

Essentials of Pilot Study Design and Conduct

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Rationale

- High quality pilot data are essential for developing research and external funding
- Yet, formal training in the knowledge and skills necessary for performing high quality pilot studies is rarely available

Objectives

- To describe challenges and solutions in the design and conduct of a pilot study
- To list publication and funding opportunities for pilot studies

Pilot Study Definition

- A preliminary, small study to prepare for a larger, more definitive study
- A small-scale test of the methods and procedures to be used on a larger scale



Kistin C et al. JAMA 2015;314:1561-1562

Leon AC et al. J Psychiatr Res 2011;45:626-629

Common Objectives of Pilot Studies

- Acceptability, fidelity, feasibility of an intervention
- Feasibility of recruitment, randomization, retention
- Integrity of study protocol
- Testing of data collection forms or questionnaires
- Assessment procedures
- Selection of most appropriate outcome measure
- Data management

Lancaster GA et al., J Eval Clin Pract 2004; 10; 307-12.

Thabane et al. BMC Medical Research Methodology 2010, 10:1

Leon AC et al. J Psychiatr Res 2011;45:626-629

A Really Good Reason to Do a Pilot Study

- A pilot study allows you to know what things go wrong so you can fix them before you start the large study



Challenges and Solutions in the Design of a Pilot Study



Specific Aims

- Necessarily limited in number and scope:
Focused and Feasible!
- Usually not definitive hypothesis testing
- Still requires well defined, purposeful objective(s)
- Embedded in a larger good idea or leading to a good, innovative idea/project

Significance

- Emphasize the importance of area of inquiry and potential product in small space
 - Scholarship has to be sharp and to the point, the key articles by the key people
 - Rationale for the pilot study clearly defined –
 - Where does the pilot study lead?
 - Theoretical model may or may not be necessary

Approach

- Feasibility
 - Beware of the tendency to propose or do too much
- Recruitment and retention
 - Propose a realistic recruitment and retention plan
 - Reviewers know that recruitment difficulties extend to pilot studies

Sample Selection

- By definition, working with small samples
 - Use as rigorous a strategy as possible but recognize the risk of less representative samples
 - Try to make sure that your pilot subjects cover the range of subjects in your full study
 - Do not slap on the label of pilot study when your sample size is too small

Sample Size

- How Many Subjects for My Pilot Study?
 - Depends on the objective of the study
 - Many pilots don't require formal sample size calculations
 - Enough observations to provide useful information
 - 95% Confidence interval approach if you know target for success (e.g. 70% of patients are able to complete the form)

Kraemer et al. Arch Gen Psychiatry 2006;63:484-489

Thabane et al. BMC Medical Research Methodology 2010:10:1

Analysis

- Be clear about how the data will be interpreted and utilized
- Analyses mainly descriptive
- Treat results as preliminary and interpret with caution



Budget



- Usually for specific expertise (data management, statistics, consultant), supplies, part of study assistant effort
- Usually not for investigator salaries, full time study coordinators, equipment, travel
- Pilots help understand resource requirements in full study

Review

- How will the review be done?
 - Ranges from NIH where same review criteria used as for R01 to small Foundation where one reviewer uses a 5 point Likert scale
 - Know the review process and criteria
- Who are the reviewers?
 - Find out who will be reviewing your application, if possible

Potential for Extramural Support

- Does the project have a high likelihood of leading to future extramural, larger grant support?
- Be explicit about how/where pilot results will fit with larger grant: place the pilot study in the context of the full-blown study

Challenges and Solutions in the Conduct of a Pilot Study



Challenges in Conducting a Pilot Study

- Short time frame
- IRB approval
 - A pilot takes as long as a large study
- Subject recruitment and retention
 - Don't let small number of subjects deceive you
- Personnel problems
 - Research assistant gets sick, co-investigator loses interest, statistician moves to another institution

Challenges in Conducting a Pilot Study

- Short time frame
- Competing demands on your time
 - Teaching load changes, more clinic or rounding time
- Supply chain problems
 - Animals, reagents, databases hard to get
- Data inconclusive
 - Uninformative numbers

Challenges in Conducting a Pilot Study

- Sort time frame
- Changes in laboratory or clinical practice
 - Affects recruitment, measures, interventions
- Equipment breakdown
 - Flow cytometer, multiplex assay system not working?
- "I never thought about that!"

Pilot and Feasibility Studies Journal

■ Aims and Scope

- *Pilot and Feasibility Studies* encompasses all aspects of the design, conduct and reporting of pilot and feasibility studies in biomedicine.
 - The journal publishes research articles that are intended to directly influence future clinical trials or large scale observational studies, as well as protocols, commentaries and methodology articles.
 - The journal also ensures that the results of all well-conducted, peer-reviewed, pilot and feasibility studies are published, regardless of outcome or significance of findings.
- <https://pilotfeasibilitystudies.biomedcentral.com/>

Sources of Funding for Pilot Studies

- NIA early stage research mechanisms
- R03s – Small Research Grants (50k direct costs a year, two years)
 - <http://www.nia.nih.gov/research/dea/r03-small-research-grants>
 - Grants for Early Medical/Surgical Specialists Transition to Aging Research (GEMSSTAR)
 - <https://www.nia.nih.gov/research/dgcg/grants-early-medicalsurgical-specialists-transition-aging-research-gemsstar#goal>
- R21s – Exploratory/Developmental Research Grants (\$275k direct costs over two years)
 - Exploratory/Developmental Research Grant Award
 - <http://grants.nih.gov/grants/funding/r21.htm>

Sources of Funding for Pilot Studies

- NIA Center Programs
 - Claude D. Pepper Older Americans Independence Centers (OAIC)
 - Pilot/Exploratory Studies Core
 - HCSRN-OAIC AGING Initiative Pilot Studies
(Health Care Systems Research Network-OAIC Advancing Geriatric Infrastructure and Network Growth)
 - Nathan Shock Centers
 - Alzheimer's Disease Research Center
 - Centers on the Demography and Economics of Aging
 - Roybal Centers for Translational Research in the Behavioral and Social Sciences of Aging
 - Resource Centers on Minority Aging Research

Sources of Funding for Pilot Studies

- K24 (Mid-Career award in Patient-Oriented research)
 - \$50,000 a year that can be used to provide research expenses and/or statistical services for mentees
<https://www.nia.nih.gov/research/grants-funding/k24-midcareer-investigator-awards-patient-oriented-research>
- NIH Clinical and Translational Science Awards (CTSA) often have local small grant or pilot study mechanisms

Sources of Funding for Pilot Studies

- AHRQ Small Research Grant Program (R03)
 - <https://grants.nih.gov/grants/guide/pa-files/PA-15-147.html>
- AFAR Research Grants
 - up to \$100,000 for a one- to two-year award to junior faculty, broad range of biomedical, clinical topics
 - <https://www.afar.org/research/funding/afar-research-grants/>
- Robert Wood Johnson Foundation
 - <https://www.rwjf.org/en/how-we-work/grants-explorer/funding-opportunities.html>
- VA Research Foundation small grants
 - Independent, nonprofit corporation with a diverse research portfolio investigating a variety of ailments afflicting our nation's veterans

Sources of Funding for Pilot Studies

■ Specialty Associations

- American Heart Association Affiliate grant Programs

http://my.americanheart.org/professional/Research/Research_UCM_316889_SubHomePage.jsp

- American Diabetes Association

<https://professional.diabetes.org/meetings/core-program>

■ State, Local Community or Institutional Small Grants