STATISTICAL ANALYSIS PLAN

Brief Title	Stigma Reduction Intervention for MSM and Healthcare Providers
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Statistical Analysis Plan: First, exploratory data analysis will be performed to characterize the distributional characteristics of all variables. To assess scale reliability and validity, item structure will be examined using Cronbach's alpha and factor analysis. Descriptive statistics, stratified by study condition and site, will be examined to characterize the sample, and assess randomization. Prior to performing statistical analysis, we will evaluate the amount, patterns, and participant characteristics associated with missing data. In the presence of differential attrition or high levels of overall attrition that could bias statistical estimates, multiple imputation will be utilized to impute missing data, with the results calculated as a pooled average across ten multiply imputed data sets using Rubin's methodology[158].

Implementation Outcome Analyses. The analysis of implementation outcomes will focus on post-intervention data, specifically at the 3-month time point, to evaluate feasibility, acceptability, satisfaction, and fidelity. The MSM (n=120) and HCP (n=60) will be evaluated as separate samples. Descriptive analyses will be used to characterize means and standard deviations for continuous implementation outcomes and proportions and frequencies for categorical responses (i.e., yes vs. no).

Psychosocial and Structural Outcome Analyses. These analyses will use an **intent-to-treat** approach, including all MSM and HCP participants randomized at baseline, even those with partial post-baseline data. Outcomes will be assessed at three time points for the intervention arm (baseline, 3-month post-intervention, and 6-month post-intervention) and two time points for the waitlist comparison arm (baseline and 3-month post-intervention). Each psychosocial and structural outcome will be evaluated in a separate generalized linear mixed model (GLMM) or generalized estimating equations (GEE), depending on outcomes, to evaluate the effect of the adapted intervention on participant outcomes[159]. The primary goal is to evaluate the preliminary efficacy of the DONGHANH intervention through the **intervention by time interaction**, which assesses whether participants in the intervention group show greater improvements or smaller

declines in outcomes from baseline to 3 months compared to the waitlist control group. We will further evaluate the Intervention by Time effect separately by at 3-month and 6-month follow-up by examining the effect of Time using two planned contrasts: baseline (0 months) vs. 3 months and baseline (0 months) vs. 6 months for the intervention group. To verify that intervention effects are comparable across intervention workshops, preliminary outcome analyses will incorporate a dummy variable for workshop cohort (e.g., workshop 2 vs. 1, workshop 3 vs. 1, workshop 4 vs. 1, workshop 5 vs. 1) and the interaction with the intervention effects. A likelihood ratio test will be used to compare the models with and without workshop-specific effects. If intervention effects are found to differ by workshop, the intervention effect will be evaluated separately for each workshop cohort and an overall intervention effect calculated that represents a weighted average across cohorts.

Secondary quasi-experimental analyses. The waitlist-controlled design will permit two additional within-subject analyses of the psychosocial and structural outcomes, where participants serve as their own controls. The first secondary analysis will provide a quasi-experimental estimate of the intervention effect among participants randomized to the waitlist control condition (MSM: n = 60; HCP: n = 30) by comparing the difference in change for each outcome for the waitlist period (months 0 to 3) vs. intervention period (months 3 to 6). A piece-wise linear approach will be used to model separate outcome trajectories during each of the two respective phases. In these models, the outcome will be regressed on time, with time divided into two linear parameters corresponding to waitlist phase, a “deflection” term for the intervention phase, and a deflection term for the booster phase. In combination, these parameters are interpreted as the slope (i.e., rate of change) during the waitlist or intervention period (months 0 to 3), and the change in slope during the intervention period (months 3 to 6). The second within-subject analyses will provide a quasi-experimental estimate of the degree to which improvements during the intervention phase are maintained during the follow-up phase across participants in both study conditions (MSM: n = 120; HCP: n = 60). A piece-wise linear approach will be used to model separate outcome trajectories during the intervention (pre-intervention to 3-month post-intervention) vs. booster phases (immediate post-intervention to 6 months post-intervention).