

PROCESS EVALUATION OF THE COBRE PROGRAM

Key Findings

Submitted by Carlyn Consulting to the
National Center for Research Resources (NCRR), NIH

September 2008

Purpose of the COBRE program

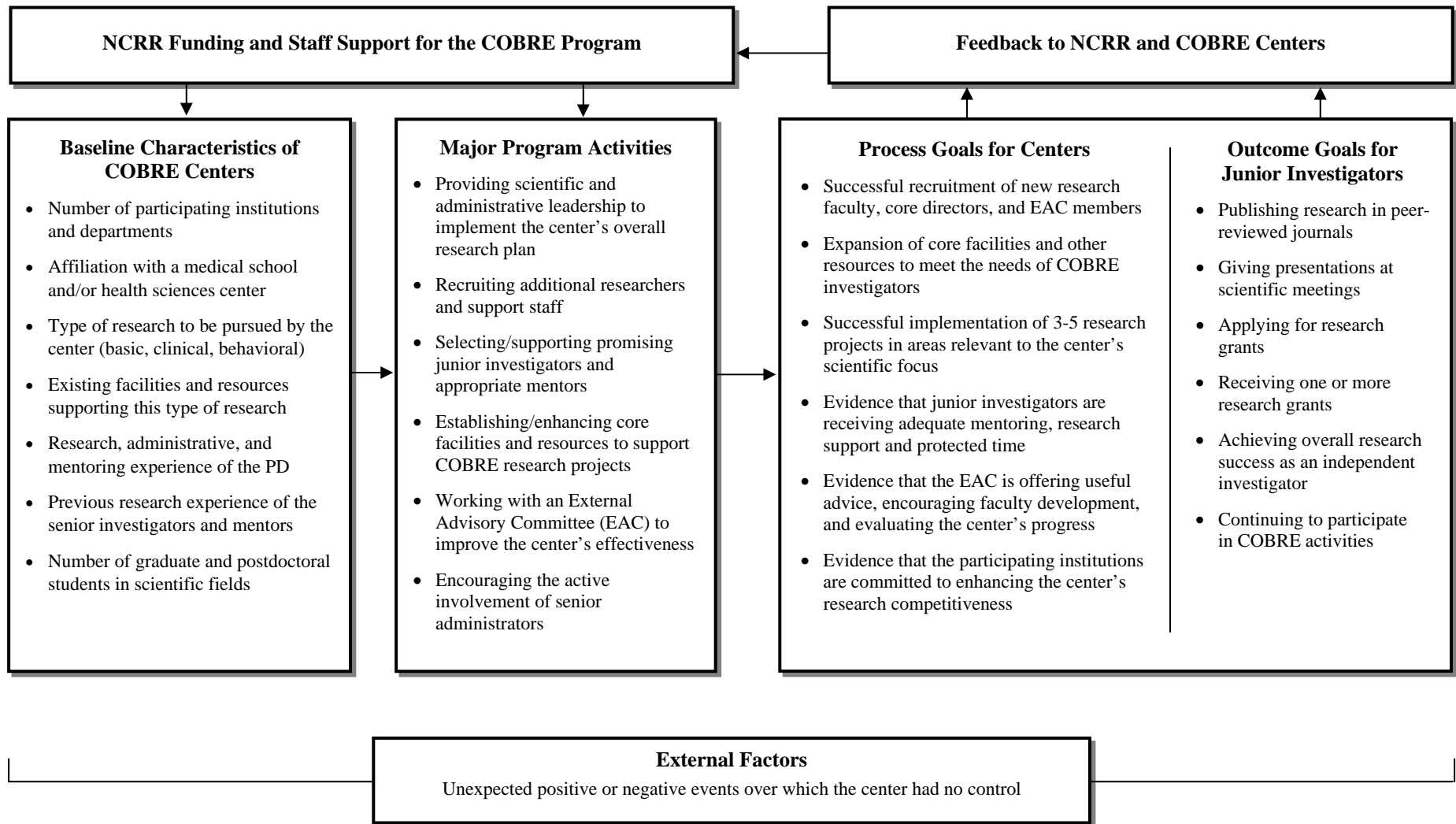
- Establish multidisciplinary biomedical research centers in IDeA states (those with 'historically low aggregate success rates' in obtaining NIH grants)
- Strengthen the infrastructure of participating institutions
- Enhance the research competitiveness of their research scientists, especially junior investigators

Evaluation design

- Based on a conceptual framework identifying the program's goals and the predictor variables likely to be related to program success
- 6 study questions were addressed
- 2 target populations:
 - Initial cohort of 19 centers awarded a COBRE grant in Sept 2000 (n=18 since WY's centers shared many resources)
 - 107 junior investigators at these centers who received substantial COBRE support during Years 1-3 and did not have an R01 before joining the program

Exhibit 1

CONCEPTUAL FRAMEWORK FOR THE PROCESS EVALUATION OF THE COBRE PROGRAM



Q1. What were the characteristics of the centers when they joined the COBRE program?

- Most were collaborative partnerships (avg = 2.1 institutions and 4.8 departments per center in Year 1); 15 centers had a formal affiliation with a med school and/or major medical center
- All focused primarily on basic research; 7 centers were also interested in clinical research
- All had existing research resources but most needed additional core facilities, renovation, and upgraded instrumentation
- All PDs were accomplished researchers (with one exception); wide variation in number of experienced investigators at baseline (ranging from 2 to 11)
- Great variation in size of postdoc and grad student pool (avg = 76 postdocs, 916 graduate science students)

Exhibit 3

Process Evaluation of the COBRE Program

**COBRE Centers' Access to Medical Centers
and Graduate/Postdoctoral Students in Scientific Fields
at Baseline (FY 2000)**

COBRE	Lead Institution	Med Schools and Major Medical Centers Participating in COBRE	# Graduate Science Students¹	# Postdocs in Science and Health Fields¹
AR1	University of Arkansas	University of Arkansas for Medical Sciences (UAMS)	837	74
DE1	University of Delaware	None	994	100
ID1	University of Idaho	Boise VA Medical Center	715	24
KS1	University of Kansas - Lawrence	University of Kansas Medical Center (KUMC)	3,631	250
KY1	University of Louisville	University of Louisville School of Medicine	769	105
KY2	University of Kentucky	University of Kentucky College of Medicine	1,233	205
ME1	Maine Medical Center Research Institute (MMCRI)	Maine Medical Center Research Institute (MMCRI)	459	70
MT1	University of Montana	None	1,025	77
NE1	University of Nebraska at Lincoln	University of Nebraska Medical Center (UNMC)	1,971	193
NV1	University of Nevada Reno	University of Nevada School of Medicine	730	0

COBRE	Lead Institution	Med Schools and Major Medical Centers Participating in COBRE	# Graduate Science Students¹	# Postdocs in Science and Health Fields¹
OK1	University of Oklahoma Health Sciences Center (OUHSC)	University of Oklahoma Health Sciences Center (OUHSC) Oklahoma State University Center for Veterinary Health Sciences	2,042	153
OK2	Oklahoma Medical Research Foundation (OMRF)	Oklahoma Medical Research Foundation (OMRF) University of Oklahoma Health Sciences Center (OUHSC) Oklahoma State University Center for Veterinary Health Sciences	2,042	153
PR1	University of Puerto Rico - Medical Sciences Campus	University of Puerto Rico - Medical Sciences Campus	1,285	7
RI1	Brown University	Brown University Medical School	671	65
SD1	University of South Dakota School of Medicine	University of South Dakota School of Medicine	195	4
VT1	University of Vermont College of Medicine	University of Vermont College of Medicine	450	90
WV1	West Virginia University	West Virginia University School of Medicine Marshall University School of Medicine	1,442	44
WY1/2	University of Wyoming	None	643	69

¹ National Science Foundation, Division of Science Resources Statistics, Graduate Students and Postdoctorates in Science and Engineering, Fall 2000. <http://www.nsf.gov/statistics/nsf02314/>

Q2. How did the COBREs implement the major activities recommended by NCRR?

- 11 centers actively recruited junior and senior investigators and 7 focused only on junior investigators; great variation in size of startup packages (largest = \$400K from COBRE and other sources)
- Some centers offered 1- to 2-year pilot project awards (\$8K-\$100K)
- Most centers held work-in-progress meetings, workshops on different topics, and annual retreats/symposia; most found they needed to strengthen their mentoring program after 2-3 years
- All COBREs recruited an EAC of accomplished researchers and met with them 1-2 times/year (sometimes by conf call); nearly all EACs expressed enthusiasm for their center
- 16 centers established an IAC and met with them 2-4 times/year

Q3. How successful were the COBREs in achieving the process goals for centers?

- 86 investigators recruited during Years 1-6 (>90% into tenured or tenure-track positions); overall retention of junior investigators was high (70-80%)
- 11 centers created permanent academic positions (avg = 2.5 new positions); 5 new PhD and 2 MD/PhD programs launched
- 11 centers developed new core facilities (21 new cores, 39 enhanced cores, 5 new research buildings); 6 centers received C06 grants and 14 received COBRE supplements to expand space
- More subprojects implemented than expected (avg = 10.9); 81% of subprojects directed by a junior investigator
- 81% of junior investigators were mentored; avg release time = 41%; 41% had at least 1 postdoc

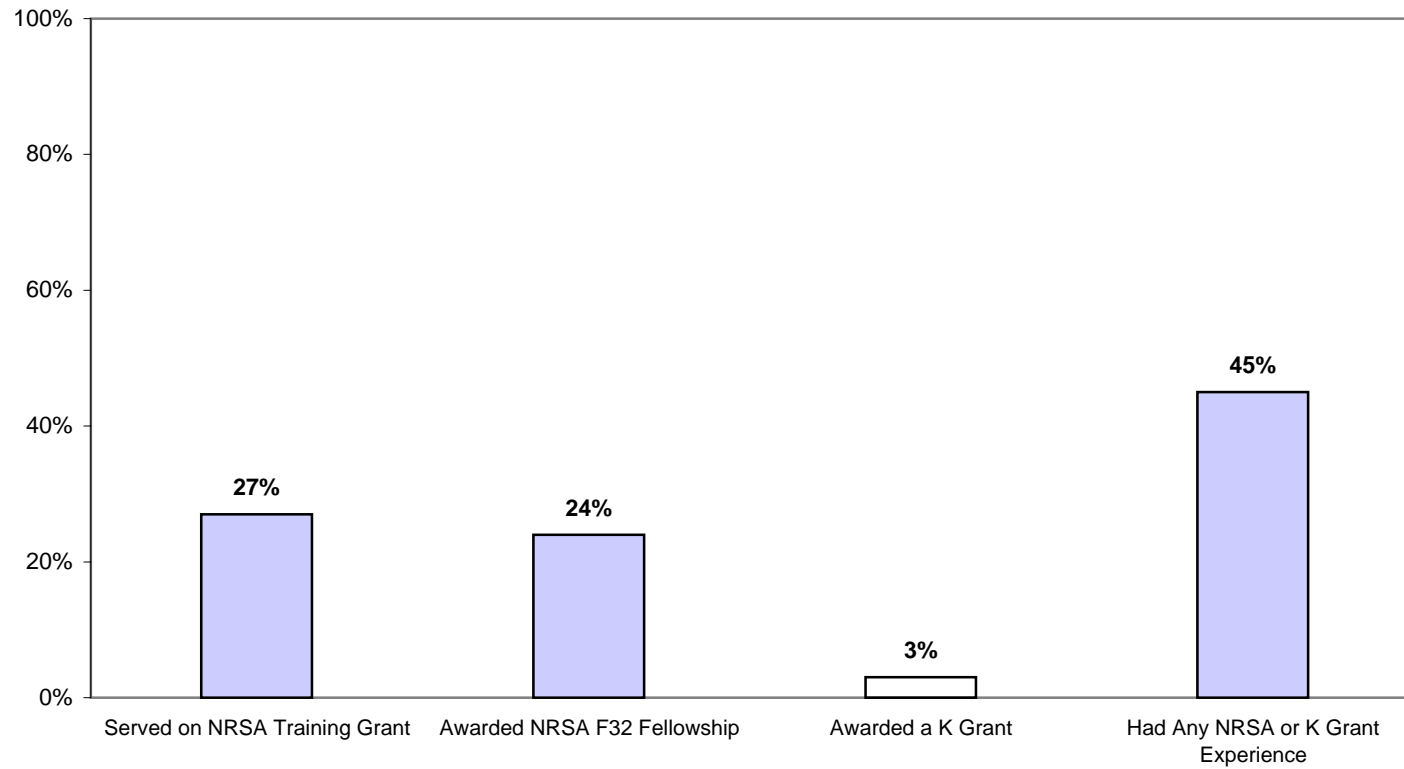
Q4. What were the characteristics of the COBRE junior investigators when they joined the program?

- More males than females (72% vs. 28%)
- Mostly PhDs (91%) + 5% MD/PhDs + 3% MDs + 1% DVM/PhDs
- Several years of research training experience:
 - Average = 8.0 years since completing doctorate
 - Nearly all had been postdocs
 - 45% had served on a T32, F, or K grant
- Substantial experience publishing in scientific journals (avg = 1.4 articles/year, 99% first authors, 57% senior authors)
- Some experience with grant applications/awards; 65% had applied for a PHS grant, 42% were successful (mostly F32s); 30% had applied for an R01, 0% were successful

Exhibit 14

Process Evaluation of the COBRE Program

Percent of Junior Investigators with Previous NRSA or K Grant Experience

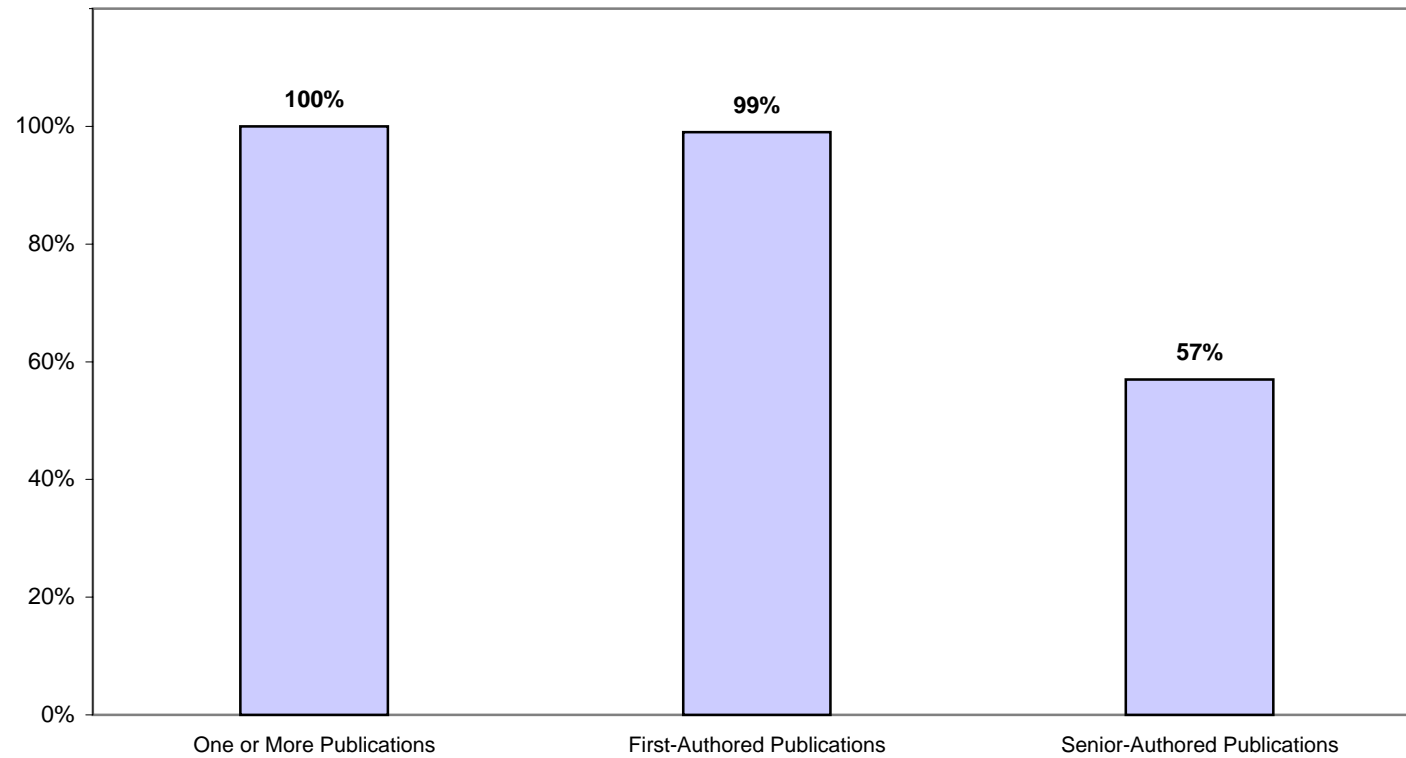


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Data source: IMPAC II.

Exhibit 15

Process Evaluation of the COBRE Program

Percent of Junior Investigators with Previous Scientific Publications

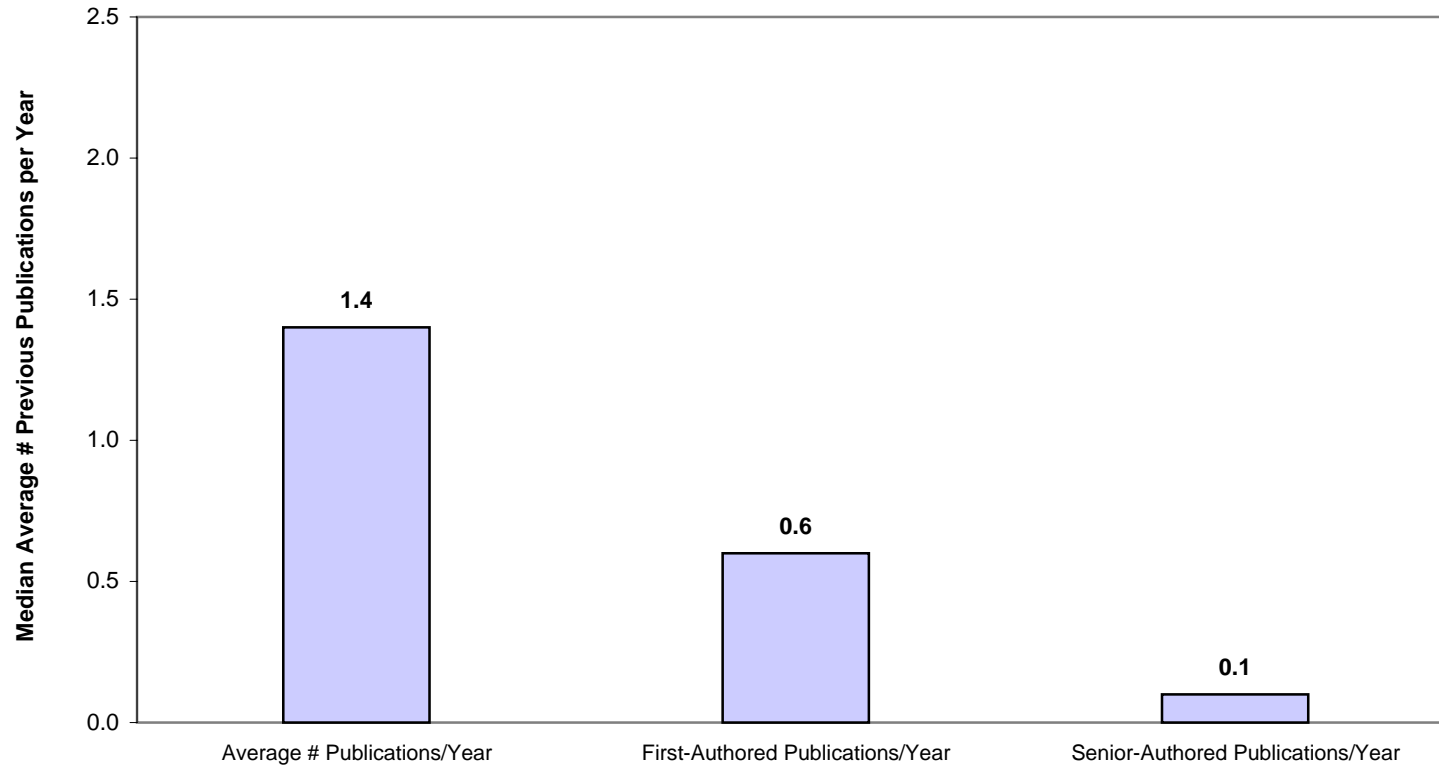


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 17

Process Evaluation of the COBRE Program

Junior Investigators' Average Number of Previous Publications Per Year

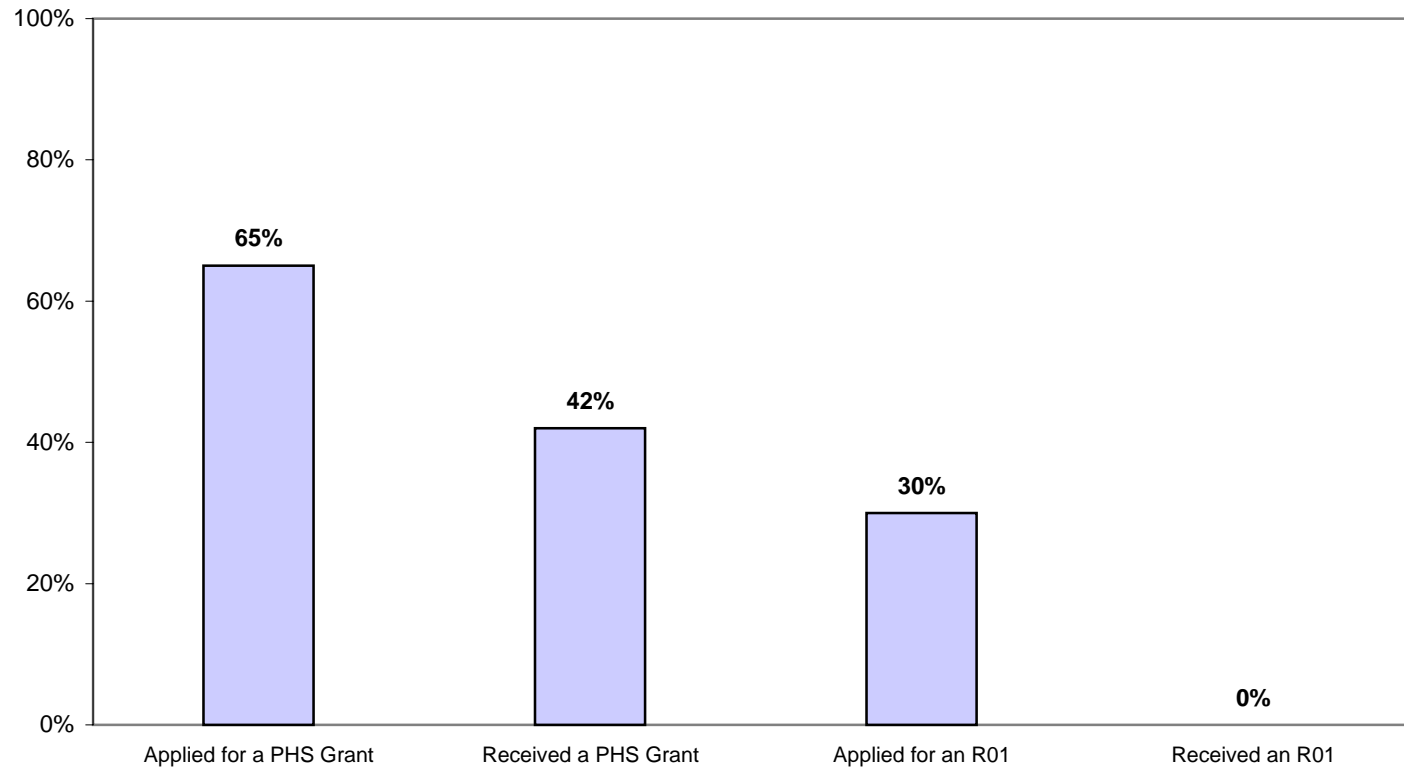


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 18

Process Evaluation of the COBRE Program

Percent of Junior Investigators with Previous PHS Grant Applications and Awards



Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). PHS subprojects were counted as grants. Data source: IMPAC II.

Q5. How successful were the COBRE junior investigators in achieving the program's goals?

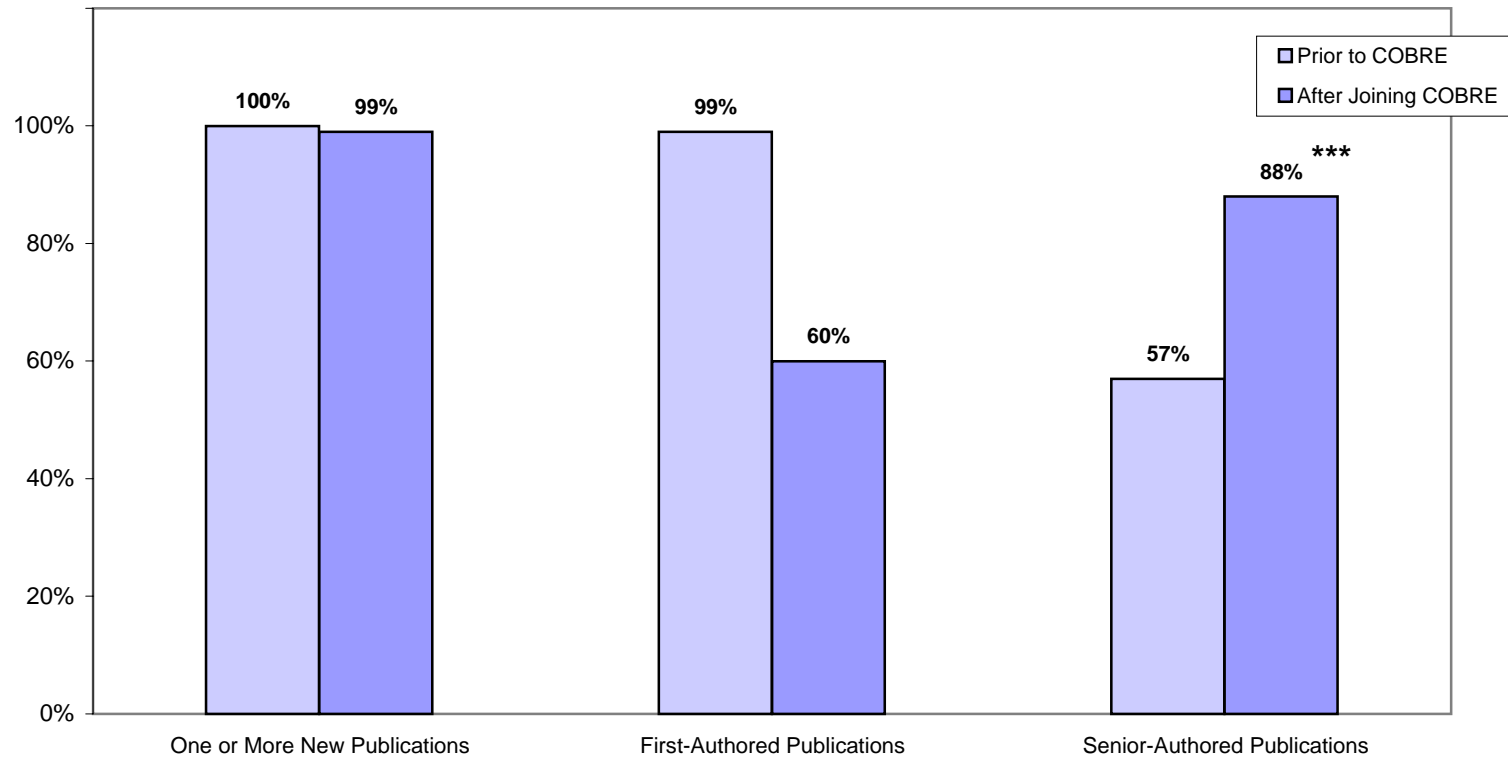
- 99% published in scientific journals, averaging 2.0 articles/year***
- Major change in authorship patterns; 60% had new first-authored articles and 88% had new senior-authored articles***
- 88% applied for a PHS grant, 65% were successful (mostly R-type grants)**; 80% applied for an R01, 40% were successful***; 24% received a large non-PHS grant; 36% received a smaller non-PHS grant
- 79% of junior investigators had a tenured or tenure-track position
- Only 7% left research during Years 1-6 (some temporarily)
- Surprisingly, the only baseline characteristic predictive of future success was having applied for an R01**

***Significant improvement in performance since joining COBRE ($p < .001$), **($p < .01$)

Exhibit 19

Process Evaluation of the COBRE Program

**Percent of Junior Investigators Who Published After Joining COBRE
(Compared to Pre-COBRE Performance)**



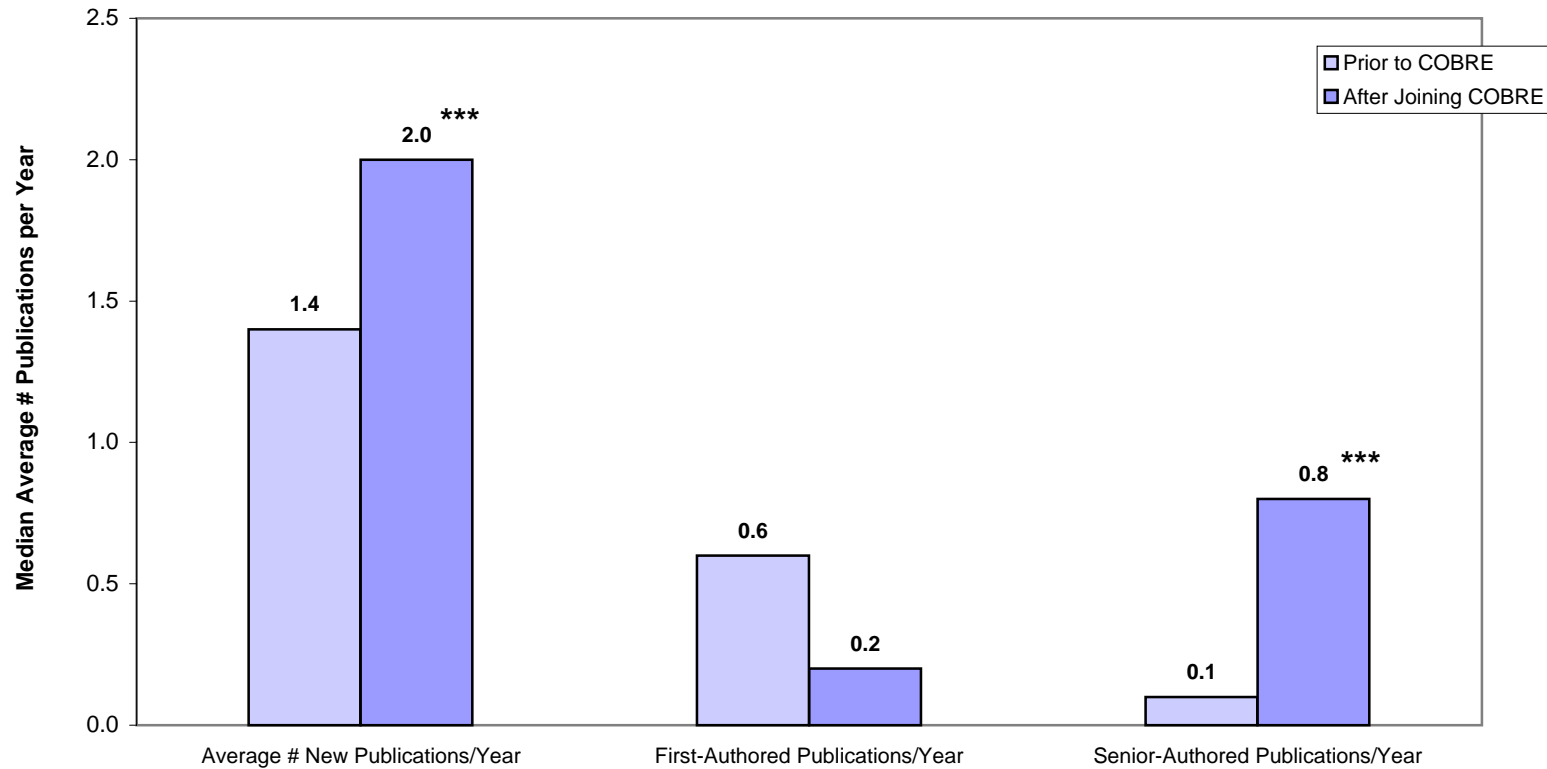
*** Significant improvement in performance ($p < .001$).

Based on an analysis of the peer-reviewed scientific articles published by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 20

Process Evaluation of the COBRE Program

**Average Number of Publications Per Year
(Compared to Pre-COBRE Performance)**



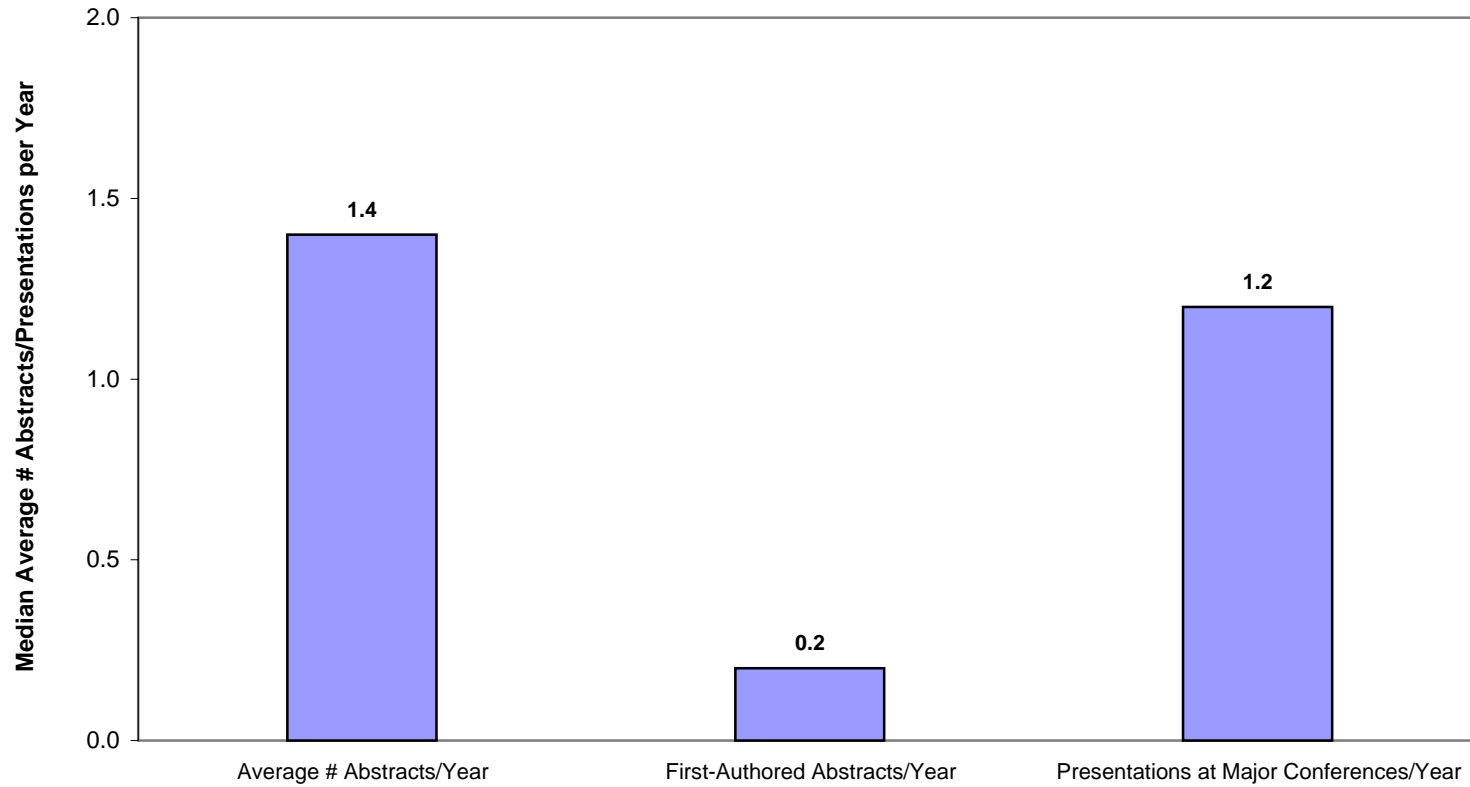
*** Significant improvement in performance ($p < .001$).

Based on an analysis of peer-reviewed scientific articles published each year by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 21

Process Evaluation of the COBRE Program

Average Number of Abstracts and Presentations Per Year After Joining COBRE

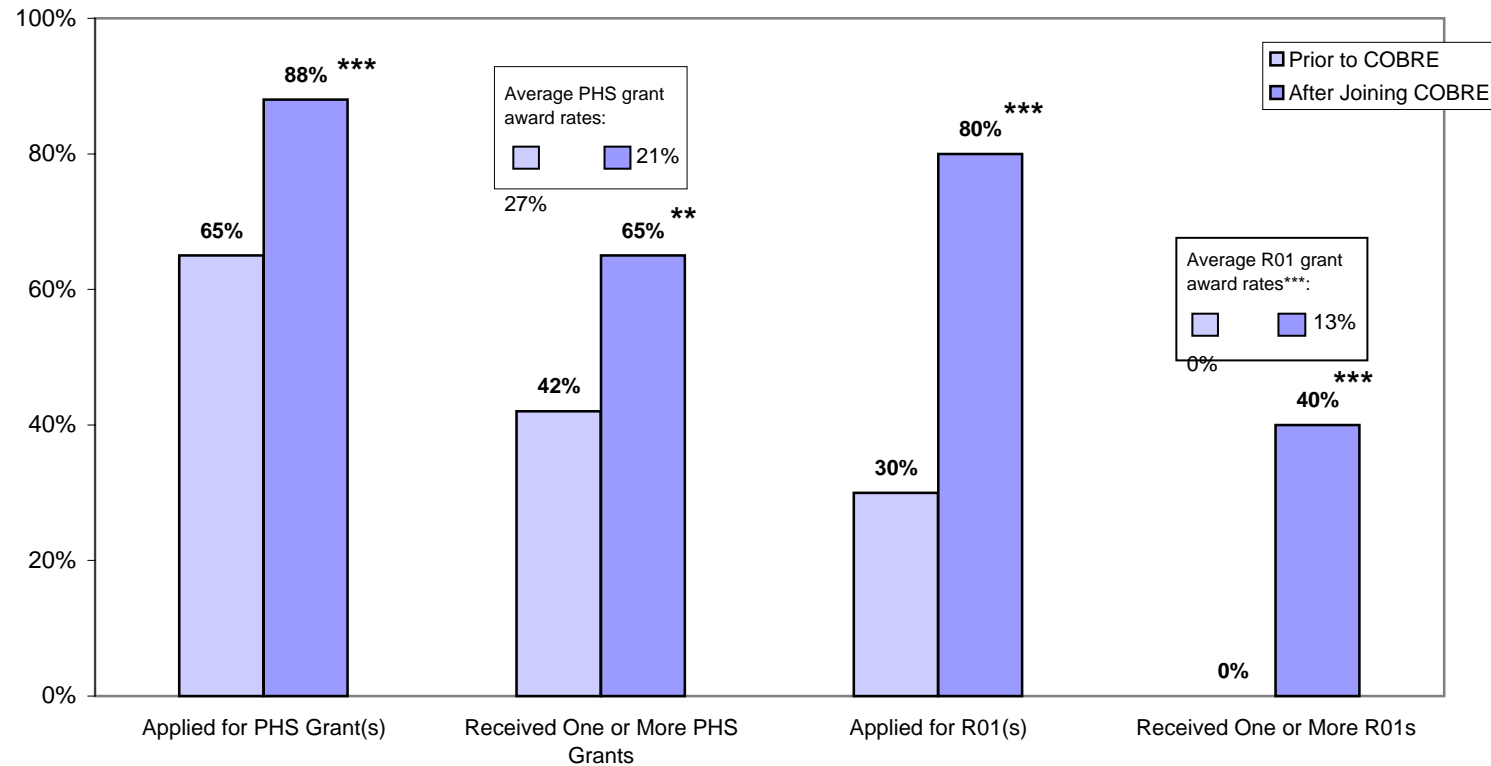


Based on an analysis of abstracts and presentations given at major research conferences per year by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), from the time they joined the program through Sept 2007. Data source: COBRE annual progress reports.

Exhibit 22

Process Evaluation of the COBRE Program

**Percent of Junior Investigators Who Applied For / Received a PHS Grant
(Compared to Pre-COBRE Performance)**



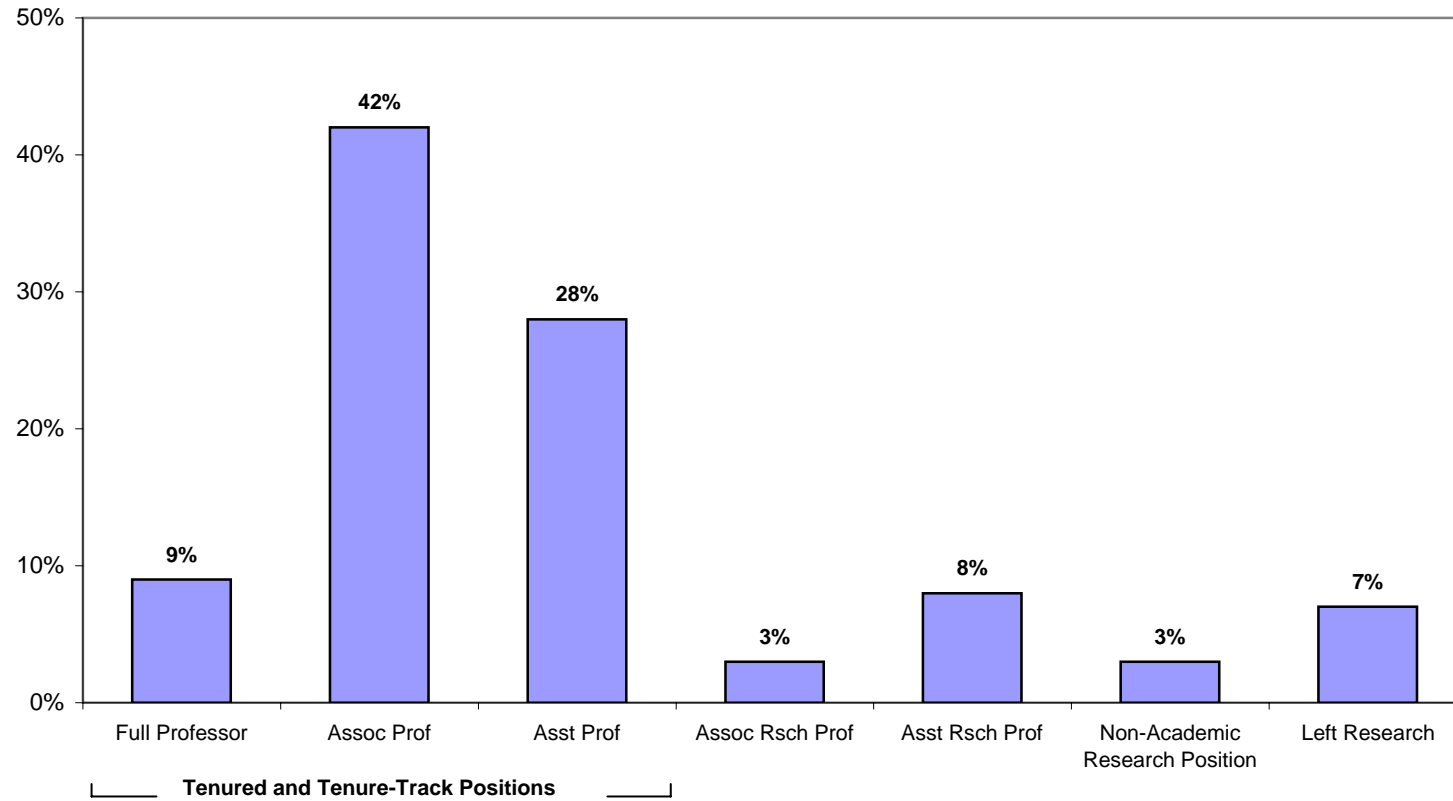
*** Significant improvement in performance ($p < .001$). ** ($p < .01$)

Based on an analysis of competitive PHS grant applications submitted by and awarded to the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). PHS subprojects were counted as grants. **Average Grant Award Rate** was calculated by determining for each grant applicant the percent of his/her applications that were funded, and then averaging these percents for the group as a whole. Data source: IMPAC II.

Exhibit 23

Process Evaluation of the COBRE Program

Types of Academic Positions Held by Junior Investigators

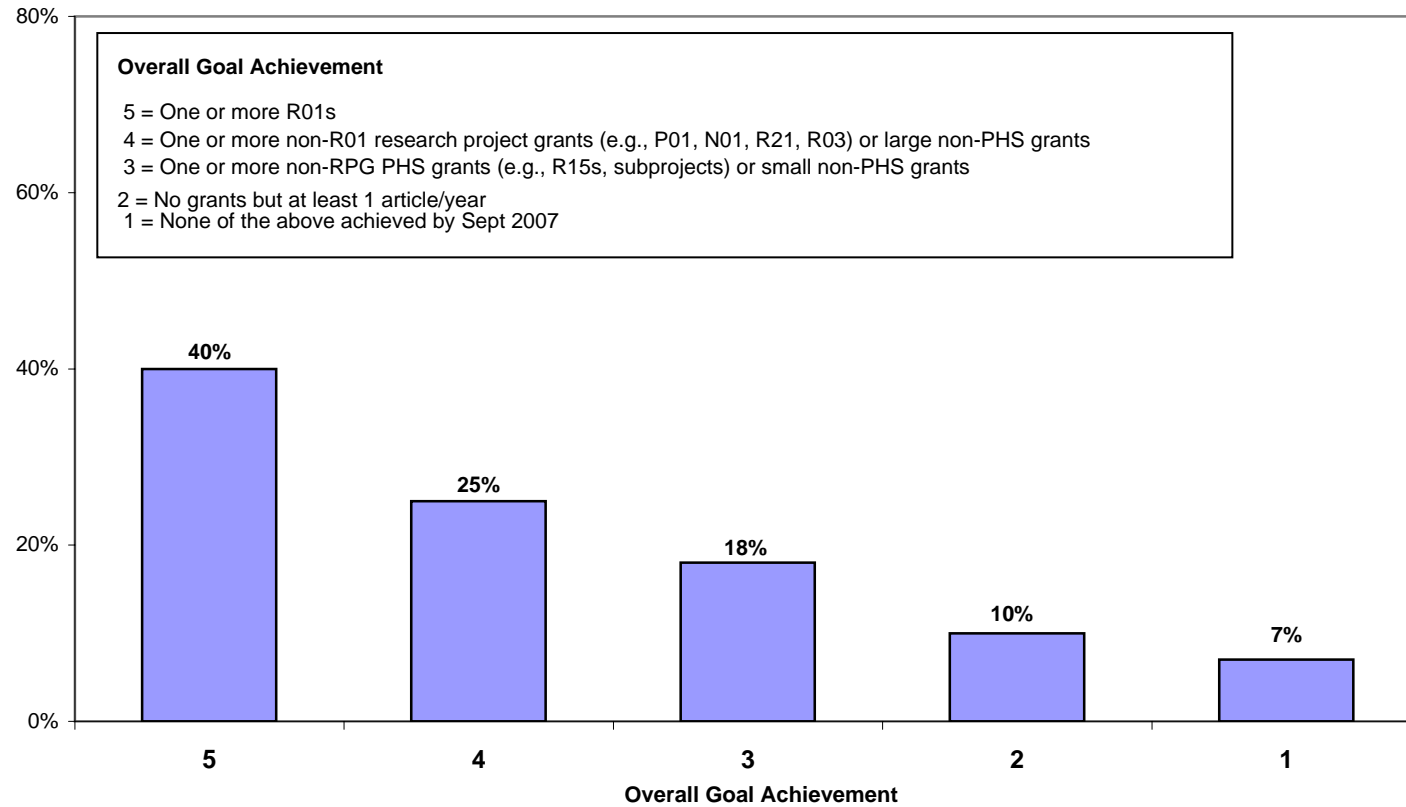


Based on an analysis of the positions held by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107) as of Sept 2007. Data sources: IMPAC II, web searches.

Exhibit 24

Process Evaluation of the COBRE Program

Overall Achievement of Program Goals by Junior Investigators



Each non-R01 junior investigator who received substantial COBRE support during Years 1-3 (N=107) was given only one rating summarizing the extent to which the person achieved the major goals of the program by Sept 2007, based on the person's PHS grants and peer-reviewed publications after joining COBRE. Average Grant Award Rate was calculated by determining for each grant applicant the percent of his/her applications that were funded, and then averaging these percents for the group as a whole. Data sources: IMPAC II, PubMed, web searches.

Q6. Did any COBREs experience positive or negative events over which they had no control?

- The most difficult unforeseen challenge was loss of the PD or associate PD due to unexpected death or departure from the institution
- Some centers faced unanticipated state and/or institutional funding constraints
- Some faced lengthy delays in hiring new personnel and construction/renovation of new facilities
- A few centers experienced very positive events (e.g., substantial increase in state funding for research, institutional decision to create more research positions)

Major findings of the evaluation

- There was considerable variation among the 18 COBREs with respect to their baseline characteristics, implementation of different program activities, and emphasis on specific goals
- The centers did an excellent job of recruiting and retaining new research faculty, core directors, and EAC members, but more attention should be given to recruiting female junior investigators
- A large majority of junior investigators (over 80%) achieved a reasonably high level of research success and performed as well as a group of K22 awardees with similar baseline characteristics, but several centers could enhance their mentoring programs
- The COBRE program has been very effective in strengthening the research infrastructure of the participating institutions
- The success of the program has been broad-based; 13 centers (nearly 75%) performed exceptionally well in one or more areas

Strategies found to be most effective

- Conducting rigorous assessments of research progress and monitoring core facilities
- Emphasizing pilot projects as well as subprojects
- Developing a good COBRE website and other outreach strategies
- Establishing a formal mentoring program, selecting mentors with care, and giving junior investigators a supportive environment with adequate protected time, postdocs, and constructive feedback
- Selecting EAC members with care, communicating with them on a regular basis, and encouraging them to assess junior investigators
- Reaching out to senior administrators, communicating with them on a regular basis, and encouraging them to serve on the IAC
- Leveraging COBRE funds to obtain additional support for the center

Other factors related to success

- Strong state support for research
- Strong institutional support for research
- Fortuitous timing of the COBRE initiative

Conclusions

- The evaluation findings illustrate how effective the COBRE program has been in strengthening the research infrastructure of institutions located in IDeA states
- The results also underscore the success of the COBRE program as a mechanism for training junior investigators
- Many COBRE participants commented on how much they have benefited from the program