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Anatomy of a Crisis: A Map of Attacks on Health Care in Syria

Methodology

When hospitals or health clinics are destroyed, the loss is far greater than the bricks and mortar of the buildings. Safe and protected spaces to seek routine and urgent medical attention are also lost. When medical workers are killed, the human toll is not just their lives, but also the exponential number of people who will suffer without treatment and the many lives that will be lost as a result. When these attacks on health care become as prolonged and widespread as they have in Syria, the consequences reach far beyond the individuals and facilities lost – the attacks reverberate across the civilian community, inciting fear that seeking medical treatment or going to a hospital will result in death, injury, kidnapping, torture, or imprisonment, both for the patient and the medical provider.

Words alone cannot convey the immensity of the health care crisis in Syria. The work conducted by Physicians for Human Rights (PHR) to visualize destroyed health infrastructure is intended to convey the magnitude and widespread nature of attacks on medical care in Syria and promote accountability for violations of international humanitarian law (IHL, see appendix for further information).

PHR Methodology for Collection of Data on Medical Facilities

PHR's team researched, documented, and corroborated attacks on medical infrastructure since March 2011. An "attack" is defined as a violent assault upon a facility resulting in any destruction, damage, or loss of the facility's function, equipment, or medical supplies. An attack can include bombing, shelling, artillery, car bombs, shooting, arson, or attack by armed personnel. PHR is mapping attacks on medical facilities¹ that were used for medical purposes at the time of attack, and therefore protected under IHL. Medical facilities used solely for military (non-medical) purposes at the time of the attack have not been mapped as incidents.

Researchers initially conducted Arabic and English language open source searches on the internet for reports of attacks on medical facilities in Syria using a variety of search terms. Once a report of an attack on a medical facility was found, PHR conducted a targeted search in both Arabic and English to find additional reports. A variety of sources were reviewed, including but not limited to: United Nations, governmental, news agency, and nongovernmental organization (NGO) reports; journal articles; dissertations; social media and video sites; blogs; TV news footage; and reports produced inside Syria from the government or non-state armed groups. The PHR team has reviewed over 14,140 sources in the course of its research, ultimately linking to over 1,140 sources (at least 680 reports, articles, and social media posts; 301 videos; and 227 photos). In addition to these, the team analyzed hundreds of other articles, posts, and reports that were related to an incident or attacks upon health care but did not provide enough specific information for PHR to deem usable. PHR has reviewed many more reports of attacks, but has mapped only those incidents it has been able to corroborate. There have been attacks on other facilities, especially nontraditional field hospitals² that have not been recorded on the map.

¹ Medical facilities include: hospitals, clinics, medical points, medical centers, pharmacies, dispensaries, and temporary field hospitals.

² A field hospital is an unofficial medical facility established to treat casualties on-site, ideally to stabilize patients so they can be safely transported to more permanent medical facilities. Field hospitals can be established in houses, basements, schools, mosques, or clinics, and are often unmarked for security reasons. Due to the targeting of medical facilities and security concerns inherent in war zones, field hospitals often are the only medical facilities functioning



PHR collaborates with the American Association for the Advancement of Science (AAAS), which provides and analyzes aerial imagery of hospital locations inside Syria. AAAS assesses high resolution satellite imagery of medical facilities in Syria for PHR, to potentially verify reports of destruction or damage to the facilities. The AAAS reports are highlighted in the Findings section.

The PHR team also sought information about attacks from medical organizations and medical personnel working inside Syria, and frequently relied upon these field sources to corroborate, correct, or supply additional information on particular attacks or facilities. Due to security reasons, PHR will not identify the field sources and refers to them as “medical field sources.”

The PHR team sorts and stores all collected data in a spreadsheet. The team has attempted to record as many details as possible, including: the medical facility name, town, and governorate; date(s) of attack; perpetrator; mode of attack; weapons used; material damage; injuries or casualties; history of the militarization of a facility or non-medical use; and hyperlinks to all sources relied upon which document the attack, including photographs and videos. In addition, the PHR team translated all Arabic written text into English and transcribed video footage from Arabic to English. For the sake of consistency, the PHR team created its own list of standardized Arabic transliterated spellings, based on a combination of popular spellings in the media and the Sada transliteration system.

PHR employs the CartoDB mapping platform. This platform provides interactive, customizable features and easily enables continual updating in real time. The map was created on CartoDB’s user interface and uses JavaScript programming to provide further custom functionality and design. These custom functions enable users to view attacks on medical facilities or personnel, attacks by year, as well as additional graphs illustrating the progression of attacks by month. The map provides additional links, including to a time lapse map of attacks on facilities, the PHR fact sheet on the health crisis in Syria, methodology that will enhance user understanding of the map’s content, and PHR’s research analysis and findings.

PHR Methodology for Mapping Attacks on Medical Facilities

Each team member independently and as a panel reviewed and evaluated every open source and field source that reported an attack. The team’s criteria for a credible medical field source or open source depended on the source’s or entity’s access to special knowledge of a facility or the Syrian health care system by virtue of mandate or circumstance; credible sources had to present relevant facts consistently and in a manner upon which PHR could reasonably rely. Data are considered credible if they give a clear, internally consistent representation of events that can be triangulated with other forms of data about those events. With each piece of data, PHR has employed a systematic two-tier analysis as to the credibility of both source and data content. Once a given source and report are deemed credible, a third tier of analysis is carried out to corroborate reports by triangulating, or comparing multiple sources, to identify consistencies or inconsistencies that raise concerns about the authenticity or veracity.³

If all sources regarding an alleged attack are consistent, PHR’s team further assesses the combination of sources in totality to determine whether or not to map the incident. The PHR team uses “reasonable belief” that an attack occurred as reported as its standard of proof. If multiple sources for an alleged attack reported conflicting information, a three-person panel reexamined the credibility and reliability of each source and determined whether to include it or exclude it from the map. During this process, the PHR team regularly communicated with field sources throughout Syria, Jordan, and Turkey – in both Arabic

in an area under attack. As a result, it is often impossible to transport patients from a field hospital to a better-equipped facility and medical personnel must resort to performing intensive surgeries in makeshift operating rooms. Because their locations must generally remain secret for the safety of patients and staff alike, PHR was not able to corroborate the coordinates of field hospitals.

³ Such inconsistencies may include conflicting reports on perpetrator, method of attack and weapons used, date of attack, motive for attack, and whether a facility still had a medical function.



and English – via Skype, telephone calls, and emails. Where possible, PHR consulted with geographically-relevant field sources to corroborate attacks and to obtain additional information.

The team strove to corroborate all incident reports with at least three independent sources. However, when an incident report was supported by two credible and reliable sources with strong data, it was included. In cases in which sources were known to employ strict methodology and have direct access to information, PHR chose to make an exception to rely upon a sole source, as was the case with the UN Commission of Inquiry’s reports, which are based on multiple sources. PHR has noted those cases in which a single source supports the incident. The PHR team systematically reviewed all sources, noting if there was lack of detail, unknown reliability or credibility of the source itself, and obvious bias or lack of objectivity. Videos were coded to establish a wide range of data points, including location, use, and damage of facility. Extra scrutiny was applied to the following videos: the quality of light or sound is very low such that it is difficult to identify spaces or people; those in which there is no identification of the date or place; those with no clear sign that the building is a hospital or clinic; those in which there is no indication of medical use, such as interior signage, medical equipment, or patients; those in which there is no indication of attack; those that have been subject to post-production editing; those identifiably designed to promote a given military unit (as made clear through their narratives and staging); and those in which the date of filming is far removed from the date of the alleged incident. If the reviewing panel did not achieve consensus as to the reliability and credibility of a source, that source was excluded.

In no way does consulting or linking to a source indicate that PHR supports the message promoted by the source – it only indicates that the source is considered to have valuable information regarding an attack, from which we may reasonably conclude an incident occurred. PHR notes that many of the sources consulted may contain biases and politically-charged messages. While PHR sought to find neutral sources, the team recognizes that there are very few reliable, detailed, and unbiased sources reporting from within Syria. PHR is aware of these biases, and use of a source does not endorse any political messages a source may espouse. PHR employs these sources only for the data that can be drawn about attacks on health care.

PHR Methodology for Corroborating Attacks on Medical Facilities by Russian Forces

Shortly after Russia became militarily involved in the Syrian conflict on September 30, 2015, PHR began receiving reports of attacks on medical facilities perpetrated by Russian forces. Prior to Russia’s military involvement in the conflict, the Syrian government and US-led international coalition were the only forces flying aircraft in Syria. It was easy to differentiate between Syrian and international coalition airstrikes based on locations of attacks, warplanes used, and munitions used. The more recent Russian airstrikes, however, are more similar to and thus often harder to distinguish from Syrian government airstrikes.

As PHR is creating documentation that can be used years from now to hold the perpetrators of these violations to account, PHR seeks to distinguish between airstrikes launched by Russian and Syrian government forces. For airstrikes launched after September 30, 2015, PHR identified perpetrators by examining the following sources and factors:

- Reports from the Russian Ministry of Defense: These public reports can confirm that Russian forces were conducting airstrikes on the same dates as and in the same locations where attacks on medical facilities occurred. However, as these reports do not provide a comprehensive list of each airstrike carried out by Russian forces, they cannot be used to rule out the possibility of Russian strikes in a specific area on a specific date.
- Open source reports: Numerous open source reports were reviewed on the day of an attack, two days before, and two days after to determine whether sources were reporting only Russian, only Syrian government, or both Russian and Syrian government airstrikes throughout the city or town during the time frame in question. If all credible sources analyzed in this research reported airstrikes by a single air force, their totality tends to suggest that the reported airforce was in fact the only one conducting airstrikes in the area at the time. However, if credible sources analyzed in the research reported



multiple air forces conducting airstrikes in the area during the time period, a specific perpetrator could not be identified in this manner.

- Testimony from doctors and sources on the ground: Field sources explain they are able to visually identify newer Russian aircraft as they are different colors and shapes than the older warplanes used by the Syrian government. Weapons experts who have identified Russian warplanes in Syria support these claims.⁴
- Patterns of attack: Field sources explain that Russian forces often fly two or more warplanes side by side as a team effort, which the Syrian government does not have the capability of doing. Field source also report that there often is no warning of Russian strikes, as the newer Russian warplanes are much quieter than the Syrian government's older planes.
- Types of weapons used: Sources consistently report that the weapons used in Russian airstrikes are much more forceful and cause more damage than the munitions used by the Syrian government.

PHR only reported an airstrike as being carried out by either Russian or Syrian government forces after corroborating at least three data points from the above list of sources and factors. If three data points could not be confirmed but PHR could determine the airstrike was not carried out by US-led international coalition forces, PHR reported the attack as being perpetrated by either Russian or Syrian government forces.

PHR Methodology for Collection of Data on Attacks on Medical Personnel

PHR utilized open source data and field sources to document the death of 786 medical personnel killed in Syria since March 2011. PHR drew primarily upon the Violations Documentation Center of Syria (VDC) English-language website, media accounts, and social media, corroborating and supplementing this information with data gathered from PHR's network of physicians in and surrounding Syria. PHR chose to exclude from our data set any documented death identified as a "non-civilian" medical worker,⁵ as medical workers engaged in combat lose protected status under IHL.

PHR's research team collected data from a wide variety of open sources, including United Nations, government, local and international NGO reports; local, regional, and international news sources; journal articles; Facebook and blog posts; Twitter feeds; and YouTube videos. PHR also conducted interviews and received information and photographs from individuals and organizations involved in providing medical services in Syria and neighboring countries with refugee populations. PHR's English and Arabic-speaking analysts reviewed materials in both English and Arabic.

To collect a comprehensive data set of medical professionals targeted in Syria, PHR queried the VDC English-language database.⁶ Searches on VDC using medical profession terms were the primary source of data. As some individuals were cross-listed in the VDC database under multiple professions, such as "Medic-Nurse," names and dates of death were compared to eliminate duplicates across professions. The PHR team documented deaths of medical workers reported by field sources, news outlets, social media, and NGO reports. Names from non-VDC sources were compared with the VDC names to eliminate duplication across sources. PHR recorded all available information regarding each identified person's name, medical specialty, date of death, reported cause of death, province of origin, location of death, and source from which the information was obtained. PHR compiled data on the following medical specialties: doctor, nurse, medic, ambulance worker, pharmacist, dentist, veterinarian, dentistry student, medical student, pharmacy student, lab technician, and veterinary student. PHR chose to include nontraditional medical personnel such as veterinarians, dentists, and students because PHR has received credible

⁴ Chris Biggers, "Confirmed: SU-25s Join Russia's Flankers in Latakia," *bellingcat*, September 21, 2015, <https://www.bellingcat.com/news/mena/2015/09/21/confirmed-su-25s-join-russias-flankers-in-latakia>.

⁵ The VDC explains on their website that "non-civilians" include officers, defected soldiers, and volunteers of the FSA, other opposition brigades and battalions that do not directly affiliate with the FSA, and foreign fighters.

⁶ Violations Documentation Center in Syria, *Martyrs*, <http://www.vdc-sy.info/index.php/en/martyrs> (last visited March 28, 2017).



reports indicating that these personnel often treat patients in medical facilities due to the lack of licensed physicians and nurses in many localities. From the database, PHR identified those medical providers who had died from bombings, shelling, shootings, executions, torture, and chemical weapons attack. PHR then created its own cause of death classification system using categories provided by the VDC⁷ in which similar causes of death were grouped together.

The categories are identified as the following:

Shelling and bombing	Includes killing by artillery, tank, mortar, rocket launchers, long distance missiles, barrel bombs, and cluster bombs dropped by military warplanes and car bombs.
Field execution	Indicates targeted killings during raids on homes, villages, clinics, and military checkpoints.
Kidnapping-Execution	Indicates when an individual is kidnapped and killed by perpetrators who are not clearly linked to any official government or security body. Perpetrators can include pro-government Shabbiha militia and forces of the pro-government National Defense Army, consisting of civilians fighting alongside the government.
Detention-Execution	Indicates when an individual is detained and killed by an official security body, or when the killing occurs in a secret detention center or a security branch.
Shooting	Includes killing by guns and snipers during raids and clashes, and shots targeting ambulances and medical personnel while providing medical aid.
Torture	Indicates an individual was first detained by an official security body or kidnapped by a perpetrator with no link to an official security body, and then tortured to death.
Prevented from seeking medical help	Indicates when an individual dies due to lack of access to medicine, medical provider, or a hospital.
Chemical & toxic gases	Indicates deaths caused by exposure to chemical and toxic substances.
Other or unknown	Unknown cause of death.

Limitations of Research

Collecting, analyzing, and corroborating the information contained in the map is subject to the difficulties inherent in reporting from conflict zones, and PHR recognizes that selection bias occurs from incomplete information. Many attacks are not reported, especially those against field hospitals and hospitals in more remote areas. This map shows only those attacks on medical facilities that PHR has been able to corroborate between March 2011 and October 30, 2016. PHR will continue to update the map from November 1, 2016 onward.

PHR recognizes that it cannot know of, let alone corroborate, all attacks upon medical facilities. It acknowledges that even objective sources may lack detail on how a facility was attacked or the extent of damages. Syria is extremely dangerous. Accordingly, there is limited access to some areas and resulting underrepresentation. Lack of reporting in certain areas may lead to selection bias, compounding possible biases of those who curate open source information about attacks on medical infrastructure in Syria through information aggregators such as websites and newsfeeds. Other sources of selection bias include political affiliation of reporting sources: PHR's current contact network inside Syria includes numerous organizations and individuals who support the Syrian opposition. Geographically, the team's current field source network is based primarily in Jordan and Turkey. The team hopes to combat this selection bias by

⁷ Violations Documentation Center in Syria, *About VDC*, <http://www.vdc-sy.info/index.php/en/about> (last visited March 28, 2017).



continuing to develop contacts within the medical community, reaching a broader array of informants across the political spectrum in a wider geographic area both within Syria and in the neighboring states with refugee populations. The team has piloted an information request on the title bar of the map in order to gather more information in less reported locations.

PHR does not have access to a complete history detailing the use of facilities at the time of attack. In some cases, this lack of access resulted in uncertainty as to whether a facility may have lost its medical purpose, and therefore its special protections under IHL. PHR has attempted to research the medical function or militarization of each hospital, since militarization of medical spaces affects civilian access to health care and constitutes a violation of the duty to respect and protect hospitals under IHL, as detailed in the appendix below.

In the process of conducting regular data cleaning, the PHR team has identified and corrected a total of 13 duplicate or non-civilian entries. On a list of over 700 deceased medical personnel, these 13 represent a minor correction. PHR monitors and cleans datasets to ensure the highest possible level of accuracy; however, minor errors occur due to the use of multiple transliteration systems and the broader difficulties inherent in documenting deaths during an ongoing conflict.

Appendix

[Legal Framework: A detailed summary of International Humanitarian Law \(IHL\) as applied to medical facilities and personnel](#)

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