. This allowed me to identify any trends or patterns in the data that may be of interest, and to evaluate my hypotheses.

Overall, the creation and comparison of time plots is a valid and valuable technique for exploring data and identifying trends and patterns over time. This can help to uncover hidden relationships between variables and inform further analysis and modeling efforts.