Project name

Providing tourniquets for ambulances and hospitals in Gaza

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Short description

Tourniquets save lives and have resulted in a lower than expected mortality rate in Gaza over the past year since the introduction of an active Stop Bleeding campaign and the local manufacture of tourniquets. Unfortunately, tourniquet remain irregularly and poorly stocked in ambulances and emergency departments due to the lack of central funding and a coordinated strategy.

This proposal seeks to address this deficit in a timely and sustainable way.

Objective(s)

The Ministry of Health will:

- Coordinate and direct national Stop Bleeding strategy with prehospital services in Gaza
- Coordinate and direct national Stop Bleeding strategy with emergency hospital services in Gaza
- Ensure sufficient stock for all prehospital and hospital stakeholders
- Acquire tourniquets in Gaza
- Seek international funding in collaboration with World Health Organization
- Monitor usage of tourniquets in Gaza

The World Health Organization will:

- Coordinate funding for acquisition of tourniquets in Gaza
- Monitor usage of tourniquets in Gaza
- Seek international funding in collaboration with the Ministry of Health

Prehospital care providers will:

- Ensure each vehicle is stocked with tourniquets
- Provide training to prehospital providers
- Monitor tourniquet usage
- Report any tourniquet device failures in the field

Hospital emergency providers will:

- Ensure appropriate device stocks
- Provide training to hospital providers likely to use tourniquets
- Monitor tourniquet usage
- Report any tourniquet device failures in emergency rooms

Context

The war in Gaza in 2014 had devastating losses, many of which were related to exsanguination from limb injury. While precise numbers are difficult to obtain due to the nature of the war, it is clear that many deaths were preventable with an appropriate layperson and prehospital awareness of hemorrhage control. If current hemorrhage control practices were in place in 2014, it is expected that several hundred lives would have been saved.

In late 2016, several government and non-governmental agencies started work on a hemorrhage control training program now referred to as the “Stop Bleeding Campaign”. This campaign has trained over two hundred providers and provided thousands of tourniquets for training and deployment in the field.

Unfortunately, there remains no coordinated national strategy for the acquisition and distribution of tourniquets among prehospital and hospital providers across at least four government and non-governmental agencies. As such, there is also no coordinated strategy for funding tourniquets, with all of the tourniquets provided to prehospital providers thus far being donated by Glia Inc and Hayat Centre.

Despite this lack of coordination, it is clear that the current Stop Bleeding Campaign is bearing fruit. Between 30 March 2018 and and 30 March 2019, at least 5,420 out of 6,872 gunshot wounds were to the lower limbs and 549 to the upper limbs, a total of 87.9% of all injuries. Despite this high number, there have been only 12 fatalities from these injuries, representing 0.2% of all limb gunshot wounds.

Many factors are responsible for this unexpectedly low number, including a system-wide emphasis on early trauma care. However, it is certain that the use of tourniquets when available and improvised tourniquets when not available contributed to this disproportionately low mortality rate.

Intended beneficiaries

- Ministry of Health (Palestine) – creation of needed medical devices
- Palestinian Red Crescent Society – continuing training and support of their 3D modeling team
- Military Medical Services
- Civil Defence
- World Health Organization

Strategic partners

- Ministry of Health (Palestine)
- Palestinian Red Crescent Society – continuing training and support of their 3D modeling team
- Military Medical Services
- Civil Defence
- World Health Organization
- International Committee of the Red Cross
- University of Western Ontario (Canada)
- London Health Sciences Centre (Canada)
- Health Canada
- Glia Inc

Methodology and activities

Prediction of future usage during non-emergency

We predicted the usage of tourniquets in prehospital and hospital settings after consultation with providers and leaders in major prehospital and hospital organizations based on current usage patterns.

Note that for several reasons, prehospital usage is expected to be significantly higher than hospital usage, as reflected in the projected usage numbers.

Table 1. Projected prehospital usage of tourniquets

Ambulance service	Total ambulances	Daily active ambulances	Projected annual tourniquet usage
Ministry of Health	64	10	400
Palestinian Red Crescent	60	10	600
Civil Defense	13	8	500
Military Medical Services	13	7	400
Total	**150**	35	**1900**

Table 2. Projected emergency departments usage of tourniquets

Hospital	Projected annual tourniquet usage
Al Shifa Hospital	60
European Gaza Hospital	60
Indonesian Hospital	36
Al-Aqsa Hospital	36
Al-Quds Hospital (NGO)	36
Al-Awda Hospital (NGO)	36
Total	**265**

Prepositioned stock for use during disaster or crisis

Prepositioned stock should provide tourniquets in the event of a disaster or crisis. Because of the critical and lifesaving nature of tourniquets, we projected a 30-day prepositioned stock to be distributed via the Ministry of Health.

The index casualty rate was derived from the first 30 days of the 2014 war and projected at 7,000 injuries. The limb injury rate was projected from the current Grand March of Return figures at 87.9%, resulting in an expected usage rate of 6,153. Considering stocking and distribution factors, a proposed number of 7,000 tourniquets is suggested for 30-day prepositioned stock.

As tourniquets do not expire, a decreased risk of future hostilities would result in depleting the prepositioned stock to an accepted level over time.

Tourniquet cost

Depending on the type of tourniquet and the need to import it, tourniquets may cost as little as USD$10 for locally manufactured tourniquets and as much as $40 for imported commercial tourniquets. As there are currently two high quality manufacturers of tourniquets in Gaza, we assumed a USD$10 cost per tourniquet.

Outputs and deliverables

Tourniquet supply to prehospital and hospital providers

Table 3 shows the expected purchase of tourniquets for normal use and prepositioned stock is listed below. These numbers assume a population growth of 3% and one major conflict every 3 years. Projections are over the next 5 years.

Table 3. Projected tourniquet purchase requirements 2019-2023

Year	Normal use	Prepositioned stock	Total required
2019	2 000	7 000	9 000
2020	2 060	0	2 060
2021	2 122	0	2 122
2022	2 186	7 000	9 186
2023	2 251	0	2 251
Total	**10 619**	**14 000**	**24 619**

Quality control and assurance

There are several tourniquets available both locally and through the import market. Because tourniquet failures may result in death or serious disability, quality control and assurance is critical.

A joint task force under the direction of the Ministry of Health and consisting of representatives of prehospital and hospital providers will ensure that tourniquets are of appropriate quality.

International certifications such as CE, FDA or Health Canada can be used to ensure that rigorous quality standards are met.

Training

Training on the use of tourniquets will be covered in a separate complementary proposal.

Usage monitoring

A joint task force under the direction of the Ministry of Health and consisting of representatives of prehospital and hospital providers will monitor tourniquet consumption and adjust required annual numbers based on usage patterns in Gaza.

Time frame

One year, renewable. Operating dates are September 1, 2020 to August 31, 2021.

Resources and budget

Table 4 shows the projected purchases costs based on requirements calculated in Table 3. These costs assume a high quality supply ranging from USD$10 for locally-produced tourniquets to USD$40 for imported high quality tourniquets.

The requested budget for 2019-2020 is $90 000 (USD) based on the realistic low estimate.

Table 4. Projected purchase costs based on high and low cost estimates 2019-2023

Year	Tourniquets	Low estimate (USD$)	High estimate (USD$)
2019	9 000	90 000	360 000
2020	2 060	20 600	82 400
2021	2 122	21 220	84 880
2022	9 186	91 860	367 440
2023	2 251	22 510	90 040
Total	**24 619**	246 190	984 760

Communication strategy

Intra-group communication will be done with in-person meetings coordinated by the Ministry of Health, with email and by telephone between assigned contacts in each stakeholder.

External communication will be via twitter, facebook, instagram and public talks in Gaza and internationally.