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

For an updated version of the methodology, see: https://s3.amazonaws.com/PHR_syria_map/methodology.pdf

For an updated version of the findings, see: https://s3.amazonaws.com/PHR_syria_map/findings.pdf

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).

Findings

PHR has mapped 150 attacks upon 124 separate medical facilities in Syria between March 22, 2011 and March 31, 2014. Each incident entry represents a single discrete attack upon a medical facility. 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 facilities 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. Of the 150 attacks, PHR has documented that 136 attacks – or 90 percent – were conducted by the Syrian government, 10 attacks – or 7 percent – were conducted by opposition forces, and we were unable to confirm who was responsible in four cases. Only two attacks occurred in 2011; 88 attacks happened in 2012, with the greatest number occurring in August and September 2012. In the first three months of 2014, 14 attacks have already been corroborated. Aleppo and Rif Dimashq (Damascus suburbs) have reported the greatest number of attacks in Syria, with 35 in each location. 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 hospitals,¹ that have not been recorded on the map.

¹ 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 in an area under attack. As a
The majority of the medical facility attacks were targeted attacks, meaning that the facilities were deliberately chosen for destruction, in violation of IHL. On 93 occasions, weapons that can be used indiscriminately to target a specific location, such as mortars, missiles, rockets, car bombs, guns, and arson, were used to attack hospitals. Twenty hospitals were hit multiple times, including Dar al Shifa and Azaz national hospitals in Aleppo and al Saeed private hospital in Deir ez Zor, which were repeatedly targeted until they were completely destroyed or forced to close. At least 24 different medical facilities that were attacked are isolated from any other buildings in the vicinity, providing additional evidence of the intentional nature of these attacks. On one occasion the Syrian government announced on the news that they had targeted a field hospital and killed a number of “terrorists,” including a physician.\(^2\)

Thirty-six other attacks on 25 separate facilities were made in densely populated areas without taking the necessary precautions to protect and respect medical facilities, personnel, patients, or civilian life, as IHL mandates. At least four hospitals were destroyed or damaged by government forces when indiscriminate weapons – such as barrel\(^3\) and cluster bombs\(^4\) dropped from planes or helicopters – were used in civilian areas, in violation of the principle of distinction.\(^5\) Indiscriminate weapons typically cannot be aimed at specific targets and therefore do not distinguish between civilian or military targets. On at least three occasions, schools, bakeries, and mosques were also destroyed in the immediate vicinity. Only the Syrian military has planes and helicopters and is the sole user of barrel and cluster bombs. PHR has no evidence that any distinction was made to protect hospitals or medical facilities, and no advance warning of the attack was ever given to patients and medical personnel inside the hospitals, as IHL requires.

The Syrian government’s attack on the country’s health system has been as focused upon medical personnel as on facilities, supporting the argument that this tactic represents a widespread and systematic governmental policy. Between March 2011 and April 30, 2014, at least 468 civilian medical personnel were reportedly killed. Medical personnel killed while providing care have predominantly lost their lives during attacks upon medical facilities. For example, in late January 2014, Dr. Hosam Jarroud was overseeing a polio vaccination campaign at Shifa hospital in Saraqib, Idlib. Government forces targeted the hospital with shelling, killing Dr. Jarroud and damaging the hospital.\(^6\)

---

\(^2\) http://sana.sy/ara/389/2014/01/26/ara/336/2014/01/31/525394.htm

\(^3\) A “barrel bomb” is a crude weapon made from a low-cost cylinder filled with explosives, shrapnel, or oil (which is then ignited) that is dropped from a helicopter or plane. Reports indicate that they vary in weight between 200 and 2,000 pounds, potentially even heavier. Barrel bombs are most commonly dropped from high altitudes, restricting the user’s ability to target with discrimination. In Syria, barrel bombs have proven very destructive, breaking into thousands of small fragments upon impact. http://brown-moses.blogspot.co.uk/2013/12/syrias-barrel-bomb-technology-relative.html

\(^4\) A “cluster bomb” is an illegal munition that is designed to disperse or release explosive submunitions each weighing less than 20 kilograms. http://www.clusterconvention.org/files/2011/01/Convention-ENG.pdf

\(^5\) The principle of distinction in IHL requires military and armed groups to distinguish between civilians/civilian objects and military personnel/objects. It is never lawful to target civilians or civilian objects such as hospitals, schools, mosques.

Medical personnel have also been arrested, disappeared, imprisoned, tortured, or executed. In the case of Hasan Ahmad Azhari Mawalid, a fifth-year pharmacy student died in his second month of detention on May 17, 2012. His family was only notified of his death a month later on June 11, 2012. Medical personnel are often arrested and sentenced to years in prison for carrying out their ethical duties – equipping hospitals, treating patients, and conducting first-aid training in besieged areas. These arrested medical personnel have been tried in a military field court, a secret court that does not announce a ruling or allow defendants to have an attorney. It is a violation to try civilians in military courts, and due process and fair trial protections are nonexistent in these cases.

Among doctors, nurses, medics, pharmacists, ambulance workers, veterinarians, dentists, dentistry students, medical students, pharmacy students, and veterinary students, the highest percentage killed were doctors (34 percent), followed by nurses (20 percent). Forty-one percent of medical workers were killed by shelling and bombing and 31 percent by shooting. Over 100 health professionals have been executed or tortured to death by government forces. The governorates most affected were Homs and Rif Dimashq, with 77 and 78 reported medical personnel deaths. In 2012, 183 medical personnel were killed; in 2013, at least 184 were killed. In the first four months of 2014 alone, 49 medical personnel were killed.

**PHR Methodology for Collection of Data on Medical Facilities**

PHR’s team researched, documented, and corroborated attacks on medical infrastructure from March 2011 until March 31, 2014. 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 opposition groups. The PHR team has reviewed over a thousand sources in the course of its research, ultimately linking to over 200 sources (at least 100 reports, articles, and social media posts; 87 videos; and 25 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 collaborated with the American Association for the Advancement of Science (AAAS), which initially provided and analyzed aerial imagery of five hospital locations inside Syria. AAAS was able to corroborate that three hospitals had been damaged, two of the hospitals did not appear to suffer aerial damage, and aerial imagery was unavailable for one location.

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 will refer to them as “medical field sources.”

---

1. PHR local source, information received Apr. 20, 2014, translated by PHR from Arabic into English, on file with PHR.
2. Ibid
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 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, and methodology that will enhance user understanding of the map’s content.

PHR Methodology for Mapping Attacks of 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.\(^\text{10}\)

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 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

\(\text{10}\) 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.
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 identifiable 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 Collection of Data on Attacks on Medical Personnel**

PHR utilized open source data and field sources to document the death of more than 450 medical personnel killed in Syria between March 2011 and April 30, 2014. 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, 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 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. 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,

---

11 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.

and veterinary student. PHR chose to include nontraditional medical personnel such as veterinarians, dentists, and students because PHR has received credible 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 VDC\textsuperscript{13} and grouped together similar causes.

The categories are identified as the following:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelling and bombing</td>
<td>Includes killing by artillery, tank, mortar, rocket launchers, long distance missiles, barrel bombs, and cluster bombs dropped by military warplanes and car bombs.</td>
</tr>
<tr>
<td>Field execution</td>
<td>Indicates targeted killings during raids on homes, villages, clinics, and military checkpoints.</td>
</tr>
<tr>
<td>Kidnapping-Execution</td>
<td>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 Shabiha militia and forces of the pro-government National Defense Army, consisting of civilians fighting alongside the government.</td>
</tr>
<tr>
<td>Detention-Execution</td>
<td>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.</td>
</tr>
<tr>
<td>Shooting</td>
<td>Includes killing by guns and snipers during raids and clashes, and shots targeting ambulances and medical personnel while providing medical aid.</td>
</tr>
<tr>
<td>Torture</td>
<td>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.</td>
</tr>
<tr>
<td>Prevented from seeking medical help</td>
<td>Indicates when an individual dies due to lack of access to medicine, medical provider, or a hospital.</td>
</tr>
<tr>
<td>Chemical &amp; toxic gases</td>
<td>Indicates deaths caused by exposure to chemical and toxic substances.</td>
</tr>
<tr>
<td>Other or unknown</td>
<td>Unknown cause of death.</td>
</tr>
</tbody>
</table>

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 March 31, 2014. PHR will continue to update the map from April 1, 2014 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 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 will also pilot an information request system from the Eastern governorate, al Hassakeh, in which PHR has found no reports of attacks.

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.

Appendix

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

For further information regarding the satellite imagery analysis, see the AAAS report "Assessing the Status of Medical Facilities in Syria."

Acknowledgments

Physicians for Human Rights (PHR) is indebted to the Syrian medical workers who shared their experiences with our team, and who have collected documentation for this project. This work would not have been possible without their courage and support. For their protection, they must remain anonymous. We especially thank one particular Syrian doctor who has generously given his time to this project.

PHR acknowledges the following team members who contributed substantially to the conceptualization and production of this map: Erin Gallagher, MA, PHR director of emergency investigation and response; Adrienne Fricke, JD, PHR Syria advisor; Elise Baker, PHR consultant; Marissa Brodney, PHR senior program associate; Widney Brown, JD, PHR director of programs; Stefan Schmitt, MS, PHR director of the international forensic program; and PHR interns Alexander Schinis, Samirah Majumdar, Nicholas Teodoro, Tyler Bellstrom, Hadley Corinne Griffin, and Alla Akselrod.

PHR would also like to thank Beth Holland, Ofilio Mayorga, and Andrew Loewenstein for providing expertise and framing on International Humanitarian Law; Dr. Phuong Pham of Harvard Humanitarian Initiative for insight into data acquisition and sorting in the early phase of our research; American Association for the Advancement of Science (AAAS) for aerial imagery and analysis; the many NGO collaborators who helped us to refine our vision for this map; CartoDB for providing a platform for us to display this data powerfully; and Beveridge Seay, Inc. for developing the mapping design.

The methodology has benefited from external review by Catherine DeAngelis, MD, MPH, PHR board member, University Distinguished Service Professor Emerita, professor emerita at Johns Hopkins University School of Medicine (Pediatrics) and School of Public Health (Health Service Management), and editor-in-
chief emerita of the Journal of the American Medical Association (JAMA); and Michele Heisler, MD, MPA, PHR volunteer medical advisor, PHR board member, professor of internal medicine and health behavior and health education at the University of Michigan Medical School and research scientist at the Ann Arbor VA’s Center for Clinical Management Research.