



# **BLAST INJURIES**



**Save the Children**

**The impact of explosive weapons  
on children in conflict**

Save the Children fights for children every single day.

We stand side by side with children in the toughest places to be a child.

We do whatever it takes to make sure they survive, get protection when they're in danger, and have the chance to learn.

Because every child should be able to make their mark on the world and build a better future for us all.

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Some names (marked \*) have been changed to protect identities.

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Cover photo: Mariam, 16, lost her left hand in a rocket attack in Mosul, Iraq.  
(Photo: Sam Tarling/Save the Children)

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# Foreword

The use of explosive weapons, traditionally meant for the open battlefield, in densely populated towns and cities continues to cause devastation to children. Time after time, these weapons result in death, life-changing injuries, and the destruction of vital facilities, such as schools and hospitals.

From Syria to Yemen to Afghanistan, our field teams are meeting children who have suffered life-altering injuries caused by explosive weapons, whether from airstrikes or landmines. We know that children are particularly vulnerable to their effects. Their bodies are thrown harder and further by the blasts. Their bones bend more, increasing the chances of long-term deformities with little chance of recovery. They have less blood to lose. They are unlikely to receive the specialist medical care they need, with health systems often at the point of collapse and fewer trained surgeons available.

There are good reasons why the killing and maiming of children in conflict is defined as a grave violation by the United Nations. If children survive explosive weapons, they often find themselves dealing not only with physical trauma and disability, but with the loss of family members, the destruction of their homes, and the disruption of their education – and with it their future prospects. To say nothing of the acute stress already caused by growing up in a war zone.

We all know just how resilient children can be, but we cannot expect them to recover without sustained and specialist support. Left untreated, we know that the long-term effects of blast injuries – both physical and psychological – will leave children facing a lifetime of suffering, and a whole generation lost and at risk of exclusion.

The Paediatric Blast Injury Partnership – led by Imperial College London with Save the Children, and made up of a fantastic community of concern of

medical specialists, humanitarians and academics – is a practical response to the unique medical challenges faced by children with blast injuries. One of the Paediatric Blast Injury Partnership's most valuable resources to date is the *Paediatric Blast Injury Field Manual*, which gives medical staff in conflict settings, who often have to operate with little or no previous experience or training, the knowledge and technical guidance needed to treat children from the point of injury onwards. It also offers advice on how to provide long-term rehabilitation care and mental health support.

Smart initiatives like these will make a real difference to injured children, and I know that medical institutions and humanitarian agencies like Save the Children will continue to build on this work to ensure children have the best chance of recovery.

But in order to truly protect children in conflict we need to see action from governments and armed actors. This is why we are calling on all warring parties to Stop the War on Children: by taking steps to uphold international laws and norms, ensuring accountability for crimes against children, and investing in the support necessary to help children recover from the physical and psychological trauma caused by conflict.

**Helle Thorning-Schmidt**

Chief Executive

Save the Children International



# Definitions: blast injuries and explosive weapons

## WHAT ARE BLAST INJURIES?

Blast injuries are the injuries caused by the multiple effects of explosive weapons and the 'overpressure' created by them. The force of this pressure is enough to cause injury itself, but can also create fragments, hurl children into objects, and cause buildings and other structures to collapse. There are four types of blast injury:<sup>1</sup>

- Primary blast injury results from blast overpressure, damaging tissues through compression and expansion. These injuries not only affect organs like the lungs, but solid tissue, including the brain.
- Secondary blast injuries are due to the creation of fragments. This can include casing and shrapnel, but also soil and rubble.
- Tertiary blast injury relates to bodily displacement – where the force of a blast can hurl children into the air or into other objects.

This leads to a range of injuries, in addition to primary and secondary injuries – for instance, blunt trauma injuries.

- Quaternary injuries are other types of injuries caused by blasts, such as burns, inhalation injuries and exposure to toxic material.

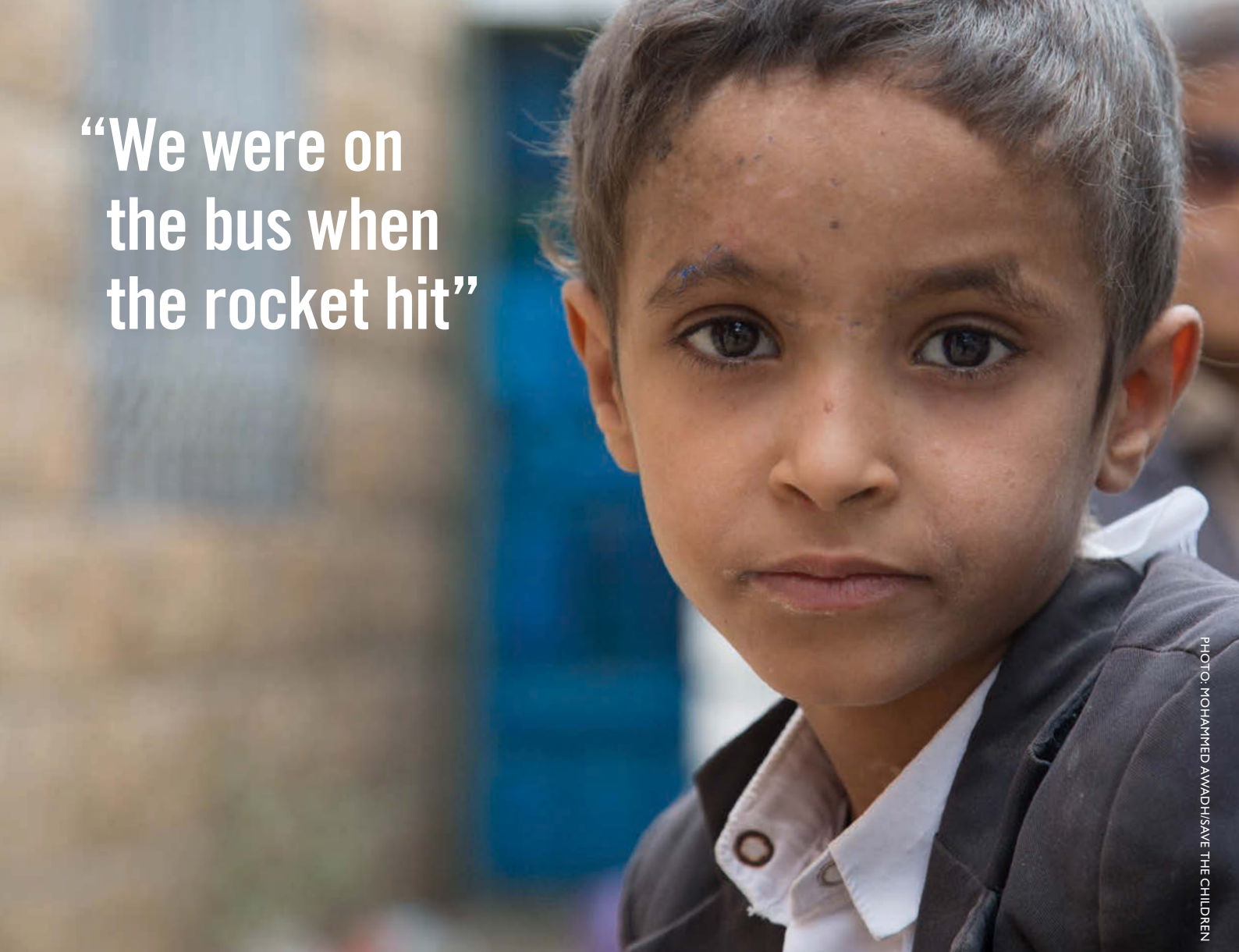
## WHAT ARE EXPLOSIVE WEAPONS?

Explosive weapons are those which “affect an area around the point of detonation, usually through the effects of blast and fragmentation.”<sup>2</sup> Within this, a range of weapons are routinely used against children, including missiles, grenades, mortars, landmines and improvised explosive devices. Also included in the definition are unexploded ordnance (UXO) or explosive remnants of war. These are explosive weapons that remain unexploded either through malfunction or design, and continue to affect children even after conflict has ended.<sup>3</sup>



Mahmoud,\* age 12, from Gaza. In 2014, he was playing outside when he heard an explosion and felt a fragment pierce his eye. He was operated on but his eye could not be saved.

PHOTO: MOHAMED NAYEF/SAVE THE CHILDREN



“We were on  
the bus when  
the rocket hit”

PHOTO: MOHAMMED AWADH/SAVE THE CHILDREN

Ismail was seven years old when the school bus he was on was hit by an airstrike on 9 August 2018. Forty children died in the attack; most were under ten years old.

Ismail sustained severe shrapnel injuries in his leg, in one eye and to his head. He remains traumatised by the event.

He was in hospital for several weeks. He received intensive psychosocial support to help him start to deal with what he had been through.

“We were on the bus when the rocket hit,” he says. “One of my friends died. Another one was injured.

“I was unconscious until I was at the hospital. I couldn’t see anything after I was hit. After a week or two, I started to see a bit.”

Ismail wishes that the war would stop. His dream is to become a doctor so that he can treat children.

# Executive summary

Armed conflicts around the world are exacting a devastating toll on children. 100 years ago, Save the Children was created to defend the rights of children caught up in conflicts they played no part in creating. Today, the global movement founded a century ago continues the fight to protect children through our global Stop the War on Children campaign.

In 2017 nearly a fifth of all children were living close to conflict – with 142 million children living near areas of intense fighting.<sup>4</sup> These children are more at risk of harm than any generation since the end of the Cold War. The number of verified incidents of all six grave violations<sup>5</sup> against children in war – as identified by the United Nations – continues to increase, with the reported number tripling since 2010.<sup>6</sup> In countries listed in the UN Children and Armed Conflict (CAAC) report in 2017, at least 10,677 children were killed or maimed.<sup>7</sup> In reality, that number is likely to be the tip of the iceberg.

In the world's worst modern conflicts children are exposed to explosive weapons – rockets, mortars, grenades, mines and improvised explosive devices (IEDs). In the five deadliest conflicts for children in 2017, Save the Children analysis of UN data shows nearly three-quarters of all child casualties were caused by explosive weapons. To better understand the effect of explosive weapons on children, the Paediatric Blast Injuries Partnership – a coalition of medics, academics and NGOs<sup>8</sup> – has conducted

a review into all the available evidence on paediatric blast injuries (PBI). Using those findings, this paper highlights some of the devastating effects of blast injuries on boys and girls. Our key findings include:

- Children are more likely to die following blast injuries than adults.
- Children are overwhelmingly likely to experience head injuries, with head and burn injuries from blast injuries a significant cause of death in young children.
- Lower-limb injuries are less common among young children than adults, and especially uncommon for infants.
- Most children affected by blasts experience multiple injuries, with some injuries, such as burns, affecting a much larger proportion of the body than in adults.
- Children have a disproportionate requirement for health services – both surgical and otherwise – and experience injuries of a greater intensity than adults.

“Paediatric blast injury is a huge challenge for everyone who deals with such patients – from first responders and surgeons to physiotherapists, counsellors and psychotherapists to medical researchers, humanitarians and policy makers. The field lies at the intersection of three complicated disciplines: blast injury physiology, paediatric polytrauma, and humanitarian medical aid in resource-limited environments.

“As part of an effort to address knowledge gaps and develop solutions, Save the Children and Imperial College have partnered to expand the focus on and understanding of the destructive impacts that explosive weapons are having on children.”

**Major General Michael von Bertele** CB OBE  
Paediatric Blast Injuries Partnership



## WHAT NEEDS TO CHANGE?

An immediate response – of a technical and medical nature – is to develop and provide better guidance and resources to those responding to paediatric blast injuries (PBI). Currently there is a lack of understanding and knowledge about how best to meet the physical and mental needs of boys and girls following a blast. Bound up in this is insufficient age- and sex-disaggregated data and high-quality casualty recording.

However, the real problem is systemic. The evidence in this report raises fundamental questions for the international community. Humanitarian laws, rules and norms prohibit not just indiscriminate attacks on civilians, but also disproportionate harm to civilian populations in relation to military objectives. These findings start to reveal the previously unseen but devastating impact of explosive weapons on children.

This poses both the international community and combatants with an urgent problem. They must rethink how they assess the harm of explosive weapons on boys and girls – adjusting their use accordingly.

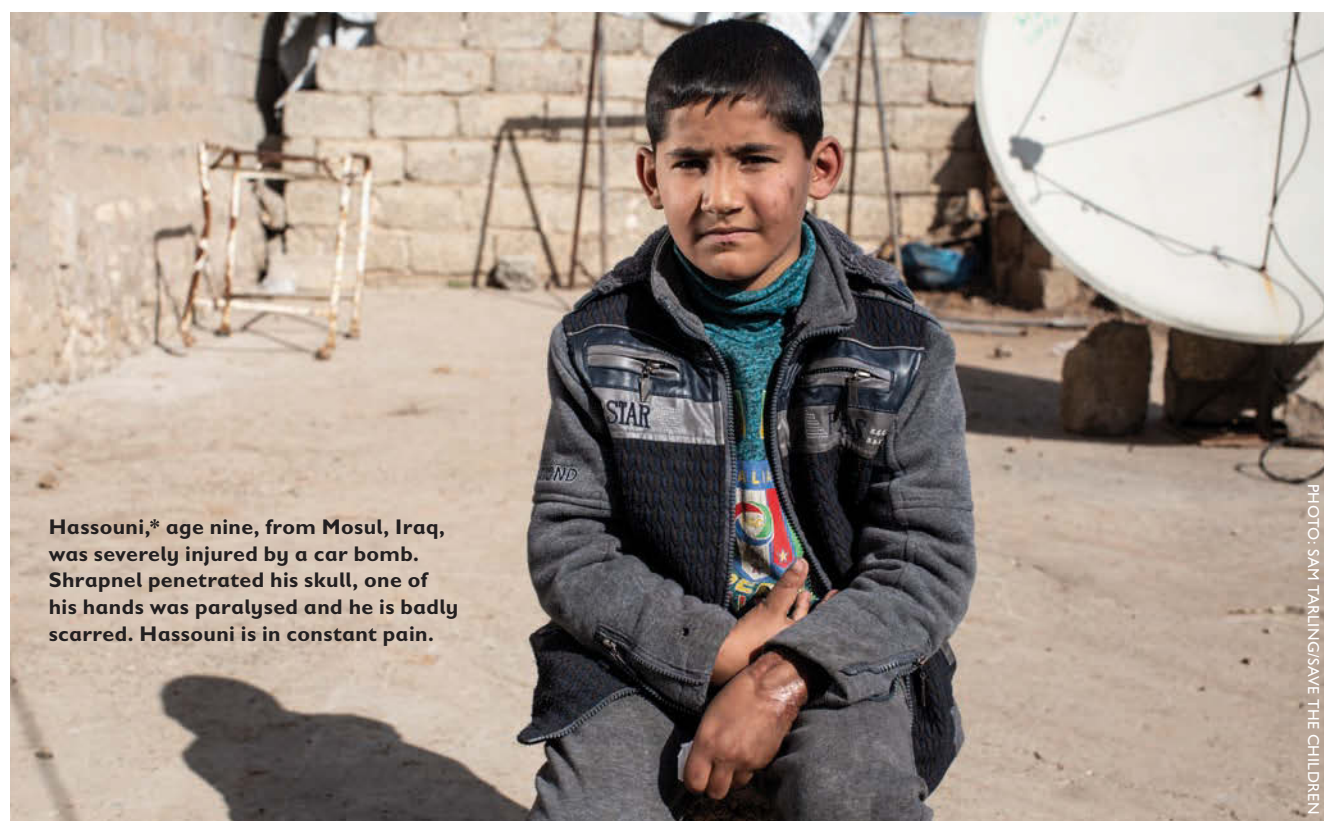
The lack of action to prevent, respond to and mitigate harm from PBI is linked to three broader

challenges. States are failing to uphold and enforce rules, norms and standards; they are failing to hold those who violate the rights of children to account; and they are failing to take practical action to protect children and enable their recovery.

The challenge children in conflict zones face is great – especially from the threats of explosive weapons. However, the resilience of children and their desire to secure safer, better futures for themselves is a platform upon which states and parties to conflict can, and must, act. Save the Children believes that practical action on the ground and policy change at national and international levels can better protect children from harm. Specifically, this report sets out the range of measures states can take to prevent and mitigate the impact of blast injuries on children under the three pillars of our campaign to Stop the War on Children. We call on states to:

- uphold international norms and standards
- hold perpetrators of violations against children to account
- support and resource practical action, with assistance from donors, to protect children in conflict and enable their recovery.

*For the full set of recommendations, see page 18.*



**Hassouni,\* age nine, from Mosul, Iraq, was severely injured by a car bomb. Shrapnel penetrated his skull, one of his hands was paralysed and he is badly scarred. Hassouni is in constant pain.**

PHOTO: SAM TALKING/SAVE THE CHILDREN



# 1 Children's exposure to blasts

Across five of the deadliest conflicts for children in 2017,<sup>9</sup> an estimated 72% of child casualties were due to blasts. Using UN data for Afghanistan, Yemen, Syria, Nigeria and Iraq we can see that of the 7,364 children killed or maimed in conflict in 2017, at least 5,322 were linked to blasts.<sup>10</sup>

| Country      | Total child casualties (2017) | Child casualties linked to blast n (%) (2017) |
|--------------|-------------------------------|-----------------------------------------------|
| Afghanistan  | 3,179 (251 girls)             | 2,216 (70%)                                   |
| Yemen        | 1,316 (369 girls)             | 814 (62%)                                     |
| Syria        | 1,271                         | 1,058 (83%)                                   |
| Nigeria      | 881                           | 672 (76%)                                     |
| Iraq         | 717 (227 girls)               | 562 (78%)                                     |
| <b>Total</b> | <b>7,364</b>                  | <b>5,322 (72%)</b>                            |

The numbers from these five countries are an indication of what is happening to children in conflicts globally. The full extent of the problem is obscured by poor-quality and unreliable casualty recording. This is a critical issue. Nevertheless, the limited information that does exist clearly points towards high levels of civilian harm as a result of explosive weapons, with children often the worst affected. Analysis of more than 140,000 casualties in Syria between March 2011 and December 2016 shows more than 14,000 child fatalities were caused by explosive weapons; by comparison, the equivalent number for adult fighters was 5,021.<sup>11</sup> Of the people killed in Syria's conflict, 83% of children and 12% of combatants were killed by blasts. In other words, children killed in the conflict were nearly seven times more likely to have died from blasts than adults involved in fighting.

In Afghanistan it is a similar story. Nearly a third of all casualties in 2017 were children. 28% of child casualties were caused by indirect explosive weapons such as mortars, rockets and grenades;<sup>12</sup> 17% were caused by IEDs; 16% a result of explosive remnants of war; and 8% due to airstrikes.<sup>13</sup> A total

of 207 children were killed in complex attacks including suicide bombings.<sup>14</sup> Compared with adult casualties, child casualties were approximately twice as likely to be killed by mortars, rockets and grenades.<sup>15</sup> When including data for 2016 as well, a staggering 84% of child fatalities in Afghanistan over the two years were related to blasts.<sup>16</sup>

According to Action on Armed Violence (AOAV), there were more than 42,000 deaths and injuries as a result of explosive violence globally in 2017 – a rise of 38% from the year before.<sup>17</sup> The Yemen Data Project estimates that since the start of the conflict in Yemen, more than 8,000 civilians have been killed by air raids, and more than 2,000 children have been killed or injured.<sup>18</sup> Meanwhile, the conflict in Ukraine left 220,000 children in 2017 at risk of landmines.<sup>19</sup>

Across conflict zones, explosive weapons continue to be used in areas inhabited by civilians. And as evidence from Afghanistan and Syria in particular shows, children are especially likely to be killed as a result of blasts.

# Selwa\*



PHOTO: ANTONIA ROUELSAVE THE CHILDREN

On 20 July 2014, Selwa's\* home in Gaza was hit by shelling. Her mother, who was pregnant at the time, her sister, two aunts, an uncle and her grandmother were killed.

Now 12, Selwa remembers being very scared and hiding under the stairs with her sister before losing consciousness. Selwa was severely injured by the blast, which left her paralysed from the neck down.

She was initially treated in Gaza and then managed to get permission to leave for treatment in Turkey. Although Selwa is totally dependent on her family's support, she remains positive.

"They said I wouldn't improve but there we go, quite the opposite, I have improved!" she says. "Hopefully, I will improve even more."

In 2018, our study *A Decade of Distress*, which was conducted in the Gaza Strip, showed even when there is a break in active conflict, children like Selwa still live in constant fear of bombs. The noise of aircraft and the threat of bombing was cited by caregivers as the single biggest source of fear in 78% of children.<sup>20</sup>

## 2 Children's unique vulnerabilities to blast injury

Children are extraordinarily resilient. And they often have a remarkable ability to recover. However, for the many children growing up in conflict zones today, the use of explosive weapons is threatening their lives, their childhood and their future. For many, the effects of blasts are immediate, long-term and life-limiting. Both physically and mentally, blast injuries alter everything – the way cells heal, skin scars, bones grow back and brains operate. Blasts affect pain, memory and resilience.<sup>21</sup> A single blast may injure a child in multiple ways.

These effects differ from those adults experience. The parts of the body affected and the severity of injuries can impact on boys and girls in complex ways. It can lead to increased mortality, and to long-term and life-changing consequences when children survive. Further, the effects of explosive weapons are not the same across age groups. A child-centric response to the threats of blast injuries – that also considers factors such as gender and pre-existing disability – is therefore required.

**“Children are resilient. They have extraordinary potential and energy that can be channelled into activating their own recovery. Children with blast injuries need champions to help them to overcome the challenge of their injuries, to protect them, and to help them to secure their own futures.”**

Colonel Nigel Tai, Consultant, trauma and vascular surgeon<sup>22</sup>

80% of paediatric blast patients experienced penetrating injuries to the head. By comparison, 31% of adult blast patients experienced the same injury.

In children under seven, limb injuries account for 20% of the known total of landmine and UXO injuries; for infants, it is just 11%. In adults, the majority of these injuries are to limbs.



65–70% of child blast patients had injuries to multiple body parts, particularly the torso and limbs.

Children under two have thinner skin than older children and adults. They are therefore more likely to suffer full-thickness burns, with resultant rapid loss of heat, fluid and protein.

**Primary blast injury** results from blast-overpressure damaging tissues through compression and expansion.

**Secondary blast injuries** are due to the creation of fragments – such as casing, shrapnel, soil and rubble.

**Tertiary blast injury** relates to bodily displacement – where the force of a blast can hurl children into the air or into other objects.

**Quaternary injuries** include burns, inhalation injuries and exposure to toxic material.



## HEAD INJURY

The recent Paediatric Blast Injury Partnership (PBIP) review into the impact of blast injuries on children found that 80% of paediatric blast patients experienced penetrating injuries to the head. By comparison, just 31% of adult blast patients experienced the same injury.<sup>23</sup> Within this, younger children are more affected. Children under seven are almost twice as likely to present with head injuries as older children.<sup>24</sup> In one study, 90% of children who died from blast injuries had skull fractures.<sup>25</sup>

Where children survive a blast, traumatic brain injuries – potentially with life-limiting and life-shortening effects – are more common for those children who are under ten years old than adolescents.<sup>26</sup> Injuries to the head are the second greatest cause of mortality in children from blast injuries (catastrophic bleeding is the greatest single cause) – the smaller stature of children makes them especially vulnerable to blast injuries overall, and head injuries in particular.<sup>27</sup>

## TORSO INJURY

The intensity of blast injuries is greater for children than adults. The PBIP review found that 26–36% of children experience severe injury and 8–18% critical injury from blasts, with more surgeries required to treat these injuries than for adults.<sup>30</sup> The most common form of these injuries are penetrations of fragments from blasts, with 65–70% of children receiving injuries to multiple parts of their body – including penetrating injuries and burns.<sup>31</sup> Many of these are to the limbs and torso, and with greater impact than on combatants, who are far more likely to be wearing protective clothing and body armour. A study carried out in US military hospitals, between 2002 and 2011, on wartime vascular injuries in the paediatric population of Iraq and Afghanistan showed that children are twice as likely to have serious bleeding from the torso than adults following blasts (25% vs 12%).<sup>32</sup>

Even where adults are not wearing armour, children are more likely to experience torso injuries from

### THE PAEDIATRIC BLAST INJURY FIELD MANUAL

Article 3.3 of the UN Convention on the Rights of the Child states that medical care of children be delivered and supervised by providers competent in that field.<sup>28</sup> However, paediatric care in conflict zones is often delivered by personnel with limited or no experience of dealing with paediatric blast injuries. In April of 2019 the PBIP piloted the world's first-ever field manual on paediatric blast injury, co-authored by specialists across the relevant disciplines, with medical partners in the north of Syria.

The field manual was initially requested by Syrian medical staff who face a huge challenge treating and responding to blast injuries to children. It is estimated that 1.5 million

Syrians are living with permanent, war-related impairments, with 86,000 people – including tens of thousands of children – whose injuries have led to amputations.<sup>29</sup>

The field manual is a comprehensive guide for local non-paediatric specialists who are often forced to operate on and treat children with blast injuries with little or no previous experience or training. It provides healthcare workers in conflict settings with knowledge and practical advice on the entire continuum of care, from point of injury to treatment to rehabilitation and mental health support. Following the pilot in Syria, there are plans to roll it out both there and in Iraq, Yemen and Afghanistan.

landmines and unexploded ordnance, and overall are more likely to die as a result of penetrating injuries. This pattern changes with age – indicating the importance of looking at civilian harm with an explicit focus on children. As children grow, blast injuries to the head and torso decrease, and injuries to lower limbs increase. In adults, the majority of landmine and UXO injuries are to limbs, whereas in children under seven, limb injuries account for 20% of the known total; for infants, it is just 11%.<sup>33</sup>

## BURNS

Burns from explosive weapons are likely to be more severe in children. Children under two have thinner skin compared with older children and adults. This means full thickness burns are more likely, with resultant rapid loss of heat, fluid and protein. This can lead to dehydration, nutritional deficiencies and hypothermia, with the potential for huge long-term consequences on a child's health.<sup>34</sup>

Because children are at greater risk than adults from burns and penetrative injuries, they are at higher risk of death and serious injury when caught in the path of an explosion. Child victims of explosive weapons represent a disproportionately large burden on health facilities.<sup>35</sup> Approximately 56% of blast victims require surgery, twice the proportion of surgical procedures required for non-blast paediatric trauma.<sup>36</sup>

“Children are at greater risk of dying from severe burns than adults. They suffer terrible disabilities from burns which, without the correct medical, surgical and psychological interventions, they can carry with them for the rest of their lives. If they survive the initial injury they are at risk of life-threatening infections.

“The long-term consequences of inadequate or inappropriate treatment can lead to disfigurement, exclusion and vulnerability. They often require a succession of skin grafts to restore mobility. The management of burns in developed countries has improved vastly over the years, leading to better outcomes for burns patients. However, the provision of burns care in many conflict zones is basic and limited, often with no specialists. The sad medical fact is that the younger the child and larger body surface area covered in burns, the lower the survival chance. This is further worsened by having a lack of access to appropriate paediatric support and intensive care facilities.

“The weaponry used in conflict zones can cause horrific burns through blasts and explosions. Some weapons are designed to burn – such as thermal incendiary devices that have been used in Syria.”

Dr Saleyha Ahsan<sup>37</sup>

## WHY WE NEED A GLOBAL TRAUMA REGISTER

A ‘Global Paediatric Trauma Register’ is required to better track trends in harm to children. This should be centrally held and managed, but broadly accessible. It should be the resource for all agencies treating children and bring together data collected by national responders, international agencies, non-governmental organisations and military medical services.

The aim would be to form a coalition of the willing to create a trauma register, informed by either a single database to which many partners contribute or that merges data from many datasets. A single, simple, accessible database, to which data could be uploaded in near real time,

might present a more accurate picture of where and how children (and others) are being injured and what treatment they are receiving. A trauma register could help instigate the development of protocols and casualty treatment regimens that could be disseminated in low-resource settings. And it could help initiate training for first responders and others, along with appropriate materials for first-aid in low-resource settings. A trauma register would be a relatively low-cost exercise that might form part of the military contribution to reconstruction, by reducing mortality and morbidity, and facilitating the eventual rehabilitation of a health service.

## BLAST INJURIES AND GENDER

Almost every aspect of conflict has gendered dynamics. The use of explosive weapons is no different. Just as children, as a group, experience blasts differently to adults, there are also differences between boys and girls – due to both their interaction with and exposure to blasts, and their physiology.

The numbers included in this analysis, and the limited data generally on child casualties, point to more boys being killed and injured than girls by blasts. However, an overall lack of gender and age disaggregated data obscures the full extent of difference between girls and boys.

Beyond the physical impact of blasts on different groups, explosive weapons – especially in

populated areas – will deepen existing inequalities and norms. For instance, rocket and air attacks on hospitals further constrain women's access to maternity services and healthcare more generally. Girls and women have been specifically targeted by attacks in order to suppress their learning and access to education. *Education under Attack 2018* found that girls and women were targeted in education-related attacks because of their gender in at least 18 countries.<sup>38</sup> For example, in one of the deadliest attacks on schools in Pakistan in 2013, local Taliban forces allegedly carried out an explosive attack outside a government girls' primary school in Khyber Pakhtunkhwa on 5 September 2013. The attack injured 13 female students under the age of 10.<sup>39</sup>

## LONG-TERM EFFECTS

### PHYSICAL

Amputations following traumatic injuries in children can lead to physical complications, and in many of the countries in which blast injuries occur, can affect social, educational and economic access for children and adolescents. Given the different make-up of children's bones and tissue, injuries early in life can affect later growth and impact limb length, range of motion and deformity. Eye and ear injuries, which are extremely common as a result of blasts, have particularly long-term effects. Damage to the eye in infancy not only leads to visual impairment, but also prevents eyes developing and can lead to visual defects – not necessarily related to the original injury. The curiosity of young children and their relative proximity to the ground result in large numbers of eye injuries as a result of mines – many of which are a legacy of previous conflict and occur in civilian-populated areas.

Children who suffer severe injuries need long-term rehabilitation across a continuum of care, and in some cases a series of prosthetics that need to be adapted as they grow. In many of the contexts where explosive weapons are being used, particularly in low-resource environments, this type of support is simply not available. In addition, specific complexities with blast injuries can make fitting the prosthetics difficult.

### PSYCHOLOGICAL HEALTH

As already highlighted, children are especially likely to experience head injuries – with children under ten more likely to experience traumatic brain injuries (TBI) than adolescents.<sup>40</sup> TBI can include concussion, loss of hearing and nerve cell damage.<sup>41</sup> Without adequate rehabilitation and support, these conditions are likely to affect many children in the long term.

Beyond the direct impact of explosive weapons on children's brains, such as TBI, children who have suffered blast injuries, whatever their age, can experience a range of emotions – including fear that the event may take place again, that they or their family and friends may be hurt, or that they may be separated from their loved ones. They may also experience feelings of grief because of physical changes resulting from the blast, anger, self-blame, shame, disbelief or anxiety. Common stress reactions that children display depend on the age of the child, but could include separation anxiety; having difficulties with sleep and eating; becoming withdrawn, unable to concentrate or confused; having intrusive thoughts and nightmares; struggling to form social connections; and becoming irritable and aggressive.



“He used to  
play and  
have fun”



PHOTO: CLAIRE THOMAS/SAVE THE CHILDREN

During the battle to retake the city of Mosul in 2016–17, Hussein,\* 14, was badly injured when an airstrike hit his neighbourhood. He lost his leg as a result of the blast. He now feels isolated and helpless when he sees other children playing football and walking to school.

“Our life was normal, comfortable, before the crisis,” says Hussein’s father. “Now it is hard. You can’t move around. You can’t guarantee your life.”

“Before the crisis, Hussein used to go to school. He used to go and play and have fun. He got paralysed. His situation is so hard. He doesn’t go to school and he cannot do his own things.”

Hussein is now receiving psychosocial support and awareness sessions from the Save the Children Child Protection Team. He is enrolled in a child-friendly space but does not feel comfortable and confident enough yet to attend and take part.

Children who are exposed to stress for prolonged periods of time without adequate caregiver support to help them manage it in a healthy way are at risk of toxic stress.<sup>42</sup> This has the potential for immediate and hugely detrimental effects on children. If left untreated, the long-term consequences are likely to be even greater, affecting children's mental and physical health for the rest of their lives. Our *An Unbearable Reality* report in 2017 focussed on the experiences of displaced children in Iraq, some of whom had lived under ISIS rule and had been recently displaced by the military offensive on Mosul. The results showed that 90% of children had lost loved ones. Many told us of bombs falling on their homes and of family members being killed by landmines or hit by explosive weapons as they fled.<sup>43</sup>

Another of our reports in 2017, *Invisible Wounds*, outlined the psychological toll the war in Syria was having on children. We found that 84% of adults and almost all children we spoke to said that ongoing bombing and shelling was the number one cause of psychological stress in children's daily lives.<sup>44</sup> In addition, 89% said children's behaviour had become more fearful and nervous as the war continued, 80% said children and adolescents had become more aggressive, and 71% said that children increasingly suffered from frequent bedwetting and involuntary urination.<sup>45</sup>

Children are incredibly resilient and able to recover from psychosocial distress. However, this often depends on the stability of their daily lives and the support they have around them – from caregivers, other adults, schools and the wider community. Such support is critical for children's long-term wellbeing. Support from governments and donors to embed appropriate services to support the wellbeing of boys and girls and enable their recovery is critical – aligned with the convention on the rights of the child, which places a duty on states to provide appropriate support.

## REVERBERATING EFFECTS

In addition to the immediate and devastating risk of death and traumatic injury, there are 'reverberating' effects of explosive weapons that must be considered in order to fully understand how destructive these weapons can be.

The International Committee of the Red Cross describes reverberating effects as those that are:

*“not directly caused by an explosive weapon but are nevertheless a product thereof. Notably, incidental destruction of civilian housing and essential civilian infrastructure – which often leads to a disruption of essential services – can result in civilian death and injury that may far outweigh the immediate civilian casualties caused by an attack.”<sup>46</sup>*

Attacks on critical infrastructure that civilians rely on to survive, such as hospitals and water systems, are widespread and can produce catastrophic results. For example, in Syria, the use of explosive weapons to lay siege to urban areas has destroyed vital food and health infrastructure, leading to malnutrition and poor health. In Afghanistan IEDs and UXO render large areas of productive land unusable.<sup>47</sup> UXO can have particularly adverse effects on women and girls, who will have different roles within a household and will be more at risk from explosive weapons when collecting water and fodder.<sup>48</sup>

Save the Children repeatedly hears from children living in and recovering from conflict that education is their priority. They want to learn and gain the tools to rebuild their countries and their lives. In recent focus-group discussions with 365 children and young people aged 10–17 inside Syria, rehabilitating and building schools was their most commonly cited priority for the future.<sup>49</sup> Yet attacks on schools – including though the use of explosive weapons – are widespread. In the first few months of 2019 alone, there have been at least 15 incidents of air strikes, shelling and in one case unexploded ordnance, affecting 13 schools or universities in Yemen. Since 2015 a total of 1,776 of the country's schools have been destroyed, damaged and rendered out of use.<sup>50</sup>

On top of the damage to education infrastructure caused by explosive weapons, blast injuries have the potential to limit children's ability to access education. Without appropriate support, such as prosthetics and rehabilitation, and in the face of stigma and cultural barriers, some children who have experienced injury may not be able to return to formal education.

# 3 Why are children exposed to blast?

More children are living in conflict – and are more at risk in conflict – than at any time since the Cold War.<sup>51</sup> Simply, there are more children living in conflict zones where explosive weapons are used. Conflict has become more urbanised and more protracted, with the proliferation of non-state armed groups increasing war's complexity – contributing to a race to the bottom with states and non-state armed groups employing brutal and indiscriminate methods of warfare.<sup>52</sup>

Children's proximity to conflict – too often fought with little regulation and regard for civilian protection – means they are more likely to be incidentally killed and injured, and they are more at risk of being injured by mines and unexploded ordnance.

For instance, in Afghanistan the UN mission has said:

*'explosive remnants of war continued to disproportionately impact children, who comprised 81 per cent of all civilian casualties from explosive remnants of war in 2017. UNAMA documented 518 child casualties (142 deaths and 376 injured) from explosive remnants of war, including 440 boys. Children who survived encounters with explosive remnants of war lost legs, arms and eye-sight, and suffered other serious injuries and psychological trauma, having a lasting detrimental impact on their quality of life. In many instances, those children killed and injured by explosive remnants of war had come across the devices while searching for scrap metal to sell and mostly picked up, played with, and/or threw stones at the devices, or brought the devices home.'*<sup>53</sup>

Save the Children believes that there are three drivers behind the high risk of blast injuries to children, and to their lack of protection in conflict more generally:

1. States and parties to conflict fail to uphold standards, including the law of armed conflict which sets out the precautions and protections that civilians – especially children – should enjoy.
2. There is an absence of accountability for crimes committed against children.
3. Insufficient practical action is taken to protect children and enable their recovery.

The means and methods of war need adjustment to restore the centrality of protection. Despite recommendations from the UN Secretary-General to avoid the use of explosive weapons in populated areas<sup>54</sup> and a joint statement from 50 states expressing concern over their use,<sup>55</sup> these weapons continue to cause excessive civilian harm. Much more needs to be done by states to build momentum for political acknowledgement of the issue, commit to avoiding their use, and take concrete steps to protect children and civilians from the impact of explosive weapons.

The fact that harm to children as a result of explosive weapons so often goes unreported, combined with the wide spectrum and long-lasting nature of that harm, means that assessments made by military forces are unlikely to sufficiently balance the harm done to children against their military objective. This requires recalibration in favour of civilians – and specifically children, who, as this report has shown, are particularly vulnerable to the effects of explosive weapons. Militaries must develop methodologies that enable those planning and authorising attacks to better estimate expected incidental harm – including harm that emerges over the long term, and harm that only affects children. If it becomes apparent that the rule of proportionality will be contravened, the attack in question must be cancelled or suspended.



## KEY PROVISIONS OF INTERNATIONAL HUMANITARIAN LAW

International law provides obligations and limits on the use of certain types of weapon – through key principles, such as distinction and proportionality, and through relevant treaties and conventions, such as the Ottawa Treaty on the Prohibition of Anti-Personnel Mines, the Convention on Cluster Munitions, and the Conventions on Chemical and Biological Weapons.

Inherent in the convention are the critical pillars of international humanitarian law – distinction and proportionality. Under the principle of distinction, parties to a conflict are obliged to distinguish between combatants and civilians, and deliberate attacks against civilians or civilian objects are forbidden.<sup>56</sup> This also prohibits the use of weapons that are unable to discriminate between civilians and combatants<sup>57</sup> – including nuclear and chemical weapons, and cluster bombs.

The principle of proportionality sets out that if an attack on a combatant or military object causes excessive harm to civilians, it is unlawful.<sup>58</sup> This prevents combatants from having complete disregard for the civilian population when

pursuing a military target, and they must not act if it could cause disproportionate harm to civilians. The Geneva Conventions also set out that it is unlawful for a weapon to be used that causes superfluous injury or unnecessary suffering.<sup>59</sup>

Under the provisions of international law, states are:

- obliged to distinguish between civilians and combatants
- prohibited from directing deliberate attacks against civilians or civilian objects, and may only target legitimate military objectives
- obliged to take feasible precautions in an attack to prevent harm to civilians
- obliged to refrain from attacks which are expected to cause disproportionate and excessive civilian harm – including damage to civilian objects
- obliged to refrain from using prohibited weapons, or weapons that cause superfluous injury and unnecessary suffering
- obliged to provide care to those wounded by conflict.

Related to all of the above, parties to the Arms Trade Treaty (ATT) bear a responsibility not to sell arms, munitions or other military equipment where there is an overriding risk they will be used in serious violations of international law. Currently, this obligation is being disregarded by governments – notably the UK, France and USA in relation to Yemen. According to the UN, the conflict has involved incidents that continue to kill, injure and displace thousands of civilians and may amount to war crimes. These include indiscriminate attacks on critical infrastructure. The Yemen Data Project has recorded more than 19,000 air raids by the Saudi and Emirati-led coalition since the conflict escalated<sup>60</sup> and patterns of harm continue, with children at the forefront of the war's brutality.

The UN has also found that airstrikes by the Saudi and Emirati-led coalition have been responsible for the majority of civilian casualties.<sup>61</sup> UNICEF has reported more than 400 children killed and maimed in Yemen in the first four months of 2019.<sup>62</sup> With

ongoing patterns of harm against civilians and the repeated failure to adequately investigate and take steps to minimise civilian harm, there is a clear risk continued arms exports will lead to further serious violations against children in Yemen, putting states in breach of the ATT.

Accountability for, and verification of, potential violations of international law, as well as prevention and mitigation of civilian harm, depends on consistent, high-quality casualty tracking and recording. Where this is done effectively, it can reduce the impact of blasts. For instance, while the number of child casualties in Afghanistan remains one of the highest in the world, blast-related casualties attributed to the government and pro-government forces have decreased over the last three years.<sup>63</sup> This is in part due to the advocacy conducted with parties to conflict using good-quality, accurate data from the UN assistance mission in Afghanistan (UNAMA).

Linked to legal provisions that protect civilian objects, children continue to face blasts and related injuries while at school. Across the deadliest conflicts mentioned in this report, children repeatedly face the threat of explosive weapons, and violence more generally, as they try to pursue their education. Between 2013 and 2017, there were more than 12,700 attacks on schools and colleges, harming more than 21,000 students and educators in at least 70 countries.<sup>64</sup>

Without a realistic prospect of being held to account, those using explosive weapons on children will continue to act with disregard for international law. They have been able to kill and maim children without challenge or consequence – continually raising the threshold for international action as a result. States with influence over parties to conflict

fail to consistently hold their allies and partners to account – or pursue international justice where national mechanisms are unwilling or unable to seek justice. The culmination of a lack of compliance and lack of accountability is a year-on-year rise in grave violations against children.<sup>65</sup>

Addressing issues of compliance and accountability will help to prevent blast injuries and harm to children as a result of explosive weapons. However, in the absence of meaningful action from states and parties to conflict, measures are required to mitigate the impact of blast injuries on children. This includes addressing the knowledge and expertise gap in treating paediatric blast injuries, investing in child-centred recovery, and taking measures to meet children's mental and psychosocial support needs.

## THE SAFE SCHOOLS DECLARATION

A growing consensus on the need to protect children in conflict, including when they are at school, led to the launch of the Safe Schools Declaration, an intergovernmental political commitment dedicated to the protection of education in conflict. Since the Declaration was launched in 2015, 87 countries have made an explicit commitment to take steps to protect education from attack, including to:

- support efforts to continue education during armed conflict
- collect reliable data on attacks and military use of schools
- provide assistance to victims of attacks
- investigate allegations of violations of national and international law and prosecute perpetrators where appropriate.

As there is a growing awareness of the impact of the use of explosive weapons on children and of the risks children face accessing education in conflict, governments can take crucial steps towards ensuring their militaries are properly trained, not only on the applicable international humanitarian law, but also on best practice guidelines – such as those included in the *Guidelines for Protecting Schools and Universities from Military Use during Armed Conflict*, drawn up by the Global Coalition to Protect Children in Conflict.

# 4 Recommendations

The field of paediatric blast injuries is still only emerging. The manual, review and analysis developed by the Paediatric Blast Injuries Partnership are vital contributions to the foundations on which greater action must be built.

The impact of blast injuries is at the hard end of the spectrum of consequences conflict has on children, but is emblematic of the global erosion of norms, standards and accountability within which harm to children has become normalised. There is both an urgent need and an opportunity to act. Specifically, Save the Children is calling on parties to conflict and states to take the following actions.

## **States must uphold international norms and standards**

- States must abide by their obligations under international humanitarian law and international human rights law.
- States should acknowledge that the use of explosive weapons in populated areas (EWIPA) risks severe harm to civilians, especially children; avoid the use of EWIPA; take immediate, practical, measures to reduce their impact on civilians and civilian infrastructure; and encourage other parties to do the same
- States should ensure they have an up-to-date cross-government protection of civilians strategy that recognises the challenges related to EWIPA and commits to measures to address them. This should include up-to-date calibrations of battle damage estimates to take account of the unique vulnerabilities of children, and child-specific measures to prevent harm.
- Militaries should review their approach to assessing proportionality in the conduct of hostilities in light of evidence of the unique, far-reaching and long-lasting vulnerabilities of children.
- One direct and practical way for countries to protect children in conflict is to ensure that the risks of serious violations against children are central to assessments under article 7 of the Arms Trade Treaty. Countries must deny or suspend the export, supply and transfer of arms, weapons and other military assets to parties to conflict where there is an overriding risk that they will be used to undermine peace and security or to commit or to facilitate serious violations of international law, including gender-based violence and serious violence against children.
- All states should take concrete steps to prevent attacks on education, including through endorsing and implementing the Safe Schools Declaration and associated *Guidelines for Protecting Schools and Universities from Military Use during Armed Conflict*.
- States parties should apply the principles of the Convention on the Elimination of All Forms of Discrimination against Women and implement a rights-based approach to victim assistance for women and girls.



### Perpetrators of violations against children must be held to account

- States must support financially and diplomatically the UN's systematic monitoring and reporting of violations of children's rights in conflict, including:
  - the tracking of age- and sex-disaggregated data on casualties and other violations
  - the complete, accurate and impartial naming of perpetrators
  - embedding standalone child protection capacity in political and peacekeeping missions.
- States must support the Office of the Special Representative of the Secretary General on Children and Armed Conflict in developing guidance on how to better monitor, report and respond to the grave violation of 'killing and maiming' – including in the negotiation of action plans for perpetrators.
- States and armed actors should commit to systematically tracking harm to civilians and recording civilian casualties in current and future conflicts, including disaggregating casualties by age and sex and tracking attacks on civilian infrastructure.

### States and donors must support and resource practical action to protect children in conflict and enable their recovery

- States and donors should support the creation of a 'Global Paediatric Trauma Register' to better track trends in harm to children. This should be centrally held and managed, but broadly accessible. It should be the resource for all agencies treating children and bring together data collected by national responders, international agencies, non-governmental organisations and military medical services.
- States should commit to, and resource, child-centred recovery from conflict. This includes distribution of the *Paediatric Blast Injury Field Manual*, associated training products and operationally driven research to better protect children in modern conflict.
- States and donors should ensure mental health and psychosocial support services for children and their families are well resourced and fully mainstreamed as an essential component of all humanitarian responses, and also in post-conflict stabilisation and reconstruction settings.



Lulu,\* 13, from Gaza. In 2014, Lulu was playing outside with friends when a missile struck. Ten of her friends were killed. Lulu was injured. She still suffers psychological trauma from the attack.

PHOTO: ANTONIA ROUELL/SAVE THE CHILDREN

# Endnotes

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- <sup>7</sup> Save the Children's analysis of: United Nations, General Assembly, *Annual Report of the Secretary General on Children and Armed Conflict (CAAC)*. S/2018/465 (16 May 2018). <http://undocs.org/s/2018/465>
- <sup>8</sup> In December 2017, Save the Children and the Centre for Blast Injuries Studies based at Imperial College London convened a pioneering workshop to explore issues around paediatric blast injury. It was the first time experts from diverse fields – including surgery, paediatrics, rehabilitation, prosthetic design, and academia – were brought together to discuss blast injury in children. The workshop issued a communique that created the Paediatric Blast Injury Partnership (PBIP) to deliver practical resources and research. At the request of Syrian medics, the PBIP pooled expertise from British doctors, researchers at Imperial College London, and charities like Save the Children and Humanity & Inclusion, to develop the first comprehensive field manual for paediatric blast injury. Full production credits for the Paediatric Blast Injury Field Manual can be found at: <http://www.imperial.ac.uk/blast-injury/research/networks/the-paediatric-blast-injury-partnership-the-production-credits-for-the-field-manual/>
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- <sup>10</sup> For this total we used the total number of blast/non-blast related child casualties as set out in the UN CAAC report (2018). For Afghanistan, we used UN Assistance Mission in Afghanistan (UNAMA) reporting for a more detailed breakdown. However, as UNAMA provides the data for the UN CAAC report there are no inconsistencies across data for the five countries.
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- <sup>14</sup> See endnote 12.
- <sup>15</sup> Save the Children analysis of UNAMA, see endnote 12.
- <sup>16</sup> Analysis of UNAMA casualty logs for 2016 and 2017, the only years a full breakdown of causes of death is publicly available ([https://unama.unmissions.org/sites/default/files/protection\\_of\\_civilians\\_in\\_armed\\_conflict\\_annual\\_report\\_2016\\_final280317.pdf](https://unama.unmissions.org/sites/default/files/protection_of_civilians_in_armed_conflict_annual_report_2016_final280317.pdf) and [https://unama.unmissions.org/sites/default/files/afghanistan\\_protection\\_of\\_civilians\\_annual\\_report\\_2017\\_final\\_6\\_march.pdf](https://unama.unmissions.org/sites/default/files/afghanistan_protection_of_civilians_annual_report_2017_final_6_march.pdf)). Of 1,580 child fatalities where a cause of death was known, 1,331 (84%) deaths could be attributed to blast-related causes, 202 (13%) to non-blast causes and 47 (3%) to mixed attacks involving both explosive and non-explosive weapons. Over the same period there were 3,460 adult deaths, of which 1,948 (56%) were attributable to blast-related causes, 556 (16%) to non-blast and 956 (28%) to mixed attacks where no distinction was specified. Indirect fire systems used in ground battles, such as mortars and artillery, caused 487 (31%) child and 540 (16%) adult deaths.
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# BLAST INJURIES

## The impact of explosive weapons on children in conflict

More children are living in conflict – and are more at risk in conflict – than at any time since the Cold War. The leading cause of casualties to these children is from explosive weapons – rockets, mortars, grenades, mines and improvised explosive devices.

*Blast Injuries* looks at the extent of children's exposure to explosive weapons in the world's worst conflicts. It shows why children – in part, because of their smaller stature and physical make-up – are especially vulnerable to blast injuries. The report goes on to look at why so many children are at risk today.

The need to act is urgent. This report sets out what states need to do to prevent and mitigate the deadly impact of explosive weapons on children.