

Global Grants Community Assessment Results

Beneficiary Community or Institution

This project will be implemented in partnership with the "Razan" Prosthetics and Rehabilitation Center, which specializes in the production of prosthetic-orthopedic products and rehabilitation aids. The "Razan" clinic, located in Ternopil, will receive not only training but also modern equipment for the production of 3D printed prosthetic sockets for lower limb amputees. This equipment will enable the creation of prosthetics that are precisely tailored to the patient's anatomy, ensuring a comfortable and accurate fit with standard limbs

Groups in the community that would receive a clear, direct and immediate benefit from the project

The direct beneficiaries of this project will be lower limb amputees who have become victims of bomb and landmine explosions.

Beneficiaries' demographic information, if relevant to the project

Amputees who have become victims of the war are mostly being transported to Western Ukraine, as this region is considered safer compared to other parts of the country. These individuals come from various social groups — civilians, including children, as well as military personnel; professionals, laborers, elderly and young people. They have been affected by bomb explosions, landmines, and other explosive devices that indiscriminately hit frontline cities and cities in Ukraine that are under constant enemy shelling, particularly in the east and south of the country.

Who conducted the assessment? Check all that apply.

- **Host sponsor members:** Yes, the Rotary Club of Ternopil initiated the assessment by engaging directly with local medical professionals, prosthetists, and hospitals. Our team conducted in-
- depth interviews and gathered qualitative data to assess the specific needs of amputees in the region.
- **International sponsor members:** As part of the assessment process, Rotary Toronto Eglinton (International Sponsor) also contributed by staying informed on the situation through media, discussions with local contacts, and understanding global best practices.
- **A cooperating organization:** Yes, we collaborated with local hospitals and rehabilitation centers such as the "Razan" Prosthetics and Rehabilitation Center in Ternopil, which specializes in prosthetic and orthopedic devices. They provided critical insights into the demand for prosthetics and the challenges faced by amputees.
- **University:** As a faculty member of Ternopil National Medical University, I (Yevhen L) also assessed the situation by talking to colleagues in the medical faculty, including professors who teach courses in rehabilitation and prosthetics. The University has also kept records of students enrolling in prosthetics-related courses, indicating an increase in interest and demand in this field.
- **Hospital:** Direct communication with local hospitals revealed the growing number of amputees being admitted, particularly as a result of injuries sustained from landmines and explosive devices.
- **Local government:** We received important demographic data and records of amputees from the local Social Services Department and government agencies, who keep track of those requiring medical and prosthetic care.
- **Other:** The assessment also involved first-hand professional medical knowledge from my background as a medical doctor and assistant professor at Ternopil National Medical University. Observations from my clinical practice and patient interactions further validated the need for 3D-printed prosthetics.

Assessment dates

The assessment has been ongoing since 2022. Since the onset of the war, we have continuously monitored the situation, maintaining open communication with healthcare professionals, hospitals, and local authorities to better understand the needs of amputees. This long-term engagement ensures that we are aware of the evolving challenges faced by the community.

What methods did you use?

- **Survey:** While no formal survey was conducted, we gathered data through informal surveys in collaboration with hospitals and prosthetic centers, where amputees were asked about their needs and challenges regarding prosthetics.
- **Community meeting:** Community meetings with local healthcare providers, including prosthetists, rehabilitation specialists, and members of local government, were held to discuss the urgent need for prosthetic solutions, particularly 3D-printed prosthetics, in Ternopil.
- **Interview:** Numerous interviews were conducted with hospital staff, prosthetists, and social workers. These interviews provided valuable insights into the day-to-day challenges faced by amputees in receiving timely, well-fitting prosthetics.
- **Focus group:** A focus group involving amputees was organized to understand their personal experiences and needs related to prosthetic devices. This direct feedback allowed us to tailor the project to meet their expectations.
- **Asset inventory:** We performed an asset inventory by reviewing the current prosthetic resources available at local hospitals and rehabilitation centers, assessing the limitations and gaps that exist in providing adequate care for amputees.
- **Other:** In addition to the above methods, I relied heavily on my professional medical knowledge and direct observation. The register of amputees kept by the Social Services Department was an invaluable resource to track the number of amputees in Ternopil and surrounding areas.

Who from the community participated in the assessment?

Representatives of the Ministry of Health, doctors, physiatrists, prosthetists, and technical specialists from Ternopil participated in the assessment. Their professional experience and expertise helped comprehensively evaluate patient needs, thoroughly analyze the situation, and determine the best approaches for implementing the project.

List the community needs that you identified that your project would address.

The project aims to provide prosthetic limbs to individuals who have suffered injuries due to the war and lost their lower limbs as a result of bombings and landmine explosions. Many of them are undergoing treatment, prosthetic fitting, and rehabilitation in medical facilities in Western Ukraine, as this region is considered relatively safer for such processes. Special attention will be given to individuals with below-knee amputations who require high-quality and functional prosthetics to regain an active lifestyle and improve their mobility and independence.

List any needs your project would not address.

Our project is focused on providing access to innovative prosthetic solutions for below-knee amputees who have been affected by the war, so it will not address some other needs.

Specifically, the project does not cover above-the-knee amputations, as this requires different prosthetic technologies and approaches. We will also not be involved in creating prosthetics for individuals who have lost their arms or upper limbs, as these needs require separate specialized solutions that fall outside the scope of our project.

Another category that will not be addressed includes amputees who have not been injured due to the war, such as patients with diabetic complications or other chronic diseases that led to amputations. Additionally, individuals who have suffered amputations due to domestic accidents or incidents like car crashes will not be included.

Our goal is to focus specifically on those directly affected by the war, which will allow us to maximize the effective use of resources and provide a high level of support.

List the community's assets or strengths.

The community we support has many strengths and assets. Those affected by the war and amputees demonstrate remarkable resilience and determination. They are eager to regain their mobility and return to everyday life, including education, work, and active participation in society. These individuals refuse to be "broken" by the war and are ready for new challenges.

Among the affected, there are representatives from various social groups—from children to professionals, laborers, and soldiers—each with their own drive to recover and reintegrate into society. Many of them are actively retraining to become prosthetists and help others who have been affected, thus addressing the shortage of qualified specialists. This determined approach to recovery not only transforms their own lives but also contributes to the development of the community as a whole.

Considering the needs and assets you listed, explain how you determined the project's primary goal.

Considering the community's needs and available resources, the primary goal of the project was determined by the desire to significantly improve the quality of life for amputees, especially those affected by the war. Limited mobility is a major barrier to functioning in daily life: children cannot go to school, and adult victims are unable to work or perform household duties.

Existing prosthetic manufacturing methods, such as plaster casts, although still used, are quite limited. They take a long time to produce, require manual adjustments and refinement, and are often not as comfortable for the patient. However, the use of 3D printing technology offers numerous advantages: the accuracy of measurements allows for the creation of individual, highly comfortable prosthetic sockets that better match the shape of the residual limb. This ensures much greater comfort, reduces manufacturing time, and enables the production of prosthetics that significantly improve the quality of life of their users.

Key advantages of this project include:

- **Improved mobility and functionality:** Thanks to precise prosthetic manufacturing, patients will be able to regain their mobility, allowing them to return to an active life — going to school, working, and performing daily tasks.
- **Personalized approach:** 3D technologies allow for the consideration of each patient's anatomical features, ensuring an ideal fit for the prosthetic and enhancing comfort.
- **Time and resource efficiency:** Compared to traditional methods, the production of 3D prosthetics takes less time, significantly speeding up the rehabilitation process.
- **Improving the qualifications of local specialists:** The project also includes training personnel to manufacture such prosthetics, which will contribute to the development of local infrastructure and improve access to qualified services.

This project aims not only to provide war victims with prosthetics but also to give them the opportunity to regain their independence and return to an active life, which is an essential step towards full rehabilitation.

How would your project activities accomplish this goal?

With the necessary funding, our project will equip a rehabilitation clinic in Ternopil with advanced technology, including one scanner, one computer and two 3D printers. A dedicated team of two Canadian specialists—a rehabilitation doctor and a software engineer—will train local technicians and prosthetists to effectively use the equipment to produce custom prosthetic sockets that fit comfortably over the residual limb.

The funding will also cover a two-year license for a unique software program developed in collaboration between the University of Toronto and Nia Technologies. This program is integral to the precise creation of prosthetic sockets.

Additionally, the project will provide the clinic with the materials needed to manufacture the sockets, including polypropylene filament, gel liners to cover the patient's residual limb, and limb kits (standard off-the-shelf lower leg and foot attachments). The majority of the budget will be dedicated to training and providing technical support over the next two years, ensuring the sustainability and long-term success of the project.

Since amputees will require multiple sockets as their wounds heal and as they grow, the 3D printing technology offers an efficient and cost-effective solution to produce interim well-fitting prosthetics in a timely manner. This technology allows amputees to regain mobility quickly, enhancing their quality of life. Once the patient's wounds are fully stabilized, a more permanent device may be desirable and/or appropriate.

By utilizing cutting-edge technology to measure, fabricate, and fit prosthetics, we will help amputees reintegrate into society more seamlessly, reducing the stigma associated with disability and promoting greater independence and confidence.

What challenges have prevented the community from accomplishing the project's goals?

The primary challenge is the lack of access to cutting-edge technology in Ukraine. The 3D printing technology we aim to implement is still relatively new and not widely available in the country. To overcome this, we are partnering with world leaders in this field to bring this innovative solution to Ukraine.

Another significant challenge is the shortage of trained prosthetists. With over 50,000 amputees in need of prosthetics, the current workforce is insufficient to meet demand. Additionally, there is a lack of hospital beds and rehabilitation specialists, which limits the capacity to provide timely care and support.

The traditional method of prosthetic fabrication, using plaster casts, is not only time-consuming but also inefficient compared to the precision and speed of 3D printing. This outdated process cannot adequately serve the growing number of amputees, leading to delays in treatment and reduced access to necessary prosthetics.

These challenges highlight the need for this project, which will introduce advanced 3D printing technology and specialized training to address the gaps in prosthetic care and rehabilitation in Ukraine.

With time, Razan will continue to advance its skills and equipment used in the fabrication of 3-D printed devices to include other types of prosthetics and orthotics.

How is the community addressing these challenges now?

Currently, the community faces significant challenges in addressing the needs of victims of the ongoing war in Ukraine. Existing production capabilities are insufficient to meet the demand for prosthetics. The plaster cast method has notable limitations in terms of fit, adaptability, and long wait times. These factors hinder the ability to provide timely, comfortable, and well-fitting prosthetics for amputees.

In response, universities and teaching hospitals are increasing efforts to train more prosthetists and physiatrists to meet the growing demand. Many amputees themselves are taking proactive steps by retraining as prosthetists, not only because returning to their previous jobs is physically impossible, but also due to a strong desire to give back and help others who have experienced similar trauma. These individuals understand the challenges better than anyone else and are uniquely positioned to offer valuable support to their peers.

With the acquisition of new prosthetic limbs, these amputees are not only regaining their physical mobility but also finding renewed purpose in life, eager to contribute to society and assist others on their journey to recovery.

How is the community addressing these challenges now?

Due to the large number of individuals wounded in the war, some are being sent to Europe and other countries for prosthetic fittings. However, this approach is neither cost-effective nor sustainable in the long term. It also creates significant barriers to ongoing follow-up care, rehabilitation, and the replacement of prosthetic limbs as needed. This situation highlights the pressing need for a more accessible and efficient solution within Ukraine itself, ensuring that amputees receive timely, high-quality care without the need for expensive international travel.

Why are the project's activities the best way to meet this community need?

Our project provides an innovative and sustainable solution to the growing number of amputees in Ukraine, particularly those affected by the ongoing war. As the conflict continues and the threat of landmines persists, the demand for prosthetics will remain high for years to come. Traditional methods of prosthetic fabrication, such as plaster casts, are slow, labor-intensive, and often do not provide the precise fit required for comfort and mobility.

By introducing 3D printing technology, we can drastically reduce the production time and improve the accuracy of prosthetic sockets. This will allow for faster fitting of amputees, improving their mobility and quality of life. As local technicians and prosthetists become more skilled with 3D printing, the speed at which prosthetics and orthotic devices are produced will increase exponentially, ensuring that more individuals affected by the war can be served promptly.

This project not only addresses the immediate need for prosthetics but also ensures a long-term solution by training local experts, increasing self-sufficiency in the production of prosthetics and orthotics, and reducing dependency on external sources. It will be a made-in-Ukraine product. With the ability to create high-quality, affordable devices locally, we can ensure that more individuals regain their mobility and independence, allowing them to reintegrate into society and continue leading meaningful lives.