Blueprint Biosecurity

Request for Proposals: Filtration Loss Testing in Respirator Equipment Research (FILTER RFP)

Important Dates:
Release Date: **Jan 26th, 2026**
Expression of Interest (EOI) Due Date: **March 1st, 2026**

Introduction and Background

Blueprint Biosecurity is a nonprofit dedicated to strengthening society's ability to prevent and respond to pandemics. We advance practical, pathogen-agnostic solutions through targeted research, strategic grantmaking, and evidence-based policy guidance that protect critical workers and reinforce systems essential to pandemic preparedness and response.

Our work spans personal protective equipment, far-UVC, and other airborne pathogen mitigation technologies. We pair research with active implementation, working with partners across government, academia, industry, and philanthropy to translate our strategic frameworks, known as Blueprints, into real-world action. Our goal is to ensure that when the next outbreak begins, society is ready to respond so communities remain safe, stable, and resilient.

Our PPE program aims to ensure critical workers have access to sufficient quantities of highly protective respirators in future pandemics; expanding on the work of our PPE Blueprint, we focus on advancing the use, stockpiling, and manufacturing capacity of reusable respirators.

During the COVID-19 pandemic, critical workers experienced extreme shortages of NIOSH-approved respirators or equivalents outside of the US; as a result, extended use and re-use of disposable respirators became common practice. While disposable respirators are typically intended to be worn for a single use, e.g. a single patient interaction, respirators were often rationed for one healthcare worker per day or fewer. For other critical workers and the general public, respirators were often worn until the respirators became visibly damaged or

difficult to breathe through[1], an approach that can be called “extreme reuse”. Extended use and reuse can compromise protection by degrading fit [2,3]; for this reason, our research supports the use of reusable respirators, such as elastomeric half-mask respirators (EHMRs), in a pandemic or other health emergency. Fit is typically seen as the bottleneck to performance with respirator re-use, and under normal circumstances, that is overwhelmingly the case. However, with extreme pandemic-induced shortages, it may be necessary for users to use a respirator (either a set of filters or a modified disposable respirator) for much longer. **In these scenarios, decay to the filters, e.g. loss of filtration efficiency, becomes a crucial consideration, and one that is relatively understudied. We aim to understand the true lifespan of the full landscape of commercially available filters and clarify the conditions in which loss of protection through decay of filters is a concern.**

Loss of filtration efficiency has been observed with filtering facepiece respirators (FFRs)[4,5]. This effect is variable across respirator models and filter materials, and the mechanisms of loss of filtration efficiency are poorly understood. The majority of disposable FFRs, as well as many filters for reusable respirators, rely on electrostatic charge to provide a high filtration efficiency while keeping breathing resistance low. Electrostatic charge can be depleted through a variety of mechanisms, including exposure to heat, humidity, solvents, and salt particles[6,7], all of which could occur during respirator use. In practice, respirators may lose filtration efficiency through mechanisms other than electrostatic charge depletion as well. This uncertainty presents a risk to critical workers who may be driven to extreme reuse due to shortages. **Understanding the drivers and mechanisms of filter degradation is essential for establishing evidence-based guidance during supply crises.**

Program Description/Scope

This RFP seeks to understand how long different classes of filters can be used in an emergency before filtration efficiency drops below functional thresholds, establishing the functional

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[1] https://www.cdc.gov/niosh/docs/2018-128/pdfs/2018-128.pdf?id=10.26616%2FNIOSHPUB2018128

[2] https://pubmed.ncbi.nlm.nih.gov/21864945/

[3] https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/fitfailure-rate-associated-with-simulated-reuse-and-extended-use-of-n95-respirators-assessed-by-a-quantitative-fit-test/223BBC46A26D4F15806FA85EAB3C10B2

[4] https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2825446

[5] https://journals.lww.com/md-journal/fulltext/2020/12110/Determination_of_the_optimal_time_for_N95.143.aspx

[6] https://pubmed.ncbi.nlm.nih.gov/10957815/

[7] https://www.mdpi.com/2073-4360/12/3/721

lifespan of reusable respirator filters and informing protocols for extreme extended use of disposable FFRs.

The primary objectives of this work include:

1. Evaluate factors that may lead to loss of filtration efficiency over time and identify the general mechanisms of decay (e.g. electrostatic charge depletion, mechanical degradation).
2. Quantify the maximum effective lifespan of particulate respirators across various filter media compositions, especially for **reusable respirator filters**.

We are especially interested in work that addresses the following technical areas:

1. Quantify changes in filtration efficiency over weeks to months of re-use for respirators and filters, alongside metrics such as breathing resistance/pressure drop and filter soilage.
    - All work must involve **some real-world wear on human subjects**. We welcome work that supplements this with validated models of simulated wear (e.g. manikins) to expand the scope of conditions that can be tested.
    - We are open to studies that explore the lifespan of both raw filter media and commercially available respirators/filters; all studies on finished commercial products must identify and consider the composition of the product. **The strongest proposals will evaluate a range of commercial products representing the full diversity of the industry** (disposable and reusable respirators, electrostatic and non-electrostatic media, across a range of materials).
2. Identify and evaluate factors that lead to loss of filtration efficiency, including but not limited to moisture, ambient particles, particles in exhaled breath, sweat, exposure to environmental solvents (e.g. vapors from surface disinfectants), exposure to oils from the skin, hands, and environment, temperature, exposure to sunlight, and/or mechanical wear (through wear and storage). **Ideally, this work considers the factors that critical workers may be exposed to during the course of their workday.** This represents a wide diversity of workers across sectors and roles including, but not limited to:
    - Healthcare and emergency response
    - Agriculture
    - Electricity and power
    - Waste and wastewater management
3. Assess how loss of filtration efficiency mechanisms affect most penetrating particle size (MPPS) and overall filtration patterns based on particle size.

4. Assess how respirator design (e.g. disposable vs reusable respirator, inclusion of an exhalation valve) affects longevity of specific filter media. Example questions:
    - Does the lifespan of a filter media material change based on the overall structure (e.g. stabilizing or hydrophobic layers) and respirator type (disposable FFR, reusable respirator filter)?
    - How does the inclusion of an exhalation valve (filtered or unfiltered) affect filter longevity?
    - What design factors lead to stresses on the filter material (shear/rubbing, bending/folding, compression/extension)?
5. Assess effects of storage protocols between wears with re-use. Example questions:
    - Is it necessary to allow respirators to fully dry out between wears in order to maintain filtration efficiency?
    - How does exposure to temperature, light, humidity, or ambient air (i.e. storing sealed vs unsealed) affect filter longevity?
    - Does storage (e.g. in pockets or bags) drive mechanical wear on filters?

While not part of the core research program, we are interested in any insights related to:

- The reversibility of loss of filtration efficiency, based on specific mechanisms of decay (e.g. reintroducing electrostatic charge without niche and specialized equipment).
- Models (e.g. simulations) or tools to predict respirator/filter lifespan based on filter composition and use patterns.
- Identification of accessible ways for a user to test filtration efficiency or respirator efficacy, for example assessing the efficacy of qualitative or quantitative fit tests, PM2.5 sensors, or novel options made from hardware store materials to detect a loss in filtration efficiency.
- Strategies to maximize protection under extended-use conditions.
- Evaluation of the risk of microbial growth with respirator re-use.

We invite proposals from academic, government, nonprofit, and industry groups with demonstrated expertise in filtration science and respirator performance testing. Deliverables may include datasets, validated testing methodologies, predictive models, and best-practice recommendations suitable for integration into public health guidance. Grantees must be willing to share and publish complete datasets, including performance data for all tested respirators. Proposals must not focus exclusively on products from a single supplier or manufacturer.

In Scope:

- Assessing lifespan of particulate respirators and filters when worn by human subjects.

- Simulating extended use of respirators using models such as wind tunnels, including development of novel models.
- Developing novel methods to assess filtration efficiency or real-world protection of a respirator.

Out of Scope:

- **Studies purely simulating respirator use** without adequate validation from real-world data collection using human subjects.
- Assessing non-particulate respirators.
- Method development for decontamination of respirators.
- Precise mechanisms of electrostatic charge degradation at the level of electret physics, e.g. precise nature of the trap states in polymer electret materials.
- Developing novel filter materials or respirators.
- Studies solely assessing how extended or re-use impacts fit.
- Assessing respirator lifespan without identifying the composition of the product and establishing mechanisms of decay.
- Work intended purely to assess or advance specific commercial products.
- Development of user solutions that have a prohibitively high cost of production, such as complex hardware to assess filtration efficiency (e.g. real-time fit sensors).
    - User solutions should not require substantial preparation in advance (e.g. marketing a novel commercial product) and should not exceed the cost of the respirator itself.

Schedule/Milestones

Preferably, projects are completed within 6 months of contract award, with at least one proposed interim milestone, which are potentially tied to contractual payments. However, we understand that longer schedules may be necessary for some proposals (e.g. for recruitment of human subjects).

Deliverables

Blueprint Biosecurity will negotiate project deliverables with individual awardees. Blueprint Biosecurity anticipates that, at a minimum, selected awardees will provide the following:

- Monthly technical reports describing progress, challenges, and next steps
- Virtual meetings to discuss progress
- A completion report within 30 days of the end of each project phase
- Any models or data analysis developed during the project, with clear documentation

Depending on the proposer’s approach and plan, other examples for deliverables may include:

- Experimental protocols, data, results, and analysis
- Models, simulation tools, or analysis scripts, with documentation
- Publications, validation data, or supporting materials
- Software tools, scripts, or design documents
- Periodic financial reporting

Award Information

General Award Information

Blueprint Biosecurity may provide multiple awards. Proposals are limited to a maximum of $1,000,000 USD. We anticipate that requests approaching this ceiling will be submitted by established groups with demonstrated experience in assessing respiratory protection, ideally with a publication record, and will address most or all of our focus areas. Preference will be given to lower-cost grants that satisfy the goals of the technical effort.

Blueprint Biosecurity reserves the right to:

- select for negotiation all, some, one, or none of the proposals received in response to this RFP;
- conduct discussions with proposers if it is later determined to be necessary;
- select for award entire proposals, or only specific portions;
- fund awards in increments or by milestone achievements
    - There may be options for continued work and additional funding following completion of the proposed work;
- request additional documentation once the award instrument has been determined (e.g., representations and certifications); and
- stop considering a proposal for award if: all parties involved fail to reach agreement on terms (award, technical, milestones, etc.) within a reasonable time; the proposer fails to provide requested additional information; or the application is deemed noncompliant with the requirements of the RFP at any time.

Proposals identified for negotiation may result in a milestone-based contract, depending on the nature of the work proposed, the required degree of interaction between parties, and other factors.

Awardees are responsible for ensuring that research is conducted in compliance with rules set forth by relevant institutional, local, and national research regulatory bodies such as Institutional Review Boards (IRBs) and/or Institutional Ethics Committees (IECs).

Blueprint Biosecurity retains sole discretion to select awards and to negotiate all terms and conditions with selectees.

Non-proprietary Research

Blueprint Biosecurity expects the results of all research performed under this RFP can be broadly published and shared to the scientific community. This contrasts with proprietary research in which development, design, production, and product utilization are restricted to corporate interests.

Hence, Blueprint Biosecurity expects that all outputs from efforts funded by this RFP will be published as open-access, or open-source, as relevant. Proposers should clearly indicate in their proposals if any portion of the research is proprietary. If so, they should clearly indicate what parts they intend to protect, why, and if/how Blueprint Biosecurity may adequately share such information with other parties to provide the greatest impact in accordance with our mission.

Administrative Overhead Policy

Blueprint Biosecurity contracts allow for indirect costs at a maximum rate of 10% of total direct costs.

Guidelines for Submission

Blueprint Biosecurity requires proposers to submit an Expression of Interest outlining:

- Capabilities and relevant experience
- High-level summary of the proposed work
- Anticipated outcomes
- Rough order-of-magnitude (ROM) budget

In addition to a main proposal, applicants are welcome to outline an **optional extension for work that supports their proposal** but does not clearly fit into the goals of this RFP. Applicants should clearly indicate what element of their proposal is an extension.

We recommend that an Expression of Interest not exceed three single-sided pages. Proposers may opt to provide supplemental papers for consideration as part of the evaluation, though these may not be reviewed in their entirety.

Expressions of Interest should be submitted by email to **FILTER-RFP@blueprintbiosecurity.org.** Please submit as a PDF or Word document, in English.

Consult our **Expression of Interest Guide** for more guidance.

ADMIN

Eligibility

Eligible Applicants
Submissions are welcome from all responsible sources, within and outside the United States, capable of satisfying the requested work in this RFP. We will be unable to provide awards to any entities subject to United States sanctions.

Organizational Conflicts of Interest
Proposers are required to disclose all potential real or perceived organizational conflicts of interests, such as

- Current or past funding, financial interests, advisory roles, or personal ties involving the PPE industry or competing industries
- Personal ties to the Blueprint Biosecurity team

Disclosures will be reviewed as part of the evaluation process and will not necessarily disqualify a proposal. **Failure to disclose relevant conflicts may result in disqualification**

Application Review Information

Evaluation Criteria
All received proposals will be evaluated by the selection committee using the following criteria; note that the listed criteria are in descending order of importance.

1. Overall scientific and technical quality
Proposals will be evaluated for innovation, achievability, reasonableness, and completion. Proposals should provide a comprehensive and logical sequence for completion, containing timelines, and all proposed deliverables. Additionally, how well the proposed research addresses the program objective will be evaluated. Proposals will also be evaluated for the schedule realism, which includes how well the proposed work aligns with the anticipated schedule. Technical risks must be addressed with planned and feasible mitigation strategies included.

2. Proposer's capability and/or related experience

Proposals will be evaluated for the technical team's experience and expertise required for achieving the proposed work. Proposals should establish prior experience in similar efforts that demonstrate adherence to proposed budget and schedule while delivering the proposed technical work.

3. Cost effectiveness/realism/reasonableness

Each proposal will be subject to cost analysis to ensure effective, reasonable, and realistic proposed costs for technical work and equipment, labor, and other associated program costs (e.g., travel, publication, conference fees). By 'cost effectiveness', we mean the ability to extract the most useful information for this RFP per dollar spent. By 'cost realism' we mean the necessity of each expense to address the program objectives. By 'cost reasonableness', we mean the justification of the monetary value of those expenses. For example, 'cost realism' would address whether a specific piece of equipment is required for the project, and 'cost reasonableness' would address whether the budgeted cost of that equipment is reasonable.

4. **Speed of execution**

Proposals will be evaluated for the speed at which the work is initiated and completed, while not sacrificing scientific integrity. Proposers should identify how their approach will preserve scientific integrity while accelerating the experimental timeline.

<u>Proposal Evaluation Process (Review and Selection Process)</u>

It is the policy of Blueprint Biosecurity to ensure impartial, equitable, comprehensive evaluations of Proposer Submissions. The review team will consist of at least two employees of Blueprint Biosecurity, as well as a small number of outside contractors/consultants/experts. Review team members will individually evaluate and comment on the proposals. A subsequent discussion will weigh the (de)merits of each proposal to inform funding decisions. Final funding decisions will be made by the members from Blueprint Biosecurity.

Blueprint Biosecurity will identify and execute a mitigation plan for identified conflicts of interests between review team members and any proposals. Our Chief Operating Officer, who will not be part of the review team, will manage this process, and adjudicate conflicts.

<u>Handling of Proposal Submissions and Proprietary Information</u>

Blueprint Biosecurity policy is to treat all submissions as protected information, and to only disclose their contents to authorized personnel strictly for the purposes of evaluation. Note that despite the use of any restrictive notices on submitted materials, support contractors may handle submissions for administrative purposes and/or to assist with technical evaluations. All Blueprint Biosecurity support contractors performing this role are expressly prohibited from performing technical research sponsored by Blueprint Biosecurity, and are bound by appropriate nondisclosure agreements. Input on technical aspects of the proposals may be

solicited by Blueprint Biosecurity from other consultants/experts who are strictly bound by the appropriate non-disclosure agreements.
No proposal submissions will be returned. Upon completion of the Proposal Evaluation process, an electronic copy of each proposal will be retained by Blueprint Biosecurity, and all other copies will be destroyed.

Award Administration Information

Types and Delivery of Notices
The following notices will be provided as applicable:

- Notice of Disinclination (for proceeding from EOI to full Proposal)
- Notice of Recommendation (for proceeding from EOI to full Proposal)
- Notice of Non-Selection (for proceeding from Proposal to negotiation of an Award)
- Notice of Selection (for proceeding from Proposal to negotiation of an Award)

All notices will be sent by email to the Technical and Administrative POCs identified in the EOI.

Expression of Interest (EOI)
Blueprint Biosecurity will respond to EOIs with either a Notice of Recommendation or a Notice of Disinclination, along with a brief description containing feedback. All proposers may still submit a full proposal, regardless of Blueprint Biosecurity's response to the provided EOI. All conforming full proposals will be reviewed according to the evaluation criteria listed in Section VI.A; these reviews will be independent of the EOI reviews, though consideration may be given to the proposers' responses to feedback provided.

Proposals
After proposal evaluations are complete, proposers will be notified as to whether their proposal was selected for award negotiation. For proposals that receive a Notice of Selection, the funding negotiation could be for the proposal in whole or in part. If a proposal has been selected for award negotiation, Blueprint Biosecurity will initiate those negotiations following the notification.

Other Information

FAQs: For questions regarding this funding opportunity, please contact Victoria Slaughter, PPE Director, at victoria.slaughter@blueprintbiosecurity.org. Answers may be shared in public FAQs.

NOTE: Blueprint Biosecurity will not provide reimbursement for costs incurred in responding to this RFP.

Blueprint Biosecurity intends to conduct individual discussions with respondents as necessary to gain a full understanding of the responses submitted. Blueprint Biosecurity will contact respondents via email.

To the maximum extent possible, please submit non-proprietary information. If absolutely necessary, responses can contain confidential or proprietary information, but only if it is clearly marked as “Proprietary” and only if you have the authority to disclose that information to Blueprint Biosecurity. Blueprint Biosecurity will disclose submission contents labeled “Proprietary” only for the purpose of review by Blueprint Biosecurity staff and contract support personnel who have agreed with Blueprint Biosecurity to maintain the confidentiality of such information. Please note that Blueprint Biosecurity may already be in possession of, or separately may obtain, information similar or identical to your proprietary information, and Blueprint Biosecurity remains free to use any of that information with the applicable restrictions from those sources, possibly including no restrictions.