

## **Cover Page**

Project RESIST: Increasing Resistance to Tobacco Marketing Among Young Adult Sexual Minority Women Using Inoculation Message Approaches

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**PROTOCOL TITLE:** Project RESIST – Increasing Resistance to Tobacco Marketing Among Young Adult Sexual Minority Women Using Inoculation Message Approaches

**INTRODUCTION AND PURPOSE:**

This protocol is part of **Project RESIST**, an R01 study funded by NCI focused on determining the effects of using culturally tailored inoculation approaches to increase resilience to tobacco marketing influences among young adult sexual minority women ages 18-30 and incorporates critical stakeholder inputs that support later adoption and implementation.

**Overall objectives**

Our long-term goal is to eliminate smoking-related health disparities among LGBTQ populations. The objectives of this study are to determine the effects of using a culturally-tailored inoculation approach to increase resilience to tobacco marketing influences among young adult sexual minority women (SMW) and obtain stakeholders critical inputs that support later adoption and implementation. Our central hypothesis is that culturally tailored inoculation messages will be more effective versus non-tailored messages to increase resilience to tobacco marketing.

Specific aims of Project Resist are:

Aim 1: Engage with key stakeholders to optimize message construction and collect pilot data to inform future intervention design.

Aim 2: Evaluate the effects of culturally tailored anti-smoking messages versus non-tailored messages on young adult SMW's smoking and quitting intentions.

Aim 3: Evaluate the effects of inoculation message type, dose, and latency on young adult SMW's resilience to tobacco marketing, smoking and quitting intentions.

Supplement: Evaluate the effectiveness of culturally tailored anti-smoking messages with the LGBTQ community at large.

This protocol describes **Aim 2** of the project which tests the hypotheses that culturally tailored anti-smoking messages that are co-designed with community advisors' and including LGBTQ+ branding will lead to greater increase in intentions to quit smoking (among participants who smoke currently) and greater decrease in intentions to purchase cigarettes (among participants who smoke and those who do not smoke) at 1-month follow-up compared with identical control messages without LGBTQ+ branding..

**Background**

US young adult cis-gender sexual minority women, including lesbian and bisexual women, (SMW thereafter) have up to 4.8 times greater odds of cigarette smoking than heterosexual women. Nationally, ~660,000 young adult SMW who smoke are at risk of smoking-related cancers and illnesses. Factors that increase smoking among SMW include tobacco marketing, minority stressors (i.e., victimization, internalized homophobia, and concealment), alcohol and drug use. Prior anti-smoking campaigns utilized inoculation messages that highlight tobacco companies targeted marketing to LGBTQ people to increase resistance against marketing influences, analogous to vaccines conferring immunity against infectious diseases. The inoculation approach is consistent with promoting resilience, defined as the ability to overcome significant risks or adversity, to protect LGBTQ populations from factors that increase risk behaviors including smoking. In addition, culturally-tailored anti-smoking messages (i.e., using LGBTQ-relevant imagery, symbols, and language) are more acceptable and may be effective in reducing smoking among

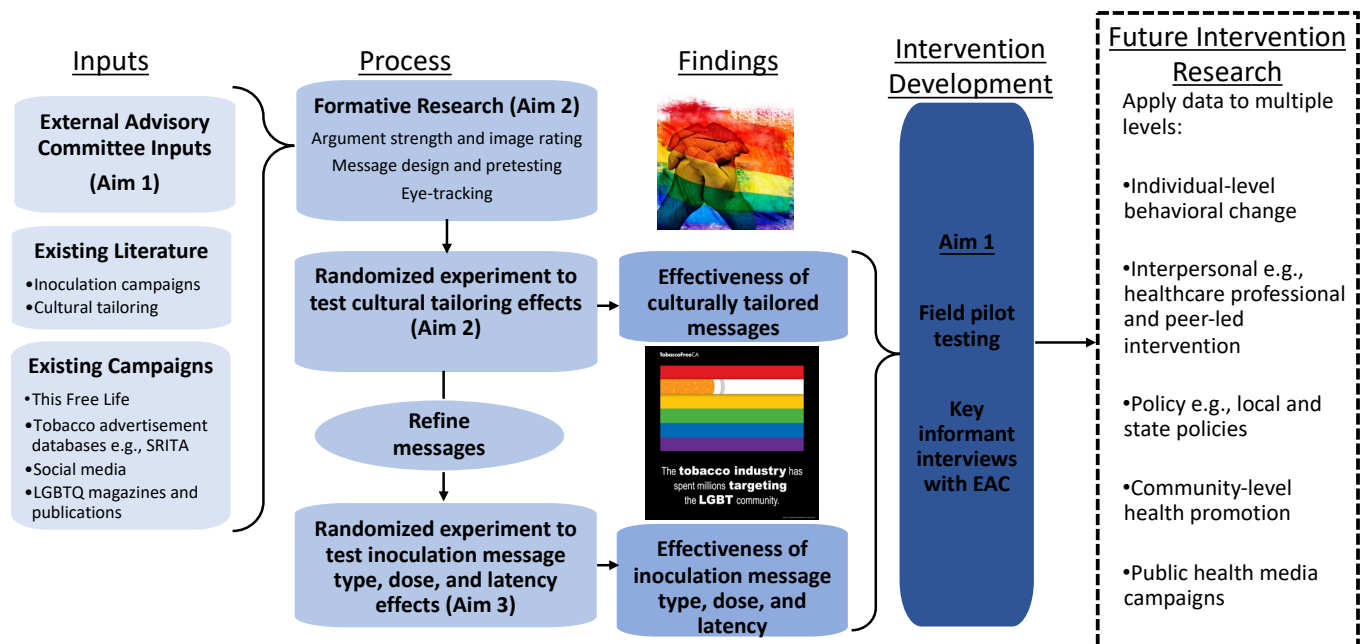
LGBTQ young adults. However, effects of cultural tailoring inoculation messages and the optimal message type (e.g., focusing on health risks of smoking vs. industry manipulation), dose (i.e., single or multiple doses), and latency of inoculation (i.e., immediate or delayed exposure) for young adult SMW have not yet been examined. This knowledge will inform the development of effective counter-marketing interventions to reduce smoking among young adult SMW.

### Significance:

This study is significant because: 1) young adult SMW are disproportionately impacted by smoking-related health disparities, 2) tobacco marketing, minority stress, resilience, and social determinants are key factors influencing smoking behaviors among young adult SMW, 3) this study addresses a key scientific gap in published research on effective culturally tailored and resilience-focused interventions to reduce smoking prevalence among young adult SMW specifically, 4) engaging stakeholders in evidence generation is critical to enhance future intervention adoption and implementation, and 5) the study will advance knowledge on the pathways and social and contextual factors associated with smoking and quitting intentions among young adult SMW.

### Study Design

The following Figure illustrates the overview of Project Resist’s research inputs, processes, findings, and intervention development to provide the foundation for future evidence-based interventions to reduce smoking among young adult SMW. We integrated inputs from the Expert Advisory Committee (EAC) comprising LGBTQ organization leaders, investigators in sexual and gender minority health, community members, and national agencies (NCI, CDC, and FDA), findings from inoculation and cultural tailoring research, and existing campaigns. Next, we conducted formative research to design, pretest, and refine culturally appropriate messages that were utilized for the survey experiment in Aim 2. We will conduct field pilot testing to assess the generalizability of the approach in real-world circumstances and engage EAC members collect contextual data to support future work.



The following section describes the study design of **Aim 2** of Project Resist.

## Design

This study utilized a randomized controlled experiment design. We conducted the experiment using the Qualtrics survey platform to assess baseline outcome measures, deliver 20 anti-smoking messages to participants in two arms (tailored arm versus control arm) over 4 weeks, and to assess the follow-up outcome measures at 1-month.

## Study Sample

**Participant recruitment.** We recruited participants who were U.S. young adult SMW ages 18-30 years between September 2021 and May 2022. Recruitment of this sample were through a combination of an online panel (Prolific), The Population Research in Identity and Disparities for Equality (PRIDE) Study, social media advertising (Instagram ads), canvassing through LGBTQ+-serving community organizations' social media accounts, and advertising on a dating app (HER). The sample was stratified by smoking status such that approximately half were current smokers (at least one cigarette within the past 30 days) and half did not smoke cigarettes.

## Experiment procedure

Participants were first screened for eligibility (ages 18-30, identify as sexual minority, and identify as women). Eligible participants completed questions on their baseline outcome measures and characteristics prior to randomization. They were randomly assigned using the Qualtrics built-in randomizer function to view either tailored or control messages. We used block randomization to achieve balance across the two conditions based on sexual orientation and race/ethnicity. Each participant viewed 5 messages within each condition to ensure sufficient exposure. They subsequently answered additional questions on prior health campaign exposure, more detailed tobacco use history, and general mental health. Participants received invitations to view 5 different messages (delivered via a Qualtrics survey) within their assigned condition at 1, 2, and 3 weeks after their baseline survey to reinforce the message exposure. Each participant had the potential of viewing up to 20 unique messages during the study period. The order of viewing the sets of 5 messages across 4 exposures (initial and boosters) and the order of messages within each set were randomized to minimize potential ordering effects. One month after the baseline survey, participants were invited to complete a follow-up survey to measure the study outcomes and additional questions on participants' characteristics.

## Anti-smoking messages

Prior to this trial, we used an iterative formative research process informed by cultural tailoring approaches to design and refine anti-smoking messages as outlined in the above Figure. To design the messages, we selected images that included photographs of young adult women (including individuals who self-identified as SMW), graphics depicting the tobacco industry's targeted marketing among young people, and images displaying the negative environmental impacts of cigarette manufacturing and use. These images were paired with statements including harms of smoking, benefits of quitting smoking, tobacco industry targeting, and environmental impacts. Where appropriate for the topic, we utilized uplifting statements and avoided stigmatizing language about people who smoke. The tailored and control ads utilized identical anti-smoking statements and images. The experimental manipulation we assessed consisted of a campaign logo using Pride colors and a slogan indicating that the focus of the campaign was on LGBTQ+ health and wellness at the bottom of the ads compared with the control ads that used an identical logo in yellow and slogans indicating health and wellness as the focus of the campaign.

## Outcome Measures

*Intention to quit smoking.* We used a 4-item scale on intention to quit smoking at baseline and at one-month follow-up. Participants were asked to rate 4 statements including "I will make an effort to quit smoking in the next 30 days" on 7-point Likert-like scales (e.g., unlikely to likely). Responses were summed to create a scale for intention to quit (range from 4-28). Higher values indicate greater intention

to quit smoking in the next 30 days. Cronbach's alpha for this scale was 0.90 at baseline and 0.91 at follow-up.

*Intention to purchase cigarettes.* We used the Juster scale to measure intention to purchase cigarettes at baseline and at one-month follow-up. Participants were asked, "How likely are you to purchase cigarettes in the next 6 months?" Responses ranged from 0=No chance, almost no chance (1 in 100) to 10=Certain, practically certain (99 in 100). Higher values reflect higher intention to purchase.

### **Statistical analyses.**

*Main treatment effects analyses.* We first compared covariate distributions across conditions, stratified by smoking status, to evaluate the extent to which randomization was successful. Our main analytic strategy was to fit lagged linear regression models to predict follow-up intention variables by experimental condition, controlling for baseline measures of each outcome, and stratified by smoking status. We report average differences in follow-up measures by experimental condition and compute 95% confidence intervals using a heteroskedastically robust variance estimator (HC2). Having confirmed covariate balance across conditions, we present treatment effects without additional covariate adjustment. We analyzed the differences between follow-up and baseline measures of each outcome in both conditions, stratified by smoking status, using paired t-tests. Sensitivity analyses that included additional regression adjustment for covariates did not yield precision improvements of treatment estimates. We conducted sensitivity analyses using inverse-probability-of-censoring weighting to account for study attrition, which was well balanced across treatment conditions.