

## GRANTSMANSHIP

# How to Develop a Budget for a Research Proposal

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*Novice investigators may be intimidated by the task of proposal budget preparation. Often a basic understanding of the mechanics of budgeting, paired with a good working relationship with the institution's sponsored programs office, can alleviate much of the stress investigators encounter in developing budgets. Careful attention to the detailed inclusive costs of conducting the proposed study combined with awareness of university and agency budget requirements is essential. This article describes strategies for developing a budget for a research proposal.*

**Keywords:** *research proposals; budget development; proposal development*

Preparing a research proposal budget may seem a daunting task to a novice or even an experienced nurse researcher. Formal academic research training commonly includes years of instruction in theory development, statistical analysis, and developing methodological techniques, but it rarely includes budget preparation education (Bergstrom & Baun, 1994). Development of a research proposal budget is intertwined with the development of the project's timeline and methodology to achieve the proposed project aims. This article describes a method for developing a research proposal budget.

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## BUDGET DEVELOPMENT

The investigator should begin considering the project's budget when the scope, duration, and significance issues of the project are contemplated. Generally, as the scope of a project expands, so does the budget (Ingersoll & Eberhard, 1999). Funding agencies often state a budget limit for applications. When the funding agency does not provide a limit, the principal investigator may examine the range of funding over previous award cycles to determine the customary budget range supported by that agency.

The initial draft of the proposal budget can be prepared following completion of the first draft of the proposed methodology, although budget considerations should be kept in mind when preparing the first draft of the Method section. For example, in making the decision to adopt a specific method of measuring a variable, one should consider the cost of the method as well as the sensitivity and specificity of the particular measure. The investigator should adopt the measure that operationalizes the variable with sufficient accuracy to address the research questions. For example, body composition is a common variable examined in nursing research at considerably highly variable costs. An investigator examining this variable may select from skin fold measurement, underwater weighing, or whole body DEXA scanning. The decision to use a particular method should be balanced between the specificity required to address the research question and the cost of the particular measurement method. The cost of other components of the research plan should similarly be considered when developing the proposal.

It is important to ensure consistency between the budget and the proposed methods. The methods are often revised multiple times prior to submission. For example, sample size evolves as research questions are revised, new measures are added, and power analyses are calculated. Repeated examination of the budget for consistency with the methods is essential. The budget justification narrative, required by most agencies, is an important opportunity to describe exactly how budget items will be used to complete the study. Information about costs incurred in preliminary or pilot work can provide evidence for the budget justification. A detailed participant protocol, perhaps developed from preliminary or pilot work, that specifies exactly what will happen with each participant is helpful to ensure that important expenses are not overlooked (e.g., participant travel expenses, resources to phone participants to confirm appointments, costs to purchase questionnaires).

Budgets are generally prepared in one of two ways. One system requires that the investigator develop the budget with variable support of organizational

fiscal staff members. This is only possible if the investigator has some familiarity with spreadsheet software such as Excel. A well-designed budget template can be extremely useful. These computer files, with built-in formulas, can usually be found at a sponsored program administration office. The advantage of this approach is that the investigator has total control over the development, details, and pace of budget preparation. The disadvantage is that many beginning and experienced investigators require considerable consultation to develop a valid budget. In the second approach, the investigator submits cost items described in this article to fiscal support staff members who prepare budget drafts for the investigator to rework until the budget is final. This approach doesn't require computer spreadsheet expertise, thus freeing time for work on the science of the project. The fiscal expert can help assure that the budget is developed accurately and in conformance with both university and funding agency requirements, which change frequently.

### BUDGET COMPONENTS

A detailed budget is an itemized list accounting for every expense required to complete the project. Itemized budgets are essential even if the granting agency does not require the submission of a detailed budget (Ingersoll & Eberhard, 1999). Without serious consideration given to all potential expenses, the investigator could easily overestimate or underestimate the cost of completing the study. A detailed budget will not only assist in planning the project but may be required for university-sponsored programs office review and approval. Items included in a research proposal budget can be divided roughly into nine categories: personnel, consultation, subcontracts, supplies, equipment, travel, other, patient care, and facilities and administration costs. A sample budget worksheet is provided in Table 1. The personnel section includes a separate line for each applicant organization employee who is involved in the project. Individuals who work within the applicant organization cannot be external consultants and must appear in the personnel section as either salaried or hourly employees. Each personnel line includes the individual's name, project role, type of appointment (i.e., number of months per calendar year), project percentage effort, and base salary (see Table 1). Percentage of effort should be based on how many hours per week they will be involved with project-related activities. These figures are used to calculate the salary requested (for example, for salaried employees:  $\text{annualized base salary} / 12 [\text{months}] \times \text{number of months appointed to project} \times \text{percentage effort}$ ) and corresponding fringe benefits costs ( $\text{salary requested} \times \text{institutional fringe rate}$ ).

**TABLE 1: Worksheet for Estimating Budgets**

<i>Personnel</i>	<i>Role</i>	<i>Base Salary</i>	<i>% Effort</i>	<i>Months</i>	<i>Part of Year</i>	<i>Salary Dollars</i>	<i>Fringe 24%</i>	<i>Salary Dollars</i>
Jeri Smith	principal investigator	\$49,500	25	12	1	\$12,375	\$2,970	\$15,345
John Brown	coinvestigator	\$35,000	20	12	1	\$7,000	\$1,680	\$8,680
Mori Tests	statistician	\$96,139	10	12	.5	\$4,807	\$1,154	\$5,961
<i>Hourly</i>		<i>Hours/ Week</i>	<i>Hourly Rate</i>	<i>Weeks/ Year</i>		<i>Salary Dollars</i>	<i>Fringe 7.65%</i>	<i>Salary Dollars</i>
TBA	temp RA	15	\$12	52		\$9,360	\$716	\$10,076
Consultant	consultant 4 days at \$50/day	400						\$400
Supplies	test tubes mounting racks	540						\$2,190
	intervention supplies	800						
	blood draw supplies	850						

(continued)

TABLE 1 (continued)

<i>Hourly</i>	<i>Hours/ Week</i>	<i>Hourly Rate</i>	<i>Weeks/ Year</i>	<i>Salary Dollars</i>	<i>Fringe 7.65%</i>	<i>Salary Dollars</i>
Equipment benchmark shaker	5,000					\$5,000
Subcontract none						\$0
Travel						\$1,000
travel to present preliminary results	1,000					\$8,400
Other						\$0
subject incentives \$35 × 240 subjects	8,400					\$57,052
Patient care						\$5,000
Total direct costs/1 year						\$52,052
Exclusions (equipment and patient care)						
Modified total direct costs (MTDC)						\$24,464
Facilities and administrative rate					47.00%	\$81,561
Total annual project costs						

Consultation and subcontracts involve contractual agreements with entities outside of the applicant organization when expertise or services are not available at the primary institution. Consultants can be viewed as independent vendors who provide services that are not part of their appointment within any institution in which they are formally employed. Work performed by consultants should be done on their own time, using their own resources. Consultant fees include a basic stipend based on projected time to complete the work and usually should not include other expenses incurred by the consultant in relation to the work performed. Subcontract agreements should be instituted when the project-related services will be completed as part of an appointment at another institution. The salary for subcontractual services should be tied to a percentage of effort and include fringe rates. When establishing a subcontract, the investigator's institution must formally negotiate with the subcontract institution, as that institution is the owner of the individual's time to be committed to the project. Early completion of subcontracts will minimize later stress for the principal investigator.

Sponsored projects often require specialized supplies and equipment. These should be itemized in the detailed budget. Specific price quotes for equipment or services are preferable to estimates. Not all supplies are considered allowable (whether or not the type of charge can be applied to the grant funding as a direct cost according to funding agency guidelines) or allocable (whether or not the charge is directly and specifically related to the project). Depending on the funding agency and the university-specific negotiated facilities and administrative cost agreement, some supplies and equipment may not be allocated to an extramurally funded project. The university's sponsored projects office will have this information. Many sponsoring agencies may restrict the purchase of equipment. However, if equipment purchases are allowed, the equipment must be used exclusively for grant work during the extramural funding. Researchers should be aware of any agency clauses concerning final ownership of grant purchased equipment.

Three additional budget categories that may also need to be included in the budget are patient care costs, travel, and other costs. Patient care expenses (inpatient or outpatient) are directly related to testing or other procedures/services essential for research participation (e.g., blood tests, mental status screening). Travel expenses, including per diem, required for the completion of a project should be budgeted if allowed by specific agency guidelines. Some agencies will also allow costs associated with travel to conferences directly related to the progress of the project. Finally, the other costs category exists for expenditures such as tuition/fees, per page publication costs, participant incentives, as well as animal purchases and animal care costs.

It is important to inflate costs, especially all personnel costs. The recommended rate of increase is 3% every year in multiyear budgets. Some agencies may allow higher inflation rates or may disallow such increases altogether; this information should be available as part of the agency application guidelines. Accounting for inflation, where allowed, is essential to avoid underestimating costs and getting a grant award with insufficient funds to complete the research project. Budget review by experienced researchers may help the principal investigator avoid the problem of missing important expenses.

Summing the budget categories of personnel, consultation, subcontracts, supplies, equipment, travel, other, and patient care represents the total direct costs (TDC) of the project. The final category of a budget for most external grants is the facilities and administrative (F & A) cost rate (sometimes called indirect cost). Some funding agencies set a specific F & A rate for all applicants. Other funders negotiate a rate with each institution (e.g., National Institutes of Health [NIH]). The F & A funds the institution's research infrastructure (e.g., laboratories, accounting, human subjects review). Different institutions include different elements in their negotiated F & A agreement. Charges that are part of the F & A costs cannot typically be requested as direct costs as well. Exceptions to this rule may depend on the specificity of the purchase or provision of the full amount of F & A based on the institution's federally negotiated rate. To calculate the F & A costs associated with a project, the negotiated/specified rate is applied to the total modified direct cost (TMDC). The TMDC refers to the total direct cost minus costs that must be excluded from the F & A calculation. Typical exclusions may include capitalized assets (equipment over a certain dollar amount), tuition/fellowships, patient care costs, renovation expenses, and certain portions of subcontract costs. The university's sponsored programs office can assist researchers in determining which budget lines are included in the TMDC. The F & A cost is equal to the TMDC multiplied by the negotiated F & A rate. The total projected cost of a project equals the total direct costs plus the F & A costs.

### **TAKING RESPONSIBILITY**

Proper budgeting and expenditure is ultimately the responsibility of the investigator. Many agencies, such as NIH, no longer examine the line item detail of a budget for allocable and allowable expenses. The university business and sponsored programs offices can assist in identifying potentially problematic direct costs. In the event of an audit, the responsibility to ensure that all charges are allowable and allocable lies with the principal

investigator. When researchers have a solid understanding of the mechanics of a sponsored project budget, they will find the fiscal management less stressful and should have less need post award to reallocate funds within categories to address overestimates and/or underestimates. Although the budget is ultimately the principal investigator's responsibility, extensive assistance should be obtained from the sponsored program office, the department fiscal/business personnel, and other researchers experienced in developing and managing similar budgets. Responsibility for monitoring and managing the budget of a funded project is equally important but beyond the scope of this article.

### CONCLUSION

Preparing a research proposal budget can seem like an overwhelming responsibility, especially for new investigators. Preparing a detailed budget during the proposal stage can minimize budget management difficulties once the project is funded. A carefully constructed detailed budget increases the likelihood of securing funding because it documents the research team's expertise to the funding agency. An accurate budget is essential to provide the necessary resources to conduct the study.

### REFERENCES

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