Mathematica

OASH Office of Population Affairs

Analysis Plan for Evaluating Program Impacts and Implementation

Office of Population Affairs

Teen Pregnancy Prevention

Tier 2 Phase II Grant Program

August 12, 2022

Dan Finkelstein

Tips on WebEx functionality

- **You can mute and unmute yourself**
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- **Raise your hand if you are having trouble unmuting yourself and we can unmute you**

- **Enter questions into the chat box – send to All Panelists**

Mathematica

Today's speakers

Dan Finkelstein
Principal
Researcher
Mathematica

Presenter

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Principal
Researcher
Mathematica

Q&A Participant

Agenda

- Importance of having an analysis plan
- Walk-through of analysis plan template
- Next steps
- Questions

Importance of having an analysis plan

Why have an analysis plan?

- **Enhances objectivity and credibility of your analyses**
  - Specifies the primary research questions, outcomes, and analytic approaches before examining the data
- **Makes efficient use of analysis time**
- **Promotes buy-in and information sharing with grantee staff and other stakeholders**
  - Provides a road map for the evaluation that grantees and other stakeholders can review and agree on before analysis begins
  - Ensures continuity in analyses if evaluation staff leave team
- **Helps with drafting final evaluation deliverable for OPA**

Completing the templates

- **Evaluators will complete the analysis plans with input from grantee staff**
- **Template focuses on highest priority information for understanding analysis plan**
- **Use the template and instructions**
  - Impact and Program Implementation Evaluation Analysis Plan Template
  - Instructions for Impact and Program Implementation Evaluation Analysis Plan

Walk through of template

Agenda

- Impact study research questions (Section 1)
- Impact study design (Section 2)
- Program implementation analyses (Section 3)
- Impact analysis (Section 4)
- Additional planned analyses of exploratory research questions (Section 5)

Impact study research questions (Section 1)

Research questions

- **Primary research questions focus on the most important outcomes for gauging a program's effect on adolescent reproductive health**
  - Limit the number of questions
  - Clearly connect questions to the program's logic model
  - Focus each question on a single outcome at a single time point
- **Secondary research questions examine impacts on other outcomes**
  - May include precursors/intermediate outcomes, subgroups, or additional time points
- **Exploratory research questions uncover relationships between variables rather than estimating program impact**
  - May include how core components influence outcomes, relationship between dosage and outcomes, and of the role of mediators of participant outcomes

Examples of research questions that specify outcomes and time points

"What is the impact of [intervention being tested in evaluation] relative to [counterfactual] on ***sexual initiation six months after the end of the intervention****?"*

"What is the impact of [intervention being tested in evaluation] relative to [counterfactual] on ***recent risky sexual behavior one year after the end of the intervention****?"*

Impact study design (Section 2)

Randomized Controlled Trials (RCTs)

Describe the unit of randomization

- For example: schools, classrooms, individuals

Process for creating intervention and comparison groups

- What was the method of random assignment?
- Was there any stratification or blocking used?
- Did the probability of assignment differ in a systematic way?

Quasi-experimental designs (QEDs)

Describe how the intervention and comparison groups were formed

- Specify criteria used to determine assignment
- Describe any factors that might differ across the two groups because of non-random assignment

Program implementation analysis (Section 3)

Implementation research questions and data

- **Document plan for measuring and analyzing the following elements:**
  - Fidelity
  - Dosage
  - Quality
  - Engagement
  - Contrast
  - Context
- **More guidance is available in a TA brief at this link:**
  - https://opa.hhs.gov/sites/default/files/2020-07/tier-1b-grant-implementation-study-planning-brief.pdf

Use a table to summarize data collection

Example Table 1: Planned implementation analyses

Implementation element	Research question	Example Measure
Fidelity	Were all intended program components offered?	Total number of sessions delivered
Dosage	How often did youth participate in the program?	Percentage of the intervention group attending the recommended number of sessions
Quality	What was the quality of staff-participant interactions?	Percentage of observed sessions that study staff scored as “high quality”
Engagement	How engaged were youth in the program?	Percentage of observed sessions that study staff rated as “moderate” or “high” engagement
Contrast	What was the effective contrast between the treatment and comparison group?	Difference in exposure to teen pregnancy prevention services
Context	What external events affected implementation?	Percentage and total number of sessions not delivered due to events in the community (e.g., COVID-19)

Questions?

- Please type your question in the chat box or unmute yourself to ask your question.

Impact Analysis (Section 4)

Describe plans for analysis

- Conduct data cleaning (Section 4a)
- Define outcome measures (Section 4b)
- Describe analytic sample (Section 4c)
- Discuss baseline equivalence (Sections 4d)
- Describe analytic approach for estimating impacts (Sections 4e-4h)

Conduct data cleaning

- **Describe the steps for cleaning and preparing baseline and follow-up data for analysis, including:**
  - Systems or software you will use to prepare, clean, and store data
  - Plans to handle inconsistent or inaccurate data (for example, youth who say at baseline that they have ever had sex, but on follow-up say they never had sex)
  - Plans and approach to imputing missing data, if applicable
- **More guidance is available in a technical assistance brief at this link:**
  - https://opa.hhs.gov/sites/default/files/2020-07/copingwithmissingdata.pdf

Define outcome measures

- **Describe specific outcome measures and time period you will use to answer the primary research questions**
- **For example:**
  - Outcome name = Ever had sexual intercourse
  - Source item = Question in the survey, "Have you ever had sex?"
  - Constructed measure = Dichotomous variable coded as 1 if respondent answered yes, 0 if respondent answered no
  - Timing of outcome measure = 6-month follow-up survey
- **Do the same for secondary research questions**

Define outcome measures (cont)

- **For outcome measures created from more than one survey question, include:**
  - The specific survey questions or items used
  - How these questions are coded to create the outcome measure
- **For example:**
  - Outcome name = Had risky sex in last 3 months
  - Outcome measure =
    - 1 if respondent answered no to "Did you use a condom or other contraception in last 3 months?";
    - 0 if respondent answered yes to "Did you use a condom or other contraception in last 3 months?";
    - also 0 if answered no to "Have you had sex in last 3 months?" and therefore skipped question on contraception
- **Include survey instrument(s) as an appendix**

Use tables to describe the outcome measures

Example Table 2: Outcomes used for primary research questions- EXAMPLE

Outcome	Source item(s)	Constructed measure	Timing of the measure
Ever had sexual intercourse	Have you ever had sexual intercourse?	Dichotomous variable coded as 1 if answered yes, zero if no, and missing otherwise	6 months after program ends

Describe the analytic sample

- **The analytic sample is the sample used to answer each research question (or set of research questions)**
- **For each outcome and time point, think about how many participants dropped from the sample (the level of attrition) or haven't responded to a particular question (item nonresponse)**
- **Example of analytic samples**
  - All individuals with complete baseline and outcome data for all variables of interest at the long-term follow-up (complete-case sample)
  - Individuals with complete outcome data but some missing baseline data, which will be imputed

Benchmark analytic approach of primary research questions: Intent-to-treat

- ***Benchmark analysis* must be based on intent-to-treat analytic approach**
  - Benchmark analysis is the analysis you believe is most defensible and credible
  - Intent-to-treat analysis includes all sample members who were assigned to the treatment or control group and have outcome data.
  - The treatment variable is defined by what was assigned, not what was ultimately received (this approach tests the offer of the intervention)
- **Analyses can also be conducted on effect of treatment on the treated (TOT) and secondary analyses**
  - See this TA brief for more guidance on this topic: https://opa.hhs.gov/sites/default/files/2020-07/estimating-program-effects-on-program-participants-brief.pdf

Analytic approach: Model specification

- **Specify the estimation approach**
  - Recommended: Linear regression for all outcomes, including dichotomous (binary) measures
  - See this TA brief for more guidance on linear probability model: https://opa.hhs.gov/sites/default/files/2020-07/lpm-tabrief.pdf
- **Specify the statistical software to be used**
- **Specify criteria to assess statistical significance of estimates**
- **Document how you will account for design elements, such as**
  - Clustering: Grouping of study participants within groups or clusters (such as classrooms or sites), wherein the members of each cluster are more similar to each other than members of other clusters. See this TA brief for more guidance: https://opa.hhs.gov/sites/default/files/2020-07/tpp-evaluation-5.pdf
  - Blocking: Classifying study participants into groups (blocks) based on one or more of the observed characteristics and then randomly assigning participants within each block to the study conditions

Analytic approach: Covariates

- ***Covariates* are control variables included in a regression analysis**
- **Describe each covariate you will include in analyses**
  - Baseline measures of outcomes
  - Demographic characteristics (age, gender, race/ethnicity)
  - Additional covariates?
  - Consider inclusion of covariates for sensitivity analyses (more in upcoming slide)

Table 4. Covariates to be included in impact analyses - EXAMPLE

Covariate	Description of the covariate
Age	Age (in years) as of the baseline data collection

Analytic approach: Secondary research questions

- **Describe the analytic approach for secondary research questions (if differs from approach with primary research questions)**
- **Should include:**
  - Model specification
  - Adjustment for baseline differences
  - Additional covariates

Analytic approach: Sensitivity analyses

- **Describe analyses to test how robust the results are or whether the analytic model is the right one for the observed data**
- **Include analyses that are variations of potentially important research decisions, such as:**
  - Different approaches for handling missing or inconsistent survey responses
  - Choosing different covariates
  - Different modeling approaches
- **More guidance is available in TA briefs at this link:**
  - https://opa.hhs.gov/sites/default/files/2020-07/selecting-benchmark-and-sensitivity-analyses.pdf

Analytic approach: Bayesian interpretation

- **Indicate whether you will supplement traditional frequentist presentation of p-values of impact estimates with a Bayesian interpretation based on posterior probabilities of effectiveness**
  - Include your approach for calculating and using posterior probabilities to interpret whether the program was effective or not
  - Indicate which contrasts will include a Bayesian interpretation (e.g., all primary research questions, all full-sample analyses, etc.).

Additional planned analyses (Section 5)

Additional planned analyses

- **Describe other planned analyses using data from the evaluation**
- **May include one or more of the following:**
  - How core components influence outcomes; see TA brief: https://opa.hhs.gov/sites/default/files/2020-07/corecomponentsbrief.pdf
  - How implementation features (dosage, quality) influence outcomes; see TA brief:
  - How precursors (knowledge, attitudes, intentions) influence subsequent risks
- **Grantees should include one research question on COVID-19 and how it influenced program implementation or participant outcomes**

Next steps

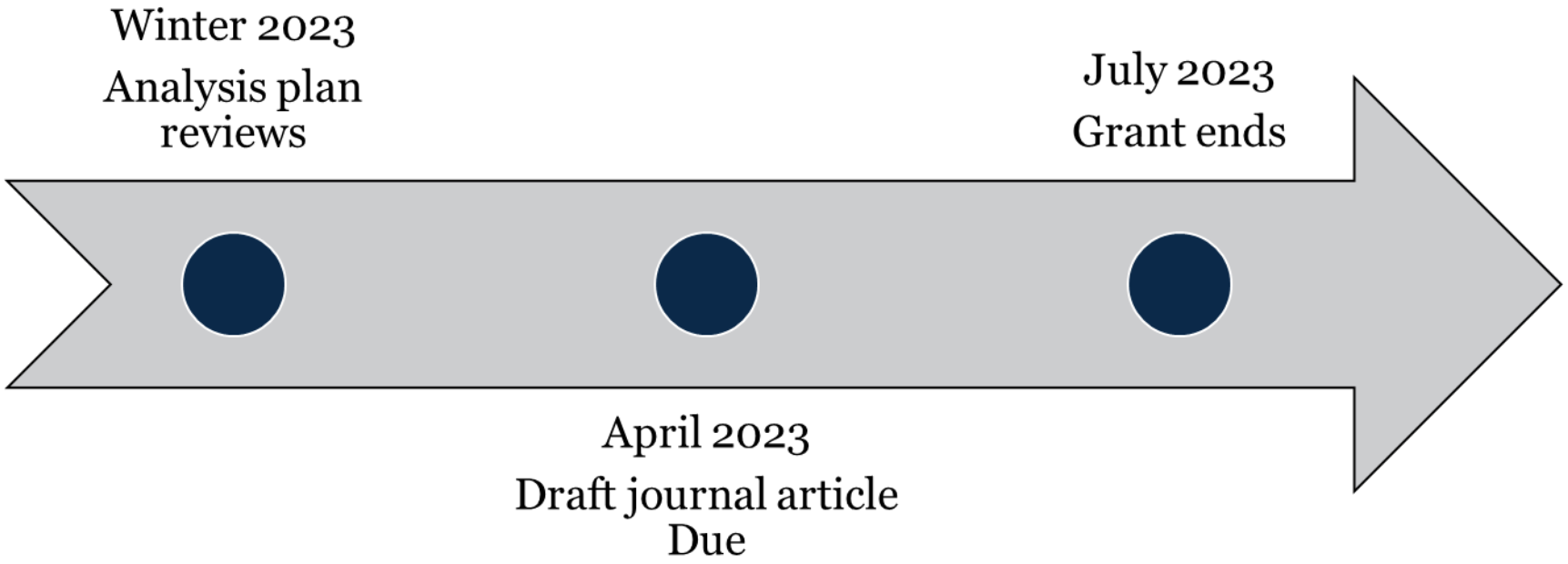
1. Draft the analysis plan using the template and naming conventions:

[Grantee name] Impact Analysis Plan.docx

2. Send the draft analysis plan (along with updated abstract, if necessary) to your TA liaison and cc to your federal project officer by January 31, 2023

3. Comments and suggestions will be returned in four weeks

Timeline for evaluation deliverable



Questions?

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For more information

Reach out with questions to:

- **Your TA liaison**
- **Your OPA Federal Program Officer**