Evaluation of the Fogarty International Research Collaboration Awards (FIRCA) Program: Phase II Outcome Evaluation

Contract #263-MD-217306

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Foreword

As a prologue, it should be noted that the following report is a historical document pertaining only to the operations of the Fogarty International Research Collaboration Awards (FIRCA) and AIDS-FIRCA grants awarded between calendar 1992 and 2003. Several key changes have been made in both programs since 2003, many of which address the recommendations in this report and are as follows:

FIRCA

- In 2003, FIC asked the NIH ICs to consider helping to fund the successful FIRCAs from their grantees. Many of the ICs responded positively and provided significant co-funding. In 2005, many NIH ICs joined NIEHS (a partner since the 2002 PA) as FIRCA program partners, including: NCCAM, NEI, NIA, NIAAA, NIBIB, NIDCD, NIDCR, NIDA, NIEHS, NINDS, and OBSSR (beginning with the May 21, 2005 receipt for January 2006 council). The ICs signed onto the 2005 FIRCA PAs both to support their grantees' international collaborative research and encourage more international research collaborations related to the missions of their institutes or centers. The NIH ICs traditionally contributing the most parent grants to the FIRCA applications and awards did not sign on (NIGMS, NIAID, NHLBI, NCI, NICHD and NIDDK in order of their support of parent grants). However, those ICs that did not sign on may co-fund FIRCAs on an ad hoc basis.
- In 2005, in response to input from the FIRCA applicants, grantees and reviewers over the years, FIC revamped the FIRCA program to meet the evolving needs of the research community in the context of rising numbers of applications at a time of increasingly constrained FIC and NIH overall budgets.
    - ***The FIRCA program was broken up into two: a behavioral and social sciences FIRCA, and a basic biomedical FIRCA starting with the May, 21, 2005 receipt date (January 2006 council round).*** By the nature of the program the FIRCA applications had always covered the whole spectrum of NIH research areas, although the highest concentration of applications was related to infectious diseases and basic cellular/molecular and genetic research. FIC had long sought to increase the pool of behavioral and social science applications and the visibility of the FIRCA in the behavioral and social science research community. But the behavioral and social sciences were perceived to be at a disadvantage among the FIRCA pool of more basic biomedical research. A natural split therefore seemed to be between basic biomedical science areas and behavioral and social science related research areas.
    - ***Both programs allow/require the foreign collaborator to apply for a follow-up "renewal" FIRCA.*** The other major substantive change in the 2005 FIRCA PAs was the requirement for the one allowable follow-up FIRCA to be submitted by the FIRCA foreign collaborator with the former US PI as co-investigator. The intent is to allow successful and well-qualified FIRCA foreign collaborators, who are already conducting the bulk of the FIRCA research in their own countries and institutions, the opportunity to continue the work with a grant in their name. It is hoped this will help them when they seek non-FIC funding at NIH or elsewhere. In addition it allows their institutions the opportunity to become familiar with and work through the complicated NIH application review process.

- ***IRC country eligibility was clarified by use of the World Bank criteria for low and middle income countries.*** This allows "graduation" of a former IRC country out of FIRCA program eligibility when they become high-income countries theoretically better able to build their own national health research capacity.

Further changes will be considered as the results of the evaluation are processed and the recent program changes have time to bear results. In addition to providing important data and guidance for the future direction of the program, the evaluation represents an important baseline for future evaluations of a program that remains vital and in demand among the global research community.

AIDS-FIRCA

The program announcement for the Fogarty International Research Collaboration Award for HIV-AIDS (AIDS-FIRCA) was inactivated as of June 17, 2003 with the last date for applications of September 1, 2003. FIC did not accept, review, or fund new or re-competing AIDS-FIRCA R03 applications for the January 1, 2004 receipt date and beyond. The AIDS-FIRCA program was de-activated due to the low application response to the AIDS-FIRCA program over the last ten years, and particularly in the last five years, coupled with the increasing number of new opportunities for funding for international AIDS-related research that significantly altered the uniqueness of and need for the AIDS-FIRCA program. The last AIDS-FIRCA award was made in September 2004. There are currently 16 AIDS-FIRCA grants that are completing their funding.

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Executive Summary

The Fogarty International Research Collaboration Awards (FIRCA) program was initiated in 1991 by the Fogarty International Center (FIC) to foster international research partnerships between NIH-supported US scientists and their collaborators in countries of the developing world. The program funds 3-year research partnerships between practicing scientists and physicians in the United States and their counterparts abroad. Following the completion of the first decade of FIRCA operations in 2002, FIC initiated an independent program evaluation of FIRCA to document the performance of the program, examine its overall operations as they have evolved over time, and make recommendations concerning the future of FIRCA.

The evaluation proceeded in two phases. An initial Feasibility Study collected program data, produced a draft logic model, and pilot-tested potential survey questions and interview protocols. A full Outcome Evaluation, the results of which are presented in this report, began in 2004. Both phases of the evaluation used FIC's standardized evaluation framework that highlights four elements of evaluation: Program planning; Program management; Partnerships and communication; and Results. The evaluation framework was used as part of a retrospective evaluation design that aimed to answer the question of how FIRCA influenced the career trajectories of its investigators (e.g., regarding collaboration between U.S. Principal Investigators (USPIs) and International Research Collaborators (IRCs), the effects on USPIs' international research interests and effects on IRCs' careers) as well as broader influences on capacity building at the institutional and national level. The full Outcome Evaluation described in this report primarily considers FIRCA program activities and outcomes between 1992 and 2003, while AIDS-FIRCA program activities and outcomes are secondarily included in the Outcome Evaluation.

The *original* FIRCA program goal was to "facilitate collaborative research efforts between US and foreign scientists that will expand and enhance the NIH-supported research program of the US Principal Investigator, while at the same time benefiting the scientific interests of the collaborating foreign scientists." This goal of collaboration has remained a constant throughout the life of the FIRCA program, although it was modified slightly in 2002 to emphasize the high quality of collaborative research. In 1998, a *second* program goal of "increasing the capacity of the foreign investigator and institution for sustained and productive research and research collaborations" was added.

Six main data collection methods were integrated as part of this Outcome Evaluation:

- Administrative data collection and review
- Interviews with program stakeholders.
- Census surveys of the USPIs and IRCs
- Publication information
- Bibliometrics, and
- Site visits

Collaboration

Assessment of the program's collaboration goal began with the creation of a publication database that merged MEDLINE records with listings of publications from surveys and grant progress reports in

order to assess the extent of pre-award collaborative publication between USPIs and IRCs, the extent of collaborative publication during the award, and the identification of continuing collaborative publication after award close. Bibliometric data provided insight into the quality of those collaborative publications relative to field norms. Survey responses and site visit interviews provided breadth of detail regarding the origin, nature, and success of collaborations from the perspective of both the US investigator and the foreign collaborator.

Findings regarding collaboration include:

- ***Many grantees began their collaboration before receiving their first award.*** Nearly half of grantees (46% of FIRCA researchers, and 43% of AIDS-FIRCA researchers), had had at least one previous collaborative publication. The large majority of survey respondents – USPIs or IRCs, FIRCA or AIDS-FIRCA awardees – indicated that they had begun their collaborations (regardless of whether or not they had published together) before receiving an award.
- ***Collaborations generally were successful in producing international-quality science.*** Approximately three-quarters of USPI-IRC pairs have produced one or more peer-reviewed journal publications that appeared in MEDLINE searches, surveys, or grant reports. For both FIRCA and AIDS-FIRCA, grantees produced an average of just over three collaborative, attributable publications per collaboration, with nearly ten percent of FIRCA collaborations resulting in ten or more collaborative publications subsequent to award. Bibliometric analysis suggests that the quality of the funded science met international norms.
- ***Collaborations were between scientific peers.*** Both USPI and IRC survey respondents saw the roles of the two collaborators as equals. The USPIs surveyed reported that they generally played a co-equal role with their IRCs, while the IRCs surveyed reported that they were generally equals as well, though a minority indicated that that the developing-country scientists played the predominant role in the collaboration.
- ***Collaborations between USPIs and IRCs continue after the award itself concludes.*** Approximately ninety percent of survey respondents whose grants have ended – whether USPIs or IRCs, FIRCA or AIDS-FIRCA – are continuing their collaboration in some form. More than thirty percent of grantees whose awards ended five or more years ago have continued to co-publish.
- ***While FIRCA and AIDS-FIRCA have on the whole been successful in promoting sustainable research collaboration, there are variations in the extent of that success:***
    - USPI-IRC pairs whose collaboration preceded the award tended to collaborate more strongly during the award period and have a more sustainable relationship afterwards.
    - IRCs from certain regions (e.g., Latin America, Eastern Europe, Former Soviet Union) tended to collaborate more strongly during the award period than those from other regions (e.g., Africa, Asia, Western Europe); collaborating pairs whose IRCs hail from countries classified as "middle-income" tended to collaborate more strongly than those from either "high-income" or "low-income" countries.

Capacity-building

Assessment of capacity-building relied primarily on survey responses to characterize the breadth of the program's capacity-building influences. Site visit interviews provided rich detail regarding both individual-level and institutional capacity-building, albeit for a small minority of grantees. Administrative records – both from NIH and other biomedical research funding sources – were

collected to further explore the extent to which the program contributed to IRCs' success in receiving future internationally-sponsored awards.

Findings regarding capacity-building include:

- ***The program has been highly successful in developing the potential of the individual international investigator.*** The career benefits of the program are manifest for FIRCA and AIDS-FIRCA researchers alike at all career stages and from all regions of the world. The benefits are both immediate in terms of prestige and long lasting in terms of international credibility-building. For junior researchers, it acts to help launch careers, often for scientists who have just returned from graduate study or postdoctoral fellowship in the United States; for more senior researchers, the program allows sustainability of high quality research, especially in countries where local funds for research are limited. The program provides researchers with the opportunity to receive equipment and consumable materials often unavailable locally.
- ***Awards are not only beneficial to individual IRCs, but they also impart "second generation" effects to students through training, travel, and education opportunities.*** The majority of IRCs used funds to train students and to send them abroad to the USPI laboratory. In many cases students were the primary carriers and diffusers of new techniques or methods from the USPIs' laboratories to IRC laboratories and institutions – a key capacity-building effect.
- ***Programmatic influence often extended to the institutional level.*** An important facet of capacity building lay in the learning and development of new techniques that diffused throughout individual labs, departments, and institutions; at many sites, equipment and consumables were also shared institutionally. Evidence of capacity building, however, tended to be greatest at institutions where researchers had multiple sources of international funding – although at such institutions, FIRCA or AIDS-FIRCA funding was one of the first sources of international funding that was secured. The program appears to have catalyzed the formation of several large-scale research networks in which former IRCs who have "graduated" from the program play key roles.
- ***Funded science tends toward basic research, though there are examples of IRCs who pursue translational research or policy impact, depending on the inclinations and abilities of the individual investigator.*** Many researchers praised the program for allowing them the freedom to pursue pure, basic research in environments where they are usually pressured to produce applied, tangible results. There were several examples, however, of IRCs translating research into clinical practice or into public policy.

Program Planning, Management, and Partnerships

Assessment of program planning, program management, and partnerships relied on administrative data review, interviews with program stakeholders, survey responses, and site visit interviews. While these are not "outcomes" of the program, strictly speaking, understanding these processes helps both to explain program results and to suggest potential future enhancements.

Findings regarding program planning, management, and partnerships include:

- ***Changes in program management have been responsive to the needs of participants.*** Examples include the evolution of the allowable expenditure rules to include salary support for the IRC, administrative costs at the IRC institution, and travel to international scientific conferences. Many IRCs believe that the program should, however, include mechanisms for them to apply directly as principal investigators.
- ***Complications associated with transfer of equipment from the US to the IRC country and funds from the USPI institution to the IRC represented the most frequent, severe, and multi-faceted set of challenges with respect to grant management.*** Specific challenges have included substantial administrative time investment at both ends, variable levels of administrative expertise and flexibility at USPI institutions, significant time lags for reimbursement, excessive taxation in the IRC country, and customs and shipping delays.

Recommendations

Recommendations for program management at FIC stemming from the Outcome Evaluation build on the key findings:

- Retain both collaboration and capacity-building goals, despite the potential tensions between the two and the complexity of the sustainable research capacity building goal.
- Retain the breadth of research topics and geographic scope.
- Should FIC create FIRCA-like programs targeted toward specific research topics or geographic areas, embed performance measurement strategies into these new programs to discern whether such new programs meet the level of quality of the parent program.
- Support IRCs in developing a viable "exit strategy."
- Should FIC allow IRCs to apply as principal investigators, it may be necessary to create separate review criteria for such situations, or even a separate competition for FIRCA applications.
- Establish a direct and formal relationship between FIC and foreign collaborators.
- Consider allowing still more flexible spending of grant funds.
- Disseminate management "best practices" to USPIs, IRCs, and their institutions.

Contents

1. Introduction

1.1 Evaluation Rationale

The Fogarty International Research Collaboration Awards (FIRCA) program was initiated in 1991 by the John E. Fogarty International Center (FIC) of the National Institutes of Health (NIH) in order to foster international research partnerships between NIH-supported scientists in the United States and collaborators in countries of the developing world. The overall mission of FIC at FIRCA's inception was "to mobilize scientific resources to reduce global health disparities and to prepare the current and future generation of scientists to meet global health needs."[1] The first FIRCA grants were awarded in 1992. In 1994, an HIV/AIDS-specific international research collaboration award (AIDS-FIRCA) was added. AIDS-FIRCA was designed to be similar to the FIRCA but to foster HIV-related research between US researchers and scientists from other countries. The program announcement for AIDS-FIRCA was inactivated as of June 17, 2003 with the last date for applications of September 1, 2003.[2] Both programs have used the R03 small research project grants mechanism.[3]

At the end of the first decade of FIRCA operations, FIC commissioned an independent evaluation to document the performance of the program, examine its overall operations as they have evolved over time, and make recommendations concerning the future of FIRCA. Examining the role of the FIRCA program – FIC's signature research grant program – within the overall missions of FIC and NIH was another evaluation objective.

Abt Associates Inc. (hereafter referred to as "Abt") was awarded the evaluation contract and performed a Feasibility Study for a FIRCA program evaluation during 2002-2003. The Feasibility Study produced a draft program logic model, a database of FIRCA grants awarded between 1992 and 2001, and preliminary study questions for a full Outcome Evaluation. These elements provided a solid foundation for the evaluation methodology, and they were iteratively refined throughout the evaluation process. As AIDS-FIRCAs are no longer being awarded, the full Outcome Evaluation described in this report primarily considers FIRCA program activities and outcomes between 1992 and 2003, while AIDS-FIRCA program activities and outcomes are included secondarily.

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[1] Former mission statement taken from 2000-2003 Strategic Plan, http://www.fic.nih.gov/about/pages/strategic-plan.aspx. The current mission statement may be found at: http://www.fic.nih.gov/About/Pages/mission-vision.aspx.

[2] The AIDS-FIRCA program was de-activated due to the low application response to the AIDS-FIRCA program over the last ten years, and particularly in the last five years, coupled with the increasing number of new opportunities for funding for international AIDS-related research significantly alters the uniqueness of and need for the AIDS-FIRCA program. Source: Email from Jeanne McDermott, FIC, October 12, 2005.

[3] Fogarty International Center, "Fogarty International Research Collaboration Award," Program Announcement PAR-91-57, reprinted in NIH Guide for Grants and Contracts, 20(27), July 12, 1991, pages 10-11; Fogarty International Center, "HIV, AIDS, and Related Illnesses Collaborative Award," Program Announcement PAR 94-029, reprinted in NIH Guide for Grants and Contracts 23(3), January 21,1994, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-94-029.html; Fogarty International Center, "Notice of Inactivation of PA-02-114 - Fogarty International Research Collaboration Award For HIV-AIDS (AIDS-FIRCA)", Notice NOT-TW-03-007, June 17, 2003, downloaded from http://www.fic.nih.gov/About/Pages/mission-vision.aspx.

Throughout this report, results for the two programs will be reported separately, and results reported for 'FIRCA' should be interpreted as applying only to the FIRCA program and not for the AIDS-FIRCA except where specifically noted.

1.2 Program History

1.2.1 Origin of FIRCA and of AIDS-FIRCA

The immediate precursor to the FIRCA program was a Latin American Initiative launched by FIC in 1988 in response to a request by former NIH Director Dr. James Wyngaarden. The purpose of this program was to foster collaborative research opportunities and to stimulate research grant applications from Latin American scientists. In 1991, following the collapse of the Soviet Union, FIC created the FIRCA mechanism, extending the regional Latin American Initiative to Eastern and Central Europe to seed long-term collaborative ties between U.S. institutions and counterparts in this region.[4] The AIDS-FIRCA award developed separately but convergently as an outgrowth of FIC's AIDS research and training portfolio.[5]

1.2.2 Evolution of FIRCA

The FIRCA program has evolved along several dimensions since its inception in 1991. Key changes are described briefly in this section.[6] For more detailed information on these changes and their impact on program management and outcomes, please see Chapter 6.

- ***Program goals.*** The *original* FIRCA program goal was to "facilitate collaborative research efforts between US and foreign scientists that will expand and enhance the NIH-supported research program on the US Principal Investigator, while at the same time benefiting the scientific interests of the collaborating foreign scientists." This goal of collaboration has remained a constant throughout the life of the FIRCA program, although it was modified

[4] Section drawn from presentation by Dr. Richard Krause, FIC, 2001.

[5] Interviews with FIC staff, April 2005.

[6] PAR-91-57, July 12, 1991; Fogarty International Center, "Fogarty International Research Collaboration Award," Program Announcement PAR-93-026, reprinted in NIH Guide for Grants and Contracts, 21(43), November 27, 1992, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-93-026.html; Fogarty International Center, "Fogarty International Research Collaboration Award," Program Announcement PAR-95-011, reprinted in NIH Guide for Grants and Contracts, 23(44), December 16, 1994, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-95-011.html; Fogarty International Center, "Fogarty International Research Collaboration Award," Program Announcement PAR-99-008, reprinted in NIH Guide for Grants and Contracts, October 30, 1998, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-99-008.html; Fogarty International Center, "Fogarty International Research Collaboration Award," Program Announcement PA-02-057, February 6, 2002, downloaded from http://grants.nih.gov/grants/guide/pa-files/PA-02-057.html; Fogarty International Center, "Fogarty International Research Collaboration Award," Notice NOT-TW-04-002, February 12, 2004 downloaded from http://grants.nih.gov/grants/guide/pa-files/NOT-TW-04-002.html. The program is scheduled to again change in 2005, with changes including the creation of separate tracks for social and behavioral science applications as distinct from basic biomedical sciences and the possibility for IRCs applying for renewals to do so as the project principal investigator.

slightly in 2002 to emphasize the high quality of collaborative research. In 1998, a *second* program goal of "increasing the capacity of the foreign investigator and institution for sustained and productive research and research collaborations" was added. The current formulation is "to help build research capabilities at the foreign site and foster further sustained and productive research and research collaborations at the foreign site."

- ***Review criteria.*** The criteria for review of applications have changed several times to reflect changing program goals described above. Specific review criteria were not listed in the FIRCA Program Announcements until 1995. Since that time, at least one priority score review criterion has been listed for the FIRCA program in each of the following general categories: 1) significance of proposed research; 2) approach and methodology; 3) capability of investigators; and 4) research environment and available resources. Importantly, a fifth priority score review criterion focused on sustainable research capacity building was added in 1998. Finally, a sixth priority score review criterion relating to innovation of proposed research was added in 2002. Additional considerations applicable to all NIH research proposals have included appropriateness of budget; adequacy of proposed protection for human subjects, animals, and the environment; inclusiveness on the basis of gender, age, and ethnicity; and adequacy of plans to share data.[7]
- ***Countries involved in the program.*** The original FIRCA Program Announcement limited the international research collaborators to Central and Eastern Europe, Latin America, and the non-US Caribbean. In 1992, collaborators from sub-Saharan Africa were added, under the condition that their research focus on cancer. The program was expanded to cover all developing countries in the 1994 Program Announcement. Finally, a 2004 notice limited the eligibility of international research collaborators to those from countries whose per-capita GNI is less than $9,000 per year according to World Bank statistics.
- ***NIH program partners.*** The National Cancer Institute was a partner on the 1992 Program Announcement only, and National Institute of Environmental Health Sciences has been a partner since 2002.
- ***Allowable expenditures.*** The first two Program Announcements allowed expenditures for materials, equipment, and travel. In 1994, travel expenditures were limited to either $5,000 per year or up to 25% of direct costs. The 1998 Program Announcement raised the travel

[7] The exact wording of many of the review criteria changed slightly between program announcements. Perhaps most significantly, the "research environment" criterion evolved from the vague "availability of the resources necessary to perform the research" in 1994 to the following in 1998: "Does the scientific environment in which the work will be done contribute to the probability of success? Do the proposed experiments take advantage of unique features of the scientific environment and of the collaborative arrangements? Is there evidence of institutional support? Are the resources necessary to perform the research available or obtainable?"

More minor but noteworthy changes in wording include the following:

- Until 2001, the investigator criteria referred exclusively to the ability of the USPI to carry out the proposed research. Afterwards, capability of the IRC was also considered.
- In 2002, the approach criterion was altered to include acknowledgement of potential problem areas and consideration of alternative approaches.
- The inclusiveness criterion was expanded to specifically include children in 1998, and the 2002 program announcement replaced the term "minority" with "all racial and ethnic groups (and subgroups)."

limit to $6,400 (maintaining the overall 25% limit), and it also allowed the use of up to $5,000 per year for salary support for the international research collaborator or others at the foreign site. In 2002, the travel allotment was raised to $7,000 per year for participants to travel to each other's laboratories and up to $2,000 per year for international research collaborators to attend conferences. Following changes in NIH policy regarding overhead on foreign grants, the 2002 announcement also allowed up to eight percent of costs to be used for facilities and administration costs at the foreign collaborator's institution.

- ***Renewal policy.*** The program did not specify a renewal policy (and thereby did not restrict renewals) until the 1998 Program Announcement, which allowed for a single competitive renewal.
- ***Research topics.*** Until 1998, FIRCA research topics were required to be directly related to the topic of the US researcher's parent NIH grant. With the exception of HIV/AIDS-related research (for which there was a separate AIDS-FIRCA), all subject areas in which NIH institutes make grants were allowed. After 1998, the requirement that the research should be related to the parent grant was eliminated, although US researchers without an active NIH grant remained ineligible to apply for a FIRCA.

1.2.3 Evolution of AIDS-FIRCA

While the AIDS-FIRCA program is closely related to the original FIRCA program, there are key differences between the two programs. Key differences are listed below[8]:

- ***Program goals.*** The *original* AIDS-FIRCA program goal differed from the FIRCA program goal in that research was to be, "unique and highly promising." In 2002, this goal was changed to mirror the FIRCA collaboration goal. As with FIRCA, a sustainable research capacity-building program goal was added in 1998, but for AIDS-FIRCA this goal was only to apply when the foreign collaborator was from a developing country.
- ***Countries involved in the program.*** Since program inception, research collaborators from any country have been eligible to apply for AIDS-FIRCA., subject only to the limitation that awards should be "consistent with U.S. foreign policy considerations."
- ***Program partners.*** The National Institute of Child Health and Human Development, National Institute of Dental and Craniofacial Research, and the National Institute of Mental Health became AIDS-FIRCA program partners in 2002.
- ***Allowable expenditures.*** The first three AIDS-FIRCA Program Announcements (1994, 1995, and 1997) allowed expenditures for materials, equipment, and travel. Equipment

[8] PAR-94-029, January 21, 1994; Fogarty International Center, "HIV, AIDS, and Related Illnesses Collaboration Award," Program Announcement PAR 95-012, reprinted in NIH Guide for Grants and Contracts 23(44), December 16,1994, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-95-012.html; Fogarty International Center, "HIV, AIDS, and Related Illnesses Collaboration Award," Program Announcement PAR 97-033, reprinted in NIH Guide for Grants and Contracts 26(3), January 31,1997, downloaded from http://grants.nih.gov/grants/guide/pa-files/PAR-97-033.html; Fogarty International Center, "HIV, AIDS, and Related Illnesses Collaboration Award," Program Announcement PA 99-029, December 18,1998, downloaded from http://grants.nih.gov/grants/guide/pa-files/PA-99-029.html; Fogarty International Center, "HIV, AIDS, and Related Illnesses Collaboration Award," Program Announcement PA 02-114, June 13, 2002, downloaded from http://grants.nih.gov/grants/guide/pa-files/PA-02-114.html; NOT-TW-03-007, June 17, 2003.

expenditures were only permitted in developing countries. The 1998 program announcement set a travel limit of $6,400 for collaborations with developed countries and $5,000 for collaborations with developing countries, of which up to $2,000 could be used for travel to international AIDS conferences. Salary support for the foreign collaborator was not provided under AIDS-FIRCA until the 2002 Program Announcement aligned AIDS-FIRCAs allowable expenditures with those of FIRCA.

- ***Renewal policy.*** The AIDS-FIRCA program did not specify a renewal policy until the 1998 Program Announcement, from which point the AIDS-FIRCA program allowed for a single competitive renewal.
- ***Research topics.*** AIDS-FIRCA awards were limited to HIV/AIDS-related research. As with FIRCA, AIDS-FIRCA topics had to be directly related to the parent NIH grant prior to 1998. After 1998, this requirement was eliminated, although an active parent grant was still an eligibility requirement for US investigators.

1.3 Evaluation Design

1.3.1 Evaluation Framework

FIC uses a standardized four-part Evaluation Framework that highlights Program Planning; Program Management; Partnerships and Communication; and Results (including outcomes, outputs, and impacts). The FIC Evaluation Framework was used to structure a retrospective design for this Outcome Evaluation. The FIC Evaluation Framework is attached as Appendix A.

1.3.2 Advisory Committee

To assist and advise in the study design process, Abt and FIC convened a three member *ad hoc* panel to guide the study and its methodology. Panel members included:

- Dr. John Donelson, Professor of Biochemistry, University of Iowa, and a former FIRCA Principal Investigator;
- Dr. Susan Cozzens, Professor and Chair of the School of Public Policy, Georgia Institute of Technology, an expert in biomedical research evaluation; and
- Dr. Jill Conley, Director of International Program, Howard Hughes Medical Institute, a specialist in international research programs.

The advisory panel met four times. At the first meeting, held on December 16, 2003, panel members discussed project goals, reviewed the logic model, and finalized the project study questions. The second meeting, held on April 19, 2004, included a discussion of site visit selection criteria. At the third meeting, held on July 29, 2004, the advisory panel discussed survey methodology and finalized the list of foreign countries and institutions to be visited. At the fourth and final meeting on September 7, 2005, the panel reviewed the first draft of the Outcome Evaluation Report.

1.3.3 Program Logic Model

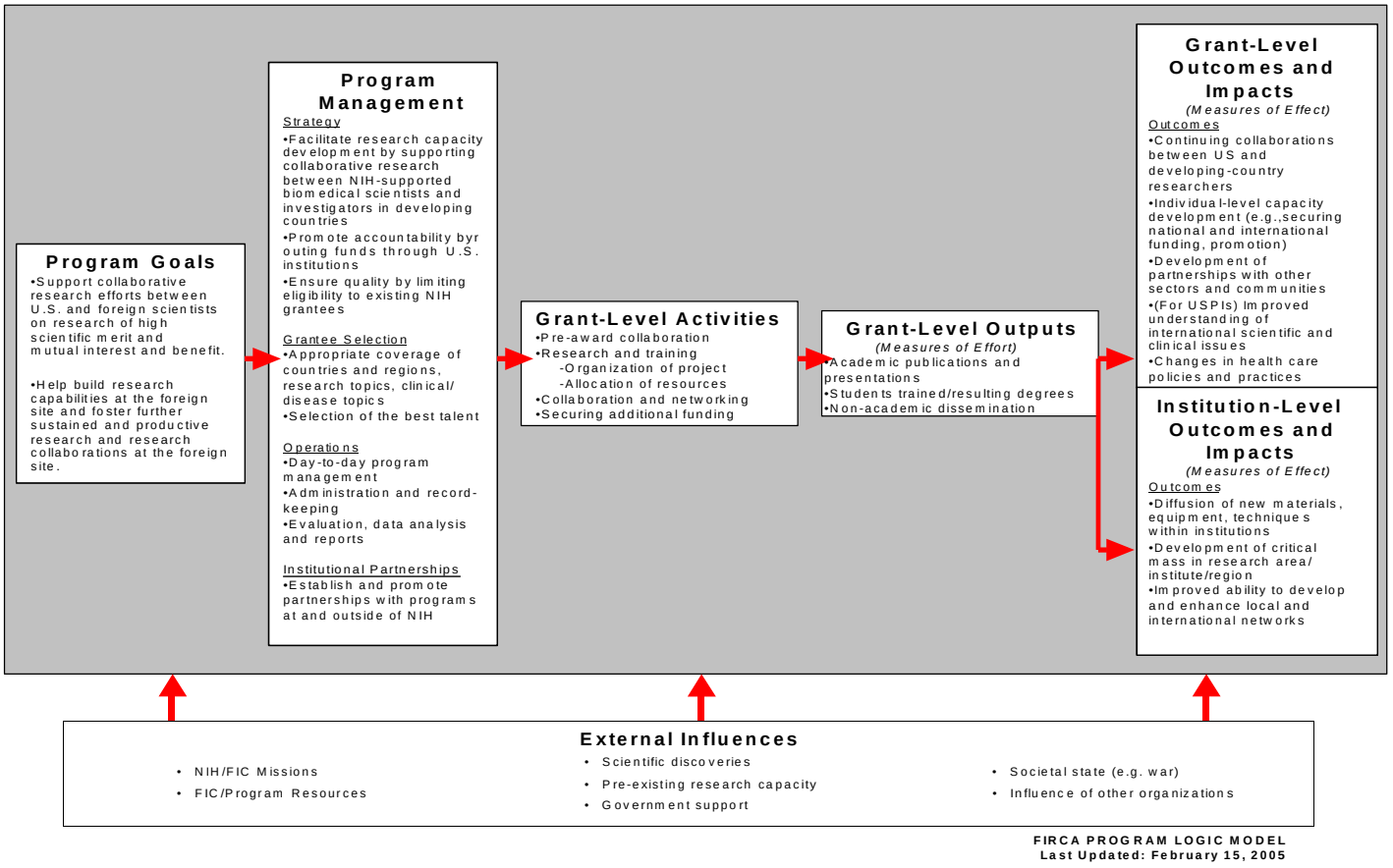
The FIRCA program logic model traces program goals, management strategies, activities, outputs, and outcomes (Figure 1.1).[9] As the logic model indicates, there are two sets of outcomes attributable to FIRCA. Key outcomes at the level of the individual investigator include development of sustainable research collaboration, building individual-level capacity through, for example, promotion or enhanced ability to compete internationally for funding, and research success. Grant-level outcomes for US investigators further include improved understanding of international research issues and increased desire to collaborate with researchers in developing countries.

Simultaneously, the research capacity goals of the program extend beyond the individual to the institutional level, especially at the foreign collaborator's home institutions. As a result of the program, new knowledge and techniques are developed, and equipment and materials are purchased; these benefits may potentially be diffused beyond the principal investigators (or their laboratories) to the broader institutions in which they operate. The ultimate impacts of this capacity development may include attainment of a critical mass of investigators skilled in a particular technique or field of research or enhanced visibility of the institution in the national and international research communities.

[9] It should be noted that the logic model was designed for the main FIRCA program under the current program goals – a slightly differing version would be applicable to AIDS-FIRCA, and the institution-level outcomes and impacts become relevant only with the 1998 FIRCA/AIDS-FIRCA Program Announcements.

Figure 1.1

FIRCA Program Logic Model



Source: Abt Associates Inc.

1.3.4 Study Questions and Research Design

Using the logic model, Abt developed a set of detailed study questions that were reviewed by the NIH Evaluation Officer and the Evaluation Advisory Committee. The final study questions, which are included as Appendix B, guided the evaluation methodology described in the following chapter.

1.4 Organization of this Report

This report is organized into seven chapters:

- Chapter One gives an overview of the FIRCA and AIDS-FIRCA programs, introduces the evaluation rationale, and describes preliminary work completed by Abt;
- Chapter Two describes the evaluation methodology in detail;
- Chapter Three provides information on the scope and demography of FIRCA and AIDS-FIRCA grants as well as the larger context in which the programs operate;
- Chapter Four discusses research collaboration outcomes before, during, and after the award period;
- Chapter Five includes outcomes with respect to sustainable research capacity building at the levels of individual foreign collaborator, other individuals, their institutions, and their policies;
- Chapter Six focuses on management considerations and challenges at the level of the foreign institution, the individual grant, and the program; and
- Chapter Seven presents evaluation findings and recommendations.

The report also contains eight appendices:

- Appendix A: FIC framework for program assessment
- Appendix B: Evaluation study questions
- Appendix C: List of interview subjects
- Appendix D: USPI survey questions with tallied responses
- Appendix E: IRC survey questions with tallied responses
- Appendix F: Grants and grantees by project start year
- Appendix G: Collaborative publications of ten "high-impact" collaborations
- Appendix H: Collaborative publications in ten "high-impact" journals

2. Evaluation Methods

2.1 Introduction

The primary objectives of the evaluation were to determine the influence of receiving FIRCA and AIDS-FIRCA awards on research collaboration and on development of sustainable research capacity. The evaluation design therefore called for a blend of "pre-post" and "cross sectional" approaches. Since the Feasibility Study concluded that no other research award program matched the scientific and geographic breadth of FIRCA, formal selection of a comparison group was not attempted. In Chapters Three and Five, however, information regarding somewhat-comparable programs such as the Howard Hughes Medical Institute International Investigators Program and the U.S. Civilian Research and Development Foundation is presented.

Six main data collection methods were employed to acquire the information used in this outcome evaluation:

- *Administrative data* collection and review was used to identify the universe of grants, investigators, and institutions to be studied through the course of the evaluation, as well as to provide insight into the design of other portions of the evaluation.
- *Interviews* were used at the beginning and end of the project to provide qualitative insights into program design, management, partnerships, and results.
- S*urveys* were the central data collection mechanism; a census survey of both the USPIs and IRCs was employed to gain the maximum depth of insight into individual, institutional, and country-level outcomes and impacts of the program.
- *Publication* information was collected for the USPI-IRC pairs to assess collaboration before and after grant award.
- *Bibliometric* techniques were employed to assess the "research of high scientific merit" portion of the collaboration goal from 2002 and beyond.
- S*ite visits* were used to assess institutional-level impacts for a subset of the awards; they also allowed the project team to "ground truth" the self-reporting inherent in surveys.

In this chapter, data collection and analytical methods are discussed in detail. Where appropriate, limitations and potential sources of bias are acknowledged and addressed.

2.1.1 A Note on Numbers

The basic unit for outcome data collection in this evaluation was the individual FIRCA or AIDS-FIRCA award as designated by a unique award number. Similarly, the target population for program-wide data collection efforts such as the surveys was the pool of all FIRCA and AIDS-FIRCA awards with start years between 1992 and 2003. Except where otherwise noted, renewals were not distinguished from the original award in data analysis.

Using this definition, the final number of FIRCA awards was 482 and the final number of AIDS-FIRCA awards was 74 (Table 2.1). As described below, however, the database of awards was corrected and updated continuously throughout the evaluation, so some of the data collection efforts that occurred earlier in the evaluation period (e.g., the USPI survey) targeted a slightly different pool

of awards. As these discrepancies were small relative to the total number of awards, they are not believed to have significantly influenced data interpretation.

It should also be acknowledged that certain USPIs, IRCs, and/or pairs of collaborators were awarded multiple FIRCA or AIDS-FIRCA grants. In addition, in some cases, the USPI or IRC changed during the course of the grant. The total numbers of participants and research collaborations are therefore distinct from each other and from the total number of awards. As described above, however, the award constituted the basic unit of analysis, and data collection instruments such as the surveys were accordingly administered multiple times to individuals or pairs of individuals with more than one award. The total number of awards, investigators, and collaborations are summarized in Table 2.1.

Table 2.1

Final Count of FIRCA and AIDS-FIRCA awards, US Principal Investigators, International Research Collaborators, and Collaborating Pairs, 1992-2003.

Count	FIRCA	AIDS-FIRCA
Number of uniquely-numbered awards	482	74
Number of awards (counting renewals individually)	527	79
Number of USPIs	496	75
Number of IRCs	498	75
Number of collaborating pairs	462	72

Source: Abt Associates Inc. analysis of program data

Finally, as explained below, the surveys were administered to recipients of all FIRCA and AIDS-FIRCA awards who could be reached via email in the time period allocated for the survey. Furthermore, of the investigators who received the survey, some did not respond. When discussing survey data, therefore, the appropriate denominator is number of respondents to a particular question. The degree to which survey respondents are likely to be representative of the larger population of awardees is discussed below.

2.2 Administrative Data Review and Analysis

2.2.1 Grant Database

As discussed above, the basic unit of data collection and analysis for this evaluation was the unique FIRCA or AIDS-FIRCA award number. The first evaluation task was therefore to assemble a database of grants awarded. The Abt project team used NIH databases (Query/View/Reporting System (QVR), Computer Retrieval of Information on Scientific Projects (CRISP), and the Fogarty International Reporting and Scientific Tracking System (FIRST)), grantee progress reports, and information collected directly from investigators during other data collection efforts such as the site visits and surveys to assemble and cross-check award information. Aside from the consideration that no single source was complete, key challenges that emerged included:

- Accounting for changes of the USPI and/or IRC within an individual award;
- Accounting for awards that received no-cost extensions or renewals while maintaining the original award number;
- Accounting for awards that were withdrawn without being so listed within the NIH databases;
- Accounting for variations on names of individuals, particularly in regions of the world where names are not always reported using the same conventions as in the US; and
- Tracking USPIs and IRCs with multiple awards who changed institutions.

The final database of grants is believed to be complete and accurate for all awards made between 1992 and 2003.

2.2.2 Progress Report Review

Abt received an archive of 301 FIRCA and AIDS-FIRCA progress reports in electronic form from the FIC program officer. Reports included both midcourse and final reporting. Grants awarded in 1992 and AIDS-FIRCA awards were less likely to be included in the progress report archive than other award groups. The progress reports were used to identify awards; update contact information for collaborators; and to identify attributable publications to preload into the USPI and IRC surveys.

2.2.3 QVR and CRISP Searches for Attribution of Publications and Capacity-Building Evidence

NIH's QVR database includes links to MEDLINE-indexed publications that cite the NIH in their acknowledgements sections. QVR searches were performed (using the NIH project number as the search criterion) to identify attributed publications for those USPI-IRC pairs that did not respond to the census survey. Of the 184 awards for which Abt searched for publications on QVR, publications were identified for 49, which likely underestimates the actual number of publications by these pairs that were actually attributable to FIRCA or AIDS-FIRCA. Publication data derived from QVR are generally less complete than progress reports because the MEDLINE search does not include all possible combinations that identify FIC and the award; not all authors recognize the awards whose funding contributed to publication; not all peer-reviewed publications are MEDLINE-indexed; and QVR extends reliably only back to 1996.

QVR and CRISP searches were also performed to identify additional NIH grants on which IRCs were listed as key personnel. For the QVR searches, the IRC's name was used as the search criterion; the searches accordingly returned grants where the IRC was mentioned in the text of summary statements and award abstracts as well as grants where the IRC was listed as the Principal Investigator. CRISP searches were performed using the IRC's last name in the "Principal Investigator" field, and the search results identified a number of additional grants that were not found in QVR. The list of grants identified through both searches was then used to perform a second QVR search to identify all key personnel on these grants; this list was matched against the USPI and IRC database to identify IRCs.

This search strategy likely substantially underestimated the actual number of IRCs involved as key personnel on NIH grants for two reasons. First, QVR extends reliably only as far as 1996, so it may not have captured all instances of IRCs who have served as co-investigators or received subawards from NIH grants. Second, as the QVR database does not allow searches of the key investigators, only

those grants with abstracts or summary statements that contain the name of the IRC would have been identified in this manner.

2.3 Interviews

Interviews were conducted with FIC program staff members, the FIRCA study section Scientific Review Administrator, FIRCA study section members, and several USPIs who have received multiple FIRCA awards. A list of interviewees and dates can be found as Appendix C.

2.3.1 FIC Program Staff Interviews

Interviews were conducted with FIC program staff members in April-May 2005, with the aim of understanding the history of the program and the evolution of program strategy, NIH program management, and partnerships between FIC and other NIH Institutes. Staff members were also consulted periodically throughout the evaluation on matters about which they had relevant knowledge.

2.3.2 Study Section Interviews

Study section member interviews were conducted in April-May 2005 with the aim of understanding the evolution of the study section, its role in interpreting and implementing the program review criteria, and on the perceived audience for the review summary statements provided for each application.

2.3.3 USPIs Who Received Multiple FIRCA Awards

As discussed in Chapter 3, several investigators (both USPIs and IRCs) have received multiple FIRCA and AIDS-FIRCA awards. In order to capture some of the details of their uniquely extensive experience with the program, Abt developed a supplemental telephone interview questionnaire for these investigators with the aim of understanding the role of the award in their overall research interests, how they selected and chose whether or not to renew collaborations with their IRCs, and how their relationships with IRCs changed over the course of multiple awards. Four USPIs with multiple FIRCA awards agreed to be interviewed, and these interviews were conducted during March 2005.

2.4 Surveys

2.4.1 Initial Survey Design

During the Feasibility Study, Abt developed a pilot survey questionnaire and administered it to a small group of USPIs and IRCs. Answers and feedback provided by these pilot participants served as a guide for the design of two detailed census surveys, one for USPIs and another for IRCs, which were administered during the Outcome Evaluation. The majority of the survey questions were close-ended or multiple-choice, but a few open-ended questions were included to allow respondents the opportunity to describe their experiences and opinions more freely. Significantly, as discussed above, the basic unit of analysis chosen for the surveys was the *award* rather than the investigator; this

decision was made to better capture nuances of experience that might otherwise be missed as well as to make the survey data more consistent with other aspects of the Outcome Evaluation.

The surveys were designed in collaboration with Dr. Linda Kupfer, the FIC evaluation officer, and approved by the project Advisory Committee. The surveys were then submitted for clearance by the Office of Management and Budget in March 2004; clearance was received in September 2004.

2.4.2 Survey Pre-testing

The surveys were pre-tested on several USPIs and their collaborators. The goals of the pre-test were to get feedback from the program participants on the survey content, to improve clarity of the questions in order to minimize bias, and to obtain an estimate of the time that would be required to complete each survey. Pre-test candidates were strategically chosen to satisfy three requirements: a) they had participated during different program periods; b) few were recipients of AIDS-FIRCA; and c) IRCs from diverse countries were included. The last requirement was imposed to ensure that the survey questions were clearly understood by individuals from diverse linguistic backgrounds. To reduce time burden on foreign respondents and to facilitate compliance, the IRC pre-test subjects were given an option to respond to open-ended questions in a language other than English.

On January 29, 2004, an introductory letter was mailed to the selected participants. The letter introduced the Outcome Evaluation, requested assistance with the evaluation process, and informed the pre-test candidates that Abt had been chosen as an independent evaluator for the program. Four days later, Abt emailed the survey document to USPIs with the request that it be completed and returned in one week. On February 10, a follow-up email was sent to participants to remind them of the survey and to provide them with a second copy. As completed surveys were returned, Abt scheduled brief telephone interviews with respondents to gather insights and recommendations regarding the clarity, content, and time commitment required for the survey.

2.4.3 Final USPI Survey Design and Implementation of the USPI Survey as an Internet Survey

The initial USPI survey design was modified based on the feedback from the pre-test respondents. The most significant modification was to reduce the total number of questions to the point where the survey could reasonably be completed in one hour.

The final USPI survey consisted of five sections. The purpose of Section 1 was to gather basic demographic information on the investigators and contact information for the IRCs. Section 2 focused on obtaining information about the origin and nature of the collaboration between the USPI and IRC, while Section 3 focused on outcomes including publications, additional funding, and continued collaboration. Section 4 solicited opinions on program management and overall satisfaction with the program. Finally, Section 5 included several open-ended questions in an attempt to gather qualitative data not captured elsewhere in the survey. The final USPI survey text is attached as Appendix D.

Given the number of awards and the complexity of the information to be collected for each, it was decided that the USPI survey should be administered as an Internet-based survey, rather than as a paper-based or telephone-based questionnaire. Abt subcontracted with Relyon.com™ to implement

the survey Internet site and database. In an introductory letter distributed by e-mail, US Principal Investigators were provided with a login name and randomly-generated password to ensure secure access to the survey website. USPIs with multiple awards were provided a unique password for each award. All data available from other sources (e.g., demographic information from the grants database, lists of publications from the progress reports) were preloaded to minimize USPI burden.

The USPI survey population initially included the USPI on 474 FIRCA and 68 AIDS-FIRCA awards received prior to 2004 and known at the start of the survey in November of 2004.[10] Of these, a total of four FIRCA grants were excluded from the survey because the USPIs were known to be deceased, and one additional FIRCA grant was excluded because the USPI is now a FIC employee and it was determined that her participation might represent a conflict of interest. Current e-mail addresses were gathered for USPIs on the remaining 469 FIRCA and all 68 AIDS-FIRCA awards using a combination of information available in existing databases, grant progress reports, publications, and internet searches. Additional searches were conducted in order to correct any address that returned an undeliverable message, and every effort was made to locate the most current contact information for each USPI. E-mails were successfully delivered to USPIs on 428 (91%) of the FIRCA awards and 62 (91%) of the AIDS-FIRCA awards in the survey population.

The USPI survey began on 11/11/2004 and closed on 3/18/2005. To increase the response rate, e-mail reminders were sent in December 2004 and January 2005 to USPIs who had not completed the survey. In March 2005, phone calls were made by FIC and Abt staff members to all USPIs who had received the questionnaire but had not responded to the survey. These USPIs were offered the option of completing the survey via e-mail or on paper. For questions that matched exactly, partial survey responses were also obtained from the Outcome Evaluation pre-test, the pilot survey conducted by Abt as part of the Feasibility Study, and phone interviews for USPIs who had received multiple awards (see above).

2.4.4 Final IRC Survey Design and Implementation of the IRC Survey as an Email Survey

The site visit teams found that, while most IRC investigators had access to electronic mail, the speed, reliability, and/or quality of their access to the Internet was variable. This finding, in addition to the slow USPI response to the Internet-based survey, suggested that an alternative mechanism would be required to maximize IRC responses. As a result, the Internet-based questionnaires were converted to a single document that could be inserted into the text of an electronic mail message. Moreover, the IRC survey instrument was shortened substantially, both because of the more limited nature of the survey technology and because feedback from the USPIs indicated that the length of their survey represented a substantial barrier to completion. As with the USPI survey, demographic and publication information available from other sources was preloaded to minimize time burden for completion of the survey.

The IRC survey population initially included recipients for all 482 FIRCA and 74 AIDS-FIRCA awards received prior to 2004. Of these, 9 FIRCA grants and 1 AIDS-FIRCA grant were excluded

[10] Additional grants were subsequently discovered. These grants were not included in the USPI survey.

because the awardees were known to be deceased.[11] Sources for e-mail addresses of the IRCs included existing databases, progress reports, published scientific reports, general internet searches, and information provided by the USPIs. E-mail surveys were successfully delivered to recipients of 393 FIRCA (83.1%) and 64 AIDS-FIRCA IRCs (87.7%) in the survey population.

The IRC survey opened on February 11, 2005 and closed on April 15, 2005. To increase the response rate, reminder e-mails were sent approximately three weeks after the initial contact to all IRCs who had not yet responded to the survey. For questions that matched exactly, partial responses were also obtained from the survey pre-test and the pilot survey.

2.4.5 Survey Response Rates and Associated Concerns Regarding Response Bias

For the purpose of assessing the effect of response rate on overall validity of the survey results, there are several important questions that must be addressed:

1) Did the experience of researchers who were automatically excluded from the survey populations because they were deceased, had a conflict of interest, or unknown at the start of the survey (USPI only) differ systematically from the experience of those who were included?
2) Did the experience of researchers who were effectively excluded from participation because they could not be reached via email differ systematically from the experience of researchers who did receive the surveys?
3) Within the groups of researchers who did receive the surveys, did the experience of respondents differ systematically from non-respondents?

While none of these questions can ever be answered definitively, the demographic data available for all grants do enable us to speculate on possible biases in our sample.

USPI survey

Overall, USPI survey responses were obtained from 242 FIRCA recipients and 35 AIDS-FIRCA recipients (56.5% of those contacted for both types of award). [12]

For the USPI survey, automatic exclusions due to death, conflict of interest, or unknown grants were limited to 6 FIRCA USPIs (1% of total grants). Given this small number, the potential effect on overall validity was assumed to be minor. There were no automatic exclusions of AIDS-FIRCA USPIs from the survey.

[11] One additional AIDS-FIRCA grant was not excluded, because, although the awardee was known to be deceased, her grant was continued by an associate. For the purposes of survey analysis, the associate was considered to be the IRC.

[12] Two additional FIRCA USPI survey responses were received after the official close of the survey. The quantitative data contained within these responses were not included in the analysis, but the publications data were added to the database.

For the USPI survey, an additional FIRCA 36 grants were effectively excluded because a current email address could not be found for the USPI (for a total of 42 grants or 9% of the original population excluded). Five AIDS-FIRCA grants were excluded due to undeliverable emails. Table 2.2 also shows that the percentage of undeliverables was highest for FIRCA USPIs who received their awards in the earliest years of the program. There are two likely explanations for this pattern:

1) Assuming constant average age of participants, USPIs who participated in the program earlier are likely to have been older at the time they were surveyed. Older USPIs are both less likely to use e-mail and more likely to be retired; and
2) Contact information gathered from administrative data reviews was least likely to be current for the group of USPIs with the earliest grants.

While this phenomenon might result in a slight over-representation of more recent grants in the sample population, the overall effect on survey validity was again judged to be small for most survey questions.

Table 2.2

Number of Grants Excluded from USPI Survey because of Deceased USPIs, Erroneous Grants Data, and Emails Undeliverable, by Start Year.

	Number of Undeliverables, FIRCA USPI survey	Percentage of Undeliverables, FIRCA USPI survey	Number of Undeliverables, AIDS-FIRCA USPI survey	Percentage of Undeliverables, AIDS-FIRCA USPI survey
1992-1995	24	15%	0	0%
1996-1999	8	6%	5	13%
2000-2003	10	6%	0	0%
Total:	**42**	**9%**	**5**	**7%**

Source: Abt Associates Inc. analysis of USPI survey distribution rates.

Finally and most importantly, of the 428 FIRCA USPIs to whom the survey emails were successfully delivered, 189 (44%) did not respond to the survey. Similarly, of the 62 AIDS-FIRCA USPIs who received the survey, 28 (44%) did not respond. Response rates by USPI institution type and region of IRC were statistically similar to overall rates in the grant population. As anticipated, however, there did appear to be variation in response rate by project start year. As shown in Figure 2.1, the percentage of FIRCA USPI non-respondents was highest earlier in the program, and response rates were not higher than 60% for two consecutive years until the grants that began in 2000.[13] .

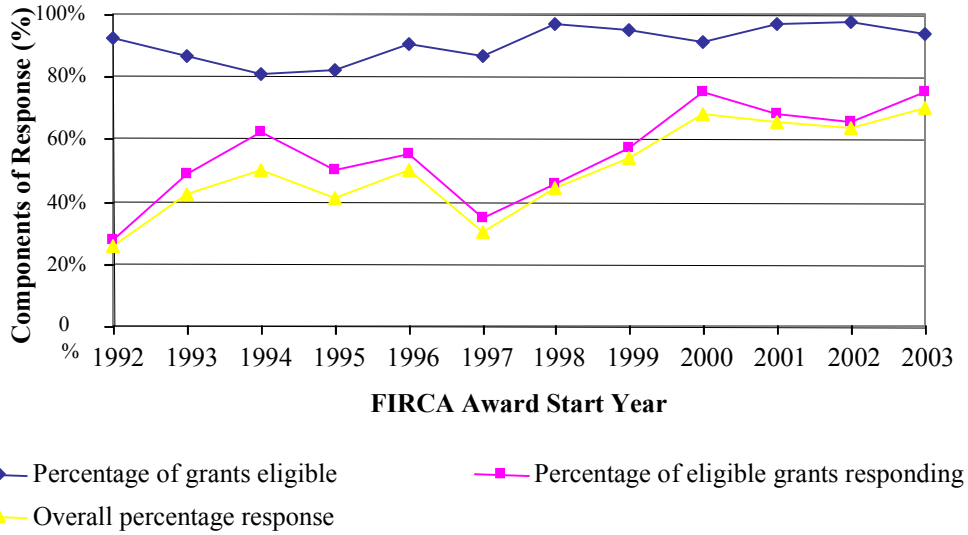
There are several possible explanations for the apparent under-representation of respondents from earlier program years. First, it is likely that some fraction of the emails that were not returned as undeliverable did not reach their intended recipients. If so, then it is reasonable to assume that this problem would disproportionately affect the earlier participants, for whom existing contact information was less likely to be correct. Second, as mentioned above, earlier participants were likely

[13] Difference statistically significant at 1% level ($p < .01$, χ^2 34.4 with 11 df). There was no non-response bias, however, by grant start year for the AIDS-FIRCA USPI responses.

to be older at the time of the survey. If it is reasonable to assume that older participants are both less likely to respond to email and less likely to participate in a web-based survey, then age could account for the differences in response rate. Third, the FIRCA experience was less likely to be fresh in the minds of earlier participants. Such participants might feel less able to respond meaningfully to the survey questions; alternatively, they might feel less invested in the program and therefore less willing to respond.

Figure 2.1

USPI Survey: Elements of Response and Non-response



Source: Abt Associates Inc. analysis of USPI survey response rates.

IRC Surveys

For the IRC survey, responses were ultimately obtained from recipients of 248 FIRCA and 30 AIDS-FIRCA awards (63.1% and 46.9% of those contacted, respectively).[14]

Nine FIRCA IRCs and one AIDS-FIRCA IRC were known to be deceased at the time of the survey (1.9% and 1.4% of awards, respectively), and no additional IRCs were excluded because of conflict of interest or misidentification of grants. The explanation for the absence of misidentified grants (as distinct from the USPI survey, where there were three) is that any such corrections to the underlying grants database had already been performed at the time that the IRC survey was fielded. Given the small numbers, the potential effect on overall validity was assumed to be minor.

For the IRC survey, administrative records, USPI survey responses, and Internet searches were used to identify the email addresses of IRCs. Despite the multi-pronged search strategy, a total of 39 FIRCA IRCs (8.1% of grants) were effectively excluded because a current e-mail address could not

[14] Two additional FIRCA IRC survey responses were received after the official close of the IRC survey. The quantitative data were not included, but the publications data were added to the database.

be found for the IRC, and an additional 4 AIDS-FIRCA grants (5.4% of AIDS-FIRCA grants) were excluded due to undeliverable emails as well. As shown in Table 2.3, the use of e-mail as the survey mechanism may have introduced some potential for response bias into the FIRCA IRC survey; this is evident in statistically significant differences in email delivery based on the age of the award. Emails could not be delivered for nearly one-sixth of the FIRCA IRCs who participated in the earliest years of the program, while the email identification rate increased to above ninety percent for those receiving the award between 1996 and 1999 and to above ninety-five percent for the most recent group of IRCs. The email addresses of AIDS-FIRCA IRCs, however, were more evenly available. Regional differences in the distribution of available email addresses would also have represented a potential source of bias, but no effect of region was detected in regional rates for this survey. Despite differences in email availability and its potential effect on delivering the survey, resulting in a slight over-representation of later grants in the sample population, the overall effect on survey validity was again judged to be small for most survey questions.

Table 2.3
Number of Grants Excluded from IRC Survey Both Because of Deceased IRCs and Emails Undeliverable, by Project Start Year.

	FIRCA IRC Survey		AIDS-FIRCA IRC Survey	
	Number of Undeliverables	Percentage of Grants	Number of Undeliverables	Percentage of Grants
1992-1995	28	16.4%	1	7.1%
1996-1999	12	9.0%	3	7.3%
2000-2003	8	4.5%	1	5.3%
Total	**48**	**10.0%**	**5**	**6.8%**

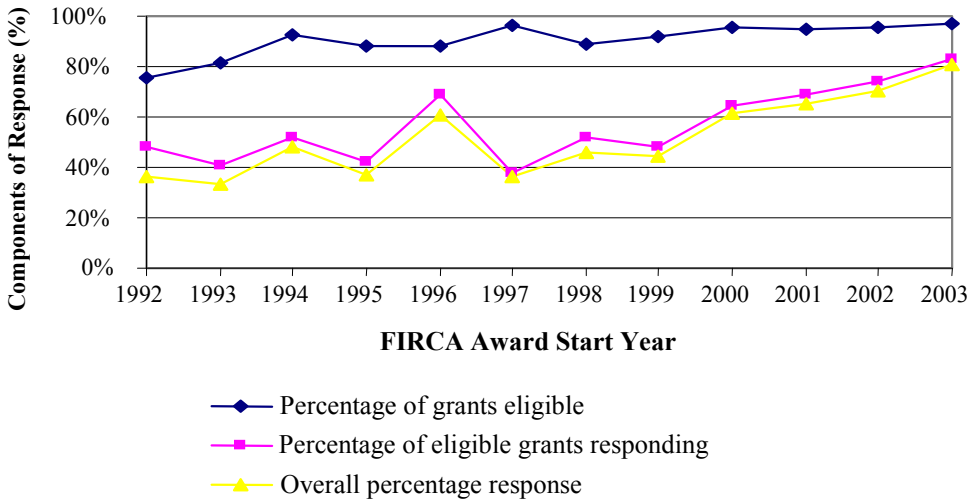
Source: Abt Associates Inc. analyses of IRC survey deliverability

Note: FIRCA IRC percentage of email undeliverable statistically significant ($p < .01$, chi-squared statistic 13.8, 2 df)

Finally and most importantly, of the 434 FIRCA IRCs to whom the survey emails were presumably delivered, 186 (42.9% of delivered surveys) did not respond to the survey. Similarly, of the 69 AIDS-FIRCA IRCs who received the survey, 39 (56.5% of delivered surveys) did not respond. Response rates by region of IRC were statistically indistinguishable from overall rates in the grant population. As anticipated, however, there was variation in response rate by grant start year. As shown in Figure 2.2, the percentage of FIRCA IRC non-respondents was highest for the first two project start years. Figure 2.2 also shows that by 1994, true non-response, rather than undeliverable emails, accounted for the survey response rate. As discussed above, the combination of distance from the award and lower degree of comfort with the electronic format (although IRCs were given the option of requesting and completing a paper survey) likely contributed to the disproportionate response from the more recent groups of IRCs.

Figure 2.2

Elements of Response and Non-response for FIRCA IRC Survey



Source: Abt Associates Inc. analysis of IRC survey response rates.

2.4.6 Other Possible Sources of Bias in the Survey Results

In addition to the response bias discussed above, there are two other possible sources of bias that commonly effect surveys of this type. The first, particularly relevant to the IRC survey (which was distributed primarily to non-native speakers of English) and the longer multiple choice questions on both surveys, is misclassification bias. It is possible that certain groups of respondents interpreted certain questions in ways that did not reflect the intentions of its designers, causing them to respond differently than they otherwise would have responded. The purpose of distributing the pre-test was in part to mitigate this type of bias. Nevertheless, its potential impact on the survey results must be considered for each survey question independently.

The second possible source of bias that must be considered for any survey administered retroactively is recall bias. Simply because more time has elapsed since their experience, the responses of earlier participants are likely to be systematically less reliable than the responses of those who participated more recently. The overall impact of recall bias on the survey results is difficult to judge, although it is likely to be most significant for questions that required quantitative estimates.

2.4.7 Survey Analysis

For the USPI survey, online responses were automatically compiled into a database by the survey website. This database was supplemented with information from the 26 survey responses received in the form of electronic text documents, 3 surveys completed on paper, coded information from phone interviews with 4 USPIs who had multiple FIRCA grants, and information from the pre-test and feasibility study. After checking to ensure uniform data quality, response rates and answers were tallied for each survey question (see Appendices D and E). More detailed analysis of quantitative results and cross-tabulation with demographic and other information was completed as needed to

address study questions and hypotheses generated by the evaluation. Comments and qualitative information provided by respondents were also compiled by question and coded as needed to address study questions and hypotheses.

For the IRC survey, all responses were received electronically, generally in the form of answers inserted into the text of an email. Responses were extracted using two methods: 1) manual cutting and pasting of text into a database created for the purpose, and 2) automatic extraction with the assistance of a JavaScript capable of recognizing and eliminating the original survey text, leaving only the answers entered by the respondent. Having been entered as text by the IRC respondents, some of the data required significant alteration to standardize responses. For example, while most IRCs used the character "X" to mark their responses to the multiple-choice questions, others used more diverse characters or placed them ambiguously. Some IRC survey respondents inserted comments or footnotes into the multiple choice questions that made interpretation more difficult. In general, if the intent of the respondent was not clear for a given multiple-choice question, that portion of the response was dropped from the analysis. Once compiled, the response databases were tabulated and analyzed by question as detailed for the USPI survey databases above.

Comments from the USPI and IRC survey respondents quoted in this report have not been altered except to correct spelling errors and where noted in brackets.

2.5 Publication Analysis and Bibliometrics

2.5.1 Publication Analysis

Abt downloaded bibliographic listings of citations for papers published collaboratively by USPIs and IRCs from MEDLINE™. The MEDLINE information was collected between November 2004 and January 2005 (the week of November 11th, 2004 for site visitees, January 1-15 for all other USPI-IRC pairs) and reflects articles co-published by the USPIs and their IRCs throughout their careers. Because the goal of the publication analysis was to assess USPI-IRC collaboration fostered by FIRCA, comparable information was not collected to evaluate the overall sustainability of research.

Information used in the publication analysis included:

- Name of USPI(s) and IRC(s)
- IRC country of origin
- FIRCA/AIDS-FIRCA
- Year of publication
- Year of first FIRCA award[15]
- Journal of publication

Searches for USPI-IRC pairs used the names (Last name First initial) of both the USPI and IRC as a primary key. In instances where no publications emerged from that search, an alternative employed was to search for the USPI, convert the search results to a text file, and search for variations on the

[15] Where a USPI-IRC pair obtained multiple FIRCA awards, the year of the first FIRCA awarded was used in the analysis (representing the onset of the FIRCA role in establishing the collaboration), rather than attempting to distinguish among collaborative publications dating from each award.

IRC's name. If that turned up no collaborative publications, the same procedure was performed using the IRC's name as the search term. Pairs for which no collaborative publications were identified were coded as "No publications identified."

The unit of analysis for the publication analysis was papers per collaboration (rather than papers per grant). The choice of the collaboration as the unit of analysis reflects the difficulty in attributing a particular paper to a single award, especially for those USPI-IRC pairs that received multiple awards. Because of the focus on grants and on the program's effect on creating collaborations between US scientists and developing country scientists, there were several methodological implications:

- In twenty-eight instances, a grant listed multiple USPIs or IRCs. In such cases, MEDLINE searches were performed using all combinations of USPIs and IRCs on the grant, to capture any potential for new collaborations formed a result of the award. Only one instance of each publication, however, was included in our database.[16]
- In thirty instances a paper was duplicated across grants – whether because two IRCs on different grants shared a common USPI, two USPIs shared an IRC, a collaboration occurred between a USPI-IRC pair and another IRC or USPI, or because two separate IRC-USPI pairs themselves collaborated. For the purpose of the analysis, each instance of the publication is counted separately, although the number of instances of duplication is noted in each case.

A second set of publications data were collected through the USPI and IRC surveys. The survey publications were validated using a three-step process:

1. Publications that did not include a journal, authors' names, and a year were not included.
2. Publications that were not collaborative between the USPI and IRC that were published "before" (including the start year and previous years) the award start date were not included.
3. Publications listed in the survey as "in press" or "submitted" were validated against MEDLINE; those that had been published and indexed by the end of April 2005 were included in the publication analysis.

2.5.2 Bibliometrics

In order to assess the "research of high scientific merit" aspect of collaboration, bibliometric tools were applied to the database of publications. Abt contracted with Thomson-ISI (which hosts the Web of Knowledge/Science Citation Index) to identify three pieces of information for each publication in our publication analysis database:

- The total number of times each article had been cited
- The "expected" citation rate – the average number of times an article published in that journal and the year it had been cited, and

[16] There was one case where there was a USPI-IRC pair who had one grant, with a second grant with the same USPI and IRC plus an additional IRC. In that instance, any publications that were only between the USPI and IRC were included once in the database.

- The journal "impact factor" – measured by the ratio of the number of citations of all articles in the journal (between 1999-2003) to the number of articles published – as a measure of journal quality.

The bibliometric information was used to address three primary questions:

- Are awardees publishing collaborative papers in high-impact journals that are themselves being highly cited?
- For those USPI-IRC pairs with collaborative papers both before and after the award, is there a difference between papers published collaboratively before and after award onset?
- Are there differences between FIRCA and AIDS-FIRCA awards?

2.6 IRC Site Visits

2.6.1 Rationale and Country Selection

The goal of the site visit was not to examine and understand the outputs and outcomes of *each individual grant* but rather to understand the influence of the program *as a whole* on institutional or national capacity development. Using the institution or country as the unit of analysis, we were able to learn about synergies created by a group of awards among a set of individuals and institutions, about partnerships and networks created, and about if and how the "whole was greater than the sum of its parts."

The broad geographical scope of the program presented many possibilities for site visit country selection. In order to narrow the selection choices, the decision was made that no site visits would be made to industrialized countries, or to AIDS-FIRCA grantees. To maximize the number of visits within the given budget constraints, Abt considered countries with a critical mass of FIRCA investigators at a given institution. Although it was realized that this strategy might preclude identifying situations in which a smaller number of FIRCA awards may have had a larger measurable impact attributed to the specific needs of that country, it served as a preliminary screen; we also recognized that the "critical mass" requirement would remove countries with large, but diffuse distributions of FIRCA awards such as Brazil and Mexico. To further narrow the selection, we considered three additional criteria:

1. Distribution within the regions of the world (Former Soviet Union, Eastern Europe, Africa, Asia, Latin America and the Caribbean). Though we could not visit all regions, we wanted to give adequate consideration to regional differences.

2. Development status of the country (low income, middle income, high income)

3. Cohort of awards (1992-1996, 1997-2001, 2002+). The program has evolved over the years and we wanted to adequately represent the influence of FIRCA at different time periods.

By considering these criteria, in conjunction with award density, we narrowed our selection to 10 candidates as shown in Table 2.4.

Table 2.4

Number of FIRCA Awards by Institution – Top 10 Candidates

TOTAL FIRCA awards in country	Institution/University	Number of FIRCA Awards at Institution
Russia (106)	Russian Academy of Science	28
	Moscow State University	23
Argentina (47)	Instituto Leloir	6
	University of Buenos Aires	5
Hungary (41)	Semmelweis Medical University	11
	University Medical School of Debrecen	6
	Hungarian Academy of Sciences	4
	National Institute of Oncology	4
Poland (36)	Jagiellonian University	5
	University of Warsaw	5
	Polish Academy of Sciences	4
	University of Gdansk	4
Czech Republic (30)	Czechoslovak Academy of Sciences	12
	Charles University	7
Chile (14)	Universidad de Chile	9
	Pontificia Universidad Catolica	5
Croatia (11)	University of Zagreb	5
Slovak Republic (10)	Slovak Academy of Sciences	7
Uruguay (10)	Universidad de la Republica	9
Slovenia (7)	University of Ljubljana	4

Source: Abt Associates Inc. analysis of program data

Note: The 482 FIRCA grants were distributed among 318 institutions worldwide. Only the most common institutions are listed above (81% of the institutions had only 1 FIRCA award).

2.6.2 Method for Selecting IRCs/Institutions Visited

Once the countries with the largest concentrations of FIRCAs by institution were determined, we emailed all FIRCA researchers within those countries. We used the response rate, availability, and willingness to participate as an additional selection criterion. Finally, with input from FIC staff and the FIRCA Evaluation Advisory Committee, the following countries were selected for site visits: Russia, Hungary, Czech Republic, Slovak Republic, Chile, Argentina, and Uruguay.

Site visit teams met with between four (Slovak Republic) and eleven (Czech Republic) investigators per country; the number of investigators visited was determined by the number who could be contacted and were available and willing to meet with the site visit teams. Although they had the most FIRCAs of all the site visit countries, Russia and Argentina were notable for a substantially lower percentage of FIRCA recipients visited, while investigators from countries with fewer FIRCAs tended to be more responsive to Abt's inquiries.

Of the 53 FIRCA investigators we visited, a total of 59 FIRCA grants were represented (four investigators had received two FIRCAs and one received three).[17] Thirty-four (58%) of the grants were received between 2001 and 2004. Our site visits tended to over sample FIRCAs received recently, while under-sampling those awarded during the early and middle years of the program. In general, the site visits captured a slightly larger fraction of "older" FIRCAs (1992-1996) in Eastern Europe and the "younger" FIRCAs of South America (2002-2004). This cohort difference may be a partial explanation of several of the differences in outcomes of capacity building associated with the FIRCA program.

2.6.3 Dates of Visit

Site team staff members visited the Eastern European countries and Russia from September 4th – 25th 2004, and the South American countries from December 1st – 10th 2004. Two to three days were spent in each country depending on the number of IRCs and institutions to be visited.

2.6.4 Site Visit Coding and Analysis

Site visit interviews were coded using a standard classification mechanism to ensure data quality and consistency. In several instances, interviewees did not know the answer to a question, or the question was not applicable to them (e.g., discussion of sustainability with new investigators), in which case answers were coded "N/A." Multiple team members were involved in the coding of each interview to enforce consistency within site visits. One project team member was involved in both site visits, further enforcing consistency.

In general, each IRC interview was coded as a single unit, with certain exceptions. Two IRCs had multiple FIRCA awards with the same USPI (one with two, and one with three FIRCAs). In one case, renewal directly followed the previous award, so a single interview unit was coded. In the other case there had been a three-year interval between the conclusion of one FIRCA and the start of the next; as the IRC described two distinct FIRCA experiences, they were coded separately. There were two IRCs who received FIRCAs with different USPIs; those interviews were coded separately. Finally, there were two IRCs who received FIRCAs as part of a common research network; they were interviewed jointly, and except in rare instances where each provided distinct information regarding the FIRCA experience, they were coded in common.

In two cases, Abt met with colleagues of the IRCs rather than the IRCs themselves because of the IRCs' previous engagement at an international conference. It had been hoped that these colleagues were sufficiently informed of the circumstances surrounding the FIRCA award to provide adequate information to include in the site visit report. Unfortunately, they were largely uninformed regarding the mechanics of the grant (though they were heavily involved in the research) and so they were dropped from the analysis. We also met with three IRCs who had just received notification of FIRCA funding and were just beginning their work. They were able to provide sufficient information

[17] Of the 59 grants represented, only 56 were able to be coded individually – the other three were too similar to the initial FIRCA grant held by the IRC and could not be distinguished.

regarding the origins and design of the collaboration and were included in the analysis, even though they were unable to answer the questions related to capacity-building.

In addition to IRC-level interview coding, the site visit teams also attempted to gain an understanding of the institutional and national-level context in which the investigators operated. Multiple investigators were asked similar questions, in order to gain the broadest and most accurate understanding of these more complex and subtle issues. The discussion of national context is incorporated into Chapter Three.

3. Context and Characteristics of the Program

The following chapter aims to place the award program within the overall context of the FIC mission and to examine the actions of FIRCA (and to a lesser extent, AIDS-FIRCA) in comparison with other international research programs with similar objectives.

Information from QVR, CRISP, and FIRST was used to analyze the characteristics of FIRCA awardees. Data were also supplemented by Internet searches and through direct information provided by the USPIs and IRCs. Summary data regarding FIRCA and AIDS-FIRCA awardees is by year and by region (where applicable, all charts and figures are divided into separate FIRCA and AIDS-FIRCA categories).

3.1 Larger Context of FIRCA

3.1.1 Mission of the Fogarty International Center

As discussed in Chapter One, the overall mission of FIC throughout much of the period evaluated was, "To mobilize scientific resources to reduce global health disparities and to prepare the current and future generation of scientists to meet global health needs." FIC supports multiple research and training grants, all with a common mission of capacity building; however, FIRCA is the single research program with such depth and breadth of project topics and geographical coverage in the behavioral and biomedical research areas. FIRCA directly fits into the overarching FIC mission through its capacity building and collaboration-facilitating goals. The realization of these goals is discussed in the following chapters.

3.1.2 International Context

While the FIRCA program is unique at FIC and at NIH for the combination of its collaborative focus, the breadth of research topics, and its geographic scope, it is not the only international program sponsoring high-quality research and promoting biomedical research capacity building. In comparison to other programs, however, FIRCA's broad geographical scope is distinctive. Two programs specifically identified by FIC that are comparable to FIRCA were examined:

Howard Hughes Medical Institute International Investigators. HHMI has provided 233 awards to biomedical investigators in developing countries since 1995, with primary focus on Latin America and Central/Eastern Europe.[18] Award sizes and lengths tend to be longer than FIRCAs (median of five years and $250,000) and the funding is awarded directly to the international researchers to spend as they choose.

U.S. Civilian Research and Development Foundation. CRDF funds researchers in many disciplines, including biomedical research. The program has awarded more than 200 FIRCA-sized awards for collaborative research between biomedical scientists in the former Soviet Union and U.S. scientists between 1996 and 2004.

[18] An additional ten awards were made in 1991 to Mexican researchers as part of a solicitation limited to Canada and Mexico.

Both of these programs share common goals with FIRCA, though both HHMI and CRDF have a narrower regional focus than FIRCA. CRDF focuses entirely on scientists in the former Soviet Union, while HHMI targets Eastern European and Latin American Researchers. Though FIRCA is primarily focused in Eastern Europe, the Former Soviet Union, and Latin America and the Caribbean, it has a more predominant influence in the Asian-Pacific and African regions (Table 3.1); AIDS-FIRCA awards have been still more broadly distributed in Africa and Asia, though less focused on Eastern Europe and the Former Soviet Union. Certainly there are other sources of sources of international funding more narrowly focused to specific fields of research available; these resources, however, are becoming scarcer, and simultaneously more competitive.[19] FIRCA is one of the most general funding opportunities in terms of research topic possibilities and is also one of the few programs to provide the opportunity for international travel. In this sense it fulfills a unique niche within the international research community.

Table 3.1

Distribution of Biomedical CRDF, HHMI, and FIRCA Awards by Region

Region	Number of Biomedical CRDF Awards	Percent of Biomedical CRDF Awards	Number of HHMI Awards	Percent of HHMI Awards	Number of FIRCA Awards	Percent of FIRCA Awards	Number of AIDS-FIRCA Awards	Percent of AIDS-FIRCA Awards
Latin America and the Caribbean	0	0%	90	37%	141	29%	13	18%
Former Soviet Union	200	100%	143	59%	119	25%	1	1%
Eastern Europe	0	0%	75	31%	144	30%	7	9%
Western Europe	0	0%	0	0%	1	0%	21	28%
Africa	0	0%	4	2%	17	4%	15	20%
Asia-Pacific	0	0%	6	2%	60	12%	17	23%
Total	200	100%	243	100%	482	100%	74	100%

Source: Abt Associates Inc. analysis of FIRCA, CRDF, and HHMI data

Note: CRDF funded 808 awards between 1996 and 2004, of which 200 were coded as "biomedical"

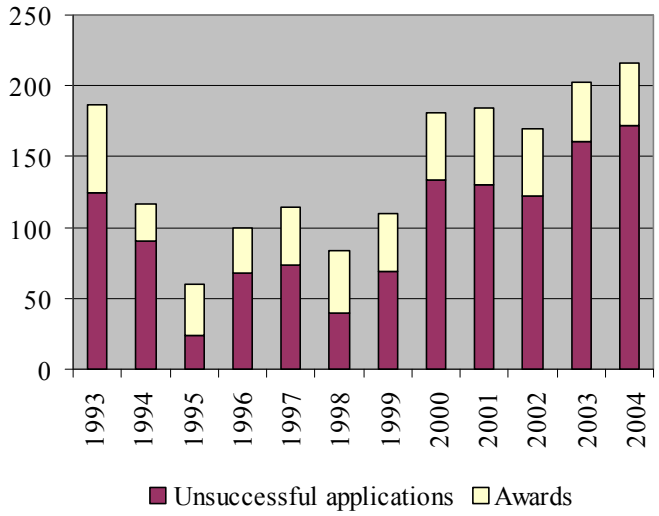
3.2 Application Data

Over the course of the program's lifetime, the number of applications for awards, the number of grants funded, and the overall success rate has varied over time. Figure 3.1A presents application

[19] Within NIH, for example, NIAID sponsors several programs whose goal is to promote collaborative infectious disease research (e.g., International Research in Infectious Diseases, Comprehensive International Program of Research on AIDS). Such programs likely would be good comparison groups for AIDS-FIRCA, though not for FIRCA. Other international funders for collaborative biomedical research include the Wellcome Trust, the Australia-New Zealand International Collaborative Research Grant, and the Institut Pasteur International Network. NIAID's programs are substantial in scope, but are limited to infectious disease topics, while most other international funders either are not specifically aimed at collaboration with developing countries, or are more limited than FIRCA in size, geographic scope or research breadth.

information for the FIRCA program. The figure shows that in recent years, while the number of funded grants has remained approximately constant, the number of applications has risen sharply. Figure 3.1B compares the FIRCA award rate with the overall NIH-wide average research project grant award rate. Figure 3.1B suggests that the FIRCA award rate has generally been in line with, or slightly lower than, the overall NIH-wide rate.[20]

Figure 3.1A
Number of FIRCA Applications and Awards, Fiscal Years 1993-2004

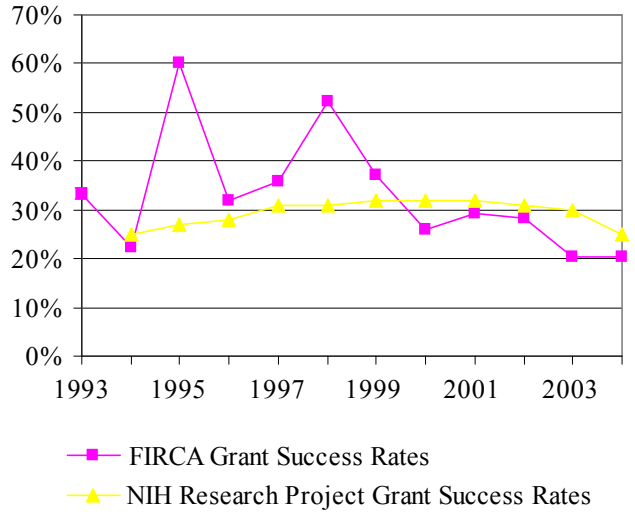


Source: FIRCA Award Data: Abt Associates Inc. analysis of program data. 1993-1997 application data from:"Initial Analysis of FIRCA Program Fiscal Years 1993-1997", provided by FIC August 2005. 1998-2004 application data from QVR runs, fiscal years 1998-2004, provided by FIC August 2005, March 2006

Note: FY 1992 FIRCA application data not available

[20] As discussed in the Feasibility Study (Table 3.2B) the number of AIDS-FIRCA applications had historically been closer to fifteen per year (127 applications between 1994 and 2001 and the funding rate above 50%.

Figure 3.1B
Comparison of FIRCA and NIH-wide Grant Success Rates, 1993-2004



Source: FIRCA Award Data: Abt Associates Inc. analysis of program data.
NIH-wide Award Data: FY 1994-1996: National Institutes of Health, FY 2003 Budget Request, http://officeofbudget.od.nih.gov/FY03/Success%20Rates.pdf. FY 1997-2004 National Institutes of Health, FY 2006 NIH Budget Request, page NIH-85

Note: FY 1992 FIRCA application data not available

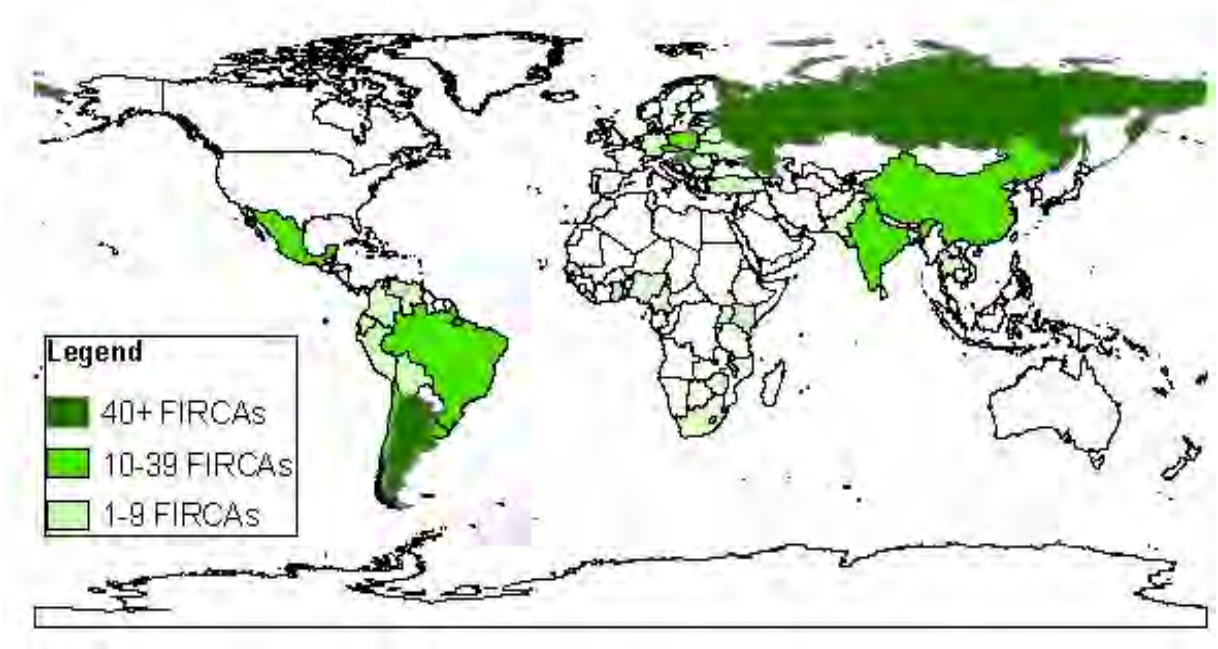
3.3 Characteristics of Awardees

3.3.1 Geographic Distribution of IRCs

Between 1992 and 2003, NIH awarded 482 FIRCA grants and 74 AIDS-FIRCA grants to researchers worldwide. Of the FIRCA awards, though collaborators are drawn from 63 countries, 86% of the total awards are concentrated in Eastern Europe, the Former Soviet Union, and Latin America and the Caribbean. AIDS-FIRCAs are most heavily concentrated in Western Europe while more than half of the FIRCAs are in Eastern Europe and the Former Soviet Union (Figure 3.2A, 3.2B, 3.3 and Table 3.2).

Figure 3.2A

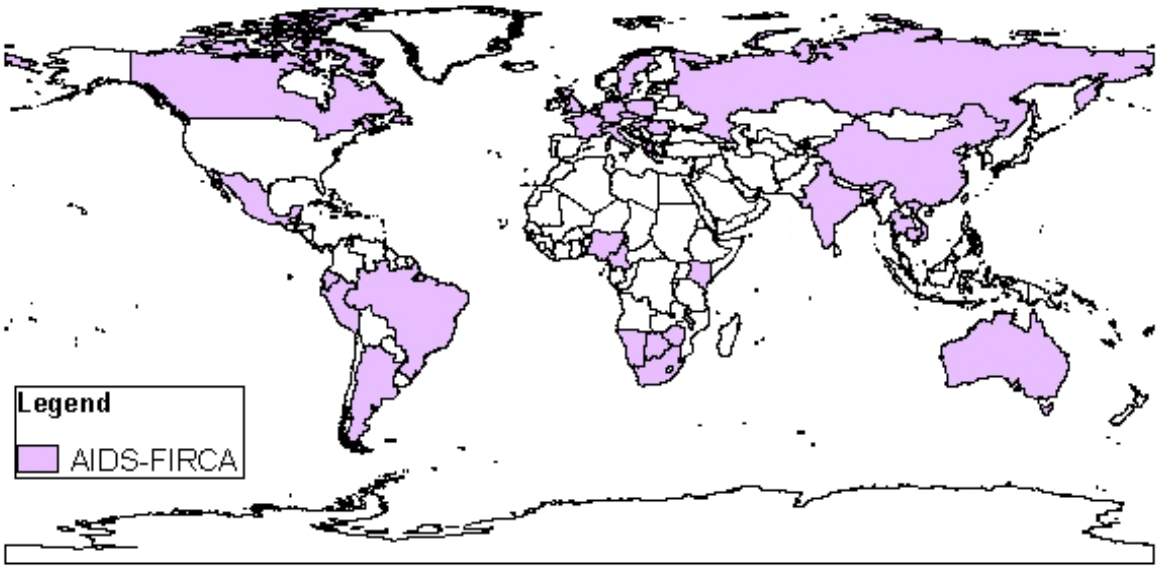
Geographic Distribution of FIRCA Awards, 1992-2003



Source: Abt Associates Inc. analysis of program data

Figure 3.2B

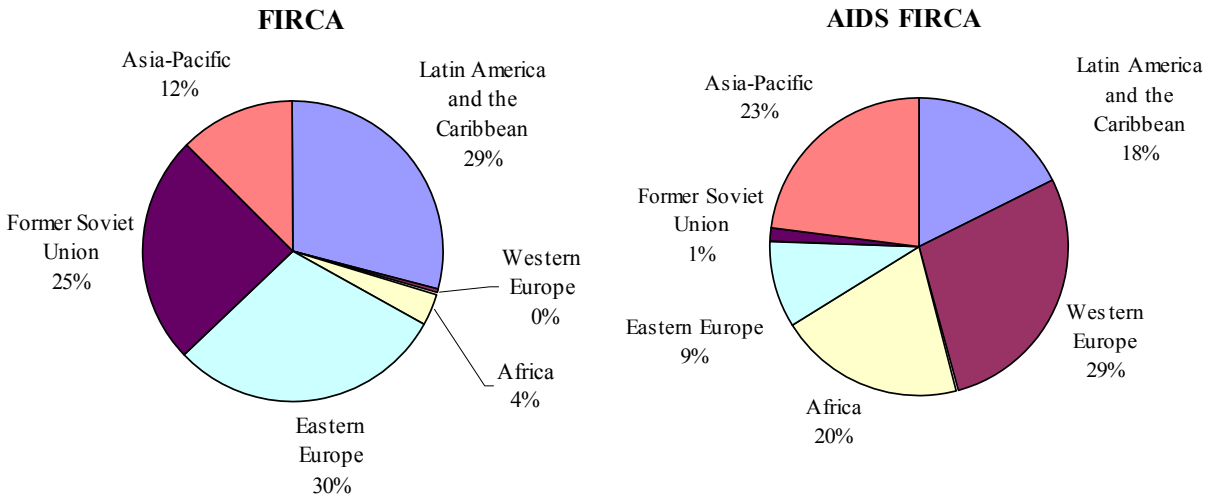
Geographic Distribution of AIDS-FIRCA Awards, 1992-2003



Source: Abt Associates Inc. analysis of program data

Figure 3.3

Distribution of FIRCAs (n=482) and AIDS-FIRCA (n=74) by Region (1992-2003)



Source: Abt Associates Inc. analysis of program data

Table 3.2

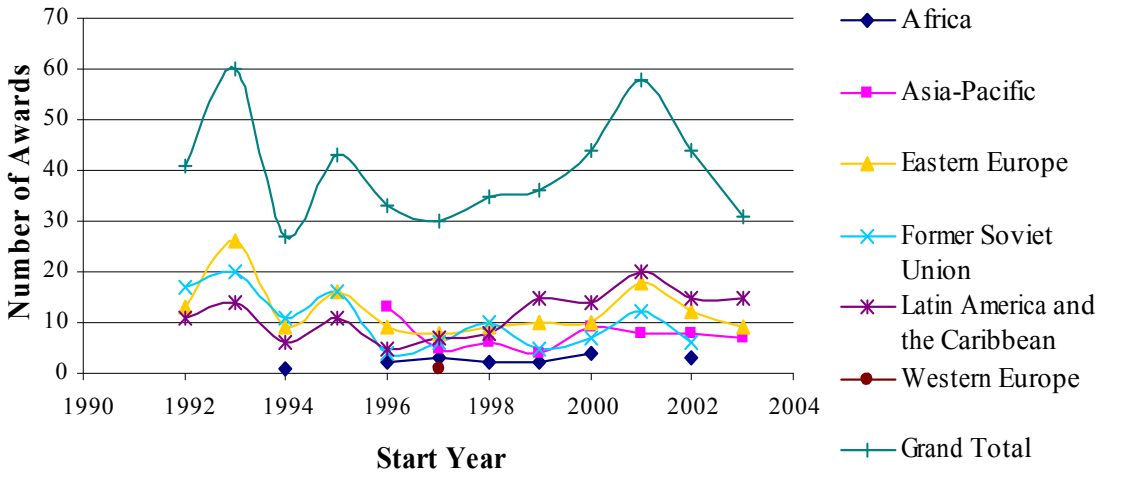
Number of FIRCAs and AIDS-FIRCAs, 1992-2003, by Country of IRC

	FIRCA	AIDS-FIRCA		FIRCA	AIDS-FIRCA
Latin America and the Caribbean	**141**	**13**	**Western Europe**	**1**	**21**
Argentina	47	2	Belgium	0	1
Belize	0	1	France	0	2
Bolivia	1	0	Germany	1	3
Brazil	26	2	Greece	0	1
Canada	0	1	Italy	0	3
Chile	14	0	Sweden	0	1
Colombia	3	0	Switzerland	0	1
Costa Rica	1	0	United Kingdom	0	9
Ecuador	2	1	**Africa**	**17**	**15**
Guadeloupe	0	1	Botswana	0	1
Jamaica	2	0	Cameroon	1	1
Mexico	24	1	Gambia	0	2
Panama	0	1	Ghana	1	0
Peru	6	3	Kenya	4	3
Trinidad	3	0	Malawi	0	1
Uruguay	10	0	Namibia	0	1
Venezuela	2	0	Nigeria	1	1
Eastern Europe	**144**	**7**	Senegal	1	0
Bulgaria	5	0	South Africa	7	3
Croatia	11	0	Uganda	1	0
Czech Republic	30	3	Zimbabwe	1	2
Hungary	41	2	**Asia-Pacific**	**60**	**17**
Poland	36	1	Australia	0	1
Romania	4	1	Bangladesh	3	0
Slovak Republic	10	0	Cambodia	0	1
Slovenia	7	0	China	17	1
Former Soviet Union	**119**	**1**	Fiji	1	0
Belarus	1	0	India	15	4
Estonia	5	0	Israel	15	2
Latvia	1	0	Pakistan	2	0
Russia	106	1	Philippines	1	0
Ukraine	6	0	Taiwan	0	3
			Thailand	1	3
			Turkey	5	0
			Vietnam	0	2
TOTAL: 482 FIRCAs			**74 AIDS-FIRCAs**		

Source: Abt Associates Inc. analysis of program data

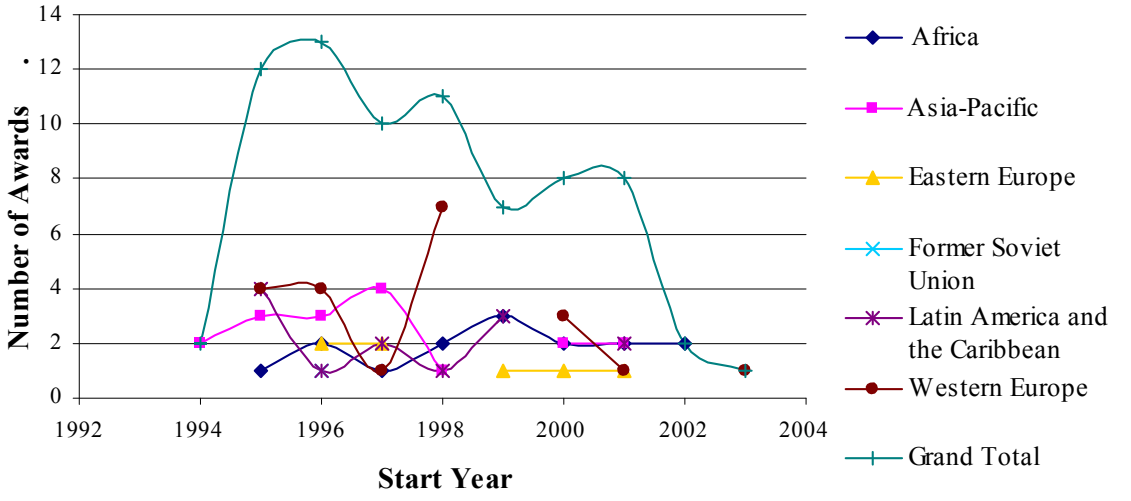
On average, forty FIRCA awards and eight AIDS-FIRCA (1992 – 2001) grants have been awarded each year, though the number of FIRCA awards has been declining since 2001 (Figures 3.4 and 3.5)

Figure 3.4
Number of FIRCAs by Region 1992-2003



Source: Abt Associates Inc. analysis of program data

Figure 3.5
Number of AIDS-FIRCAs by Region, 1994-2003



Source: Abt Associates Inc. analysis of program data

3.3.2 Geographic Distribution of USPIs

US Principal Investigators were drawn from forty US states at 175 US institutions, with approximately 30% of the collaborators based in thirteen US universities (Table 3.3).

Table 3.3

Major US Collaborating Institutions, 1992 – 2003

USPI Institution	Number of total FIRCAs	Number of total AIDS-FIRCAs	Total
University of Washington	20	4	24
University of Pennsylvania	20	2	22
Johns Hopkins University	11	3	14
University of California San Francisco	9	4	13
Yale University	11	2	13
University of California San Diego	7	4	11
University of Virginia Charlottesville	11	0	11
Mount Sinai School of Medicine of NYU	9	1	10
Stanford University	9	1	10
University of Alabama Birmingham	7	2	9
University of California Los Angeles	6	3	9
University of North Carolina Chapel Hill	9	0	9
University of Pittsburgh	8	1	9

Source: Abt Associates Inc. analysis of program data

3.3.3 Scientific Content of Awards

All awards were coded into a primary area of scientific content based on their abstracts and keywords in NIH's CRISP database. The majority of the FIRCA awards could be classified (with the caveat that the abstracts and keywords may not perfectly describe the actual research performed) as Cell and Developmental Biology, Neuroscience, Genetics, Biophysics, or Microbiology and Infectious Diseases (these five categories account for approximately 60% of all awards). There is some variation in research area by country; namely, Eastern European research topics are significantly different than the other regions due to the high number of researchers pursuing Neuroscience and Biophysics (Chi Square test, $p<0.05$) (Table 3.4A). Only about 6% of all awards are classified as clinical or applied (Medical Studies); all other research is basic.

Table 3.4A

Topics of FIRCA Research by Region, 1992-2003

	Africa	Asia-Pacific	Eastern Europe	Former Soviet Union	Latin American and the Caribbean	Western Europe	Total	Percent of Total
Cell and Developmental Biology	3	8	26	11	18	0	66	13.7%
Neuroscience	0	5	22	13	23	0	63	13.1%
Genetics	3	11	12	15	18	0	59	12.2%
Biophysics	1	5	23	15	12	1	57	11.8%
Microbiology and Infectious Diseases	2	6	8	8	18	0	42	8.7%
Medical Disciplines	2	4	12	4	5	0	27	5.6%
Biochemistry	0	1	8	11	6	0	26	5.4%
Molecular Biology	1	1	9	9	6	0	26	5.4%
Vaccine Development	2	3	6	4	10	0	25	5.2%
Pharmacology	0	3	9	6	7	0	25	5.2%
Public Health	3	4	5	3	6	0	21	4.4%
Chemistry	0	1	4	5	3	0	13	2.7%
Physiology	0	3	1	0	4	0	8	1.7%
Bioengineering	0	1	0	6	0	0	7	1.5%
Social Sciences	0	2	0	0	2	0	4	0.8%
Statistics and/or research methods and/or informatics	0	1	2	1	0	0	4	0.8%
Nutritional Sciences	0	1	0	0	2	0	3	0.6%
Psychology, non-clinical	0	0	2	1	0	0	3	0.6%
Ecology	0	0	0	1	1	0	2	0.4%
Pediatric Disciplines	0	0	0	1	0	0	1	0.2%
Total	**17**	**60**	**149**	**114**	**141**	**1**	**482**	**100%**

Source: Abt Associates Inc. analysis of program data

AIDS-FIRCA awards were less diverse in terms of research areas than FIRCA awards. Given the nature of the program, it is not unexpected that more than 70% of all awards are concentrated in the field of Microbiology and Infectious Diseases and an additional 10% in Vaccine Development (Table 3.4B).

Table 3.4B

Topics of AIDS-FIRCA Research by Region, 1992-2003

Topic of Research	Africa	Asia-Pacific	Eastern Europe	Former Soviet Union	Latin America and the Caribbean	Western Europe	Total	Percent of Total
Microbiology and Infectious Diseases	11	14	4	1	11	12	53	71.6%
Vaccine Development	2	2	0	0	0	4	8	10.8%
Public Health	1	1	0	0	1	0	3	4.1%
Biophysics	0	0	0	0	0	2	2	2.7%
Cell and Developmental Biology	0	0	1	0	0	1	2	2.7%
Drug resistance	0	0	0	0	0	1	1	1.4%
Biochemistry	0	0	1	0	0	0	1	1.4%
Genetics	0	0	0	0	1	0	1	1.4%
Molecular Biology	0	0	0	0	0	1	1	1.4%
Pharmacology	0	0	1	0	0	0	1	1.4%
Social Sciences	1	0	0	0	0	0	1	1.4%
Total	**15**	**17**	**7**	**1**	**13**	**21**	**74**	**100%**

Source: Abt Associates Inc. analysis of program data

3.3.4 Underlying Parent Grants

An alternative mechanism for classifying scientific content of awards is to assess the underlying parent grant award. Table 3.5 shows parent grant awards for FIRCAs and AIDS-FIRCAs awarded between fiscal years 1999 and 2002. Table 3.5 shows that for FIRCAs, NIGMS-related awards are approximately one-quarter of the total, while a substantial number of FIRCAs were based on NIAID, NHLBI, NCI, NINDS, NIDDK, and NICHD parent grants. For AIDS-FIRCAs, the large majority of awards were based on NIAID-funded parent grants.[21]

3.3.5 Gender of Awardees

All IRCs and USPIs were coded by gender. Gender was determined based on the information reported in the surveys and information provided by FIC. Supplementary information was obtained through internet searches. There were two FIRCA USPIs and 12 FIRCA IRCs for whom gender could not be determined. Overall, the majority of FIRCA and AIDS-FIRCA IRCs and USPIs are male (80.7% of FIRCA USPIs and 75.7% of FIRCA IRCs; 79.7% of AIDS-FIRCA USPIs and 66.2%

[21] The percentage breakdown of awards by IC in the 1999-2002 data provided by NIH are similar to 1992-2001 parent grant information in the Phase I Feasibility Study: Lal et al., "Evaluation of the Fogarty International Research Collaboration Awards (FIRCA) Program: A Feasibility Study", March 2003, page 17.

of AIDS-FIRCA IRCs). Of the FIRCA and AIDS-FIRCA IRCs, the majority of males and females tend to work with male USPIs, however, women were more likely to work with women than with men (chi square test, P<0.10) (Table 3.6). Regression analysis indicated that the percentage of female IRCs has not increased over time.[22]

Table 3.5

Parent Grant Distribution of FIRCA and AIDS-FIRCA Researchers, 1999-2002 Awards

FIRCA			AIDS-FIRCA		
IC	**Number of Awards**	**Percentage of Awards**	**IC**	**Number of Awards**	**Percentage of Awards**
NIGMS	41	24%	NIAID	20	71%
NIAID	28	17%	NICHD	3	11%
NHLBI	21	13%	NCI	2	7%
NCI	17	10%	NCRR	1	4%
NIDDK	14	8%	NIDA	1	4%
NINDS	13	8%	NIGMS	1	4%
NICHD	12	7%	Other	0	0%
Other ICs	22	13%	ICs		
Total	**168**	**100%**	**Total**	**28**	**100%**

Source: Abt Associates Inc. analysis of program data

Note: "Other ICs" of FIRCA parent grants include NIA (4 awards), NCRR (3), NIDCD (3), NIMH (3), NEI (2), NIAMS (2), NIDA (2), NIAAA (1), NIEHS (1), NINR (1)

Table 3.6

Gender Distribution of FIRCA and AIDS-FIRCA Researchers

IRC GENDER	USPI GENDER			Total
	Female	**Male**	**Could not be Determined**	
FIRCA				
Female	30.5%	69.5%	0.0%	**21.8%**
Male	15.9%	83.6%	0.5%	**75.7%**
Could not be Determined	8.3%	91.7%	0.0%	**2.5%**
Total	**18.9%**	**80.7%**	**0.4%**	**100.0%**
AIDS-FIRCA				
Female	25.0%	75.0%	0.0%	**21.6%**
Male	16.3%	83.7%	0.0%	**66.2%**
Could not be Determined	33.3%	66.7%	0.0%	**12.2%**
Total	**20.3%**	**79.7%**	**0.0%**	**100.0%**

[22] Regression analysis of year (independent variable) against percentage of IRCs female (dependent variable). Regression equation = 0.15 + 0.012*(year) + ε. R^2=0.27; t-statistic for coefficient of year = 1.91; 95% confidence interval on coefficient of year = -.002 to 0.027, suggesting that coefficient is not statistically distinguishable from zero.

Source: Abt Associates Inc. analysis of program data

3.3.6 Duration of Award

Though the official duration of an award is three years, there are also opportunities to receive a no-cost extension or to apply for a renewal. Additionally, towards the beginning of the FIRCA program, there were many one and two year awards. AIDS-FIRCAs had a higher frequency of no cost extensions than FIRCA awards, though the difference was not significant (Table 3.7).

Table 3.7

Total Duration of FIRCA and AIDS-FIRCA Awards

Duration	FIRCA	Percent of FIRCAs	AIDS-FIRCA	Percent of AIDS-FIRCAs	Total
1 year	13	2.7%	0	0.0%	13
2 years	26	5.4%	1	1.4%	27
3 years	249	51.7%	35	47.3%	284
> 3 years	149	31.0%	33	44.6%	182
Renewal	45	9.3%	5	6.5%	50
Total	**482**		**74**		**556**

Source: Abt Associates Inc. analysis of program data

There were several USPIs that have received multiple awards with various IRCs. Three USPIs had four distinct awards, five had three awards, and 34 had two awards. USPIs with multiple awards account for just over 17% of all awards (Table 3.8).

Table 3.8

Number of USPIs with Multiple Awards 1992-2003

	4 grants	3 grants	2 grants	1 grant
Number of FIRCA USPIs	3	3	25	411
Number of AIDS-FIRCA USPIs	0	2	9	50
Total Awards	12	15	68	461
Percent of Total Awards	2.2%	2.7%	12.2%	82.9%

Source: Abt Associates Inc. analysis of program data

There were 20 pairs of collaborators (3 AIDS-FIRCA, 16 FIRCA, and 1 pair with 1 FIRCA and 1 AIDS-FIRCA award) that received multiple awards (this number excludes those who received renewals) (Table 3.9). The effect of multiple awards on collaboration strength and capacity building is discussed in Chapters 4 and 5.

Table 3.9

Number of USPI and IRC Pairs with Multiple FIRCA and AIDS-FIRCA Awards 1992-2003

Country of IRC	Number of Pairs with Multiple awards (FIRCA)	Number of Pairs with Multiple Awards (AIDS-FIRCA)	Number of pairs with both FIRCA and AIDS-FIRCA awards
Russia	3	0	0
Poland	2	0	1
Argentina	2	0	0
Czech Republic	2	0	0
Croatia	2	0	0
Peru	1	1	0
Brazil	1	0	0
Uruguay	1	0	0
Slovak Republic	1	0	0
Bangladesh	1	0	0
Gambia	0	1	0
United Kingdom	0	1	0

Source: Abt Associates Inc. analysis of program data

4. Collaboration Between US Principal Investigators and Their International Research Collaborators

4.1 Chapter Structure

Chapter Four discusses the collaboration between USPIs and their IRCs. The chapter is divided into four sections:

- Awards and the origin of collaboration
- Collaboration during the FIRCA award
- Collaboration after FIRCA award close
- Collaboration and publication quality

4.2 Awards and the Origin of Collaboration

One of the principal study questions underlying this evaluation is, "What role did the program play in facilitating collaborations between US scientists and their foreign colleagues?" All data sources – the USPI and IRC surveys, the publication analysis, and the site visits, suggest a single conclusion, namely that FIRCA has – especially recently – been a vehicle that successfully *enhances* collaborations between US and international researchers.

4.2.1 Award's Role in Creating Collaborations

As shown in Table 4.1, the USPI survey reported that nearly two-thirds of the FIRCA principal investigators, and more than three-quarters of the AIDS-FIRCA principal investigators, reported some form of previous collaboration. The large majority responded positively to the general statement, "We already had a collaboration;" more specifically, approximately one-quarter (23%) of both the FIRCA and AIDS-FIRCA principal investigators reported that their IRC was a former student or postdoctoral fellow. Of those who had not had a previous collaboration, conferences – both in the United States and elsewhere – appear to be the primary source of collaboration formation. The IRC survey reported similar results; the large majority of IRCs (81% for FIRCA, 62% for AIDS-FIRCA) reported some form of previous collaboration, with a substantial minority (30% for FIRCA, 21% for AIDS-FIRCA) reporting that they were a former student or postdoc of their US Principal Investigator.[23]

[23] Source: Abt Associates Inc. analysis of IRC survey question 2. Note: 15 FIRCA IRCs and 1 AIDS-FIRCA IRC did not respond to this question.

Table 4.1

USPI Survey: Sources of Collaboration

Source of Collaboration	FIRCA count (n = 240)	percent of respondents	AIDS-FIRCA count (n = 35)	percent of respondents
We already had a collaboration and I wished to strengthen it	139	58%	23	66%
S/he was my student or postdoctoral fellow	55	23%	8	23%
Other.	44	18%	6	17%
We met at a conference elsewhere and had shared interests	42	18%	5	14%
I learned about IRC's work and wished to establish collaboration	37	15%	6	17%
We met at a conference in the United States and had shared interests	32	13%	3	9%
IRC contacted me	32	13%	3	9%
S/he was not my students or postdoctoral fellow, but was a student or postdoctoral fellow in my department	10	4%	5	14%
Summary: Had previous collaboration	158	66%	27	77%
Summary: Did not have previous collaboration	82	34%	8	23%

Source: Abt Associates Inc. analysis of USPI survey question 2.2

Note: 2 FIRCA US Principal Investigators did not respond to this question

Nearly 20% of survey respondents reported "other" as their source of collaboration. The 54 "other" responses were coded, and included:

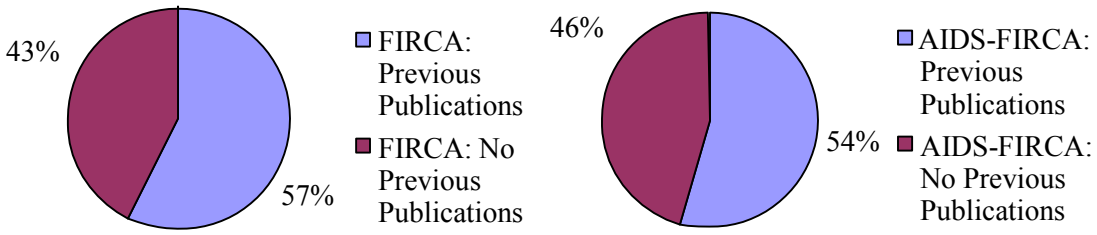
- Collaborators who were introduced by third parties (16 examples)
- Collaborators who met while IRC was involved with a fellowship, sabbatical, or other training in the United States (12 examples)
- USPI identified collaborator who had key expertise or data (8 examples)
- The USPI and IRC were colleagues at the same level and institution before applying for the FIRCA award (3 examples).

"The project required the commitment of a parasitologist, expert in immunology and immunological methodologies in the lab, and someone who would act as a liaison with the Ministry of Health" – FIRCA USPI (IRC in Philippines)

The publication analysis provides a different mechanism for assessing collaboration between the USPIs and their IRCs. Researchers were coded as having had a "previous" collaboration were they to have at least one common publication by the year in which the FIRCA was awarded. As shown in Figures 4.1A and 4.1B, nearly half of grantees (46% of FIRCA researchers, and 43% of AIDS-FIRCA researchers), had had at least one previous collaborative publication. This finding is similar to the survey results, though slightly lower, as would be expected, as self-reported "collaborations" do not necessarily lead to publication, while publications should always be the result of collaboration.

Figures 4.1A and 4.1B

Publication Data: Percentage of FIRCA and AIDS-FIRCA Collaborations with Previous Collaborative Publications



Source: Abt Associates Inc. analysis of collected publications

4.3 Collaboration During the FIRCA Award Period

In considering collaboration during the FIRCA award period, we first consider *inputs* to the collaborations, such as the allocation of funds between USPIs and IRCs, turn next to *operations* of the collaborations – the degree and frequency of contact, and reporting of the nature of the collaboration – and conclude with collaboration *outcomes*.

4.3.1 Collaboration Inputs: Funding Distribution

The distribution of funding is one input to the collaboration. As only USPIs would know the distribution of funds between laboratories, only they were asked questions regarding it. Question 2.8 of the USPI survey reported the distribution of funds. As shown in Table 4.2A, the FIRCA USPIs tended to assign a higher percentage of their budgets to their IRCs than did the AIDS-FIRCA principal investigators. Eighty-five of the FIRCA USPIs who responded reported that the IRCs received 80% or more of the total project budgets, as against two-thirds (66%) of the AIDS-FIRCA USPIs. Twenty-five percent of the AIDS-FIRCA USPIs, on the other hand, reported that their own laboratories received more than 40% of the award funding.

Table 4.2A

USPI Survey: Funding Split Between USPIs and IRCs

Percent Funding split (USPI/IRC)	FIRCA count	Percent of respondents	AIDS-FIRCA count	Percent of respondents
0/100	44	19%	3	9%
1-5/99-95	49	21%	5	16%
6-10/94-90	55	24%	9	28%
11-20/89-80	51	22%	4	13%
21-30/79-70	14	6%	1	3%
31-40/69-90	6	3%	2	6%
41-100/59-0	15	6%	8	25%

Source: Abt Associates Inc. analysis of USPI survey question 2.8
Note: 8 FIRCA USPIs and 3 AIDS-FIRCA USPIs did not respond to the question

IRCs were asked whether the program represented the only source of funding available to them during the award period. As Table 4.2B shows, there were substantial differences among the responses of FIRCA IRCs, AIDS-FIRCA IRCs from developing countries, and AIDS-FIRCA IRCs from developed countries. The large majority of FIRCA IRCs had access to other forms of support – especially government support (though site visitees mentioned that local government funding often was small relative to FIRCA). Some developing-country AIDS-FIRCA researchers, and the large majority of AIDS-FIRCA IRCs, also had access to government, foundation, private, or other international support during the award period.

Table 4.2B

IRC Survey: IRC Funding Sources for Related Research

Funding sources	FIRCA	AIDS-FIRCA (Developing Countries, n = 14)	AIDS-FIRCA (Developed Countries, n=16)
FIRCA was my only source of funding	27%	71%	19%
I had some other source of support	73%	29%	81%
I had other government support in my country	66%	7%	56%
I had other foundation or private support in my country	10%	7%	44%
I had other international support	15%	14%	13%
Other support	3%	14%	0%

Source: Abt Associates Inc. analysis of IRC survey question 5
Note: As IRCs can have more than one source of support, columns may total to more than 100%

Table 4.2C subdivides the FIRCA respondents by region. The table suggests substantial differences across regions regarding the percentage of IRCs who received any non-FIRCA funding, with researchers from the former Soviet Union most likely to report that they received funding in addition

to FIRCA, with Asian researchers most likely to report that FIRCA provided the sole source of research funding.[24] The table suggests two additional findings:

- The large majority of respondents reported that they had local government funding (66% of all respondents). With the exception of the small number of African respondents, local government funding was the other source of support often mentioned; three-quarters of all respondents who indicated that they had any funding indicated that their only source of funds in addition to FIRCA came from local government support (data not shown). As will be discussed in detail in Chapter 5, FIRCA funding often is larger in magnitude and more useful to researchers than locally-available support.
- While a minority of respondents indicated that they received funding from other international sources or from local foundations and industry, the percentage varied substantially across regions, with researchers in the Former Soviet Union and Africa more likely to indicate that they received such funding, and Asian and Eastern European researchers less likely to mention such funds.

Table 4.2C

IRC Survey: IRC Funding Sources for Related Research by Region (FIRCA)

Funding Sources	Africa	Americas	Asia	Eastern Europe	Former Soviet Union	Total
FIRCA was my only source of funding	22%	27%	42%	27%	11%	27%
I had some other source of support	78%	73%	58%	73%	89%	73%
I had other government support in my country	33%	64%	53%	70%	81%	66%
I had other foundation or private support in my country	33%	14%	8%	4%	14%	10%
I had other international support	22%	16%	5%	11%	28%	15%

Source: Abt Associates Inc. analysis of IRC survey question 5
Note: 8 IRCs (4 from the Former Soviet Union, 2 from Asia, 1 from the Americas, and 1 from Eastern Europe) did not respond to this question

[24] Regional differences significant at the 10% level ($p < .06$, chi-squared statistic 9.0, 4 df)

4.3.2 Collaboration Operations: Work Distribution and Degree of Contact

Due to the difference in survey design, the USPIs and IRCs were asked somewhat different questions regarding the work distribution during the FIRCA award. The USPIs received a more complex question (USPI survey question 2.4) identifying specific portions of the award process and asked whether they took the lead, whether the IRC did, or whether the two shared work equally. Table 4.3 shows responses for both FIRCA and AIDS-FIRCA USPIs. FIRCA USPIs reported that in general, the USPIs and IRCs played equal roles, with the exceptions being proposal preparation (USPIs more likely to lead), data collection, and approval of day-to-day expenditures (IRCs more likely to lead). AIDS-FIRCA USPIs similarly reported that in general collaborators played equal roles.[25]

> "Distinct portions of research were performed by my lab; other portions were performed jointly by members of my lab and USPI's lab during visits of my lab members to the USPI lab." - FIRCA IRC (Slovak Republic)

Table 4.3
USPI Survey: USPI Reporting of Work Distribution

	FIRCA (223 respondents)			AIDS-FIRCA (30 respondents)		
Role	**USPI lead (%)**	**IRC lead (%)**	**Equal role (%)**	**USPI lead (%)**	**IRC lead (%)**	**Equal role (%)**
Identification of research objective	29%	11%	60%	43%	10%	47%
Proposal preparation	50%	18%	32%	60%	7%	33%
Design of research project	21%	18%	60%	50%	10%	40%
Changes to project design	20%	26%	54%	29%	25%	46%
Data collection	6%	69%	25%	7%	63%	30%
Data analysis	11%	42%	48%	33%	27%	40%
Approval of day-to-day expenditures	18%	62%	20%	37%	43%	20%
Approval of substantial expenditures	34%	25%	41%	53%	20%	27%
Report/manuscript writing	23%	19%	58%	30%	17%	53%
Other dissemination (e.g., presenting results at conferences)	8%	37%	55%	14%	21%	64%

Source: Abt Associates Inc analysis of USPI Survey question 2.4

Note: 19 FIRCA USPIs and 5 AIDS-FIRCA USPIs did not answer any of the question, while an additional 12 FIRCA and 2 AIDS-FIRCA USPIs answered only part of the question.

[25] A comparison worth noting is that the FIRCA USPIs who responded to this question tended to be less likely to give a primary role to the USPI than did the AIDS-FIRCA USPIs (e.g., when comparing "identification of research objective" 29% of the FIRCA USPIs responded that they played the lead role, as opposed to 43% of AIDS-FIRCA respondents). This difference is especially interesting given that AIDS-FIRCA is a program where 21 of 74 collaborations were between US and Western European investigators.

The IRC survey included a simpler question regarding work distribution, due to the simpler survey format. As shown in Table 4.4, approximately 80% of both FIRCA and AIDS-FIRCA IRCs who responded to the survey believed that both the US and international laboratories played a strong role in the collaboration – with a roughly equal split between those who describe their collaboration as close and bilateral and who describe their collaboration as having split the research into tasks performed separately by each institution. A small fraction of IRCs argue that their laboratories played a predominant role, with limited interaction with the USPI laboratory.

> "I spent some time working in the USPI lab doing experiments and performing analyses of the sequences that were generated in my lab. I also spent some time discussing results of experiments in meetings that we had in US during scientific conferences. Most importantly, one of my students spent an entire year working in the USPI lab where he developed a project that was not part of the original specific aims but that was designed according to the results we obtained. The USPI came twice for visiting my lab where we had fruitful discussions between him and my graduate students." – FIRCA IRC (Brazil)

Table 4.4

IRC Survey: IRC Reporting of Work Distribution

Reporting of Role	FIRCA count	Percent of respondents	AIDS-FIRCA count	Percent of respondents
Both labs contributed to all phases of the project.	95	40%	11	37%
There were distinct portions of the research performed by USPI lab and distinct pieces performed by my lab.	93	39%	14	47%
Work was done entirely by me with minimal guidance and advice from USPI	30	13%	2	7%
Other (please describe below)	21	9%	3	10%

Source: Abt Associates Inc analysis of IRC survey question 3

Note: 9 FIRCA IRCs (but no AIDS-FIRCA IRCs) did not respond to this question. Qualitative analysis of the "other" reports suggests that most could have been reclassified into one of the other three categories.

The USPIs and IRCs reported close contact during the award period. As shown in Appendices D and E, the USPIs and IRCs corresponded, on average, between once a week and once a month. The management of the program allows for expenditures for travel (for both USPIs and IRCs) in order to facilitate face-to-face contact between the investigators.

USPIs and IRCs were asked about the face-to-face time that they spent together, whether in the US, in the IRC's home countries, or elsewhere. Table 4.5A shows that the large majority of awardees spent face-to-face time together, during which time there was ample time for the learning and dissemination of new techniques. Figure 4.2 shows more detailed information for FIRCA recipients. Several insights can be drawn from the table and figure:

- ***The vast majority of FIRCA awardees spent some face-to-face time, but were more likely to spend time in the USPI country than the IRC country.*** More than ninety percent of FIRCA USPIs who responded to this survey question report spending face-to-face time in the US, while just over seventy percent of them reported spending face-to-face time in the IRC's country. The FIRCA USPIs reported spending on average more than three times as many days together in the US (average of 58 days) than in the IRC's country (average of 17 days).[26]
- ***While the vast majority of AIDS-FIRCA researchers also spent face-to-face time, that time was more evenly balanced between the US and the IRC's country.*** A higher percentage of AIDS-FIRCA USPIs reported that they spent time face-to-face in the IRC's country (90%) than in the US (83%), and the AIDS-FIRCA USPIs spent on average more time in the IRC country than in the US (36 days versus 32 days).
- ***A small minority of awardees spent the majority of the total face-to-face time.*** The large majority of face-to-face time was spent by those spending more than one month together; in some circumstances (FIRCA grantees spending time in the US, AIDS-FIRCA grantees spending time in country), those awardees who spent six or more months together spent the majority of total time together (6625 of 12420 total days spent by FIRCA USPIs in the US; 540 of 1057 total days spent by AIDS-FIRCA USPIs in the IRC's country).

Table 4.5A

USPI Survey: Summary Statistics Regarding Face-to-Face Collaboration Between the USPI and IRC in the United States and in the IRC's Home Country

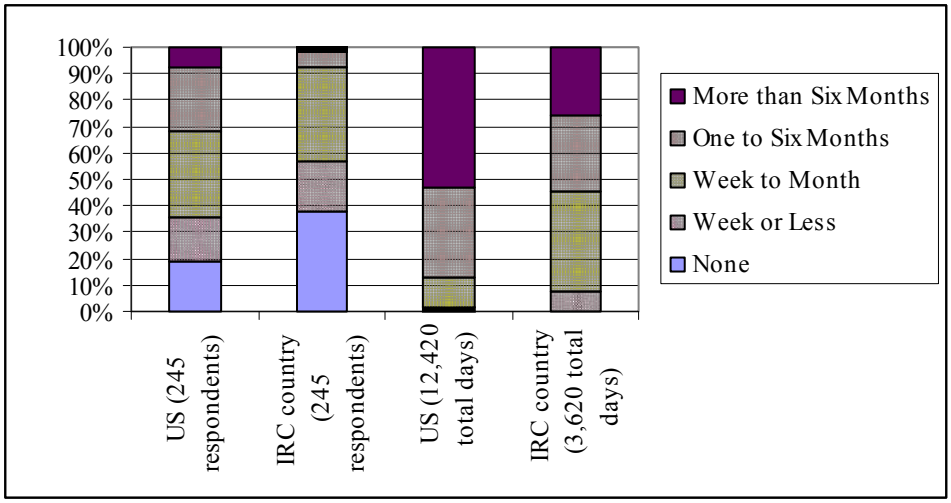
Face-to-Face Time	FIRCA	AIDS-FIRCA
Number and percentage of USPI respondents reporting that they spent *any* face-to-face time in the US	198 (92%)	24 (83%)
Average number of days spent in the US	58.26	32.38
Number and percentage of USPI respondents reporting that they spent *any* face-to-face time in the IRC's country	153 (71%)	26 (90%)
Average number of days spent in the IRC's country	16.92	36.45

Source: Abt Associates Inc. analysis of USPI survey question 2.6

Note: 30 FIRCA USPIs and 6 AIDS-FIRCA USPIs did not answer the question. Also note that similar results would be obtained from analysis of IRC survey question 4a (data not shown)

[26] The first two conclusions are statistically significant. The average number of days spent face to face in the US as reported by the FIRCA USPIs was significantly higher than for AIDS-FIRCA USPIs as analyzed through paired t-tests (df=79, t=2.176, p<0.03). Similarly, average number of days spent face to face in other countries as reported by the IRCs was significantly higher for FIRCA than for AIDS-FIRCA (df=52, t=2.946, p<0.01).

Figure 4.2
USPI Survey: Face-to-Face Collaboration Between FIRCA USPIs and IRCs in the United States and in the IRC's Home Country



Source: Abt Associates Inc. analysis of USPI survey question 2.6

Note: 30 FIRCA USPIs and 6 AIDS-FIRCA USPIs did not answer the question. Also note that similar results would be obtained from analysis of IRC survey question 4a (data not shown)

The IRCs were asked to describe the nature of these face-to-face collaborations, which were coded into standard categories. As shown in Table 4.5B, nearly all IRCs responding to the survey used their face-to-face time for research-related purposes, including conducting experiments, learning techniques, discussing findings, and planning future research. Approximately half of the FIRCA and AIDS-FIRCA IRCs also jointly attended conferences and prepared papers for publication or grants for submission. A smaller fraction was involved in teaching – both the IRCs and the USPIs were involved in teaching or giving seminars at the others' institutions. Finally, several IRCs mentioned that their students or post-docs also participated in face-to-face collaboration, generally spending time at the USPI's laboratory performing research (discussed in more detail in Section 5.3).

Table 4.5B
IRC Survey: Uses of Face-to-Face Collaboration Time

Reported Use	IRCs: FIRCA (#)	IRCs: FIRCA (% of respondents)	IRCs: AIDS-FIRCA (#)	IRCs: AIDS-FIRCA (% of respondents)
Research/experiments/discussion of results	196	89%	24	89%
Manuscript/grant preparation	134	61%	13	48%
Conference attendance	131	59%	13	48%
Teaching/giving seminars	41	19%	8	30%
Participation of IRC students	13	6%	0	0%
Total: Respondents to Question 4b	**221**		**27**	

Source: Abt Associates analysis of IRC survey question 4b.

Note: 9 FIRCA IRCs did not respond to the underlying question 4a.

4.3.3 Collaboration Outcomes: Collaborations Created and Enhanced

The USPI survey contained two questions directly addressing the program's role in catalyzing collaborations with various types of stakeholders. Principal investigators were asked whether their FIRCA award "created" or "enhanced" collaborations with a range of stakeholders –including researchers, governments, clinicians, and industry in both the US and the IRC's home country. Two insights emerge from analysis of these survey questions:

- USPIs reported that collaborations with researchers (both in the USPI's country and the IRC's) were more likely to be affected than collaborations with governments, clinicians, or industry.
- USPIs reported that collaborations with all stakeholder types were more likely to be "enhanced" than "created" – which fits with the finding that FIRCA was likely to enhance existing research collaborations as discussed in Section 4.2 above.

These insights apply to both FIRCA and AIDS-FIRCA survey respondents.

4.3.4 Collaboration Outcomes: Published Research

The primary outcome of any research grant program is the published, peer-reviewed science that it produces. Assessing the publication outcomes of a program like FIRCA or AIDS-FIRCA is difficult, for several reasons – the first two of which lead to an expansive definition of the publication outcomes of the program, while the third represents a caution on interpretation:

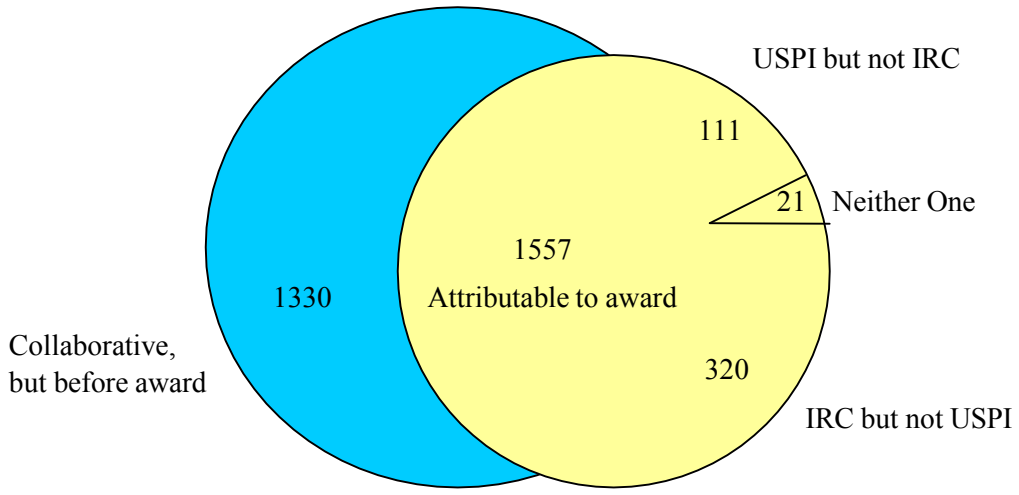
- ***Not all research derived from the program must be collaborative.*** As discussed in Section 4.3.2 and Table 4.4, a substantial fraction of collaborators reported a distribution of work where the two laboratories pursued parallel courses, and some IRCs reported that their laboratory was responsible for the bulk of the science produced. It would therefore be expected that there may be publications attributable to the program involving only one of the collaborators.
- ***The value of the program may extend beyond award conclusion.*** As discussed in Sections 4.3.2 and 4.3.3, awards both created new and enhanced existing collaborations. Any collaborative publication stemming from award onset may therefore result from the award.
- ***Not all publications can be "purely" attributed to the program.*** FIRCA and AIDS-FIRCA are only a minor fraction of the total funds available to US investigators; as Section 5.2.4 will discuss in detail, IRCs also may have funds from other sources, both locally and internationally. Especially for IRCs with additional international funding, attributing research success to the award may overestimate the effect of the program.

Chapter Two discusses the methodology by which we assembled the list of publications and its potential limitations – both to underestimate and to overestimate the impact of the program. For the purpose of this chapter, we adopt the expansive definition of the program's reach, cognizant of the limits of its interpretation.

Figures 4.3A and 4.3B visually represent the publications attributed to the program – 4.3A for FIRCA and 4.3B for AIDS-FIRCA. The blue circle shows collaborative publications prior to each collaboration's first FIRCA/AIDS-FIRCA award, while the yellow shows publications post-award and therefore attributed to the program. The sub-portions of the yellow circle are those publications that show authorship by the USPI but not the IRC; neither the IRC nor the USPI; and the IRC but not the USPI respectively, while the green oval represents the overlap between the two – the number of collaborative publications attributable to the program.

Figure 4.3A

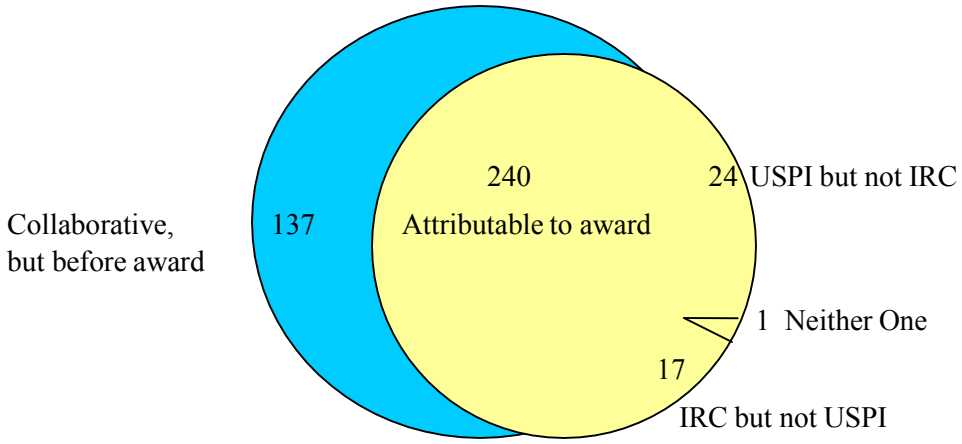
Publication Data: Characterization of FIRCA Publications by Degree of Collaboration and Timing



Source: Abt Associates Inc. analysis of collected publications

Figure 4.3B

Publication Data: Characterization of AIDS-FIRCA Publications by Degree of Collaboration and Timing



Source: Abt Associates Inc. analysis of collected publications

For both FIRCA and AIDS-FIRCA, the figures show an average of just over three collaborative, attributable, publications per *collaboration*[27] (240/72 = 3.33 for AIDS-FIRCA and 1557/462 = 3.37 for FIRCA). For FIRCA, there is an average of one additional publication per *collaboration* that is not collaborative (451/462 = 0.98), with most of those additional publications attributable to publications that involve the IRCs only. For AIDS-FIRCA, there is on average an additional half a publication per *collaboration* (42/72 = 0.58), with the majority attributable to publications that involve the USPIs only.

There was a sufficient volume of FIRCA awards to permit additional subdivision and cross-tabulation of the publications, which sheds light on several additional issues, such as:

- ***The vast majority of collected publications are in "Western" peer-reviewed journals.*** Of the 2009 publications published during and after collaboration formation, 132 (7%) were coded as being published in developing country journals. As would be expected, which collaborators published these papers influenced where they were published; while 2% (2 of 111) naming only the USPI and 4% of collaborative publications (70 of 1557) were in developing-country journals, 18% of those listing only the IRC (57 of 320) and 14% naming neither (3 of 21) were. This finding may overstate the "true" percentage of collaborative publications in "Western" peer-reviewed journals, as MEDLINE does not index all journals. The only avenue for the inclusion of non-MEDLINE-indexed publications would have been

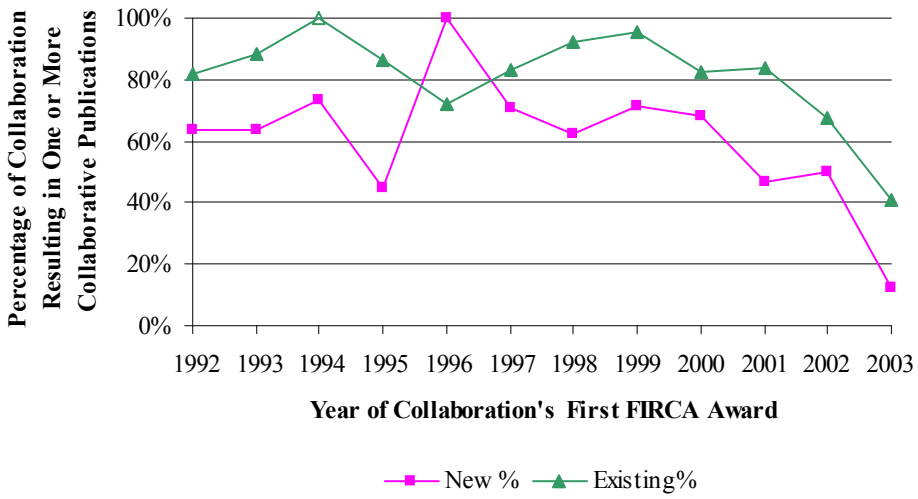
[27] As discussed in Chapter Two, the denominator for the publication analysis is the *collaboration* rather than the individual grant number (e.g., since some collaborations extend to multiple awards, the 482 FIRCA awards result in 462 collaborations, and the 74 AIDS-FIRCA awards include 72 separate collaborations) .

for them to have been included in the survey results; had the survey response rate been closer to 100% the number and fraction of publications in "non-Western" peer reviewed journals likely would have been higher.

- ***Pre-existing collaborations were more likely to be productive, and considerably more productive, than were new collaborations.*** Figures 4.5A and 4.5B further subdivide the FIRCAs only by whether or not they had pre-existing collaborations. Figure 4.4A addresses the likelihood of success; the figure shows that with the exception of one year of awards, new collaborations were substantially less likely to co-publish during and after the award period than were pre-existing collaborations. Figure 4.4B examines the strength of collaboration, looking at the average number of post-award collaborative publications *per collaboration that led to one or more publications.* The figure shows that, especially for older collaborations, of those collaborations that continued to publish together after award, the productivity of the pre-existing collaborations was considerably higher.

Figure 4.4A

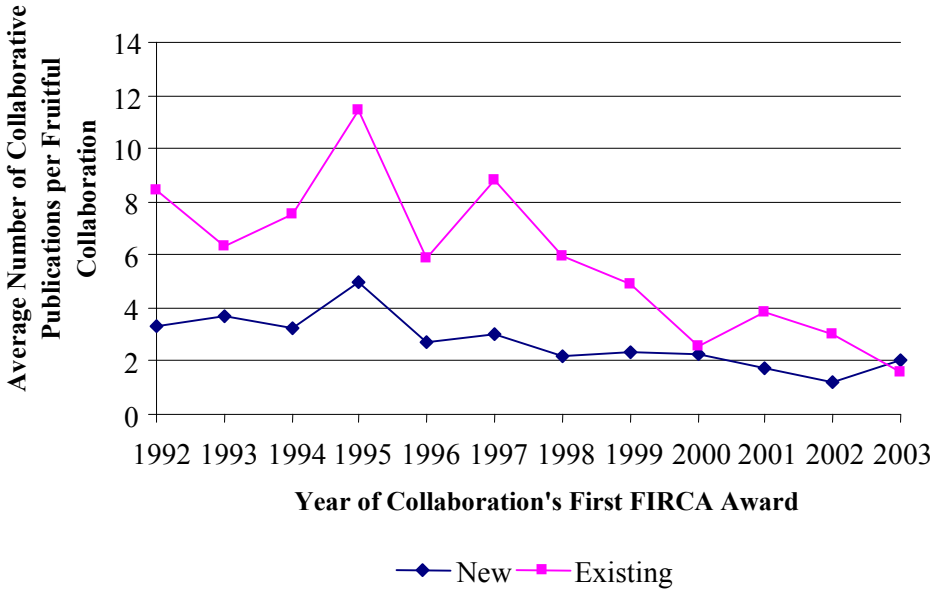
Publication Data: Percentage of FIRCA Collaborations Resulting in Publications, by Year of Collaboration's First FIRCA Award and Existence of pre-FIRCA Collaborative Publications



Source: Abt Associates Inc. analysis of collected publications

Figure 4.4B

Publication Data: Number of Collaborative Publications per Collaboration Resulting in Publications, by Year of Collaboration's First FIRCA Award and Existence of pre-FIRCA Collaborative Publications



Source: Abt Associates Inc. analysis of collected publications

- ***There is a correlation between the number of FIRCA awards received in a given region and the productivity of those collaborations.*** Table 4.6 shows the cross-tabulation of post-FIRCA publications by region of the world. The table suggests that there is a strong correlation between the number of FIRCA awards in a region and metrics of collaboration strength. While the percentage of collaborations resulting in one or more publications remains roughly similar among the regions (65% for Africa to 74% for the Americas – there was only one FIRCA award in Western Europe), regions with more FIRCAs (Eastern Europe, Americas) had both a larger number of publications per award and a higher percentage of "super-collaborators" (collaborations with ten or more publications) than did the Asian and African FIRCA recipients. The results of the FIRCAs from the former Soviet states lay between the other groups. Collaborations from the FSU were more highly skewed in their results. They were less likely than average to result in publication, as the percentage of collaborations with one or more publications and publications per collaboration is below the overall average. The percentage of high-publishing collaborations, however, is relatively high.
- ***There is also both a correlation between the number of FIRCA awards received by countries in each World Bank development category and the productivity of those collaborations, and some relationship between development category and productivity per se.*** Table 4.7 shows the cross-tabulation of post-FIRCA publications by World Bank development category (e.g., "High Income", "Upper middle income", "Lower middle income," "Low income"). The table suggests that there is a correlation between the number

of FIRCA awards in a region and metrics of collaboration strength. At the same time, one might have hypothesized a relationship between collaboration strength and national income – that collaborations in high-income countries were more productive than in low-income countries. This hypothesis is partially borne out by Table 4.7. Comparing the upper-middle-income, lower-middle-income, and low-income countries, collaboration strength (as measured by publications per collaboration and presence of "super-collaborators") does relate to development category; that relationship is less clear for the percentage of collaborations resulting in one or more publications ("fruitful" collaborations)– there is virtually no difference between the upper-middle-income (72% co-publish) and the lower-middle-income (74% co-publish) – though a substantial difference between them and low-income countries (59% co-publish). An intriguing finding, though, is that collaborators from high-income countries (e.g., Slovenia, Israel, Taiwan) fared poorly relative to the lower-middle-income-country and even the low-income-country researchers.

Table 4.6

Publication Data: Collaborative Publications During/After Award by Region (FIRCA only)

Metric	Africa	Americas	Asia	Eastern Europe	Former Soviet Union	Western Europe	Grand Total
Collaborations by region	17	135	59	134	116	1	462
Percentage of collaborations with one or more collaborative publications post-award	65%	74%	71%	75%	68%	100%	72%
Number of collaborative publications	40	482	175	525	333	2	1557
Collaborative publications per *collaboration*	2.35	3.57	2.97	3.91	2.87	2.00	3.37
Number of collaborations with 10+ collaborative publications post-award ("super-collaborators")	0	10	3	18	9	0	40
% of collaborations "super-collaborators"	0%	7%	5%	13%	8%	0%	9%

Source: Abt Associates Inc. analysis of collected publications

Table 4.7

Publication Data: Collaborative Publications During/After Award by Development Category (FIRCA only)

Metric	High Income	Upper middle income	Lower middle income	Low income	Grand Total
Collaborations by development level	23	221	189	29	462
Percentage of collaborations with one or more collaborative publications post-award	70%	72%	74%	59%	72%
Number of collaborative publications	43	812	626	76	1557
Collaborative publications per *collaboration*	1.87	3.67	3.31	2.62	3.37
Number of "super-collaborators"	0	24	15	1	40
Percentage of collaborations that are "super-collaborators"	0%	11%	8%	3%	9%

Source: Abt Associates Inc. analysis of collected publications

4.4 Collaboration After the FIRCA Award Period

4.4.1 Applying for Future Research Funding After Award Close

Both the USPIs and the IRCs were asked whether they intended to pursue additional funding for the research undertaken during the grant.[28] Researchers who attempt to renew their awards are highly likely to propose new projects as the direction of their research changes to reflect the project's results. One example identified during the site visits is a researcher who uses the leech as a model to understand the nervous system. She completed an initial project regarding serotonin function and submitted a new application to examine non-spiking motor neurons. Table 4.8 shows that the USPI and IRC survey responses come from somewhat different groups. The IRCs who responded to the survey were more likely to reply that they intended to seek renewals than did the USPIs.

One commonality between the two groups was that many (25-30%) of the collaborators intended to apply for funding from another source after the close of the project. A second commonality was the difference between FIRCA and AIDS-FIRCA survey respondents; AIDS-FIRCA collaborators were quite likely to apply for funding outside of the FIRCA program (54% for AIDS-FIRCA IRCs and 42% for AIDS-FIRCA USPIs) but unlikely to apply for FIRCA renewals. This finding fits with FIC's decision described in Chapter One to terminate AIDS-FIRCA, in part because application and renewal rates were not comparable to the primary FIRCA program.

[28] Discussion of receipt of funding by IRCs (which includes funding received in collaboration with USPIs, funding received in collaboration with other US-based researchers, or funding received independently), is discussed in Section 5.2.4.

Table 4.8

USPI and IRC Surveys: Reporting of Applying for Future Research Funding

Response	FIRCA				AIDS-FIRCA			
	USPI (#)	USPI (%)	IRC (#)	IRC (%)	USPI (#)	USPI (%)	IRC (#)	IRC (%)
NO, I did not apply for any follow-up funding	111	49%	55	23%	16	52%	10	36%
YES, I applied for a FIRCA renewal (with or without my collaborator)	58	26%	79	33%	2	6%	1	4%
YES, I applied for other follow-up funding	55	24%	73	31%	13	42%	15	54%
My grant is ongoing	3	1%	58	24%	0	0%	3	11%

Source: Abt Associates Inc. analysis of USPI survey question 3.4 and IRC survey question 9.

Note: 19 USPIs (15 FIRCA, 4 AIDS-FIRCA) and 13 IRCs (11 FIRCA, 2 AIDS-FIRCA) did not respond to this question

4.4.2 Remaining in Contact After Award Close

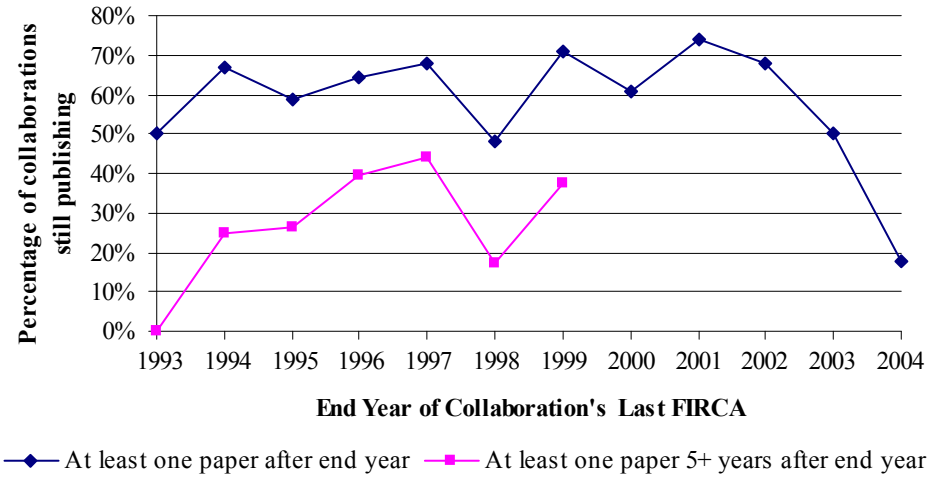
Both the USPIs and IRCs were asked whether they would remain in contact after award close. In the USPI survey (question 3.4C), only those USPIs who did not receive follow-up funding with their IRC (or whose grants were still ongoing) were asked whether they remained in contact with their IRC – as all others were assumed still to be in contact. As shown in detail in Appendix D, more than ninety percent of the pairs who are no longer formally working together have remained in contact. The IRC survey asked all of the collaborators about their collaboration status, and as shown in Appendix E nearly ninety percent of those whose grants have concluded (141 of 163 or 87% of FIRCA IRCs whose grants are ongoing, 22 of 26 or 85% of AIDS-FIRCA IRCs) remain in contact. This finding suggests that FIRCA has established ongoing personal ties, even if those ties may not be currently realized through co-funding or ongoing publications.

4.4.3 Co-Publishing After Award Close

A final indicator of the effectiveness of FIRCA in creating new collaborations is to examine whether collaborations are continuing even after award close. Of the FIRCA 462 *collaborations*, 326 had ended by the end of 2004, while 136 are ongoing. One metric of success is whether the collaboration is still actively co-publishing N years after award completion. Figure 4.5 shows the percentage of collaborations still active – the top line shows the percentage that published any papers after collaborations formally ended, while the bottom line shows the percentage that published at least one paper five or more years after collaboration end. The figure shows that approximately 60% of collaborations remain active; the sharp drop in 2004 is unsurprising, as 2005 publications are still arriving. The figure also shows that 31% of all collaborations that ended five or more years ago continued to publish collaboratively after that point.

Figure 4.5

Publication Data: Percentage of FIRCA Collaborations Continuing to Co-publish, by End Year of Last FIRCA Award (FIRCA only)



Source: Abt Associates Inc. analysis of collected publications

4.5 Collaboration and Publication Quality

As discussed in Chapter One, beginning with the 2002 FIRCA RFA the program objective of promoting collaboration explicitly includes "merit." "High-quality" research, however, can have multiple meanings, including:

- Publications attributable to the program are cited often (total number of citations as metric).
- Each publication attributable to the program is cited often (average number of citations per paper or average number of citations per paper-year as metric)
- Publications are in high-quality or high-impact journals (expected citations or expected citations per paper as metric)
- Publications are cited more often than those appearing in the same journal and issue (ratio of average to expected citations per paper as metric)

Bibliometric data can be applied at the level of individual publications, individual collaborations, or the entire body of work produced by FIRCA or AIDS-FIRCA.

Each indicator provides varying insights into the "quality" of the research performed by grantees. The first indicator provides an indication of the overall quality of a body of work – rewarding collaborations that produce both a large quantity of papers and a high citation rate for each; collaborations with a large number of overall citations are likely having a strong overall influence on their respective fields. The second indicator provides an indication of the quality of each individual publication, rather than of an entire body of work. The third indicator locates the journal in which the paper appears, rather than the citations of the paper itself, as a source of quality; publications appearing in high-impact journals such as *Science* presumably were considered of sufficiently high

quality at the time by the editors of those journals so that they were accepted for publication, whether or not the future direction of scientific research was such that they articles themselves were cited often. The final indicator, unlike the other three, is a relative quality indicator, expressing whether research attributable to FIRCA and AIDS-FIRCA collaborations is of higher (or lower) quality than that of the body of biomedical research.

One caution to be highlighted at the outset of this section is that bibliometric data are not available for all FIRCA and AIDS-FIRCA publications, as discussed above in section 4.3.4. Two sets of publications were not included in this analysis. The first set of excluded publications is those in non-biomedical journals (e.g., chemistry and physics journals such as *Journal of Physical Chemistry* and *Physical Review Letters*) that are indexed through the Web of Knowledge (provided by Thomson/ISI) but were not included in the bibliometric analysis because they were identified during the survey or could not be matched to records in the Thomson/ISI database). 576 publications (15% of the 3820 total publications collected) were not included for this reason. The second set is those in regional and international journals that are not indexed by Thomson/ISI in the Web of Knowledge. Bibliometric data for 541 publications (14% of the total publications collected) could not be included for this reason. Nevertheless, citations were identified for more than 2,700 total publications, including for nearly 1,500 publications attributable to FIRCA and AIDS-FIRCA. The size of the database (which accounts for more than 70% of the total publications collected) suggests that it is sufficient for conclusions to be drawn with some confidence regarding the quality of the science produced by the FIRCA program.

4.5.1 FIRCA and AIDS-FIRCA Publication Quality: Actual Citations

As discussed in detail in Chapter Two, bibliometric data were available for 1,226 FIRCA and 213 AIDS-FIRCA publications that were published *after* grant award. Table 4.9 shows some summary data for both the FIRCA and AIDS-FIRCA grantees, including both the "highest-cited" grantees (See Appendix G for listing of papers of "highest-cited" grantees) and program totals. The table suggests five tentative findings:

- ***There was no clear distinction between FIRCA and AIDS-FIRCA grantees regarding the overall mass of citations.*** On the one hand, nine of the "top ten" cited collaborations were FIRCA grantees, with one (collaboration H) an AIDS-FIRCA grantee. At the same time, the average citations per paper was the same for the AIDS-FIRCA publications and for the FIRCA publications (15.8 per paper for AIDS-FIRCA, 15.9 for FIRCA).
- ***Several of the highest-cited collaborations are those where the collaborations have received more than one FIRCA award.*** Four of the "top ten" cited collaborations had received either a new FIRCA award or an award renewal. This is to be expected, as reviewers specifically look for evidence of successful collaboration during the renewal review process (see Section 6.4.7).[29]
- ***It is still too early to assess the quality of the later cohorts of FIRCA and AIDS-FIRCA grantees.*** Eight of the top ten and all of the eight highest-cited collaborations began by 1995. This finding is unsurprising, as there is a lag between collaboration and publication, and

[29] Average citations per paper also rose slightly as the number of awards increased (data not shown).

another between publication and citation; the table suggests that the full impact of a collaboration on the biomedical literature may not be felt for approximately a full decade.

- ***There is a positive correlation between the mass of citations attributable to collaborations and the quality of individual publications (as measured by citations per publication).*** Table 4.9 shows that there is a positive correlation between the total number of citations associated with the "top-ten" collaborations and the average number of citations per paper (correlation coefficient = 0.56). While most of the "top-ten" both published twelve or more papers and had a high citation count, Collaborations A, B, and C are distinct in that that they achieved the "top-ten" list with only five or six highly-cited papers.

Table 4.9

Publication Data: FIRCA and AIDS-FIRCA Publication Quality as Measured by Actual Citations

Collaboration	FIRCA or AIDS-FIRCA	IRC Country	Year of First FIRCA Award	Number of Awards/ Renewals	Number of Collaborative Publications During/After Award with Bibliometric Data	Total Number of Citations	Citations per Paper
A	FIRCA	Russia	1998	1/0	5	382	76.4
B	AIDS-FIRCA	Switzerland	1995	1/0	6	413	68.8
C	FIRCA	South Africa	1996	1/0	6	396	66
D	FIRCA	Czech Republic	1992	2/0	13	710	54.6
E	FIRCA	Uruguay	1995	3/0	18	818	45.4
F	FIRCA	Argentina	1995	2/1	41	1413	34.5
G	FIRCA	Hungary	1993	1/0	19	572	30.1
H	FIRCA	Russia	1994	1/0	18	460	25.6
I	FIRCA	Brazil	1994	1/1	21	527	25.1
J	FIRCA	Poland	1995	1/0	35	796	22.7
Total: 10 Collaborations					**182**	**6487**	**35.6**
Publications of All FIRCA Collaborations:					**1226**	**19463**	**15.9**
Publications of All AIDS-FIRCA Collaborations:					**213**	**3365**	**15.8**

Source: Abt Associates Inc. analysis of Thomson/ISI citation information

Note: Table includes only those publications for which Thomson/ISI citation information could be collected (1,226 of 1,557) FIRCA collaborative publications and 213 of 240 AIDS-FIRCA collaborative publications

4.5.2 FIRCA and AIDS-FIRCA Publication Quality: Highly-Cited Journals

Another measure of publication quality is the quality of the journals in which publications attributable to FIRCA and AIDS-FIRCA are cited, based on the citation patterns of the articles that appear in them. Publication in a "high-quality" journal is a measure of peer reviewers' assessment of the quality of the science *at the time of publication*; citations, on the other hand, are a measure of perceived quality *after publication.* Thomson/ISI provided, in addition to the actual number of

citations of each publication, the average number of citations of the other articles appearing in the same journal and volume (the "expected citation" rate). Table 4.10A shows the ten "highest-impact" journals based on expected citations, and the number of publications subsequent to grant award published in each (See Appendix H for listing of papers). Table 4.10B shows the journals with the largest number of attributable publications. One publication (*Proceedings of the National Academy of Sciences)* appears on both lists, although Table 4.10B shows that most of the journals in which publication is frequent are relatively high-impact publications. The implication is that FIRCA-supported and AIDS-FIRCA-supported investigators have published some papers in very high-impact journals, as well as many papers in journals that are strong within biomedical fields.

Table 4.10A –Publication Data: FIRCA and AIDS-FIRCA Publication Quality as Measured by Highest-Impact Journals

	"Highest-impact" Journals			
Journal	**Number of papers during/after**	**Number of papers with bibliometric data during/after**	**Expected citations/paper**	**Actual citations/paper**
Science	8	7	102.06	87.29
J Exp Med	3	3	92.99	85.33
Neuron.	5	5	87.25	77.60
J Cell Biol	6	4	84.01	57.50
Structure	4	3	58.47	93.00
EMBO J	5	3	56.27	50.67
Nature	11	8	55.97	95.38
Cancer Res	16	13	46.79	28.08
N Engl J Med	3	3	43.73	24.33
Proc Natl Acad Sci USA	57	43	36.94	33.21
All Journals (FIRCA plus AIDS-FIRCA)	**2291**	**1439**	**16.00**	**15.87**

Source: Abt Associates Inc. analysis of Thomson/ISI bibliometric information
Note: "High-impact" journals did not include those with only one or two publications for which bibliometric data were available

Table 4.10B –Publication Data: FIRCA and AIDS-FIRCA Publication Quality as Measured by Highest-Impact Journals

Journals with Most Publications				
Journal	**Number of papers during/after**	**Number of papers with bibliometric data during/after**	**Expected citations/paper**	**Actual citations/paper**
J Biol Chem	127	96	20.80	21.80
Biochemistry	66	58	18.27	16.57
Proc Natl Acad Sci USA	57	43	36.94	33.21
J Virol	29	19	16.13	22.21
J Immunol	28	27	22.61	14.78
Am J Trop Med Hyg	27	22	5.77	5.91
Biophys J	26	21	16.45	17.24
Proteins	26	22	15.23	15.91
FEBS Lett	25	17	18.15	17.47
J Infect Dis	24	20	14.94	14.25
All Journals (FIRCA plus AIDS-FIRCA)	**2291**	**1439**	**16.00**	**15.87**

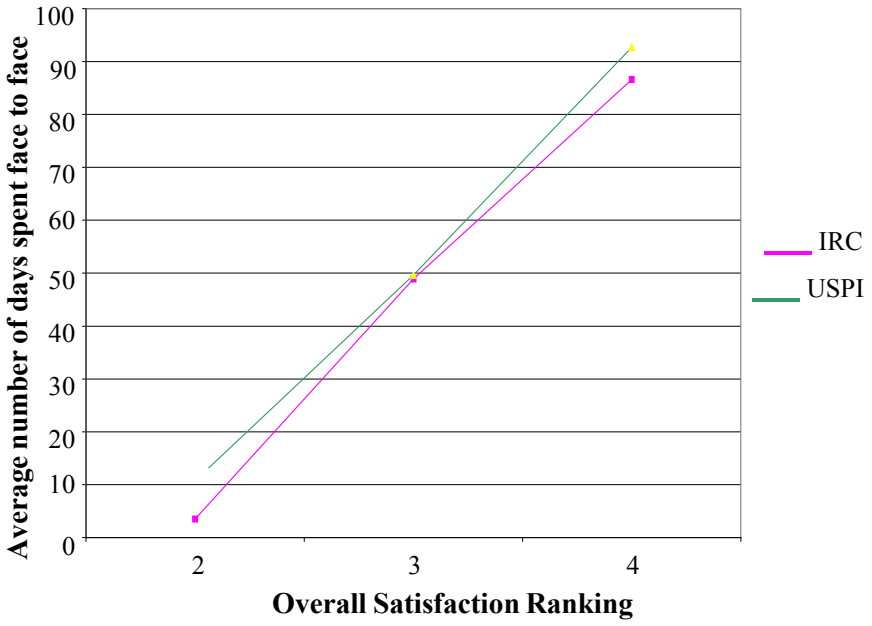
Source: Abt Associates Inc. analysis of Thomson/ISI bibliometric information
Note: "High-impact" journals did not include those with only one or two publications for which bibliometric data were available

4.6 Collaboration and Overall Program Satisfaction

Asked to evaluate the variety of factors contributed to the overall success of their projects, the vast majority of FIRCA and AIDS-FIRCA USPI survey respondents indicated that a "good collaborative relationship between me and my IRC" was important (90% of FIRCA USPI survey respondents and 85% of AIDS-FIRCA USPI survey respondents; USPI survey question 4.4). Higher levels of overall satisfaction with the program as reported by FIRCA IRC and USPI survey respondents—a measure that seems likely to be correlated with collaboration quality—tended to be associated with higher total number of days spent face to face with the USPI, as shown in Figure 4.6.

Figure 4.6

USPI and IRC Surveys: Average Number of Days Spent Face-to-Face as Reported by FIRCA IRCs and USPIs, by Ranking of Overall Satisfaction with the Program



Source: Abt Associates Inc. analysis of USPI and IRC survey results.
Note: Non-integer responses were dropped from the analysis due to low frequency, as were rankings of 1 (two for the USPI survey).

While it would be improper to conclude from this apparent correlation that time spent face to face necessarily contributed to increased overall satisfaction with the program, let alone to higher quality collaborations, anecdotal evidence suggests that it was the case for some collaborators that lack of interaction contributed to ineffective collaboration. One IRC survey respondent from Costa Rica suggested that the best way to improve the program would be to require more interaction between the USPI and the IRC, preferably in the IRC country. The site visit team encountered only three cases in which the IRC reported difficulty corresponding with the USPI (one in Hungary, one in Chile, and one in Argentina); in each of these cases the IRCs believed that poor communication resulted in an inability to truly benefit from the program. As might be expected from a program intended to facilitate collaboration between US and developing-country scientists, stronger interactions among participants were related to perceptions of project success and program satisfaction.

5. Sustainable Research Capacity

5.1 Chapter Structure

Chapter Five discusses the avenues by which the FIRCA program has helped to "build research capabilities at the foreign site and to foster further sustained and productive research and research collaborations at the foreign site." This chapter examines research capacity development at the following five levels:

- Effect on the International Research Collaborators Themselves
- "Second-Generation" Effects: IRCs' Students and Postdoctoral Fellows
- Effect on the IRCs' Institutions
- Sustainability of Effects on IRC Careers After FIRCA Support Period Concluded
- Broader Impacts: Public Policy and Government Support for Research

5.2 Effect on the International Research Collaborators Themselves

One of the most substantial capacity building effects of the program is at the level of the individual investigator. FIRCA helps to foster highly-skilled scientists and often allows them to pursue career paths that would otherwise be impossible. Through the purchase of equipment and consumable supplies, IRCs gain valuable resources that are often not available through other local and international grant programs. The program also fills a unique capacity-building niche in the allowance for travel funding and salary supplementation. For researchers from institutions with low pre-existing capacity, the program provides an avenue through which they can establish themselves as credible internationally, capable of performing world-class research. Similarly, in very hierarchical systems, a FIRCA provides researchers the freedom to pursue their individual interests without constraint. The career benefits of the program are both immediate in terms of prestige and long lasting in terms of international credibility-building. In both the IRC survey and the site visits, there was a general accord that FIRCA grants allowed the IRCs to conduct work "that would otherwise not be possible."

5.2.1 Use of Program Funds by IRCs

As reported in the IRC survey, the majority of program funding was used for consumable supplies, small equipment, travel, and personnel and salary supplementation (Figure 5.1A). On average, investigators spent the majority of their funding on consumable materials (47% of FIRCA funds and 53% of AIDS-FIRCA funds). While FIRCA and AIDS-FIRCA researchers had roughly the same distribution of average annual expenditures, there was some divergence, especially with regards to travel and small equipment purchases. Namely, FIRCA awardees spent on average less than one quarter (23% of their total annual funding) on equipment purchases and approximately one-third (35%) on travel, while AIDS-FIRCA researchers spent five percent on equipment and nearly one-fifth (18%) on travel. Figure 5.1B, which considers the percentage of IRCs who spent some funds on each category, shows the distinction between FIRCA and AIDS-FIRCA regarding the use of funds for equipment even more sharply. Figure 5.1B suggests that while roughly the same fraction of FIRCA and AIDS-FIRCA IRCs spent some of their funds toward salary, travel, consumables, and "other" supplies, three-quarters of the FIRCA IRCs (77%) used funds toward equipment while only one-third

of AIDS-FIRCA IRCs (33%) spent funds on equipment. Several partial explanations contribute to this difference, including:

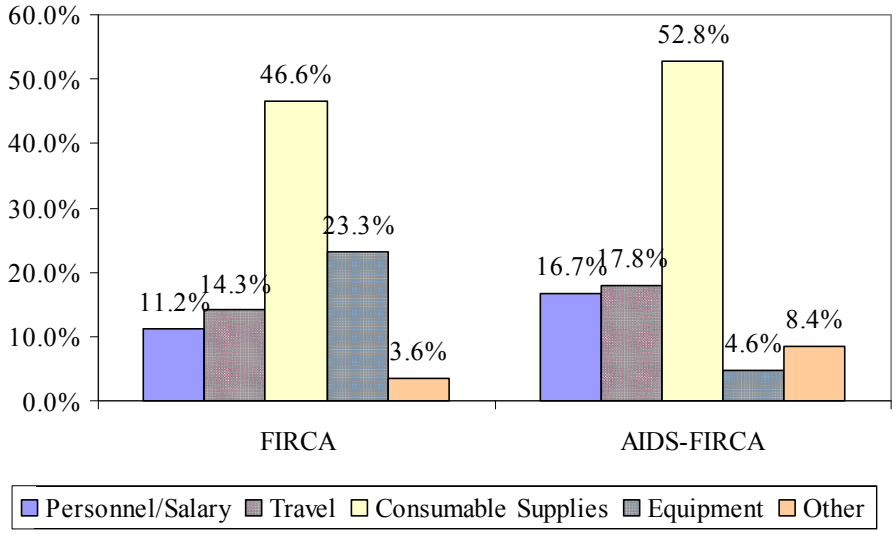
- As some AIDS-FIRCA researchers are from developed countries (Table 3.2) with already-developed research capacity, they likely would not use funds for equipment to the same extent as would researchers from developing countries.
- As AIDS-FIRCA researchers are more likely to have been involved with Microbiology and Infectious Disease projects (Table 3.4B), they may not have required as much large-scale equipment as might other researchers.

These findings from the IRC survey are consistent with the hypothesis drawn from the site visits: program funds do in fact benefit IRCs not only for travel and consumable material purchases, but also in small to mid-sized equipment purchases and salary supplementation. During the site visits it was consistently observed that FIRCA funds were allocated to the purchase of mid-size pieces of equipment ranging from electrophysiology setups and HPLC (High Pressure Liquid Chromatography) machines, to small durable equipment such as pipettes, balances, and vortex machines. Several IRCs doing electrophysiological research used FIRCA funds to purchase patch-clamp setups for their lab, a relatively inexpensive but crucial piece of equipment. Several researchers used the survey to comment about the unique nature of FIRCA and AIDS-FIRCA in comparison to other grant programs. A Hungarian IRC noted on the survey that "A major difference between FIRCA and currently available Hungarian funds is that FIRCA gives a considerable support [sic] for buying instruments/equipments that make a real difference in the efficacy of research."

Many IRCs found the program extremely useful in receiving not only reagents that were difficult and expensive to obtain in their countries but also in receiving specialized materials donated from their USPIs' laboratories. Several investigators mentioned during the site visits that their collaborations advanced their research substantially because their USPIs provided access to specialized materials that would have taken them months or years to produce themselves. One Chilean IRC received genetically modified *Drosophila* samples from her USPI that otherwise would have taken years to engineer on her own.

Figure 5.1A

IRC Survey: Average Allocation of Funding by IRCs

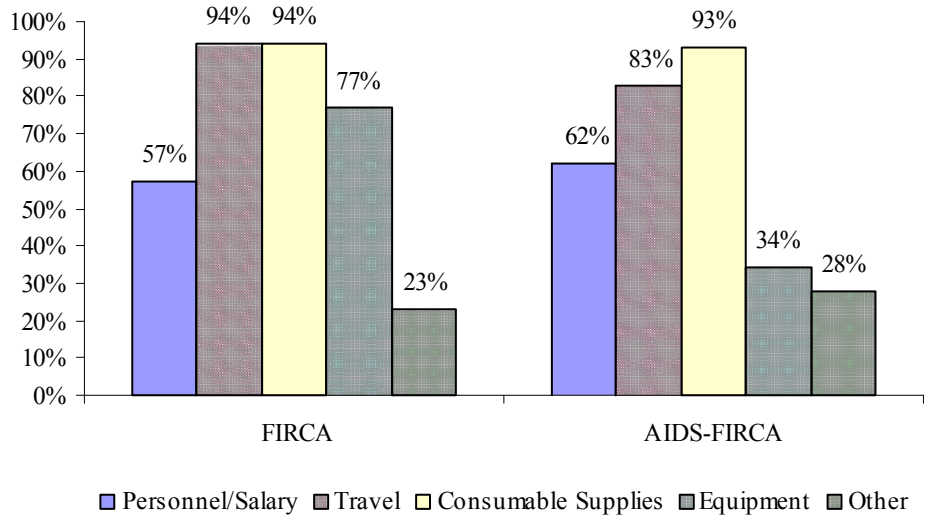


Source: Abt Associates Inc. analysis of IRC survey question 6a

Note: 18 FIRCA IRCs and 1 AIDS-FIRCA IRC did not respond to the question

Figure 5.1B

IRC Survey: Percentage of IRCs Allocating Some Funds to:



Source: Abt Associates Inc. analysis of IRC survey question 6a

Note: 18 FIRCA IRCs and 1 AIDS-FIRCA IRC did not respond to the question

Not only is funding instrumental in the purchase of small equipment and consumable materials, for some researchers, the funding allowed IRCs to establish their own labs at the onset of their research careers. Though this was not an explicit survey question, it was freely commented on by several South American researchers and was also observed during the site visits. In one lab visited, everything from the glassware and reagents, to the small and medium pieces of equipment was purchased exclusively using FIRCA funds. One IRC from Argentina commented that, "because of FIRCA, I was able to start my own lab."

"The impact on my research was that I gained equipment that I would normally not have had the funding for. Research funding is very limited in South Africa and gaining capital equipment was a real benefit. I could set up a muscle research lab and was able to use the equipment also to support other work in our department." – FIRCA IRC (South Africa)

Responses from the USPI survey indicate that if there was more funding available, it would be best used for salary support for additional personnel (suggested by 68% of FIRCA USPIs, 78% of AIDS-FIRCA USPIs) and additional supplies (suggested by 62% of FIRCA USPIs, 63% of AIDS-FIRCA USPIs). Additional suggestions included additional funding for equipment, salaries, dissemination efforts, and networking efforts (Table 5.1). Though this question was not asked on the IRC survey due to the condensed nature of the questions, several site visitees mentioned that salary support for graduate students was crucial, as it is difficult to find local support for students.

Table 5.1
IRC Survey: Proposed Uses of Additional Funding if Available

Proposed Uses of Additional Funding	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Additional personnel	139	68%	21	78%
Additional supplies	128	62%	17	63%
Additional equipment	103	50%	12	44%
More travel for USPI and IRC	50	24%	6	22%
Higher salaries for existing personnel	45	22%	2	7%
Other	28	14%	5	19%
publications)	25	12%	6	22%
collaborations	22	11%	2	7%
funding (e.g., lobbying, writing grants)	17	8%	1	4%

Source: Abt Associates Inc. analysis of USPI survey question 4.5C

5.2.2 Techniques Developed and Learned by IRCs

Both in the IRC survey and in the site visits, the IRCs felt that an important facet of the program's capacity-building successes lay in either the development of new techniques in concert with their USPIs, or learning techniques from the USPIs that they could apply in their institutions. New

techniques were *learned* by 54% of the FIRCA IRCs and 63% of AIDS-FIRCA IRCs, while new techniques or research tools were *developed* by 60% of the FIRCA IRCs and 50% of AIDS-FIRCA IRCs. Based on site visit findings, it was hypothesized that the development and learning of new techniques was related to the career stage of the foreign investigator. However, based on the survey data, there was no significant difference between the likelihood of senior or junior researchers to develop or learn new techniques of research tools (Table 5.2).

Table 5.2
IRC Survey: Cross-tabulation of Self-Reported Technique Learning and Development by Seniority of IRC

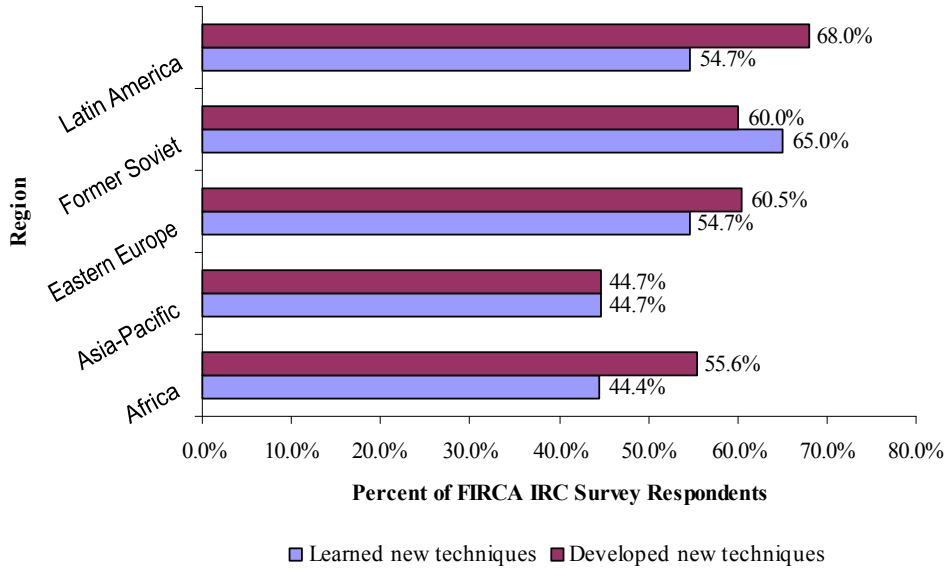
Seniority	Learned new techniques	Developed new techniques
Junior	56%	60%
Senior	53%	60%
Grand Total	**54%**	**60%**

Source: Abt Associates Inc. analysis of IRC survey question 11

Note: Seniority was coded based on the number of years since highest degree at time FIRCA was awarded ("junior" < 10 years < "senior")

While there was no significant difference between senior and junior researchers in their propensity to learn or develop new techniques, the survey data suggests that regional differences exist. Eastern European, Former Soviet Union and Latin American researchers were more likely to report *learning* new techniques than either Asia/Pacific or African researchers. Similarly, the Asian/Pacific FIRCA researchers were the least likely to report *developing* new techniques and the Latin American researchers were the most likely (Figure 5.2). These cross-tabulations suggest trends, but neither of the relationships was significant at the 0.1 level in a Chi Square test. This relationship was not cross-tabulated for the AIDS-FIRCA recipients because of the small sample size.

Figure 5.2
IRC Survey: Cross-tabulation of Self-Reported Technique Learning and Development by Region



Source: Abt Associates Inc. analysis of IRC survey question 11

"The FIRCA program allowed me to learn more molecular diagnostic techniques, expand my research work and strengthen my teaching ability." – AIDS-FIRCA IRC (Thailand)

The techniques learned and developed by the IRCs were broad. During the site visits, multiple stories were told regarding the opportunities presented by FIRCA. One FIRCA enabled an IRC to bring the first tissue culture methodology to her university. The techniques learned from her USPI are now used across multiple departments and have been incorporated as a standard methodology. Additionally, an entire new cell line was brought to her university by the USPI. Another FIRCA IRC reported that he developed a new line of research exploring the trafficking of vesicles in glial cells under normal and pathological conditions during his collaboration. A FIRCA IRC noted in the survey that "the long period of the FIRCA program gives the possibility to learn new experimental methods and procedures and to use new facilities for success in research."

"In 2001 I received the scientific title of the Professor of Chemistry and was recently promoted to a full professor at my home institution, because of my scientific achievements which were, in a great part, made possible owing to FIRCA." – FIRCA IRC (Poland)

5.2.3 Effect of Award on IRCs' Careers: Survey Data

Perhaps the most cited advantage of the program for the FIRCA and AIDS-FIRCA IRCs alike was the positive career building benefits. The large majority of IRCs (79% of FIRCA recipients and 73% of AIDS-FIRCA recipients) indicated that the award improved their ability to conduct high-quality research. The influence on ability to conduct high quality research was roughly equal across all regions; the junior researchers, however, noted a significantly higher benefit than senior researchers (chi square test, df=1, $p<0.1$) (Figure 5.3).

This finding supports the site visit hypothesis that the effect of funding on career progression depends on the career status of the IRC at the time the award is given. Benefits are more concentrated in younger researchers. Regardless of career status, however, the large majority of IRCs who commented on the role of the grant in raising their profile and credibility within their institutions and countries believed that the award played a substantial role:

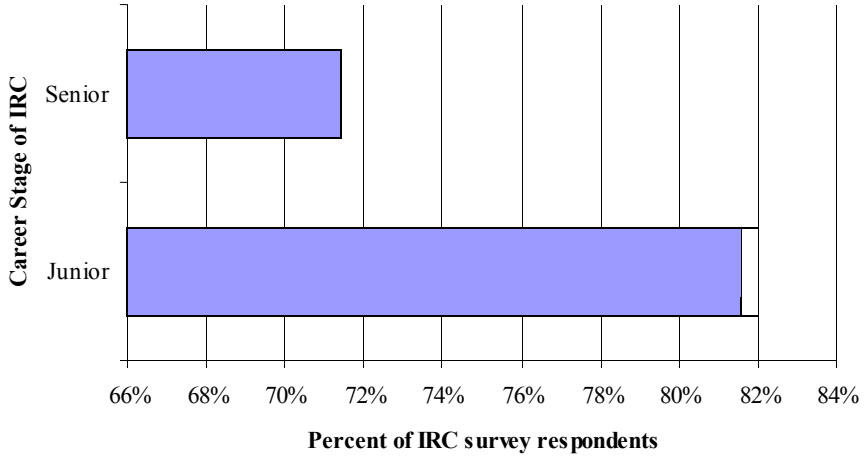
- "It was essential to establish my own lab in Buenos Aires. Without it, it would have been almost impossible to succeed doing basic research in Argentina at those times." (Argentina)
- FIRCA helped "to maintain the research program of a very excellent scientist and helped keep him from joining the brain drain from Russia." (Russia)
- "Both the persons who returned from a [FIRCA] fellowship and Departments having such persons usually have higher credit in my country." (Russia)
- "The FIRCA Award was very important to begin my own laboratory in my country" (China).
- "Being awarded the FIRCA grant represented a major achievement in my institution." (Brazil)
- "FIRCA is a prestigious grant and people in Israel were impressed that I had a NIH-based grant. So, it helped me with scientific credibility." (Brazil/Israel)[30]
- "The FIRCA process is widely known amongst Indian and US scientific groups. A grant award from FIRCA therefore confers a high rating to relatively new research groups like ours." (India)

While the bulk of comments suggested that IRCs felt that receiving the award had positive career benefits, two IRCs expressed a different opinion, stating that their colleagues and governments did not necessarily recognize the award as an important achievement:

- "Unfortunately the Argentine government does not award the same degree of recognition to [FIRCA] grants in comparison to other awards from abroad, which are highly publicized in the media and are therefore attributed more prestige." (Argentina)
- "I would suggest that award lists are published in a much broader way; at least in my country, it would be most beneficial (to awardees) if many other people, particularly in the political-academic environments, knew about the awards." (Mexico)

[30] This particular IRC received funding while in Brazil but relocated to Israel during the grant period.

Figure 5.3
IRC Survey: Self-Reported Improved Ability to Conduct High-Quality Research by Seniority of IRC



Source: Abt Associates Inc. analysis of IRC survey question 11

Note: Difference is significant at p=0.1 (chi square test)

"My experience was wonderful. I had done a fellowship in US and when I returned to Brazil I had very few resources available. The funds obtained from the grant allowed purchasing the main equipments and supplies that allowed us later to apply for a larger program. I am very satisfied with that opportunity." – FIRCA IRC (Brazil)

Seventy percent of FIRCA and 47% of AIDS-FIRCA IRCs reported improvement in their grant writing skills (Appendix E, question 11). The improvement in skills was felt most amongst Eastern European and Former Soviet Union researchers, though there was no significant difference between regions. Thirty-eight percent of FIRCA and 47% of AIDS-FIRCA IRCs report that they received promotions or additional funding that was directly attributable to their experiences. The incidence of promotions and follow-on funding was lowest for African researchers, but this difference may be purely attributable to the low response rate of African FIRCA IRCs (n=9). These career-building effects were mirrored in the site visits.

In Eastern Europe and the Former Soviet Union, where institutes tended to be more hierarchical, site visitees reported that FIRCA was especially important to junior researchers, who could gain credibility within the hierarchy by receiving grants. One researcher explained how FIRCA enabled him to return to his country after finishing a Postdoctoral fellowship in the US. He had a position at his institution upon his return, but without the freedom permitted by the FIRCA grant, his work would have been limited to the topic of the senior researcher in his department.

In South America, where research generally tends to be more democratic (although one exception reported during the site visits is that in Argentina salary is determined by one's rank within the national research council CONICET, which does remain heavily hierarchical), site visitees reported that FIRCA was more often useful to younger researchers as a means for establishing laboratories, attracting students, and giving them the incentive to return home and begin careers. One junior researcher said that without FIRCA, he would not have been able to start his own lab and certainly

would not have been able to continue with the research he started in the United States. His lab was limited in terms of equipment and materials; however everything we saw had been purchased using FIRCA funds. There were several other South American investigators who mentioned that they would have returned in the absence of FIRCA, but likely would have joined a more established laboratory group and pursued research under the direction of a more senior investigator; the FIRCA award made it possible for them to create their own independent laboratories and begin their own lines of research.

> "These awards are highly regarded in other countries and although the amount was small, the prestige associated with being a FIRCA recipient is significant in terms of career development and opportunities for promotion and competitive grant funds in the country of origin." – AIDS-FIRCA IRC (Australia)

More established researchers site visited also benefited from FIRCA in that the grant gave them the opportunity to expand the scope of their research, but they did not see the same extent of direct career advancement benefits that the younger researchers did.

Overall, junior and senior researchers site visited felt that FIRCA enabled them to do work that would otherwise not be possible. Junior researchers tend to use FIRCA more as a re-entry grant or as career-boosting funding, whereas more senior researchers tend to view FIRCA more as a supplement to on-going research. Several investigators mentioned that with the assistance of FIRCA funding, they were able to conduct research that "had never been done before" in their countries. Several site visitees reported that having FIRCA on their resumes helped to secure additional grant support down the road, as well as helping to establish their international reputability.

5.2.4 Effect on IRCs' Careers: Receipt of Other International Funding

IRCs tend to be talented and successful biomedical scientists. While the award on its own can impart substantial career-building effects, it is not the only source of international funds available and often does not act in isolation. The evaluation team collected data on other funding from three additional sources. In addition to the HHMI and CRDF awards discussed in Section 3.1.2, NIH databases were also searched for listings of IRCs, whether as principal investigators or as otherwise named within grant summary statements or abstracts.[31] The comparison of recipients of these funding sources with the database of IRCs suggested four scenarios for IRC career development:

[31] Other NIH funding. CRISP and QVR databases were searched to identify other funding sources at NIH naming the IRCs CRISP was used to identify IRCs who serve as principal investigators on NIH grants; QVR information does not extend through the entire FIRCA period, but can identify other types of collaboration (subawards, co-principal investigators, consultants).

Howard Hughes Medical Institute International Investigators. HHMI has provided 243 awards to biomedical investigators in developing countries, with primary focus on Latin America and Central/Eastern Europe. Award sizes and lengths tend to be longer than FIRCAs.

U.S. Civilian Research and Development Foundation. CRDF has awarded more than two hundred FIRCA-sized awards for collaborative research in biomedical sciences between scientists in the former Soviet Union and U.S. scientists between 1996 and 2004.

Award as sole international funding. The only funding source identified for the IRC was the FIRCA or AIDS-FIRCA award. International funding other than the award was not identified for the large majority of IRCs.

Award precedes other international funding. A second scenario was that the IRC went on to receive additional international funding through one of these sources. In such cases, it becomes possible to attribute (at least partially) the IRC's receipt of additional funding to the experience and visibility gained by be involved with a FIRCA or AIDS-FIRCA.

Award follows other international funding. A third outcome is that IRCs had previously been awarded other international funding or involved in other funded international collaborations. In such cases, award of a FIRCA or AIDS-FIRCA may be the consequence of, rather than the cause of, previous recognition.

IRC moves to a developed country. A final outcome is that IRCs come to the United States or another developed country following the receipt of their award. To the extent to which receiving a FIRCA or AIDS-FIRCA links developing-country scientists with funding and institutions in the United States, it also may become necessary to attribute (at least partially) the IRC's decision to move to the U.S. to the experience and visibility gained by participating in the program.

IRCs Whose Award Precedes Other International Funding

Fifty-five FIRCA and ten AIDS-FIRCA IRCs from developing countries (11% of FIRCA IRCs and 13% of AIDS-FIRCA IRCs) were listed on a total of 138 international awards (NIH and non-NIH) on which they are named the principal investigator or as a project participant. The majority of the awards (57%) were initiated after the date of the IRC's first award. As shown in Table 5.3, the most common type of award is through HHMI, though a substantial number of IRCs also receive funding at NIH institutes, NIAID, FIC, and NIGMS being the most common. This search certainly underestimates the role that FIRCA IRCs are playing on existing NIH grants, as the search only identified those grants listing the IRC's name specifically in the summary statement or CRISP listing.[32]

Comparing the list of ICs on whose awards grantees were named before the FIRCA award against the parent grants of FIRCAs and AIDS-FIRCAs (Table 3.5) reveals both similarities and differences.

- For FIRCA IRCs, while NIAID was the IC whose awards most often listed IRCs before the FIRCA, followed by NIGMS, FIC, and NHLBI, the largest source by far of parent grants was NIGMS followed by NIAID, NHLBI, and others.
- For AIDS-FIRCA grantees, NIAID is both the most prevalent source of parent grants and the most likely listing of prior IRC NIH awards. FIC is a close second in IRC listings. This finding is likely explained by NIAID's predominant role in funding HIV/AIDS related research and FIC's role as a sponsor of international research training

[32] Another reason to believe that this search underestimates the total number of awards received lies in a comparison of question 5 of the IRC survey, "I had other international support" with this list of awards. Of those IRCs who filled out the survey stating that they received other international support, under half (15 of 38 or 39%) appear on this list of awards.

Table 5.3
Awards Data: Additional Awards of FIRCA and AIDS-FIRCA IRCs by Country and Organization/NIH Institute

Country	Number of Awards
Russia	42
Argentina	16
Peru	11
Czech Republic	9
Chile	8
Brazil	5
Mexico	5
Poland	5
Uruguay	4
Bangladesh	3
Cameroon	3
Hungary	3
India	3
South Africa	3
Estonia	2
Panama	2
Slovakia	2
Bolivia	1
Croatia	1
Ecuador	1
Fiji	1
Israel	1
Malawi	1
Philippines	1
Slovak Republic	1
Slovenia	1
Uganda	1
Ukraine	1
Zimbabwe	1
Grand Total	

Organization	FIRCA IRC	AIDS-FIRCA IRC	TOTAL
All NIH ICs	52	16	68
HHMI	53	1	54
CRDF	16	0	16
NIH IC Detail:			
NIAID	12	7	19
FIC	7	6	13
NIGMS	10	0	10
NHLBI	6	1	7
NICHD	3	1	4
NIDDK	4	0	4
NCI	1	1	2
NIAAA	2	0	2
NINDS	2	0	2
NIAMS	2	0	2
NIDA	1	0	1
NIDCR	1	0	1
NCRR	1	0	1
		138 awards	

Source: Abt Associates Inc. analysis of QVR and CRISP data

Site visited-IRCs in all countries except for Russia also reported receiving other international funds. In addition to HHMI International awards and one of the R01 subcontracts shown in Table 5.3, site visitees had received Wellcome Trust grants (5 awards), two Fogarty International Research Fellowships (a discontinued program whose recipients wish it were still available), and two grants

from the Muscular Dystrophy Association (MDA) in the United States. Five investigators – two in Chile, one in the Czech Republic, and two in Uruguay – have proven exceptionally effective in obtaining support in addition to FIRCA; one investigator has received two HHMI awards and a Wellcome Trust; one has received an HHMI, an MDA grant, and a large IFS grant; one received two HHMI awards before receiving a FIRCA; one has received a Wellcome Trust and a Guggenheim fellowship; and one has received three HHMI awards and is a subcontractor to a U.S. institution on an R01 grant (has 20% of grant). As will be discussed below, the laboratories and investigators who have been most successful in building long-term research capacity have acquired other external sources of funds, generally (though not necessarily) with FIRCA being the first of the awards they have received.

Other Awards Precede Funding

Thirty IRCs (5%) received funding as principal investigators (a total of 43 awards) from one of the three sources investigated in detail *prior* to receiving their FIRCA funding. For example, one investigator has received R01 funding from NIH since 1990, and was an IRC on a FIRCA granted in 1992. He further received funding from HHMI in 1997 and 2002; given that the other NIH funding preceded his becoming a FIRCA IRC, it is difficult to attribute his success in winning HHMI awards solely to his FIRCA success. Other IRCs received FIRCA and other international funding simultaneously. One investigator from the Russian Academy of Sciences, for example, received a CRDF award and a FIRCA award nearly simultaneously in 2000; a second CRDF and an HHMI award followed in 2001. For these investigators, the program's "capacity-building" and career development roles are less certain; while the award certainly played some role in advancing the IRCs' careers, that role is confounded by the other funding that they received.

Awardees Who Move to Developed Countries

While the program may be able to claim credit for the achievement of the IRCs who won awards as principal investigators or are listed as collaborators on future NIH awards, twenty-two FIRCA IRCs and one AIDS-FIRCA IRC (4.6% of FIRCA IRCs, 1.4% of AIDS-FIRCA IRCs) were identified by the CRISP and QVR searches as being principal investigators on NIH awards, but listed as being located at U.S. – rather than home-country – institutions. The large majority (17 of 23) of these IRCs are from the former Soviet Union and Eastern Europe, while four were from the Americas and two from Africa. It is possible that additional investigators have moved to the United States though they were not identified through the CRISP and QVR searches. While the reason for these investigators' decisions to relocate was not determined as part of the Outcome Evaluation, possibilities include the desire of international scientists – especially in the Former Soviet Union and Eastern Europe where the post-communist era both led to short-term economic hardship and decreased the barriers to close ties with the United States -- to relocate to the U.S. where science could be pursued more easily, as well as any role that the award may itself have played by creating opportunities for foreign scientists to interact with their U.S. counterparts.

Table 5.4

Awards Data: FIRCA Awardees Who Move to Developed Countries

Home Country of IRC	FIRCA	AIDS-FIRCA
Argentina	3	0
Belarus	1	0
Brazil	1	0
Czech Republic	1	0
Ghana	1	0
Hungary	3	0
Poland	3	0
Romania	1	0
Russia	7	0
Ukraine	1	0
Gambia	0	1
Total	**22**	**1**

Source: Abt Associates Inc. analysis of CRISP and QVR data

There is no indication that receiving a FIRCA or AIDS-FIRCA award necessarily led to the investigators' choosing to come to the United States (or England in the case of one researcher); the IRCs may have intended to leave even before applying to the program.

5.3 "Second-Generation" Effects: IRCs' Students and Postdoctoral Fellows

Like all research awards, FIRCAs are not only beneficial to individual IRCs, but also they impart "second generation" effects to students through training, travel, and education opportunities. The support of new labs not only assists individual researchers, in several instances, it also boosted the morale of entire departments and conferred advantages other researchers and students at the institution.

5.3.1 Use of Program Funds to Train IRCs' Students and Postdoctoral Fellows

The majority of IRCs used funding to train undergraduate, graduate, and post-doctoral students. On average, as Table 5.5 indicates, FIRCA grantees trained more students than AIDS-FIRCA investigators (FIRCA: 3.04 Undergraduates, 2.43 Graduates, 1.2 Post-Docs; AIDS-FIRCA: 0.7 Undergraduates, 1.57 Graduates, 0.44 Post-Docs) (Table 5.5). One IRC from Namibia explained in the survey response that the research benefits were not only personal; additionally, "many young people in Namibia learned new skills in collecting research using a variety of methods." A Brazilian IRC explained that the FIRCA allowed the development of several Master's and Ph.D. Thesis and research projects involving students in his lab as well as other labs in his institution. In comparison to funding from the Brazilian government, the FIRCA funding was quite large and served as the main source of funding in his lab.

Table 5.5
IRC Survey: Average Number of Students Trained by Award in IRCs' Countries

Average Number of Students Trained	FIRCA	AIDS-FIRCA
Undergraduate Students	3.0	0.7
Graduate Students	2.4	1.6
Post-Doctoral Fellows	1.2	0.4

Source: Abt Associates Inc. analysis of IRC survey question 8

This survey finding was supported through the site visits, though exact numbers of students trained could not be calculated as not all researchers visited could quantify the number of students that had been trained through the award.[33] However, the majority of IRCs interviewed sent one or more students abroad using FIRCA funds. In many cases students were the primary carriers and diffusers of new techniques or methods from the USPIs' laboratories to IRC laboratories and institutions – a key capacity-building effect. Table 5.6 shows that there was a marked regional difference in sending students abroad; more than half of South American IRCs site visited sent their students to the United States, generally to learn techniques in the USPI's laboratory, but also in several cases to attend conferences or seminars – such as the Woods Hole/Marine Biology Laboratory seminar series. While the IRC survey reported (as discussed in Chapter Six) that travel and visa issues have been more difficult for Eastern European researchers relative to South American researchers, the survey findings did not suggest that visa difficulties accounted for the difference in travel to the United States. It appears that socio-cultural factors (e.g., South America has younger investigators and less hierarchical systems of research relative to Eastern Europe, the economic burden of travel on South American investigators may be lower relative to Eastern European researchers) may be more likely explanations.

Table 5.6
Site Visits: Use of FIRCA Funding by Site Visitees to Send Students to the United States

Country	IRC Sent Students/Postdocs Abroad	IRC Did Not Send Students/Postdocs Abroad	N/A
Argentina	4	4	0
Chile	5	2	1
Uruguay	5	3	0
Czech Republic	3	8	0
Hungary	2	7	0
Russia	3	3	1
Slovak Republic	2	3	0

Source: Abt Associates Inc. analysis of IRC site visit data

[33] While the IRC survey did not specifically ask how many of the students trained were trained in the USPIs' laboratories, sixteen FIRCA IRCs and one AIDS-FIRCA IRC mentioned in free responses that they had sent students or postdoctoral fellows to be trained in the United States.

5.3.2 Post-award Second-generation Effects

Another second-generation effect of the FIRCA award observed during the site visits was the dispatch of students or postdoctoral fellows to the United States (generally to the laboratories of the USPIs, but not in all cases) to continue their studies. There was a slight difference between the South American IRCs, eleven of the twenty-two who sent students or post-docs, as compared with nine of the thirty-two Eastern European IRCs. Although information was not available in all cases, generally only one student per FIRCA has been sent abroad. There are, however, exceptions to this observation. A large-scale research network has been formed between the University of Alabama, Birmingham and the University of the Republic in Uruguay that has sent between ten and fifteen students overseas for postdoctoral or Ph.D. training. Additionally, students from the University of Alabama have also been sent to Uruguay to receive training. This network is unusual, but has proven highly effective in terms of capacity building at the IRC institution and in terms of benefiting both institutions. A smaller network also has been set up between the University of Chile and the University of Pennsylvania. The IRC has a long-standing relation with his USPI that has resulted in three students going to the University of Pennsylvania both on FIRCA and other FIC funds. Several U.S. students have also traveled to Chile for training.

As would be expected, IRCs site visited who sent their students abroad as part of their FIRCA grants are more likely to send students to U.S. institutions for further degree or non-degree training, but there is not a perfect correlation between the two (data not shown).

5.4 Effect on the IRCs' Institutions

In addition to effects on the careers of the IRCs themselves and their students, the evaluation considered the extent to which the program affected the institutions in which those investigators work more broadly. Categories of broader institutional outcomes identified included:

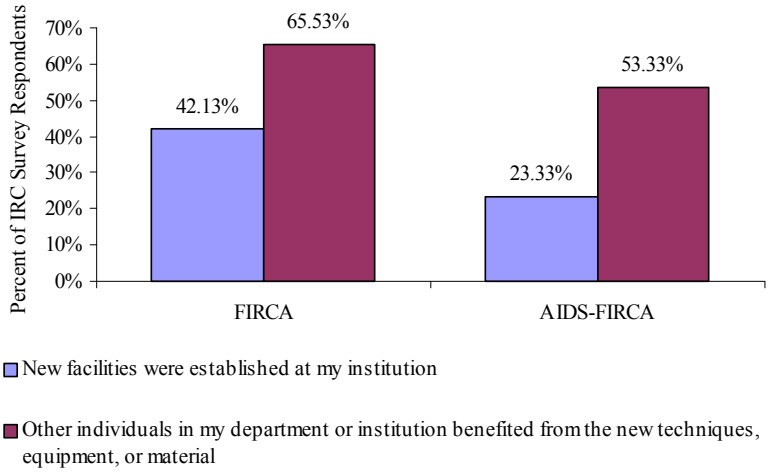
- Dissemination of equipment and techniques to other researchers in IRCs' institutions
- Development of new courses and teaching materials – both by the IRC and the USPI, and
- Other institutional effects such as raising the profiles of institutions and maintaining critical masses of researchers during periods of local economic distress

5.4.1 Dissemination of Equipment and Techniques to Other Researchers in IRCs' Institutions

A substantial effect of the program on capacity building is the finding that techniques learned during the course of research are generally diffused more broadly throughout IRCs' departments and entire institutions. Based on the results of the IRC survey, many researchers noted that new facilities were established at their institution (42.1% of FIRCA and 23.3% of AIDS-FIRCA respondents). Similarly, the majority of FIRCA and AIDS-FIRCA IRCs (65.5% of FIRCA and 53.3% of AIDS-FIRCA respondents) said that the effects of their grant benefited other individuals in their department or institution through the dissemination of techniques, and equipment and material sharing (Figure 5.4). There was no difference between senior and junior researchers in the incidence of materials and equipment sharing; As shown in Table 5.7, however, there is a significant difference between regions, with African countries benefiting the most (Chi Square Test, df=3, p=0.06).

Figure 5.4

IRC Survey: Departmental and Institutional Benefits of FIRCA and AIDS-FIRCA



Source: Abt Associates Inc. analysis of IRC survey question 11

Table 5.7

IRC Survey: Cross Tabulation of Positive Responses to Survey Question 11, by Region

Region	Percentage of Positive Respondents
Africa	78%
Asia-Pacific	42%
Eastern Europe	62%
Former Soviet Union	68%
Latin America and the Caribbean	68%

Source: Abt Associates Inc. analysis of IRC survey question 11

Note: "Positive Response" defined as answering positively either to: "New facilities were established at my institution" or to: "Other individuals in my department or institution benefited from the new techniques, equipment, or material".
Difference among regions significant at 10% level (df=4, p=0.06)

The survey findings directly support the site visit hypothesis that in addition to the effects on IRCs themselves, the influence of funding extends broadly to their IRC institutions. Of the 56 IRCs site visited, 50 reported that they diffused techniques to other members of their institution. Diffusion could range from the adjoining laboratory to throughout the nation; diffusion tended to be broadest when institutions were smaller (and therefore more likely in South America than in Eastern Europe's larger scientific establishments). The equipment purchased using FIRCA funds – especially mid-sized equipment but in many cases even smaller pieces – is also broadly used; of the forty-two IRCs visited who reported equipment purchases using FIRCA funds, forty reported that the equipment is used by others. FIRCA alone was not responsible for the purchase of any large equipment that

attracts national or international use, but several researchers have purchased confocal microscopes using funds pooled between FIRCA and other grants; these larger items are often used regionally or nationally.

5.4.2 Development of New Courses and Training Materials

As reported above, the majority of FIRCA and AIDS-FIRCA IRCs believed that the dissemination of new techniques and materials benefited others in their labs, departments and institutions. Anecdotal evidence gathered during the site visits suggests that one primary benefit is that during the USPIs' time in the IRC country, they give seminars, lectures and teach mini-courses to the faculty and students at the IRCs' institutions. Many investigators mentioned that this was crucial for broader institutional capacity building. One USPI, for example, taught modern techniques in organic chemistry synthesis that were more broadly attended than by just the IRC's group and led to one of the student attendees who was not a member of the IRC's group to continue studies at the USPI's laboratory. One AIDS-FIRCA IRC commented on the survey that "during the collaboration, the USPI and his team shared their expertise by participating in post-graduate teaching in my institution…" Such bilateral travel can have important capacity-building effects beyond the IRC's own research laboratory and immediate group.

5.4.3 Site Visit Findings: Other Effects on IRC Institutions

In addition to the previously mentioned benefits, many IRCs elaborated on additional broad benefits realized at their institutions attributable to the award. Most importantly, IRCs discussed the importance of the program as an avenue of communication to the broader scientific world and a means by which to establish international credibility for individuals and institutions. For one researcher, at a time when morale was low at his institution, FIRCA "helped maintain my level of motivation in research."

> "Importantly, for us in a developing country, it (FIRCA) allows us to maintain strong links with outstanding groups in US. This has improved our research strength." –FIRCA IRC (Brazil)

Similarly, during the site visits, both South American and Eastern European IRCs mentioned that FIRCA has played a strong role in keeping a level of scientific inquiry and basic biomedical research capabilities existent in countries and institutions where local funding sources are highly variable and economic conditions unsettled; when economic conditions do improve and substantial local funding becomes available (which appears to have happened in the Czech Republic and is beginning to occur in Chile and Hungary), there is a cadre of investigators who are well-placed to engage in research at an international level using those local funds.

South American IRCs mentioned two additional broad benefits. First, experience with FIRCA has provided investigators and their colleagues with experience in applying for external funding and navigating funding processes that are often complex and new to them. In several countries, IRCs with FIRCAs promote the program to their colleagues and help them fill out the application materials. A second benefit has been that when FIRCA raises the publication rate of investigators within an institution, it can have a significant effect on the productivity of the institution viewed as a whole, which can help other investigators pursue external funds.

5.5 Sustainability of Effects on IRC Careers and Institutional Capacity-Building After Award Period Concluded

It is difficult to evaluate the sustainability of capacity building effects of an award once the funding period has concluded, especially given the limited available information regarding funding received after award period end. The longevity of effects may be linked to the funding status of the individual researcher, the strength of his or her institution, and more broadly, to the economic conditions of the country. Surveys and site visits, however, provide some insight into the potential for sustained career- and institutional-building effects associated with FIRCA and AIDS-FIRCA.

5.5.1 Large-Scale Career and Institutional-Capacity Building

Several IRCs mentioned in their free-text survey responses that the largest capacity-building effects conferred by the award resulted when an individual, a lab, a department, or an institution had multiple awards, or international funding sources acting in parallel. One FIRCA researcher explained that, "simultaneously with the FIRCA, an NIH grant (R03) was awarded to another faculty, leading to an application for another R03 grant. Whether it was the FIRCA or the R03s, through these awards, a big impact was made on institutional policies."

The site visits also suggested that large-scale institutional capacity-building and dramatic IRC career transformation were also associated with the receipt of multiple FIRCA awards and non-FIRCA international funding. Two groups visited in particular merit additional discussion. The first is a Chilean network of researchers – who have received support through a network grant in their own country (in which three of six participating groups are also funded through FIRCA), several of whose students have been trained in the United States through the FIC International Training and Research Program in Population and Health (ITRPH); two of the students trained through ITRPH have returned with FIC GRIP re-entry grants. This network combines funding from multiple FIC programs and strong local research support to engage in internationally significant work in reproductive biology, in collaboration with two U.S. investigators.

> "New facilities were established at my home Institute. Significant amount was invested by Russian Academy of Sciences as a supplement to FIRCA. Later 2 more supplements were obtained to expand facilities." –FIRCA IRC (Russia)

A second network has been formed in Uruguay. The core of the relationship is a long-term collaboration between a USPI and an IRC (3 FIRCAs) that has led to two additional FIRCA awards – one between the same USPI and an IRC and a second between a colleague of the original IRC and a colleague of the original USPI who were introduced by the core USPI-IRC pair; a third-generation FIRCA proposal (a colleague of the colleague) is in preparation. More than one dozen students of these investigators (the IRCs could not remember if they are in the fourth or fifth generation of students) have received advanced training in the United States, including some who have returned to Uruguay and others who have remained in the United States as active participants in the network.

Because of the low cost of Uruguayan research, the additional external funding received by this network has led to substantial advances in capacity throughout the Uruguayan biomedical science community. The network has created several large, well-funded laboratories that are pursuing research to U.S. standards. The university at which the majority of the network's investigators are located created an MD/PhD program in 2001 in which approximately 75 students are enrolled; this

network is funding the Ph.D. portion of the research the M.D.s perform. Other M.D.s not directly engaged in Ph.D. programs are also drawn into the research being performed by this network; the combination of clinical and basic science skills has improved the quality of research – expanding capabilities and suggesting new hypotheses – in addition to advancing the capability for established clinicians to incorporate research methods into their practice. The network investigators expect that within five to ten years Uruguay will have developed translational research capabilities that should be broadly applicable to health promotion, working with industry, and to making basic biomedical science in Uruguay internationally competitive – especially now that the Instituto Pasteur is investing approximately twenty million euros in a regional biomedical science center located in Montevideo that will provide large-scale equipment currently in short supply in the country.

A FIRCA award lay at the genesis of the network's formation; its role in catalyzing the capacity development in this network is unquestionable. This network is an example, however, of the complexity of attributing capacity development to a single source of international funding. The research network has also received three HHMI awards as well as a subcontract to an NIH R01; these awards also have contributed substantially to capacity development at this institution.

An Argentinian institution visited may be forming this type of sustainable, collaborative research network. The institute has always had private funding through corporate and personal donations, and so began with a base of equipment, trained investigators, and support services (including a well-stocked library). There are five researchers at the organization who have received FIRCA awards. At the same time, scientists have received more than $1.2 million in HHMI funding, and an investigator's R01 award represents a substantial source of outside funding as well. The two junior investigators who were visited have received HHMI awards in addition to FIRCAs; they have used the combined funds to start mid-size laboratory groups of approximately ten investigators and to make rapid research progress.

5.5.2 Other Career-Changing Effects

In both the surveys and site visits, there were a few examples of FIRCA or AIDS-FIRCA alone having career-changing effects for IRCs that continued after the conclusion of award. One established investigator visited used the FIRCA to move into a new line of research that could be continued even in the absence of additional international funding and that has been extremely scientifically productive for over a decade. Another IRC responding to the survey identified AIDS-FIRCA as a mechanism that allowed him to engage more heavily in research, "This award allowed me in conjunction with Wellcome Trust-sponsored Research Leave to be hands-on in the lab after numerous years with a heavy administrative burden. This really enabled me to get back to the 'cutting edge' of technology and my Institute and Department benefited as a result."

"It did help me dramatically in career development. Not only I was able to attract external funds in my country, but I was also able to develop independent research after returning to US. I had since been funded by a National Scientist Development Award from American Heart Association, and was awarded an RO1 [sic] by NHLBI last year." – FIRCA IRC (China)

5.5.3 Inferences Regarding Capacity-Building

FIC and the FIRCA program can take credit for enhancing the careers of outstanding scientists who are fully-fledged internationally competitive scientists and who have

"graduated" from (or are in the process of graduating from) FIC's support. Yet many of the recipients who have been most successful in the long-term (or emerging investigators who appear to be on that path) likely are also those who have received other sources of international funding. An inference drawn from the site visits and surveys (which could not be tested conclusively given the evaluation data collected) is that there appears to be a limited range of countries – primarily at the "lower middle income" development level – where large-scale capacity-building is most likely to occur. These tend to be countries with existing (albeit limited) research infrastructures where costs of research (e.g., faculty salaries, research space) are relatively low. In such countries and institutions, even a single FIRCA can have a substantial impact, allowing an investigator to dramatically increase the size of his or her laboratory; receiving multiple awards (or award plus other international funding) may then catalyze the type of large-scale capacity-building described in previous sections. In countries or institutions with very limited research infrastructure, one FIRCA may not be sufficient to overcome barriers to successful research collaboration, while in richer countries the award size may be too small to substantially influence the research undertaken by the IRC.

5.6 Broader Impacts: Public Policy and Government Support for Research

Though the program is primarily regarded as an opportunity to pursue basic research, there are several examples of translational public policy and governmental impacts.

5.6.1 Translational Research and Health Care Impacts

Very few FIRCA or AIDS-FIRCA researchers intend their work to have short-term or even medium-term clinical or policy impacts; they see themselves as basic researchers and expect that others will engage in translation when underlying mechanisms are sufficiently well-understood. While the IRC survey did not explicitly ask whether grantees were engaged in translational research or research with health care implications, several IRCs (12 of 248 FIRCA respondents or 4%, 3 of 30 AIDS-FIRCA respondents or 10%) used free-response fields to mention that their research had the potential for translational or health care applications. A few examples mentioned on the IRC survey include:

- For one IRC from India, the "FIRCA award provided the seed grant to a project which has now grown to be an NGO, utilizing the health education strategies learnt as part of FIRCA Award. Investigators and teams trained during FIRCA award in Delhi, India have grown to become project directors of reputed research studies. FIRCA awards provide capacity building opportunities for researchers from developing countries to enhance their academic credentials along with their learnt research knowledge, to further grow to become Principal Investigators on future research studies. Many other organizations across India are now utilizing the intervention strategies and educational materials developed under this project."

- An AIDS-FIRCA IRC from Italy mentioned that, "results have been transferred in the clinical settings and are now widely applied in diagnostic assays for detection of HCMV [human cytomegalovirus] drug resistant strains. As stated, the clinical settings where they are now most applied is the Transplantation settings."

- Another AIDS-FIRCA IRC from Namibia stated that, "the program for which the research was provided has gone on to be a model of adolescent health prevention through life skills. The research enabled us to make a convincing case to donors and tens of thousands of young people have been trained in the program. A similar model was developed for Pacific Island countries."

Many of the researchers site visited thought that one of the key effects of FIRCA on their careers is that it allowed them to resist pressure to be more applied in their research and shorter-term in their thinking. In a particular example, two of the South American researchers to whom we spoke use the parasite that causes Chagas' disease (a disease that predominantly affects individuals in the southern portion of South America where they live) as a research model to study basic metabolic functions. While the abstracts of their grants reference the clinical harm caused by the parasite, the researchers themselves see it as a suitable research model for unraveling fundamental questions at the cellular level, not as a medical problem to be solved.

There were also several translationally-oriented scientists met during the site visits – two in the Slovak Republic, one in the Czech Republic, two in Chile, and four in Uruguay. Four of the nine themselves had medical degrees, two had MD/PhDs and two are MDs doing research. Their laboratories were the only labs observed where clinical and basic science perspectives were being incorporated into interdisciplinary research. One of these researchers mentioned that he was a co- author on a patent applied for in Europe as a result of his FIRCA research – all other researchers who discussed patenting during their site visits mentioned how backward their countries were in intellectual property development and protection and how uninterested business appeared to be in funding translational research (as distinct from direct research on specific problems posed by the companies).

5.6.2 Public Policy Impacts

Though USPIs mentioned that the award enhanced relations with government and national agencies in the IRC country (Appendix D, question 3.2; 28% of FIRCA and 36% of AIDS-FIRCA respondents), there were few concrete examples given as to the nature of these enhancements. One AIDS-FIRCA researcher from England mentioned that his work had direct policy impacts related to the standardization of investigation and screening for TB in high risk neonates and their mothers, and two FIRCA researchers mentioned policy-related effects of their research as well.

On the site visits, no investigators could identify specific successes they have had to date in using their research results or research successes in changing government policies, but there are several encouraging steps in each South American country visited (though not in Eastern Europe). The lack of policy impacts in Eastern Europe may be partially explained by the long-standing and hierarchical science policies in the countries. This science policy tradition stands in contrast with the much younger scientific community in the South American countries visited, where specific science policy is non-existent, or just beginning to be developed.

In Chile, the government has become increasingly interested in fostering research – the higher fraction of GDP devoted to S&T activities (0.5% in Chile as compared with 0.3% in Argentina and 0.15% in Uruguay) and the creation of the Millennium Research Networks (a funding mechanism to

support networks of 6-10 interdisciplinary research groups) are evidence of the recent policy shift. FIRCA investigators are linked to this push due to their presence in at least two of the networks; to the extent to which they succeed, they will help to validate national policy and push it further forward.

In Argentina, scientists are now beginning to organize to lobby their political leadership to begin to pay more attention to science and technology. Several of the IRCs to whom we spoke believe that Argentina's science and technology policy can be best characterized as, "the changing absence of policy." Only one of the investigators to whom we spoke is sufficiently senior to have any influence, but several are located in institutions whose leadership is increasingly attempting to organize the country's scientists to serve policy goals.

Uruguay is a country where the timing for such organization appears ripe. A forthcoming change in government from the parties who have led Uruguay for nearly twenty years offers an opportunity for the nation's research community to participate in policy formation. The incoming government reached out to the scientific community to help it draft a new, formal, science policy. Two of the IRCs visited were invited to help develop the portion of the policy devoted to biomedical research, in recognition of their status as leading biomedical researchers in Uruguay. Just as in Chile, should researchers' success translate to policy design that furthers both scientific and economic progress, FIRCA will have been associated with far-reaching policy change that itself may catalyze further scientific progress broadly throughout the country.

IRCs are often scientific leaders in their institutions and countries. The ability to affect change at the policy level depends appears to depend on the local political situation and stability, the development status of the country, and the character and ambitions of the individual researchers. As policy work is not an explicit program goal, the researchers do not feel specifically obligated to pursue policy work; however, actions of individuals can, in some instances, be partially attributed to program support. FIRCA and AIDS-FIRCA promote high-quality basic research, but the incidence of translational and applied research appears to depend on the individual character and interests of the IRC.

6. Management

6.1 Chapter Structure

This chapter discusses evaluation findings with respect to program management. In Section 6.2, management issues at the level of the IRC institution is covered. Section 6.3 addresses management issues at the level of the individual grant, the most significant of which were communication and transfer of funds and equipment from the USPI institution to the IRC. Finally, Section 6.4 includes findings with respect to a variety of program-wide management issues and concerns.

6.2 Issues Specific to the IRC Institution

The most significant management-related problems identified in this evaluation at the level of the IRC institution arose from application of institutional overhead charges, lack of laboratory infrastructure at the IRC institutions, and salary concerns of the IRCs. Although these problems did not necessarily occur at all IRC institutions, they were mentioned frequently by both site visitees and IRC survey respondents.

6.2.1 Application of Institutional Overhead Charges to Direct Research Funds

As discussed in Section 1.2, under the original rules no portion of FIRCA funds could be used for overhead at the collaborating institution. In 2002, following the implementation of new NIH policy for overhead on foreign grants, up to eight percent of IRC funds can be used for facilities and overhead. Interviews with IRC site visitees in Eastern Europe revealed that some IRCs experienced difficulty convincing their institutions not to apply overhead charges of 5% to 17% of the grant amount even before overhead expenditures were allowed. Several Eastern European IRC site visitees reported that they were eventually forced to pay overhead to their institutions from their direct project funds, drastically cutting into funds available for research, while others emphasized that they expended a great deal of time and effort in convincing their institutions to waive this requirement due to the special circumstances of this grant. This trend was not reflected in the IRC survey responses, however, with respect to estimated expenditures. One Russian respondent to the IRC survey reported that 10% of his FIRCA funds were spent on "institutional support," but the vast majority attributed their spending to other sources (see Appendix E, question 6a). Given that indirect spending was not allowable under the terms of the grant until 2002, it is possible that IRCs who paid overhead may have been reluctant to report it in writing.

Site visitees in Latin America did not report such problems specifically, although they did indicate that it would be helpful if a portion of the overhead paid to the US institution could be shared to cover basic costs such as electricity, heat, and water. The extent to which problems due to overhead charges imposed by IRC institutions occurred in other regions is unknown, although anecdotal evidence from the IRC survey suggests that it may also have been a problem in Asia. Respondents from India and Cambodia reported spending at least 5% of their FIRCA funds on indirect costs, and one respondent from Bangladesh reported spending 21% of the grant budget on "rent, communication, utilities, and interdepartmental."

6.2.2 Laboratory Infrastructure Concerns

Some researchers also reported problems resulting from inadequate laboratory infrastructure. As shown in Table 6.1, IRC survey responses with respect to infrastructure concerns differed significantly by geographic region. As might be expected based on development status, infrastructure issues were viewed as most problematic in Africa, the Former Soviet Union, and Latin America.

Table 6.1

IRC Survey: Percentage of FIRCA Respondents Reporting that Lack of Infrastructure Presented a Challenge to Successful Collaboration, by Region

Region	Number of FIRCA IRCs reporting concern	Percent of FIRCA IRC respondents within region reporting concern
Africa	3	38%
Asia and Pacific	1	3%
Eastern Europe	4	5%
Russia and Former Soviet Union	6	16%
Latin America and Caribbean	12	16%
Total	25	11%

Source: Abt Associates Inc. analysis of IRC survey question 12

Note: Variation significant at the p<0.01 level, chi-squared statistic =14.15, df=4

Observations during the site visits raised concerns regarding the adequacy of laboratory infrastructure at certain IRC institutions. Some FIRCA awardees appeared to work in relatively modern facilities, but others were forced to make the best of old and decrepit buildings. In Russia, Abt staff members visited Moscow State University and the Russian Academy of Sciences, both of which are considered top academic establishments in the country. Signs of deterioration were evident. In several cases, buildings were poorly lit and/or under construction. With the exception of computers, which seemed to be readily available, laboratory equipment was outdated. In Uruguay, the building that housed one department was severely lacking in modern and necessary basic equipment, and the ventilation was so poor that the few hoods available were not fully functional. Moreover, in virtually all countries visited, laboratory space was extremely scarce and often served as the limiting factor on the number of students that could work in the lab. One researcher in the Czech Republic and another in Hungary had attempted to double the available space by dividing a single-floored laboratory into a two-story room. In both cases, the second floor was accessible only by ladder, which struck the site visitors as both inefficient and a potential safety hazard.

When interviewed, both Russian and Uruguayan site visitees were likely to report laboratory infrastructure concerns. Though many of the IRCs interviewed did not specifically complain about the lack of infrastructure, they mentioned casually that the inconsistent electrical systems at their institutions and the leaky pipes often caused equipment and materials damage.

Concern regarding lack of infrastructure at the IRC institution was also evident in survey responses. In the USPI survey, one-fifth of FIRCA respondents (21% of FIRCA USPIs) and several AIDS-FIRCA respondents (14% of AIDS-FIRCA USPIs) reported that lack of infrastructure at the IRC

institution presented a challenge to successful collaboration (Appendix D, USPI survey question 4.5A). The corresponding responses from the IRC survey were slightly lower (11% of FIRCA IRCs and 17% of AIDS-FIRCA IRCs), perhaps reflecting different perceptions and standards with respect to adequate infrastructure on behalf of the IRCs (Appendix E, IRC survey question 12).

6.2.3 Salary Concerns of IRCs

Researchers in most of the developing world face the reality of salaries that are disproportionately low relative not only to salaries of researchers in the developed world but also relative to what citizens of their own countries with comparable credentials can command in other professions. South American IRC site visitees reported that the average yearly salary of a researcher (in 2004) is $5,000. According to a 1996 Russian news source, only 17% of Russian scientists received a salary that exceeded the officially defined poverty level.[34] One USPI contacted for the survey reported that his former collaborator in Russia left science for business because a science career could not support his large family. One Eastern European researcher interviewed during the site visits commented that, in order to enter the world of research, "you must truly love what you are doing because you are essentially wedding yourself to a life of poverty."

Poverty among international collaborators and flight from science for more lucrative careers represents a major obstacle for successful international research collaboration. Partially in response to these concerns, allowable expenditure rules for FIRCA were changed in 1998 to include up to $5,000 in salary support for collaborators in the IRC country. The same change was made to the AIDS-FIRCA program in 2002.

6.3 Individual Grant Management

This section addresses project management at the level of the individual grant. The major categories of issues identified in this area were visa restrictions and transfer of funds and equipment.

6.3.1 Impact of Travel and Visa Restrictions

By nearly all accounts, travel to the US has become more difficult for foreign nationals since September 11, 2001. It was therefore expected that this trend might be apparent in the survey results regarding travel. However, as the USPI and IRC surveys asked respondents to report number of days spent together in the US by grant rather than by year, the quantitative data are difficult to interpret with respect to the possible effects of travel visa restrictions. As illustrated in Table 6.3, IRC survey results do not indicate significant differences in time spent together in the US for grants completed before and after 2004, the first year in which the entire grant duration would necessarily have occurred after September 2001. However, it should be acknowledged that a significant number of grants made after 2001 were ongoing at the time of the evaluation, so effects of September 11 would not necessarily be captured in this data-set. Given that earlier participants would likely have found it more difficult to remember the exact number of days spent together, it also seems plausible that recall bias could have skewed these results, obscuring any possible trends.

[34] Andrei Yurevich and Irina Tsapenko, "Russian Science Faces Funding, Personnel Crisis." Current Digest of the Post-Soviet Press. VOLUME XLV III, NO. 9; Pg. 13. March 27, 1996.

Table 6.2

IRC Survey: Average Number of Days Reportedly Spent Together in the US for Complete Grants, by Grant End Date

	Grants ending prior to 2004	Grants ending in 2004
Average number of days spent face to face in the US	60.7	56.5
Number of respondents	118	26

Source: Abt Associates Inc. analysis of IRC survey question 4a

Anecdotal reports from IRC site visitees and survey respondents suggest that visa and travel restrictions did negatively impact ease of communication between IRCs and USPIs, especially in Eastern Europe. Several of the Russian IRCs complained that the time lag between submission of visa applications to the local US Embassy and their subsequent approval or rejection averages between six months and one year. Site visitees also reported instances of single-entry visas being issued when multiple-entry visas were requested as well as denials with no explanation whatsoever. ”

> “I understand that the State Department does [not] approve the awards provided by FIRCA. On the other hand, the State Department makes visits to USPI's lab or attendance [of] the conferences in the US [difficult]. I hardly appreciate that sort of policy.”
>
> -Russian IRC

6.3.2 Transfer of funds and equipment

Early program announcements for both FIRCA and AIDS-FIRCA clearly state that, although the bulk of the research was to be carried out at the IRC institution, the USPI institution was to have administrative responsibility for all expenditures. The available options for transfer of funds and equipment mentioned on the surveys and site visits have included a broad range of mechanisms:

1) Purchases were made by the USPI lab in the US and transferred to the IRC institution;
2) Purchases were made by the IRC lab or institution in the IRC country and later reimbursed by the USPI institution;
3) Materials (especially equipment) were donated by the USPI institution to the IRC institution;
4) US institutions set up purchase orders with IRC listed as recipients;
5) US institutions transferred funds directly to the IRC’s institution;
6) US institutions issued university credit cards to IRCs;
7) Formal agreements were arranged between USPI and IRC institutions.

There was considerable variation among USPI institutions in administration of funds at all phases of the program, the nature of concerns reported by the USPIs and IRCs regarding the transfer of funds and equipment varied as well.

Problems encountered due to administrative arrangements with the USPI institution

Many IRC site visitees reported that USPI institutions were initially unfamiliar with international grants administration, and misunderstandings could result in long delays. One site visitee in Eastern Europe reported having to delay the start of his research for one year because of complications with funding transfer from the USPI institution, and another in South America had been awaiting the transfer of funds that would allow him to start work on the project for six months at the time of the site visit. A South African IRC survey respondent complained that it took 6-9 months for the USPI institution to notify him that the funds were available, while a Mexican IRC stated that "it took almost year to receive the funds, because of the complicated regulations and lack of flexibility from the USPI institution."

> "I know about other colleagues that have gone through lots of trouble to administer their grants, since the US institutions seem to have different policies on how to handle FIRCA awards. There should be more clear guidelines for American institutions on how to do this, so that the foreign collaborator does not need to spend long hours e-mailing or talking on the phone with administrative personnel from the grant departments."
> - FIRCA IRC (Argentina)

Faced with the variability of administrative relationships with their USPI institutions, many IRC site visitees and survey respondents questioned the efficiency of channeling funds through the USPI institution. During the South America site visit, the Abt site visit team spoke directly with the departmental grants manager at one institution. She estimated that 20% of the grant amount was lost in taxes, fees paid to the USPI institution, and time wasted in frustrating communication with administrators. Familiar with US grants management through her work administering other international research grant programs, she could not understand why her institution was not eligible for direct funding despite successfully managing larger international awards from institutions including NIH. Several IRC survey respondents also claimed that FIRCA is the only international grant program they are aware of that does not make funding available to the IRC institution directly. A notable exception were the Russian site visitees, many of whom expressed concern that their institutions would attempt to "shave off" some of the funding for themselves if given control.

In spite of the dissatisfaction implied by these anecdotes, however, only nine percent of FIRCA and none of the AIDS-FIRCA IRC survey respondents identified "excessive administrative burden from USPI institution" as a challenge to successful collaboration (IRC survey question 12). Several hypotheses might explain this apparent discrepancy. For instance, it may be that only a small fraction of IRCs experienced administrative problems, but the severity of the problems they experienced caused them to be particularly likely to mention them during the site visits and in the survey responses. It is also possible that, while administrative issues with the USPI institution were a problem, the other survey options were more compelling (the most frequently chosen alternatives were "delays in customs clearance in my country," "insufficient project period," and "delays in shipping from abroad"). Misclassification bias due to language issues is also a possibility, as it is impossible to know whether IRC survey respondents interpreted "administrative burden" as inclusive of funding-related issues.

Time lag for reimbursement and fluctuating exchange rates

USPI institutions varied with respect to frequency of reimbursement, with some institutions paying annually or semi-annually and some paying as frequently as every few weeks. Among IRCs who were required by the USPI institution to make purchases on their own and submit invoices for reimbursement, there were concerns on two counts. First, researchers who were not otherwise well-funded reported that simply advancing the necessary cash could be difficult, regardless of the length of the time that elapsed between expenditure and reimbursement. One Czech IRC survey respondent described hardships imposed during a trip to the US due to this problem:

> At those times it was not possible to change Czech crowns for US dollars neither at home nor in the USA and anybody entering from the East was thus terribly short of dollars, having hardly enough for a basic live [*sic*]. Instead of accepting some "first financial aid" as an essential in advance payment for several first weeks, I had to wait two weeks for refunding my expenses for [food].

Second, several site visitees who found loans or other means to bridge the time gap reported losing money due to the falling value of the dollar in recent years. While international currency exchange rates are clearly beyond the control of the program, for some IRCs the associated financial losses were significant. Even those who were not directly affected due to time lags for reimbursement complained that the purchasing power of their grant money was severely curtailed, and still others mentioned that fluctuating exchange rates greatly complicated the budgeting process.

In order to circumvent the relatively slow process of invoicing and reimbursement, several USPI-IRC pairs reported that the IRC was issued a university credit card for local purchasing. This arrangement apparently worked well, although it would have required an unusual level of administrative flexibility on the part of the USPI institutions in question. One Brazilian IRC who employed this method also mentioned that not all of his in-country suppliers were willing and able to accept a foreign credit card.

Problems encountered in-country

In addition to the administrative difficulties discussed above, IRCs encountered several other problems with transfer of funds and equipment. Discussed below, these included taxation, customs and shipping delays, and in-country administrative hurdles.

1) Value-added and export taxes

One concern reported by IRC site visitees as well as both USPI and IRC survey respondents was the loss of a portion of research funding due to value added taxes and/or import taxes on equipment and materials. In many of the former Soviet countries, site visitees and survey respondents reported that they paid between 19% and 25% in value-added taxes on all of their purchases. While high in-country costs for equipment and supplies often made it more cost-effective for the IRC to purchase equipment and materials in the US, value-added and import taxes could cost the researchers up to an additional 50% on top of the actual cost. One USPI survey respondent working with a Russian IRC reported that "anything sent to the country without personal guidance usually was lost or detained

such that it was useless. Also, they always then charged import duties higher than the worth of the shipment."

Site visitees in Argentina consistently reported many of the same difficulties as the Russian and former Soviet IRCs. Several Argentine and Chilean site visitees avoided the issue by having their USPI "donate" supplies and equipment to their universities. Equipment or materials were purchased in the US using FIRCA funds and then shipped to the IRC institution with a "donation letter" stating that the items were being donated for research purposes. Although several researchers mentioned that obtaining the necessary authorization required a significant time investment on both ends, the materials ultimately arrived tax-free and at discounted prices relative to what they would have cost if purchased in-country. One Argentine IRC survey respondent suggested that FIC "could pay a great service to the foreign collaborators if they were to setup an office that handles purchases that are later sent to the scientist overseas as a donation."

2) Customs clearance and shipping delays

When asked what challenges made participation in the program more difficult, both customs clearance and shipping delays were identified as challenges by a significant portion of IRC survey respondents (38% of FIRCA and 17% of AIDS-FIRCA IRC respondents chose "delays in customs clearance in my country" while 24% of FIRCA and 10% of AIDS-FIRCA IRC respondents chose "delays in shipping from abroad"). As shown in Table 6.3, there was significant regional variation in reporting for delays due to customs clearance, with Latin American (especially Argentina, Chile, and Brazil) and Russian respondents reporting customs delays far more frequently than respondents from other regions. No significant differences by region were observed for shipping delays.

Table 6.3

IRC Survey: FIRCA IRC Survey Respondents Reporting Delays Due to Customs Clearance or Shipping Delays, by Region

	Number reporting delays in customs clearance	Percent reporting delays in customs clearance	Number reporting shipping delays	Percent reporting shipping delays
Africa	1	13%	3	38%
Asia-Pacific	9	26%	5	14%
Eastern Europe	22	27%	17	21%
Former Soviet Union	18	46%	13	33%
Latin America and Caribbean		54%	20	27%

Source: Abt Associates Inc. analysis of IRC survey data.

Note: Customs clearance variation significant at p<0.01 level (chi-squared statistic=18.02, df=4). Shipping delays variation not statistically significant at 5% level (chi-squared statistic=5.25, df=4)

One Russian IRC emphasized that the word "delay" did not begin to describe the difficulties he encountered, commenting: "It is almost an inability, rather than delays indicated above, to ship anything from abroad and get it cleared by customs in Russia." Common solutions to these problems mentioned by site visitees and survey respondents included a variety of shipping procedures designed to circumvent delays. For example, one USPI mentioned that he had become a registered shipper

with United Airlines, and others relied on costly but reliable express mail services. In extreme cases, equipment and supplies were carried exclusively by hand or in the luggage of study personnel traveling between labs.

3) Single country administrative issues

The most frequent reports of administrative difficulties imposed by foreign governments came from Indian IRC survey respondents. Several Indian IRCs reported problems in obtaining Foreign Currency Non-Resident (FCNR) approval, which is necessary to facilitate transfer of foreign currency to India from abroad. FCNR bank accounts are exempt from Indian government taxes, and the exchange risk is born by the bank. However, the application process can apparently involve a lot of red tape. One Indian IRC survey respondent complained: "Being part of a STATE Driven University setup we could not get over the TROUBLE of obtaining an FCNR Number from the Indian Government (Home Ministry) to initiate the transfer of US$ to India [emphasis by respondent]."

A second set of country-specific difficulties concerned the import of living organisms for research. One Czech IRC survey respondent mentioned problems encountered while attempting to transport genetically modified mice into his country, and a Hungarian IRC survey respondent mentioned problems encountered while shipping *Xenopus* frogs due to veterinary regulations. It is not clear whether these were isolated incidents or whether problems due to national policy with respect to specific organisms were more widespread.

Finally, in both India and Brazil national governments impose ethical clearance procedures in addition to those imposed by NIH. An Indian survey respondent reported that his project was delayed for almost two years because of difficulties obtaining ethical clearance from the Indian Council of Medical Research and governmental agencies.

Level of satisfaction among participants

Despite the challenges discussed above, fewer than 20% of IRC survey respondents (17% of FIRCA IRC survey respondents and 19% of AIDS-FIRCA respondents) reported dissatisfaction with procedures for transfer of equipment and supplies (IRC question 13b). Given the variable administrative relationships between IRCs and USPI institutions described above, it was expected that satisfaction level would vary by USPI institutions. However, since only 46 of the 116 USPI institutions with at least one IRC survey respondent had more than one survey returned and only 13 institutions had at least 4 surveys returned, this hypothesis was difficult to test quantitatively. For the group of USPI institutions with 4 or more responses, results are shown in Table 6.4. While this small data set does hint that there were problems at particular institutions (e.g., institutions B, E, and K), overall variation by institution was not statistically significant. Several factors (e.g., differences in project start year, changes in administrative personnel over time) may combine to further confound any specific influences of transfer procedures due to institutional policies.

Table 6.4

IRC Survey: Percentage of Respondents Reporting Satisfaction with Transfer Procedures by USPI Institution for all Institutions with Four or More IRC Survey Responses

USPI institution	Number satisfied	Percent satisfied	USPI institution	Number satisfied	Percent satisfied
A	4	100.0%	H	5	100.0%
B	2	50.0%	I	5	100.0%
C	4	100.0%	J	5	100.0%
D	3	75.0%	K	4	66.7%
E	3	60.0%	L	5	83.3%
F	5	100.0%	M	9	90.0%
G	5	100.0%			

Source: Abt Associates Inc. analysis of IRC survey question 13b

Note: Variation not statistically significant (chi-squared statistic = 15.61, df=12).

6.4 Programmatic Management Issues

6.4.1 Award Amount and Allowable Expenditures

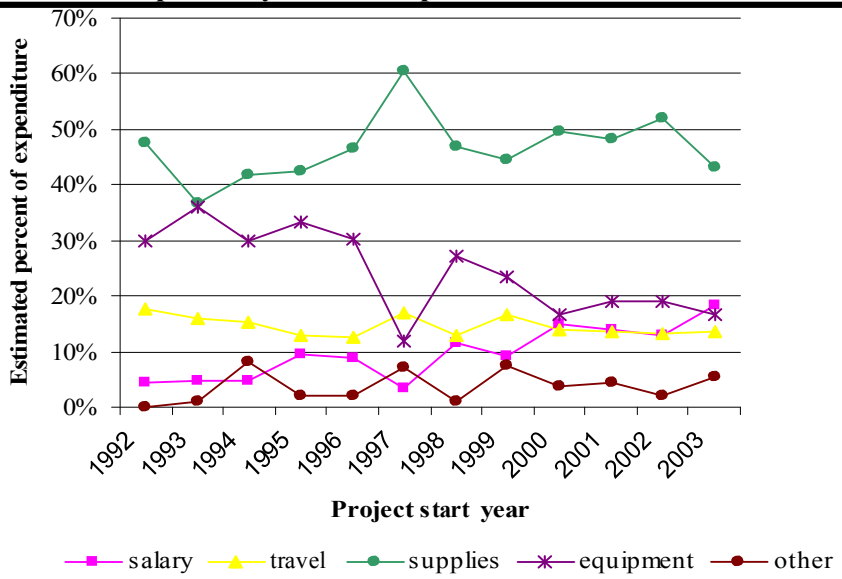
Impact of changes on reported expenditures

Chapter One details the changes in FIRCA and AIDS-FIRCA allowable categories of expenditures, and breakdowns of program-wide expenditures are discussed in Chapter Five. In this section, we examine the influence of changing management guidelines on IRCs' expenditures. Figure 6.1 summarizes expenditures reported by IRC survey respondents by type and project start year. The figure suggests that there have not been substantial changes in expenditure patterns over time. Although reported average expenditures for salary increased after salary expenditures became allowable in 1998, they previously averaged between 5 and 10% of total expenditures. Approximately one-quarter of the FIRCA IRCs whose projects began 1992-1997 reported nonzero spending on salary, while nearly three-quarters of the FIRCA IRCs whose grants began between 1998 and 2003 reported salary spending (24 of 93 or 26% starting 1992-1997, 109 of 155 or 70% of 1998-2003 grantees).

The reliability of this finding is difficult to assess, as these data were reported retroactively by non-native speakers of English and may have been particularly subject to both recall and misclassification bias. Given that respondents were likely to have been aware that salary expenditures were not allowable and therefore less likely to report them *a priori*, however, the notion that actual salary expenditures occurred prior to 1998 is difficult to dismiss. If true, this suggests that the management change may have legitimized and expanded a practice that was already occurring.

Figure 6.1

IRC Survey: Average estimated percent of total expenditures for salary, travel, supplies, equipment, and other as reported by FIRCA respondents



Source: Abt Associates Inc. analysis of IRC survey question 6a.

Figure 6.1 also suggests that the changes to allowable expenditure rules regarding travel in 1994, 1998, and 2002 had relatively little impact on travel spending, which remained relatively constant between 10 and 20% for all project years.

Level of satisfaction among researchers

Numbers of USPI and IRC survey respondents who identified "insufficient funds" as a challenge to successful collaboration are summarized in Table 6.5. Among FIRCA survey respondents, however, USPIs were significantly more likely to have identified insufficient funding level as a primary challenge to the success of their research.

Table 6.5
USPI and IRC Surveys: Percentage of Respondents Reporting that "insufficient funds" Presented a Challenge and Recommending "award a smaller number of grants with higher award amounts"

	Percent of FIRCA IRCs	Percent of AIDS-FIRCA IRCs	Percent of FIRCA USPIs	Percent of AIDS-FIRCA USPIs
Reported "insufficient funds"	20% [a]	28%	34% [a]	41%
Recommended "award a smaller number of grants with higher award amounts"	14%	23%	24%	37%

Source: IRC survey questions 12 and 14; USPI survey questions 4.5 and 4.6.

Note: Difference between FIRCA IRCs and USPIs statistically significant ($p<0.001$, chi-squared statistic=11.67, df=1)

This difference is likely attributable to a combination of factors, including higher expectations on the part of the USPIs, the higher administrative burden borne by the USPI, and the fact that most of the direct funding was earmarked for the IRC. A similar pattern was apparent among USPI and IRC survey respondents recommending "award a smaller number of grants with higher award amounts" as a positive structural change to the program (see Appendix D, question 4.6 and 14).

Regional differences were apparent with respect to satisfaction with funding level among FIRCA IRCs, with the highest percentage of IRCs from former Soviet countries and the Asia-Pacific region reporting that "insufficient funds" was a challenge (Table 6.6).

Table 6.6

IRC Survey: Percentage of FIRCA IRC Respondents Reporting that "insufficient funds" Presented a Challenge, by Region

Region	Number of IRCs	Percentage of IRCs
Africa	1	13%
Asia-Pacific	8	23%
Eastern Europe	10	12%
Former Soviet Union	16	41%
Latin America and Caribbean	13	18%

Source: Abt Associates Inc. analysis of IRC survey question 12.

Note: Variation significant at the $p<0.01$ level (chi-squared statistic =14.54, df=4)

USPI survey respondents who identified "insufficient funds" as a challenge were asked to estimate the amount of additional funding needed. The mean for FIRCA respondents was $79,000 with a median of $60,000. Among AIDS-FIRCA USPIs, the mean was $81,500 with a median of $75,000 (Appendix D, question 4.5B).

"A major difference between FIRCA and currently available Hungarian funds is that FIRCA gives a considerable support for buying instruments/equipment - that makes a real difference in the efficacy of research."
-FIRCA IRC (Hungary)

Qualitative data from the surveys and site visits support the hypothesis that, although few researchers would ever refuse additional funds, the IRCs were generally satisfied with the grant amount. One Hungarian IRC survey respondent described it as a "reasonable amount of money allowing us to perform good scientific research," while a Polish IRC described the funding amount as "quite substantial."

Regarding the allowable expenditure rules, opinion appeared to be mixed. In the more recent cohort of FIRCA recipients, IRC site visitees were consistently pleased with the availability of any salary support. In Europe, the IRCs tended to use this additional funding to support students or technicians, whereas South American IRCs often used at least part of the stipend to supplement their own salaries.

With respect to the amount available for salary, however, the majority of site visitees in Eastern Europe and Russia indicated that the FIRCA salary stipend was too small as a percentage of the total FIRCA award amount. One Russian IRC survey respondent remarked: "I would like… to have a possibility to increase the amount of funds for salaries (now it is $5000/year) at the expense of the other categories of the budget." Expressing a similar sentiment, a Ukrainian respondent commented: "I think the amount of grant is reasonable. The only thing which to my opinion is too small is salary. $5,000 per year is much less than expected from such grants. "

> "One question I would put forward to other investigators participating in this survey, however, is whether the restrictions set by the NIH modular budget satisfies the foreign investigator's laboratory needs. Whereas for certain researchers the problem is the need for more funding for supplies, others may need more funds for posdoc [sic] and/or graduate student stipends."
>
> --FIRCA IRC (Argentina)

Perhaps unused to the NIH modular budget format, several IRCs also expressed dissatisfaction with the rigidity of the allowable expenditure rules. One Brazilian survey respondent made a case for flexibility, at least with respect to some small portion of the award amount:

> Sometimes the lack of small money can hamper or delay the success of a much larger (and expensive) effort…. The following example is self-explanatory: I bought a -80 C^o freezer which was quite expensive, and almost essential for the project as a whole. This equipment do not work well at temperatures above 25 or 30 C^o, which means that in the tropics (as is my case) they need a room with air conditioning. However, I was told at [USPI institution] that NIH would not allow me to buy an air conditioning unit, because it was seen as infrastructure (which should be provided by my university). Though in principle I agree with the arguments, by the time the freezer arrived I had no support from Brazilian money, and the net result was that I could not use the freezer for almost one year. In short, some flexibility on the use of a small part of the grant (say, USD $3000/year) would make a big positive difference, at least in Brazil.

Other IRCs reported confusion over the allowable expenditure rules, such as the Brazilian IRC who commented that "there was a lack of information about how the funds could be used, and I could have planned better the expenses over the period." It is unclear, however, the extent to which such confusion was due to poor communication with the USPI institution or a lack of knowledge about restrictions.

6.4.2 Eligibility Requirements

Eligibility restrictions by topic and link to the parent grant

Until 1998, the FIRCA program was open to applications from researchers in virtually any field except HIV/AIDS-related research (for which there was a separate AIDS-FIRCA) subject only to the limitation that the research topic must be directly related to an existing active NIH research grant.[35]

[35] Initially defined as any R series, P series, or U series grant; Center Core Grants (P30), Shannon Awards (R55), and Small Grants (R03) were excluded after 1995. In the evaluation period, FIRCA parent grants included awards from at least 17 NIH agencies and parent grants for AIDS-FIRCAs included at least 6 NIH agencies (though the large majority of AIDS-FIRCA parent grants were NIAID-funded research).

After 1998, the rules were changed to allow research that was not related to the parent grant, although the requirement that the USPI had to have an existing NIH research grant remained in place. The AIDS-FIRCA program has always accepted applications for projects related to HIV/AIDS or HIV/AIDS-related research only.

In practice, the vast majority (99%) of FIRCA USPI survey respondents and all of AIDS-FIRCA USPI survey respondents indicated that the topic of their research was at least somewhat related to the parent grant from NIH, with most (62% of FIRCA respondents and 61% of AIDS-FIRCA respondents) reporting that the topics were "moderately" similar (Appendix D, question 4.3D). USPIs were also asked whether they believed it was appropriate to require that FIRCA award topics be related to the parent grant. About 70% of each group seemed to approve of the requirement, (Appendix D, question 4.3E). Although IRCs were not asked directly for their opinions with respect to linking the FIRCA award to an existing R01 or similar grant, an Argentine IRC survey respondent commented that "the fact that the project is tied up to one objective of the USPI R01, may weaken the foreign investigator's scientific independence." Several IRC site visitees echoed this desire for more freedom in choosing and developing their research topics.

Both USPI and IRC survey respondents were also asked whether the following would be a positive structural change to the program: "restrict awards to specific topics considered important for developing countries (e.g., HIV/AIDS, malaria, TB)." As shown in Table 6.7, the idea was generally unpopular except among AIDS-FIRCA USPIs. These results are unsurprising given that HIV/AIDS researchers were excluded from the FIRCA group by definition.

Table 6.7

USPI and IRC Surveys: Percentage Respondents who Agreed that "restrict awards to specific subjects of topics considered important for developing countries (e.g., HIV/AIDS, malaria, TB)" Would Be a Positive Change

	FIRCA number	Percentage of FIRCA respondents	AIDS-FIRCA number	Percentage of AIDS-FIRCA respondents
USPI	19	9%	17	63%
IRC	6	3%	3	12%

Source: USPI survey question 4.6; IRC survey question 14.

Eligibility restrictions by collaborating country or institution

As discussed in Chapter One, eligibility restrictions by collaborating country have been in place since the beginning of the FIRCA program. Neither FIRCA nor AIDS-FIRCA ever imposed explicit eligibility requirements based on existing research capacity at the IRC institution. In practice, however, the review criteria introduced to both programs in 1998 can probably be assumed to prevent the extremes at both ends from receiving high priority scores. Specifically, the "Environment" criterion ensures that the foreign institution provide enough infrastructure to make the research effort possible, while the "Sustainable Research Capacity" criterion makes it more difficult for applicants

from very well-funded institutions to receive funding (for more on review criteria see section 6.3.4 below).

USPI survey respondents were asked whether additional eligibility restrictions based on research capacity of country or institution would represent a positive change to the program. Neither proposition was popular among USPI survey respondents, with 17% of FIRCA USPIs and 30% of AIDS-FIRCA USPIs supporting restrictions by country and 5% of FIRCA and 19% of AIDS-FIRCA USPIs supporting restrictions by institution (Appendix D, question 4.6). The higher level of support for restrictions among AIDS-FIRCA USPIs may be explained by the fact that the AIDS-FIRCA program included collaborations with researchers from highly developed countries. Differences by region and development level of collaborating country were not statistically significant (data not shown).

IRC survey respondents were not asked for opinions with respect to geographic eligibility restrictions because it was assumed that few IRCs could be entirely objective on this matter. Certain IRCs from countries that recently had been excluded, however, commented in free response sections. For instance, an Israeli IRC survey respondent had only one recommendation for improvement to the program was: "add Israel back into list of countries eligible for application." Putting the same sentiment somewhat more diplomatically, a Slovenian IRC suggested "Again include all foreign countries and not only to those with GDP below 10.000 USD. My research in last two years was very dependent on FIRCA money but unfortunately I cannot apply for a renewal as Slovenia has GDP above 10.000 USD [sic]."[36]

Other proposed eligibility restrictions

In addition to the eligibility restrictions by research topic and collaborating country discussed above, USPI and IRC survey respondents were also asked for their opinions on restricting eligibility by IRC career stage or previous application for a FIRCA or AIDS-FIRCA grant. Specifically, they were asked to evaluate these two propositions: 1) "restrict awards to teams where the International Research Collaborator is at an early stage of his or her career (e.g., within 10 years following the receipt of a Ph.D. or an equivalent degree)"; and 2) "restrict awards to first time applicants only (both USPI and IRC must be first time applicants)." Restrictions based on prior application status were favored by fewer than 4% of respondents in all groups (Table 6.8), although this might be expected based on the fact that every respondent would necessarily have been excluded from re-application under this proposition. As might be expected, enthusiasm for restrictions based on career stage of the IRC was not overwhelmingly high among any group of respondents. USPI respondents were significantly more likely to favor such restrictions than were IRCs.

[36] Note that the actual per capita GNI threshold is $9000.

Table 6.8

USPI and IRC Surveys: Percentage Respondents Supporting Proposed Restrictions on Eligibility Unrelated to Existing Research Capacity or Topic of Research

Proposed Restriction	Percent of FIRCA IRCs	Percent of FIRCA USPIs	Percent of AIDS-FIRCA IRCs	Percent of AIDS-FIRCA USPIs
Restrict awards to teams where the International Research Collaborator is at an early stage of his or her career (e.g., within 10 years following the receipt of a Ph.D. or an equivalent degree)	8%	17%	4%	22%
Restrict awards to first time applicants only (both PI and IRC must be first time applicants)	1%	2%	0%	4%

Source: Abt Associates Inc. analysis of USPI survey question 4.6 and IRC survey question 14.

Note: FIRCA USPIs were significantly more likely to favor early-career restriction than FIRCA IRCs ($p<0.01$, chi-squared statistic=7.49, df=1), and AIDS-FIRCA USPIs were also significantly more likely to favor it than AIDS-FIRCA IRCs ($p<0.05$, chi-squared statistic=3.90, df=1).

Table 6.9 summarizes the views of respondents to the USPI and IRC surveys regarding eligibility restrictions. It should be noted that these results are not strictly comparable since IRCs were not asked to evaluate the options of restricting eligibility with respect to existing research capacity in-country or by institution. IRC survey respondents overwhelmingly opposed the imposition of any additional eligibility restrictions on the program. Unprompted by any specific request for comments on this matter, one Russian FIRCA IRC stated, "I want to stress that this is very important for development of fundamental science and international collaboration that FIRCA program does not have any restrictions." USPI survey respondents were not as broadly opposed to the imposition of additional eligibility restrictions, with more than half (58%) favoring restrictions based on some combination of research topic, research capacity of collaborating country or institution, IRC career stage, or previous application status.

Table 6.9

USPI and IRC Surveys: Percentage Respondents Favoring Any Suggested Restrictions

	USPI	IRC
Number and percentage of FIRCA survey respondents favoring any restrictions	121 (58%)	23 (11%)
Number and percentage of AIDS-FIRCA survey respondents favoring any restrictions	8 (30%)	3 (12%)

Source: Abt Associates Inc. analysis of USPI survey question 4.6 and IRC survey question 14.

6.4.3 Application and Reporting Issues

Paperwork burden for the USPI

The current structure of the program places the majority of the paperwork burden on the USPI, while most of the funding is intended for the IRC—and even that amount is small relative to the parent grant. Nevertheless, only a very small percentage of USPI survey respondents reported that "excessive requirements from NIH" represented a challenge to collaboration (6% of FIRCA USPI survey respondents and 7% of AIDS-FIRCA USPI survey respondents; Appendix D, question 4.5A). Of the 8 FIRCA USPIs who indicated that they would not recommend the program to a colleague, 6 indicated that the reason was a high administrative burden relative to the amount of funding they could expect to receive. One USPI commented that "a FIRCA should be pursued realizing that it is generally an altruistic exercise for the USPI."

Paperwork burden for the IRC

Like the USPIs, IRCs also appeared to view NIH requirements as reasonable, with only a small number (3% of FIRCA IRC survey respondents and 7% of AIDS-FIRCA respondents) listing "excessive administrative requirements from NIH" as a challenge (Appendix E, question 12). Site visitees also indicated that, relative to other grant programs with which they were familiar, the paperwork burden associated with FIRCA was equivalent or slightly less burdensome.

Most IRC site visitees also expressed their appreciation for the fact that the USPI bears the majority of the paperwork burden. However, a few were concerned that their lack of familiarity with NIH application and reporting requirements forced them to rely heavily on assistance from their USPIs. Some IRC survey respondents echoed this sentiment, with one Hungarian IRC commenting that:

> The information provided about filling the grant application forms assume that one has experience with the NIH grant procedures. Although the USPI necessarily has this experience, the application process could be made faster and easier if a separate set of information/guide was compiled for the foreign investigator that would explain the things they need to do and forms to fill without relying on previous knowledge about NIH grant procedures.

Another IRC survey respondent drew attention to a more intangible aspect of the reliance of the IRC on the USPI to negotiate the application process: "It would be desirable to explicitly give the Foreign collaborator the status of PI (Foreign PI perhaps). As it is, the Foreign collaborator's participation does not receive proper recognition during the application process and tenure of the grant." Such comments suggest a desire on the part of certain IRCs for a more equal role in the collaboration and an independent relationship with FIC.

On the issue of NIH procedures, however, other IRCs took a more optimistic view. A South African IRC commented that she "learned a lot about the NIH systems from taking part in major portion of the grant writing." In fact, as discussed in Chapter 5, many IRC survey respondents reported that participation in the program had improved their grant-writing skills (Appendix E, question 11). Initially unfamiliar with the NIH application and review procedures, some IRCs even expressed

appreciation for the thoroughness of the application process, such as the Czech IRC survey respondent who commented that: "Filling forms and putting together all material for NIH was rather time-consuming task, it is true. However, later on, when I realized and was informed how precise was an act of deciding who will be or not will be awarded, I found it reasonable."

6.4.4 Review Process

FIRCA review process and selection of study section members[37]

The review process for any given cycle begins with an administrative review of all applications; any incomplete or ineligible applications are discarded at that time. During a conversation with the Abt evaluation team, the FIRCA study section scientific review administrator (SRA) estimated that about 5-10 applications (out of a total of around 95) had been discarded because of missing information in the most recent review cycle. Next, the remaining applications are assigned to a generic subject area. Applications are then channeled to the most appropriate reviewer on the study section for scoring, after which final scoring recommendations are discussed by the study section as a whole. The review process for renewal applications differs only slightly from the review process for new applications, and all applications received in a given cycle are considered part of the same competitive pool.

A list of the 33 generic subject areas in use since 2002 was provided to Abt by the FIRCA study section SRA; Table 6.10 lists the 19 subject areas to which at least 10 applications were assigned in that time period. As delineation of subject areas and assignment of specific proposals was done for convenience rather than by careful application of rigorous coding criteria, there is potential for overlap in many of the categories; Table 6.10 should therefore be interpreted as suggestive rather than definitive. While most of the subjects areas listed are traditional fields of basic biological, chemical, or medical research, 12 applications were assigned to the subject area "behavioral science", and another twelve were assigned to other social science subject areas (e.g., "social science"(7), "psychology" (2), "economics" (2), and "anthropology" (1)).

[37] AIDS-FIRCA proposals were reviewed by existing NIH HIV/AIDS study sections. Because these study sections were not unique to or established specifically for AIDS-FIRCA, members were not interviewed for this evaluation.

Table 6.10
Administrative Data: Most Frequently Assigned Generic Subject Areas for FIRCA Applications, between February 2002 and July 2005

Subject Area	Number of applications assigned, 2002-2005	Subject Area	Number of applications assigned, 2002-2005
Biochemistry	100	Pathology	15
Neurobiology	63	Neurology	15
Immunology	59	Developmental Biology	14
Parasitology	31	Electrophysiology	14
Chemistry	31	Epidemiology	14
Cell Biology	30	Molecular Biology	14
Genetics	29	Virology	12
Endocrinology	25	Behavioral Science	12
Physiology	23	Cardiology	10
Microbiology	20		

Source: Information provided by NIH Scientific Review Administrator.

Given this variation in scientific research topics included in the applicant pool, the primary consideration in recruiting and selecting study section members is necessarily to cover as broad a spectrum of scientific expertise as possible. The NIH SRA added that he also seeks members who are able to review beyond boundaries. All study section members interviewed agreed that the study section is adequate to the difficult task it faces, and several made a point of crediting good management by the NIH study section head. Nevertheless, applicants who do not receive funding often appeal on the basis that there was no reviewer on the study section with adequate expertise in their research area.

Interpretation of review criteria by the study sections

Interviews with both the NIH FIRCA study section representatives and the program officer suggested that the introduction of the sustainable research capacity program objective in 1998 represented a challenge for review and scoring of applications. In the 1998 RFA, the sustainable research collaboration program objective was described by a series of questions:

> Does the collaboration have the potential to enhance the research capability of the foreign collaborator and the foreign site? Does the research constitute a substantial scientific endeavor for the foreign collaborator, including creative and scientific input to the research proposal? The foreign site and investigator should not be used merely to gather biological samples (clinical, plants, etc), or behavioral data (interviews, surveys, etc). In all cases, the foreign investigator should be actively involved in analyzing and interpreting the data. Is the research on a problem of particular relevance for the foreign country involved? Are the resources necessary to perform the research available or obtainable?

While these questions provide some guidance for applicants and reviewers, they hardly constitute an ironclad definition of "sustainable research capacity." Interviews with FIRCA study section members

revealed that the panel generally identifies two models of "sustainable research capacity" when reviewing applications:

1. The "synergistic" model, in which two established researchers who are already viewed as leaders in their fields collaborate on a project that opens up new possibilities for both participants. Here the contribution to research capacity is generally in the form of intellectual growth for both collaborators.
2. The "mentoring" model, in which a younger IRC, often but not always having spent time working with the USPI in some capacity in the US, enhances or establishes his or her research career through collaboration with the USPI. In this case, sustainable research capacity is increased through the addition of a new or more capable researcher to the country's scientific community.

Of these two models, study section interviewees indicated that the first requires more thorough and thoughtful justification in the grant application. In addition to specifying what is included in their definition of sustainable research capacity building, study section members were also careful to emphasize what it is not. Specifically, interviewees mentioned that applications where either the USPI or the IRC has no record of previous research and applications where the IRC is relegated to the role of sample-collector are not considered to have demonstrated that the application will fulfill the research capacity criterion.

Interviews with study section members included questions intended to reveal how the scientific merit of the application is balanced against capacity building goals in cases where there is tension between them, and in the absence of clear-cut instructions on how to weigh their relative importance. The NIH SRA described the attitudes of two section members with particularly extreme views on the matter; one was generally willing to overlook failure to address sustainable research capacity if the scientific merit of an application was particularly high while the other considered research capacity goals to take precedence in all cases. Interviews with study section members confirmed that views on this matter differed markedly. Regardless of their personal opinions with respect to the relative importance of capacity building, however, all study section interviewees expressed confidence that the full study section is effective at identifying the best applications.

Study section interviewees were also careful to stress that it is not the case that renewal applications are preferred over new applications, although some members seemed more receptive to renewals than others. In particular, interviewees emphasized that a renewal application must demonstrate both an outstanding collaborative relationship and that significant progress has been made, especially relative to other renewal applications. For instance, one study section interviewee described a situation where the panel had to decide between two renewal applications. One application included a single collaborative publication while the other included twelve.

The review process and the IRC

Comments offered in response to the open-ended questions on the IRC survey suggest that there may be considerable frustration among IRCs regarding the review process, particularly for renewal applications. For example, to explain why he would not recommend the program to a colleague, one Russian IRC survey respondent offered, "because evaluation criteria are vague and are subject for

personal biases." A Hungarian IRC commented that, "I had great experience during the award period, however, I feel strange how the renewal of our grant was handled." Finally, a site visitee in Uruguay described receiving a higher score on her unsuccessful renewal application than she had on the initial application; she could not understand how an application with a lower priority score could have been more successful in obtaining funding.

Still other IRCs seemed baffled by specific comments received from reviewers. For instance, one IRC site visitee complained that his renewal application resulted in some comments that the first three years had been "lackluster" despite the publication of several articles in top journals including *Science.* The comment led him to wonder what more the reviewers could possibly have been looking for. A Chilean IRC survey respondent commented:

> In our renewal one of the reviews said that there was basically no collaboration between us since most of the work was done in Chile. However, if one read the instructions, that is the main point of the grant; i.e., most of the work should be done at the foreign site as it should complement work that already is being done in the USA as part of the parent grant. I think the FIRCA chairmen should make this issue clear to the reviewers, since due in part to that comment our grant was not renewed.

An Eastern European site visitee expressed frustration when he re-submitted a renewal application that incorporated corrections and feedback received from the first study section panel only to have a second panel criticize him for making the changes recommended by the first one.

While a certain amount of resentment and negative feeling among rejected renewal applicants may be inevitable, such comments suggest that efforts to increase understanding of the review process and criteria among IRCs may be beneficial. An obvious place to start would be with the study section members who write the comments and summary statements; however, interviews with study section members revealed that most reviewers are already conscious of the fact that the IRC is likely to be one of the people reading their comments. One study section interviewee emphasized that he tries to couch his language in terms that will not be intentionally hurtful to the IRC, even if the IRC is the primary weakness of the application. Nonetheless, he emphasized that the IRC is only one of several target audiences for the comments and that they must ultimately be adequate to justify the score given to the application. Several other study section members commented that they see it as the job of the USPI to help the IRC to negotiate the application and review process; if that is not happening, they suggested, then perhaps it is an indication that the collaborative relationship is not worthy of continued FIRCA funding.

6.4.5 Awareness of Program Among Stakeholders

Publicity for the FIRCA program

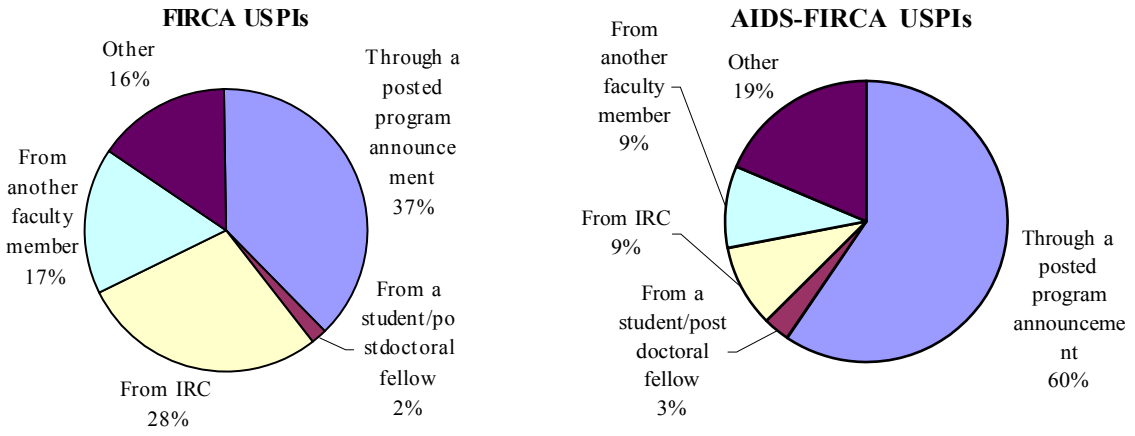
Throughout the life of the program, the FIRCA and AIDS-FIRCA programs have been advertised through standard NIH program announcements that are available through the NIH Guide to Grants as well as on the FIC website. For the most recent round, the Program Officer also e-mailed the FIRCA mailing list. In 1998 only, the program was advertised in the journals *Science* and *The Scientist*.

Awareness of the program and satisfaction with publicity among participants

When asked whether they believed that the program was appropriately advertised at the time they received the award, the large majority (84 % of FIRCA USPI survey respondents and 85% of AIDS-FIRCA USPI survey respondents) expressed their satisfaction.

Figure 6.2 summarizes the results of USPI survey question 4.1, in which respondents were asked about how they had first heard of FIRCA. Many (38% of FIRCA awardees and 61% of AIDS-FIRCA awardees) reported having first heard of FIRCA through posted program announcements. Several respondents who chose "Other" nonetheless listed the FIC Internet site as their primary source of information, a misclassification error that likely resulted in an underestimate of the importance of posted program announcements indicated by the survey results. However, a substantial number of USPIs reported that they had heard of the program through other sources. Of the remaining 16% of respondents who answered "Other" and did not mention the FIC website, common mechanisms listed were contact with FIC staff members, colleagues, and former awardees, suggesting that word-of-mouth is an additional mechanism for program promotion.

Figure 6.2
USPI Survey: How FIRCA and AIDS-FIRCA USPI Respondents Reported Having First Heard of the Program



Source: Abt Associates Inc. analysis of USPI survey question 4.1.

When asked whether certain modes of communication would have alerted them more rapidly or have been useful in recruiting other researchers or faculty members, a majority of USPI survey respondents (66% of FIRCA USPIs and 63% of AIDS-FIRCA USPIs) identified website links and announcements as a useful strategy. Approximately half of respondents identified mailings to potential applicants as a useful strategy, while many (40%% of FIRCA USPIs and 30%% of AIDS-FIRCA USPIs) favored advertisements in biomedical journals. The majority of suggestions listed under "Other" fall under the umbrella of direct mailings or emails to all or targeted groups of NIH grant recipients.

Because of constraints on the number of questions that could be included in a text-based survey, no data were collected directly from the IRCs with respect to how they first became aware of the program. Nevertheless, the high percentage of IRC respondents who claimed to have recommended the program to colleagues (87% of FIRCA and 79% of AIDS-FIRCA IRCs) suggests that word of mouth may play an important role in raising program awareness among potential IRCs.

> "It would be wonderful if the FIRCA could be experienced by other young investigators. Perhaps, the program should be more well known."
> –FIRCA IRC (Brazil)

Awareness of the program through partnerships with other NIH Institutes and FIRCA USPI parent grants

Survey results suggest that few USPIs hear of FIRCA as a result of direct communication with NIH. At the same time, USPIs surveyed suggested that direct mailings to potential applicants may be one mechanism for further spurring participation. Partnerships by other ICs in the FIRCA program offers one potential mechanism for increasing contact between NIH program staff and their grantees regarding the existence and potential attractiveness of the program for U.S.-based principal investigators and their international collaborators. As discussed in Chapter 1, during the period of the evaluation participation by other ICs in the FIRCA and AIDS-FIRCA programs was relatively limited, with NCI participating briefly in the early 1990s in FIRCA, and other ICs becoming involved in 2002: NIEHS in FIRCA, and NICHD, NIDCR, and NIMH in AIDS-FIRCA. Comparing these lists of partners with historical award data by IC from Chapter 3 (Tables 3.5A and 3.5B) suggests that USPIs were not using grants from partnering ICs as the basis for their FIRCA and AIDS-FIRCA awards. While the effect of expanding program partnerships on applications and awards could not be assessed – as only one year's worth of awards was included in the evaluation – anecdotal evidence suggests that partner ICs do "market" the program to their grantees, resulting in an increase in applications from investigator communities that previously have been less likely to participate in the program.[38]

Awareness of the program among potential IRC applicants

The question of whether the program is well known in the international research community was not addressed directly by this evaluation. However, given that nearly 30% of USPI survey respondents claimed to have heard of the program through their IRC, awareness of the program among potential IRC applicants would seem to be important to generating applications.

When asked whether they had a sense of the quality of the FIRCA applicant pool relative to other FIC, NIH, and international grant programs, study section interviewees were generally satisfied. Several added that the requirement for all USPI applicants to have received prior NIH research support likely helps to bring the applicant pool up above the curve. From interviews with FIC staff, Abt learned that satisfaction level with the FIRCA applicant pool relative to other FIC programs such as GRIP is generally high.

[38] Email from Dr. Kathy Michels, FIRCA program officer, October 2005.

6.4.6 Duration of Grant Period and Competitive Renewal Policy

The maximum duration of the funding period for both FIRCA and AIDS-FIRCA has always been 3 years, with a minimum of 1 year required until 2002. No-cost extensions of the grant period are approved on a case-by-case basis. Satisfaction among participants with the duration of the grant period was assessed directly in both the USPI and IRC surveys, with about 30% of FIRCA IRC survey respondents claiming that the project period was too short and 24% of FIRCA USPIs making the same claim (Appendix D, question 4.5A; Appendix E, question 12).

USPIs who responded the duration was a challenge were also asked to estimate the additional time needed; the mean response among FIRCA USPIs was 18 months with a standard deviation of 9 months and the median response was 12 months (Appendix D, question 4.5D). USPIs were also asked to evaluate whether it would be beneficial to the program to award smaller 'planning' grants with a shorter award periods. Approximately 18% of FIRCA USPI survey respondents reported favoring such a change (Appendix D, question 4.6), although it is not clear whether respondents interpreted the question to mean that the 'planning' grants would be used to replace or supplement the current FIRCA grant program.

> "We have had a great interaction over these 3 years and both groups profited from the different knowledges both the USPI and the foreign PI have. The project is going really well, however, the renewal application was not approved. This will be a big drawback for me and I am hoping I'll get the possibility to apply to other source of collaborative funds to keep this wonderful collaboration and project going." – Chilean IRC

Attitudes of program participants towards the renewal policy are more difficult to assess. Overall, about 30% of FIRCA IRC survey respondents and 26% of FIRCA USPI survey respondents reported that they had applied for a renewal following completion of the original FIRCA grant. As reported in Table 6.8, enthusiasm for restricting awards to first time applicants only was almost nonexistent. Comments from IRC survey respondents whose renewal applications were denied suggests that many IRCs were very much in favor of the renewals, at least with respect to their own grants.

6.4.7 After FIRCA: Continuing Long-Term Collaboration

Among international research support mechanisms, FIRCA appears to be relatively unique in seeking to build sustainable research capacity through research collaboration. USPI survey respondents were asked to evaluate whether a number of post-FIRCA activities would improve long-term collaborations between program participants; results are shown in Table 6.11.

Table 6.11

USPI Survey: Other Activities FIC Should Support to Improve Long-term Collaborations Between Program Participants

	Number of FIRCA respondents in favor	Percent of FIRCA respondents in favor	Number of AIDS-FIRCA respondents in favor	Percent of AIDS-FIRCA respondents in favor
Allow more than one renewal of FIRCA grant	146	68%	16	59%
Create a web site for the participants	83	39%	13	48%
Sponsor alumni meetings	61	29%	8	30%
Publish a newsletter	33	15%	6	22%
Establish an alumni organization	23	11%	1	4%
Other.	20	9%	4	15%
No additional activities	15	7%	4	15%

Source: Abt Associates Inc. analysis of USPI survey question 4.3C

When asked whether one award plus a single renewal would give an international collaborator enough research experience to successfully compete for an NIH R01 research grant, one study section interviewee stated bluntly that it usually is not, especially in light of the attitudes of most R01 study sections regarding the wisdom of sending scarce US research funds abroad. Another study section member expressed the opposite opinion. Still others felt that making the IRC competitive at the R01 level was not a reasonable goal for FIRCA.

For IRCs who "graduate" the program but are not yet ready to compete for research funds internationally, there would seem to be few additional options. Both USPI and IRC participants have reported that it can be difficult to find funding for collaborative research. For instance, one Czech IRC commented that, "my third application was refused from competition because my lab was too advanced already. However, I am still interested in collaboration with my former USPI and so is he." One USPI, interviewed regarding his multiple FIRCA grants, expressed dismay that his former collaborator in the Czech Republic had difficulty finding funding after the renewal option had been exhausted. Most suggestions offered by USPIs and some IRCs to improve the situation centered on providing time and resources to help researchers explore opportunities for continued funding. A Brazilian IRC survey respondent commented that, "it would be interesting if Fogarty could direct international collaborators that are finishing their grants to sites or agencies in search for possibilities of grant funding for International Scientists." Several USPIs suggested small travel grants for FIRCA alumni, while others felt that FIRCA conferences or in-country workshops would help with recruiting as well as continued collaboration. Finally, one USPI also suggested creating a fellowship program to support a few of the most deserving IRCs after FIRCA. Another possibility discussed by FIC stakeholders would be to give IRCs access to the FIC GRIP program, which is not currently open to FIRCA alumni.

7. Evaluation Findings and Recommendations

7.1 Chapter Structure

This chapter summarizes the main findings and recommendations that emerged from this Outcome Evaluation. Except where specified, these findings apply to the FIRCA program only. Findings are organized according to the Assessment Criteria outlined in the FIC Framework for Program Assessment (see Appendix A). Following the findings, recommendations are made in the categories of Program Planning and Program Management.

7.2 Findings

7.2.1 Program Planning

- ***FIRCA program goals have shifted over time to explicitly incorporate sustainable research capacity building in addition to promoting international research collaboration.*** While ambitious and innovative, the simultaneous implementation of these goals can present substantial challenges for program management and may strain program resources. Nevertheless, the dual goals appear to be entirely consistent with FIC priorities and stakeholder expectations.
- ***FIRCA was a pioneer in the area of building sustainable research capacity through support for collaborative research, but it is currently one of several international research funding programs pursuing this strategy.*** Although FIRCA remains the broadest program in terms of geographic distribution and research topics supported, CRDF currently provides more awards and HHMI provides larger ones.

7.2.2 Program Management

- ***Changes in program management have in general been responsive to the needs of participants.*** Examples include the evolution of the allowable expenditure rules to include salary support for the IRC, administrative costs at the IRC institution, and travel to international scientific conferences.
- ***Complications associated with transfer of equipment from the US to the IRC country and funds from the USPI institution to the IRC represented the most frequent, severe, and multi-faceted set of challenges with respect to grant management.*** Specific challenges have included substantial administrative time investment at both ends, variable levels of administrative expertise and flexibility at USPI institutions, significant time lags for reimbursement, excessive taxation in the IRC country, and customs and shipping delays. Such problems have caused many IRCs and some USPIs to question the wisdom and efficiency of channeling funds through the USPI institution.
- ***Interpretation of the sustainable research capacity building program goal has largely been left up to the FIRCA study section.*** Study section members appear to share a common definition of sustainable research capacity building, but opinion varies widely on how to negotiate the tension between capacity-building goals and project selection based on

scientific merit. Nevertheless, the study section appears to be well-managed and willing to engage in thoughtful deliberation on these issues.

- ***The review process appears to be effective in selecting pairs that will collaborate successfully.*** Two distinct lines of evidence support this finding: 1) the USPI and IRC surveys indicate that pairs are collaborating during and after the award; and 2) the publication analysis suggests that the regions from which most successful applicants are chosen (Americas and Central and Eastern Europe relative to Asia and Africa) are those where collaborations are more likely to be successful.
- ***Apart from the Program Announcements, word of mouth is the most important mechanism through which members of the international research community become aware of FIRCA.*** Most USPIs who responded to the survey claim to have first heard of FIRCA through a posted Program Announcement or learned of it through a colleague, former student, or collaborator. The vast majority of USPIs responded that they would recommend the program to a colleague, and most IRCs responded that they had already done so.

7.2.3 Partnerships and Communication

- ***The historical lack of a formal relationship between FIC and the IRC may have enhanced perceptions that are counterproductive to program objectives.*** In choosing to communicate exclusively with the USPI and channel funding through the USPI institution, FIC may be contributing to a perception among participants and stakeholders that IRCs are not viewed as equals in the collaborative process. Such a perception could undermine program goals and impacts in a variety of ways; examples include negative impacts on confidence among IRCs; failure of foreign administrators and policy-makers to fully recognize the prestige of the FIRCA award, and negative impacts on intangible benefits such as promotion of cooperation and goodwill in the international research community.
- ***Partnerships with other NIH Institutes and Centers have historically been limited.*** Program partners for FIRCA have been limited to the National Cancer Institute (1992 only) and the National Institute of Environmental Health Sciences (since 2002). AIDS-FIRCA had more partnerships, with the National Institute of Dental and Craniofacial Research, National Institute of Child Health and Human Development, and National Institute of Mental Health all participating from 2002 to 2003. The National Institute of Allergies and Infectious Disease has historically not participated despite the overlap of its mission with AIDS-FIRCA program goals.

7.2.4 Results

Following from the dual program goals, the main outputs, outcomes and impacts of the FIRCA program fall into the categories of international research collaboration and sustainable research capacity building. AIDS-FIRCA results are considered separately in the context of the decision to discontinue the program.

International Research Collaboration

- ***Many grantees had begun their collaboration before receiving their first award.*** Nearly half of grantees (46% of FIRCA researchers, and 43% of AIDS-FIRCA researchers), had had

at least one previous collaborative publication. The large majority of survey respondents – USPIs or IRCs, FIRCA or AIDS-FIRCA awardees – indicated that they had begun their collaborations (regardless of whether or not they had published together) before receiving an award.

- ***Collaborations generally were successful in producing international-quality science.*** Approximately three-quarters of USPI-IRC pairs have produced one or more peer-reviewed journal publications that were identified by the MEDLINE searches, surveys, or grant reports. For both FIRCA and AIDS-FIRCA, grantees produced an average of just over three collaborative, attributable, publications per collaboration, with nearly ten percent of FIRCA collaborations resulting in ten or more collaborative publications subsequent to award. Bibliometric analysis suggests that the quality of the funded science met international norms.
- ***'Value' of publications emerging from FIRCA.*** Given the publication productivity of FIRCA awards (4.4 publications over three years) for a cost of $100,000 total, a simple comparison to recent statistics about R01 publications yields an approximate $23,000 per FIRCA publication vs. $96,000 for each paper from an R01. R01s yield about 2.48 publications annually, and after adjustments, 7.6 MEDLINE papers over four years of a grant. (Druss, BG, Marcus, SC, Tracking publication outcomes of National Institutes of Health grants, Am J Med (2005), 118, 658-63) While the FIRCA award is tied to a parent grant, many of the FIRCAs are loosely tied to the content of the R01. This type of comparison should be carried out in more depth and over time, in order to assess 'value' added of the FIRCA awards for this outcome metric.
- ***The majority of collaborative relationships are between scientific peers.*** The USPIs surveyed reported that they generally played a co-equal role with their IRCs, while the IRCs surveyed reported that they were generally equals as well, though a minority indicated that that the developing-country scientists played the predominant role in the collaboration.
- ***Collaborations between USPIs and IRCs continue after the award itself concludes.*** Approximately ninety percent of survey respondents whose grants have ended – whether USPIs or IRCs, FIRCA or AIDS-FIRCA – are continuing their collaboration in some form. More than thirty percent of grantees whose awards ended five or more years ago have continued to co-publish.
- ***While FIRCA and AIDS-FIRCA have on the whole been successful in promoting sustainable research collaboration, there are variations in the extent of that success:***
    - USPI-IRC pairs who had collaborated prior to receiving the FIRCA not only were they more likely to publish together after their award; they were also likely to publish together more often after the award.
    - IRCs from certain regions (e.g., Latin America, Eastern Europe, Former Soviet Union) tended to collaborate more strongly during the award period than those from other regions (e.g., Africa, Asia, Western Europe); collaborating pairs whose IRCs hail from countries classified as "middle-income" tended to collaborate more strongly than those from either "high-income" or "low-income" countries.

Sustainable Research Capacity Building

- ***The program has been highly successful in developing the potential of the individual international investigator.*** The program helps to foster highly-skilled scientists and often allows them to pursue career paths that would otherwise not be possible. Through the

purchase of equipment and consumable supplies, IRCs gain valuable resources that are often not available through other local and international grant programs. The program also fills a unique capacity building niche in the allowance for travel funding and salary supplementation. An important facet of capacity building lay in the learning and development of new techniques that are diffused throughout individual labs, departments, and institutions. For junior researchers, FIRCA and AIDS-FIRCA often acted as a re-entry grant to help launch careers; for more senior researchers, the program allows sustainability of high quality research, especially in countries where local funds for research are limited. The career benefits are manifest for FIRCA and AIDS-FIRCA researchers alike at all career stages and from all regions of the world. The benefits are both immediate in term of prestige and long lasting in terms of international credibility-building.

- ***Nevertheless, the program alone may not be sufficient to allow IRCs to compete successfully at NIH.*** At least ten percent of IRCs have received additional international funding subsequent to award from NIH and other organizations such as CRDF and HHMI. But both the USPI survey results and the study section member interviews suggest that investigators believe that that FIRCA or AIDS-FIRCA has not been sufficient to allow most IRCs to compete successfully at NIH, despite the career-building advantages that it does provide.
- ***Awards are not only beneficial to individual IRCs, but they also impart "second generation" effects to students through training, travel, and education opportunities.*** The majority of IRCs used funds to train students and to send them abroad to the USPI laboratory. In many cases students were the primary carriers and diffusers of new techniques or methods from the USPIs' laboratories to IRC laboratories and institutions – a key capacity-building effect.
- ***Programmatic influence often extended to the institutional level, especially in middle-income countries.*** An important facet of capacity building lay in the learning and development of new techniques that are diffused throughout individual labs, departments, and institutions; at many institutions, equipment and consumables were also shared institutionally. Evidence of institutional capacity building, however, tended to be greatest at institutions where researchers had multiple sources of international funding – although at such institutions, FIRCA or AIDS-FIRCA funding was one of the first sources of international funding that was secured. The program appears to have catalyzed the formation of several large-scale research networks in which former IRCs who have "graduated" from the program play key roles. Many of these larger-scale successes appear to be in middle-income countries, especially in Latin America, Eastern Europe, and the Former Soviet Union, although the relationship between countries' income level and success is confounded by the fact that other international programs such as CRDF and HHMI have been highly influential in this group of countries as well.
- ***Funded science tends toward basic research, though there are examples of IRCs who pursue translational research or policy impact, depending on the inclinations and abilities of the individual investigator.*** Many researchers praised the program for allowing them the freedom to pursue pure, basic research in environments where they are usually pressured to produce applied, tangible results. There were several examples, however, of IRCs translating research into clinical practice or into public policy.

Findings Regarding AIDS-FIRCA

Although the AIDS-FIRCA program has been discontinued, it remained in existence during the period included in the evaluation. While the evaluation did not focus specifically on the AIDS-FIRCA program, two findings regarding it emerged.

- ***Many of the concerns among FIC program staff members regarding past trends in AIDS-FIRCA application and renewal rates are substantiated by evidence from both the Feasibility Study and the Outcome Evaluation.*** FIC program staff members stated throughout the evaluation that the AIDS-FIRCA program had been receiving fewer applications, that the quality of the applicants was lower, and, most significantly, that fewer AIDS-FIRCA awardees were applying for renewals. These concerns are borne out in the analysis of application rates conducted during the Feasibility Study. Survey results further support the belief that more AIDS-FIRCA recipients applied for additional funding outside of FIC.
- ***Nevertheless, most AIDS-FIRCA program outcomes were virtually indistinguishable from those of its sister program.*** Along many key outcome dimensions – including formation of new collaborations, average publications per award, and publication quality – AIDS-FIRCA awards appear to be statistically indistinguishable from FIRCA awards.

7.3 Recommendations

The following recommendations for future program planning and management are based on the results and findings of this report. They are intended to guide FIC in applying the insights gained through the Outcome Evaluation as it moves forward with the FIRCA program.

7.3.1 Recommendations to Improve Program Planning

FIC must be the ultimate arbiter and interpreter of program goals and priorities. While the results of the Outcome Evaluation cannot reveal what strategy FIC ought to pursue, they suggest that the current strategy has been quite successful.

- ***Retain both collaboration and capacity-building goals, despite the potential tensions between the two and the complexity of the sustainable research capacity building goal.*** Perhaps the most important insight to emerge from this evaluation is that sustainable research capacity building is a multi-faceted process that occurs on a variety of levels. The current FIRCA program strategy is to cast a wide net, and collaboration and capacity-building outcomes are accordingly varied. The present breadth and flexibility of the program is viewed by both FIC and grantees as an asset, and there is little question that these are the qualities that make FIRCA unique among providers of funds for international research collaboration. On the other hand, narrowing the goals or clarifying priorities might help FIC to convert program resources into targeted outcomes more efficiently; for instance, resources could be channeled to projects likely to have the most positive effect on the career of the foreign collaborator or pre-existing collaborations likely to be most productive after the award.

- ***Retain the breadth of research topics and geographic scope.*** Outcome evaluation findings suggest that investigators are satisfied with the breadth of research topics – allowing researchers to engage in basic or translational research as they choose. While IRCs in more highly developed nations were unhappy with the recent decision to limit the FIRCA program based on countries' GDP, the finding that collaborations between USPIs and IRCs from middle-income nations produced a higher publication rate than those from high-income nations, coupled with the more speculative observation that the awards were more likely to have large-scale capacity-building effects in middle-income countries, supports FIC's decision.
- ***Should FIC create FIRCA-like programs targeted toward specific research topics or geographic areas, embed performance measurement strategies into these new programs to discern whether such new programs meet the level of quality of the parent program.*** Creating a new arm of the collaboration award has the potential to expand FIRCA's penetration into new communities of investigators. Evaluation findings suggest, however, that any "carve-out" awards may be viewed more favorably by those investigators in the specific sub-pool than by the general biomedical science community, and that the specific sub-pool may not be sufficiently large or engaged to generate high-quality applications. Any such program, therefore, should be monitored closely to ensure that it meets the level of quality of the program as a whole. The AIDS-FIRCA experience suggests that program staff should closely monitor metrics such as: 1) application rate and quality; 2) changes in the frequency distribution of research topics in the applicant pool; and 3) the rate of re-application. Should such metrics diverge from statistics for the parent FIRCA program, or otherwise change dramatically over time, it would suggest additional management attention to, or rethinking of, the new program.

7.3.2 Recommendations to Improve Program Management

- ***Support IRCs in developing a viable "exit strategy***." The finding that the program alone is not sufficient to allow its IRCs to compete successfully for NIH funding suggests that programmatic change to assist IRCs in developing programmatic "exit strategies." One possibility lies in allowing IRCs to apply to the program as principal investigators; winning a FIRCA grant as principal investigator rather than as a collaborator would enhance the IRC's prestige, as well as proving him or her able to successfully write NIH-level grants. Other possibilities include providing resources to help IRCs identify other international research funding programs or training in skills such as grantsmanship that could assist IRCs in transitioning to full independence.
- ***Should FIC allow IRCs to apply as principal investigators, it may be necessary to create separate review criteria for such situations, or even a separate competition for FIRCA applications.*** Many of the current study section members interviewed for this Outcome Evaluation emphasized that the FIRCA applicant pool tends to be of particularly high quality because every USPI has successfully applied for and received NIH support at the R01 level. In contrast, most former foreign collaborators submitting new applications are unlikely to have received similar levels of support from NIH or any other source. In the absence of additional guidance from FIC, however, the study section may find it difficult to assign high scores to applications from the newly eligible foreign collaborators. It may therefore be

appropriate for FIC to work with the study section to define criteria for comparing US investigator-led and foreign investigator-led applications.

- ***Establish a direct and formal relationship between FIC and foreign collaborators.*** Allowing IRCs to themselves apply as principal investigators is the most direct mechanism for establishing such relationships. Even short of this change, however, there are opportunities for expanding the relationships between FIC and the IRCs – giving IRCs the sense that they could communicate directly with NIH. Specifically, FIC should strongly encourage IRCs to establish direct communication with the FIC program officer, who is best placed to provide advice on resolving IRCs' administrative concerns.
- ***Consider allowing still more flexible spending of grant funds.*** FIRCA currently is structured to allow for flexibility in spending of grant funds – travel, salary, equipment, consumable supplies, and IRC-institution facilities and administrative costs can all be covered under the award, though there are restrictions on the amount that can be spent in some categories. As illustrated by the broad range of survey responses to the question of how funds were allocated and anecdotes from awardees surveyed and visited for this evaluation, there have been cases where additional flexibility in the expenditure rules would have further enhanced research collaboration. Giving the USPIs and IRCs the flexibility to determine how best to structure their collaboration – subject to review at the applicant stage by the study section and oversight by program staff during the award– may in some cases improve the grant experience for the collaborators.
- ***Disseminate management "best practices" to USPIs, IRCs, and their institutions.*** Although FIRCA as a program is quite flexible in allowing US and developing-country institutions to structure collaborations and transfers of funds, the Outcome Evaluation found that practices vary across universities, and not necessarily to the benefit of the collaborations. Given the difficulties all collaborations face in transferring materials across borders (and that many collaborations face in arranging for people to move freely to and from the US), further institutional-level barriers should be minimized where possible. Creating and disseminating "best practices" (some of which may vary by country or region) to both US and international collaborators and their institutions may reduce barriers to successful collaboration.

Appendix A: FIC Framework for Evaluation

Framework for Program Assessment (Evaluation and Review)
Fogarty International Center
A Performance-based Review Process

I. Goals and Objectives of Assessment

Goal:
The goal of assessment at the Fogarty International Center (FIC) is to:

Provide the tools and information necessary to improve each FIC sponsored program to achieve the FIC mission.

Document progress and successes of the programs.

Provide new directions for FIC programs

Identify role of the programs in fulfilling the FIC Mission:

The Fogarty International Center promotes and supports scientific research and training internationally to reduce disparities in global health.

Identify commonalities among FIC programs

A. Guiding Principles:

- Assessment is a continuous quality improvement, review process.
- The primary responsibility for continuous assessment, reporting and analysis rests at the Program Officer (PO) level.
- Assessment will focus on outputs, outcomes and impacts and mechanisms to ensure that these occur. While reporting of metrics (number of trainees achieving advanced degrees, number of publications etc.) is necessary, meeting stated metric goals can become a check off exercise with little accomplished. Reviews will go beyond metrics and will depend on the basic principle of external peer review and recommendations. Evaluation, on the other hand, will include a major component of data collection and analysis.
- The assessment process will consider innovation, flexibility and risk-taking positively.
- Programs must be assessed against their own goals and objectives, taking into account fiscal resources and granting mechanisms.
- Review and evaluation will use retrospective measurements of the achievements over a certain time period (eventually a cyclical period) based in part on measured quantitative outputs, outcomes and impacts (metrics), as well as success stories and more qualitative outputs, outcomes and impacts. This information will be used to make recommendations for the future.

B. Specific Objectives:

- To stimulate the performance of programs at FIC and to encourage innovative approaches to address problems and issues relating to global health disparities.

- To demonstrate sound stewardship of federal funds and the programs they support.
- To produce guidance for program officers and FIC management, to strengthen programs, improve performance, enhance funding decisions, demonstrate public health and economic benefits, and promote sound program policies, and evaluate mature programs.
- Provide mechanisms to identify program accomplishments to FIC, NIH, HHS, funding agencies, national and international partners and the US Congress.
- Identify, share and stimulate best-management practices for improvement in performance in the FIC programs as a whole.
- To publish the results of the reviews and evaluations in peer-reviewed journals

Elements and Basis for Review and Evaluation

The review and evaluation process is a continuum through a period of time (to be agreed to). It begins with the FIC Strategic Plan. Program plans, in the form of a well-developed Request for Applications (RFA) and Program Announcements (PA) are then developed with the input of the stakeholder community. The program officer will be in charge of ensuring that the appropriate stakeholder community is involved in the development of the program plan and the RFA. The program officer will monitor the progress of trainees and projects and may visit a project to interact with its management team, faculty staff, institutional administration and constituents. If mutually decided, a specialized team of experts can visit a project to advise it and make specific recommendations about specific elements and or issues (review visit). This type of correction can help a project correct itself mid-course rather than wait until the end of the project to terminate it for its weaknesses. The process will culminate with a visit of a group of experts, a Review Panel (RP) during year 4/5 of the program (this will differ from program to program and will depend on the program cycle) or at an appropriate time in the program. During year 9/10 of the program, a program evaluation will take place that will include data collection and data analysis by a contractor who specializes in evaluation.

A key to effective program review is the degree to which the review is normalized to the resources, objectives and program planning of the individual program. Given that each program has different financial resources, utilizes different talent pools with various specialties, faces different issues in host countries, works under unique institutional policies, and uses different approaches to reducing global health disparities, the review should be tailored to take program variability into account.

A. Program Development

The foundation for individual program review is a well-developed program plan that culminates in an RFA. Importantly, planning a program will normally require a two year lead time to allow sufficient input, partnership development and administrative review Each program has its own RFA that, in addition to other materials developed in addition to the RFA act as a strategic plan for that program. The RFA is keyed into the FIC, NIH, HHS Strategic Plan as well as the strategic plans of the program partners. Planning cannot be stressed enough in its importance. It can be based on experience, program results in the past, and stakeholder needs and expectations. Each program should have a plan developed which addressing its goals and objectives. Although

this plan need not be formalized and written down, have a written form will ensure continuity for the program. The program plan can be informed through consultations, workshops, and meetings. It should be specific to resource needs, managing the program to meet those needs, data needs, and data gathering, analysis and storage.

A program plan, reflecting the input of management and constituents, will include:

- Vision and focus of where the program is heading and why;
- Backgrounds on issues and mechanisms for establishing priorities for investment of resources; and
- Goals and objectives and performance milestones targets that provide guidance for evaluating program performance.

Planning is fundamental to program assessment. Developing the understanding, communication and data collection processes necessary to meet the basic goals of the program is necessary. A program should be reassessed and new planning (planning workshops, planning meetings etc.) take place every five years or as appropriate. Of course network meetings can also be used as part of the continuous review and planning for a program.

B. Self-Assessment Process

Each program should conduct self-assessment and analysis on a regular basis in between the program assessments. Each program's self-assessment will be based on performance milestones unique to that program, as well as the criteria given below for all programs. Annual self-assessment can be accomplished at network meetings or following the submission of progress reports from the projects under the program. It is important that the self-assessment will include identification of results, potential problems and mechanisms. Self-assessment and program analysis is a checkpoint in preparation for the program review and program evaluation, which will occur at regular intervals. Analysis of program data should be conducted in conjunction with self-analysis. In some cases, both collection and analysis of program data may need to be contracted out

Data collected by the program could include:

- Reporting major research accomplishments – Publications in high profile journals; citations; trainee training; successful new grant applications; presentations at international meetings (and abstracts);
- Career accomplishments – tracking the path and impact of graduates who have entered a health field, research, academia or government; percentage of trainees returning to country of origin (brain drain issue); membership on scientific or policy committees; membership on advisory panels; analysis against control groups.
- Clinical Benefits – improved understanding of new or existing diseases; improved tools to detect, diagnose, treat, prevent disease; development of treatment or treatment regime for disease.

- Institutional Changes – creation of networks, collaboration among labs; building infrastructure (labs, departments, research groups); provide critical mass; establish political support for institution, project; establish lab as regional center.
- Changing the Research/Health Care Agenda – Documentation of the changes in approach to solving global health care issues (e.g., laws impacted or changed, policies created or altered, awareness altered; media attention), better public health programs.
- Information Use – Documentation of how, when and in what way information was used by the target constituents to implement and/or change the ways they conduct business, use resources, and/or change the quality of life, improve health and treat disease.
- Qualitative Effects – Qualitative description of impact of program on training, health, and social effects – success stories.
- Other

C. Reporting Framework

The key to continuous assessment is regular communication between the PI and the PO. Periodic reporting by the PI should be a routine part of this communication in order to document accomplishments and impacts in meeting program goals. It is this mechanism that specifically allows for qualitative measures of accomplishment to be addressed, such as health and/or economic gains made by implementation of program results. Reporting following significant project events should be mandated (e.g., publications in refereed journals, significant research findings, health care advances resulting from FIC grant activities, technical reports, workshops, special events). Fogarty is currently working on a standard format of quantitative and qualitative measurements and which will allow analysis across many programs.

II. Assessment Criteria

Continuing assessment is designed to strengthen, improve and enhance the impact of FIC. There are several important criteria that reflect the effectiveness of the FIC program and establish benchmarks that describe expected performance levels:

Areas of Assessment:

1. Program Planning
2. Program Management
- **a. Project Selection**
- **b. Recruiting Talent**
- **c. Institutional Setting**
- **d. Program components**
- **e. Human Subjects and Fiscal Accountability**

3. Partnerships and Communication
- **a. Partnerships**
- **b. Communication**

4. Results
- **a. Program Input**
- **b. Program Output**

c. Program Outcomes

Each is described in detail below:

1. Program Planning

Effective programs will use the strategic planning framework of the FIC as well as that of any partners as a basis for developing their RFA based on the needs of the U.S. scientific community, host countries, and as identified in collaboration with stakeholders such as other government agencies, foreign scientists, experts in the field. Effective planning may also involve regional programs. Partnerships with other agencies and organizations are considered important. Program plans will be reviewed annually and amended as necessary. These changes will be communicated to all involved parties (FIC Admin, NIH partners, PIs etc.). Sufficient time should be allotted into the planning process to maximize input and RFA preparation. Program planning will involve input from all consistencies important to the program.

Suggested Indicators of Performance:

- Evidence of a planning process and a plan (priority determination, clear articulation)
- Relevance of program to FIC, NIH IC, HHS strategic plans
- Stakeholder involvement (numbers, duration, roles) in planning
- Integration of input into planning
- Reevaluation of program goals over time
- Strategic planning process

Suggested Questions:

- What was the strategic planning process?
- What role do stakeholders have in setting the goals? The priorities?
- Who provided input for the initiative? How were stakeholders identified? How were they involved?
- How are modifications to the initiative implemented?
- Are the goals difficult, risk taking goals? Do they convey vision?
- How do goals fit into FIC, NIH, HHS strategic plans and initiatives?

2. Program Management

a. Project Selection: The program incorporates an excellent and relevant peer review process selecting those proposals that receive consistently high marks for merit, application and priority fit. The selection/review process should take into account host country needs in the program's scientific area. The program officer role should be well defined.

Suggested Indicators of Performance:

- Review process including: composition of panels, review criteria, quality of feedback to PI, amount of time allowed for review, conflict of interest issues and involvement of program officer

Suggested Questions:
- Under what institute/center did the review take place?
- Is the composition of the review panel appropriate to the program?
- If the program was interdisciplinary in nature, was the panel adequate to address all facets of the program?
- Are the review criteria appropriate and does the panel employ them? Were international issues been taken into account
- What was the role of the program officer in the selection of the panel? In the review?

b. Recruiting Talent: Every program will attract a variety of talent. The best efforts will involve the best talent. The program must have mechanisms in place to identify and attract the best and most appropriate talent available.

Suggested Indicators of Performance:
- Recruitment of new/young investigators; recruitment of foreign investigators; success rate; minority applications; interdisciplinary teams; turnover of investigators

Suggested Questions:
- How does the program advertise its RFA?
- How does the program make certain its RFA attract new talent, international talent and interdisciplinary teams?

c. Program Components: Each program is made up of various projects that come together to form a program. It is the role of the PO to see to it that the various program components have a chance to interact and gain experience from one another. The whole program should have a greater effect than the sum of its parts.
- Network meetings; other meetings/ways at which PIs and/or trainees get together
- Are there networking opportunities available under the Program?
- What are some successful interactions that have been encouraged?

d. Institutional setting: Programs vary in their institutional setting and institutional support. The program should be well supported by both the academic institution(s) involved and the federal institutions involved. There must be appropriate business practices available at both the domestic and the foreign institution for grant implementation to go smoothly.
- Matching funds; mentorship support; laboratory support; administrative support and good business practices
- Does the institution provide additional or matching funds for the program?
- How supportive is the institution for the program?

- How involved is the administration of the institution with the program?

e. **Human Subjects and Fiscal Accountability**– Programs should demonstrate that they have appropriate mechanisms in place to account for federal funds and are properly documenting protocol reviews for human subjects.

Suggested Indicators of Performance:

- Presence of operational IRB; good accounting practices; good documentation practices; assurance that all intended funding is reaching the foreign collaborator and the trainees.
- Is there need for IRB review in this program? If so, does the institution (US and foreign) have a functional IRB? What are its credentials? Have they reviewed projects under this program?
- What role does the foreign institution play re. accounting under this project? How well are expenses documented? Is the funding reaching the foreign collaborator and the trainees? Is the funding being used to support agreed activities?

3. Partnerships and Communication

a. **Partnerships:** federal, national and international partnerships are essential to addressing global health issues. Partnerships should be attracted, nurtured and maintained and will be examined during the assessment process.

Suggested Indicators of Performance:

- Numbers of partnerships; different types of partnerships (NIH, HHS, other federal, international, interdisciplinary, NGOs, industry); involvement of partners in the development of strategic goals; funds from partners; cost of partnership

Suggested Questions:

- How were partnerships developed? What role did management play?
- Do the partners provide a significant contribution in funding or human resources?
- Could the effort have succeeded without the partnership?
- Has the program established long-term relationships that continue to be productive?
- What is the cost/benefit ratio of the partnerships?

a. **Communications**: To be fully successful, scientific results must be communicated to the user community and utilized. During the assessment the link of the program to the user community will be reviewed and

implementation of the science into policy or other working frameworks will be assessed.

Suggested Indicators of Performance:

- Appropriate community input into the strategic planning; informational meeting/training sessions held with community; involvement of community on advisory board of program; involvement of community in selection of trainees; involvement of program in the community; demographics of contacts and efforts; requests for information, presentations; community needs surveys; user community feedback (mechanisms and tracking)

Suggested Questions:

- Has the program defined its user community? Are they identified in the RFA? Do the projects have plans to interact with the user community?
- Are needs assessments of the community conducted?
- How does the program maintain contacts with the user community?
- What methods and tools does the program use to transmit scientific findings and results? How effective are they? Is the program on the forefront of using new technologies to improve their information transfer capabilities? Does the program present results and finding in the ways useful to the community?
- What role do users have in reviewing the progress of the program?
- What are the communication efforts the program makes?
- How satisfied is the user community? Are they getting the information they need? When they need it? If not, why not?
- How do program assess their effectiveness in working with the user community?
- Do the programs have flexibility to adjust and react to unanticipated events that require new research and outreach activities?

4. Results of the Program

Depending upon age of a program, significant results will fall into different categories. The following should be documented and reported, analyzed and evaluated:

a. Program Input – the total of the resources put into the program (funds and as kind input from partners nationally and internationally – any "enabling resources")

b. Program Outputs – The program must be managed to produce program outputs which are the immediate, observable products of research and training activities, such as publications or patent submissions, citations, degrees conferred. In the best sense, quantitative indices of output are tools for the program. They allow POs and PIs to track changes, highlight progress and spot potential problems. Trends and variations in output may be much more significant than observations

of the steady state. Fogarty may eventually use some of this data for benchmarking purposes. (expected for younger and older programs)

Suggested Indicators of Performance:

- Number and list of publications (journal articles, book chapters, reports etc.); number and list of presentations; number of trainees; field of training? Number and type of degrees/certificates earned; number and list of meetings and attendance at meetings.

Suggested questions:

- What type of publications have been produced and how have they been utilized, distributed? Is the publication a direct result of the training?
- What types of students have been trained, in what areas and what degree has been earned?
- What meetings have been held? Who attended? What area was discussed? Was there any evaluation conducted?

c. Program Outcomes – Longer-term results for which a program is designed to contribute, such as strengthened research capacity within the U.S. and foreign laboratory, effective transfer of scientific principles and methods, success in obtaining/attracting further scientific and/or international support. (expected for more mature programs)

Suggested Indicators of Performance:

- Number of laboratories started: number of new grants or new funding procured; scientific methods discovered – number and type; scientific departments started or strengthened; awards received; careers enhanced.

Suggested Questions:

- In what scientific areas were laboratories started? Was this totally lacking or is this supplemental? Do the labs support training? Are they well funded and supported by the institution? What percentage of the time do the PIs conduct research vs. administration and other duties? Is laboratory direct result of training?
- What scientific principles were developed? Who is using them? Are they used internationally? Is methodology a direct result of training?
- Where does the new grant funding/new funding in general come from? National or International? Is the new research funding a direct result of the training?
- Did any trainees or PIs receive awards as a result of training? If so, list and describe how training influenced this.
- Did the training influence any trainees' careers? How? Were they are promotions?

d. Program Impacts – The total consequences of the program, including unanticipated benefits. These can include the influence of research activities on

clinical public health practice or health policy, success in establishing a sustainable career structure, affecting the career path of trainees, changes in health care systems, alterations in health care laws. Demonstrating impacts requires more complex analysis and synthesis of multiple lines of evidence of both a quantitative and qualitative nature (expected for the most mature program).

Suggested Indicators of Performance:

- New policies adopted or advanced; new clinical procedures adopted; new career structure in place: alteration of health care system; alteration of health care laws

Suggested Questions:

- What were the new policies adopted as a result of training provided by this program? How was the trainee or training involved with the policy?
- What new health practice was adopted as a result of training and how was this linked to the training?
- Were any health laws changed as a result of the program and how did this come about?
- Are there any economic impacts that can be demonstrated as a result of training? Environmental impacts? Health care impacts (laws, policies; systems etc.) How do these relate to training?
- Are there any success stories (using the metrics described and others as needed)? How do these relate to the training?
- Is impact local? National? Regional? International?
- Are partners involved in impact? Who are they and how are they involved?

Assessment Roles

A. Role of the Fogarty International Center Advisory Board (FICAB) and FIC Administration

The review and evaluation process and schedule should be proposed at the program officer level and approved at the FIC administration level. It is anticipated that the Advisory Board (AB) will play a key role in assessment, either by chairing or co-chairing the Program reviews or by participating in the teams in some official capacity. Thus, the Program review panels (PRPs) can be considered a subcommittee of the Federal Advisory Committee Act (FACA) chartered FIC Advisory Board. Reports developed by the review panels will be approved and distributed by FIC administration in conjunction with the FIC Advisory Board. FIC will annually communicate the results of all the FIC assessments to the Director of NIH, the Secretary of HHS and to the Congress.

B. The Role of the Program Officer (PO)

The FIC has ultimate responsibility for the excellence and effectiveness of FIC programs. The PO will be responsible for the day-to-day assessment and analysis of the program

progress. The PO will work with the Evaluation Officer to analyze program progress, synthesize program results, and to set up the review or evaluation. Together they will determine the appropriate outside experts to be part of the review as well as determine specifics of the review e.g., dates, sites, presentations, and agenda.

A. Role of the Evaluation Officer (EO)

The evaluation officer, in coordination with the FIC POs and the FIC administration will be responsible for setting the annual schedule for review and evaluation. She will apply for all funds for reviews and evaluations and will work out all budgets with the POs. She will work with the PO to set the agenda and schedule for the reviews. She will provide training for review chairs and members. She will work with review panel to conduct the review write the final report and with the FIC administration on the annual assessment report to the Director of NIH, the Secretary of HHS and to congress. She will schedule an annual meeting of FIC staff to discuss of all the assessments that have taken place in a given year. She will work with other NIH IC s and other experts on assessment to ensure that the Fogarty assessments are current. She will serve as the planner and interface for program evaluations. The EO will be available to work with the PO on program analysis and synthesis of program results.

B. Program Advisory Visit – Make-up and Role

The program advisory visits are more informal designed to enable program officers to make informed mid-course corrections for projects or programs in their portfolios. They should be small in nature and targeted to a specific question or set of questions the program officer feels needs to be addressed. They do not need to be lead by an FIC advisory board member, but that is an option. There should be a summary report following advisory visits.

C. Program Review Panels (PRPs) – Make-up and Role

At five-year intervals a visiting committee, Program Review Panel (PRP) will conduct a formal review of the FIC programs using the formal framework and criteria given in Section III. The panel will be made up of 4-8 members, including at least one or as many as two, FICAB members, and 3 to 6 experienced administrators and decision-makers, health care professionals and scientists as well as people experienced in program review from other disciplines as appropriate. The PRP can include, but not be limited to, persons such as:

- Deans or Associate Deans of Appropriate Colleges or Universities
- World renowned scientists in appropriate fields
- Executives of national and international health care or related agencies
- Executives of national and international health care NGOs
- Officers of appropriate commercial and industrial entities
- Recognized medical practitioners in appropriate fields
- Expert international scientists or administrators who are stakeholders or partners in the program

- Scientists from partner institutions (IC).
- Representative with fiscal expertise (e.g., person involved with grants management).

PRP members should be highly respected and recognized in their fields. Panel membership should be jointly determined and agreed to by FIC staff and the AB as well as the evaluation officer. An individual respected by all parties, very familiar with FIC objectives and programs, and someone with a longer-term commitment to FIC should chair the PAT.

Using any and all material available and necessary to conduct its review, the role of the PRP should be as follows:

- To document and report on the program's overall productivity and accomplishments relative to FIC's mission and goals and the programs RFA and level of support.
- To assess the program's overall scientific or educational strength (e.g., by the significance of scientific or public health related advances and impacts, the rigor of the planning process, the level to which the best talent and resources have been brought to bear on program's goals and objectives and the success in meeting them, the rigor of the self –assessment process, publications, patents and other metrics of output).
- To assess the effectiveness of the programs management in meeting stated goals and objectives and in providing overall leadership for the program.
- To assess the program's partnerships and linkages, both nationally and internationally.
- To assess the program's position and role in its host institution and host country.
- To assess, considering all the above, the program's potential for growth.

Based on these assessments, the PRP should provide the PO and FIC management a comprehensive written report that documents the program's strengths and weaknesses, makes specific suggestions for program improvement, reports program accomplishments and provides for an overall assessment using criteria developed in Section III. The PRP shall have a draft assessment report ready upon leaving the program assessment. A final report shall be due to the PO and the evaluation officer within 30 working days of the review exercise, and is the responsibility of the PRP Chair. Upon receiving the report the PO will have a reasonable time, 21 working days to review the report, make factual comments, and if necessary write a response. A final version of the report with the PO's input is due to the FIC administration within 60 working days of the review. At the approval of FIC administration, the report will become part of the official record of the program.

Appendix B: Evaluation Study Questions

General category		Specific questions	(see key at end of document)									
			1 FIC	2 NIH	3 Donors	4 PI	5 IRC	6 Site	7 PI	8 IRC	9 Coll	10 Review
PROGRAM GOALS												
NIH/FIC context	1.1	How did the program originate and evolve? What were the original goals of the program? How did they change over time?	x	x								x
	1.2	What are the program's unstated goals (e.g. promote gender equity, reduction in health disparity)? How have they evolved?	x	x								
	1.3	How does FIRCA fit with other capacity building programs?	x	x	x							x
PROGRAM MANAGEMENT												
Program Strategies	2.1	Is FIRCA well advertised? Does it attract the best US and foreign researchers? What improvements are needed?	x			x	x		x	x		
	2.2	What are the pros and cons of routing funds through US institutions? Is there a better way? What are the issues with direct funding of institutions abroad?	x	x					x	x		
	2.3	Was the decision to limit grantees to R01 grant recipients a conscious part of FIC's merit assurance strategy? Are there other ways to ensure high quality participants?	x	x								x
	2.4	Should the award type be changed for bigger impact (e.g. a planning grant for an international R01 type award)	x	x								x
	2.5	Is the award amount sufficient?	x			x	x		x	x		
	2.6	If the award amount were different/higher, what additional activities might it support? How much higher must it be to significantly improve research merit or attract a greater number of new or repeat applications? Should a different type of funding mechanism be used?	x			x	x		x	x	x	
	2.7	Is the award period sufficient? Should it be longer? By how much?	x			x	x		x	x	x	
	2.8	How does the program ensure that FIRCA projects are collaborative, with the IRC contributing equally in the collaboration?	x			x			x			
Grantee Selection	2.9	What were awardees doing immediately before receiving the award? What institutions do the awardees come from (rankings of universities, both US and foreign)				x	x		x	x		x
	2.10	Is the selection process fair and consistent with program goals? How do reviewers balance merit and capacity development goals?	x									x
	2.11	Do FIRCA recipients reapply and get future funding? If not, why not? Should awardees be ineligible from reapplying? Are certain US-based or foreign institutions/projects/PIs more successful in getting FIRCA funding? Why?	x	x		x			x			x

	2.12 To what degree are FIRCA projects related to the parent grants? Should they be required to?	x	x		x			x			x
	2.13 How appropriate is the coverage of countries/regions, and research/disease topics? Are there countries/research areas that are disproportionately represented in the awardee pool? Given resource constraints, should FIC change the pool of eligible target countries? Or restrict support to specific research/disease topics?	x	x	x							x
Operations	2.14 How (and how well) is the program administered at FIC? How well are data records collected and maintained (and utilized for future management purposes)? What is the best way to report the data? What is currently done?	x						x			x
	2.15 How is "satisfactory research progress" determined (required for FIRCA continuation)?	x									x
	2.16 What are the impediments or disincentives to program participation (by first-time or returning researchers)? What are the trade-offs if resources for proposal preparation were provided?	x			x			x			
Institutional Partnerships	2.17 What is the nature of FIRCA partnerships with other programs at FIC, NIH and other US and international entities? How are partnerships established and sustained?	x	x	x							x
	2.19 What other initiatives or activities (e.g. an alumni organization) can FIC support to improve long-term networking and collaborations? How can FIRCA absorb the addition workload introduced by these activities?	x	x					x			
GRANT LEVEL ACTIVITIES											
	3.1 What is the nature of pre-award collaboration (i.e. proposal preparation) between USPIs and IRCs?				x	x		x	x		
	3.2 How is the project organized and conducted (respective role of the PIs and their students)?				x	x		x	x		
	3.3 How are project resources allocated between IRC salary, facilities, equipment and other expenditures?				x	x		x	x		
	3.4 How are students (and postdocs and other staff), especially at the foreign site, involved?				x	x		x	x		
	3.5 What is the nature of the collaboration between USPIs and IRCs during the course of the grant? Is the research truly collaborative or does the USPI play a "consultative" role to the IRC? Given resource limitations, what is the preferred mode? How important is this collaboration to USPI and IRC?				x	x		x	x		
	3.6 What fraction of the awardees continue their collaborations post-FIRCA? What factors influence the continuing relationship between IRCs and USPIs? Are there lessons to be emulated for other grantees or the program?				x	x		x	x	x	
	3.7 What is the nature and extent of collaborations between IRCs and non-FIRCA partners during the FIRCA award period? Does this partnership extend beyond the award period?				x	x		x	x		
	3.8 Does the FIRCA grant, directly or indirectly, lead to other collaborations, partnerships with other researchers, sectors and communities (especially within developing regions)?					x			x	x	

3.9	Do IRCs receive additional support to conduct research funded under FIRCA?					x			x	x	
GRANT LEVEL OUTPUTS											
4.1	What are the grant's outputs?				x	x		x	x	x	
4.2	How are the grant products disseminated both within the research community and external stakeholders (e.g., government officials, health ministries)?				x	x	x	x	x		
4.3	Why do some grants appear to be significantly more productive than others? What factors could explain differences in productivity (research area, country, types of research)?	x					x				x
GRANT LEVEL OUTCOMES AND IMPACTS											
5.1	What is the quality of the joint research produced? How does it compare to similar research efforts (i.e., in the same region of the world, similar research area)?						x				
5.2	Do students (or other individuals) involved with FIRCA find productive careers in research or health policy? How, if at all, does FIRCA help support the career development of its foreign participants? Does the program support gender equity?	*x*			x	x			x	x	x
5.3	How does the FIRCA grant lead to opportunities to build the intangible institutional infrastructure (courses, departments, etc)?					x			x	x	
5.4	How does the FIRCA grant lead to opportunities to build the tangible physical infrastructure (building, lab, etc)?					x			x	x	
5.5	In what way does the grant help develop critical mass of scientific expertise in research area/institute/region?	x				x			x	x	
5.6	Do the IRCs, jointly or independently, secure additional follow up funding, from NIH or elsewhere to continue research initiated by FIRCA? What are these funding sources? If the funding is obtained, to what degree is it attributable to FIRCA?				x	x		x	x	x	
5.7	How did the project help the USPI's research and career progression? Did it improve the USPI's understanding of international scientific and clinical issues? Were there any outcomes on the institutions of the participating USPIs?				x			x			
5.8	How did the project contribute to the IRC's ability to access up-to-date scientific information, particularly through the internet?				x			x			
5.9	How did the project contribute to or change the management or organizational skills of the IRC?				x	x		x	x	x	
5.10	What changes in policies, clinical practices, health outcomes, and other practices outside of academic research can at least partially be attributed to the FIRCA grant?	x			x	x		x	x		x
5.11	In what ways is research capacity established though FIRCA sustainable? How can the sustainability be enhanced?					x		x	x	x	x
5.12	What were the actual (and perceived or potential) benefits of FIRCA-supported research, both in terms of fostering discovery, and reducing global health disparities? How can the impact of research on other sectors be enhanced through changes to the program or partnerships?							x	x	x	x

5.13	What were the main challenges faced by IRCs in the course of the FIRCA project? What can NIH/FIC do to help overcome these challenges? What factors contributed to the success of the project?							x	x			
EXTERNAL INFLEUNCES												
6.1	What was the antecedent level of research capacity (e.g., access to the internet, availability of equipment, etc)?					x				x	x	
6.2	How does FIRCA fit within the strategies and objectives of NIH and FIC?	x	x	x							x	
6.3	How do the FIC/NIH program resources affect FIRCA resources?	x	x									
6.4	Did new scientific discoveries affect IRCs' research projects? How?					x			x			
6.5	What level of awareness and support (financial or other) by the IRC's government exists for the research by the IRC?					x			x	x	x	
6.6	What external factors (political turmoil, wars, institutional collapses, etc.), if any, affected the project?				x	x		x	x	x	x	
6.7	Did any other organizations deter or facilitate success of the project?				x	x		x	x	x		
6.8	What are some of the factors that influence grant success? (e.g. cohort, existing research capacity in IRC country, research topic/type)										x	

1	*Interviews (or focus groups) with FIC Staff (or Panel Reviewers)*	1
2	*Interviews with NIH Staff*	2
3	*Interviews with Other Donors*	3
4	*Interviews with small sample of USPIs*	4
5	*Site Visits to a purposive sample of IRCs*	5
6	*Bibliometrics Study*	6
7	*Survey of USPIs*	7
8	*Survey of IRCs*	8
9	*Interviews/written questions to supervisors/colleagues of IRCs*	9
10	*Document Review/Data Analysis*	10

Appendix C: Interviews

FIC staff members, interviewed as a group in April 2005:

- Kenneth Bridbord
- Joshua Rosenthal
- Kathleen Michels
- Karen Hofman

USPIs with multiple FIRCA awards, interviewed via telephone in April 2005:

- Eric Hunter
- William Petri
- Dieter Soll
- Michelle Williams

Study section members, interviewed via telephone in April and May 2005:

- Sandy Warren
- Steven Blacklow
- Gregory Quirk
- Noreen Williams

Appendix D: USPI Survey with Tallied Responses

OMB No. 0925-0531
Exp Date 09/30/2007

SECTION 1. BACKGROUND INFORMATION

1.1 FIRCA Grant Information:

Project Number	
Title of Award	
Start Year	
End Year	
Total Award Amount	
NIH Institute of Parent Grant	
Was this an AIDS-FIRCA Award?	
Scientific Discipline(s) of the Project	
Area of research at time of the award	

Project best characterized as: (Please mark one)

Basic	
Clinical	
Applied	

Project's general focus: (Please mark one)

Biomedical science	
Behavioral science	
Health science	

1.2A Your Information:

First Name	
Surname	
Gender	
Age at time of FIRCA start	
Title at time of FIRCA start	
Institution at time of FIRCA start	
Current title (if different from above)	
Current institution (if different from above)	
Telephone number	
Preferred e-mail address	

1.2B Your International Research Collaborator's (IRC) Information:

First Name _____
Surname _____
Gender _____
Current title _____
Current institution _____
Telephone number _____
Preferred e-mail address _____

SECTION 2. GRANT APPLICATION AND ACTIVITIES

2.1 Why did you choose to participate in the FIRCA program? Please mark up to three most relevant choices:

	NR	N	percent responded
FIRCA	2	243	99.2%
AIDS-FIRCA	0	35	1.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
To help support a known international colleague or former student	111	45.7%	10	28.6%
To extend my research agenda internationally	94	38.7%	16	45.7%
To maintain/strengthen collaboration with another researcher (not my former student or postdoctoral fellow)	80	32.9%	11	31.4%
To establish a new collaboration with another researcher (not my former student or postdoctoral fellow)	77	31.7%	9	25.7%
To maintain/strengthen collaboration with my former student or postdoctoral fellow	70	28.8%	13	37.1%
To take advantage of unique research resources that are not available in the US (e.g., 7 population groups, samples)	65	26.7%	18	51.4%
Other	17	7.0%	4	11.4%
To maintain/strengthen collaboration with my former advisor	4	1.6%	1	2.9%

2.2 How/why did you choose to partner with your IRC? Please mark up to three most relevant choices:

	NR	N	percent responded
FIRCA	2	243	99.2%
AIDS-FIRCA	0	35	1

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
We already had a collaboration and I wished to strengthen it	141	58.0%	23	65.7%
S/he was my student or postdoctoral fellow	55	22.6%	8	22.9%
Other.	46	18.9%	6	17.1%
We met at a conference elsewhere and had shared interests	42	17.3%	5	14.3%
I learned about IRC's work and wished to establish collaboration	38	15.6%	6	17.1%
We met at a conference in the United States and had shared interests	32	13.2%	3	8.6%
IRC contacted me	32	13.2%	3	8.6%
S/he was a student or postdoctoral fellow in my department	10	4.1%	5	14.3%

2.3 How was the topic of your research selected? Please select up to three most relevant choices:

	NR	N	percent responded
FIRCA	7	238	97.1%
AIDS-FIRCA	2	33	94.3%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
My interests	207	87.0%	30	90.9%
IRC interests	154	64.7%	25	75.8%
Interests of a colleague in IRC institution	38	16.0%	8	24.2%
Other.	30	12.6%	1	3.0%
Review of academic literature	20	8.4%	4	12.1%
Interests of a colleague in my institution	11	4.6%	1	3.0%
Research priorities of IRC government	4	1.7%	5	15.2%

2.4 For your FIRCA grant, who took a lead role in the activities below?

FIRCA

	N	rate	USPI	IRC	Equal	USPI percent	IRC percent	Equal percent
Identification of research objective	225	91.8%	66	25	134	29.3%	11.1%	59.6%
Proposal preparation	222	90.6%	109	40	73	49.1%	18.0%	32.9%
Design of research project	223	91.0%	48	40	135	21.5%	17.9%	60.5%
Changes to project design	214	87.3%	43	54	117	20.1%	25.2%	54.7%
Data collection	225	91.8%	13	156	56	5.8%	69.3%	24.9%
Data analysis	224	91.4%	24	93	107	10.7%	41.5%	47.8%
Approval of day-to-day expenditures	226	92.2%	41	140	45	18.1%	61.9%	19.9%
Approval of substantial expenditures	225	91.8%	76	56	93	33.8%	24.9%	41.3%
Report/manuscript writing	225	91.8%	52	44	129	23.1%	19.6%	57.3%
Other dissemination (e.g., presenting results at conferences)	216	88.2%	16	81	119	7.4%	37.5%	55.1%

AIDS-FIRCA

	N	rate	USPI	IRC	Equal	USPI percent	IRC percent	Equal percent
Identification of research objective	30	85.7%	13	3	14	43.3%	10.0%	46.7%
Proposal preparation	30	85.7%	18	2	10	60.0%	6.7%	33.3%
Design of research project	30	85.7%	15	3	12	50.0%	10.0%	40.0%
Changes to project design	28	80.0%	8	7	13	28.6%	25.0%	46.4%
Data collection	30	85.7%	2	19	9	6.7%	63.3%	30.0%
Data analysis	30	85.7%	10	8	12	33.3%	26.7%	40.0%
Approval of day-to-day expenditures	30	85.7%	11	13	6	36.7%	43.3%	20.0%
Approval of substantial expenditures	30	85.7%	16	6	8	53.3%	20.0%	26.7%
Report/manuscript writing	30	85.7%	9	5	16	30.0%	16.7%	53.3%
Other dissemination (e.g., presenting results at conferences)	28	80.0%	4	6	18	14.3%	21.4%	64.3%

2.5 On average, how frequently did you correspond with your IRC? Please mark one.

	NR	N	percent responded
FIRCA	13	232	94.7%
AIDS-FIRCA	3	32	91.4%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Daily	16	6.9%	1	3.1%
Weekly	105	45.3%	14	43.8%
Monthly	101	43.5%	14	43.8%
Less frequently	10	4.3%	3	9.4%

2.6 Over the course of the grant, approximately, how many days did you spend face-to-face with your IRC?

	NR	N	percent responded
FIRCA	214	31	12.7%
AIDS-FIRCA	29	6	17.1%

	mean	st dev	median	min	max
Days in US-FIRCA	57.77	110.42	20	0	800
Days in US-AIDS-FIRCA	32.38	51.12	10	0	180
Days in IRC country-FIRCA	16.84	41.19	7	0	400
Days in IRC country-AIDS-FIRCA	36.45	99.69	14	0	540
Days in other country-FIRCA	2.47	5.09	0	0	30
Days in other country-AIDS-FIRCA	1.66	4.25	0	0	21

2.7 How many times did you visit your IRC in his/her country/institution?

	NR	responses	percent responded
FIRCA	20	225	91.8%
AIDS-FIRCA	5	30	85.7%

	mean	st dev	median	min	max
number of visits-FIRCA	1.91	2.35	1	0	20
number of visits-AIDS-FIRCA	4.13	9.07	2	0	50

2.8 Please provide a very rough estimate of how your FIRCA funds were allocated (The two rows should add up to 100%). You do not need to compute percentages from actual data; rather, enter approximate fractions as you remember them.

	NR	N	percent responded
FIRCA	9	236	96.3%
AIDS-FIRCA	3	32	91.4%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
0/100	44	18.6%	3	9.4%
1-5/99-95	49	20.8%	5	15.6%
6-10/94-90	55	23.3%	9	28.1%
11-20/89-80	53	22.5%	4	12.5%
21-30/79-70	14	5.9%	1	3.1%
31-40/69-90	6	2.5%	2	6.3%
41-100/59-0	15	6.4%	8	25.0%

SECTION 3. FIRCA GRANT RESULTS

3.1 Please list any peer-reviewed publications, presentations, books, or other products attributable to your participation in FIRCA:

[Publications data analyzed separately.]

3.2 Did your participation in the FIRCA program create or enhance collaborations with any of the following individuals or organizations? For each group listed below, please mark those that were affected by FIRCA, and then tell us if they were created or enhanced through FIRCA.

FIRCA

	N	rate	Created	Created Percent	Enhanced	Enhanced Percent	Not Affected	Not Affected Percent
Researchers in IRC country	211	86.1%	55	26.1%	133	63.0%	23	10.9%
Researchers in US	199	81.2%	17	8.5%	106	53.3%	76	38.2%
Government/national agencies in IRC country	198	80.8%	13	6.6%	56	28.3%	129	65.2%
Government/national agencies in US	191	78.0%	9	4.7%	40	20.9%	142	74.3%
Hospitals/clinics in IRC country	191	78.0%	12	6.3%	32	16.8%	147	77.0%
Hospitals/clinics in US	190	77.6%	5	2.6%	9	4.7%	176	92.6%
Industry in IRC country	189	77.1%	4	2.1%	9	4.8%	176	93.1%
Industry in US	190	77.6%	4	2.1%	18	9.5%	168	88.4%
Other	26	10.6%	4	15.4%	5	19.2%	17	65.4%

AIDS-FIRCA

	N	rate	Created	Created Percent	Enhanced	Enhanced Percent	Not Affected	Not Affected Percent
Researchers in IRC country	27	77.1%	8	29.6%	17	63.0%	2	7.4%
Researchers in US	26	74.3%	3	11.5%	16	61.5%	7	26.9%
Government/national agencies in IRC country	25	71.4%	1	4.0%	9	36.0%	15	60.0%
Government/national agencies in US	23	65.7%	2	8.7%	4	17.4%	17	73.9%
Hospitals/clinics in IRC country	23	65.7%	2	8.7%	5	21.7%	16	69.6%

Hospitals/clinics in US	22	62.9%	1	4.5%	0	0.0%	21	95.5%
Industry in IRC country	23	65.7%	0	0.0%	2	8.7%	21	91.3%
Industry in US	23	65.7%	0	0.0%	4	17.4%	19	82.6%
Other	4	11.4%	0	0.0%	0	0.0%	3	75.0%

3.3 To the extent that you know, who were the main users of your research findings. If research is at an early stage, who do you expect to be the main user? Please rank all that apply on a scale of 1 to 4:

FIRCA

	N	rate	1	Percent	2	Percent	3	Percent	4	Percent
Other researchers in the US	211	86.1%	7	3.3%	75	35.5%	59	28.0%	70	33.2%
Clinical institutions, practicing physicians in the US	204	83.3%	138	67.6%	53	26.0%	8	3.9%	5	2.5%
Industry in the US	202	82.4%	128	63.4%	60	29.7%	14	6.9%	0	0.0%
Government policymakers in the US	201	82.0%	162	80.6%	34	16.9%	5	2.5%	0	0.0%
Other	33	13.5%	18	54.5%	5	15.2%	3	9.1%	7	21.2%

AIDS-FIRCA

	N	rate	1	Percent	2	Percent	3	Percent	4	Percent
Other researchers in the US	28	80.0%	2	7.1%	12	42.9%	3	10.7%	7	25.0%
Clinical institutions, practicing physicians in the US	27	77.1%	15	55.6%	10	37.0%	1	3.7%	0	0.0%
Industry in the US	27	77.1%	15	55.6%	12	44.4%	0	0.0%	0	0.0%
Government policymakers in the US	27	77.1%	20	74.1%	5	18.5%	1	3.7%	0	0.0%
Other	5	14.3%	2	40.0%	1	20.0%	0	0.0%	2	40.0%

3.4A Did you apply for follow-up funding to continue the research initiated during the FIRCA project? Mark one.

	NR	N	percent responded
FIRCA	17	228	93.1%
AIDS-FIRCA	4	31	88.6%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
No	112	49.1%	16	51.6%
Yes, I applied for a FIRCA renewal	58	25.4%	2	6.5%
Yes, I applied for other follow-up funding	55	24.1%	13	41.9%

My grant is ongoing	3	1.3%	0	0.0%

3.4B If you answered YES to 3.4A, did you receive follow-up funding to continue the FIRCA project with the following individuals? Please mark all that apply:

	NR	N	percent responded
FIRCA	4	108	96.4%
AIDS-FIRCA	0	15	100.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes, I received follow-up funding with my IRC, another IRC, with a domestic collaborator, or by myself.	40	37.0%	8	53.3%
I applied, but did not receive follow-up funding.	37	34.3%	5	33.3%
Grant is ongoing.	31	28.7%	2	13.3%

3.4C If you did not receive follow up funding with your IRC, did you maintain contact with him or her?

	NR	N	percent responded
FIRCA	1	148	99.3%
AIDS-FIRCA	0	21	100.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	137	92.6%	19	90.5%
No	11	7.4%	1	4.8%

3.4D If you answered NO to 3.4A, what were/are your reasons? Mark up to three most relevant choices. If you did not answer NO to 3.4A, please skip to 3.5.

	NR	responses	percent responded
FIRCA	12	100	89.3%
AIDS-FIRCA	0	16	100.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Other reasons for not reapplying.	60	60.0%	16	100.0%
I do not plan/did not reapply because the award amount is insufficient	23	23.0%	1	6.3%
I do not plan/did not reapply because my IRC has received or is expected to receive funds from a different source and does not/did not need FIRCA funds anymore	16	16.0%	0	0.0%
I do not plan/did not reapply because the application process is too time-consuming	13	13.0%	0	0.0%
I am not eligible to reapply	8	8.0%	1	6.3%

3.5 To the best of your knowledge, which of the following took place as a result of your participation in the FIRCA program? If you mark 'yes', to what extent is it attributable to FIRCA? Please indicate in the columns on the right (0 - Cannot say; 1 - Not at all; 2 - Somewhat; 3 - A lot; 4 - Entirely).

FIRCA

	N	rate	Did not take place		Cannot say		Not at all		Somewhat		A lot		Entirely	
My understanding of international scientific and/or clinical issues was improved	211	86.1%	10	4.7%	6	2.8%	0	0.0%	71	33.6%	102	48.3%	22	10.4%
My FIRCA led to advances in theory	208	84.9%	23	11.1%	8	3.8%	4	1.9%	80	38.5%	76	36.5%	17	8.2%
My FIRCA led to the development of new research methods and/or tools	207	84.5%	21	10.1%	12	5.8%	7	3.4%	78	37.7%	66	31.9%	23	11.1%
More students and staff joined my research group or department	201	82.0%	52	25.9%	16	8.0%	23	11.4%	66	32.8%	35	17.4%	9	4.5%
New facilities were established in my institution	202	82.4%	110	54.5%	7	3.5%	60	29.7%	17	8.4%	6	3.0%	2	1.0%
I was promoted	205	83.7%	106	51.7%	16	7.8%	47	22.9%	29	14.1%	3	1.5%	4	2.0%
My FIRCA led to new ways of organizing or conducting research	205	83.7%	59	28.8%	12	5.9%	16	7.8%	83	40.5%	31	15.1%	4	2.0%
New research program in FIRCA-related area was established in my institution	202	82.4%	105	52.0%	11	5.4%	38	18.8%	28	13.9%	15	7.4%	5	2.5%
Gender inequality was reduced at my institution	199	81.2%	98	49.2%	38	19.1%	41	20.6%	16	8.0%	4	2.0%	2	1.0%
Other	8	3.3%	2	25.0%	0	0.0%	1	12.5%	0	0.0%	0	0.0%	4	50.0%

AIDS-FIRCA

	N	rate	Did not take place		Cannot say		Not at all		Somewhat		A lot		Entirely	
My understanding of international scientific and/or clinical issues was improved	26	74.3%	0	0.0%	1	3.8%	2	7.7%	6	23.1%	13	50.0%	4	15.4%
My FIRCA led to advances in theory	26	74.3%	2	7.7%	3	11.5%	0	0.0%	9	34.6%	10	38.5%	2	7.7%
My FIRCA led to the development of new research methods and/or tools	26	74.3%	2	7.7%	4	15.4%	0	0.0%	5	19.2%	12	46.2%	3	11.5%
More students and staff joined my research group or department	26	74.3%	5	19.2%	1	3.8%	3	11.5%	8	30.8%	7	26.9%	2	7.7%
New facilities were established in my institution	25	71.4%	12	48.0%	3	12.0%	5	20.0%	4	16.0%	0	0.0%	1	4.0%
I was promoted	25	71.4%	10	40.0%	2	8.0%	4	16.0%	8	32.0%	1	4.0%	0	0.0%
My FIRCA led to new ways of organizing or conducting research	26	74.3%	6	23.1%	1	3.8%	0	0.0%	13	50.0%	6	23.1%	0	0.0%
New research program in FIRCA-related area was established in my institution	25	71.4%	10	40.0%	4	16.0%	4	16.0%	3	12.0%	2	8.0%	2	8.0%
Gender inequality was reduced at my institution	24	68.6%	11	45.8%	6	25.0%	6	25.0%	1	4.2%	0	0.0%	0	0.0%
Other	4	11.4%	1	25.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	2	50.0%

SECTION 4. EXTERNAL INFLUENCES

4.1 How did you first learn about the FIRCA program? Please mark one:

	NR	responses	percent responded
FIRCA	12	233	95.1%
AIDS-FIRCA	4	31	88.6%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Through a posted program announcement	87	37.3%	19	61.3%
From a student/postdoctoral fellow	4	1.7%	1	3.2%
From IRC	64	27.5%	3	9.7%
From another faculty member	42	18.0%	3	9.7%
Other.	36	15.5%	6	19.4%

4.2A Do you believe that at the time you and your IRC applied, the FIRCA program was appropriately advertised?

	NR	responses	percent responded
FIRCA	26	219	89.4%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	185	84.5%	23	85.2%
No	34	15.5%	4	14.8%

4.2B Would the following modes have alerted you more rapidly or have been useful in recruiting other researchers or faculty members? Mark up to three most relevant choices.

	NR	responses	percent responded
FIRCA	47	198	80.8%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Website links and announcements	132	66.7%	17	63.0%
Mailings to potential researchers	103	52.0%	13	48.1%
Biomedical journals	79	39.9%	8	29.6%
Other.	11	5.6%	3	11.1%

4.3A Do you believe the results of your FIRCA research were adequately disseminated?

	NR	responses	percent responded
FIRCA	24	221	90.2%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	206	93.2%	21	77.8%
No	15	6.8%	6	22.2%

4.3B If you answered NO to 4.3A, what could an external sponsor do to help disseminate the research results? Please check all that apply.

	NR	responses	percent responded
FIRCA	230	15	6.1%
AIDS-FIRCA	33	2	5.7%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Provide internet access to IRC/IRC institution	6	40.0%	1	50.0%
Sponsor conferences	11	73.3%	2	100.0%
Establish newsletters	7	46.7%	4	200.0%
Nothing	3	20.0%	2	100.0%
Other.	3	20.0%	1	50.0%

4.3C What other activities should FIC support to improve long-term collaborations between program participants? Please mark up to three most relevant choices:

	NR	responses	percent responded
FIRCA	28	217	88.6%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Allow more than one renewal of FIRCA grant	149	68.7%	16	59.3%
Create a web site for the participants	84	38.7%	13	48.1%
Sponsor alumni meetings	62	28.6%	8	29.6%
Publish a newsletter	33	15.2%	6	22.2%
Establish an alumni organization	23	10.6%	1	3.7%
Other.	21	9.7%	4	14.8%
No additional activities	15	6.9%	4	14.8%

4.3D To what extent was the FIRCA award topic related to your parent grant from NIH?

	NR	responses	percent responded
FIRCA	28	217	88.6%
AIDS-FIRCA	7	28	80.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Moderately	134	61.8%	17	60.7%
Very similar	44	20.3%	7	25.0%
Somewhat	37	17.1%	4	14.3%
Not at all	2	0.9%	0	0.0%

4.3E Do you think it is appropriate that FIRCA awards are required to be related to the NIH parent grants?

	NR	responses	percent responded
FIRCA	25	220	89.8%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	159	72.3%	18	66.7%
No	61	27.7%	9	33.3%

4.4 What factors contributed to the success of your project? Please mark up to three most relevant choices:

	NR	responses	percent responded
FIRCA	41	204	83.3%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Good research skills of my IRC	196	96.1%	23	85.2%
Good collaborative relationship between me and my IRC	184	90.2%	23	85.2%
Pre-existing infrastructure at the IRC's institution (e.g., students, equipment)	117	57.4%	18	66.7%
Good management skills of my IRC	62	30.4%	9	33.3%
Government support in the IRC's country	17	8.3%	5	18.5%
None of these factors	6	2.9%	2	7.4%
Other.	6	2.9%	3	11.1%

4.5A What challenges made your participation in the FIRCA project difficult? Please mark up to three most relevant choices:

	NR	responses	percent responded
FIRCA	23	222	90.6%
AIDS-FIRCA	6	29	82.9%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Delays in customs clearance in the IRC country	81	36.5%	5	17.2%
Insufficient funds	76	34.2%	12	41.4%
Delays of shipment from abroad in the IRC country	68	30.6%	7	24.1%
Insufficient project period (too short)	54	24.3%	3	10.3%
Lack of infrastructure at the IRC institution (e.g., communication, equipment)	45	20.3%	4	13.8%
Lack of government support in the IRC country	36	16.2%	1	3.4%
Other.	36	16.2%	4	13.8%
External factors in the IRC country (e.g., wars, institutional collapse, political turmoil)	24	10.8%	3	10.3%
None	20	9.0%	6	20.7%
Lack of administrative and financial expertise in IRC institution	17	7.7%	1	3.4%
Lack of researchers working in similar area at the IRC institution	13	5.9%	2	6.9%
Excessive administrative burden from NIH	12	5.4%	2	6.9%

4.5B If 'Insufficient funds' was checked in question 4.5A, how much additional funding is required?

	NR	responses	percent responded
FIRCA	3	73	96.1%
AIDS-FIRCA	1	11	91.7%

	mean	st dev	median	min	max
amount-FIRCA	$78,260	$82,760	$60,000	$10,000	$600,000
amount-AIDS-FIRCA	$81,500	$60,187	$75,000	$15,000	$200,000

4.5C If 'Insufficient funds' was checked in question 4.5A, had the FIRCA amount been higher, what additional activities/purchases would it have realistically supported? Please mark up to three most relevant choices:

	NR	responses	percent responded
FIRCA	36	209	85.3%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Additional personnel	141	67.5%	21	77.8%
Additional supplies	131	62.7%	17	63.0%
Additional equipment	106	50.7%	12	44.4%
More travel for USPI and IRC	51	24.4%	6	22.2%
Higher salaries for existing personnel	45	21.5%	2	7.4%
Other.	28	13.4%	5	18.5%

4.5D If 'Insufficient project period' was checked in question 4.5A, how much additional time would be required?

	NR	responses	percent responded
FIRCA	1	53	98.1%
AIDS-FIRCA	0	3	100.0%

	mean	st dev	median	min	max
months-FIRCA	17	9	12	2	48
months-AIDS-FIRCA	20	7	24	12	24

4.6 Given resource constraints, what do you recommend as the best ways to restructure the FIRCA program? Please mark up to three options below that you think may lead to the biggest improvement in the program:

	NR	responses	percent responded
FIRCA	32	213	86.9%
AIDS-FIRCA	8	27	77.1%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
None of these ways would improve the program	69	32.4%	4	14.8%
Award a smaller number of grants with higher award amounts	51	23.9%	10	37.0%
Award smaller "planning" grants with a shorter award period	38	17.8%	3	11.1%
Restrict awards to countries with low research capacity *	37	17.4%	8	29.6%
Restrict awards to teams where the IRC is at an early stage of his or her career (e.g., within 10 years following the receipt of a Ph.D. or equivalent degree)	35	16.4%	6	22.2%
Other.	31	14.6%	2	7.4%
Restrict awards to specific subjects of topics considered important for developing countries (e.g., HIV/AIDS, malaria, TB)	20	9.4%	17	63.0%
Restrict awards to institutions with low research capacity (regardless of the country capacity for research)	10	4.7%	5	18.5%
Restrict awards to first time applicants only (both PI and IRC must be first time applicants)	5	2.3%	1	3.7%

4.7 How would you rate your overall experience as a FIRCA program participant? Please rank on a scale of 1 to 4? (1 - Poor; 2 - Moderate; 3 - Good; 4 - Great):

	NR	responses	percent responded
FIRCA	27	218	89.0%
AIDS-FIRCA	7	28	80.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Poor	6	2.8%	0	0.0%
Moderate	11	5.0%	3	10.7%
Good	73	33.5%	8	28.6%
Great	125	57.3%	17	60.7%
"3.5"	3	1.4%	0	0.0%

4.8A Would you recommend the FIRCA program to your colleagues?

	NR	responses	percent responded
FIRCA	27	218	89.0%
AIDS-FIRCA	7	28	80.0%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	210	96.3%	27	96.4%
No	8	3.7%	1	3.6%

Appendix E: IRC Survey with Tallied Responses

OMB No. 0925-0531
Exp Date 09/30/2007

1. Personal Information:

1a. Name:

1b. FIRCA award number:

1c. Award start year:

1d. Email address:

1e. Project title:

1f. Number of years since PhD/MD at time of FIRCA project start:

	NR	NA	responses	percent responded
FIRCA	23	0	225	91%
AIDS-FIRCA	3	2	25	83%

	mean	st dev	median	min	max
age-FIRCA	14.86	9.64	12	1	45
age-AIDS-FIRCA	11.22	7.04	9	0.5	28

1g. Gender (mark one):

	NR	responses	percent responded
FIRCA	10	238	96%
AIDS-FIRCA	0	30	100%

	FIRCA	percent	AIDS-FIRCA	percent
MALE	185	78%	20	67%
FEMALE	42	18%	9	30%

2. How/why did you choose to partner with your US Principal Investigator (USPI)? Please mark all that apply:

	NR	responses	percent responded
FIRCA	15	233	94%
AIDS-FIRCA	1	29	97%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
We already had a collaboration and I wished to strengthen it	155	67%	16	55%
S/he was my former mentor in the United States	71	30%	6	21%
We were introduced through another faculty member in the United States	23	10%	5	17%
We met at a conference in the United States and had shared interests	19	8%	7	24%
We met at a conference elsewhere and had shared interests	27	12%	3	10%
USPI contacted me	11	5%	2	7%
Other (please describe below)	20	9%	4	14%

3. How would you characterize the nature of your collaboration during the FIRCA grant?

	NR	responses	percent responded
FIRCA	9	239	96%
AIDS-FIRCA	0	30	100%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Both labs contributed to all phases of the project.	95	40%	11	37%
There were distinct portions of the research performed by USPI lab and distinct pieces performed by my lab.	93	39%	14	47%
Work was done entirely by me with minimal guidance and advice from USPI	30	13%	2	7%
Other (please describe below)	21	9%	3	10%

4a. Over the course of the grant, approximately how many days did you spend face-to-face in the same location with your USPI? Please list the approximate number of days spent together:

	NR	responses	percent responded
FIRCA	9	239	96%
AIDS-FIRCA	0	30	100%

	mean	st dev	median	min	max
in your country - FIRCA	21.62	81.55	10	0	1100
in your country - AIDS-FIRCA	19.00	17.02	14	0	60
in the US – FIRCA	59.35	87.49	30	0	1020
in the US - AIDS-FIRCA	55.74	142.48	12	0	720
in other countries - FIRCA	6.18	8.16	4	0	60
in other countries - AIDS-FIRCA	3.20	4.39	2	0	15

4b. Please describe the activities that occurred during these visits (e.g., conference attendance, research, teaching, manuscript preparation):

5. At the time of your FIRCA award, did you have any other funding sources supporting the FIRCA-related research topic? Please mark all that apply:

	NR	responses	percent responded
FIRCA	8	240	97%
AIDS-FIRCA	0	30	100%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
No, FIRCA was my only funding source supporting this research topic	65	27%	13	43%
Yes, I had other government support in my country	158	66%	10	33%
Yes, I had other foundation or private support in my country	24	10%	8	27%
Yes, I had other international support	35	15%	4	13%
Other (please describe below)	6	3%	2	7%

6a. Please provide a very rough estimate of how your FIRCA funds were allocated. You do not need to compute percentages from actual data; instead, please enter approximate values as you remember them (the total should add up to 100%).

	NR*	responses	percent responded
FIRCA	18	230	93%
AIDS-FIRCA	1	29	97%

	mean	st dev	median	min	max
Personnel/Salary -FIRCA	11.2%	15.0%	0.1	0	0.8
Personnel/Salary -AIDS-FIRCA	16.7%	22.7%	0.05	0	0.8
Travel -FIRCA	14.3%	10.4%	0.1	0	0.7
Travel -AIDS-FIRCA	17.8%	24.6%	0.1	0	1
Consumable Supplies -FIRCA	47.2%	25.0%	0.5	0	0.96
Consumable Supplies -AIDS-FIRCA	52.8%	35.1%	0.6	0	1
Equipment -FIRCA	23.3%	23.2%	0.2	0	1
Equipment -AIDS-FIRCA	4.6%	10.7%	0	0	0.54
Other -FIRCA	3.6%	11.0%	0	0	0.9
Other -AIDS-FIRCA	8.4%	20.3%	0	0	0.8

*Note: considered NR if sum was less than 90%.

6b. If you purchased equipment, please specify what equipment you purchased:

7. Did your participation in the FIRCA program lead to any peer-reviewed publications and/or other written products (e.g., conference presentations, books/book chapters, websites, etc.)? If so, please list the publications that you attribute to FIRCA below (peer-reviewed publications are mandatory, any other publications are optional):

[Publications data analyzed separately.]

8. How many students and/or postdoctoral fellows in your group were trained using FIRCA funds?

	NR	NA	responses	percent responded
FIRCA	27	0	221	89%
AIDS-FIRCA	5	2	23	77%

	mean	st dev	median	min	max
number of undergraduates-FIRCA	3.04	8.10	2	0	100
number of undergraduates-AIDS-FIRCA	0.71	1.14	0	0	3
number of graduate students-FIRCA	2.43	2.63	2	0	30
number of graduate students- AIDS-FIRCA	1.57	2.21	1	0	11
number of postdocs -FIRCA	1.20	1.13	1	0	5
number of postdocs -AIDS-FIRCA	0.44	0.73	0	0	2

9. Did you apply for follow-up funding from any source to continue the research initiated during the FIRCA project?

	NR	responses	percent responded
FIRCA	11	237	96%
AIDS-FIRCA	2	28	93%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
YES, I applied for a FIRCA renewal or a new FIRCA grant with my USPI	72	30%	1	4%
YES, I applied for another FIRCA with a different US investigator	7	3%	0	0%
YES, I applied for other follow-up funding from other sources	73	31%	15	54%
NO, I did not apply for any follow-up funding	55	23%	10	36%
My grant is ongoing	58	24%	3	11%

10. If your FIRCA grant is complete, have you corresponded with your USPI in the last year?

	NR	responses	percent responded
FIRCA	12	236	95%
AIDS-FIRCA	0	30	100%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
YES	141	60%	22	73%
NO	22	9%	4	13%
My grant is ongoing	73	31%	4	13%

11. To the best of your knowledge, which of the following took place as a result of your participation in the FIRCA program? Please mark any and all that apply:

	NR	responses	percent responded
FIRCA	13	235	95%
AIDS-FIRCA	0	30	100%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
I learned new research techniques	135	57%	19	63%
I developed new research tools or techniques	149	63%	15	50%
More students and staff joined my research group or department	141	60%	14	47%
I improved my ability to conduct high quality research	186	79%	22	73%
I improved my grant-writing skills	164	70%	14	47%
New facilities were established at my institution	99	42%	7	23%
Other individuals in my department or institution benefited from the new techniques, equipment, or material	154	66%	16	53%
I received additional funding or promotion at my institution attributable to FIRCA accomplishments	90	38%	14	47%
None	2	1%	1	3%
Other impacts on you or your institution (please describe below)	25	11%	4	13%

12. What challenges made your participation in the FIRCA project difficult? Please mark any and all that apply:

	NR	responses	percent responded
FIRCA	10	238	96%
AIDS-FIRCA	1	29	97%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Excessive administrative burden from USPI institution	22	9.2%	0	0.0%
Excessive requirements from NIH	6	2.5%	2	6.9%
Delays in customs clearance in my country	90	**37.8%**	5	17.2%
Delays in shipping from abroad	58	**24.4%**	3	10.3%
Lack of infrastructure at my institution (e.g., Internet access/communication, equipment)	26	10.9%	5	17.2%
Insufficient funds	48	20.2%	8	27.6%
Insufficient project period (too short)	71	29.8%	5	17.2%
Lack of researchers working in similar area at my institution	37	15.5%	9	31.0%
Lack of government support in my country	54	22.7%	4	13.8%
External factors in my country (e.g., war, institutional collapse, political turmoil)	10	4.2%	2	6.9%
None	47	19.7%	8	27.6%
Other (please describe below)	23	9.7%	4	13.8%

13a. How were FIRCA funds transferred to you/your institution?

13b. Were you satisfied with the transfer procedures? If no, please elaborate.

	NR	responses	percent responded
FIRCA	38	210	85%
AIDS-FIRCA	4	26	87%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
Yes	175	83%	21	81%
No	35	17%	5	19%

14. If you could restructure the FIRCA program in any way, which of the following changes would you make going forward (if any)? Please mark all options that apply:

	NR	responses	percent responded
FIRCA	35	213	86%
AIDS-FIRCA	4	26	87%

	FIRCA count	percent of respondents	AIDS-FIRCA count	percent of respondents
No change is necessary - I like the structure of FIRCA as it is now	148	69%	14	54%
Restrict awards to teams where the International Research Collaborator is at an early stage of his or her career (e.g., within 10 years following the receipt of a Ph.D. or an equivalent degree)	17	8%	1	4%
Restrict awards to specific subjects or topics considered important for developing and transitional countries (e.g., HIV/AIDS, malaria, TB)	6	3%	3	12%
Restrict awards to first time applicants only (both USPI and IRC must be first time applicants)	3	1%	0	0%
Award a smaller number of grants with higher award amounts	30	14%	6	23%
Award a larger number of grants with smaller award amounts or shorter award periods	12	6%	1	4%
Other (please describe below)	27	13%	3	12%

15a. Would you recommend the FIRCA program to your colleagues?

___ YES, I already have recommended it to others
___ YES, I would recommend it to others, but have not yet had the opportunity to do so.
___ NO, I would not recommend it.

15b. If you would not recommend the program, why not?

16. How would you rate your overall experience as a FIRCA program participant? Please rank on a scale of 1 to 4 (1 - Poor; 2 - Moderate; 3 - Good; 4 - Great). Feel free to elaborate.

Ranking (1-4): ___

Comments:

17. Are there any other accomplishments resulting from the FIRCA award that have not been previously mentioned (e.g., career development, ability to do research that otherwise would not have been possible, policy impacts, clinical applications)?

18. Are there any aspects of the program not addressed in this survey that you believe could be improved? Do you have any other comments?

Appendix F: Grants and Grantees by Project Start Year

FIRCA

USPI Name	Start Year	Country Name	IRC Name
Dym, Martin	1992	Argentina	Chemes, Hector
Hirschberg, Carlos B.	1992	Argentina	Parodi, Armando
Kosik, Kenneth S.	1992	Argentina	Caceres, Alfredo
Llinas, Rodolfo R.	1992	Argentina	Uchitel, Osvaldo D.
Millan, Jose L.	1992	Argentina	Podesta, Ernesto J.
Rico-Hesse, Rebeca	1992	Argentina	Romanowski, Victor
Murray, Jeffrey C.	1992	Brazil	Richieri-Costa, Antonio
Reed, Steven G.	1992	Brazil	Santana Da Silva, Joao
Carey, David J.	1992	Chile	Brandan, Enrique
Lozoff, Betsy	1992	Chile	De Andraca, Isidora
Garlid, Keith	1992	Czech Republic	Jezek, Peter
Hunter, Eric	1992	Czech Republic	Ruml, Tomas
Strominger, Jack L.	1992	Czech Republic	Bazil, Vladimir
Huszar, Gabor B.	1992	Hungary	Szollosi
Nelson, Sidney D.	1992	Hungary	Perjesi, Pal
Weber, George	1992	Hungary	Olah, Edith
Janmey, Paul A.	1992	Latvia	Vegners, Rolands
Delmar, Mario	1992	Mexico	Ibarra, Jose
Lakowicz, Joseph R.	1992	Poland	Kupryszewski, Gotfryd
Zukowska-Grojec, Zofia	1992	Poland	Pruszczyk, Piotr
Herberman, Ronald B.	1992	Romania	Sulica, Andrei
Silverstein, Samuel C	1992	Romania	Simionescu, Nicolae
Stern, David M.	1992	Romania	Simionescu, Maya
Askari, Amir	1992	Russia	Boldyrev, Alexander
Berg, Douglas E.	1992	Russia	Sverdlov, Evgeny
Boineau, John P.	1992	Russia	Rosenshtraukh, Leonid V.
Breakefield, Xandra O.	1992	Russia	Limborska, Svetlana A.
Edidin, Michael	1992	Russia	Margolis, Leonid B.
Kramer, Fred R.	1992	Russia	Chetverin, Alexander B.
Lee, John W.	1992	Russia	Gitelson, Josef I.
Makowski, Lee	1992	Russia	Kishchenko, Gregory P.
Neiman, Paul E.	1992	Russia	Lobanenkov, Victor V.
Peterson, Darrell L.	1992	Russia	Smirnov, Mikhail N.
Rosen, Jeffrey M.	1992	Russia	Gorodetsky, Stanislav I.
Rovainen, Carl M.	1992	Russia	Moskalenko, Yuri E.
Shafer, Richard H.	1992	Russia	Gursky, Georgii

Sherman, Fred	1992	Russia	Ter-Avanesyan, Michael D.
Spielman, Andrew	1992	Russia	Korenberg, Edward
Yeager, Andrew M.	1992	Russia	Chimishkyan, Cornelyi
Sabban, Esther	1992	Slovak Republic	Kvetnansky, Richard
Sugden, William	1992	Slovak Republic	Altaner, Cestmir
Fox, Robert O.	1993	Argentina	Ermacora, Mario
Lardy, Henry A.	1993	Argentina	Coronel, Carlos E.
Neale, Joseph Hickman	1993	Argentina	Fiszman, Monica
Rasmussen, Howard	1993	Argentina	Florin-Christensen, Jorge
Blanton, Ronald E.	1993	Brazil	Barreto, Mauricio
Hamlin, Joyce	1993	Brazil	Lara, Francisco
Nussenzweig, Victor	1993	Brazil	Schenkman, Sergio
Slayman, Carolyn W.	1993	Brazil	Verjovski-Almeidia, Sergio
Hertzberg, Elliot L.	1993	Chile	Saez, Juan C.
Boykin, David	1993	Croatia	Karminski-Zamola, Grace M
Soll, Dieter G	1993	Croatia	Weygand-Durasevie, Ivana
Behe, Michael J	1993	Czech Republic	Kypr, Jaroslav
Dottin, Robert P.	1993	Czech Republic	Folk, Petr
El-Fakahany, Esam E.	1993	Czech Republic	Tucek, Stanislav
Harris, Kristen M	1993	Czech Republic	Spacek, Josef
Johnson, W. Curtis	1993	Czech Republic	Vorlickova, Michaela
Lipsick, Joseph	1993	Czech Republic	Smarda, Jan
Moshe, Solomon L.	1993	Czech Republic	Mares, Pavel
Palmer, Lawrence G.	1993	Czech Republic	Pacha, Jiri
Trinchieri, Giorgio	1993	Czech Republic	Pospisil, Miloslav
Tu, Anthony T.	1993	Estonia	Moller, Kadri
Baker, James R.	1993	Hungary	Nagy, Endre
Fredberg, Jeffrey J.	1993	Hungary	Hantos, Zoltan
Honn, Kenneth V.	1993	Hungary	Timar, Jozsef
Mccubrey, James A	1993	Hungary	Farago, Anna
Rusch, Nancy J.	1993	Hungary	Monos, Emil
Stern, Paula H.	1993	Hungary	Lakatos, Peter
Williamson, John	1993	Hungary	Baffy, Gyorgy
Carpenter, Graham	1993	Mexico	Hernandez, Teresa
Sina, Barbara J.	1993	Mexico	Rodriguez, Mario
Stanley, Samuel L	1993	Mexico	Calderon, Jesus
Anderson, Vernon Emmett	1993	Poland	Paneth, Piotr
Olson, James E.	1993	Poland	Hilgier, Wojciech
Wang, Chih-Lueh Albert	1993	Poland	Dabrowska, Renata
Whitsel, Barry L	1993	Poland	Blinowska, Kararzyna J.
Woessner, Frederick	1993	Poland	Rechberger, Tomasz
Beattie, Kenneth L.	1993	Russia	Budowsky, Edward I.
Bergman, Richard N.	1993	Russia	Galperin, Edward

Buchanan, James	1993	Russia	Vesselkin, Nikolai P.
Burke, Morris	1993	Russia	Golitsina, Nina L
Corces, Victor	1993	Russia	Evgen'ev, Michael
Cramer, William	1993	Russia	Krishtalik, Lev I.
Duax, William	1993	Russia	Pletnev, Vladimir
Gall, Joseph G.	1993	Russia	Gruzova, M.N.
Gennis, Robert B	1993	Russia	Konstantinov, Alexander
Goldfarb, Alexander	1993	Russia	Zaychikov, Evgeny
Krieger, John N.	1993	Russia	Nikolaeva, Irina
Lehmann, John	1993	Russia	Stepanov, A.S.
Lehrer, Robert I.	1993	Russia	Korneva, Helen A.
Ohnishi, Tomoko	1993	Russia	Vinogradov, Andrei D.
Oliver, James H.	1993	Russia	Balashov, Yuri S.
Overbaugh, Julie	1993	Russia	Tikchonenko, T.I.
Phillips, Robert S	1993	Russia	Demidkina, Tatyana V.
Rosen, Barry	1993	Russia	Skulachev, Vladimir P.
Walker, David H.	1993	Russia	Tarasevich, Irina V.
Sherman, Fred	1993	Slovak Republic	Kuzela, Stefen
Beier, John	1993	Trinidad	Chadee, Dave D.
Ingham, Kenneth	1993	Ukraine	Medved, Leonid V.
Maixner, William	1993	Venezuela	Suarez-Roca, Heberto
Demay, Marie B.	1994	Argentina	Bogado, Cesar
Reed, Steven G	1994	Brazil	Badaro, Roberto
Wilson, Mary E	1994	Brazil	Jeronimo, Selma M. B.
Law, John H.	1994	Bulgaria	Ralchev, Kiril Hristov
Haase, Ashley T.	1994	Czech Republic	Svoboda, Jan
Brash, Alan R	1994	Estonia	Samel, Nigulas
Thorbecke, G. Jeanette	1994	Ghana	Tsiagbe, V. K.
Arnold, Edward	1994	Mexico	Jacobo-Molina, Alfredo
Komisaruk, Barry R.	1994	Mexico	Beyer, Carlos
Oliver, Janet M	1994	Mexico	Ortega, Enrique
Girotti, Albert W.	1994	Poland	Korytowski, Witold
Hubbell, Wayne L.	1994	Poland	Froncisz, Wojeich
Jen-Jacobson, Linda	1994	Poland	Stec, Wojciech J.
Todd, Andrew	1994	Poland	Tendera, Michal
Chambers, William H.	1994	Romania	Metes, Diana
Blinks, John R.	1994	Russia	Vysotsky, Eugene S.
Cooperman, Barry S.	1994	Russia	Baykov, Alexander A.
Glendenning, Karen K	1994	Russia	Altman, Jacob A.
Jacobson, Kenneth A	1994	Russia	Vasiliev, Juri
James, Thomas L	1994	Russia	Ivanov, Valery I.
Paul, Sudhir	1994	Russia	Gabibov, Alexander
Pitman, Roger K.	1994	Russia	Tarabrina, Nadja V.

Skolnick, Jeffrey	1994	Russia	Finkelstein, A.V.
Wei, Edward T.	1994	Russia	Vlasov, Guennady P.
Zimmermann, Robert A.	1994	Russia	Bogdanov, Alexei A.
Herlyn, Meenhard	1994	Slovak Republic	Bizik, Jozef
Gratton, Enrico	1994	Ukraine	Demchenko, Alexander
Heinemann, Stephen	1995	Argentina	Elgoyhen, Ana Belen
Iqbal, Khalid	1995	Argentina	Alonso, Alejandra (Del Carmen)
Low, Malcolm J	1995	Argentina	Rubinstein, Marcelo
Docampo, Roberto	1995	Brazil	De Souza, Wanderley
Mann, Barbara J.	1995	Brazil	Braga, Lucia
Jones, Rosemary C.	1995	Bulgaria	Gabrovska, Milka Christova
Soll, Dieter G	1995	Chile	Orellana, Omar
Bawa, Kamaljit	1995	Costa Rica	Sittenfeld, Ana
Brown, Dennis A	1995	Croatia	Sabolic, Ivan
Adamec, Jiri	1995	Czech Republic	Kalousek, Frantisek
Orkand, Richard K.	1995	Czech Republic	Vyklicky, Ladislav
Stunkard, Albert J.	1995	Czech Republic	Hainer, Voytech
Chakrabarty, Ananda M.	1995	Estonia	Kivisaar, Maia
Bassingthwaighte, James B.	1995	Hungary	Eke, Andras
Humphreys-Beher, Michael G.	1995	Hungary	Zelles, Tivadar
Kovacs, Maria	1995	Hungary	Csorba, Janos
Nuttall, Alfred L	1995	Hungary	Vass, Zoltan
Roninson, Igor B	1995	Hungary	Sarkadi, Balazs
Schulten, Klaus J.	1995	Hungary	Erdi, Peter
Squier, Christopher A.	1995	Hungary	Banoczy, Jolan
Nataro, James P.	1995	Mexico	Cravioto, Alejandro
Stephensen, Charles B.	1995	Peru	Salazar-Lindo, Eduardo
Rewers, Marian J.	1995	Poland	Walczak, Mieczysław
Skolnick, Jeffrey	1995	Poland	Kolinski, Andrzej
Crum, Lawrence A	1995	Russia	Rudenko, Oleg A.
Dacey, Dennis M	1995	Russia	Chernorizov, Alexander M.
Eatock, Ruth Anne	1995	Russia	Kalamkarov, Grigorii
Feldman, Marcus W	1995	Russia	Zhivotovsky, Lev A.
Ferretti, Joseph J	1995	Russia	Totolian, Artem A.
Gudkov, Andrei V	1995	Russia	Peter Chumakov, And Boris Kopnin
Hattman, Stanley M	1995	Russia	Malygin, Ernst
Hunt, Steven	1995	Russia	Koshechkin, Vladimir A.
Kahn, Arnold J.	1995	Russia	Friedenstein, Alexander
Keller, Bradley B	1995	Russia	Tsyvian, Pavel
Novick, Richard P.	1995	Russia	Nikiforov, Vadim G.
Stang, Peter J	1995	Russia	Zefirov, Nikolai

Stark, George R.	1995	Russia	Kopnin, Boris P.
Steere, Allen C.	1995	Russia	Ananjeva, Lidia Petrovna
Wysocki, Charles J	1995	Russia	Voznessenskaya, Vera V.
Dettbarn, Wolf-D D	1995	Slovenia	Sket, Dusan
Sheppard, Norman	1995	Trinidad	Narinesingh, Dyer
Cregg, James M	1995	Ukraine	Sibirny, Andrei
Freeman, Bruce	1995	Uruguay	Radi, Rafael
Bissell, D. Montgomery	1996	Argentina	Kornblihtt, Alberto R.
Petri, William A	1996	Bangladesh	Haque, Rashidul
Cox, Daniel J	1996	Bulgaria	Koev, Dragomir
Van Holde, Kensal	1996	Bulgaria	Yaneva, Julia
Cohen, Ira	1996	China	Yu, Hangang
Grundke-Iqbal, Inge	1996	China	Wang, Jian-Zhi
Jette, David	1996	China	Zhengming, Luo
Yang, Chung	1996	China	Wang, Li-Dong
Lipsick, Joseph	1996	Czech Republic	Smarda, Jan
Schultz, Richard M	1996	Czech Republic	Kubleka, Michal
Hauser, W. Allen	1996	Ecuador	Carpio, Arturo
Appel, Stanley	1996	Hungary	Siklos, Laszlo
Deutsch, Carol J	1996	Hungary	Panyi, Gyorgy
Laurie, Gordon W	1996	Hungary	Pogany, Gabor
Panigrahi, Pinaki	1996	India	Singh, Meharban
Perry, Cheryl L.	1996	India	Reddy, K.S.
Verkman, Alan S	1996	India	Periasamy, Nallagounder
Connors, Barry	1996	Israel	Amitai, Yael
Neer, Eva J.	1996	Israel	Reiner, Orly
Pauls, David	1996	Israel	Zohar, Ada
Demple, Bruce F	1996	Mexico	Amabile-Cuevas, Carlos
Feyereisen, Rene	1996	Mexico	Rodriguez-Arnaiz, Rosario
Berg, Douglas E.	1996	Peru	Leon-Barua, Raul
Banerjee, Ruma	1996	Poland	Paneth, Piotr
Mccammon, James A	1996	Poland	Antosiewicz, Jan
Balster, Robert L	1996	Russia	Zvartau, Edwin E.
Borisy, Gary G	1996	Russia	Vorobjev, Ivan
Cohen, Fredric S	1996	Russia	Chizmadzhev, Yuri
Sealfon, Stuart C	1996	South Africa	Millar, Robert
Wang, Kuan	1996	South Africa	Kruger, Marlena C.
El-Fakahany, Esam E.	1996	Turkey	Oktay, Sule
Granger, Daniel	1996	Turkey	Kurtel, Hizir
Gardiner, Katheleen	1996	Ukraine	Rynditch, Alla
Coleman, Rosalind A	1997	Argentina	Igal, Rueben
Scheraga, Harold A	1997	Argentina	Vila, Jorge
Tarleton, Rick	1997	Argentina	Postan, Miriam

Petri, William A	1997	Bangladesh	Haque, Rashidul
King, Mary-Claire	1997	Chile	Carvallo, Pilar
Bavister, Barry D	1997	China	Ji, Wiezhi
Zheng, Yan-Ping	1997	China	Young, Derson
Pryor, William A	1997	Croatia	Klasinc, L.
Cebra, John J	1997	Czech Republic	Tlaskalova, Helena
Mankin, Alexander S	1997	Estonia	Remme, Jaanus
Stossel, Thomas P	1997	Estonia	Uibo, Raivo
Dluhy, Richard A	1997	Germany	Losche, Mathias
King, Mary-Claire	1997	Hungary	Olah, Edith
Kranias, Evangelia G	1997	Hungary	Kiss, Eva
Nimgaonkar, Vishwajit	1997	India	Thelma, B.K.
Roberts, Charles T	1997	Israel	Werner, Haim
Fazleabas, Asgerally	1997	Kenya	Bambra, Charanjit
Mcgiff, John C	1997	Mexico	Escalante, Bruno
Gilman, Robert H	1997	Peru	Garcia, Hector
Cody, Vivian	1997	Poland	Wojtczak, Andrzej
Ransohoff, Richard M	1997	Poland	Glabinski, Andrzej
Allison, William S	1997	Russia	Malyan, A.N.
Armstrong, David M	1997	Russia	Rayevsky, Kirill
Caparon, Michael G	1997	Russia	Sverdlov, Evgeny
Roder, Heinrich	1997	Russia	Dolgikh, Dimitry
Worden, Mary K	1997	Russia	Bykhovshaia, Maria
King, Michael P	1997	Slovenia	Grubic, Zoran
Armstrong, Richard N	1997	South Africa	Dirr, Heini
Severson, David W	1997	Trinidad	Chadee, Dave
Douglas, Janice G	1997	Uganda	Mugerwa, Ray
Woosley, Raymond	1997	Ukraine	Shuba, Yaroslav
Gray, Harry	1998	Argentina	Vila, Alejandro
Johnson, Alan	1998	Argentina	De Olmos, Jose
Kristan, William	1998	Argentina	Szczupak, LIDIA
Conn, Carole A	1998	Belarus	Kluger, Matthew
Quakyi, Isabella	1998	Cameroon	Leke, Rose
Stein, Gary	1998	Chile	Montecino, Martin
Hardy, Matthew	1998	China	Gao, Hui-Bao
Tsao, Betty P	1998	China	Chen, Shun-Le
Teale, Judy M	1998	Colombia	Restrepo, Blanca
New, Maria	1998	Croatia	Dumic, Miroslav
Kopecek, Jindrich	1998	Czech Republic	Rihova, Blanka
Kraus, Jan	1998	Czech Republic	Kozich, Viktor
Crews, Phillip	1998	Fiji	Aalbersberg, William
Naftolin, Frederick	1998	Hungary	Parducz, Arpad
Whitsett, Jeffrey	1998	Hungary	Zsengeller, Zsuzsanna

Sen, Ranjan	1998	India	Rath, Satyajit
Horwitz, Susan	1998	Israel	Wolfson, Marina
Montrose, Marshall	1998	Israel	Moran, Arie
Conn, Michael	1998	Mexico	Ulloa-Aguirre, Alfredo
Small, Peter M	1998	Mexico	Ponce De Leon, Alfredo
Sun, Grace Y	1998	Poland	Strosznajder, Joanna
Andreeff, Michael W	1998	Russia	Sudarikov, Andrew
Clarkson, Robert B	1998	Russia	Atsarkin, Vadim
Farrer, Lindsay	1998	Russia	Rogaev, Evgeny
Fowler, Carol	1998	Russia	Grigorenko, Elena
Mackay, Trudy	1998	Russia	Pasyukova, Elena
Norekian, Tigran	1998	Russia	Balaban, Pavel
Porges, Stephen	1998	Russia	Stroganova, Tatyana
Ronai, Zeev A	1998	Russia	Krasilnikov, Mikhail
Stuchebrukhov, Alexei A	1998	Russia	Medvedev, Emile
Marks, Andrew	1998	Slovak Republic	Ondrias, Karol
Sabban, Esther	1998	Slovak Republic	Kvetnansky, Richard
Sloane, Bonnie F	1998	Slovenia	Lah, Tamara
Freeman, Bruce	1998	Uruguay	Radi, Rafael
Williams, Michelle A	1998	Zimbabwe	Mahomed, Kassam
Chien, Kenneth R	1999	Argentina	Hertig, Cecilia M.
Gibori, Geula	1999	Argentina	Telleria, Carlos
Kazanietz, Marcelo	1999	Argentina	Alonso, Daniel
Ross, Susan R	1999	Argentina	Piazzon, Isabel
Sine, Steven	1999	Argentina	Bouzat, Cecilia B.
Storch, Judith R	1999	Argentina	Corsico, Betina
Moore, Lorna G	1999	Bolivia	Vargas, Enrique
Conn, Jan E	1999	Brazil	Rosa-Freitas, Maria
Donelson, John	1999	Brazil	Teixeira, Santuza
Manning, Jerry	1999	Brazil	Gazzinelli, Ricardo
Mcmahon-Pratt, Diane	1999	Brazil	Traub-Cseko, Yara
Newburger, Peter	1999	Brazil	Condino-Neto, Antonio
Ding, Xinxin	1999	China	Chen, Ying
Silverstein, Merril D	1999	China	Tao, Xianglong
Britt, William J	1999	Croatia	Jonjic, Stipan
Brown, Dennis A	1999	Croatia	Sabolic, Ivan
Crews, Fulton T	1999	Czech Republic	Fiserova, Magdalena
Benz, Christopher C	1999	Hungary	Szollosi, Janos
Davies, Peter J	1999	Hungary	Nagy, Laszlo
King, Mary-Claire	1999	Israel	Avraham, Karen
Cooper, Richard	1999	Jamaica	Mckenzie, Colin
Walker, Edward D	1999	Kenya	Vulule, John Mudegu
King, Michael P	1999	Mexico	Gonzalez-Halphen, Diego

Markwald, Roger	1999	Mexico	Victoria De La Cruz, Maria
Cohn, Daniel H	1999	Pakistan	Ahmad, Mahmud
Scheraga, Harold A	1999	Poland	Liwo, Jozef
Somer, Virend K	1999	Poland	Narkiewicz, Krysztof
Turner, Douglas H	1999	Poland	Kierzek, Ryszard
Brown, Michael D	1999	Russia	Sukernik, Rem I.
Garlid, Keith	1999	Russia	Mironova, Galina
Pace, Carlos	1999	Russia	Krayevsky, Alexander
Reinitz, John	1999	Russia	Samsonova, Maria G.
Wickstrom, Eric	1999	Russia	Zarytova, Valentina
Weaver, Scott C	1999	Senegal	Diallo, Mawlouth
Mierke, Dale F	1999	Slovenia	Grdadolnik, Joze
Waterman, Michael R	1999	Slovenia	Rozman, Damjana
Docampo, Roberto	2000	Argentina	Cazzulo, Juan Jose
Kopf, Gregory	2000	Argentina	Fornes, Miguel W.
Low, Malcolm J	2000	Argentina	Rubinstein, Marcelo
White, Michael M	2000	Argentina	Barrantes, Francisco J.
Bier, Ethan	2000	Brazil	Araujo, Helena
Rao, Anjana	2000	Brazil	Lopes, Ulisses Gazos
Wilson, Mary E	2000	Brazil	Jeronimo, Selma M. B.
Ferreri, Nicholas R	2000	Chile	Vio, Carlos
Ribera, Angeles	2000	Chile	Kukuljan, Manuel
Jiang, Xi	2000	China	Fang, Zhaoyin
Logothetis, Diomedes	2000	China	He, Cheng
Taylor, John W	2000	Colombia	Mcewen, Juan
Fields, Alan P	2000	Croatia	Banfic, Hrvoje
Riddiford, Lynn	2000	Czech Republic	Jindra, Marek
Geiduschek, Peter E	2000	India	Bhargava, Purnima
Sporn, Michael B	2000	India	Kondaiah, Paturu
Fisher, Andrew J	2000	Israel	Chejanovsky, Nor
King, Mary-Claire	2000	Israel	Kanaan, Moien
Schuchman, Edward H	2000	Israel	Gatt, Shimon
Bulun, Serdar E	2000	Kenya	Mwenda, Jason
Sibley, Carol H	2000	Kenya	Nzila-Mouanda, Alexis
Sanguinetti, Michael	2000	Mexico	Sanchez-Chapula, Jose
Surmeier, Dalton J	2000	Mexico	Bargas, Jose
Williams, Michelle A	2000	Peru	Sanchez, Sixto
Kron, Michael A	2000	Philippines	Ramirez, Bernadette
Hernandez, Victor J	2000	Poland	Wegrzyn, Gregorz
Huebner, Kay	2000	Poland	Podolski, Jacek
JAMES, THOMAS L And KOLLMAN, PETER	2000	Poland	Cieplak, Piotr
Krolewski, Andrzej S	2000	Poland	Malecki, Maciej

Stanley, William	2000	Poland	Beresewicz, Andrzej
Thompson, David H	2000	Poland	Sarna, Tadeusz
Citovsky, Vitaly H	2000	Russia	Atabekov, Joseph
Cox, Michael M	2000	Russia	Lanzov, Vladislav Alexsandrovich
Cramer, William	2000	Russia	Antonenko, Yuri
Fortini, Mark	2000	Russia	Rogaev, Evgeny
Grainger, Robert	2000	Russia	Zaraisky, Andrey G.
Hanawalt, Philip C	2000	Russia	Svetlova, Maria
Laimins, Laimonis	2000	Russia	Kisseljov, Fyodor
Boris-Lawrie, Kathleen A	2000	Slovak Republic	Altaner, Cestmir
Haydon, Phillip	2000	Slovenia	Zorec, Robert
Hogan, Brigid L	2000	South Africa	Kidson, Susan
Wallace, Douglas C	2000	South Africa	Olckers, Antonel
Houk, Kendall	2000	Turkey	Aviyente, Viktorya
Eisner, Thomas	2000	Uruguay	Gonzalez, Andres
Braden, Bradford C	2001	Argentina	Goldbaum, Fernando
Khosla, Chaitan S	2001	Argentina	Gramajo, Hugo
Stefani, Enrico	2001	Argentina	Uchitel, Osvaldo
Mcgowan, Stephen E	2001	Brazil	Jeronimo, Selma M.B.
Nathanson, Michael H	2001	Brazil	Leite, Fatima
Prescott, Stephen M	2001	Brazil	De Castro Faria Neto, Hugo
Ross, Christopher A	2001	Brazil	Engelender, Simone
Anthony, James C	2001	Chile	Caris, Luis
Hopkins, Nancy H	2001	Chile	Allende, Miguel
Strauss, Jerome F	2001	Chile	Devoto, Luigi
French, Frank S	2001	China	Yong-Lian, Zhang
Zheng, Yi	2001	China	Wang, Zhi-Xin
Greenberg, Harry	2001	Colombia	Franco, Manuel
Donowitz, Mark	2001	Croatia	Zizak, Mirza
Lee, Yuan C	2001	Croatia	Lauc, Gordon
Soll, Dieter G	2001	Croatia	Weygand-Durasevie, Ivana
Keithly, Janet	2001	Czech Republic	Stejskal, Frantisek
Kurtz, Theodore W	2001	Czech Republic	Pravenec, Michal
Muller, Miklos	2001	Czech Republic	Tachezy, Jan
Schultz, Richard M	2001	Czech Republic	Motlik, Jan
Smith, Elaine M	2001	Czech Republic	Tachezy, Ruth
Javitt, Daniel C	2001	Hungary	Karmos, George
Landy, Arthur H	2001	Hungary	Dorgai, Laszlo
Lechan, Ronald M	2001	Hungary	Fekete, Csabe
Povlishock, John T	2001	Hungary	Buki, Andras
Schroeder, Charles E	2001	Hungary	Ulbert, Istvan
Goldstein, Lawrence S	2001	India	Ray, Krishanu

Hepburn, Kenneth W	2001	India	Varghese, Mathew
Petri, William A	2001	India	Bhattacharya, Sudha
Wilkinson, Keith D	2001	India	Sobhanaditya, Jonnalagadda
Wilson, Leslie	2001	India	Panda, Dulal
Steller, Hermann	2001	Israel	Larisch-Bosch, Sarit
Jahoor, Farook	2001	Jamaica	Reid, Marvin
Massey, Douglas S	2001	Mexico	Zenteno, Rene
Pfaff, Samuel L	2001	Mexico	Varela-Echavarria, Alfredo
Bomsztyk, Karol	2001	Poland	Ostrowski, Jerzy
Girotti, Albert W	2001	Poland	Korytowski, Witold
Von Bartheld, Christopher S	2001	Poland	Butowt, Rafal
Biessmann, Harald	2001	Russia	Georgiev, Pavel
Cines, Douglas B	2001	Russia	Tkachuck, Vsevolod
Crofts, Antony R	2001	Russia	Samoilova, Rimma
Dinman, Jonathan D	2001	Russia	Dontsova, Olga
Dismukes, Gerard C	2001	Russia	Vyacheslav, Klimov
Feldman, Marcus W	2001	Russia	Zhivotovsky, Lev A.
Geacintov, Nicholas E	2001	Russia	Gromova, Elizabeta
Hattman, Stanley M	2001	Russia	Malygin, Ernst
James, Thomas L	2001	Russia	Ivanov, Valery
Kuroda, Mitzi I	2001	Russia	Zhimulev, Igor
Menger, Fred M	2001	Russia	Yaroslavov, Alexander
Oraevsky, Alexander A	2001	Russia	Andreev, Valeri
Griffith, Jack	2001	Slovak Republic	Tomaska, Lubomir
Gyorke, Sandor	2001	Slovak Republic	Zahradnikova, Alexandra
Bell, Curtis C	2001	Uruguay	Caputi, Angel
Freeman, Bruce	2001	Uruguay	Rubbo, Homero
Freeman, Bruce	2001	Uruguay	Radi, Rafeal
Siede, Wolfram	2001	Uruguay	Nunes, Elia
Williams, Noreen	2001	Uruguay	Garat, Beatriz
Wipf, Peter	2001	Uruguay	Serra, Gloria
Coleman, Rosalind A	2002	Argentina	Gonzalez-Baro, Maria R.
Ferreira, Adriana B	2002	Argentina	Caceres, Alfredo
Kay, Steve A	2002	Argentina	Ceriani, M. Fernanda
Pfenninger, Karl H	2002	Argentina	Quiroga, Santiago
Soto, Ana M	2002	Argentina	Luque, Enrique
Clark, Andrew G	2002	Brazil	Carvalho, A. Bernardo
Tollefsen, Douglas M	2002	Brazil	Pavao, Mauro
Weller, Peter F	2002	Brazil	Bozza, Patricia T.
Willett, Walter C	2002	Brazil	Sichieri, Rosely
Braunstein, Myron L	2002	Bulgaria	Bocheva, Nadejda
Burridge, Keith W	2002	Chile	Leyton, Lisette
Chang, Jing-Yu	2002	China	Luo, Fei

Zhu, Cheng	2002	China	Long, Mian
Garlid, Keith	2002	Czech Republic	Jezek, Petr
Meydani, Simin N	2002	Ecuador	Sempertegui, Fernanco
Gadsby, David C	2002	Hungary	Csanady, Laszlo
Mitchell, Douglas K	2002	Hungary	Szucs, Gyorgy
Mlodzik, Marek	2002	Hungary	Mihaly, Jozsef
Sussman, Elyse S	2002	Hungary	Winkler, Istvan
Yonetani, Takashi	2002	Hungary	Fidy, Judit
Meiri, Karina F	2002	India	Mani, Shyamala
Tykocinski, Mark L	2002	Israel	Rachmilewitz, Jacob
Van De Kar, Louis D	2002	Israel	Newman, Micheal
Beckwith, Jonathan R	2002	Mexico	Georgellis, Dimitris
Gertler, Paul J	2002	Mexico	Bertozzi, Stefano
Mosher, Deane F	2002	Nigeria	Olorundare, Olufunke
Levey, Andrew S	2002	Pakistan	Jafar, Tazeen
Gilman, Robert H	2002	Peru	Garcia, Hector
Banerjee, Ruma	2002	Poland	Paneth, Piotr
Chazin, Walter J	2002	Poland	Kuznicki, Jacek
Maddock, Janine R	2002	Poland	Wegrzyn, Grzegorz
Plow, Edward F	2002	Poland	Cierniewski, Czeslaw
Ransohoff, Richard M	2002	Poland	Glabinski, Andrzej
Borodovsky, Mark	2002	Russia	Tumanyan, Vladimir
Cecchini, Gary L	2002	Russia	Vinogradov, Andrei D
Martin, Roy W	2002	Russia	Khokhlova, Vera
Nudler, Evgeny A	2002	Russia	Mironov, Alexander
Wang, Chih-Lueh Albert	2002	Russia	Vorotnikov, Alexander
Crowe, James E	2002	South Africa	Tiemessen, Caroline
Hill, Martha N	2002	South Africa	Steyn, Krisela
Meiselman, Herbert J	2002	Turkey	Baskurt, Oguz
Petri, William A	2002	Turkey	Tanyuksel, Mehmet
Horn, John P	2002	Ukraine	Skok, Vladimir I.
Weaver, Scott C	2002	Venezuela	Navarro, Juan Carlos
Colman, David R.	2003	Argentina	Boccaccio, Graciela L.
Fuchs, Paul A	2003	Argentina	Elgoyhen, Ana
Gage, Fred H	2003	Argentina	Schinder, Alejandro
Kranias, Evangelia G	2003	Argentina	Mattiazzi, Alicia
Lee, Jean C	2003	Argentina	Centron, Daniela
O'donnell, Patricio	2003	Argentina	Murer, Mario Gustavo
Scheraga, Harold A	2003	Argentina	Vila, Jorge
Sztul, Elizabeth S	2003	Argentina	Alvarez, Cecilia
Schoolnik, Gary K	2003	Bangladesh	Islam, Sirajul
Krieger, Monty	2003	Chile	Rigotti, Attilio
Thompson, Beti	2003	Chile	Puschel, Klaus

Logothetis, Diomedes	2003	China	Zhang, Hailin
Flavell, Richard A	2003	Czech Republic	Tlaskalova, Helena
Bender, Welcome W.	2003	Hungary	Sipos, Laszlo
Larsen, Philip R	2003	Hungary	Gereben, Balazs
Lyons-Ruth, Karlen	2003	Hungary	Sasvari-Szekely, Maria
Terhorst, Cornelis P	2003	Hungary	Lanyi, Arpad
Vierling, Elizabeth	2003	Hungary	Vigh, Laszlo
Duman, Ronald S	2003	India	Vaidya, Vidita
Hu, Howard	2003	India	Balakrishnan, Kalpana
Ginsberg, Mark H	2003	Israel	Alon, Ronen
Loverde, Philip T.	2003	Israel	Fishelson, Zvi
Gallo, Joseph J	2003	Mexico	Garcia-Pena, Carmen
Melvin, James E	2003	Mexico	Arreola, Jorge
Visconti, Pablo E	2003	Mexico	Darszon, Alberto
Hitti, Jane E	2003	Peru	Garcia, Pedro
Rhoads, Robert E	2003	Poland	Darzynkiewicz, Edward
Cerhan, James R	2003	Slovak Republic	Gulis, Gabriel
Tobet, Stuart A	2003	Slovenia	Majdic, Gregor
Cummings, Jeffrey L.	2003	Thailand	Senanarong, Vorapun
Beckman, Joseph S	2003	Uruguay	Barbeito, Luis

Source: Abt Associates Inc. analysis of program data

AIDS-FIRCA

USPI Name	Start Year	Country Name	IRC Name
Cody, Vivian	1993	Poland	Wojtczak, Andrzej
Casadevall, Arturo	1994	Israel	Spira, Gadi
Mathews, Michael B.	1994	Israel	Shaul, Yosef
Mosier, Donald E.	1995	Argentina	Picchio, Gaston Rafael
Johnson, Bruce D.	1995	Australia	Maher, Lisa
Woody, George E.	1995	Brazil	Pechansky, Flavio
Wood, Charles	1995	China	Geng, Yun Qi
De Groot, Anne	1995	Gambia	Whittle, Hilton
Britt, William J	1995	Germany	Mach, Michael
Ho, David D.	1995	Greece	Hatzakis, Angelos
Barrow, William	1995	Guadeloupe	Rastogi, Nalin
Essex, Myron	1995	Mexico	Soto-Ramirez, Luis
Didier, Trono	1995	Switzerland	Carpentier, Jean-Louis
Levy, Jay A.	1995	Thailand	Sitthisombat, Nopporn
Gigliotti, Francis	1995	United Kingdom	Wakefield, Ann E.
Neurath, Alexander	1996	Czech Republic	Rosenberg, Ivan

Sessler, Jonathan	1996	Czech Republic	Kral, Vladimir
Coates, Thomas J.	1996	India	Bhave, Gheeta
Miller, Christopher	1996	Kenya	Otsyula, Moses
Stanton, Bonita	1996	Namibia	Terreri, Nancy
Holmes, King	1996	Peru	Gotuzzo, Eduardo
Stevenson, Mario	1996	Russia	Bukrinskaya, Alissa
Wong-Staal, Flossie	1996	Sweden	Ahrlund-Richter, Lars
Ratner, Lee	1996	Taiwan	Wang, Jaang Jiun
Tan, Wai-Yuan	1996	Taiwan	Hsieh, Ying-Hen
Rana, Tariq M.	1996	United Kingdom	Varani, Gabriele
Richman, Douglas	1996	United Kingdom	Brown And Pillay, Deenan
Richman, Douglas	1996	United Kingdom	Leigh Brown, Andrew (Aj)
Hunter, Eric	1997	Argentina	Gonzalez, Silvia
Hopewell, Philip C	1997	Botswana	Davis, Rumisha
Pitha-Rowe, Paula	1997	Czech Republic	Melkova, Zora
Steinman, Ralph	1997	Germany	Racz, Paul Bollinger,
Robert	1997	India	Paranjape, R S
Holmes, King	1997	Peru	Gotuzzo, Eduardo
Chatterjee, Delphi	1997	Taiwan	Khoo, Kay-Hooi
Kaplan, Gilla	1997	Thailand	Akarasewi, Pasakorn
Detels, Roger	1997	Vietnam	Nguyen, Tran Hien
Fahey, Robert	1998	Canada	Av-Gay, Yossef
Kasper, Lloyd	1998	France	Buzoni-Gatel, Dominique
De Groot, Anne	1998	Gambia	Whittle, Hilton
Joiner, Keith	1998	Germany	Lingelbach, Klaus
Gupta, Phalguni	1998	India	Chatterjee, Ramdas
Chou, Sunwen	1998	Italy	Baldanti, Fausto
Sullivan, John	1998	South Africa	Pillay, Thilagavathie
Hunter, Christopher	1998	United Kingdom	Alexander, James
Levitz, Stuart	1998	United Kingdom	Harrison, Thomas
Mcneil, Michael	1998	United Kingdom	Field, Robert
Mcneil, Michael	1998	United Kingdom	Naismith, James
Morisky, Donald	1999	Belize	Smith, Shirlene
Anderson, Deborah	1999	Brazil	Segurado, Aluicio
Weber, Irene	1999	Hungary	Tozser, Jozsef
Taha, Taha	1999	Malawi	Kumwenda, Newton I.
Boothroyd, John	1999	Panama	Ortega-Barria, Eduardo
Campbell, Thomas	1999	Zimbabwe	Borok, Margaret
Padian, Nancy	1999	Zimbabwe	Chipato, Tsungai
Nyambi, Phillipe	2000	Cameroon	Zekeng, Leopold
Russell, David	2000	Hungary	Miczak, Andras
Ahmad, Nafees	2000	India	Jameel, Shahid
Bodduluri, Haribabu	2000	Italy	Sozzani, Silvano

Casadevall, Arturo	2000	Italy	Vecchiarelli, Anna
Brook, Judith	2000	South Africa	Morojele, Neo
Lallemant, Marc	2000	Thailand	Sirirungsi, Wasna
Cushion, Melanie	2000	United Kingdom	Wakefield, Ann E.
Gorbach, Pamina	2001	Cambodia	Sopheab, Heng
Griffiths, Jeffrey	2001	Ecuador	Fernando, Sempertegui
Calderone, Richard	2001	France	Latge, Jean-Paul
Barrows, Louis	2001	Nigeria	Akubue, Paul
Frenkel, Lisa	2001	Peru	Alarcon, Jorge
Kozinetz, Claudia	2001	Romania	Matusa, Rodica
Joiner, Keith	2001	South Africa	Hoppe, Heinrich
Stanton, Bonita	2001	Vietnam	Truong, Tan Minh
Griffiths, Jeffrey	2002	Kenya	Mugambi,
Holmes, King	2002	Kenya	Bukusi, Elizabeth
McNeil, Michael	2003	Belgium	Holsters

Source: Abt Associates Inc. analysis of program data

Appendix G: Collaborative Publications of Ten "High-Impact" Collaborations

(IRCs in bold; sorted by first author to partially preserve anonymity)

Alvarez B, Demicheli V, Duran R, Trujillo M, Cervenansky C, Freeman BA, **Radi R**. Inactivation of human Cu-Zn superoxide dismutase by peroxynitrite and formation of histidinyl radical. *Free Radic Biol Med*. 2004;37(6):813-22.

Alvarez B, Ferrer-Sueta G, Freeman BA, **Radi R**. Kinetics of peroxynitrite reaction with amino acids and human serum albumin. J *Biol Chem*. 1999;274(2):842-8.

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Belogurov GA, Fabrichniy IP, Pohjanjoki P, Kasho VN, Lehtihuhta E, Turkina MV, Cooperman BS, Goldman A, **Baykov AA**, Lahti R. Catalytically important ionizations along the reaction pathway of yeast pyrophosphatase. *Biochemistry*. 2000;39(45):13931-8.

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Appendix H: Collaborative Publications in Ten "High-Impact" Journals

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