Defense Health Agency
2023.4 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

May 30, 2023: DHA begins accepting white papers via DSIP
June 16, 2023: DSIP Topic Q&A closes to new questions at 12:00 p.m. ET
July 18, 2023: Deadline for whitepaper submission at 12:00 p.m. ET
August 30, 2023: Deadline for full proposal submission 12:00 p.m. ET

INTRODUCTION

The Defense Health Agency (DHA) SBIR Program seeks small businesses with strong research and development capabilities to pursue and commercialize medical technologies.

The Defense SBIR/STTR Innovation Portal (DSIP) is the official portal for DoD SBIR/STTR proposal submission. Proposals submitted by any other means will be disregarded. Detailed instructions regarding registration and proposal submission are provided in the DoD SBIR Program Broad Agency Announcement (BAA) which must be followed by all proposers.

DHA requirements, in addition to or deviating from the DoD Program BAA, are provided in the instructions below.

Only Government personnel will evaluate proposals. Specific questions pertaining to the administration of the DHA SBIR Program and these proposal preparation instructions should be directed to:

DHA SBIR Program Management Office (PMO)
Email: usarmy.detrick.medcom-usamrmc.mbx.dhpsbir@health.mil

Proposers are encouraged to thoroughly review the DoD Program BAA and register for the DSIP Listserv to remain apprised of important programmatic and contractual changes.

- The DoD Program BAA is located at: https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/#announcements. Be sure to select the tab for the appropriate BAA cycle.
- Register for the DSIP Listserv at: https://www.dodsbirsttr.mil/submissions/login.

This release contains an open topic. As outlined in section 7 of the SBIR and STTR Extension Act of 2022, innovation open topic activities—

(A) Increase the transition of commercial technology to the Department of Defense;
(B) Expand the small business nontraditional industrial base;
(C) Increase commercialization derived from investments of the Department of Defense; and
(D) Expand the ability for qualifying small business concerns to propose technology solutions to meet the needs of the Department of Defense.

Unlike conventional topics, which specify the desired technical objective and output, open topics can use generalized mission requirements or specific technology areas to adapt commercial products or solutions to close capability gaps, improve performance, or provide technological advancements in existing capabilities.

A small business concern may only submit one (1) whitepaper submission and full proposal to each open topic. If more than one whitepaper and full proposal from a small business concern is received for a single open topic, only the most recent proposal to be certified and submitted prior to the submission deadline will receive an evaluation. All prior proposals submitted by the small business concern for the same open topic will be marked as nonresponsive and will not receive an evaluation.

Proposals submitted in response to this topic will follow a two-step submission process.

STEP ONE- Whitepaper submission: Proposing small business concerns must certify and submit, by the deadline listed above, the following proposal volumes in DSIP:

1. All Firm-level Forms. On the Defense SBIR/STTR Innovation Portal (DSIP) at https://www.dodsbirsttr.mil/submissions/, prepare the Firm-level Forms – Firm Certifications, Audit Information, and Company Commercialization Report (CCR).
2. Supporting Documents (Volume 5). A 1- 2 page whitepaper must be uploaded to Volume 5 outlining the proposed effort. The header on each page of the whitepaper should contain your company name, topic number, and proposal number assigned by DSIP when the proposal was created. The header may be included in the one-inch margin.
    A. Technical abstract: (1 paragraphs)
        - Full understanding of the problem/opportunity and how it addresses the topic's outlined capability gaps
        - Dual-use solution (non-Defense & DoD adaptation)
        - Solution's uniqueness and why it is DoD preferred
        - Identify technical risks and present credible plan to tackle such risks

    B. Evidence of Phase I feasibility results: (2-3 paragraphs)
        - Outline of evidence that the Phase I feasibility study outlined in the topic was met
        - Provide prototype design specifications and performance data if available
        - Summary of Scientific or Technical R/R&D effort, including research questions, methods, results, and relevant literature
        - GLP-biocompatibility (in vitro and in vivo) safety validation data, if available.

    C. Phase II technical objectives and key results: (2-3 paragraph)
        - Clearly describe three to five objectives of the Phase II RDT&E effort. These should be tied to specific proposed Phase II tasks. They shall be qualitative and specific to the participating DoD end-user(s). They shall describe end-state outcomes (i.e. what will be done), rather than processes or activities (i.e., how it will be done). Each objective shall be accompanied by specific 'key results', measurable throughout Phase II performance
        - Include the refinement and optimization of the prototype

    D. Commercialization strategy: (1 paragraph)
        - Commercialization plan

    NOTE: At step one of this process, proposers will NOT complete Volume 1 (Proposal Coversheet), Volume 2 (Technical Volume), Volume 3 (Cost Volume), or Volume 6 (Fraud, Waste and Abuse training). The Company Commercialization Report will be required in the Firm-level Forms but will not be provided in Volume 4.

Upon the deadline listed above, whitepapers will be screened by DHA to determine suitability for full proposal submission. All whitepapers will be screened on a competitive basis. Whitepapers will only be screened in response to an active, corresponding DHA topic. Whitepapers will be initially screened to determine responsiveness to the topic objectives and an understanding of the capability gap. Whitepapers passing this initial screening will be notified to submit a full proposal (step two) that will be technically evaluated by subject matter experts to determine the most promising technical and scientific approaches. If at any point the whitepaper is deemed untimely, unresponsive, ineligible, the proposal will be rejected.

STEP TWO: No later than 8 August, proposers with favorably screened whitepapers will receive notification from DHA SBIR with instructions to submit a full proposal in DSIP. **Proposals that are submitted without prior notification from DHA SBIR will not receive an evaluation**. Full proposals

will follow the guidelines provided in the DoD Program BAA, with additional details and deviations below.

DIRECT TO PHASE II GUIDELINES

15 U.S.C. §638 (cc), as amended by NDAA FY2012, Sec. 5106, and further amended by NDAA FY2019, Sec. 854, PILOT TO ALLOW PHASE FLEXIBILITY, allows DoD to make a SBIR Phase II award to a small business concern with respect to a project, without regard to whether the small business concern was provided an award under Phase I of the SBIR program with respect to such project. DHA is conducting a "Direct to Phase II" implementation of this authority for select topics under this BAA. DoD does not guarantee Direct to Phase II opportunities will be offered in future BAAs.

Each eligible topic requires that proposing small business concerns provide documentation to demonstrate feasibility described in the Phase I section of the topic has been met. **Feasibility documentation cannot be based upon or logically extend from any prior or ongoing federally funded SBIR or STTR work.** Work submitted within the feasibility documentation must have been substantially performed by the proposing small business concern and/or the PI. If technology in the feasibility documentation is subject to Intellectual Property (IP), the proposing small business concern must either own the IP, or must have obtained license rights to such technology prior to proposal submission, to enable it and its subcontractors to legally carry out the proposed work. If the proposing small business concern fails to demonstrate technical merit and feasibility equivalent to the Phase I level as described in the associated topic, the related Phase II proposal will not be accepted or evaluated, in accordance with the Component-specific Direct to Phase II instructions.

DHA Direct to Phase II Proposals are different than traditional DHA SBIR Phase I proposals. The chart below explains some of these differences.

	STANDARD DHA SBIR PROCESS	DHA D2P2 PROCESS
PHASE 1 TYPICAL FUNDING LEVEL	$250,000	None
PHASE 1 TECHNICAL *POP DURATION	6 months	None
PHASE 2 TYPICAL FUNDING LEVEL	$1,300,000	$1,300,000
PHASE 2 TECHNICAL *POP DURATION	24 months	24 months

*POP= Period of Performance

DIRECT TO PHASE II PROPOSAL GUIDELINES

Direct to Phase II proposals must include all volumes, not to exceed maximum page limit, and must follow the formatting requirements provided in the DoD SBIR Program BAA. Technical Volumes that exceed the page limit will be reviewed only to the last word on the maximum page limit.

a. DoD Proposal Cover Sheet (Volume 1)

b. Technical Volume (Volume 2):

Part 1: Phase I Justification (20 Pages Maximum)

Part 2: Phase II Technical Proposal (40 Pages Maximum)

c. Cost Volume (Volume 3)

d. Company Commercialization Report (Volume 4)

e. Supporting Documents (Volume 5)

f. Fraud, Waste, Abuse (Volume 6)

Technical Volume (Volume 2):

A. **Phase I Justification (20 Pages Maximum)**. Offerors are required to provide evidence that the scientific and technical merit and feasibility has been established as described in the topic description.

B. **Phase II Technical Objectives and Approach (40 Pages Maximum).** List the specific technical objectives of the Phase II research and describe the technical approach in detail to be used to meet these objectives.

C. **Phase II Statement of work (including subcontractor's efforts).** Provide an explicit, detailed description of the Phase II approach. The plan should indicate what is planned, how and where the work will be carried out, a schedule of major events, and the final product to be developed. Phase II is the principal research and development effort and is expected to produce a well-defined deliverable prototype or product.

D. **Related Work.** Describe significant activities directly related to the proposed effort, including those conducted by the Principal Investigator, the proposing firm, consultants, or others. Report how the activities interface with the proposed project and discuss any planned coordination with outside sources. The proposers' awareness of the state-of-the-art in the technology and associated science must be demonstrated.

E. **Commercialization Strategy.** Describe your company's strategy for converting the proposed SBIR research, resulting from your proposed Phase II contract, into a product or non-R&D service with widespread commercial use -- including private sector and/or military markets. Include a schedule showing the quantitative commercialization results that your company expects to achieve.

F. **Key Personnel**. Identify key personnel, including the Principal Investigator. List directly related education and experience and relevant publications (if any) of key personnel. No Government personnel may be listed. A concise resume of the Principal Investigator(s) must be included.

G. **Foreign Citizens**. Identify any foreign citizens or individuals holding dual citizenship expected to be involved on this project as a direct employee, subcontractor, or consultant. For these individuals, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. Proposing small business concerns frequently assume that individuals with dual citizenship or a work permit will be permitted to work on an SBIR project and do not report them. This is not necessarily the case and a proposal will be rejected if the requested information is not provided. Therefore, proposing small business concerns should report any and all individuals expected to be involved on this project that are considered a foreign national as defined in Section 3 of the DoD Program BAA. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a SBIR contract. Supplemental information provided in response to this paragraph will be protected in accordance with the Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).

H. **Facilities/Equipment**. Describe available instrumentation and physical facilities necessary. Justify items of equipment to be purchased (as detailed in the cost proposal) here, including Government Furnished Equipment (GFE). All requirements for government furnished

equipment or other assets, as well as associated costs, must be determined and agreed to during Phase II contract negotiations. State whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state (name) and local governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.

l. **Subcontractors/Consultants.** Involvement of university, academic institution, or other consultants in the project may be appropriate. If such involvement is intended, it should be described in detail and identified in the Cost Volume.

Cost Volume (Volume 3):

The Cost Volume must contain a budget for the entire 24-month Direct to Phase II period and not to exceed $1,300,000. Costs must be separated and clearly identified on the Proposal Cover Sheet (Volume 1) and in the Cost Volume (Volume 3).

Please review the updated Percentage of Work (POW) calculation details included in section 5.3 of the DoD Program BAA. DHA will occasionally accept deviations from the POW requirements with written approval from the Funding Agreement Officer.

Travel must be justified and relate to the project needs for direct Research Development Test & Evaluation (RDT&E) Technology Readiness Level (TRL) increasing costs. Travel costs must include the purpose of the trip(s), number of trips, origin and destination, length of trip(s), and number of personnel.

Company Commercialization Report (Volume 4):

Completion of the CCR upload from SBIR.gov to DSIP is required for proposing small business concerns with prior Federal SBIR or STTR awards.

Supporting Documents (Volume 5):

In addition to the Volume 5 requirements outlined in the DoD Program BAA, the following Supporting Documents are required:

1. 1-2 page whitepaper response to the open topic that was submitted by the deadline above.
2. The notification received to submit a full proposal.

****If the whitepaper and full proposal submission notification are not included, the proposal will be deemed unresponsive.**

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)

The DHA SBIR Program **does not** participate in the Technical and Business Assistance (formerly the Discretionary Technical Assistance Program). Contractors shall not submit proposals that include Technical and Business Assistance.

The DHA SBIR Program has a Technical Assistance Advocate (TAA) who provides technical and commercialization assistance to small businesses that have Phase I and Phase II projects.

EVALUATION AND SELECTION

The DHA SBIR Program will evaluate and select Direct to Phase II proposals using the evaluation criteria in the DoD SBIR Program BAA. Due to limited funding, the DHA SBIR Program reserves the right to limit awards under any topic and only proposals considered to be of superior quality will be funded.

Proposing firms will be notified via email to the Corporate Official of selection or non-selection status

for a Direct to Phase II award within 90 days of the closing date of the BAA.

Non-selected companies may request feedback within 15 calendar days of the non-select notification. The Corporate Official identified in the firm's proposal shall submit the feedback request to the SBIR Office at usarmy.detrick.medcom-usamrmc.mbx.dhpsbir@health.mil as specified in the non-select notification. Please note feedback is provided in an official PDF via email to the Corporate Official identified in the firm proposal within 60 days of receipt of the request. Requests for oral feedback will not be accommodated. If contact information for the Corporate Official has changed since proposal submission, a notice of the change on company letterhead signed by the Corporate Official must accompany the feedback request.

NOTE: Feedback is not the same as a FAR Part 15 debriefing. Acquisitions under this solicitation are awarded via "other competitive procedures". Therefore, offerors are neither entitled to nor will they be provided FAR Part 15 debriefs.

Refer to the DoD SBIR Program BAA for procedures to protest the Announcement.
As further prescribed in FAR 33.106(b), FAR 52.233-3, Protests after Award shall be submitted to:

Ms. Samantha L. Connors
SBIR/STTR Chief, Contracts Branch 8
Contracting Officer
U.S. Army Medical Research Acquisition Activity
Phone: (301)-619-6979
Email: Samantha.l.connors.civ@health.mil

AWARD AND CONTRACT INFORMATION
Direct to Phase II awards will typically be Firm-Fixed-Price contracts with the Contracting Officer Representative and other contracting staff identified. If you request a different contract type (cost plus) please include the rationale within the proposal. Note: Award times may increase depending on requested contract type.

RESEARCH INVOLVING HUMAN SUBJECTS, HUMAN SPECIMENS/DATA, OR ANIMAL RESEARCH
Prior to contract award when an IRB is indicated, proposers must demonstrate compliance with relevant regulatory approval requirements that pertain to proposals involving human subjects, human specimens, or research with animals. If necessary, approvals are not obtained within two months of notification of selection, the decision to award may be terminated.

Offerors are expressly forbidden to use, or subcontract for the use of, laboratory animals in any manner without the express written approval of the U.S. Army Medical Research and Development Command (USAMRDC) Animal Care and Use Review Office (ACURO). Written authorization to begin research under the applicable protocol(s) proposed for this award will be issued in the form of an approval letter from the USAMRDC ACURO to the recipient. Modifications to previously approved protocols require re-approval by ACURO prior to implementation.

Research under this award involving the use of human subjects, to include the use of human anatomical substances or human data, shall not begin until the USAMRDC's Office of Human and Animal Research Oversight (OHARO) provides formal authorization. Written approval to begin a research protocol will be issued from the USAMRDC OHARO, under separate notification to the recipient. Written approval from the USAMRDC OHARO is required for any sub-recipient using funds from this

award to conduct research involving human subjects. If the Offeror intends to submit research funded by this award to the U.S. Food and Drug Administration, Offerors shall propose a regulatory strategy for review.

Non-compliance with any provision may result in withholding of funds and or termination of the award.

WAIVERS

In rare situations, the DHA SBIR Program allows for a waiver to be incorporated allowing federal facility usage for testing/evaluation. A waiver will only be permitted when it has been determined that no applicable U.S. facility has the ability or expertise to perform the specified work. The DHA SBIR Program has the right of refusal. If approved, the DHA SBIR Program will assist in establishing the waiver for approval. If approved, the proposer will subcontract directly with the federal facility and not a third-party representative.

Transfer of funds between a firm and a Military Lab must meet the following APAN 15-01 requirements:

1) The DoD Intramural Researcher must obtain a letter from his/her commanding officer or Military Facility director authorizing his/her participation in the Extramural Research project. This letter must be provided to the Extramural Organization for inclusion in the proposal or application.

2) The DoD Intramural Researcher must also coordinate with his/her local RM office (or equivalent) to prepare a sound budget and justification for the estimated costs. Where there are no DoD-established reimbursement rates [e.g., institution review board (IRB) fees, indirect cost rates, etc.], the Military Facility's RM office (or equivalent) must provide details of how the proposed rates were determined. The DoD Intramural Researcher must use the enclosed budget and justification form when developing the estimated costs and provide it to the Extramural Organization for inclusion in the proposal or application. Instructions for completing this form will be included in the FOA.

3) The Extramural Research proposal or application must include a proposed financial plan for how the Military Facility's Intramural Research costs will be supported [i.e., directly funded by DoD, resources (other than award funds) provided by the Awardee to the Military Facility, or award funds provided by the Awardee to the Military Facility (in accordance with the requirements below)].

4) The DoD Intramural Researcher should also coordinate with his/her technology transfer office.

International Traffic in Arms Regulation (ITAR)

For topics indicating ITAR restrictions or the potential for classified work, limitations are generally placed on disclosure of information involving topics of a classified nature or those involving export control restrictions, which may curtail or preclude the involvement of universities and certain non-profit institutions beyond the basic research level. Small businesses must structure their proposals to clearly identify the work that will be performed that is of a basic research nature and how it can be segregated from work that falls under the classification and export control restrictions. As a result, information must also be provided on how efforts can be performed in later phases, such as Phase III, if the university/research institution is the source of critical knowledge, effort, or infrastructure (facilities and equipment).

END

DHA SBIR 23.4 Topic Index
Release 2

DHA234-P001 Open Topic for Temporary Stabilization of Corneal and Corneoscleral Injuries

DHA234-P001 TITLE: Open Topic for Temporary Stabilization of Corneal and Corneoscleral Injuries

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Combat Casualty Care

OBJECTIVE: The objective of this topic is the development of a non-surgical prototype technology capable of obtaining approval/clearance by the Food and Drug Administration (FDA) that is simple enough for medical personnel to administer in a theater of operations (TO) with minimal additional training that will temporarily stabilize suspected full thickness corneal and corneoscleral injuries during transport to a higher echelon of care where surgical intervention is available. This award will seek offerors to engage the FDA, conduct Good Laboratory Practice (GLP) animal studies, and deliver prototype devices to the government.

DESCRIPTION: Ocular injuries are common occurrences among warfighters, occurring disproportionately compared to injuries affecting more protected areas of the body. The cornea is the first tissue of the ocular structure and often impacted first in trauma. Combat corneal injuries often have a significant impact on vision and there can be significant delays in receiving specialty care for combat ocular trauma. In recent combat operations corneal puncture injuries resulted in poor visual outcomes often resulting in blindness. This is predominantly due to inadequate battlefield interventions to close the open ocular wounds and restore intraocular pressure. A study published in 2020 describes the cause and type of ocular injuries in modern warfare and analyzed all patients with eye injuries from the Iraq and Afghanistan conflicts who were treated at Military Treatment Facilities (MTF). They reported 67,586 persons were admitted to either a United States or United Kingdom MTF for treatment of injuries. 8-10% of wounded soldiers had ocular injuries. 82% of those injuries occurred in battle and 71% were from explosions, and 56% had open globe injuries. [1]

If an open globe (OG) injury is suspected on the battlefield, a rigid eye shield is applied to protect the eye, and the injured warfighter is evacuated to an ophthalmic specialist. Then, OG injuries are closed with sutures to create a watertight seal. This may occur up to 24 hr post-injury currently and is expected to increase up to 72 hr in future combat operations where air evacuation may not be guaranteed. [2-4] However, 53% of OG injured eyes retain intraocular foreign body upon injury and require evacuation to an ophthalmic specialist for surgical intervention. [5]

In order to address corneal and corneoscleral injuries earlier and in a way that is relevant to the the austerity encountered in a TO, a product that allows for temporary stabilization of corneal and corneoscleral injuries is needed. The temporary cornea repair (TCR) will serve as a bridge management strategy that will remain in place until more definitive care is available. The TCR capability will be in support of MTFs associated with the Military Healthcare System at Role of Care (RoC) 2 (Forward Resuscitative Surgical Team) and RoC 3 (Combat Support Hospital). For a description of RoC please see the reference section.

PHASE I: This topic is intended for technology proven ready to move directly into Phase II. Therefore, the offeror shall provide detail and documentation which demonstrates the accomplishment of a "Phase I-like" effort, including a feasibility study. This includes, insofar as possible, the scientific and technical merit of a non-surgical prototype that will temporarily stabilize suspected full thickness corneal and corneoscleral injuries. Feasibility documentation of particular interest is prior evidence leading to:

- Preliminary data to support the safety and efficacy of the prototype.
- Design specifications for the prototype.
- GLP-biocompatibility (in vitro and in vivo) safety validation data if available.
- Statistically significant performance data if available.

PHASE II: This phase will focus on refinement and optimization of a non-surgical prototype that will temporarily stabilize suspected full thickness corneal and corneoscleral injuries and can be tested in a military relevant environment.

Offerors should propose technology solutions ranging from initial testing of design concepts and evaluation of candidate(s) where study endpoints are defined, and animal models are proposed. ((Technology Readiness level (TRL) 3)) to component validation in a non-GLP laboratory environment to refine hypothesis and identify relevant statistical data required for further technological assessment (TRL 4). Further information regarding DOD Biomedical TRLs can be found in the reference section.

The work may include, but is not necessarily limited to, the following:

- Prototype refinement/maturation progressing towards clinical product
- Preclinical studies (as needed) to support an Investigational Device Exemption (IDE) (or
- other appropriate FDA) submission
- Preclinical studies under GLP (as needed) to support IDE (or other appropriate FDA) submission
- IDE (or other appropriate FDA) submission
- Stability and shelf-life studies if performed
- Establishment of Good Manufacturing Practice (GMP) planning for clinical trials and for market release
- The performer is expected deliver up to 4 prototypes for military relevant testing.

The desired prototype should be simple enough for medical personnel to administer in a TO with minimal additional training, safe enough to use on any suspected corneal or corneoscleral injuries, capable of maintaining a tight seal for an extended period during transport, and effective at stabilizing the eye such that it preserves eyesight.

PHASE III DUAL USE APPLICATIONS: The goal for this Phase is to further development and testing of the prototype through commercialization and FDA approval for its intended use as a temporary stabilization of corneal and corneoscleral injuries. The temporary cornea repair would need to serve as a bridge management strategy that will remain in place until more definitive care is available. Military uses of this technology would support RoC 2 and 3, as well as a mass casualty event where casualties greatly overwhelm first responders and patients need to be triaged to preserve life, limb, and sight.

REFERENCES:

1. [1] Breeze J, Blanch RJ, Mazzoli R, DuBose J, Bowley DM, Powers DB. Comparing the Management of Eye Injuries by Coalition Military Surgeons during the Iraq and Afghanistan Conflicts. Ophthalmology. 2020 Apr;127(4):458-466.
1. [2] Linde, A. S., Mcginnis, L. J. & Thompson, D. M. Multi-battle domain-perspective in military medical simulation trauma training. J Trauma Treat https:// doi. org/ 10. 4172/ 2167- 1222. 10003 91 (2017).
2. [3] Riesberg, J., Powell, D. & Loos, P. The loss of the golden hour. Special Warfare Mag. 30(1), 49–51 (2017).
3. [4] Army, U. S. The US army in multi-domain operations 2028. TRADOC Pamphlet 525, 3–1 (2018).
4. [5] Vlasov, A. et al. Corneal and Corneoscleral Injury in Combat Ocular Trauma from Operations Iraqi Freedom and Enduring Freedom. Mil. Med. 182, 114–119, https://doi.org/10.7205/MILMED-D-16-00041 (2017).
5. Roles of Care doctrine: https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp4_02ch1.pdf
6. Combat Ocular Trauma: Open-globe wounds in operation Iraqi Freedom and Operation Enduring Freedom: risk factors for poor visual outcomes and enucleation; Harris JP, Justin GA, Brooks DI, Woreta FA, Agrawal RV, Ryan DS, Weichel ED, Colyer MH.; Acta Ophthalmol. 2021 Dec.

7. Military Relevant Testing: Development and Characterization of a Benchtop Corneal Puncture Injury Model; Eric J. Snider, Lauren E. Cornell, Jorge M. Acevedo, Brandon Gross, Peter R. Edsall, Brian J. Lund, and David O. Zamora; Sci Rep. 2020; 10: 4218.

KEYWORDS: Cornea injuries, corneoscleral injuries, corneal repair, combat ocular trauma, open globe injuries, roles of care