No Safe Place: Geopolitical and Humanitarian Implications of Medical Care Infrastructure Destruction in the Donbas Conflict[1]

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"We witness with alarming frequency a lack of respect for the sanctity of health care, for the right to health care, and for international humanitarian law: patients are shot in their hospital beds, medical personnel are threatened, intimidated or attacked, hospitals are bombed." - World Health Organization, 2016

The Donbas area of eastern Ukraine[3] has been an active war zone since the late spring/early summer of 2014 when Russian-backed separatists and later Russian military forces attacked Ukrainian government officials and troops, igniting a conflict that continues at this writing. As a consequence, the region has suffered enormous loss of life and untold human suffering. Basic facts of what has become one of Europe's worst humanitarian disasters in recent times are readily available and reported in official and

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[3] Defined as Donetsk and Luhansk oblasts (regions).

non-governmental sources and in the mainstream media; as of late 2018 more than 10,000 persons have been killed in the Donbas fighting (of which over 3,000 were civilians[4]) and over 1.8 million persons have been displaced or remain at risk (UN OHCHR 2018; UNHCR 2018). Despite a purported cease-fire having been in place between the Ukrainian government and separatist forces since February 2015 under the so-called "Minsk II" accords, literally tens of thousands of violations of that agreement have been documented by the Special Monitoring Mission (SMM) of the Organization for Security and Co-operation in Europe (OSCE) along or near the "line of contact" that separates the warring parties (OSCE 2017). Even more tragically, as the United Nations (UN) Security Council reports, "…civilians [in the Donbas] continued to bear the brunt of the fighting as children were out of school, civilians were subjected to shelling, gunfire and landmines, and health problems were worsening" (UNHCR 2018).

However, the scale of damage that has been wrought on the social and economic infrastructure in the Donbas had eluded detailed assessment. In what had been one of Europe's major industrial areas and the home to some 6.6 million people prior to the outbreak of war, less attention has been paid to humanitarian infrastructural damage. Indeed, the extent of physical damage incurred in the Donbas to date is the worst in the post-Soviet space excepting only the massive destruction that accompanied the suppression of the insurgency in Chechnya in the 1990s.[5] Imagery readily available online of the wreckage of the formerly state-of-the-art airport terminal at Donetsk, bombed out apartment blocks, houses, factories, mines, power stations and the electricity grid, bridges and highways, and a countryside littered with derelict military and civilian vehicles visually underscores the extent to which this conflict has devastated the Donbas. Damage is likely to continue, due to fact that the region is widely reported to be rife with landmines and unexploded ordnance.

The fragility of the local infrastructure is illustrated by in-depth reporting on the risks associated with attacks on water filtration plants, not only from the imminent danger of highly toxic chlorine gas being released but also the indirect health threats to the population from lack of access to clean water (Zwijnenburg 2017). As a recent report makes clear, the war has ruined the heavy industrial economic base of Luhansk Oblast, not only through physical damage but also the disruption of trade with Russia, the difficulties of realigning markets, and decisions of Ukrainian policy makers (Milakovsky 2018). Conditions are also challenging in neighboring Donetsk, where water filtration systems, roads, and housing have been compromised by the fighting (Interfax 2017; Zavtonov and Malkhin 2017). Vasyliuk and colleagues (2015) have even documented marked deterioration of regional biodiversity as a consequence of military engagement. Thus, both the physical infrastructure and natural environment have been extensively damaged by the war. But the full extent of harm done to social infrastructure in the Donbas has yet to be adequately assessed in terms of its impact on the remaining resident population or on Ukraine generally. Damage to three specific sectors, healthcare networks, schools, and local governance infrastructure, are frequently noted in reports of

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[4] This number includes the 298 crew and passengers aboard Malaysia Airlines Flight 17 shot down over Ukraine by separatist and/or Russian forces.
[5] The long-term conflict between Armenia and Azerbaijan over the disputed territory of Nagorno-Karabakh and the civil war in Tajikistan claimed more lives.

specific sites of engagement or hostilities in Donbas but have yet to be comprehensively catalogued.

In this paper, we draw upon findings from a larger project focused on conceptualizations of *state capacity* among states bordering on the Russian Federation to better understand the costs of the Donbas War. We seek to extend standard approaches to the measurement of state capacity, enhance the specificity with which we document the damage of humanitarian infrastructure, and provide a preliminary exploration of the ways in which damage to humanitarian infrastructure negatively affects long-term prospects for the provision of services and public attitudes in the Donbas. To this end, our paper documents the extent of damage to healthcare infrastructure and presents two case studies to begin developing methods for blame attribution. While identifying perpetrators of attacks on healthcare facilities is challenging – and controversial – it is an important part of the process to tell the story of the Donbas War and contribute to longer-term post-conflict reconstruction and reconciliation efforts.

Our paper is structured in the following way. In the first section, we briefly outline our overarching interests in state capacity and how social science literature on this subject is linked to civilian infrastructure in the Donbas. In the second section, we describe our methodology for precisely identifying damage to healthcare facilities and present data about the extent of damage in the region. In the third section, we present two case studies of specific combat operations in Lyman and Mariupol that use available evidence to identify the likely perpetrators of hospital attacks. In the fourth and final section, we discuss our efforts to extend the project in two directions: understanding how degrading civilian infrastructure affects perceptions of legitimacy and expanding the types of civilian infrastructure in the project.

State Capacity

Standard approaches to state capacity address the ability of a government both to *extract* and *coerce* the means for its survival from the population on the territory that it controls (via taxes, customs duties, or military conscription). We focus on recent calls for an expansion of state capacity to include how bureaucratic entities *deliver* socioeconomic goods and services (education, jobs, infrastructure) and provide citizens the opportunity to participate in the political process (elections) that secures their loyalty and, consequently, regime legitimacy. Focusing on higher-order indicators of state capacity, our overarching expectation is that all other things being equal, more robust state capacity promotes sociopolitical *resilience*, while less robust state capacity leads to instability and invites aggression from more powerful neighboring states.

The growing importance of state capacity as a social science research theme is traceable to the pivotal *Bringing the State Back In* (Evans, Rueschemeyer, and Skocpol 1985).[6] Skocpol described this "paradigmatic reorientation" away from the previously dominant society-centric, interest group, and politics-based approach as owing in part to the need to account for less than satisfactory research outcomes or, as she put it, "…poor fits between historical patterns and sequences and those posited by the original [society and political-centric] concepts and assumptions" (Skocpol 1985, 5). The emphasis on the state as a powerful agent of socioeconomic change – and not merely an instrument – has enhanced our understanding of state-society dynamics, as represented by such works as

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[6] In some landmark case studies, even further back (e.g., Stepan 1978; Trimberger 1978; Krasner 1984).

Politician's Dilemma (Geddes 1994) and *Seeing the State* (Corbridge et al. 2005). *State capacity*, reference to "…the ability of a government to administer its territory effectively" (Wang 1995, 89), is key. Still, *state capacity* means different things to different people, especially when considering how states administer their territory, how it might be measured, and how it relates to conflict (Braithwaite 2010; Hendrix 2010).

In periods of conflict, research emphasizes the state's ability to use force, or the threat of force, to secure borders, control regions, or otherwise undermine challenges to the regime's sovereignty or legitimacy (Savoia and Sen 2015). *Coercive capacity*, ("military capacity"), refers to the ability armed forces and internal security maintain stabilizing levels of law and order (e.g., Hendrix 2010). To do so, the state's ability to secure the funds it requires to govern, to defend itself, to maintain internal security, or to attack other states (Tilly 1990; Besley and Persson 2008).

Bureaucratic capacity ("administrative capacity") is tied to the Weberian vision of a neutral, competent civil service delivering policy developed by the political branches and emphasizing the role of local personnel. We contend this later form of capacity is particularly valuable for states seeking to solidify citizen loyalty and focus our analysis on bureaucratic capacity in healthcare. Keeping with recent scholarship, we include an emphasis upon variations in capacity within national contexts (Koren and Sorbahi 2018). External actors may attempt to degrade bureaucratic capacity through measures such as cyber and kinetic attacks on infrastructure, exacting damage that renders it more difficult for the target state to marshal resources and deliver services. External actors may also act to degrade perceptions of service delivery through media and/or propaganda efforts designed to directly question the quality of healthcare, education, or elections in the targeted state, or by indirectly undermining citizen confidence in the general capacity of the targeted state's service delivery to citizens. Effects on capacity can be challenging to effectively document. The next section builds upon our discussion of bureaucratic state capacity by investigating how healthcare facilities have been treated by combatants in conflict situations generally, and in Ukraine specifically.

Healthcare and Conflict

There is broad international support for improved record keeping concerning damage to healthcare infrastructure and harm to both international and local healthcare providers. Adherence to international conventions and norms concerning the exclusion of healthcare facilities from armed engagement is of notable concern, particularly after suspect actions in Syria on the part of Syrian and Russian forces and in the Yemen conflict by the Saudi-backed coalition. Calls for the reconsideration of the absolute "neutrality" of healthcare facilities and providers have highlighted the challenges experienced on the ground, where facilities and professionals are embedded in complex contexts of state control, state security provision, and regional identities (Rubenstein 2014). Current approaches stress the central role of impartiality in healthcare treatment (treating those in need first, regardless of affiliation) and facilities (separating healthcare locations from military activities such as billeting of solders or storage of ammunitions) as a means of supporting the exclusion of healthcare from the damages associated with armed combat.

While coordinated data collection efforts concerning damage to healthcare infrastructure in conflict locations are in development, implementation has lagged (Patel, et al. 2017). There are persistent potential problems of specificity (location), determining

the degree of damage, and comprehensive coverage associated with the diverse efforts at documenting conflict damage to healthcare facilities used currently. Broidy and colleagues (2018) assessed reported damage to healthcare infrastructure across six recent armed conflicts: Syria, Iraq, Yemen, Chechnya, Bosnia-Herzegovina, and Kosovo, finding substantial variation in methods and estimated damage, without considering the thorny challenges of identifying precise locations. In the Syrian crisis, a three-stage search using open sources with local partner reports or confirmatory satellite images yielded 464 incidents, while an innovative approach by the UN's World Health Organization (WHO), encouraging individuals on the ground to report via social media applications which were then confirmed by on observations *in situ*, generated 402 cases (Broidy et al. 2018: 3). While summary estimates of healthcare damage within individual conflict zones are typically readily available, many lack a carefully delineated methodology, precise periodicity, and detailed information on location, yielding wide variations in estimates.

As we have reported previously (Buckley et al. 2018) and expand further here, although the situation in the Donbas is certainly not on a scale as devastating as that in Syria or Yemen, it is much more extensive than is generally appreciated, and raises major regional humanitarian and geopolitical implications (Buckley, Clem, and Herron 2018) We addresses this aspect of the Donbas conflict by adducing hitherto un-catalogued geo-located data on reported attacks on specific medical facilities in the region. Complementing summary reports of the extent of damage by the WHO and others, our assessment seeks to document the precise location and timing of attacks across the region. We also present in-depth examinations of two specific areas where the known positions of the two belligerent parties--Ukrainian government forces and militias associated with them on one side and Russian-backed separatists and elements of the Russian army on the other--to explore indicators of blame attribution for these attacks or if the damage documented is more likely collateral to the fighting itself. This task is challenging, even in a very small sample of cases, owing to the complexity of the conflict as the battlefront moved across eastern Ukraine (in some places back and forth), the frequent misreporting/multi-reporting of incidents, and the use of disinformation techniques by all sides concerned. But the geopolitical implications of blame attribution are potentially so important that establishing both the database and the methodology to make such judgments warrants the effort.

Methodology

Documenting damage to humanitarian infrastructure is challenging, particularly during ongoing conflict. Limited on the ground coverage by journalists and international organizations can hinder accurate accounting of the location, extent, and timing of infrastructural damage. During periods of conflict, the reporting of damage to humanitarian infrastructure is subject to political manipulation, potentially generating higher levels of reporting in cases attributable to enemy fire by local forces. Accuracy is also challenging. Can a single object be subject to multiple acts of damage across time? How might damage reports vary systematically across sources? How consistent are reports of precise locations, particularly in regions with variations in naming protocols?

Spurred by multiple general reports of damage to humanitarian targets in regions such as Syria and Yemen informed by anecdotal reports of the challenges brought on by the

destruction of healthcare infrastructure from multiple individuals displaced from the Donbas conflict in early 2018, we initiated a systematic media review of information noting damage to healthcare infrastructure in the Donbas. We elected to focus upon reports of damage attributable to a specific location and time period, which could be geo-located and confirmed with pre-conflict listings of healthcare infrastructure for the region.

Our sources are drawn from central newspapers in Ukraine and the Russian Federation (2014- Sept. 2018), ten papers in the Donbas itself (2014-2015), quarterly reports by the Office of the United Nations High Commissioner for Human Rights (OHCHR, April 2014- August 2018), and non-governmental organization (NGO) reports (2014-2018).[7] These were supplemented with of major international English-language news sources. Using identify keyword searches (translated and back translated into Ukrainian, English, and Russian), we searched each "hit" to for specific discussion of damage to healthcare infrastructure (registering the time of the attack, the precise name of the location). We checked reported locations against listings of hospitals and clinics as of January 1, 2014 in the region with specific locations provided through Google map searches and healthcare directories. For every report, multiple spellings and naming conventions were employed in order to tie reports to the precise location. This enabled us to confirm locations for each specific report, which we coded for mapping, and contents archived. The results yielded a mappable database of healthcare infrastructure damage, by quarter of occurrence, reporting source, and, narrative text.

This conservative approach excluded multiple press reports (142) alluding generally to "damages to hospitals" or citing "damage to a healthcare clinic" in large urban area with multiple healthcare facilities such as Donetsk or Luhansk, without further specification. We recorded reports of damage to health care infrastructure in the same calendar quarter as one occurrence, to avoid dual reporting, generating a conservative estimate of the total number of attacks, while enabling the count of multiple attacks over time to specific locations (such as the Vishnevsky Hospital in Donetsk). Several locations (23) reported damage across multiple quarters. Coverage of any one reported incident in our database seldom occurred across our source categories. The majority (80) of damaged locations were reported by only one source.

Employing this conservative approach, we found that about one-third (92) of the hospitals and clinics in the region had been damaged or destroyed during our period of observation. This number is somewhat lower than estimates by the WHO, which estimated a total of 145 hospital attacks during the duration of the conflict in August of 2016, and 150 by December of 2016. In addition to our strict attention to specificity in the reporting, we also suspect our lower numbers may result from our more limited approach to healthcare infrastructure, which excluded pharmacies or temporary aid stations.

Our initial data analysis provides insight into the "big picture" of healthcare infrastructure damage at different stages of the conflict. While this provides us with critical information about what was damaged, it does not tell us the circumstances under

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[7] For Ukrainian, Russian, Donetsk, and Luhansk newspapers we relied on EastView databases.

which capacity was degraded. The next section presents two case studies that address blame attribution and by extension, potential effects on perceptions of legitimacy.

Two Case Studies and Blame Attribution

A considerable literature and wide-ranging discussion has emerged exploring the origins of the Donbas crisis; attempts to reach a peaceful settlement and end the fighting; and sorting out the geopolitical situation of Ukraine vis-à-vis Russia on the one hand and the European Union (EU) and the North Atlantic Treaty Organization (NATO) on the other. We do not propose to enter these discussions here; we take it for granted that hostilities commenced between Russia and Ukraine and continue, and we focus on the material outcomes of that fighting and the consequences flowing from the reality on the ground extant. That said, we understand that moving beyond our inventory of attacks on healthcare infrastructure, important as that inventory is in the grand scheme of things, to even attempt to assign blame for specific events to one side or the other will inevitably engage the wider debates about the conflict. In complicated and politically fraught conflicts, attribution might also allow the bringing of war crimes charges or other punitive measures (such as sanctions).

As noted above, the proximate cause of this conflict is Russia's increased involvement from relatively small-scale assistance to armed separatist factions in the Donbas region that Moscow gestated, to the direct intervention by regular units of the Russian armed forces as the fighting intensified with Ukrainian government forces and its allied militias (Clem 2018).

That said, as we have written elsewhere (Buckley, Clem, and Herron 2018), in this context it is vital to understand that various notions of "hybrid warfare"[8] or the Ukrainian government's use of the term "Anti-Terrorist Operation"[9] (ATO) that imply dealing with surreptitious tactics similar to that employed by Russia in its seizure of Ukraine's Crimea region earlier in 2014 by largely non-kinetic means with few, if any, casualties, are in the case of the Donbas crisis grossly misleading. Instead, what has occurred in the Donbas is full-scale modern warfare involving heavy artillery and mortars, tanks and other armored fighting vehicles, drones, and sophisticated electronic systems such as counter-battery radars, especially on the Russian side (Felgenhauer 2018). Of particular note is the BM-21 "Grad" ("Hail") multiple launch rocket system (MLRS), employed by both Ukrainian and Russian forces in this conflict, which have the widest area effect of any conventional weapon system in use anywhere today (GICHD 2017) and which has devastated vast areas with indiscriminate effect and produced extensive physical damage and thousands of casualties, including both combatants and civilians.[10] Tim Judah's first-hand account (2014) of the intense fighting around Ilovaisk in August 2014 should lay to rest any notion of "little green men" casually taking over control of disputed territory. Likewise, Amos Fox's (2017) in-depth analysis of the battle for Debal'tseve which signaled the end of the large-scale fighting with the defeat of the Ukrainian army in this strategically key city, where: "Far from the eye of the casual observer or mainstream-media outlets are

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[8] For a critique of these, see: Hoffman 2014; Kofman 2016.

[9] The use of this term was officially ended in February 2018 to be replaced by Joint Force Operation.

[10] The standard 40 round BM-21 salvo on impact produces over 150,000 primary fragments over an area 600m x 600m and an unknown but very large number of secondary fragments (GICHD 2017). Other types of MLRS are also in use in the Donbas conflict, but infrequently.

battlefields more reminiscent to those of World War I than one would expect to find in the 21st Century."

Insert Figure 1 about here

The spatial pattern of attacks against hospitals and other medical facilities in the Donbas (Figure 1) is a reflection of this overall ebb and flow of fighting from the early summer 2014 to the present.[11] Likewise, the number of such attacks matches the tempo of combat, with the vast majority occurring in the period leading up to the Minsk II accords, spiking in late 2014 and into early 2015 (Figure 2). Early on, relatively small-scale actions occurred as separatist fighters, including a number of Russian intelligence operatives and mercenaries established themselves in and around Slavyansk (Sloviansk), in Donetsk, Luhansk and a number of cities and towns in those areas, and street fighting broke out in Mariupol. The heaviest fighting of the war occurred from July 2014 through February 2015 as Ukrainian forces recaptured most of the territory under separatist control but then were driven back when Russian army units entered the fighting. The large cluster of attacks along the line of contact marking the battlefront as of Minsk II, especially in Luhansk and the greater Donetsk area, is reflective of the horrific fighting that occurred there; note that virtually all of the symbols on Figure 1 for the year 2015 represent attacks in the first two quarters of that year (Figure 2).

Insert Figure 2 about here

Among the dozens of such events, we have selected two for further investigation: attacks on Lyman,[12] and the city of Mariupol and its environs. We chose these two cases because they stand apart from the larger clusters of attacks and it is therefore easier to identify the movements of military forces from either the Ukrainian or the Russian/separatist sides.

Lyman

Lyman is in an area around Slavyansk (Figure 3) that came to be controlled by separatists under the command of the Russian intelligence operative Igor Girkin (for background, see Toal (2017: 264-66). We have documented five attacks against health care facilities in this immediate area in 2014 and one in 2015 (Figure 3). Of these six cases, we are able to attribute blame for the attacks in four.

Insert Figure 3 about here

In April 2014, the Ukrainian government moved against Slavyansk and other insurgent-controlled towns in the vicinity as the ATO began in earnest. By early July, Girkin and his fighters abandoned Slavyansk, Kramatorsk, and other towns and began a general retreat in the direction of Donetsk. As the separatists were pushed back, Ukrainian forces re-took control of Lyman in early June, and as fighting around the town

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[11] Interactive maps available online illustrate this. See, for example:
https://www.youtube.com/watch?v=MndkmBVG18s
[12] Formerly Krasny Liman.

ensued, the major hospital (the Krasny Liman Railway Hospital) was attacked and badly damaged. In a letter to Ukrainian authorities, the NGO Human Rights Watch (HRW) lodged a formal complaint about this attack, stating that "…mortars fired by Ukrainian forces damaged the facility's roof, pharmacy, general therapy, surgery and gynecology wings" and that one health care professional, the hospital's only surgeon, was killed in the attack (HRW 2017). HRW investigators at the scene reported impact craters "consistent with a 120 mm mortar attack"[13] and opined that the hospital may have been specifically targeted inasmuch as it was more seriously damaged than surrounding areas. Post-attack video of the hospital complex clearly shows several impact craters as well as damage to the roof of one of the main buildings that was almost certainly caused by a mortar round given the angle at which impact occurred (mortar rounds follow a high arcing trajectory as opposed to artillery rounds or the even flatter trajectory of tank rounds). Hospital personnel interviewed by HRW and the local NGO Kharkiv Human Rights Protection Group (KHPG 2014) reported that a Ukrainian military commander explained that the facility was attacked because it had been identified as "an insurgent hospital."

Our evidence indicates that in the early stages of the ATO, Ukrainian forces attacked three of the five hospitals damaged in and around Slavyansk, including the Krasny Liman Railway Hospital, the City Hospital in Slavyansk, and the Seminivka Psychiatric Clinic (Figure 3) (HRW 2014). In some of these cases (but not the Krasny Liman Railway Hospital) insurgents had taken control of the facilities and were using ambulances to transport their wounded and fighters. It should also be taken into account that the situation on the ground at this time was very fluid with an enemy that often blended with and at times was supported by the local population, and that the Ukrainian troops were both untrained, poorly equipped, and badly led as a consequences of years of neglect, waste, and highly corrupted leadership (Akimenko 2018), all of which is a recipe for unwarranted acts beyond the norms of warfare. On the other hand, it is clear that the attack on the main hospital in Kramatorsk in February 2015 (Figure 3) came at the hands of separatists or, more likely, Russian forces, employing MLRS fire[14] against the city as the tide of battle had shifted and the fighting moved back westward, and by which time such area effects weaponry was being employed ("Ukraine Crisis" 2015; HRW 2015). In summary, combat operations by Ukrainian forces is the likely source of damage to medical facilities in Lyman.

Mariupol

Mariupol is a major industrial and port city in southwestern Donetsk Oblast on the northern littoral of the Sea of Azov. In the period following the Maidan uprising, separatist forces attempted to take control of the city and fighting ensued between them and Ukrainian government troops and police, until a pro-Kyiv militia succeeded in re-taking the city in early June 2014 (Loiko 2014). Within days, separatist forces had been driven back along the coast to the Russian border and that part of the front stabilized under government control. Although fighting during this period was at times intense, it mainly involved small arms as neither side employed heavier weapons, thus limiting the

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[13] Such mortars are used by both Ukrainian and Russian/separatist forces.
[14] In this case larger rockets and cluster munitions which increase the damage on infrastructure and have an even more deadly effect on civilians.

amount of damage done as well as civilian casualties. However, on August 24, large numbers of troops, armor, and heavy weapons crossed the Ukrainian border from Russia and on August 25, Russian combatants attacked the city of Novoazovsk and captured it on August 27, driving Ukrainian forces back in the direction of Mariupol (Kramer and Gordon 2014). By early September 2014 separatist and Russian forces had reached the outskirts of Mariupol until they were halted by heavy fighting near the village of Shyroknye about 11 km from the Mariupol city limits, where the front has stabilized along the current line of control.

Insert Figure 4 about here

Much of what we know about how the fighting unfolded along the Azov Sea coast comes from detailed investigations conducted by the Bellingcat open source reporting collective (2015; 2018). Bellingcat analysts make intensive and innovative use of commercial satellite imagery and social media in various formats (ground level imagery, video, and intercepted communications) to identify the movements of military units and equipment and especially the source of artillery and rocket attacks. Our own data indicate a total of eight attacks on medical facilities in the Mariupol sector; four in 2014, three in 2015, and one in 2016 (Figure 4). Of the four in 2014, one, the hospital in Novoazovsk, was reportedly struck by artillery fire on August 26 (Leonard 2014). Bellingcat (2015) demonstrated conclusively that mortars, artillery, and rockets fired into Novoazovsk came from inside Russian territory (the border is nearby) or from Russian or separatist controlled areas across the Ukrainian border, with the hospital in Novoazovsk among the civilian areas shelled. Given the preponderance of evidence in this instance, this attack can be attributed to Russian/separatist forces.

There is no direct evidence available to us to attribute the attacks on hospitals in Mariupol proper or its suburbs in 2014, 2015, and 2016. However, there is ample indirect evidence in the form of frequent shelling of the city by Russian and separatist forces throughout this period, mainly using BM-21 Grad rockets. For example, the OSCE SMM (2014b) reported that the area to the northeast of the city was struck by Grads in October 2014. By far the most notorious such incident occurred on January 24, 2015, when a heavy Grad barrage struck residential areas and hit shops, markets, apartment blocks, and a school, killing 30 civilians and wounding many more (BBC 2015). Bellingcat (2018) determined that the shelling originated from Russian-controlled territory and, furthermore, that the attacks were carried out by regular units of the Russian Army as well as separatists. The basic parameters of the attack were also confirmed by the OSCE SMM (2015). Although it is not known what targets the Grads were supposed to hit, as Bellingcat (2018: 51) notes: "…the degree of precision of salvo fire by MLRS of the BM-21 type leads the reporting team to conclude that any targeting at a location in the outskirts of a town would have assumed the plausible loss of civilian life." Given the proclivity of Russian and separatist forces to use Grads and other artillery in such an indiscriminate fashion, and assuming that the Ukrainian forces would not attack a city that they controlled, we believe it safe to attribute the Mariupol attacks to the Russian/separatist side.

There are photos posted on social media of the attack on the Telmanove hospital (in the Mariupol sector) in 2015 (but not for the 2014 attack) with what appears to be

overpressure damage from a near miss. Inasmuch as Telmanove is in the non-government controlled area (i.e., separatist territory) that incident may have been resulted from shelling from the Ukrainian side, whereas the attack on Volnovakha (also in the Mariupol sector) in 2015 is in an area controlled by Ukrainian forces where previously Grad strikes from separatist territory caused numerous casualties, in particular an attack on a traffic checkpoint where civilian vehicles were hit and ten civilians died (Stop Fake.Org 2015). In summary, it appears that of the eight attacks against medical facilities in the Mariupol sector, one is definitely, four probably, and one possibly attributed to the Russian/separatist side and two probably to Ukrainian forces.

Investigating other attacks against medical facilities, especially in areas where there are large clusters of events that can be correlated with known or suspected troop dispositions, will enhance our abilities to confidently reconstruct events on the ground and potentially attribute blame. For example, the area around Debal'tseve was encircled by Russian forces and subjected to devastating artillery and rocket attacks from Russian forces (Fox 2017), damaging a number of medical facilities in the process. Both the cities of Donetsk and Luhansk (HRW 2014b) were under siege by Ukrainian forces in August 2014 prior to the Russian/separatist counterattack. Those cities and others nearby were heavily shelled by Ukrainian forces, damaging several hospitals and clinics, some severely, as documented by the OSCE SMM (2014). Because of the density of settlement in these urban and suburban areas, additional work is required to sort out the location of opposing forces and gather additional data, especially from the OSCE SMM daily event logs and other reporting. Findings to date indicate that multi-source assessments and cross verification is critical for detailing the timing and precise locations of damage to humanitarian infrastructure.

Expanding Research on State Capacity and Damage to Civilian Infrastructure

Better understanding the scope and consequences of damage to medical facilities, as well as the underlying reasons for their targeting, is a crucial component in developing a complete story of the connection between state capacity and legitimacy and how that connection can be degraded by outside forces. However, medical facilities constitute only a part of essential infrastructure for state service provision. In this final section of the paper, we outline our efforts to extend this study to other aspects of bureaucratic state capacity in education and elections.

Education

Over 80 countries have endorsed the Safe School Declaration, which seeks to protect students and educators living in regions of conflict and war by taking concrete measures to deter the military use of schools, end attacks on schools, and lessen student (particularly female student) fears of violence of sexual abuse by soldiers or armed groups (GCPEA 2018A). Signatories to the declaration, including the majority of NATO members, have agreed to leverage their positions to encourage all countries to adopt strong policies to refrain from the utilization of educational infrastructure for any military purposes (regardless of whether the facility is in use) and the targeting to schools, students, or educators. Damage to educational infrastructure not only places children in direct risk from conflict, it hinders the provision of education within communities,

denying children valuable access to the beneficial coping contributions school attendance provides during conflict.

Between 2013 and 2017 an estimated 1,700 attacks injured over 21,000 students and educators in conflict regions spanning 70 countries, including Ukraine (GCPEA 2018B), where assessments have detailed damages to schools, mining of regions near schools and the use of school buildings for military purposes (HRW 2015). Clear and detailed data on the location and severity of attacks on educational infrastructure in conflict zones are vexing (UNICEF 2013). While GCPEA estimations are widely viewed as the most comprehensive, they lack detailed documentation of verification procedures and locational information, openly calling for the need to further strengthen monitoring and reporting at the local and international level (GCPEA, 2018B). While assessing the number of attacks, sources do not yet agree on whether counts should focus on individual incidents, or upon the percentage of schools affected. Coordinated efforts, with standardized reporting could contribute to the generation of more comparative and consistent data. However, in a detailed assessment of the accuracy of the UN Monitoring and Reporting Mechanism (MRM) focused on attacks on schools, Bennouna and colleagues (2018) found that standardized, centralized reporting often undercounted events as many community members lacked access to reporting channels. Results from this study also point to challenges in gathering data on the precise locations of attacks in settings where anonymity is critical for individual or community safety.

Insert Figure 5 about here

Using the same methodology as our assessment of damage to healthcare facilities, we illustrate here (Figure 5) the impact of shelling on educational facilities in the Donbas region just for the year 2015. The map shows schools that were damaged by the fighting and those where damage was so significant that the school was unable to function. These data are preliminary and do not reflect the full extent of likely damage inflicted on these facilities, but the figure illustrates how we will move forward to track the effects of the war on school infrastructure.

Election Administration

Another critical component of civilian infrastructure in democratic societies is election administration. For elections to occur, facilities must be secured all over the country, and thousands of temporary civil servants must be engaged to conduct polling and count the votes. Prior to the annexation of Crimea and war in the Donbas, Ukrainian elections used over 33,000 polling sites and hundreds of thousands of poll workers every election. Since the conflict began, Ukraine has held two national elections in 2014, with two more scheduled for 2019. The impact of the conflict on elections is significant, with millions of voters disenfranchised because of their inability to access services due to annexation or occupation (Herron, Thunberg, and Boyko 2015).

Insert Figure 6 about here

Figure 6 shows how conflict has impeded the state in providing opportunities for citizens to vote. Each point on the map is a polling station that was closed during the

October 2014 parliamentary elections. The polling stations labeled in blue were closed for the entire election period because Ukrainian security services did not control the territory around them. The polling stations labeled in red were slated to be opened but were closed before or on election day due to threats of violence or other issues. The status of polling places not only gives us insight into the ability of the state to provide a safe and secure election environment, but also the status of other forms of civilian infrastructure because schools, hospitals, and other public facilities often serve as electoral precincts.

By expanding our data collection to additional forms of civilian infrastructure, we plan to more fully investigate how the Donbas War has degraded state capacity and better understand the implications for legitimacy.

Conclusion

In this paper, we inventoried and assessed the widespread damage to the medical care infrastructure and the implications that it has already had and will have on Ukrainians' quality of life. We suggested the challenges it presents to the Ukrainian government in re-establishing medical care and its legitimacy as a provider of basic social welfare services. We also explored which combatants were to blame for the damage. Considering the extent of destruction in the Donbas to healthcare, education, and electoral/governance infrastructure, we suggest that continued efforts to trace the timing, precise location, and the reporting of responsibility is required. Information on where and when the provision of core services is impeded, and how multi-source press reports may agree or differ in the attribution of blame, grants valuable insight into how residents view state capacity. It is a vital question as to how the Ukrainian state can successfully develop the capacity needed to maintain the loyalty of its citizens and restore legitimated control over its sovereign territory. Conversely, if Ukraine fails in that effort and, partially as a consequence, is forced to *de facto* cede territory to Russia or to breakaway quasi states aligned with Russia, the geopolitical implications in such a strategic region will be profound.
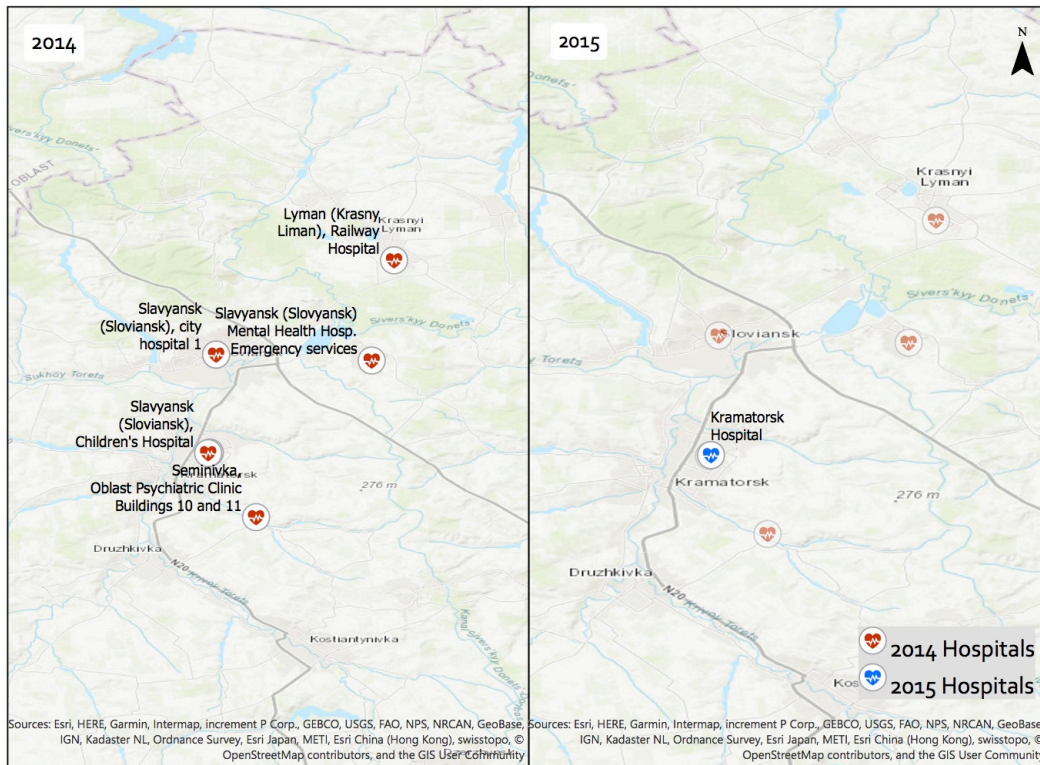
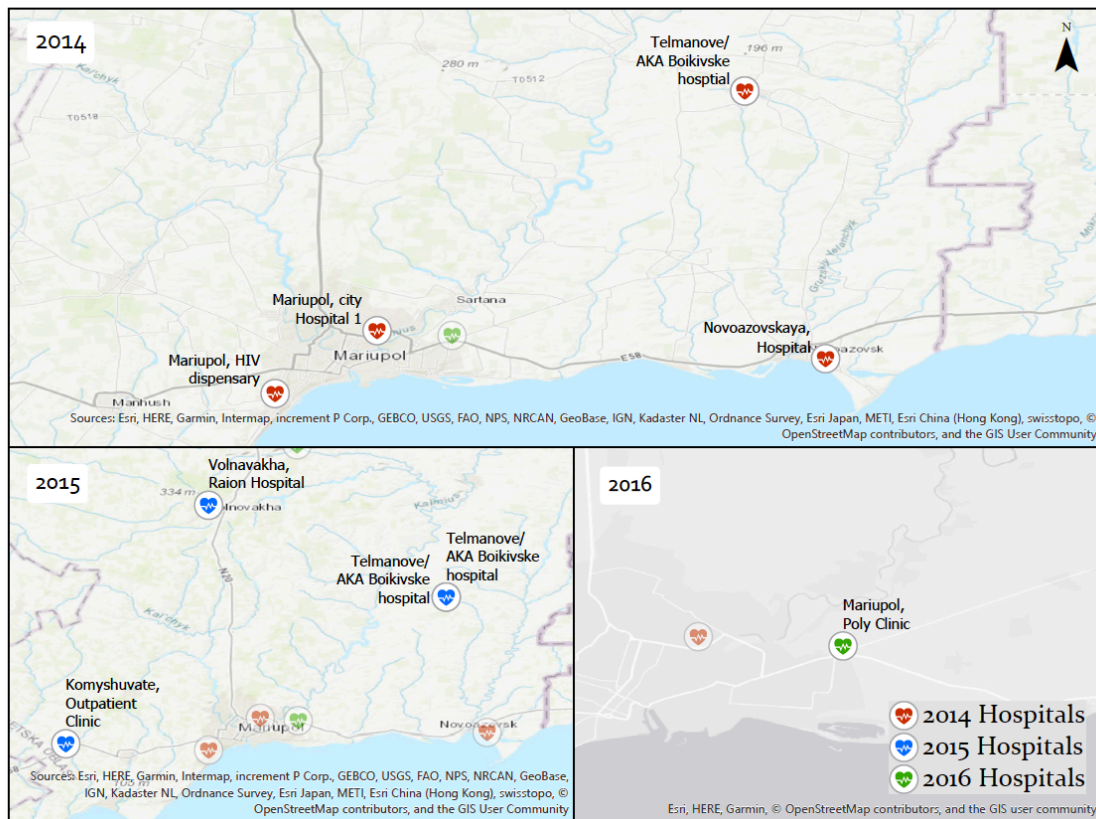**Figure 1: Attacks on Healthcare Facilities, 2014-2018**
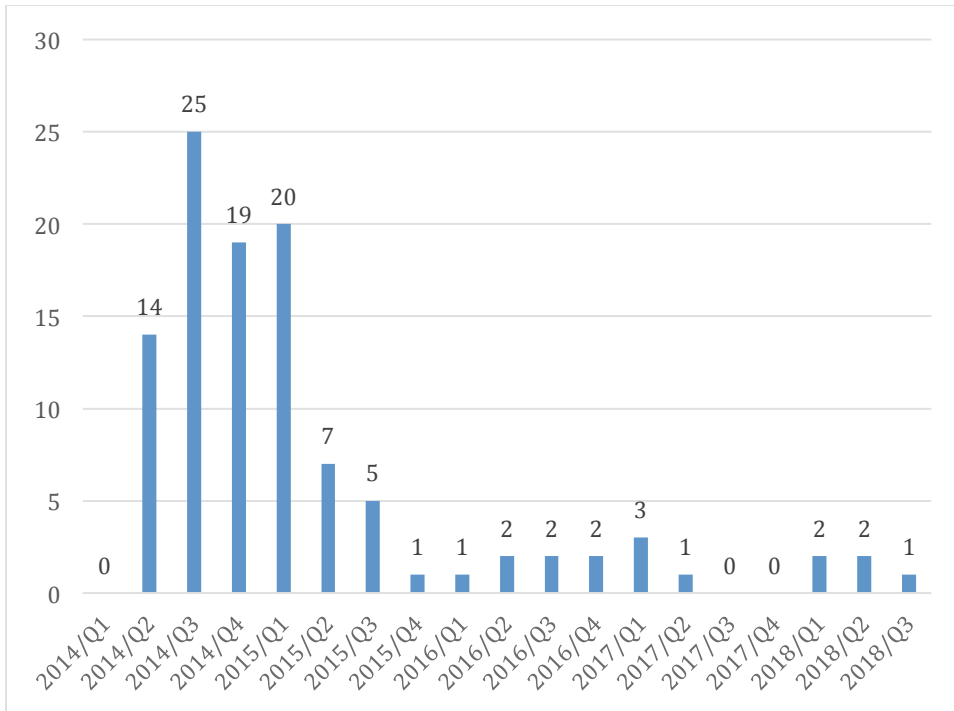
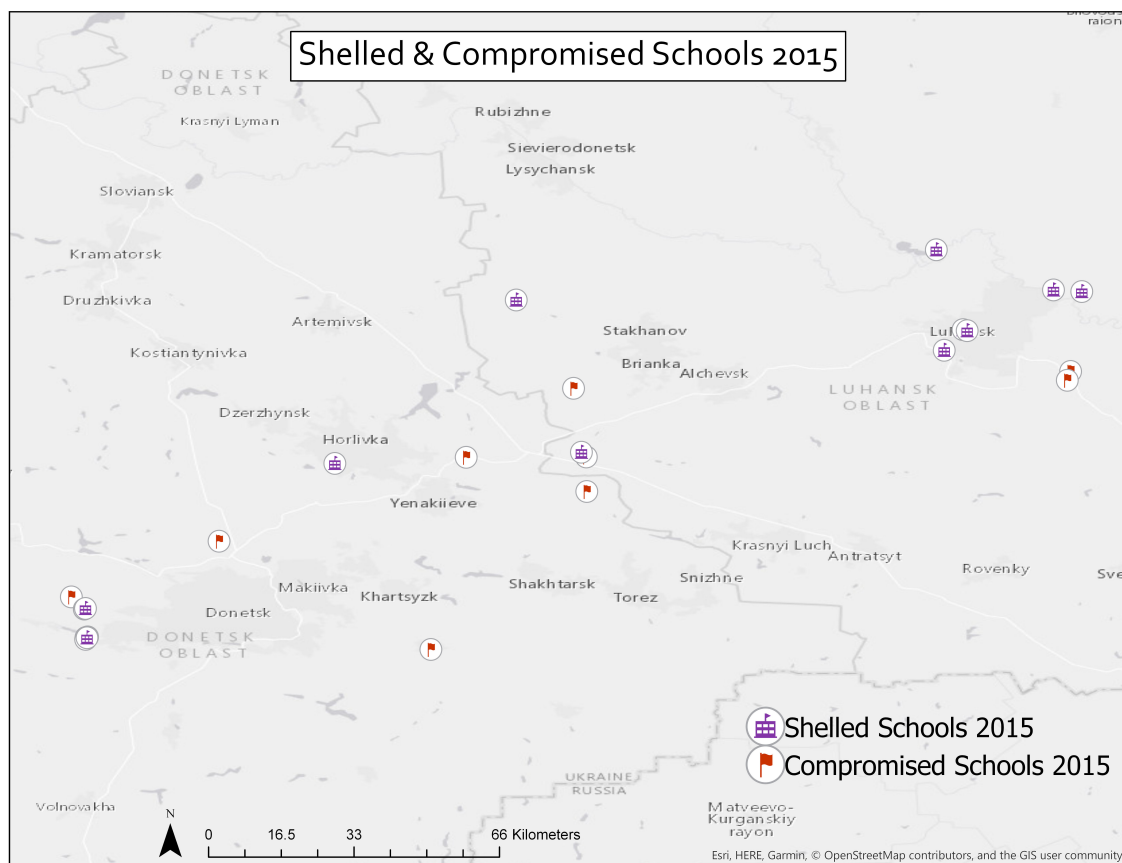**Figure 2: Quarterly Shelling Reports for Donbas Hospitals, 2014-2018**

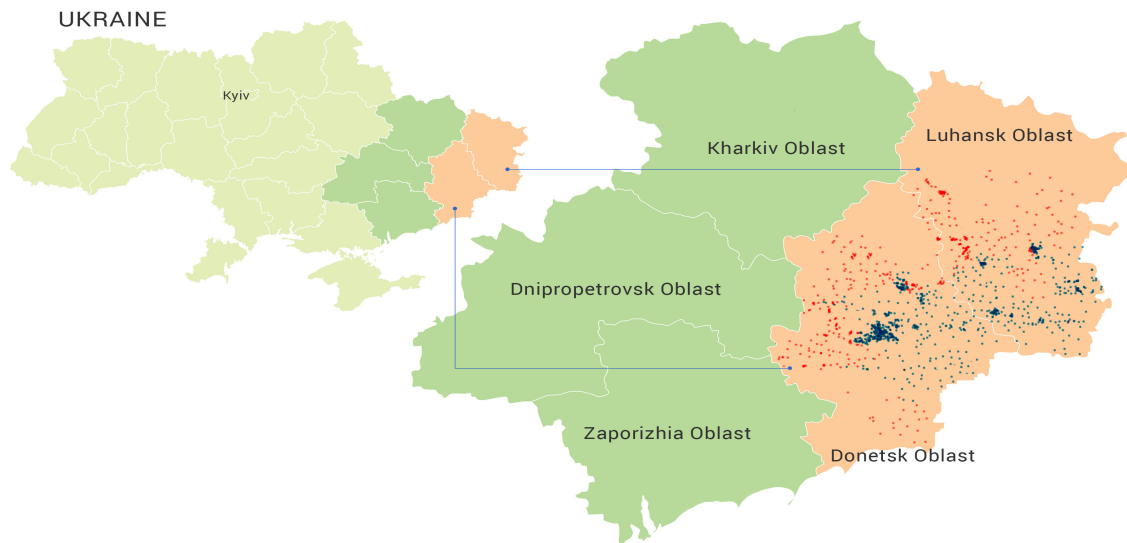**Figure 3: Slavyansk Area Hospital Attacks, 2014-2015**

Mariupol Area Attacks 2014-2016

Figure 4: Mariupol Area Hospital Attacks, 2014-2016

Figure 5: Shelled and Compromised Schools, 2015

Figure 5: Polling Station Status in the Donbas, 2014 Parliamentary Elections

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