

EVALUATION OF THE K22 PROGRAM

Key Findings

NIH Training Advisory Committee (TAC) Presentation

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What is the purpose of the K22 grant?

To help junior investigators develop independent research careers by:

- Supporting them as they move to their first academic position
- Making sure they have adequate release time, technical support, and equipment
- Offering advice in securing a tenure-track (or equivalent) position
- Encouraging them to publish in peer-reviewed journals
- Encouraging them to apply for research grants, especially R01s
- Expecting them to receive an R01 grant (or equivalent)

What types of K22 programs did different ICs offer?

Intramural mentoring phase  transition phase (ET)

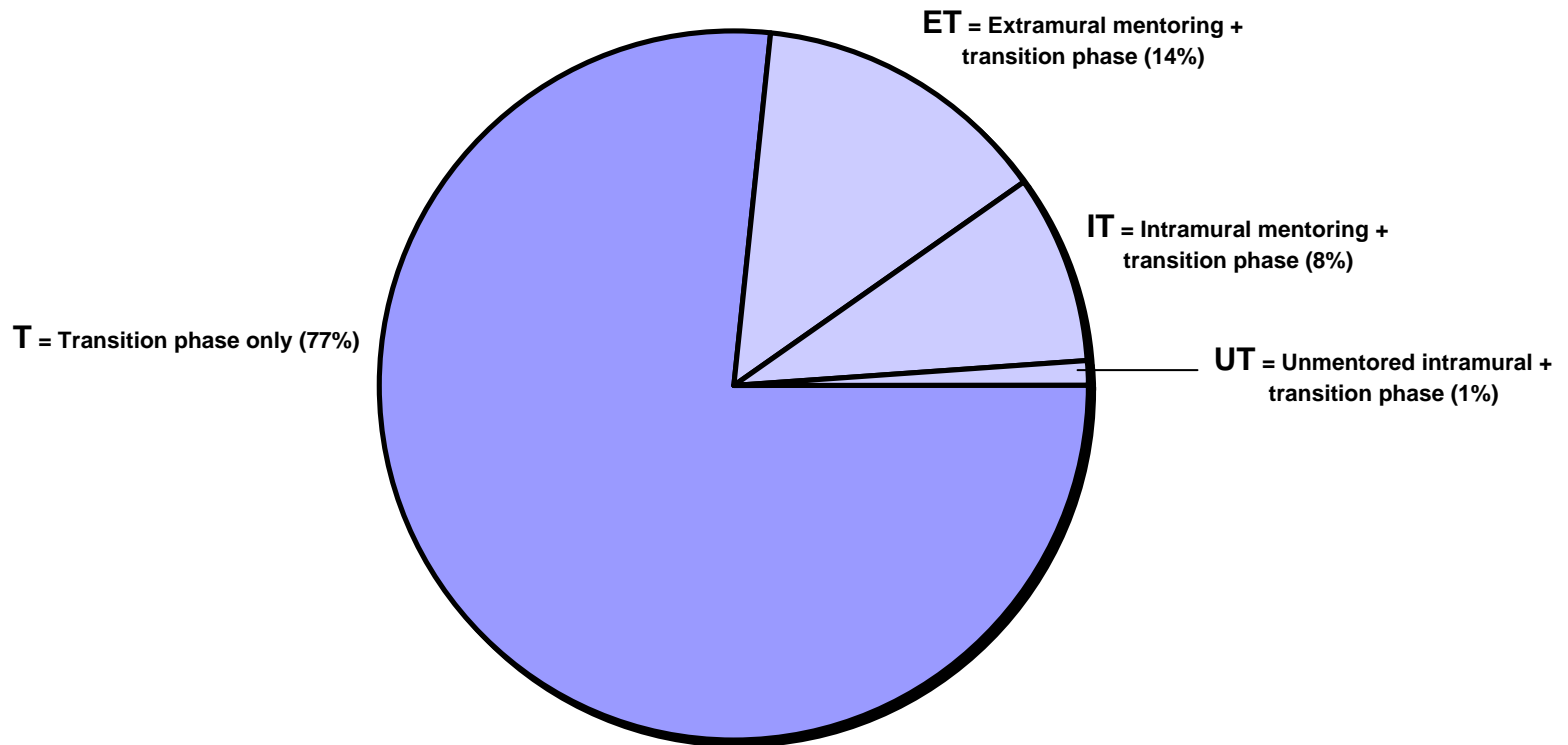
Extramural mentoring phase  transition phase (IT)

Transition phase only (T)

- IT and ET programs offered up to 5 years of support
- T programs varied from 2 years (NIAID) to 4 years (NHGRI, NIDCR)
- Most T programs cost less per year than ET and IT programs

Exhibit 1
Evaluation of the K22 Program

Percent of K22 Participants in Each Type of Program

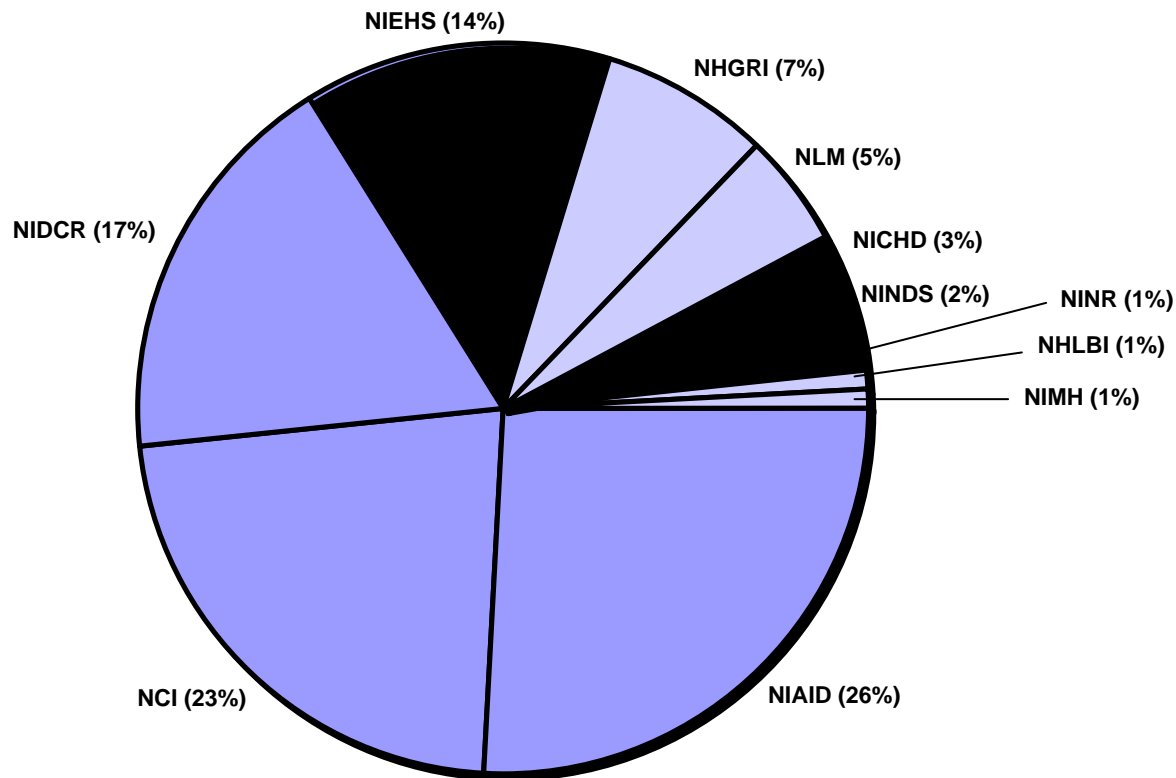


Based on an analysis of all individuals who participated in the K22 program during FY 1998-2005 (N=256). Data sources: IMPAC II, K22 program directors.

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Exhibit 2
Evaluation of the K22 Program

Percent of K22 Participants Sponsored by Each Institute/Center (IC)



Based on an analysis of all individuals who participated in the K22 program during FY 1998-2005 (N=256). Data sources: IMPAC II, K22 program directors.

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What were the major findings of the evaluation?

- A high proportion of K22 awardees were very successful in achieving the program's goals, especially with respect to:
 - Publishing new senior-authored articles
 - Applying for NIH grants, especially R01s
 - Receiving R01 grants
 - Securing a tenured or tenure-track position
- K22 awardees were significantly more successful than the control group (unsuccessful K22 applicants) in achieving program goals
- Transition-only (T) K22 programs seem to work best
 - T programs cost less than mentored ET and IT programs
 - T participants achieved the highest levels of overall research success
- NIAID's 2-year transition-only program turned out to be the most successful in terms of R01 application/award rates

For the K22 awardees and control group combined, which baseline characteristics were most predictive of future success in achieving program goals (per multiple regression analysis)?

- Receiving a K22 award ***
- Having a PhD ***
- More years since doctorate degree **
- More previous first-authored articles per year **
- Being male *
- More years since K22 application *

Surprisingly, the following variables were not predictive of future success:

- K22 priority score
- More years on a prior T, F, and/or K grant

For the K22 awardees as a group, which characteristics were most related to future success (using regression)?

Baseline factors

- More previous first-authored articles per year ***
- Having a PhD **
- More years since doctorate degree **
- More years since K22 award **

Program factors

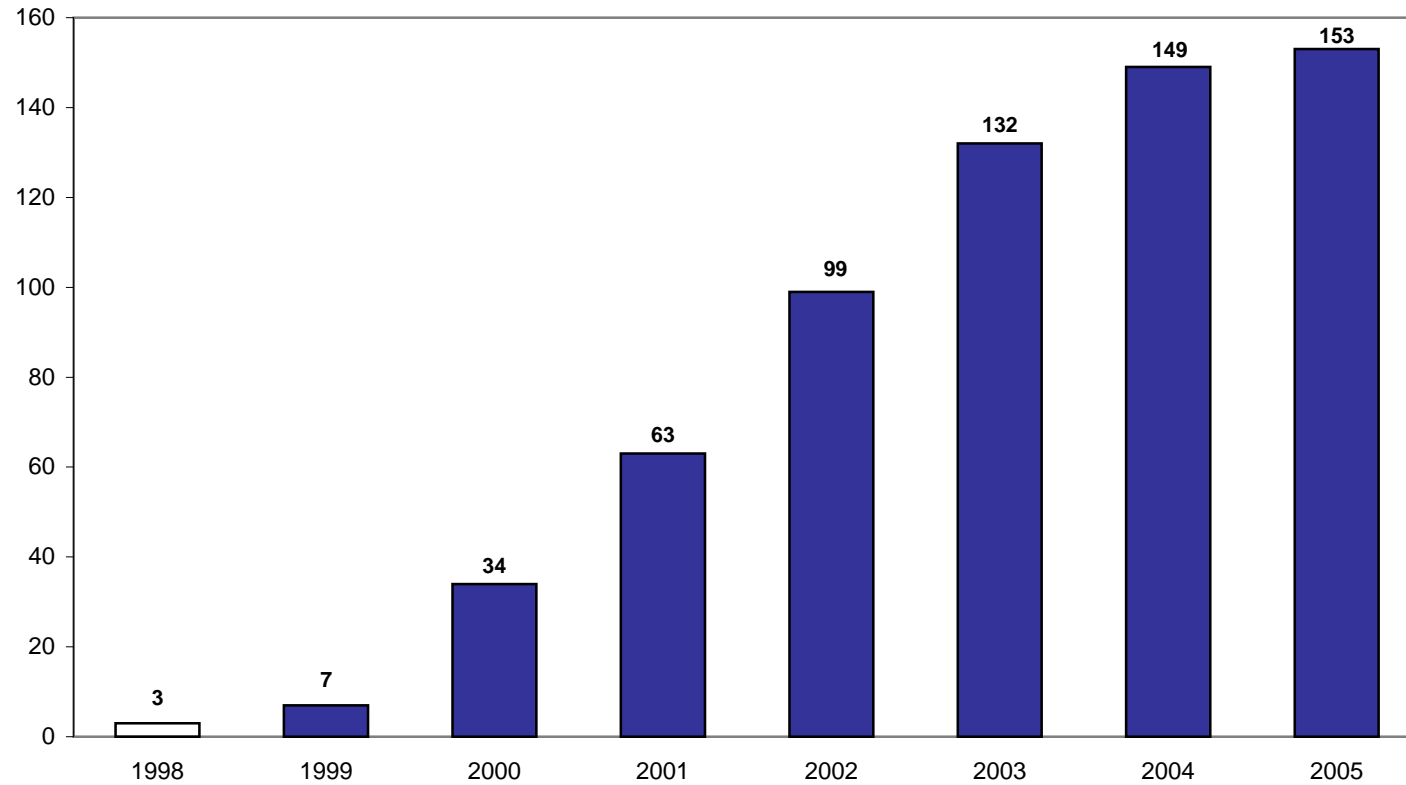
- Sponsoring institute = NIAID ***
- More years on K22 grant ***
- Research intensiveness of K22 institution **
- Type of program = transition-phase only (T) **

How large was the K22 program during its first 8 years?

- The program grew steadily during FY 1998-2005 – from 3 to 153 participants per year
- 256 individuals and 11 ICs participated
- 48 'graduates' per year (FY 2005)
- NIAID, NCI, NIDCR, NIEHS sponsored 80% of K22 participants

Exhibit 3
Evaluation of the K22 Program

Total Number of K22 Participants Each Year



Based on an analysis of all individuals who participated in the K22 program during FY 1998-2005 (N=256).
Data sources: IMPAC II, K22 program directors.

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What were the characteristics of the participants when they joined the K22 program?

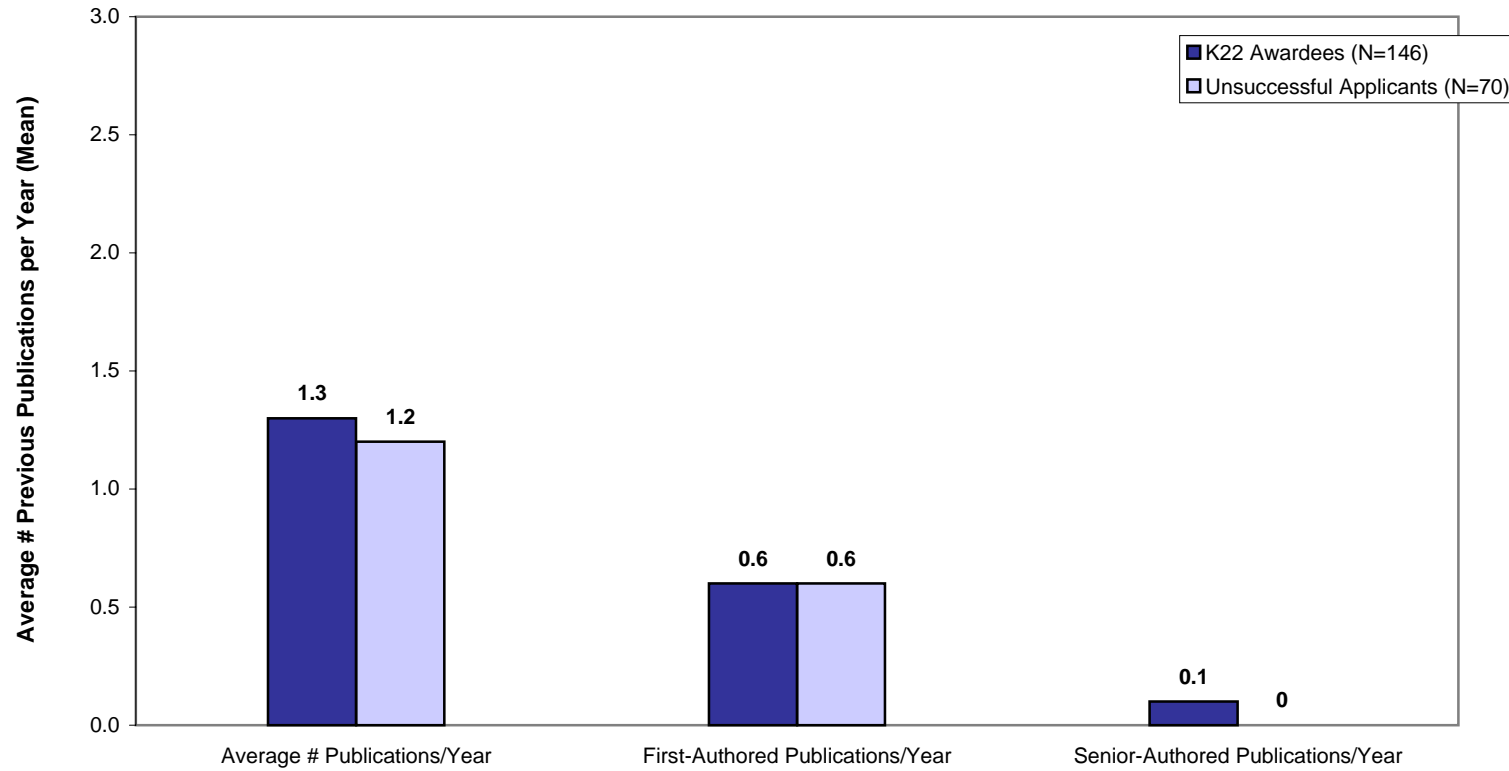
- More males than females (59% vs. 41%)
- Mostly PhDs (72%) + 11% MDs + 10% MD/PhDs + 7% dental and other degrees
- Several years of research training experience:
 - Average = 7.5 years since completing doctorate
 - Nearly all had been postdocs
 - 65% had served on a T32, F or K grant ... an average of 4 years
- Substantial experience publishing in scientific journals
- Some experience with grant applications/awards (mostly F32s or other Ks)

Were the K22 awardees and the control group (unsuccessful applicants) different at baseline?

- 5 criteria used to select control group: FY of application, priority score, IC, gender, type of doctoral degree
- K22 awardees had better priority scores (155 vs. 216) **
- Surprisingly, K22 awardees had significantly less F32 experience than the control group (26% vs. 34%) *
- The 2 groups were very similar with respect to:
 - Fiscal year of K22 application
 - Sponsoring IC
 - Male-female ratio
 - Type of doctoral degree
 - Years since completing doctorate
 - Scientific publications, including # previous articles/year
 - Experience applying for and receiving PHS grants

Exhibit 5
Evaluation of the K22 Program

**Average Number of Previous Publications Per Year
K22 Awardees vs. Unsuccessful Applicants**



Based on a comparison of the previous peer-reviewed publications of the K22 awardees who finished the program by Sept 2005 and unsuccessful applicants who applied for a K22 grant during the same time period as the awardees. Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Were the K22 awardees more successful than the control group in achieving the program's goals?

Yes, regression analysis found that receiving a K22 award was significantly related to applicants' future research success ***

Additional findings:

- Although the control group published more first-authored articles, **
senior-authored articles **

K22 awardees had more

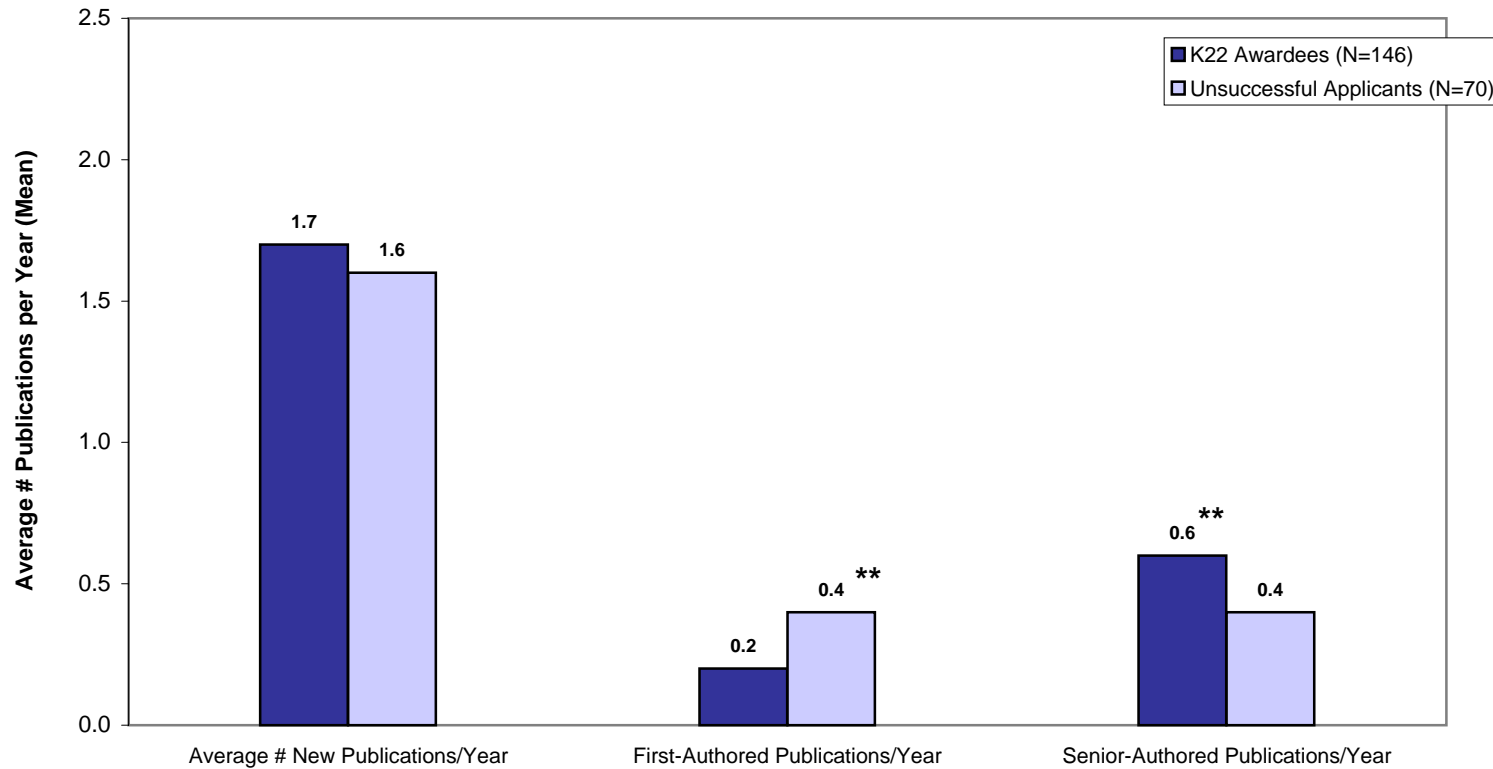
- More K22 awardees applied for PHS grants (including R01s) **
*

More K22 awardees received PHS grants, particularly R01s

- 89% of K22 awardees were in tenured or tenure-track positions by Sept 2006 ... 58% of control group **
- 85% of K22 awardees achieved a reasonably high level of overall research success (summary score ≥ 3) ... 54% of control group **

Exhibit 8
Evaluation of the K22 Program

Average Number of Publications Per Year Through Sept 2006
K22 Awardees vs. Unsuccessful Applicants



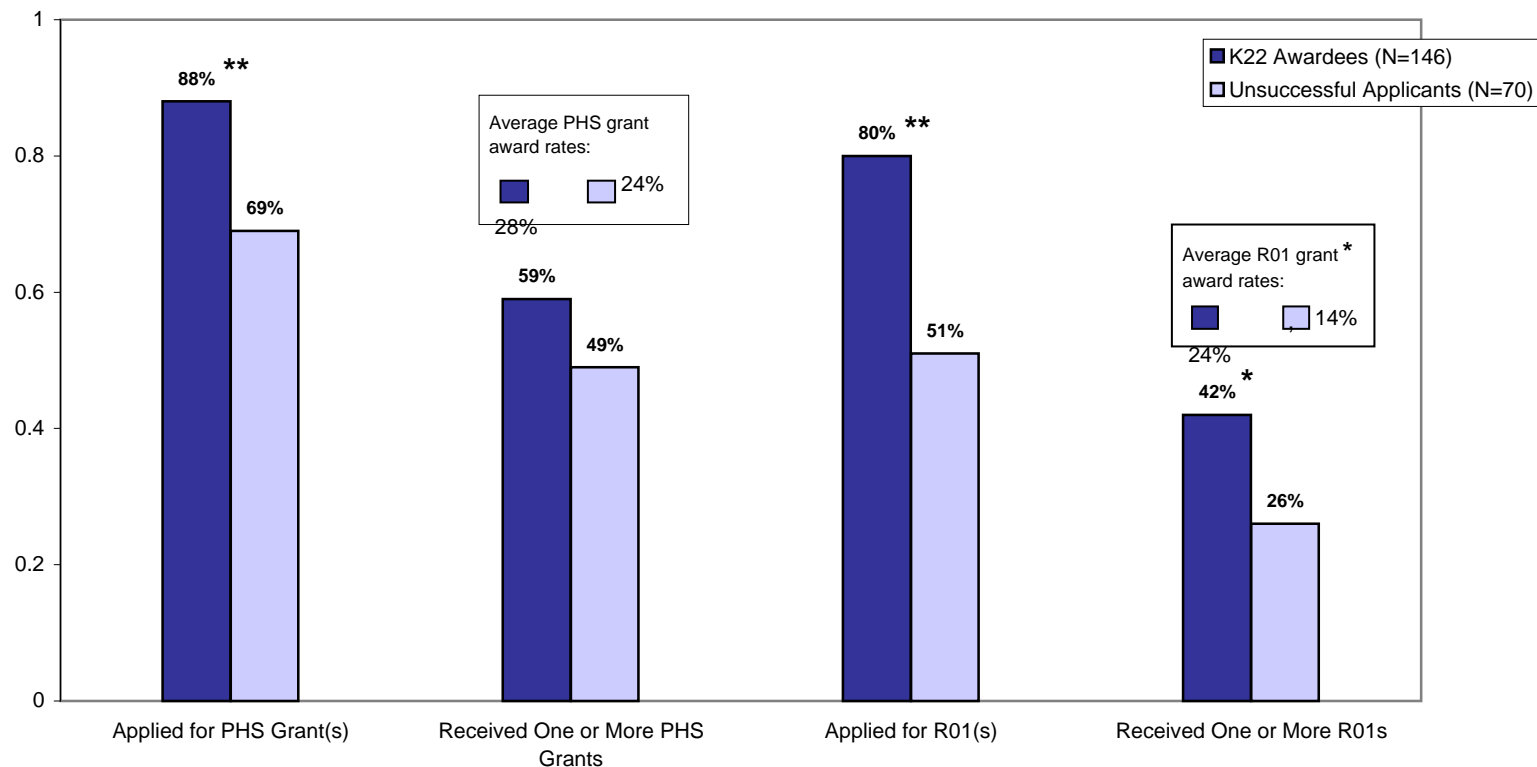
** Significant difference between experimental and control group ($p < .01$).

Based on a comparison of the peer-reviewed publications of the K22 awardees who finished the program by Sept 2005 and unsuccessful applicants who applied for a K22 grant during the same time period as the awardees. Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 9

Evaluation of the K22 Program

**Percent Who Applied For / Received a PHS Grant by Sept 2006
K22 Awardees vs. Unsuccessful Applicants**



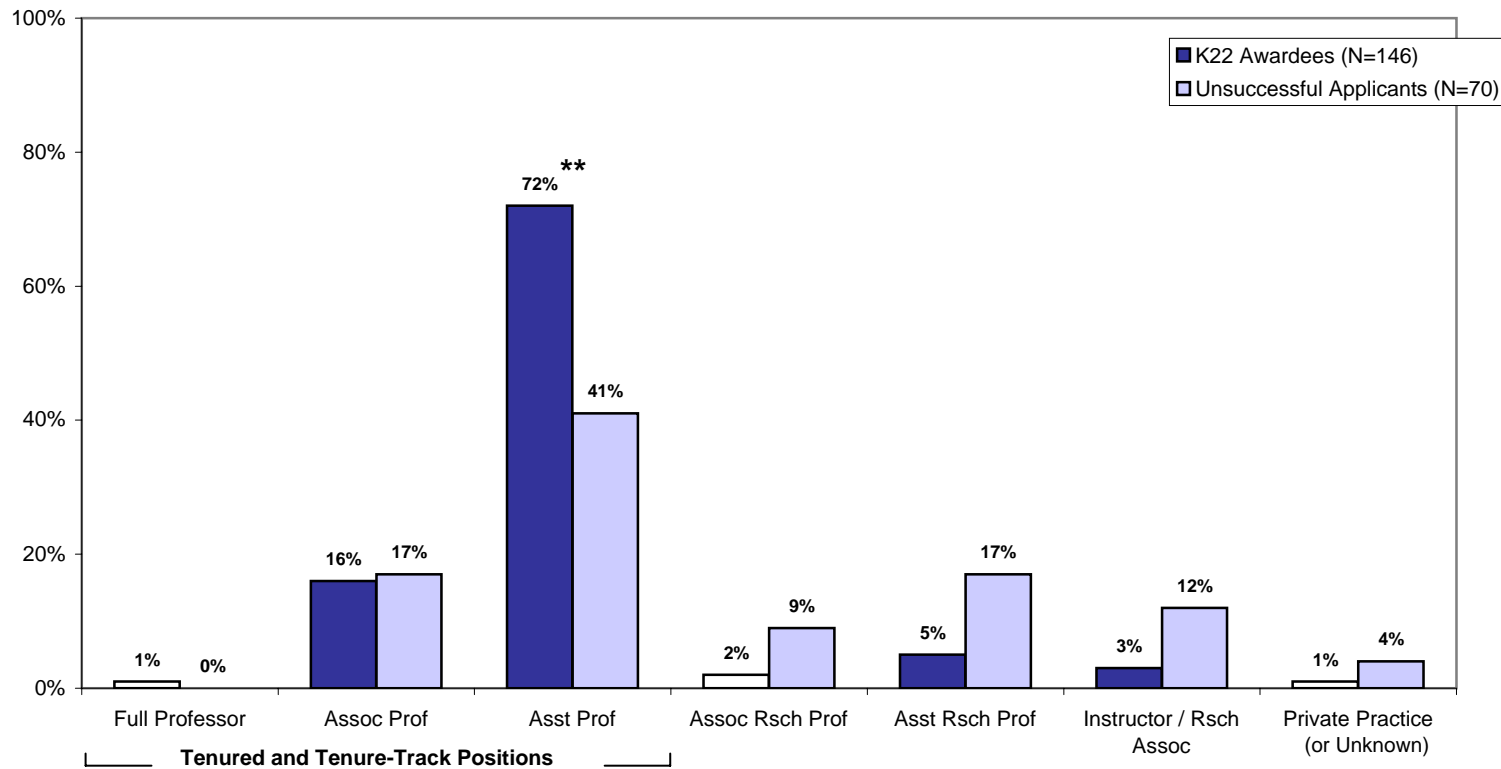
** Significant difference between experimental and control group ($p < .01$). * ($p < .05$)

Based on a comparison of the K22 awardees who finished the program by Sept 2005 and unsuccessful applicants who applied for a K22 grant during the same time period as the awardees with respect to their subsequent competitive PHS grant applications and awards. Grant experience prior to K22 participation was not counted. **Average Grant Award Rate** was calculated by determining for each person who applied for a grant the percent of their applications that were funded, and then averaging these percents for the group as a whole. Data source: IMPAC II.

Exhibit 10

Evaluation of the K22 Program

**Types of Academic Positions Held in Sept 2006
K22 Awardees vs. Unsuccessful Applicants**



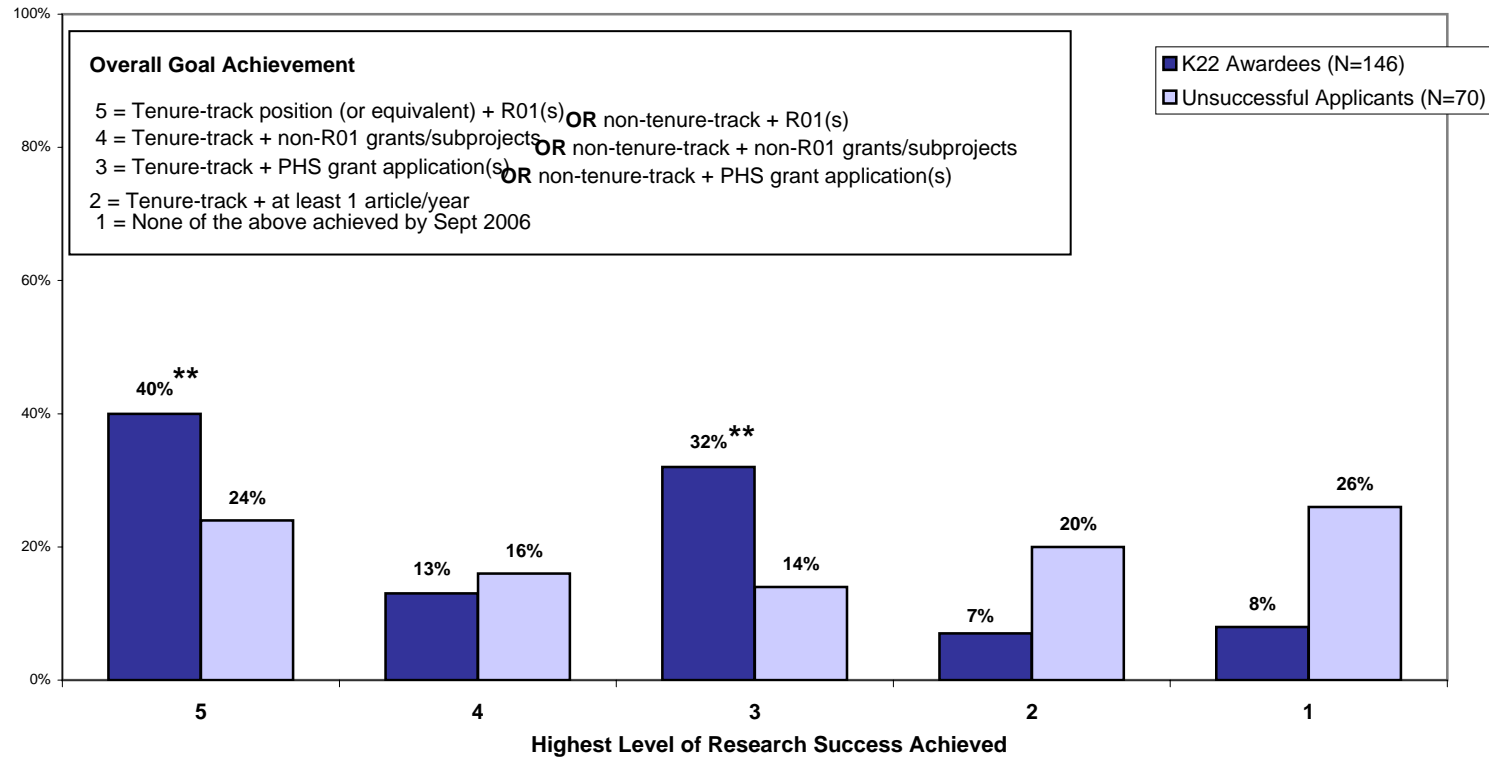
** Significant difference between experimental and control group in securing any type of tenured or tenure-track position ($p < .01$).

Based on a comparison of the K22 awardees who finished the program by Sept 2005 and unsuccessful applicants who applied for a K22 grant during the same time period as the awardees with respect to the academic positions they held as of Sept 2006. Data sources: IMPAC II, web searches.

Exhibit 11

Evaluation of the K22 Program

**Percent Who Achieved Different Levels of Research Success by Sept 2006
K22 Awardees vs. Unsuccessful Applicants**



** Significant difference between experimental and control group in scoring 3 or higher (p < .01).

Based on a comparison of the K22 awardees who finished the program by Sept 2005 and unsuccessful applicants who applied for a K22 grant during the same time period as the awardees with respect to their subsequent research success. Each individual was given only one rating based on an analysis of the person's academic position, PHS grants, PHS committee service, and peer-reviewed publications after joining the K22 program through Sept 2006. Data sources: IMPAC II, PubMed, web searches.

Were there differences in the success of the participants in the 3 types of K22 programs?

Yes, regression analysis found that receiving a transition-only K22 award (T) was significantly related to applicants' overall research success **

Additional findings:

- More Ts applied for PHS grants** (including R01s*)
- ITs and Ts were more likely than ETs to secure tenured or tenure-track positions *

Were there differences in the success of the participants in the 4 'transition phase only' K22 programs?

Yes, regression analysis found that receiving a K22 award from NIAID was significantly related to applicants' overall research success ***

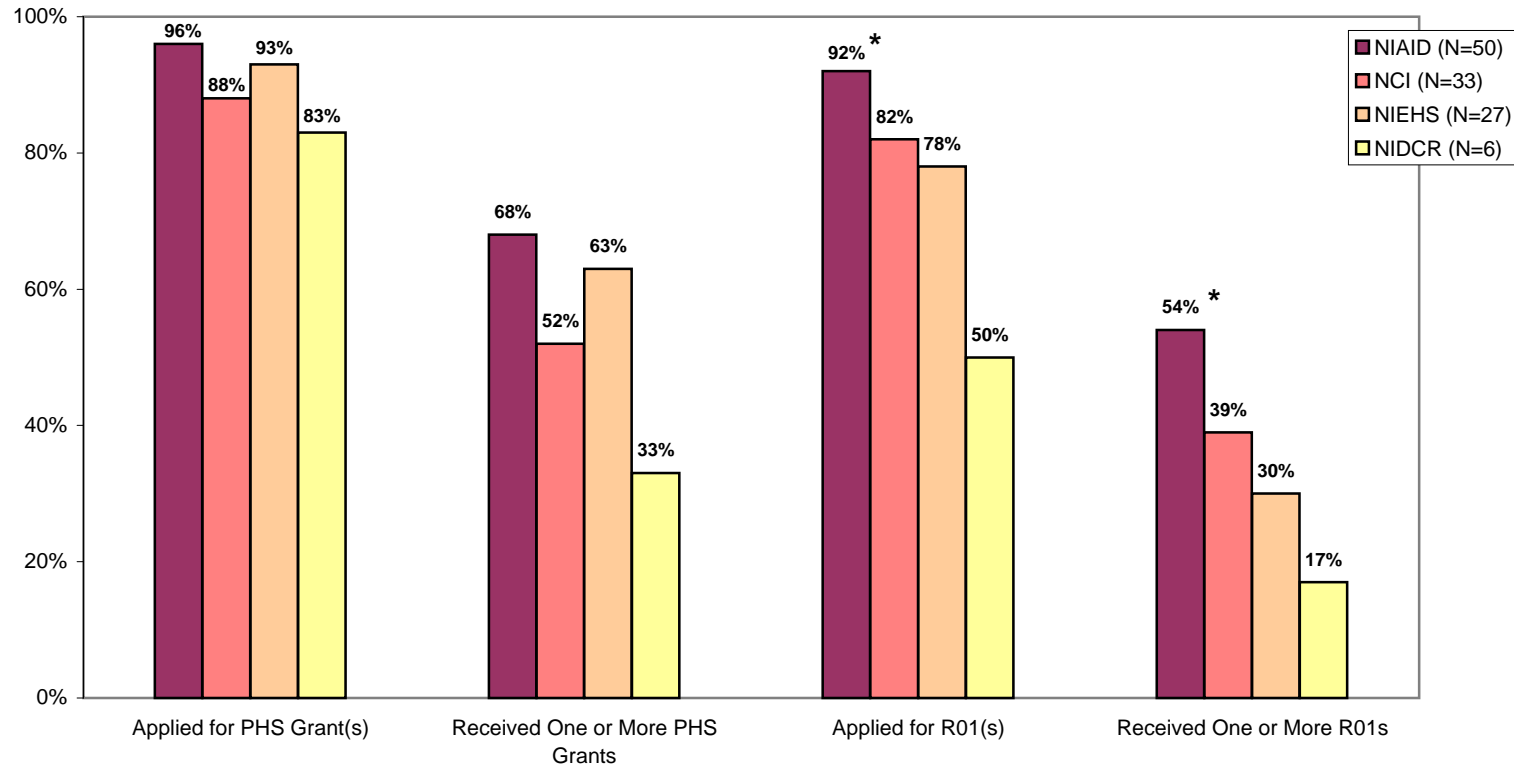
Additional findings:

- NIAID awardees had highest grant application/award rates after joining the program, especially for R01s *

Exhibit 15

Evaluation of the K22 Program

Percent of K22 Participants Who Applied For / Received a PHS Grant by Sept 2006
Comparison of 4 'Transition Phase Only' K22 Programs Sponsored by Different NIH Institutes



* Significant difference between 2 or more groups (p < .05).

Based on an analysis of competitive PHS grant applications submitted by and awarded to K22 participants who finished the program by Sept 2005. Grant experience prior to K22 participation was not counted. Data source: IMPAC II.

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In summary, what were the study's major findings?

- A high proportion of K22 awardees were very successful in achieving the program's goals:
 - Publishing new senior-authored articles
 - Applying for NIH grants, especially R01s
 - Receiving R01 grants
 - Securing a tenured or tenure-track position
- K22 awardees were significantly more successful than the control group in achieving program goals

Which baseline characteristics were most related to future success in achieving program goals?

- Receiving a K22 award
- More previous first-authored articles per year
- Having a PhD
- More years since doctorate degree
- More years since K22 award

Which program characteristics were most related to future success?

- Sponsoring institute = NIAID
- More years on K22 grant
- Research intensiveness of K22 institution
- Type of program = transition-phase only (T)