Evidence Building Strategy for the Fostering Healthy Futures for Teens (FHF-T) Program

February 2024

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Below we detail planned analyses to provide a comprehensive and rigorous evaluation of Fostering Healthy Futures for Teens' (FHF-T) intervention effects, recognizing the Title IV-E Prevention Services Clearinghouse's (Clearinghouse) standards and definitions. FHF-T was previously reviewed by the Clearinghouse for inclusion on its registry. The review concluded that the program did "not currently meet criteria" as "no studies of the program that achieved a rating of moderate or high on design and execution demonstrated a favorable effect on a target outcome." In order to increase the evidence base for FHF-T, in part by examining domains of interest that would meet current standards for the Clearinghouse, current analytic plans include focusing on two outcomes of interest: delinquency (as measured from self-reports and state court records; meets "Child Well-being: Delinquent Behavior" domain) and permanency (specific measurement approach still under consideration; meets "Child Permanency" domain).

Delinquency

The Clearinghouse reviewed a final narrative report and analysis plan posted on Open Science Framework that was written for the Arnold Ventures Foundation (grant funder for the randomized controlled trial [RCT] of FHF-T) and determined that the findings relevant to "Child well-being" (behavioral and emotional functioning, social functioning, and delinquent behavior) showed "no effect." We plan to do the following in order to build the evidence base for FHF-T in the delinquency realm:

1. The main analyses conducted in the final narrative report for Arnold Ventures utilized linear (for continuous outcomes) and logistic (for dichotomous outcomes) regressions to evaluate intervention effects. However, the distributions for both self-reported delinquency and court records evidence some skew. Court records, in particular, evidence significant skew and zero - inflation due to low base rates (i.e., only 19 youth, out of 245, have a post-intervention court charge). Therefore, we plan to explore other modeling approaches (e.g., zero-inflated models) that manage such distributional issues.

2. In the Arnold Ventures report, we included both intent to treat (ITT; all participants who were randomized to the intervention) and treatment-on-the-treated (TOT; only participants who enrolled in the intervention) impacts; these analyses have allowed us to consider both the average treatment effects on all participants who were offered the intervention as well as the average treatment effects on participants who actually engaged in the program. However, ITT effects are often diluted because of noncompliance to the intervention. This occurs because while the offer of treatment is random, the actual compliance/uptake of the treatment may not be, which may lead to bias in findings.[i] We have therefore reviewed the literature for best practices for establishing causality of treatment effects in RCTs, particularly in terms of managing treatment noncompliance.

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[i] Huang, 2018

We will consider a variety of approaches to account for treatment noncompliance, including complier average causal effect (CACE) models, the Bloom adjustment, and/or instrumental variables (IVs) approach.

3. Unique to RCTs, missing data on outcomes can be affected by both treatment noncompliance as well as nonresponse/attrition at follow-up. In the Arnold Ventures report we tested for evidence of differential attrition within the FHF-T trial, and found that that these values resulted in "tolerable bias" under the Clearinghouse's attrition boundaries. We plan to explore alternative approaches to handling missing data, including listwise deletion, full information maximum likelihood (FIML), and multiple imputation. Given that we have very little missing data on baseline variables, FIML may be less beneficial, and we may opt to use listwise deletion.

4. The final narrative report for Arnold Ventures tested numerous variables for baseline equivalence per their directive. However, at the conclusion of that report, we had concerns that some of these baseline equivalence tests may have resulted in spurious findings due to multiple comparisons. In addition, we had different covariates for the ITT and TOT analyses. Aside from the analytic challenges related to having a different set of covariates for the different analytic samples, it may also be the case that the large number of included covariates may have impacted statistical power to detect intervention effects. Therefore, we plan to determine a set of meaningful baseline variables that are theoretically and empirically related to both the FHF-T program and the outcomes of interest, and then conduct baseline equivalence tests on only those variables, hopefully resulting in the same control variables for both the ITT and TOT samples. Following the standards set forth in the Clearinghouse Handbook, we will first start with examining baseline equivalence on direct pre-test measures, race/ethnicity, socioeconomic status, and age.

5. Time 3 (i.e., 1.5 years post-intervention) data collection efforts, for Cohort 3 and particularly Cohort 4, were significantly impacted by the onset of the COVID pandemic. The pandemic not only impacted our data collection efforts but may have also impacted rates of both self-reported delinquent behavior and court records as there is some evidence to suggest that there were fewer opportunities to engage in these behaviors and less surveillance during lock-down periods of the pandemic. Additionally, our efforts to collect state court charge records for Cohorts 3 and 4 in the FHF-T trial were significantly impacted by the passage of Colorado House Bill 19-1335 and Senate Bill 108, which required courts to automatically expunge juvenile delinquency records and divert all but the most serious or high-risk juvenile offenders out of the juvenile justice system, respectively. As a result of these legislative changes, there were fewer youth with court filings in the state, likely contributing to a reduction in the number of youth with post- intervention offenses. We see this most clearly in the raw base rates of post-intervention court charges, which dropped from 23.5% in Cohort 1 to 1.3% and 3.3%, respectively, for Cohorts 3 and 4. Future analytic strategies will take into account the statistical and interpretational challenges related to both COVID and the changes in state law and practice. We will ensure that these analyses meet the standards set in the Clearinghouse Handbook regarding documentation of sustained effects "Beyond the End of Treatment."

6. Given low base rates of some of the delinquent behaviors in the sample (e.g., court charges, trouble with police), and to capture dimensionality and variability in delinquent behaviors, we plan to create a composite delinquency index as a key outcome variable. Like substance use and other

problem behaviors, delinquency varies in function, form, and severity; composite indices that consider this variability are important to capture the full spectrum of the behavior. Candidate variables that we will consider for inclusion in the delinquency index include: any post-intervention court charge, any violent delinquency in the past year, any nonviolent delinquency in the past year, any trouble with police in the past year, ever received detention/suspension/expulsion from school due to delinquency in the past year, and relevant Youth Self Report subscales (e.g., rule-breaking, aggressive behavior, externalizing behavior). We may examine this variable both as a dichotomous yes/no index (any endorsement of any of the candidate variables) and a composite count index (adding the number of candidate variables that were endorsed). For the baseline index, we will explore whether to add caregiver report of externalizing behaviors as measured by relevant Child Behavior Checklist subscales as a potential candidate variable (caregivers were only interviewed at baseline). In selecting candidate variables for inclusion, we will be attuned to the Clearinghouse's definitional standards for "Child Well-being: Delinquent Behavior" outcomes and will ensure any composite indices meet the Clearinghouse's measurement standards of reliability, validity, and consistency between groups. We will also check for any issues with potential multicollinearity among candidate variables. Finally, we will explore whether to use linear, Poisson, or negative binomial regressions in the analyses.

7. Even though the Clearinghouse does not currently consider subgroup analyses when rating programs for efficacy, understanding for whom the FHF-T program is effective is crucial for building the evidence base for this program, and also has important implications for implementation. Therefore, we are continuing to explore potential moderators of the effect of the intervention on delinquency outcomes. Preliminary moderation analyses that were conducted for the final narrative report for Arnold Ventures suggested that adverse childhood experiences (ACEs) and baseline caregiver-reported externalizing behaviors significantly moderated the effect of the intervention, such that at high levels of ACEs/externalizing behaviors, control youth had a higher odds of delinquent behavior as compared to intervention youth. Continued analyses exploring this line of inquiry are planned. When reporting on these analyses, we will present the main effects first as primary findings, followed by any subsequent subgroup analyses.

Permanency
The Clearinghouse reviewed a previous paper[ii] examining permanency outcomes from the first two cohorts of FHF-T but determined that permanency as defined in that manuscript did not meet their definitions of "child permanency." To address this, we plan to consult the broader literature to determine different ways to conceptualize child permanency and map those onto the Clearinghouse's definitions. We also plan to review other programs that were reviewed by the Clearinghouse and had positive ratings for "child permanency" outcomes to determine how those studies had conceptualized and measured child permanency. This is a crucial first step that will help guide our future analytic plans for this outcome domain of interest.

[ii] Taussig et al., 2019