

Reverberating effects of explosive weapons on the health system in Yemen

March 26, 2021 marked the sad 6th anniversary of the war in Yemen. According to the UN, the humanitarian crisis will continue to worsen throughout 2021.

Throughout the six years of conflict, Yemen has been particularly badly affected by the massive use of explosive weapons. **Bombing and artillery fire has not only had a direct and direct impact on civilians, but has also destroyed infrastructure and systems that civilians depend upon to survive.**

The importance of public services and infrastructure in the midst of a crisis cannot be underestimated. This is even clearer as the world struggles with the COVID-19 pandemic. Public health, the provision of safe water, the capacity to deliver food to a population, and the ability to freely move and transport goods or people are critical services for survival. The destruction of essential infrastructure and services creates reverberating effects that disrupt all aspects of life, including housing, food security, health and livelihoods, while exacerbating displacement.

These long-term effects from the use of explosive weapons continue to cause additional casualties and increase the long-term vulnerability of populations.

In Yemen, **50% of health facilities are now damaged as a result of the conflict.** Since 2015, there have been 169 confirmed attacks on health facilities.⁽¹⁾ In addition, key transports hubs have been destroyed or made unsafe due to contamination by unexploded explosive weapons. As a direct result, **critical medical supplies and medicines are not delivered.**

Even the threat of contamination by unexploded ordnance restricts patients from coming to health facilities when needed. Some patients reaching HI-supported medical facilities had a journey of up to 16 hours to reach the nearest health facility. Yemen cannot afford the severe and long-lasting effects of explosive weapons on health facilities while **20.1 million people lack access to adequate healthcare.**

KEY FACTS 2021⁽²⁾

- In Yemen, 20.7 million people are in need of humanitarian assistance, representing 66% of the population,
- 49 conflict frontlines instead of 33 in 2020,
- 51% of the health infrastructure is still functional. Only 15% of the functional health system has been able to redirect to the fight against COVID-19.⁽³⁾



Aden, destruction by airstrikes. October 2017. © HI

1. UNOCHA, February 2021, Humanitarian Needs Overview: https://reliefweb.int/sites/reliefweb.int/files/resources/Yemen_HNO_2021_Final.pdf

2. Ibid.

3. Statement by the Humanitarian Coordinator for Yemen, 26 October 2020: <https://reliefweb.int/report/yemen/statement-humanitarian-coordinator-yemen-26-october-2020-attack-hospital-taizz-injuries>

Explosive weapons: effects far beyond the impact zone

Explosive weapons are a category of weapons that project an explosive blast, heat, and fragmentation around a point of detonation.

⁽⁴⁾ These include aircraft bombs and missiles, artillery shells, mortars, and rockets, and multi-barrel rocket launchers, as well as improvised explosive devices (IEDs). These weapons are often launched from airborne vehicles such as airplanes, helicopters, and drones, leading to high dispersal areas and ineffective targeting. They may also be launched from ground-based vehicles or by hand. In Yemen, nearly every form of explosive weapon has been used.⁽⁵⁾

Explosive weapons with wide area effects

Reverberating effects and consequences over decades

Combined effects in a humanitarian crisis

Bombs do not fall in isolation. In Yemen, the humanitarian consequences caused by explosive weapons with wide area effects are compounded by a pre-existing economic and social context that is already extremely precarious. In fact, the bombing exacerbates existing fragilities that are already influencing the crisis in the country. Economic hardship, social context, barriers to access, food and health security were all pre-existing factors that the conflict exacerbated: the systemic consequences of explosive weapons with wide area effects used in populated areas continues to increase the vulnerability of the population.

Reverberating effects and systematic consequences

Reverberating effects are the long-term impacts of explosive weapons use. The term captures effects beyond the initial high-pressure blast wave caused by the detonation of explosive weapons. Often understood as tertiary effects or indirect effects, these reverberating effects capture the extent of damage that occurs after the bombing.

Reverberating effects include damage to systems and structures such as civilians'

are devastating because of their large blast radius and fragmentation effect, inaccuracy of the delivery of the weapons, and the frequent practice of simultaneously releasing multiple explosive weapons munitions across an area. These wide area effects cause death, injury, and wide-scale destruction of infrastructure in areas far beyond the initial point of impact. This ensures that even if weapons are aimed at military targets, the use of such weapons in villages, towns, and cities will likely risk indiscriminate civilian casualties and disproportionate damage to vital infrastructure.

homes, transportation networks, water and sanitation systems, electricity and power grids, telecommunications systems, hospitals and health facilities, and public buildings. It also entails the impact caused by the lack of access to services that occurs after the destruction of facilities or infrastructure involved with health, education, cultural and religious practices, livelihoods, and food security. These long-term impacts can affect civilians for decades after the explosive weapons event. The legacy of contamination by unexploded ordnance from explosive weapons, as well as forced displacement due to insecurity or the destruction of services, are also reverberating effects caused by the use of explosive weapons.

When infrastructure is limited or resources such as water or food are scarce, the potential impact of explosive weapons is amplified.⁽⁶⁾ Yemen has long faced structural challenges concerning water scarcity, food insecurity, and poverty. The Group of Eminent Experts on Yemen (GEE) have noted that « the destruction and damage the conflict has caused to the already limited infrastructure and access to basic services, such as medical care, education and justice, have significantly affected the resilience of vulnerable communities. »⁽⁷⁾

Destruction and Disruption to Health Services

Health facilities damaged through the wide area effects of explosive weapons have directly reduced the quality of healthcare available to the Yemeni population. When facilities are destroyed, health services are interrupted. Furthermore, the destruction of other infrastructure such as roads endangers both the population's access to services and the medical supply chain necessary to keep hospitals operating.

Since the beginning of the conflict, medical

facilities have been directly attacked at least 169 times. Mwatana for Human Rights has documented 35 aerial attacks on 32 health facilities across 10 governorates in the period between 2015 and 2018.⁽⁸⁾ Sa'ada was the most affected governorate, with 27 attacks on health facilities. **Amongst the many incidents affecting health services, the following are examples of when explosive weapons use resulted in restricted access to lifesaving medical services in Yemen.**

🔍 Hayden Hospital, Sa'ada governorate (26 October 2015):

An MSF-supported hospital in Hayden District, Sa'ada, in northern Yemen, was destroyed after 2 hours of airstrikes in October 2015. Damage to the hospital included the destruction of the inpatient and outpatient departments, the maternity ward, the lab, and the emergency room. Hayden Hospital is located in one of Yemen's least-served governorates and a region characterised by a lack of public services. On average, this hospital treated 200 war-wounded people per month in the emergency room. As the only hospital within an 80-kilometre radius, the reverberating impact from the loss of this hospital left 200,000 people with no access to lifesaving medical care.⁽⁹⁾

🔍 Abs Rural Hospital, Hajjah governorate (15 August 2016):

Another MSF-supported facility in Hajjah governorate in northwestern Yemen was hit by an aerial bomb in August 2016. The attack destroyed the emergency room and caused significant structural damage to the building. Abs hospital was the centrepiece for mass casualties in the region and the sole hospital designed to serve civilians in the area, with a catchment of more than 150,000 people.⁽¹⁰⁾ The hospital was shut down for 3 months, denying the population access to care.⁽¹¹⁾ Without the Abs hospital surgical centre, the next available option for civilians was Hajjah, which is 100 km from Abs.

🔍 Al Mokha Hospital (6 November 2019):

This MSF-supported hospital was partially destroyed in November 2019 when missiles hit a military warehouse near the hospital. The wide area effects of the missiles destroyed the hospital and pharmacy. The hospital provided emergency surgical care for patients suffering from conflict-related injuries, as well as other necessary surgical emergencies such as caesarean operations for complicated deliveries. The MSF hospital had been the only free-of-charge facility offering such services for civilians in the Mokha area. Since January 2019, the hospital had treated 1,787 patients and performed 2,476 surgical procedures, including 201 caesarean sections.⁽¹²⁾ Operations were moved to Aden, as the site cannot be re-opened until demining activities have cleared the area of contamination.

🔍 Al Jafra Hospital and Al Saudi Field Hospital (7 February 2020):

On 7 February 2020, the Al Jafra Hospital and Al Saudi field hospital in Majzar District in Marib were hit by artillery shells.⁽¹³⁾ The hospitals, located 75 kilometers northwest of Marib City, serve a population of about 15,000, including a high proportion of displaced people. The facilities have been badly damaged, including the intensive care unit, occupational therapy unit, inpatient unit, and the pharmacy at Al Jafra Hospital, which is the main hospital in the area. The nearby Al Saudi field hospital, a mobile clinic, was structurally damaged.

4. ICRC, June 2016, Explosive weapons in populated areas – Factsheet, https://www.icrc.org/en/download/file/23879/4264_002_factsheet-explosive-weapons_2.pdf

5. AOAV, 2016, « Wide-Area Impact: Investigating The Wide-Area Effect of Explosive Weapons », p. 1. : <https://aoav.org.uk/wp-content/uploads/2016/03/Wide-Area-Impact-explosive-weapons-in-populated-areas.pdf>

6. For more information, see UNIDIR's work on developing a framework: Wille Christina and John Borrie, 2016, « Understanding the Reverberating Effects of Explosive Weapons A Way Forward », p. 2 : <https://www.unidir.org/publication/understanding-reverberating-effects-explosive-weapons-way-forward>

7. GEE, 2019, « Situation of human rights in Yemen, including violations and abuses since September 2014 » A/HRC/42/17, p. 5 : <https://www.ohchr.org/EN/HRBodies/HRC/YemenGEE/Pages/Index.aspx>

8. Mwatana, 2020, « I ripped the IV out of my arm and started running: Attacks on Health Care in Yemen », p. 33 : <https://mwatana.org/en/i-ripped-iv-out-of-my-arm>

9. Human Rights Watch, 2015, « Yemen: Coalition Airstrikes Hit Hospital Credible, Impartial Inquiry Needed into Attack », Human Rights Watch, 27 October 2015 : <https://www.hrw.org/news/2015/10/27/yemen-coalition-airstrikes-hit-hosp>

10. MSF, 2017, « Crisis update - January 2017 », Crisis Update. [https://www.msf.org/yemen-crisis-update-january-2017\(55\)](https://www.msf.org/yemen-crisis-update-january-2017(55)).

11. Ibid. note 8.

12. MSF, 2019, « MSF hospital partially destroyed in Mocha attack », 7 November 2019 : <https://www.msf.org/msf-hospital-partially-destroyed-attack-mocha-southwest-yemen>

13. OCHA, 2020, « Displacement in Marib, Sana'a and Al Jawf governorates », Situation Report No.2 : <https://reliefweb.int/report/yemen/yemen-displacement-marib-sana-and-al-jawf-governorates-situation-report-no-2-18>

Given ongoing hostilities in the area, the hospitals were closed for the safety of staff and patients.

Access to Health Facilities: For Patients and Supplies:

The destruction of health facilities by explosive weapons immediately reduces access to health facilities for people in crisis and increases the population's vulnerability to malnutrition, water-borne diseases, and life-long impairments from conflict-related injuries.⁽¹⁴⁾ The World Bank has identified the disruption of immunization campaigns, the spread of diseases facilitated by vulnerability caused by malnutrition, inadequate water and sanitation, and an increasing vacuum of services caused by health staff deserting due to insecurity as impacts from the conflict. Though not all of these impacts can be attributed solely to explosive

weapons, the destruction of even a few health facilities in this context contributes to the worsening public health situation in Yemen.

However, explosive weapons use has long-term impacts on health beyond the destruction of facilities. Health facilities not physically damaged by explosive weapons are nonetheless impacted by damage caused through explosive weapons use on the wider civilian infrastructure such as roads or ports. When key transport hubs are destroyed or roads damaged, the transport of medical goods and humanitarian supplies cannot be maintained. Disruptions to transport and supply chains caused by the broader conflict in Yemen has also caused severe shortages of medical supplies and medicines,⁽¹⁵⁾ contributing to the deprivation of more than 20 million people from adequate health care.

Recommendations⁽¹⁶⁾

- In Yemen, the parties to the conflict, the international community and the members of the UN Security Council must do everything possible to support and implement a nationwide ceasefire.
- In Yemen, all parties to the conflict must respect international humanitarian law, end the use of explosive weapons in populated areas, protect infrastructure vital to the survival of the population - such as health facilities - and work to clear and rebuild the thousands of infrastructures that have been destroyed, damaged or contaminated by explosive remnants of war.
- The international community must acknowledge the severe and long-lasting indirect or reverberating effects of explosive weapons use, which devastate the economic, health, and social dimensions of a society. Through the political declaration currently under discussion, States should commit to recognize both the direct and indirect effects of the use of explosive weapons. They must further recognize the rights and needs of all victims—critically injured people, survivors, families of those injured and/or killed, and affected communities— to receive adequate assistance based on their needs in a non-discriminatory manner, including in the form of emergency medical care, physical rehabilitation, psychosocial support, and socio-economic inclusion, as well as support towards the full realization of their rights and full participation in their societies.
- A strong commitment by all States to ban the use of explosive weapons with wide area effects in populated areas, as urgently called for by the UN Secretary General and ICRC, cannot wait. States must undertake strong commitments in a political declaration to prevent situations like Yemen where civilians will pay the price for these practices over decades.

14. For an in-depth analysis of the immediate and long-term needs of victims of explosive weapons, see: HI, 2019, "On the waiting list: Meeting the immediate and long-term needs of victims of explosive weapons in Syria": <https://blog.hi.org/wp-content/uploads/2019/09/THE-WAITING-LIST-RAPPORT-FRENCH-SMALL.pdf>

15. Engelke, Wilfried, 2017, « Yemen Transport Sector, » Banque mondiale, p. 6 : <http://documents.worldbank.org/curated/en/636961508411397037/Yemen-transport-sector>

16. The content of this fact sheet is based on the report: HI, 2020, [Death Sentence to Civilians: The Long-Term Impact of Explosive Weapons in Populated Areas in Yemen](#).