Application: RFP: Innovation Challenge 2021 - Full Proposal

Hello Nabarun,

Full Proposal Instructions

The Foundation for Opioid Response Efforts (http://forefdn.org) (FORE) is pleased to invite you to submit a full proposal.

Before you begin your application, please review the following:

- Required fields are highlighted with a **red asterisk**.
- Please read all instructions to ensure all requested information is submitted.
- Be mindful of the **word limits** for certain sections of the application.
- The following documents **must** be submitted as part of the application:
    - A detailed line-item project budget (template file is provided)
    - Completed Milestones and Outcomes table (template file is provided)
    - Curriculum vitae of person(s) leading the project
    - Letter of support from your organization's leadership
    - Letters of collaboration from partnering organizations (if applicable)
    - IRS Form 990 (within last year) or Proof of Tax Exemption
    - Organizational Budget for the current year
    - Three most recent Audited Financial Statements (within last year)

Application Questions

Please use only the conversation box on the left hand side of each section to communicate any questions you have while completing the application. A FORE program staff member is alerted immediately and will respond via the conversation box as soon as possible.

Contact

Programmatic questions about this funding opportunity should be addressed to Senior Program Officer Ken Shatzkes, Ph.D. at kshatzkes@ForeFdn.org (mailto:kshatzkes@forefdn.org).

General Information

Project Name

Provide a brief title for your project.

Randomized Trial and Analytic Chemistry Innovations to Optimize Drug Alerts

Organization

Provide the name of the organization where the project will take place.

University Of North Carolina At Chapel Hill

[redacted]

***Grant Term**

Provide the expected number of months it will take to complete the project.

24

***Start Date**

Provide the proposed start date of the project.

Nov 1, 2021

***End Date**

Provide the proposed end date of the project.

Oct 31, 2023

***Population Focus**

Please identify the population(s) that the project will focus on.

General Public; Urban Communities; Rural Communities; Low-Income

***Geographic Region**

Please select the geographic region(s) that the project will focus on. Please make sure to select a Region **AND** State by using the (+) dropdown, unless it is a National-based project.

Midwest; Northeast; Southeast; West; North Carolina

***Focus Area - Innovation**

Please select "Innovation" **AND** one of the three focus areas in the (+) dropdown below for the proposed project.

Innovation; Timely & Actionable Data

Executive Summary

***Executive Summary**

In lay terms, summarize the essential elements of the proposal, including hypotheses, goals, strategy/work plan, desired outcomes, and the broader impact that the project will have on opioid use disorder patients (maximum 200 words).

Bringing together advertising, epidemiology, and chemistry, our proposal generates evidence-based guidance for drug alerts, and chemistry innovations for timely data to reduce overdose deaths.

Pandemic Pedigree

Requested by the state health department, our team developed a fully digital rapid COVID message testing solution. Governor Cooper used our optimized messages encouraging social distancing verbatim. We propose applying this rapid-yet-rigorous paradigm to drug alert communication. Our chemistry innovations are inspired by drive-thru COVID testing. We extend this high-usability archetype, making unregulated drug surveillance more efficient and timely.

Proposal Aims

Drug checking is an essential public health response to novel psychoactive substances and adulterants that are treacherous. It remains underutilized. To expand drug checking, in Aim 1 we reduce implementation barriers through chemistry innovations.

Drug alerts are critical to reduce harm and death. In Aim 2 we advance communication science by establishing design guides, templates, and visual libraries for drug alerts. We will generate scientific evidence that minimizes thrill-seeking unintended consequences, and reduces gender-based disparities, through a message testing randomized trial.

By pairing novel data collection with cutting-edge communication guidance, we offer a comprehensive solution. These techniques empower people who use drugs to make informed choices and reduce harm.

{COVID Test Inspiration: Supplement.01 (https://go.unc.edu/FORE01)}

Abstract

***Project Goal**

Provide a brief summary of the anticipated project goals (maximum 50 words).

Our primary goal is to generate evidence-based recommendations that are immediately actionable to expand unregulated drug surveillance and improve alert quality nationwide. Our intermediate goals are to produce public domain visual tools and chemistry protocols that will allow others to conduct drug checking and communicate findings effectively and responsibly.

***Strategy**

Briefly describe the strategies the proposed project will seek to accomplish the Project Goal above (maximum 50 words).

In Aim 1 we will develop new sample collection and analytic chemistry protocols that alleviate legal concerns and enable more efficient and widespread use of university labs. In Aim 2 we will conduct a message testing RCT to generate evidence for best practices in drug alert communication.

***Outcomes**

Briefly describe the desired outcomes to accomplish the Project Goal above. What impact will this project have on opioid use disorder patients and/or the field (maximum 50 words)?

1. Scientific findings from 2 high quality studies

2. Style guide and templates for drug alerts

3. Hand-drawn illustration library for drug communications

4. Laboratory and sample collection protocols

These advances simultaneously generate surveillance data for *policymakers*, while empowering *people who use drugs* to make informed choices about their bodies.

***Need/Problem Being Addressed**

Briefly describe the unmet need in caring for patients that this proposal seeks to address (maximum 50 words).

Drug checking has urgent implications to counter fentanyl analogs, yet remains underutilized. Drug alerts rarely use evidence-based health communication strategies, nor is there data showing alerts increase awareness and change behavior. Through innovative chemistry and an RCT, we overcome concerns about handling controlled substances and generate evidence for better communication.

Significance & Impact

***Significance and Impact**

Provide a description of the significance of the problem or barrier that this proposal seeks to address. Describe the existing evidence and preliminary data to justify the proposed project. Describe how this project overall has and/or will specifically accelerate improvements in patient care. What is the broader impact (short-term and long-term) this project would have on patients and the opioid crisis (maximum 500 words)?

✦ **Aim 1**

Nationwide, drug checking capacity is extremely limited. It is common in other countries.[1-12] Samples are brought by participants to make informed choices, sometimes discarding them.[8] Drug checking is acceptable with community members.[13-15] We propose an *evidence-making intervention* [16] to address capacity and legal concerns.

Our experience has been encouraging. Our pilot in NC has detected concerning substances (xylazine, phenacetin, methyl-fentanyl, synthetic cannabinoids), and perplexing ones (caffeine, artificial sweeteners, niacin). Our findings have resulted in alerts distributed by health departments {📂 Supplement.02 (https://go.unc.edu/FORE02)}, requests from medical examiners, and informed clinical management.

But, confirmatory testing is a bottleneck. Field FTIR programs need confirmatory testing with GCMS/LCMS for:

- samples with 4+ substances
- differentiating fentanyl analogs
- counterfeit pills
- identifying benzodiazepines

We developed this service for NC Survivors Union because 20% of their FTIR-analyzed samples were inconclusive. Yet, only a commercial lab in Pennsylvania (https://www.nmslabs.com/forensic-testing) and Erowid (https://drugsdata.org/about.php) provide similar services.

⛔ **Challenges to Uptake**

1. Lack of analytic chemistry expertise at harm reduction programs and health departments;
2. Criminal and post-mortem forensic labs do not allow insight into context and motivations for drug use relevant for surveillance, clinical management, behavior change.
3. Community-based programs and health departments have concerns about receiving controlled substances.
4. University labs have concerns about handling controlled substances without DEA registration.
5. Existing laboratory protocols focus on controlled substances and miss adulterants causing clinical harm.

✅ **Solutions**

1. Develop laboratory protocols facilitating university labs to provide primary and confirmatory testing for community-based programs.
2. Collect contextual information to understand psychological aspects of risk perception, structural causes of street-level fluctuation (eg., changes in trusted-dealer relationships).
3. Develop sample collection methods minimizing legal exposure by leveraging trace residue from materials already collected: drug litter, discarded baggies, used cottons.
4. Develop sample transport alternatives for university labs by dissolving drugs in an organic solvent not requiring DEA registration.
5. Develop new methods to detect adulterants ignored by forensics.

✦✦ Aim 2

Better drug alert design is achievable with communication science. Well-established research [17-21] demonstrates reducing complexity and increasing relevance of text and visuals improve health communication. These theories are the "missing link" for communication effectiveness.[22,23] Our team has optimized the design of tobacco, alcohol, and sugary drink communications [24-28]; yet, for drug alerts these visual design principles have been ignored.[29-34]

Drug alerts must be designed to minimize unintended consequences. Our team and others describe how poorly designed alerts inadvertently encourage risk-seeking.[22,35-38]

Instead, alerts should use established communication theories to:

- guide attention (visual persuasion theory [17]);
- increase awareness/knowledge (dual coding theory [39,40]);
- encourage behavior change.[41]

These theories suggest simple language and visuals in structured layout increase attention, comprehension, intentions to use information, and reduce risk-seeking.[34,41]

Drug alerts must be designed to deliver the right message, at the right time, through the right channel. Optimizing distribution is critical to counter gender disparities.[42] Street health communications skew towards public channels used by men,[32] whereas women receive drug information more through peers.[35] A phone-based methadone patient intervention [43] found framing did not interact with gender for repeated exposures, but concluded that gender is relevant for public messaging and behavior.[44] Trusted dealers and peer-based networks are considered most reliable.[30,33,35,45,46] Therefore, we will optimize alerts for sharing by peers.[25]

Supplemental Files

If necessary, provide figures, preliminary data, and/or a list of references to support the Significance and Impact section above.

Supplemental_Information_UNC.pptx

citations.pdf

abbreviations.pdf

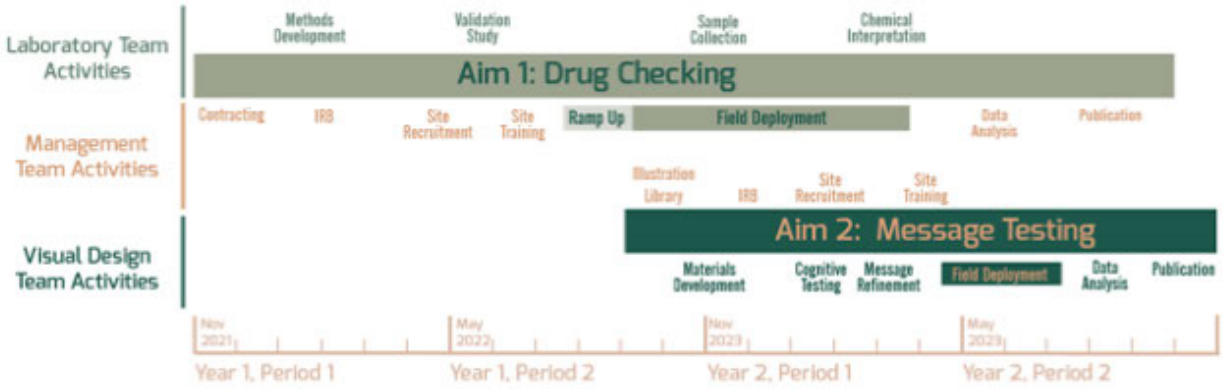
Strategy & Approach

***Strategy and Approach**

Provide a description of the project and its anticipated goals. Describe the rationale, strategies, and specific methodologies the proposed project will set to accomplish these goals (maximum 1,000 words).

Project Timeline in {📂 Supplement.03 (https://go.unc.edu/FORE03)}

{Supplement.03} Project Timeline



✦ **Aim 1**

1. Implementation Optimization

Pilot same-sample lab validation from 2 NC sites has been promising, and results have been used to guide clinical care at UNC Hospital already. However, there is need for further optimization of lab methods for complex mixtures and residue samples, and collection kit refinement to reduce solvent evaporation-during-transit and contamination.{Video: 🗂️ Supplement.04 (https://vimeo.com/571816432)} Therefore to enable replication, we seek dedicated laboratory resources for methods development and validation.

2. Data Collection

To mitigate potential pandemic-related out-of-state travel restrictions, we will conduct Aim 1 in 7 NC syringe programs who are already engaged. The sites are located in counties that are **urban**:

- Durham
- Guilford [Greensboro - 2 sites]
- Buncombe [Asheville]

and **rural**:

- Pitt
- Randolph
- Madison

Each site has agreed to provide 50 samples over 6-8 months (analytic n=350). Sites will advertise drug checking services, and participants will bring in drug samples: litter/bag reside, small quantities of powder, or used cottons. Samples will be dissolved in 2mL of the organic solvent acetonitrile, with vials wrapped in sealant tape, and sent to UNC via express mail. **Denaturing samples in acetonitrile renders them unusable by DEA standards and not subject to controlled substance regulations.** At the point of sample acquisition, mobile-optimized software we are developing with Brandeis University will enable collection of standardized data (sold as, color, texture, location, subjective effects, etc.) about context.{🗂️ Supplement.05 (https://go.unc.edu/FORE05)} The software allows labs to append the initial field record with spectrometry results, after which it automates reporting back to the community site, and publishes an anonymized public version for participants. Sample processing and reporting are modeled on the Erowid (https://drugsdata.org/) platform long-established for clandestine drug checking.

3. Analysis

Analytic Chemistry

We will explore both GCMS and LCMS lab methods.{🗂️ Supplement.06 (https://go.unc.edu/FORE06)} Samples will be run on:

- GCMS: ThermoScientific Exactive gas chromatograph mass spectrometer
- LCMS: PE Sciex 3000 triple quadrupole mass spectrometer with Shimadzu LCMS

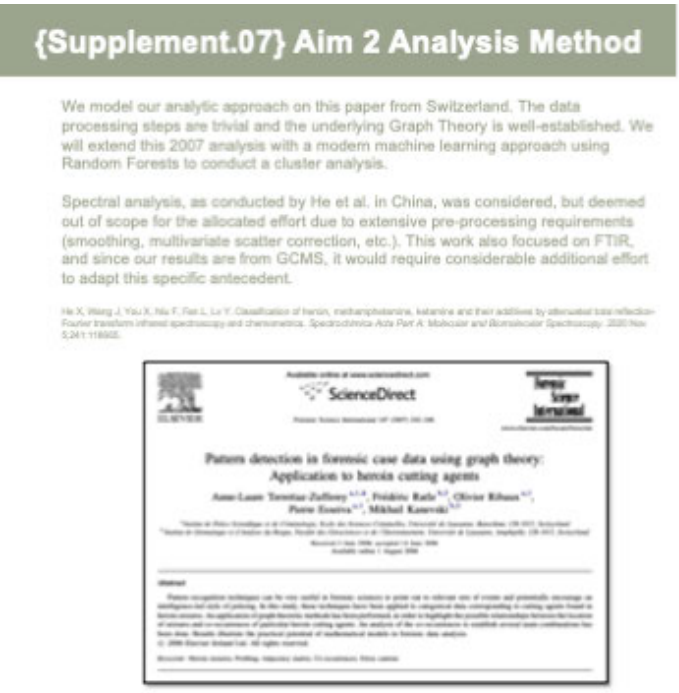
The National Institute of Standards and Technology library (https://chemdata.nist.gov/dokuwiki/doku.php?id=chemdata:start) will be used for spectral matching and compound identification. Samples will be derivatized using BSTFA to identify adulterants, substituting labile groups in small molecules with tri-methylated silicon. Trimethylsilyl substitution allows observation of adulterants that would otherwise be vaporized.

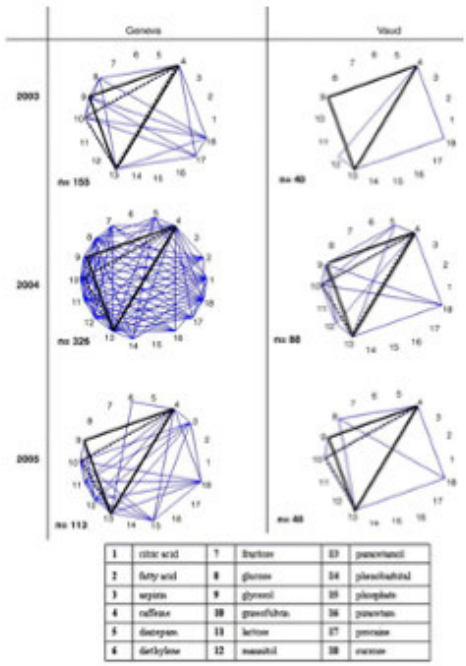
Descriptive Analysis

Live aggregate visualizations will be produced in Qualtrics (https://www.qualtrics.com/support/survey-platform/reports-module/results-section/visualizations/visualizations-overview/), similar to reporting in Toronto (https://drugchecking.cdpe.org/). Descriptive time trends in fentanyl positivity will be reported, stratified by what the drug was sold as (e.g., cocaine), and urbanicity, using negative binomial regression.

Graph Theory and Machine Learning

Phenotype analysis using Graph Theory will replicate forensic studies from Switzerland.[47,48]){🗂️ Supplement.07 (https://go.unc.edu/FORE07)} Each vertex represents a psychoactive moiety, adulterant, cutting/bulking agent, or synthesis by-product; edges represent binary co-occurrence. The corresponding adjacency matrix will be used for cluster identification in unsupervised machine learning with Random Forests.[49] In contrast with “black box” algorithms, this easy-to-implement two-step approach delivers visually elegant connectograms (https://en.wikipedia.org/wiki/Connectogram), enabling interpretation by stakeholders and policymakers





✦✦ **Aim 2**

1. Design Optimization

We have been collecting English-language drug alerts from around the world.{🗂️ Supplement.08 (https://go.unc.edu/FORE08)} We will expand our library by reaching out to health departments and community-based programs, and searching social media. We will divide our inquiry into two alert types: purity/overdose and adulterants. We will conduct a critical review of existing alerts, identifying common themes, visual elements, and actions.

Leveraging our team’s expertise in visual communication and infographics [50-52], we will develop prototype alerts adhering to effective design principles:

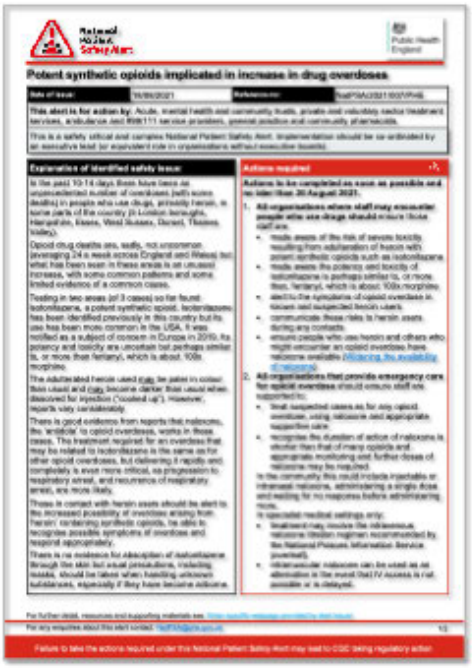
- direct, plain language text;
- purpose-drawn relevant visuals;

- attention-guiding layouts;
- appropriate calls-to-action.

We will then conduct cognitive and relevancy testing of prototypes with participants and staff of NC Survivors Union syringe service program (letter of collaboration). Sample prototype in {🗂️ Supplement.09 (https://go.unc.edu/FORE09)}.

{Supplement.08} Examples of Drug Alerts

Drug alerts from Summer 2021 from a Canadian drug checking program via Twitter, and public health agencies in the US and England. Poor design choices are evident throughout.



{Supplement.09} Prototype RCT Stimuli

A hypothetical drug alert formatted according to communication theory and visual best practices, including information hierarchy and call to action. Text contextualizes the warning and makes the information relevant to the audience.

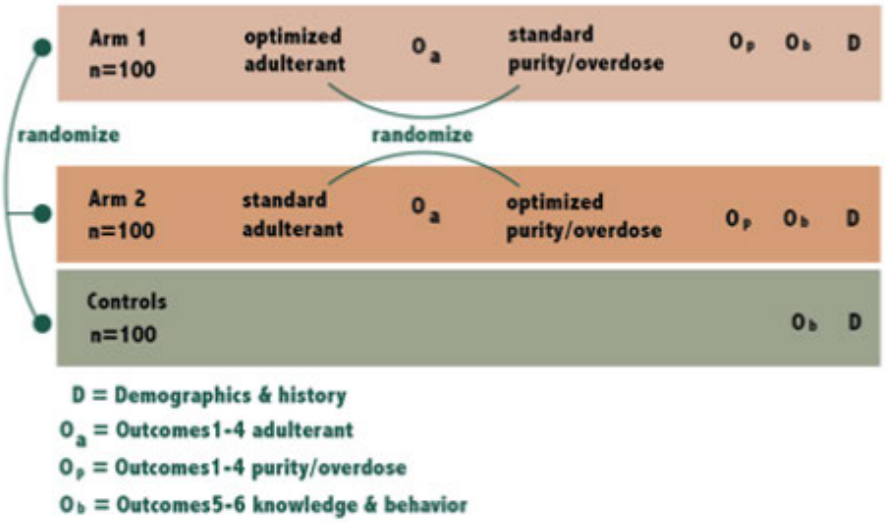
Similar stimuli will be constructed for Aim 1. We will revise based on cognitive testing and feedback from people with lived experience, prior to RCT deployment.

Illustrations accompanying each health harm will be developed in this proposal to accompany the stimuli.

2. Data Collection

In 2023, anticipating easing of pandemic restrictions, we turn to national scope to increase generalizability. We will recruit 4 sites, one from each FORE region, for a message testing RCT. The structure is a within-subjects, cross-over design, with an added control, resulting in a three-arm trial.{🗂️ Supplement.10 (https://go.unc.edu/FORE10)} In two treatment arms, participants will be randomized to view one optimized alert message (for adulterants or overdose risk) and a standard alert (for the risk not shown in optimized version), in random order. In the control arm, participants will not view drug alert messages, but provide baseline data for comparative behavioral outcomes.

{Supplement.10} Aim 1 RCT Schematic



Outcomes will be measured using questions from our health communication publications:

1. attention;
2. relevance;
3. perceived message effectiveness;
4. social interactions and sharing;
5. knowledge and beliefs;
6. behavioral intentions.

Details in {📂 Supplement.11 (https://go.unc.edu/FORE11)}.

Behavioral intentions are an appropriate outcome for this foundational study, and can form the basis for future behavior change experiments.

A short section will query for moderators (demographics, overdose history). We anticipate the interaction will take 10 minutes. Consent, stimuli presentation, and questionnaire will be delivered via a Qualtrics survey to participants' mobile phones. The sites will recruit 1,500 participants, with an expected yield of 20%, providing n=200 for treatment arms, and n=100 for controls. Participants will earn $10 for recruitment or participation.

3. Analysis

First, we will use repeated measures ANOVA (within subject comparison) to test if there are drug alert condition differences (optimized vs. standard) for social interactions (primary outcome), perceived message effectiveness, relevance, and attention (Outcomes 1-4). Second, we will examine the main effects (optimized vs. standard vs. control) on behavioral intentions, knowledge, and beliefs (Outcomes 5-6), using first stimuli exposed.

With 200 participants, we expect to have 80% power to detect small effects (f=0.12), assuming a critical alpha of 0.05, two-tailed test, and variance error of 0.2.

Moderators

Based on qualitative studies, we will test for moderation by age [30,35], gender [30,32,42], and prior overdose history.[32] We hypothesize that desensitization (through overdose survivorship) may make messages more salient to less experienced participants. In our work on tobacco, we have found that warnings are more persuasive among susceptible individuals than established smokers. [53] This research question, which has never been studied with street drugs, informs audience segmentation, alert placement channels, and resource allocation.

Supplemental Files

If necessary, provide figures, preliminary data, and/or a list of references to support the Strategy and Approach above.

Supplemental_Information_UNC.pptx

citations.pdf

abbreviations.pdf

*Potential Difficulties

Discuss potential problems you may encounter and suggest alternative strategies to overcome these difficulties (maximum 250 words).

This proposal is ambitious but planned meticulously. We address four potential difficulties, but are also open to discussions about limiting scope. For example, we could conduct the RCT at fewer sites.

1. **To constrain scope and avoid pandemic restrictions on out-of-state-travel, we limit data collection to NC in 2022.** The seven NC sites have agreed to participate already in Aim 1. By the start of data collection in Aim 2 in early 2023, we are optimistic of avoiding COVID-related out-of-state travel limitations, like those imposed by UNC in 2020 and lifted in 2021. If needed in Aim 2, the seven Aim 1 sites can serve as backup.
2. **We streamline RCT deployment through electronic tools**. With extensive experience in advertising and academic health communications, Dr. Lazard has conducted dozens of message testing experiments using electronic tools. Unlike *clinical* trials, overhead for message testing RCTs is low. We are confident in meeting the stated obligations with the resources requested. NC Survivors Union has confirmed feasibility for data collection on mobile phones.
3. **We are developing drug checking software so that burdensome processes are minimized.** The software co-developed with Brandeis is a groundbreaking tool that ensures efficient data entry and delivery. If deployment is delayed, we will use the paper-card system used in the NC drug checking pilot (https://www.opioiddata.org/drug-checking-faq/) currently.{🗂️ Supplement.12 (https://go.unc.edu/FORE12)}
4. **We mitigate environmental impact from our kits.** We make conscious decisions: pencils instead of plastic pens, biodegradable spatulas. Averting even a few overdose hospitalizations would avoid enough medical waste to offset the impact of our kits.

*Learning Opportunities, Sustainability, and Scalability

Describe your plan on how the solutions that emerge from this project will produce improvements in opioid use disorder care beyond FORE's grant period (maximum 300 words).

Long-term Preservation

Carolina Digital Repository (https://cdr.lib.unc.edu) is backed by an institutional commitment from the University of North Carolina with planned support for decades; products from this proposal are considered top priority for long-term preservation. CDR is indexed by Google Scholar and metadata will be search-optimized. CDR generates DOI for each digital deposit for citation software and ensures a unique permalink.

Actions performed to ensure long-term preservation:

- Bitstream maintenance
- Persistent, permanent identifier
- Preservation metadata
- On- and off-site backup
- Routine virus and file corruption checks
- Periodic refreshments to new storage media
- Monitoring of file format for changes that may warrant transformation/reassessment
- Migration to successive format

Sample Collection and Laboratory Protocols

These open source materials will be designed to optimize scalability, usability, and replication. Protocols will be of manageable length with specific recommendations, material purchasing lists, and other practical tools.

Statistical Notebooks

The Opioid Data Lab (https:/www.opioiddata.org) uses GitHub (https://github.com/opioiddatalab) for long-term change management and Open Science collaboration, allowing others to reuse analytic code while maintaining canonical version control. Major version releases will also be archived in CDR. We ensure long-term replicability through Jupyter Lab Notebooks

(https://cdr.lib.unc.edu/downloads/kh04dz59q?locale=en), an open-source web application that allows us to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, and machine learning. With embedded software version control, Jupyter Notebooks allow the entire analysis to be run (or modified) exactly as it was executed originally by future researcher generations.

Hand-drawn Illustrations

Vector and raster format illustrations {📁 Supplement.13 (https://go.unc.edu/FORE13)} will be placed in the public domain using Creative Commons License CC0 1.0 (https://creativecommons.org/publicdomain/zero/1.0/), allowing unrestricted modification in perpetuity. Images will be included in CDR and submitted to open source image databases (e.g., Unsplash, Adobe Stock, Pixabay, Shutterstock) that store and disseminate images worldwide.

***Results Dissemination**

Describe your plan to communicate and disseminate the results of your project (maximum 150 words).

Opioid Data Lab has established digital-forward practices for dissemination. Three key audiences are described below are aligned with each element of Outcomes.

A1. Lab scientists, drug checking community of practice

Need detailed information to replicate protocols. Currently occurs via email or listservs.

A2. Front line workers, harm reduction programs, clinicians

Need practical information delivered succinctly; competing demands from care delivery.

A3. People who use drugs, general public, news media, policymakers

Need actionable information presented simply, with broad implications.

Dissemination Channels

- Post working materials to GitHub throughout scientific process (Audience 1)
- Post final (and major versioned) materials to Carolina Digital Repository (Audience 2)
- Dedicated plain language, search engine-optimized pages on OpioidData.org (https://www.opioiddata.org) (Audience 3)
- Two open-access publications (Audiences 1 and 2)
- Twitter/LinkedIn threads (https://twitter.com/nabarund/status/1402290481577435138) with short Vimeo explanations (Audiences 2 and 3)
- Professional listservs (Audiences 1 and 2)
- Conference presentations (Audience 1)
- Library of hand-drawn illustrations in public domain (Audiences 2 and 3)

Expected Outcomes & Milestones

***Expected Outcomes**

Describe in detail both intermediate and final outcomes for the project, indicating which will be your measure(s) for success. What is the scope of impact and/or how many patients/people do you anticipate your project will affect? Note: Your outcomes should be measurable, and you should indicate your measurement tool(s) (maximum 500 words).

Final Outcomes

1. Scientific findings

Peer-reviewed publications, conference presentations, academic social media videos and threads.

Audience: General drug scientists and communications scientists
Scope: Two open access peer-reviewed publications, video explanation, slides
Metrics: Number of institutions expressing direct interest; paper and slide views, downloads, citations; Twitter, LinkedIn, and Vimeo

metrics; number of presentations and attendance at webinars and conferences; engagement in listserv discussions.
Expected Impact: High. Engagement of greater than 40,000 views/interactions anticipated across social media and academic platforms, based on our experience with existing Opioid Data Lab dissemination infrastructure.

2. Style guide for drug alerts

A user-friendly guide to visual construction of drug alerts, based on effective design principles.

Audience: Emergency personnel, harm reduction programs, health departments, clinicians
Scope: Open to all comers
Metric: Style guide download metrics; examples of alerts created by third-parties posted to social media
Expected Impact: Moderate volume (hundreds to thousands), but within audience that is strongly motivated and most likely to apply the standards, with expected attention internationally.

3. Visual library for drug communication

A library of open source images about drug use that can be used in alert creation by anyone. Hand-drawn illustrations will be anatomically correct, de-stigmatizing, racially diverse, and emotionally calibrated. Illustrations will be designed to reproduce well in printed flyers and social media (e.g., dimensions, resolution, transparent background, etc.).

Audience: Front line workers, scientists, PWUD, visual designers, bloggers, news media
Scope: Universal rights-free open access (CC0 1.0 (https://creativecommons.org/publicdomain/zero/1.0/))
Metric: Usage metrics from CDR and public image databases (e.g., Unsplash, Adobe Stock, Pixabay, Shutterstock); news and social media use examples
Expected Impact: High. “The average Unsplash (https://unsplash.com/) photo is viewed over 600,000 times and downloaded over 4,000 times [in its lifetime].” [DP Review (https://www.dpreview.com/opinion/9312839751/what-i-ve-learned-after-sharing-my-photos-for-free-on-unsplash-for-4-years)] To be conservative, we anticipate 20% of eventual volume to accrue in the first 12 months.

4. Laboratory and sample collection protocols

A collection of resources to expand drug checking via university labs. Dossier will include materials and source list for sample collection kit, printable label templates, GCMS/LCMS laboratory protocols, validation results, chemical library dependencies, tools to translate chemical names to street-comprehensible equivalents, and key publications.

Audience: Scientists, front line workers, harm reduction programs, health departments
Scope: University labs, harm reduction programs, health departments
Metric: Views and downloads from CDR, GitHub, and other platforms; replication of study methods measured through literature review, technical assistance requests
Expected Impact: Moderate volume (hundreds), but within audience that is strongly motivated.

Intermediate Outcomes

At the Opioid Data Lab, we specialize in *telling the story of how science is conducted*. We generate a steady stream of content throughout the process, while improving scientific transparency: webinars, video tutorials, Twitter/LinkedIn threads, and Vimeo videos describing the research process and materials. In-platform viewing and sharing metrics will be reported. This approach has garnered hundreds of thousands of views and interactions across platforms this year. We will establish standards by which to publicly tag FORE.

We have engaged with the community of practice and directly impacted people during the proposal process, and will continue. This engagement ensures ethical conduct of studies, and recruits partners for work-product amplification.

***Milestones**

Use the template file below to clearly outline all projected milestones and/or deliverables in six month increments. Briefly describe what will be the outcome(s) of each of these milestones/deliverables. Your progress will be in part evaluated against these milestones every six months. Include the date range at the top of each period, and insert or delete lines depending on the number of projected milestones in the period.

Milestones_UNC.xlsx