PLAN FOR THE EVALUATION OF THE NICHD EXTRAMURAL ASSOCIATES RESEARCH DEVELOPMENT AWARD (EARDA) PROGRAM

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SECTION 1: PROGRAM TO BE EVALUATED

1.2 Program to be Evaluated

The Extramural Associates (EA) Program was established in 1978 in the Office of the Director (OD), National Institutes of Health (NIH), to increase the participation of minority and women's institutions in biomedical and behavioral research and in research training, ultimately contributing to the health and well being of all U.S. citizens.

To accomplish its goals, the EA Program supported residency-training programs at the NIH for scientific faculty and academic science administrators from eligible institutions. In its initial design, the EA Program contributed to a cost sharing Interagency Personnel Act (IPA) agreement that supported a six-month NIH residency experience for science faculty and/or administrators from target institutions. During their residency, the EA participants learned about NIH research support mechanisms, especially those designed for non-research intensive institutions. The EA Program staff and preceptors introduced the EA participants to the grant and contract application process, review process, funding mechanisms, as well as to basic features of grants and contract proposal design and development. Additionally, the EA participants met with scientists and administrators from the various NIH Institutes and Centers, and other Federal agencies, as well as private research funding organizations with missions and programs that coincided with that of the NIH. At the end of training, the EA participants were expected to return to their schools, and with no funding from the NIH, communicate what they learned to their colleagues and students with the intent of increasing interest and participation in research.

In 1994, the NIH augmented the IPA residency program with a grant support program, thus establishing the Extramural Associates Research and Development Award (EARDA) Program. The EARDA Program targets minority institutions, defined as having 50percent or more minority students, and women's educational institutions. The Program supports the development of both an administrative infrastructure focused on research and augments the residency training with post-residency, preceptor interaction.

The EARDA Program is implemented in four phases. During the planning and development phase, the scope and contents of the Program are reviewed and updated, and activities are planned. Eligible minority/women institutions are targeted and the Program staff interacts with eligible institutions.

During the pre-award phase, active recruitment of eligible institutions takes place and grants are awarded. During the third phase, participation in the residency program exposes the EA to NIH staff, programs, and opportunities. The post-award, or fourth, phase encompasses the activities that the EA and the institution develop and implement to meet the goals of the program. These phases will be described more fully in Section 3.4.

The EARDA Program competitively selects scientific faculty or administrators from eligible institutions for one of two programs:

- The *Sponsored Research Infrastructure Program (SRIP),* a five month residency program for minority and women's institutions that award masters, or higher, academic degrees in the health or social science fields such as a Doctor of Medicine, Dental Surgery, Veterinary Medicine, or Pharmacy degree. The award is $35,000 in Year 1 and $85,000 in Years 2 and 3. Baccalaureate degree granting institutions can apply for the five-month program, as well.

  The goals of the SRIP are to:

  - Set up or augment an Office of Research Development (ORD) to work with an existing Office of Sponsored Research (OSR) or comparable office; and
  - Increase research and research training activities within the institution.

- The *Faculty Research Enhancement Support Program (FRESP),* a ten-week program, designed specifically for institutions that award degrees in the sciences no higher than the baccalaureate. Eligible institutions are expected to have little or no research activity. Additionally, community colleges with recognized science programs or ties to a four-year institution that have a 50percent minority enrollment are also eligible. Participating institutions receive $25,000 in year one, and $30,000 in the years two and three.

  The goal of the FRESP is to:

  - Establish a focal point within the institution for information receipt and dissemination about research and research training opportunities for faculty and for students, in cooperation with an existing OSR or comparable office at the institution.

In both the SRIP and FRESP programs, after completing the residency part of the program, the participants return to their home with EARDA funds to implement the institutional plan that was presented in the EARDA application or refined while they are at the NIH. Each EA is expected to play an active role in promoting and expanding opportunities for students and other faculty to participate in biomedical and behavioral research and in research training. In addition, the EA can initiate or expand an "Office of Research Infrastructure" through the information they have gained about Federal health related programs and grant and contract activities, with appropriate support from their home institution.

Both the SRIP and FRESP grants provide support for three years during Phase I of the program. Institutions can then compete for a Phase II award, which provides an additional three years of support.

To assist with monitoring and reviewing ongoing activities, the guidelines for the EARDA Program established an advisory committee. It is composed of fifteen members who broadly represent the gender, ethnicity, academic discipline, roles, and locations of the NIH Institutes, Divisions, and Centers.

In 2001, the EARDA Program was moved to the National Institute of Child Health and Human Development (NICHD) from the OD, NIH. While the NICHD now provides the administrative home to the Program, it continues to be a trans-NIH program. The Program currently awards 3-5 new grants annually. Twenty to 25 grants are ongoing at a time. The Program is staffed by four FTEs. Program staff members develop, update, implement, and coordinate the EARDA pre-award, NIH residency, and post-award activities. Staff also identify EARDA eligible institutions, provide pre-award residency and post-award support to the EA and the institution, communicate internally to the NIH and externally about the Program, provide quality assurance in the form of site visits and update reports, convene an advisory committee to the Program, and prepare and maintain the operating budget for all Program activities.

1.3 Program Goals

The major goal of the EARDA Program is to encourage, assist, and facilitate the entry and increased participation of EARDA eligible (women and minority) institutions in biomedical and behavioral research and in research training. After participating in the EARDA Program, the EAs are expected to serve as change agents as they return to their home institutions. The Program's overall objectives for EAs include working with their institutions to:

- Increase knowledge about NIH extramural programs and the range of federal support for biomedical and behavioral research
- Develop skills in preparing competitive research proposals
- Expand opportunities for research by developing a network of NIH and other agency contacts and serving as a liaison for faculty and students
- Establish or expand the institution's Office of Sponsored Research (OSR); and
- Develop partnerships with research intensive institutions

With these tools, the EA can assist his/her institution in establishing relationships with research-intensive organizations and in improving local support for student, faculty and administration participation in research activities.

The first chart, Figure 1: PROGRAM OBJECTIVES AND PROGRAM AND INSTITUTIONAL COMPONENTS, shows how the EARDA Program components (Column 1) are driven by Program objectives and translated into expectations for the home institutions. Column 2 captures the "Program Activities" in which the EA participates during residency and that are supported by the EARDA Program. Activities include workshops, networking, lectures, mentoring, and other interactions with NIH staff who can help to address the EARDA objectives. The third column highlights possible EA and other activities that begin when the EA returns to the

institution. It is anticipated that activities such as workshops, seminars, scientific presentations, release time, and OSR development will be facilitated by the EAs. In addition, the EAs are expected to foster communication about research opportunities, provide ongoing communication and networking about these opportunities, and encourage grant submissions, all

of which are possible products or outcomes of EARDA participation. In return, home institutions are expected to provide participants with support such as release time, office space, and technical, administrative and/or financial assistance.

FIGURE 1: PROGRAM OBJECTIVES and PROGRAM AND INSTITUTIONAL COMPONENTS

EARDA PROGRAM OBJECTIVES (1)	EA PROGRAM ACTIVITIES INITIATED BY THE NIH or COMPLETED DURING RESIDENCY (2)	POSSIBLE EA and OTHER ACTIVITIES at the HOME INSTITUTION (3)
Increase knowledge about NIH Extramural Programs and other Federal agencies	Technical assistance workshops Residency Networking Lectures Mentors Obtain background information for the implementation plan	Workshops, seminars, research opportunities, newsletter/brochure meeting attendance Refine implementation plan
Develop grant writing skills	Residency workshop Draft implementation plan Mentors	Workshops Submission of grants Research review committees
Expand opportunities for research	Residency – exposure to NIH programs and process Mentors Make contacts for implementation plan Computer skills training Networking Update meetings	EARDA Program grants Pilot grants Workshops, conferences, seminars Scientific presentations Release time Administrative assistance Technical assistance
Establish/expand ORD	EARDA Program grants Draft implementation plan	ORD in kind support, active monitoring of research submissions and projects Development of in-house advisory committee

Partners with research intensive institutions	Residency exposure to institutions with grants, researchers Mentors for grant applications Networking re: additional opportunities Make contacts for implementation Plan	Provide short-term faculty exchange EA related travel Update meetings Supplemental grants at partner institutions

SECTION 2: NEED FOR AN EVALUATION

The EARDA Program has an important mission to stimulate the participation of minority and women's institutions in biomedical and behavioral-- research and research training. As such, the Program can play an important role in helping the NIH and the NICHD achieve their research goals pertaining to health disparities. To date, however, the Program has never been evaluated through a formal assessment. The move of the EARDA Program from the OD, NIH to the NICHD provides an opportunity to review its structure, funding and impact. An evaluation will also allow senior NICHD and Program staff, as well as the EA Program Advisory Board, to assess procedures and outcomes to see if objectives are being met and to determine what changes, if any, may strengthen the EARDA Program.

2.1 Type of Evaluation

The proposed evaluation of the EARDA Program reflects the Program's goals: thus, it will be both a process and an outcome evaluation.

As a process evaluation, it will assess if the Program is being implemented as planned, if the EARDA institutions are able to make expected changes, if the processes critical to achieving Program goals are in place, and if specific process goals are being achieved.

The review of the EARDA Program will also include an impact evaluation. This will assess program accomplishments (short and intermediate outcomes) and effects (longer-term impacts). By assessing short and intermediate outcomes, the evaluation will help to determine whether the Program is making progress in reaching its ultimate goals. The evaluation will also examine the relationships between Program activities and outcomes and impacts (intended and unintended) and identify Program strategies, or key factors that are critical to success.

2.2 Purpose of the Evaluation

The primary purpose and goals of the evaluation are to determine:

1. If the current NIH administrative management and the resulting operations of the EARDA Program effectively achieve the Program's objectives

2. What key factors contribute to these outcomes

3. If and what changes in the management, program operations/structure, and related variables are needed to better enable the Program to meet its objectives

The evaluation has been preceded by a feasibility study. Under subcontract to IQ Solutions, KAI designed and performed qualitative and quantitative evaluation of the EARDA Program to determine if a full-scale design could be undertaken and what the most productive format would be. Specifically, the following questions were to be addressed: a) what type of evaluation should be conducted? b) what data, both primary and secondary, should be included in the evaluation of the EARDA Program? c) what are the appropriate methods and measures to collect that data? d)

how should participants in the evaluation be identified and selected? e) what will be the product of a full-scale evaluation?

To this end, KAI met with the EARDA Director, NICHD Evaluation Officer, and the Evaluation Technical Workgroup, an ad hoc committee established by the EA Program Advisory Board members, NIH and other DHHS stakeholders in the EARDA Program and Extramural Associates and representatives from their institutions. Interviewees were recommended by the Program Director, and the Evaluation Technical Workgroup and were selected based on their perspective on and experience with the EARDA Program.

Primary data were collected both in person and through telephone conversations using an open-ended, unstructured interview tool. The focus of the discussion differed somewhat depending on the interviewee and his/her relationship with the Program. Areas for discussion included the process of applying for the EARDA Program; interaction with the EARDA Program during the application, pre-award and award period; EA experience at NIH; effect of the EA experience on the individual and the Institution; EA's return to the Institution; NIH follow-up with the EA and Institution; strengths and weaknesses of the EARDA Program; suggestions for program improvement; and recommendations for evaluation approach and content.

In addition, KAI conducted site visits at four institutions that are participating in the EARDA Program – Virginia Union University, Medgar Evers College, Immaculata College, and Mercy College.

Secondary data were collected from grant applications submitted for the EARDA Program, including successful and unsuccessful grants from the different types of institutions participating in the process; lists of eligible and participating institutions representing the four types of eligible institutions – HBCUs, TCUs, HSIs, Women's Institutions; programmatic materials including EA Program Advisory Board Meeting minutes, site visit reports, proceedings from Board retreats, Technical Assistance Workshop agendas and attendees, correspondence with potential applicants and potential participants, award letters, and Biennial meeting agendas and invitations.

2.3 Use of Results

The feasibility study indicates that a comprehensive evaluation can address both the process and outcome of the EARDA Program and compare an institution's research related activities before and after EARDA participation. Results can assess if the current management and operations of the EARDA Program effectively achieve the Program's objectives; the factors that contribute to these outcomes, and what changes may be implemented to enhance the Program. In addition, the results may be used to demonstrate more generally the impact of this type of program for institutions that serve underrepresented minorities and women and its success in increasing research interest and opportunities for these populations. Publication and presentation of the results may contribute to greater knowledge of and interest in this Program, both within the NIH, in other Federal agencies, and in academia.

2.4 Review of the Literature

Despite various efforts by government, industry, and academia, there continues to be a consistent underrepresentation of women and minorities in biomedical and behavioral sciences, and particularly in research. This underrepresentation may be due to lack of mentors, and role models, as well as to limited knowledge of and access to opportunities, institutional and otherwise.

Several major steps have been taken to start addressing these issues, starting with the 1985 creation of the Office of Minority Health (OMH), in the U.S. Department of Health and Human Services (HHS. Under the direction of the Deputy Assistant Secretary for Minority Health, the OMH advises the Secretary and the Office of Public Health and Science (OPHS) on public health issues affecting American Indians and Alaska Natives, Asian Americans, Native Hawaiians and Other Pacific Islanders, Blacks/African Americans, and Hispanics/Latinos. The mission of OMH is to improve the health of racial and ethnic populations through the development of effective health policies and programs that help to eliminate disparities in health. One of the approaches to eliminating health disparities is to insure that people of color are given the opportunity for training in the biomedical and bio-behavioral sciences and related research.

Similarly, the National Center on Minority Health and Health Disparities (NCMHD) was recently created at the NIH to promote minority health research and to lead, coordinate, support, and assess the NIH effort to reduce and ultimately eliminate health disparities. The specific goals and purposes of the Center include the important need to promote, assist, and support research capacity building activities in the minority and medically underserved communities. This includes focusing on research infrastructure development, faculty career development, and increasing the number of underrepresented minority students and students from health disparity groups with an interest in careers in biomedical and bio-behavioral research.

The EARDA Program responds to these initiatives by exposing minorities and women to the NIH environment, NIH and other researchers, and funding opportunities. As such, it can play an important role in addressing health disparities. Yet, the Program does not stand-alone in this area. EARDA is one of a variety of programs stemming from academic institutions, private foundations, and the government that are designed to improve the recruitment, retention and representation of women and minorities in the sciences. These programs focus on the importance of women, minorities, and others underrepresented in the sciences and the unique contribution that they will make to biobehavioral and biomedical research in the future (National Council for Research on Women, 2001). Although there has been increased attention to developing programs that will create interest in the sciences for women and minorities, the evaluation of such programs is not extensive. Further evaluation of these programs is essential to determine if they are meeting their goals of creating greater interest and opportunities in the sciences for these underrepresented groups.

Previous research has identified twenty programs providing enrichment opportunities to minority college students from 1966 to 1996, (Jackson and McGlinn, 1994). The programs' various

components included admission preparation, academic enhancement, motivational activities, mentorships, career counseling, and research apprenticeship. Evaluations of 18 of the 20 programs were performed with the use of secondary data. For example, the Medical/Dental Education Preparatory Program (MEDPREP) of Southern Illinois University School of Medicine provided support to underrepresented minority and disadvantaged students as they prepared for admission to health professional schools, (University of Southern Illinois, 2002). Students who participated in the MEDPREP Program had high rates of acceptance, matriculation, and graduation from these schools (Carline, et al., 1998).

Another example is the Minority Access to Research Careers (MARC) Program at the NIH, which aims to strengthen the science curricula at minority-based institutions and to provide research training opportunities for students and faculty at these institutions. Thus, the goal of the MARC Program is to increase the size and the competitiveness of the underrepresented minorities population engaged in biomedical research. The MARC evaluation assessed the career outcomes of students who received the pre-doctoral fellowship, primarily through data collected from NIH data sets and the students' current curricula vitae. Outcomes were chosen to represent postgraduate training and career involvement in research. Results indicate a favorable achievement pattern for former MARC doctoral fellows, which was consistent over time and comparable to previous evaluations of NRSA trainees and fellows (National Institute of General Medical Science, NIGMS, 2001).

With funding from the National Science Foundation (NSF), the Education Development Center for Children and Technology created the Telementoring Young Women in Science, Engineering, and Computing project. In this project, high school girls could utilize online mentoring environments to interact with professional women in the sciences and technical fields. A survey evaluation completed by the participants revealed that the Telementoring had a positive effect on the students, who indicated that they would be inclined to pursue internships and other career-enhancing activities, based on the positive interactions with their mentors (Education Development Center, 1998).

The University of Michigan is conducting an evaluation of its Undergraduate Research Opportunity Program (UROP) and the Women in Science and Engineering Program (WISE) funded by the NSF. Through a rigorous schedule of tutoring and other special activities, WISE aims to provide women students with opportunities to explore academic, career, and personal interests. Preliminary results from the WISE 1997-1998 end of year survey of participants suggest that there has been a positive influence on students' beliefs. In this evaluation, WISE participants' views were matched with a non-WISE control group. The evaluation contractor is in the process of gathering data from the Registrar for a 1993/94-matched sample to compare WISE and non-WISE students on retention to graduation, academic achievement, and retention in the science disciplines (UROP/WISE Program, University of Michigan, 1999).

The above studies, like the programs they evaluated, focused on individual rather than institutional outcomes. Most information was culled from secondary data, and data were analyzed quantitatively. Most of these studies did not utilize comparison groups and were not able to isolate program components that contribute to success. Further, these evaluations did not address the uniqueness of each participating Institution or individual in explaining the outcome

from the interventions. Thus, they are less useful than they might have been in understanding, which factors contribute to the effectiveness of the programs under study. While the proposed evaluation of the EARDA Program will collect secondary data, it will also develop survey instruments that will elicit both quantitative and qualitative data. In addition, case studies will be performed to enrich the understanding of the Program and EARDA institutions. Comparisons will be made among survey respondents from eligible nonapparent institutions, unsuccessful institutions, and EARDA graduates. Case studies will compare institutions that represent our categories of analysis, (FRESP, SRIP, both successful and less successful).

Another set of studies evaluated the impact of programs at the institutional level. The HBCU Capacity Building Program was developed by the Public Health Service in 1992 as a demonstration effort intended to increase the involvement of Historically Black Colleges and Universities (HBCUs) in health and social service programs. Four years of funding was provided to four HBCUs to develop an administrative infrastructure that would enable them to compete more effectively for federal grants and contracts, (U.S. Department of Health and Human Services Office of Minority Health, 1997).

The program was evaluated in 1996 by Expand Associates. After evaluation questions were identified, a "logic model" was developed from the program announcement and program files. Data collection instruments and procedures included a data summary form completed by the HBCU to record indicators of program implementation and outcomes; telephone interviews with two Technical Assistance providers, in-person interviews with two Federal Program Offices, and a site visit to each of the four HBCUs. Both quantitative and qualitative data were collected.

Results show that the four HBCUs successfully implemented the programs to yield the desired outcomes. The data also provide insight into how the program could be enhanced in the future.

The logic model and general quantitative and qualitative approach to data collection used to evaluate the HBCU Capacity Building Program serve as the model for the evaluation of the EARDA Program. However, the HBCU evaluation did not attempt to explain how or why particular processes were pursued or particular outcomes were achieved. The EARDA Program evaluation will attempt to evaluate factors that enhanced processes and outcomes.

Several NIH Institutes have awarded cooperative agreements to minority institutions to develop capacity to conduct specific types of research. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) awarded the Collaborative Minority Institution Alcohol Research Development (CMAIRD) to three HBCUs to increase the number of minority students and faculty in alcohol research. Two years of support for an administrative care was given, (Project Description and Justification, PDJ, A Feasibility Study to Evaluate Minority Institution Research Development Programs Awarded as Cooperative Agreements). The National Institute of Neurological Disorders and Stroke (NINDS) awarded a cooperative agreement for a Specialized Neuroscience Research Program to the Morehouse School of Medicine. Goals of this program are similar to the NIAAA Program; however, the NINDS required that a lead neuroscientist be recruited to participate in the program. A feasibility study is being conducted to assess the best approach, as well as a comparison between results obtained from cooperative agreement programs and more traditional mechanisms may be proposed. Collection of both quantitative

and qualitative data is anticipated. While the proposed approach to this evaluation seems comprehensive, it will involve only a small number of institutions that have been chosen to receive those awards. In contrast, the EARDA Program evaluation will attempt to understand the universe of eligible institutions by including not only all of the awardee institutions, but also those institutions who were never successful and those that never applied for a grant.

SECTION III: EVALUATION DESIGN

Given its overall goals, the EARDA Program is rather unique among NIH grant programs. It aims to develop the infrastructure needed to permit non-research oriented minority and women's institutions to aid faculty and students in their active pursuit of research-related interests. Its efforts are focused on those institutions that historically have provided that first higher-educational stepping stone for many minority individuals and women who have chosen scientific career paths. While the Program is not intended to change the mission of these schools and make them into research universities in their own right, it does aim to increase research and research training activities within an institution.

The difference in mission, culture, climate and student body of EARDA institutions has implications for the design of and approach to the evaluation. Institutions eligible to participate include community colleges, baccalaureate degree granting institutions, and institutions that award graduate and professional degrees. These institutions may be in different phases of research infrastructure development. Additionally, student populations may vary greatly in their knowledge of and exposure to biomedical and behavioral research. Thus, it may be inappropriate to measure the success of this Program and the institutions that participate in it by the NIH gold standard of applying for and receiving an investigator initiated grant (R01). As will be described, a range of other activities constitutes successful outcomes and impacts for the EARDA Program.

These differences require a more creative approach, integrating quantitative and qualitative assessment of the Program and allowing the unique characteristics of the institutions to be factored into the evaluation while serving as their own "controls." Thus, a pre/post evaluation of each of the participating institutions is proposed. In this way, an institution will be compared to itself over time allowing the impact of the EARDA Program to be assessed within the context of each participating institution.

Surveys of non-participating institutions, both those that never applied for a grant and those that applied and were never successful in obtaining one, will complement the pre/post design and enable the researchers to reaffirm how and if participation in the EARDA Program makes a difference. In addition, the perspective of non-participating institutions will help to elucidate factors that influence the effectiveness of the Program in reaching eligible institutions and factors that contribute to the success (or non-success) of eligible institutions that choose to apply. A separate series of in-depth case studies of select EARDA institutions completes the overall design and will allow evaluators to examine, in depth, the complex, interrelationship among individual, institutional and programmatic features in the pre-award, NIH residency and post-award phases, which influence Program impact and outcomes.

The evaluation will be organized into three operational phases: planning, data collection, and analysis.

Phase 1 - Planning Phase

During the *evaluation planning phase* (4 months), an initiation meeting will be held to refine the evaluation plan, aims, and tasks and to detail the work plan. This includes specifying data to be collected and analyzed to implement the research methodology. During this period, the following activities will be conducted:

- Develop standardized survey instruments for the EA, participating institutions, institutions that failed to receive an award, and institutions that never participated in the Program.
- Identify secondary data from the EARDA Program Office needed to address study questions and evaluation goals. Develop format for collecting data.
- Refine approach to case studies, including a) identifying criteria for selecting individuals/institutions that will participate; and b) developing a semi-structured interview tool.
- Pilot test and revise all instruments.
- Prepare and submit OMB materials to meet clearance requirements.
- Develop administrative tools including mailing lists (including e-mail address), introductory letters, etc.
- Refine detailed sampling plan based on eligible, participating, non-participant (failed, never applied) institutions.
- Develop data coding scheme.
- Design and test data management system for receipt and analysis of study data.
- Develop timeline for subsequent phases.

This phase is essential in laying the groundwork for smooth implementation of the other phases.

Phase 2 – Data Collection Phase

During the 9-month *data collection phase*, data will be collected from the EARDA Program office and appropriate NICHD or NIH offices, from the survey, and through case studies. OMB clearance for the survey instrument must be obtained and is anticipated to take 3 months to complete. During the period from completion of the OMB material and approval of the instrument, the contractor can proceed with secondary data collection so that the data collection period is not unnecessarily prolonged.

During the data collection phase the following activities will take place:

- Collect and record EARDA Program information relating to the planning,
- development, and implementation of the Program
- Receive OMB clearance
- Send introductory letter and survey instrument (by e-mail, where possible) to individuals/institutions identified in the sampling plan
- Follow up on survey instruments not returned
- Enter data into data base
- Mail introductory letters to sites involved in case studies

- Schedule and perform site visits to collect data for case studies
- Begin quality assurance review of data

Phase 3 – Analysis Phase
During the final 5 months of the project, data will be compiled and analyzed (first months) and the evaluation report will be drafted, finalized, and presented. Specifically, the following activities will take place:

- Complete quality assurance review of data, address any issues that arise
- Develop a detailed, qualitative case history describing the experience of the selected sites with the EARDA Program and the characteristics of the EA and the institution
- Analyze Program implementation and outcomes based on the statistical plan.
- Present initial findings for review and discussion by the EARDA Program
- Evaluation Work Group. Prepare and present final report and findings.

3.1 Study Questions and Hypotheses

During the feasibility study, discussions were held with EARDA stakeholders, including those at the NIH, EARDA Advisory Committee members, former EAs and senior staff at home institutions. These discussions guided the development of the proposed evaluation design and plan and helped to identify the questions that will be answered through the data collection and analysis.

The evaluation goals described in Section 2.2 can be translated into key questions listed below that drive the specific evaluation study questions and design.

> Is the EARDA Program being conducted as described and planned; that is, are proposed activities being carried out? Are targeted institutions participating?
>
> Have the participating individuals and SRIP/FRESP institutions achieved the Program's intermediate and long term goals?
>
> Is the success of the Program dependent on contextual variables at each institution? If so, on which ones, and in which way? What role(s) does the EA play in helping the institution accomplish the program objectives?

Hypotheses are derived from the overarching goal of the EARDA Program. The hypotheses provide a framework for understanding the accomplishments of EARDA eligible institutions and determining if the EARDA Program makes a difference in enhancing the research capacity at non-research oriented institutions:

- The activities of the EARDA Program increase the likelihood that non-research oriented, minority and women's institutions will have the infrastructure to expand opportunities for the participants, their institutions, their faculty, and their students to conduct biomedical and

- The level of institutional support for and faculty collaboration in EARDA activities, as well as the presence of other EAs, is directly related to the success of the EA in accomplishing activities related to EARDA objectives. (This relates to evaluation questions 2 and 3.)

- Key EA characteristics are directly related to the EA's success in accomplishing activities related to EARDA objectives. (This relates to evaluation question 3.)

3.2 Target Population

Institutions that have a combined minority enrollment of 50percent or greater and women's colleges are eligible. For the EARDA program, the target populations for this evaluation are described in the following sections.

3.2. a. Overall Description

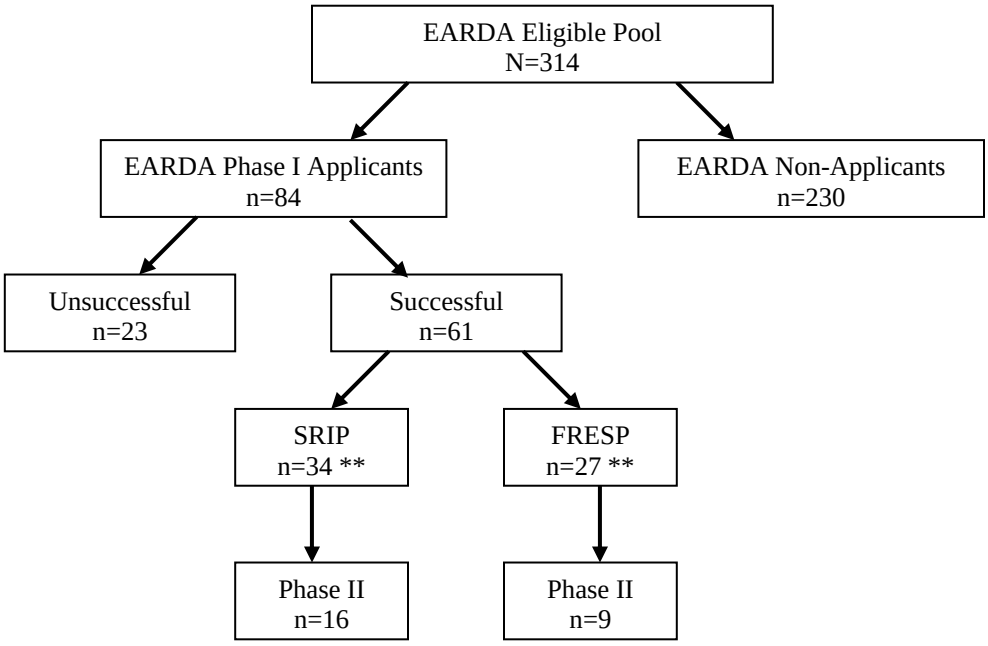
The target population for the EARDA Program evaluation begins with the pool of eligible institutions, including community colleges – Historically Black Colleges and Universities (HBCUs), Hispanic serving institutions (HSIs), women's colleges and universities, and Tribal Colleges and Universities (TCUs). Figure 2 shows the total number of eligible schools (N=314) in each of these categories.

FIGURE 2 – UNIVERSE OF EARDA ELIGIBLE INSTITUTIONS

Historically Black Colleges and Universities (HBCUs)	117
Tribal Colleges and Universities (TCUs)	34
Eligible Hispanic Serving Institutions (HSIs)**	111
Women's Colleges and Universities	52
Total	314

Of the 314 eligible schools, 84 applied for and 61 institutions received EARDA grants. Of the 61 grants awarded, 27 were FRESP and 34 were SRIP. Of the successful institution grantees 32 applied for continuing grants (Phase II), and of these, 25 or 78% (16 SRIP and 9 FRESP) received continued support. Figure 3 shows the applicant pool and award status.

Figure 3: EARDA Eligible Institutions and Applicants



** Not all of the SRIPS or FRESPs are eligible yet to apply for Phase 2

3.2. b. Target Population for Evaluation and Data Collection

For this evaluation, data would be collected from the following target groups:

- a sample of eligible institutions that *never applied* for EARDA grants
- all eligible institutions that *applied for, but never received* an EARDA grant
- all institutions *receiving EARDA grants* (e.g. eligible institutions that applied and received at least one EARDA grant).

Because this latter group includes all institutions that received an EARDA grant, it will encompass the four types of representative institutions (HBCUs, HSIs, TCUs, and Women's Institutions), SRIP and FRESP institutions, as well as EARDA institutions that applied for Phase II support and those that did not.

Specifically, data will be collected from the above groups as follows:

- *Non-Applicant Eligible Institutions* – From the universe of EARDA eligible institutions, a 25percent convenience sample (n=58) of institutions that never applied for a grant will be canvassed. The population will be over sampled (e.g. 33percent) to obtain a 25percent participation rate. A convenience sample will allow for the selection of both SRIP and FRESP eligible institutions, representing the four types of institutions. Within the sample, a representative from administration and a science faculty will be sent the survey instrument for a total of 116 respondents.

- *Pool of Never Successful Applicants* – All (100percent) institutions (n= 23) that have applied for but did not receive a grant will be surveyed. A representative from administration and a science faculty/student (n=46) will be asked to participate. Every effort will be made to include the person/PI who applied for the EARDA grant.
- *EARDA "Ever Successful" Institutions* – All EARDA institutions will be included in the survey. At each EARDA institution, the EA, a science faculty member, and a representative from administration (ORD representative, President/Vice President or another stakeholder such as the Provost) from the institution will be surveyed (61 institutions, n=183).

In addition, a subset of EARDA institutions will be selected as case studies to further explore findings from the survey. (See Section 4.2.for more details.)

3.3 Key Variables

The three primary research questions can be broken down into subquestions with key variables that will provide the specific information needed to answer them. Figure 4 summarizes the questions, Program phase, and data elements. Program phases are described in Section 1.2 and more fully in Section 3.4. The hypotheses relate to the research questions as described in Section 3.1.

FIGURE 4: STUDY QUESTIONS, PROGRAM PHASE, AND DATA ELEMENTS

Study Questions	Program Phase	Data Element /Concepts to Address
1. Program conduct 1.a. Adequacy of resources	Planning and Development Pre-Award	- Number of FTEs at NIH carrying out the Program - Funds allotted to Program - Number of flyers, letters disseminated to potential institutions - Number of Technical Assistance workshops conducted annually - Number of new institutions attending workshop - Number of applicant institutions by type
1.b. Establishment of a system for internal communication of EARDA activities	Post-Award	- Establishment of Email – communication - Newsletter - Meetings- regularly scheduled, ad hoc (e.g. among and between EARDA Program staff, NICHD Administration, NIH Mentors)
1.c. Institutional characteristics	Pre-Award	- Number of eligible urban and rural institutions - Number of eligible minority institutions - Number of HBCUs - Number of other minority institutions - Number of eligible women's colleges - Number of institutions by type of award (FRESP, SRIP)
1.d. Non-participating eligible institutions	Pre-Award	- Reasons for non-participation (no knowledge of Program, no - resources, no interests, residency requirements, etc.) - Motivating factors for participation (e.g., more funds, shorter NIH - residency)
1.e. Productive EARDA Program activities toward meeting goals of the program	Pre-Award, EARDA Residency, Post Award	- Pre-award by EARDA Program to EARDA participant - Quality of EAs NIH residency experience - Post award support - Facilitation of collaborative arrangements - Consonance between EA/institution and Program goals - Evaluation of the implementation plan

Study Questions	Program Phase	Data Element /Concepts to Address
1.f. Skills and knowledge gained	EARDA Residency	- Understanding of the Peer review process - Budget preparation - Research/grant - Grant writing - NIH staff functions - Funding opportunities - Networking opportunities - Preparing periodic reports
		-
2. Achievement of intermediate and long term goals by participating individuals and SRIP/FRESP institutions	EARDA Residency Post-Award	Items 2a-2e will assess change from pre- to post-award, using the Institutional Plan as a reference point.
2.a. Establishment or improvement of ORD or improvement to OSR	Post-Award	- Number/scope ORD activities - Number/scope OSR activities - Relationship of ORD/OSR
2.b. Conducted workshops and seminars	Post-Award	- Number of workshops (faculty, student) conducted annually - Number of seminars (faculty, student) conducted annually - Faculty/student perception of workshop - Content of workshops
2.c. Student/faculty participation in research activities	Post-Award	- Number of pilot research projects submitted - Number of pilot research projects funded - Number of funded research projects in which faculty and students are participating - Number of publications pre/post EARDA - Number of presentations pre/post EARDA - Number of meetings attended pre/post EARDA
2.d. Establishment of collaborations with other institutions	Post-Award	- Number of students funded under minority supplements - Faculty participating with other institutions - Faculty/student visits to/from other institutions - Faculty participation in outside peer review activities - Description of interactions/collaborations

Study Questions	Program Phase	Data Element /Concepts to Address
2.e. Impact of EARDA on receipt of other funds	Post-Award	- Number of MARC awards pre/post EARDA - Number of MBRS awards pre/post EARDA - Number and type of other NIH and Federal awards - Number and type of other non-Federal awards
2.f. Perception of change in EA and institutional attitudes and behaviors toward research	Post-Award	- Qualitative data (e.g., perception of changes)
2.g. Perception of change in students' attitude towards research and research programs	Post-Award	- Number of students participating on research projects - Number of students applying for graduate programs in the - biomedical and behavioral areas - Qualitative data (e.g. perception of changes)
3. Influence of the contextual variables at each institution on success of program. Role of EA in helping institutions to accomplish goals	Planning and Development Pre-Award EARDA Residency Post-Award	
3.a. Change in institutional infrastructure to support the returning EA	Post-Award	- Number of FTEs in Office of Sponsored Research pre/post - EARDA - Number of release time hours for participant pre/post EARDA - EA's perception of Institutional change

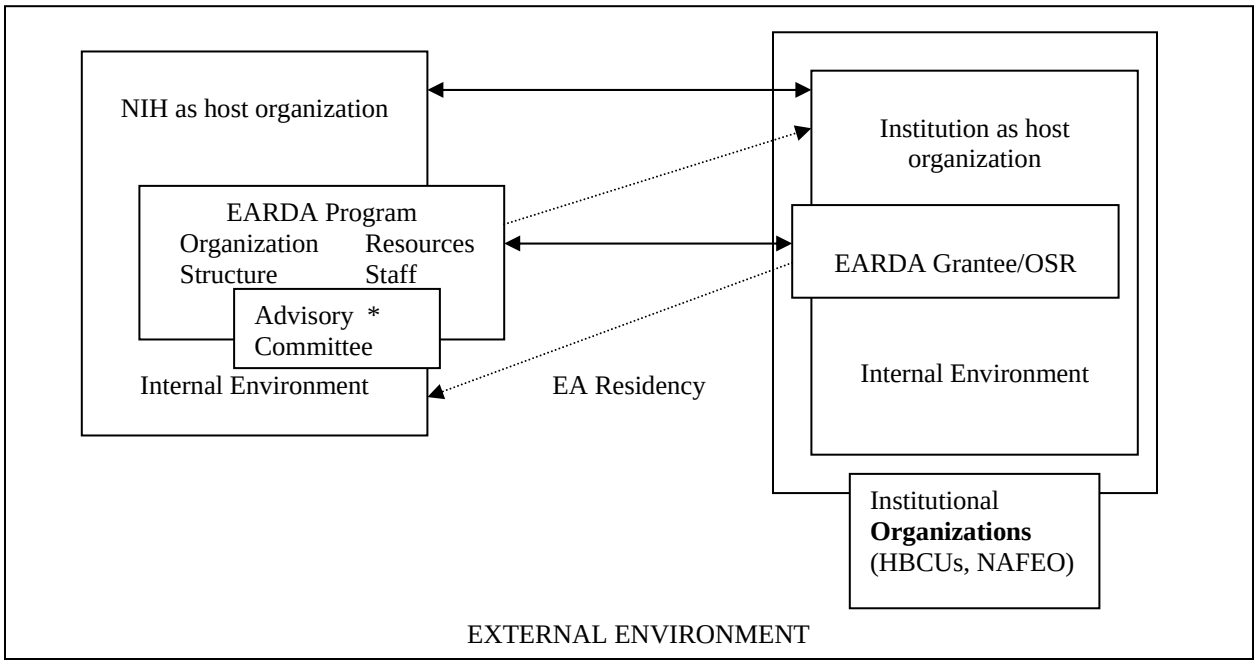
Study Questions	Program Phase	Data Element /Concepts to Address
3.b. Concrete support provided to EA/Program	EARDA Participation Post-Award	- Director's salary - Office space availability - Computers - Inter/Intrainstitutional office communication -submission of annual reports -development of timelines -Faculty development grants -Faculty appointments (e.g. to Research Committee, Financial/Administrative Committee) -Facility upgrades (e.g., labs) - Progress on Implementation Plan
3.c. Contribution of faculty and staff commitment to pursuit of research activities		- Presence of other EA at Institution - Number of EARDA pilot projects submitted - Number of EARDA pilot projects funded - Number of full scale funded research projects in which faculty and students are participating pre/post EARDA - Number of publications pre/post EARDA - Number of presentations pre/post EARDA - Number of meetings attended pre/post EARDA
3.d. Perceived barriers to the success of the EARDA Program at the Institution		- Qualitative data
3.e. Personal EA characteristics that influence contribution activities and ability to achieve program goals		- Age/gender - Faculty/Administration position - Discipline/Degree - Time at Institution - Research experience

3.4 Conceptual Framework

Figure 5 describes the EARDA Program environment. The EARDA Program resides within and is influenced by the NIH structure, resources, and staff. The Advisory Committee, made up of representatives of the various Institutes and one member from the Office of Minority Health, DHHS, serves as intermediary between the EARDA Program and the NIH. Likewise, the EAs are supported and influenced by the internal environment of their home organization and are dependent upon it for staff, credibility, information, and funding. Organizations representative of women/minority status of the institutions[1] serve as the voice of the Institutions to the greater external environment.

The greater external environment, which cannot be controlled by the Program, exerts influence through such aspects as legislation, funding, technology, and competition but is not within the scope of the evaluation.

Figure 5: EARDA Organizational Structure



* One member from Office of Minority Health

[1] These organizations include Historically Black Colleges and Universities, National Association for Equal Opportunity for Higher Education, Hispanic Association of Colleges and Universities, Society for Advancement of Chicano and Native American Scientists, American Association of University Women, and American Indian Higher Education Council.

Figure 6 provides the conceptual framework for evaluating the EARDA Program and incorporates the Program and evaluation goals while outlining the Program's major goals. This framework will serve as the blueprint for the evaluation of the EARDA Program.

The Program is best described by its implementation phases. During the *planning and development* phase, the EARDA Program is reviewed and updated, activities for the residency are planned, and NIH mentors/participants are identified. At the same time, eligible minority and women's institutions are targeted for participation. There is interaction between the Program and the institutions as efforts are made to identify eligible schools. The process by which the Program is developed and implemented is important to its success and to the success of the EAs and participating institutions.

During the *pre-award* phase, the EARDA Program office actively recruits individuals and their institutions to participate in the Program through solicitation letters, technical assistance workshops, and NIH Program staff support. Both individual and institutional characteristics, as well as the presence of a former EA at the Institution, influence whether a school will respond to these solicitations and will support EA participation.

EARDA participation exposes individuals to the NIH and to research opportunities while increasing the knowledge and skills of the EA. Characteristics of the individual EA mediate how much she/he gains from the experience and the characteristics of the Institution influence how much support and encouragement the EA will get during this phase. The evaluation will assess the residency experience and the EAs' perceptions of the influence of the mentor on their learning during this time, and on their future capability to effect change at their home institutions. The implementation *process* will, along with institutional characteristics and EA's personal characteristics, influence the effectiveness of the EA in serving as a research advocate at the institution. The Institutional Plan, developed as part of the proposal process and refined during the NIH residency will be used as a reference point for reviewing the accomplishments of the EARDA institutions and for defining the criteria of "successful" and "less successful" institutions on an individual basis.

Pre-award and EARDA participation represent the process of the EARDA Program. **Immediate** outcomes from these two phases include increased knowledge and skills for the EA and an implementation plan that has been revised and is ready to be put into effect.

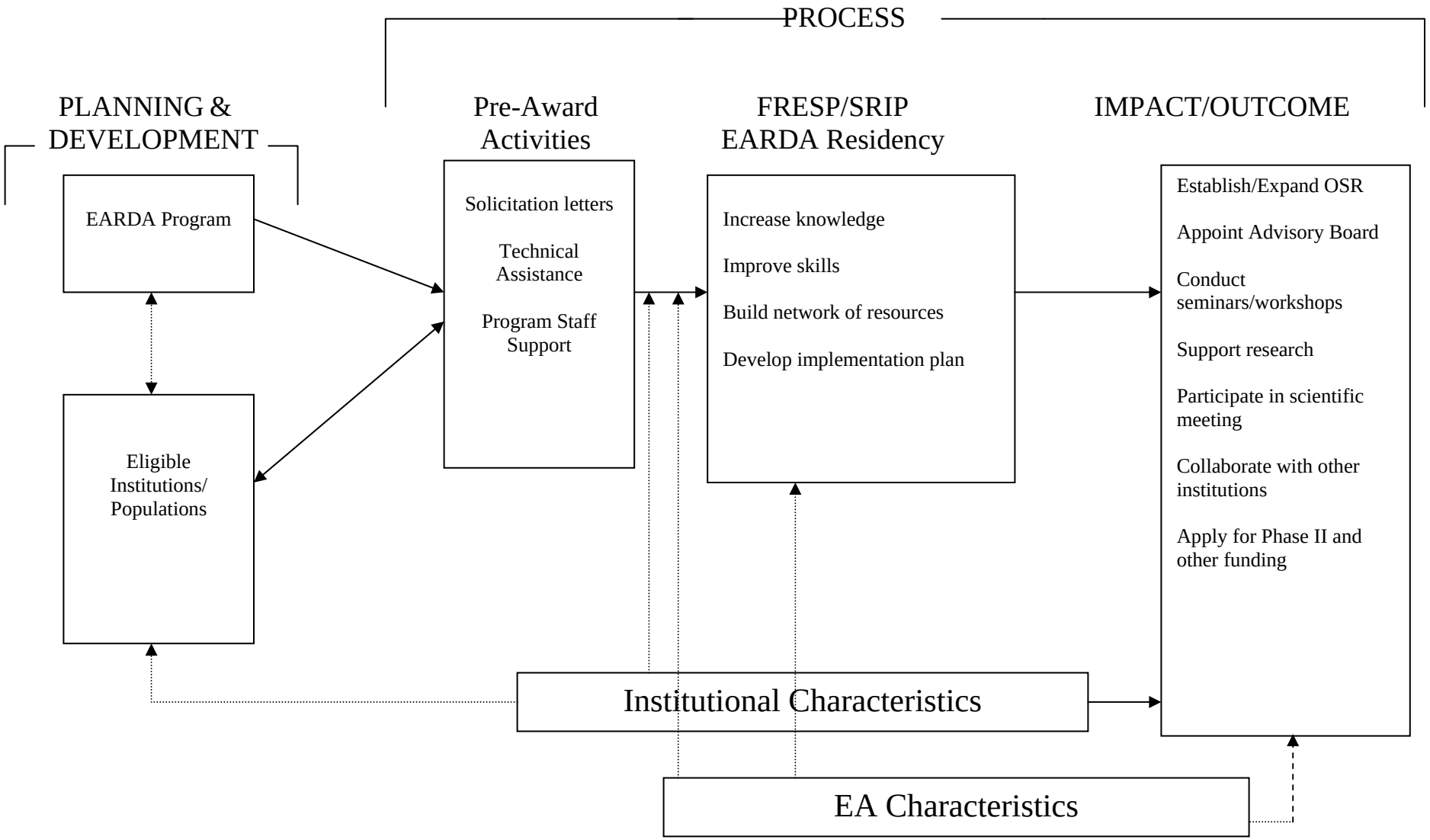
The impact of the Program is seen in the *post-award* phase during which the EA, with the support of the institution, develops and implements programs that provide research opportunities for faculty and staff at the institution. Both EA and institutional characteristics influence the impact of the Program on the EA, other faculty, students and the institution. [2]

Resources and funding both for the EARDA Program and the institution influence the ability of the Program to achieve its goals. **Intermediate** outcomes could include the development or improvement of an OSR, application for (and successful) Phase II funding, and evidence of

[2] An institutional plan is submitted with the EARDA grant proposal. During the NIH residency, this implementation plan is reviewed and developed as a blueprint of activities to be performed. This dynamic document may be reviewed and revised over time once the EA returns to his/her home institution.

institutional support for the EA and the Program. Further refinement of the OSR, seminars and workshops, research support, collaboration with other institutions, and attendance at and participation in scientific activities will represent **long term** outcomes.

FIGURE 6: CONCEPTUAL MODEL



SECTION 4: DATA COLLECTION AND ANALYSIS

For the evaluation, data will be collected and analyzed utilizing an array of strategies. Quantitative data will be analyzed using exploratory, descriptive, and multivariate techniques. Information gathered through case studies and surveys will be described qualitatively. The qualitative information will be analyzed using multi-step content analysis and coded to identify themes and patterns that emerge that can be presented quantitatively.

4.1 Data Sources

Different sources, tools, and instruments will be used to collect both primary and secondary data. Specifically, primary data will be collected through:

Survey Instrument(s) - A survey questionnaire will be constructed with relevant subcomponents that will be distributed to:

- A sample of eligible institutions that never applied for EARDA grants (*Non-Applicant Eligible Institutions)*
- All eligible institutions that applied for, but never received an EARDA grant (*Pool of Never Successful Applicants)*
- All institutions receiving EARDA grants (e.g. eligible institutions that applied and received at least one EARDA grant) (*EARDA "Ever Successful" Institutions)*

Case Studies - A sample of eight institutions that have participated in the EARDA program and that have been funded using two different types of EARDA grants (SRIP/FRESP) will constitute a series of case studies. They will also represent institutions, which according to their progress reports, have been more or less successful in achieving program aims. The case studies will include a review of secondary data, site visits and interviews using a semi-structured interview tool with EARDA participants, faculty, and staff members. (See also Section 4.2.b.)

Secondary data will include:

- Published lists of eligible institutions
- Annual reports from EARDA awardees
- Grant awards and continuation awards
- EARDA Program records

4.2 Data Collection Strategies

Figure 7 summarizes the research questions, relevant data variables and their type, as well as their source.

FIGURE 7: STUDY QUESTIONS, VARIABLES, TYPE OF VARIABLE AND SOURCE

Study Questions	Program Phase/Variables	Variable Type	Source
Is the program being conducted as planned? (Hypothesis 1)			
1.a. What are the resources?	Planning/Development - Number of FTEs at NIH carrying out the program - Funds allotted to program	Inferential - Independent	Secondary data from EARDA Program
	Pre-award - Number of flyers, letters disseminated to potential institutions - Number of technical assistance workshops conducted - Number of new institutions attending workshop - Number of applicant institutions by type	Inferential - Dependent	Secondary data from EARDA Program
1.b. Has internal communication system for the EARDA Program been established?	- Establishment of -Email -Web site -Newsletter -Meetings- regularly scheduled, ad hoc	Descriptive	Secondary data from EARDA Program Survey
1.c. Are target Institutions participating?	Pre-Award - Universe of eligible minority institutions	Inferential - Independent	Listings of eligible institutions from EARDA
	- Applicant institutions by type of award (FRESP/SRIP) - Number of urban and rural institutions - Number of minority institutions - Number of HBCU's - Number of other minority institutions - Number of women's colleges	Inferential - DependentStratisfying	NICHD Grant Office
	- Institutions receiving awards by type of award and above Categories	Inferential - Dependent Stratifying	NICHD Grant Office Listing of Grants Awarded

FIGURE 7: STUDY QUESTIONS, VARIABLES, TYPE OF VARIABLE AND SOURCE

Study Questions	Program Phase/Variables	Variable Type	Source
1.d. Why are eligible institutions not participating?	Pre-Award - Reasons for non-participation (e.g., no knowledge of program, no resources, no interests, residency requirements.)	Descriptive	Survey of eligible, non-participating institutions
	- Motivating factors for participation (e.g., more funds, longer periods.)	Descriptive	Survey
1.e. What are the most productive EARDA program activities in meeting goals of the program?	- Pre award support to EARDA participants from EARDA programs - Quality of EA's NIH residency experience - Post award support - Facilitation of collaborative arrangements - Consonance between EA/institution and program goals	Descriptive (perception)	Survey Case studies
1.f. What skills and knowledge are gained in EARDA Program?	Residency - Understanding of the Peer review process - Research grant budget preparation - Grant writing - NIH staff functions - Funding opportunities - Networking opportunities - Preparing periodic reports	Descriptive (perception)	Survey Case Studies

FIGURE 7: STUDY QUESTIONS, VARIABLES, TYPE OF VARIABLE AND SOURCE

Study Questions	Program Phase/Variables	Variable Type	Source
2. What intermediate and long term goals have been achieved by participating institutions? (2a-e)	Pre-Award/Post-Award - ORD Office established or improved - Workshops initiated - Scope of ORD activities - Number of seminars conducted - Number of workshops (faculty, student) conducted - Number of seminars (faculty, student) conducted attended? - Number of pilot projects submitted - Number of pilot projects funded - Number of funded research projects in which faculty and students are participating - Number of publications - Number of presentations - Number of meetings attended - Number of students funded under minority supplements - Number of MARC awards - Number of MBRS awards - Other NIH, Federal, non-Federal awards - Number of students participating on research projects - Number of students applying for graduate programs in the biomedical and behavioral areas	Pre/Post Comparison	Grant Applications Annual Reports Phase II Proposal Survey
2.a. Has the ORD/OSR improved?	Post-Award - Relationship of ORD/OSR - Perception of ORD activities and relationship to OSR	Descriptive	Case studies Survey
2.b. Workshops and seminars	Post-Award - Faculty/student perception of workshop - Content of workshops	Descriptive	Case studies Survey Workshop material
2.c. Student/faculty participation in research activities	Post-Award - Perception of participation by students and faculty	Descriptive	Case studies Survey

FIGURE 7: STUDY QUESTIONS, VARIABLES, TYPE OF VARIABLE AND SOURCE

Study Questions	Program Phase/Variables	Variable Type	Source
2.d. Collaboration with other institutions	Post-Award - Description of interactions/collaborations – Faculty participating with other institutions - Faculty/student visits to/from other institutions - Faculty participation in outside peer review activities	Descriptive	Survey Case Studies
2.e. Funding complemented by other programs	Post-Award - Description of activities to gain awards	Descriptive	Survey Case studies
3. What key institutional factors contribute to the EARDA outcomes? (Hypothesis 2) What is the role of EA in helping institution to accomplish goals?			
3.a. Institutional infrastructure and support	Pre/Post - Number of FTEs in Office of Sponsored Research pre/post EARDA - Number of release time hours for participant pre/post EARDA - Qualifications and experience of support personnel - FTEs in grants administration	Pre/Post Comparison	Grant application Annual report Survey

FIGURE 7: STUDY QUESTIONS, VARIABLES, TYPE OF VARIABLE AND SOURCE

Study Questions	Program Phase/Variables	Variable Type	Source
3.b. Concrete support provided by the institution	Pre/Post-Award - Director's salary - Office space availability - Computers - Inter/Intra Institutional office communication -submission of annual reports -development of time lines -faculty appointments (e.g., Research Committee, Financial committee) -Indirect costs -Faculty development grants -Facility upgrades (e.g., labs) - Progress on Implementation Plan	Pre/Post Comparison	Grant application Annual report Survey
3.c. Evidence of faculty and staff commitment to research	- Presence of other EA at Institution - Number of pilot projects submitted - Number of pilot projects funded - Number of full scale funded research projects in which faculty and students are participating - Number of publications pre/post EARDA - Number of presentations pre/post EARDA - Number of meetings attended pre/post EARDA	Pre/post comparison	Survey Case Studies
3.d. Influence of contextual variables on EARDA success at an institution	Post-Award - Institutional evaluation of the EARDA - Perceived Attitude of administration - EA perception of institutional change - Perceived Barriers to change	Descriptive	Survey Case Studies
3.e. Personal EA characteristics that contribute to success	- Age/Gender - Faculty/Administration position - Discipline/Degree - Time at Institution - Research experience	Descriptive	Survey Case Studies

4.2.a Quantitative Data

Data from the published lists of eligible institutions will be reconciled so that a consistent and encompassing universe is created.

To capture data that describes the EARDA Program, an ***EARDA Program Sheet*** will be constructed to gather information from the EARDA Program office.

To extract data from the Annual reports from EARDA awardees, grant and continuation awards, and the EARDA Program records, a ***Data Summary Sheet*** will be constructed with relevant categories in which to enter indicated data elements. Two members of the evaluation team will review the reports, records, grant awards to capture relevant data on the ***Data Summary Sheet*** for each EARDA participant. The data will provide a baseline status of the institutions and changes that occur over time. These data will be coded, collated, and analyzed to address the research questions.

4.2.b Case Studies

As noted earlier, case studies will be conducted at eight EARDA participant institutions to address perceptions of the EARDA Program and to elucidate key factors that can be attributed to the differences in success within the FRESP/SRIP recipient pools. The EARDA Program Director will be asked to suggest institutions that have been successful ("high performers") or less successful ("low performers") in achieving the Program goals. For purposes of the evaluation, "success" will be assessed using the Implementation Plan (see Section 3.4, p.21) as a reference point for reviewing the accomplishments of the EARDA institutions. The Program Director will propose two FRESP and two SRIP institutions that meet *both* of these designations ("successful" and "less successful").

This methodology will allow four categories to be created for the case studies: 1) FRESP high and 2) FRESP low performers, and 3) SRIP high and 4) SRIP low performers. Selecting two institutions to represent each category will allow for comparison within each category to confirm findings. The EARDA Evaluation Technical Workgroup will be given the criteria and rationale used to identify the institutions for inclusion in the studies and will be asked to independently approve the case study selections.

Analysis of the case studies will utilize a network-based approach to discern structural patterns and relationships among the EARDA participant, other faculty, administration, departments and institutions. Because institutions are characterized by interdependency, interaction, and integration, different groups within an organization, faculty and students, biomedical and behavioral departments, scientists and administrators are to some extent dependent on each other to accomplish their work. The EA, as faculty or administrator, must interact within and across his/her department and with students to accomplish any task. Within the structure of the institution, the direct and indirect exposure to other network members, access to resources in the primary and related networks, and position in the network structure are variables that will enhance or impede the EA success in accomplishing the goals of the EARDA Program.

When evaluating the EARDA Program, it would be useful to have an understanding of which members of a network are most likely to change their behavior (e.g., take a more active role in

research, train other faculty/students) based on their position in and interactions within their own organization, other research institutions, and the NIH. The network-based approach will be useful in analyzing the effects that the structural patterns and relationships can have on program success, performance and activities. This information will be useful to the EARDA Program in identifying areas in which skill building to help the EA negotiate within their institution are needed. It will also assist NIH managers in determining if the EARDA Program's activities and structures adequately address the various components of an institution's network.

There are various approaches to implementing a network analysis approach ranging from purely descriptive to a mathematical calculation of the frequency, intensity, and content of interaction between and among members of the network. For this evaluation, both types of analyses are proposed, starting with a descriptive analysis of the EA network to describe the interactions that take place in accomplishing each task. For example, to arrange for a grant-writing workshop in one institution, a junior faculty member must receive support from department members, and approval from the department chair, the Dean of the College, and an administrative Vice President before submitting a budget to the Finance Office for approval. The number and route of interactions, and the amount of time to complete the interactions can be compared among institutions and may shed light on why some institutions were more successful than others in achieving Program goals. Ultimately, the nature of the interactions as well as other findings from the case studies can be coded and a quantitative analysis can be performed.

The case studies will utilize semi-structured interviews conducted during site visits. To understand what patterns and factors lead to various levels of achievement, questions will focus on:

- skills and knowledge gained while participating in the EARDA Program,
- intermediate and long-term goals achieved (see data elements in Question 2, Figure 7),
- perceptions of the ORD/OSR,
- workshops and seminars,
- participation by students and faculty in research activities,
- collaboration with other institutions,
- the process of gaining funding from other programs,
- institutional infrastructure and support,
- perceptions of the influence of the institution on the success of the EARDA Program, and
- perceptions of attitude change at home institutions,
- suggestions for the EARDA Program office

Additionally, during the interviews, respondents will be asked with whom they are most likely to interact with regarding the EARDA Program within; a) their institution, b) related organizations (e.g. professional associations), and the NIH. They will be asked about the frequency, quality, and content of these interactions.

4.3 New Data Collection Instruments

A survey instrument sent both electronically and in hard copy, as appropriate, to potential respondents, will be used to address the study research questions. A core set of questions for all respondents will identify respondent demographic characteristics and institutional characteristics. The remainder of the questions will be customized to the groups being surveyed and will be available as subcomponents of the survey. For the EARDA recipients, questions will focus on the most productive activities in the EARDA Program, skills and knowledge gained in participating in the EARDA Program, intermediate and long-term goals achieved (see data elements in Question 2, Figure 7), perceptions of the ORD, workshops and seminars, participation by students and faculty in research activities, collaboration with other institutions, the process of gaining funding from other programs, institutional infrastructure and support, perceptions of the influence of the institution on the success of the EARDA Program, and suggestions for the EARDA Program. For sites that will also be visited, the visits will provide a consistency check for the responses to the questionnaires.

The pool of eligible institutions (both FRESP and SRIP) that applied, but did not receive a grant, will be asked to respond to questions on attendance at pre-award workshops, perceptions of the Program, perceptions of why the application was not accepted, and perceived barriers to receiving an award. Both this group and the EARDA recipients will be asked to report the number of times they applied for the EARDA grant, number of EA proposed, and perceived reason for success/non-success.

A sample of institutions from the universe of EARDA eligible institutions that have never applied for a grant will be canvassed to explore why the institution has not applied, barriers to applying, attendance at pre-award workshops, and perceptions of the EARDA Program.

The universe of questions for the various questionnaires has been identified from the data collected during the feasibility study, including interviews with EARDA stakeholders, EARDA participants, and site visits. They have been expanded based on a thorough literature review of evaluations of similar programs for minorities and biomedical and behavioral researchers. The version of the survey for the EARDA participant will contain approximately fifty questions and the other two versions will contain no more than twenty questions. Each will be designed using principles of good survey construction. Questions will be understandable by the respondent, and assist him/her in recalling relevant behavior. Because recall is often fragmentary, the respondent will need to make various inferences and estimations, and the survey questions will enable them to readily do so. Finally, the respondent must "map" their answer to the response choices. Questions will use familiar and unambiguous terms and provide a context for response. The format for the questionnaire will include open/closed questions and frequency (e.g., never, sometimes, always) and/or desirability scales (e.g., not at all, somewhat, a lot). Reference periods will be included (e.g., since the NIH residency) to help provide a context to the respondent.

Each version of the instrument will be pilot tested at an appropriate institution to ensure that it is comprehensive, easy to follow, and takes no more than twenty minutes to complete. Both the content and the graphical layout of the questionnaire will be assessed.

To identify to whom the questionnaire will be sent, each institution will receive a telephone call prior to and after mailing (or electronic mailing) the questionnaires. The caller, will, by a series of preset questions, determine if the survey instruments should be mailed to the President, head of the Office of Sponsored Research, and/or to any other individual identified. Name of faculty in the biobehavioral and biomedical sciences who have expressed an interest in research (if possible) will also be solicited. Wherever possible, the EA applicant will be asked to complete the survey. Targeted questions concerning the faculty's interest and participation in various related activities will help to identify the best choice of respondents. The questionnaires will be accompanied by a cover letter from the Director, NICHD, directions, and a stamped return envelope for those recipients that do not wish to use electronic mail. Respondents will be asked to send their responses, by mail or e-mail, within two weeks. As an incentive to participate, responding institutions will receive a $100 gift certificate to purchase books for their library.

Response rate for the EARDA institutions should be high (>90 percent) as these institutions receive a benefit from participating in the Program. The response rate from the pool of applicants that were not successful could be relatively high, as these institutions may perceive that they have something to gain from a response. On the other hand, they may not wish to participate further in a program from which they were rejected, and thus the response rate may be difficult to anticipate. The response rate for the sample of all other eligible institutions is difficult to estimate. The telephone calls prior to and after sending the questionnaires, as well as the incentive, should help to encourage participation. If the response rate is less than 75 percent for the initial sample of institutions, a second set of questionnaires will be sent to other eligible institutions that did not apply until a total response rate of 25 percent is achieved. Because all of the EARDA recipients and all of the applicants who were never successful will be included in the first mailing, ongoing encouragement by the evaluation team and resending of questionnaires, if required, will help to improve response rate.

4.4 Clearance Requirements

The questionnaire will require clearance from the U.S. Office of Management and Budget (OMB). The process for obtaining OMB clearance is formal, well described, and can take from three to six months. No delay is expected in receiving OMB clearance as this study poses minimal risk to the respondents and imposes little burden on their time.

4.5 Data Integrity

To assist in ensuring data integrity, all instruments used in the evaluation will be pilot tested on five respondents. Pilot data will not be included in the analysis. The site visits and interviews will be conducted by two senior researchers to ensure comprehensive recording of the information. Staff extracting data from secondary documents will be trained in the process. In addition, a 10 percent sample of data that are extracted from secondary documents will be reextracted to ensure accuracy and comprehensiveness.

Data will be entered into computer files by trained data entry staff. Ten percent of the data entered into the computer will be verified against source documents. If more than a 1% error rate is found, an additional 10 percent will be entered, and data entry staff will be retrained.

4.6 Ethical Considerations

Staff conducting the evaluation will be senior, seasoned researchers who understand the need for sensitivity in talking with Program staff, EARDA participants, and academic representatives. In reports, no actual names of the institutions or the interviewees will be used. Instead, each will be coded.

With respect to security of responses and computerized data files, study data will be safeguarded against loss and unauthorized use. Any hard copy forms will be stored in locked, fireproof cabinets. To protect records and files against loss, daily back-up onto tape must be done so that in the case of a disk failure, only data written to the files since the last back-up are subject to loss and can be easily restored.

The first level of security in any data system is accomplished by restricting physical access to the data system. Therefore, data files will be protected by passwords that are changed routinely. Access to directories is strictly monitored according to need.

Burden placed on respondents and program personnel will be minimized by short questionnaires and by gaining agreement on the length, format, and timing of site visits and interviews.

4.7 Data Preparation

Each EARDA Program participant and interviewee will be given a unique numeric code. Unique numeric codes will also be assigned to applicants who did not receive grants and the sample of eligible institutions that did not apply for a grant.

The ***EARDA Program Sheet*** and ***Data Summary Sheet*** will be constructed to facilitate data collection and data entry into the computer. Screen facsimiles of these sheets will be constructed to facilitate data entry into the computer and automated editing. Likewise, the questionnaires will also have screen facsimiles to facilitate data entry into the computer and automated editing.

Data will be edited for field specific, logical, and consistency checks. Once data are clean, analysis will begin. Coding lists will be developed based on site visit and interview responses and each response will be coded and entered into the appropriate file.

4.8 Data Analysis

Quantitative analyses will take place using exploratory, descriptive, and inferential statistics, as appropriate. Data will first be explored to ensure that they are complete and accurate. Institutions will then be described according to their characteristics (e.g. FRESP/SRIP, etc.). The universe of EARDA participants will also be described (e.g. gender, age, education, etc.).

To address the first and second study hypotheses, multivariate models will be constructed with independent, dependent, and stratifying variables, as shown in Figure 7. Pre/post EARDA Program participation will also be analyzed using appropriate statistical techniques that consider longitudinal data. For the analysis of **longitudinal data**, three key technologies are listed below.

1. **Generalized Estimating Equations** (Zeger and Liang, 1986). As implemented in SAS 6.12 PROC GENMOD, these are regression models for clustered data; both longitudinal and survey designs introduce clustering. These regression models permit continuous
    a. outcomes such as scale scores on survey instruments, binary outcomes (e.g., low/high), and count outcomes (e.g., number of grants submitted).

2. **Random Effects Regression** (Laird and Ware, 1982). As implemented in SAS PROC MIXED, these are longitudinal regression models, primarily for continuous outcomes, with the key element of allowing random effects. Thus, baseline institutional status, EARDA participant or non-participant, can be a random effect rather than the focus of explicit modeling.

3. **Hierarchical Modeling** (Goldstein, 1995). As implemented in MLN software (Woodhouse *et al*., 1995), these are regression models, also suitable for longitudinal data. A novel element is that EARDA participants are "nested" in institutions, with and without other EARDA participants. That is, the model explicitly deals with the "multi-level" nested structure of many designs.

Qualitative analysis relating to the case studies will be performed to address the research questions. For the case studies and network analysis, the roles of individuals, the groupings of people in the overall institution, the relationship strengths, direction and frequency, and the overall structure of the network can be used to assess why and how the EARDA Program is successful, and may be used to predict changes that might be instituted to improve the Program and the chances of success.

4.9 Presentation of Results

The results of the evaluation will be presented in a final report that includes analysis of the responses to the survey questionnaire, case studies, and secondary data as well as a synthesis of the data that responds to the study questions. It is also recommended that a set of slides be provided for use in presentations to interested NIH and other groups, and a manuscript be provided for publication in an appropriate journal.

A meeting will be convened of the EARDA Evaluation Technical Workgroup prior to finalizing of the study products. This Workgroup will review the data and findings and provide input into their interpretation. Once the study products are finalized, they will be presented to EARDA stakeholders, including NIH and other federal agency representatives, as well as to EARDA eligible institutions. A formal presentation at the EARDA update meeting could include not only a report of the findings, but commentary from institutions that participated in the survey and/or case studies.

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