How Many Scientists Do the NIH Support? Improving Estimates of the Workforce

Authors: William E. McGarvey, PhD‡**,** Patty Morris*, Xiaodong Li*, Jackie Li*, Matt Probus*, Meridyth Cissel*, Laurel L. Haak, PhD*

Abstract

A key question often asked of the NIH budget is, "How many extramural researchers are supported by the NIH Extramural Research Program?" Previous efforts addressing this question focused on manual sampling of paper progress report forms filed by NIH investigators. With modern text-mining tools, virtually all electronic progress reports for research grants available from FY 2005 through FY 2007 were inspected to obtain key personnel data. Research grant mechanisms included Research Projects (RPG's), SBIR-STTRs, Research Centers, Research Career Awards, and Other Research. Iterative cycles of extraction, validation, and manual verification refined the process, ultimately achieving a 90% accuracy rate. From this database of research personnel records, a "weighted means" algorithm identified and accounted for multiple appearances by the same individual, both within and across years. Beyond providing an estimate of 156,062 reported key personnel in FY 2007, the database has proven to be a rich resource for NIH workforce analyses, including examining the number of personnel engaged in work on more than one grant, role and age distributions, and differences in personnel by grant mechanism. The results indicate that the forms and guidance for collecting extramural personnel data need to be adjusted to improve reporting and accuracy in any determination of the size of the NIH workforce.

Author Addresses: (‡)National Institutes of Health, Office of Extramural Research, Division of Information Services, 6705 Rockledge Dr. Suite 4156, Bethesda, MD 20895-7995; (*) Discovery Logic, 1375 Piccard Rd. Suite 325, Rockville, MD, 20850.

Author Bios: William McGarvey, PhD, is a Scientific Program Evaluation Specialist at the Office of Extramural Research, National Institutes of Health, Bethesda, MD. Ms. Patty Morris, the project manager for this study, is the Director of Quality Assurance at Discovery Logic, Rockville, MD. Mr. Xiaodong Li and Ms. Jackie Li are software engineers at Discovery Logic. Mr. Matt Probus is the Chief Technology Officer and Vice President at Discovery Logic. Ms. Meridyth Cissel is a systems analyst at Discovery Logic. Laurel Haak, PhD, is the Scientific Director at Discovery Logic.

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Introduction

There has been an ongoing interest in the number and type of researchers supported by National Institutes of Health (NIH) extramural research grants. Such information can help the NIH assess staffing patterns, plan budgets, determine effective grant sizes, and evaluate the effectiveness of training and fellowship programs such as Ruth L. Kirschstein National Research Service Awards.[1]

In 1993, the NIH Office of Science Policy and Legislation, at the request of the NIH Office of Management, estimated the number of principal investigators (PIs), students, and postdoctorates supported on NIH extramural Research Project grants (R01) and Research Program Project and Center grants (P01). They gathered a 5% proportionate random sample of new and competing renewals for the Fiscal Years 1983, 1985, 1987, and 1990 and analyzed staffing patterns and costs. Their sampling method indicated the number of full-time equivalent staff supported on R01s and P01s to be between 2.99 and 3.33 over that 7-year period.[2]

Ten years later, in preparation for the FY 2004 Congressional Appropriations Hearings, NIH Director Elias Zerhouni requested a similar effort to develop an estimate of the number and types of staff associated with extramural research projects. The NIH Office of Extramural Research (OER) collected a "convenience" (*i.e.*, non-random) sample of 1,039 progress reports on FY 2002 research projects, to produce an estimate derived from the personnel information reported on the Key Persons page of the reports. This exercise covered many more research activities than the 1993 Staffing Patterns report, and derived an estimate of 207,711 key research personnel.[3] In FY 2006, using similar methods but a much smaller sample frame of 100 progress reports, an estimate of 325,000 personnel was obtained. This figure has been quoted numerous times since then, and is referred to on the NIH Home page.[4-6]

These manual enumeration studies were time consuming, and therefore were performed infrequently. However, the NIH needed more regular assessments of its research workforce to support budget development and to gauge the size and health of the U.S. biomedical research system. The purpose of the present study was to improve the precision for estimating the number of Key Personnel supported fully, or in part, by extramural research projects as well as to develop a methodology to automate the regular collection of NIH workforce statistics. This would support year-to-year comparisons and enhance the accuracy of statistical analyses. The methodology consisted of:

- Customizing text mining tools to identify Key Personnel listed in annual non-competing grant progress reports.
- Testing reliability of such tools to create a Key Personnel database on three years of progress reports.
- Creating a research personnel database.
- Implementing an algorithm to identify multiple appearances of an individual; and when possible, linking records back to individual profiles stored in IMPAC-II, the NIH grants management system.

Methods

Counting researchers: What is the population of electronic progress reports?

We obtained Key Personnel information from progress reports stored in IMPAC-II. Progress reports are filed by Principal Investigators (PI) for each non-competing year of an award. For example, a traditional research grant, the R01 is often a 5-year award. The PI would file a progress report for years 1-4 of the award at the close of each award year. A progress report filed in Fiscal Year (FY) 2007 would thus report on project status and personnel for FY 2006. Prior to FY 2004, these progress reports were available only as paper documents.[7] In FY 2004 13% of progress reports were available as electronic documents. By FY 2005, almost 95% of progress reports were available as electronic documents. Automated extraction efforts were concentrated on documents from FY 2005 and later years given the much higher availability of searchable electronic files.

All research grants were examined based on primary interest in determining the number of research personnel.[8,9] We processed over 30,000 progress reports for each fiscal year of the study, which represented 95% of the total number filed (**Table 1**).

Table 1. Progress report processing statistics

Fiscal Year	Progress Report Document Count	Electronic Document Count	% of Documents Available in Electronic Form	Documents with Personnel Table	Documents with Extraction Results	% of all Documents Processed
2005	33,873	33,015	97.5%	30,800	30,745	90.7%
2006	34,383	33,736	98.1%	33,000	32,973	95.9%
2007	33,619	32,713	97.3%	32,060	32,024	95.3%

Progress reports are filed using various revisions of paper Form 2590, which are then manually scanned and converted into electronic image files, or on-line using an e-SNAP form.[10] During the three-year period covered by this study, NIH was gradually rolling out an on-line grant application system. In these three years, the number and proportion of e-SNAPs grew from 25% of all progress reports in FY 2005 to 63% in FY 2007.

Table 2. Progress report document types

Fiscal Year	Doc Type	# Documents	% Documents
2005	2590	23,234	75%
	e-SNAP	7,785	25%
2006	2590	18,400	56%
	e-SNAP	14,633	44%
2007	2590	12,024	37%
	e-SNAP	20,095	63%

Extraction of personnel records

Text mining tools had to be customized to identify adequately Key Personnel listed in grant progress reports. An iterative process was used to refine the automated localization of key personnel pages in all research program grant mechanisms across several form types. This iterative process extracted key personnel data field by field and line-by-line, validated data type extracted for each field, and then manually verified a sample of data. The data sample encompassed each form type (*e.g.*, versions of Form 2590 vs. e-SNAP) and each grant mechanism, for each year (see **Figure 1**). The automated extraction process had to be flexible enough to account for multiple form types, as well as accommodate handwritten forms, numerous font types, stray marks on pages, and scanning errors such as crooked pages.

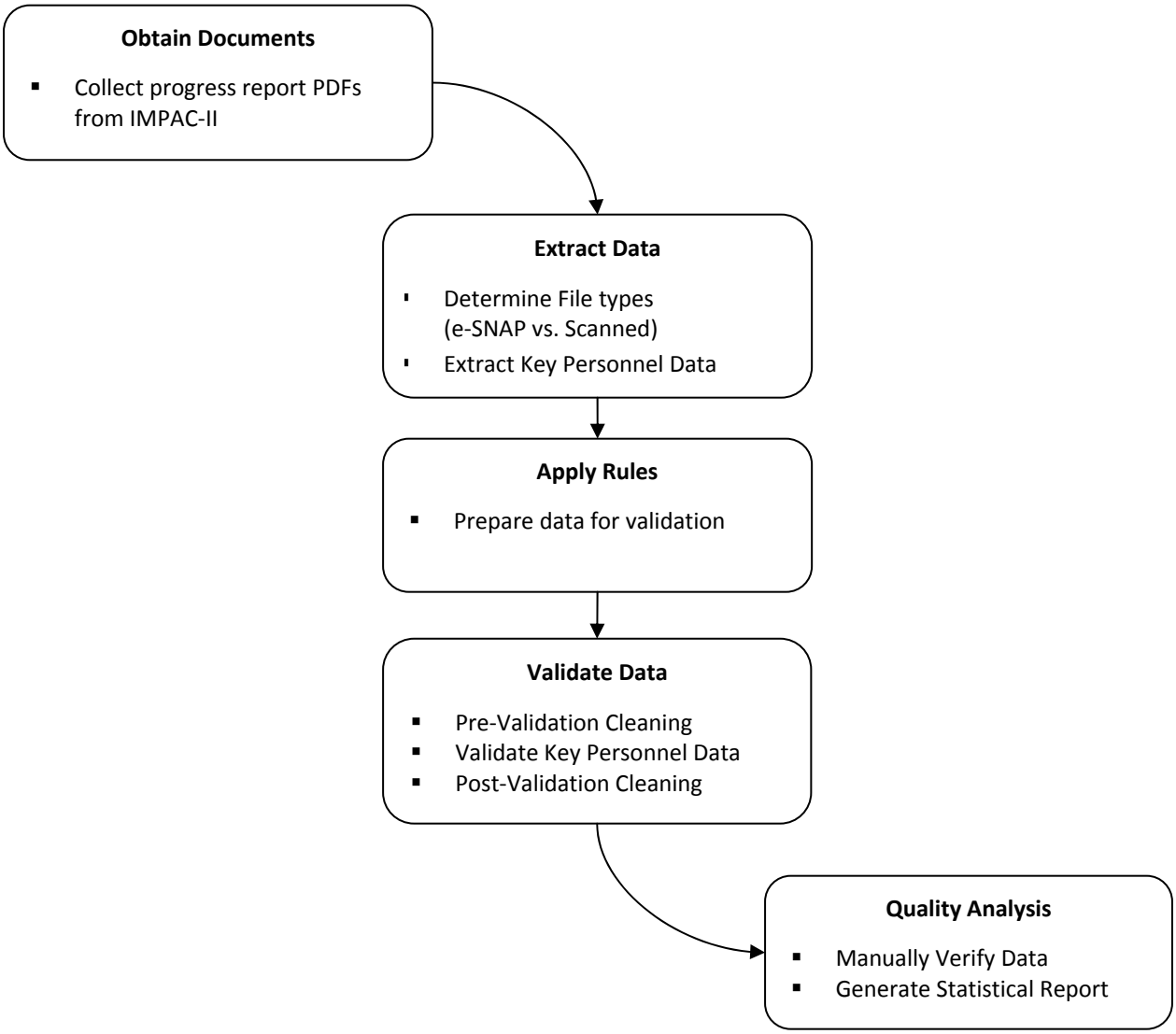


Figure 1. Methodology for processing Key Personnel tables in progress reports.

For each electronic progress report we identified and extracted data from all of the Key Personnel form fields: personnel name, degree, social security number (SSN), role on project, date of birth (DOB), and annual percent effort or calendar months (as reported). Each field had a different reporting rate, as shown in **Table 3**. During the time frame of this study, the reporting requirements changed for various data elements. For example, in FY 2005, PIs were required to enter the full 9-digit SSN. In FY 2006, this was reduced to requiring only the last 4 digits. The configuration of the effort reporting fields varied by form type and year from: (1) percent effort to (2) calendar months to (3) academic months or summer months. To address the problem of inconsistent reporting, the actual values reported were captured and then performed a calculation to transform all data to percent effort.

Table 3. Reporting rates for each field on the Key Personnel form, by data row on the form

Field	% Records with Data
Last Name	>99%
First Name	95%
Middle Initial	30%
DOB	64%
SSN	68%
Degree	89%
Role	95%
Percent Effort	89%

A particular challenge for parsing degree and role data was that all of the fields on the form were free-form text entry. Raw data were saved from the forms and we applied a post-hoc analysis step to categorize entries. For degree data, we were able to use guidance found in IMPAC-II to categorize degrees into five categories: academic doctorate, professional doctorate, Master's, Bachelor's, and Other. In the absence of policy guidance on role, we used an expert manual review process. NIH staff or Consultants familiar with roles independently created role categories. This process yielded seven categories (**Table 4**). We then mapped over 1,200 role records to categories and used this information to automatically parse roles.

Table 4. Representative examples of role categorization entries

Principal Investigator	Investigator	Postdoctoral Scholar	Student	Technician	Research Support	Unclassified
Principal Investigator	Co-Principal Investigator	Fellow	Student Researcher	Analyst	Accountant	Advisor
PI	Research Director	Postdoctoral Scientist	Graduate Student	Database Specialist	Field Coordinator	Facilitator
Principal	Senior Investigator	Research Scholar	Graduate Assistant	Laboratory Technician	Resource Manager	Participant
Overall PI	Clinical Investigator	Visiting Scholar	Student Assistant	Animal Technician	Administrative Manager	Exercise Committee
PD PI	Participating Investigator	Post Doctorate	Graduate Investigator	Associate Specialist	Business Manager	Human Subjects

Creating a database structure to store records for analysis

A secure database was created whose field structure accommodated each of the fields on the personnel form plus provided additional fields for form type and year. We used this database to capture and store the raw data from the personnel forms and the transformed data and categories. We then related these database tables to IMPAC-II using the progress report application identification number (APPL_ID).[11] In this step, the PI information was linked to IMPAC-II records.

Duplicate records: What about people who work on more than one grant?

Researchers can be a PI on more than one grant. Similarly, Key Personnel may contribute effort to more than one grant. To reach an accurate estimate of the number of individual researchers supported by NIH grants, we modified the weighted-similarities algorithm described by Trajtenberg et al.[12] to detect and account for multiple appearances by the same individual. This algorithm identified unique person profiles by comparing similarities between records on a field-by-field basis. For this to be effective, we focused on selected fields with high reporting (see **Table 3**) and highly unique values. In the first pass, we used Name (first, middle, last), SSN, and DOB In the second pass, we incorporated the PI of the grant and sponsoring organization information. Using this methodology, we determined a match score and a conservative cut-off value above which records would be collapsed into unique person profiles. Results were stored in a new table with unique profile identifiers that related back to the raw data rows. This method requires two very high scores among key fields together with additional evidence of record similarity. This approach is used to avoid collapsing records if the confidence level is not high.

Enumeration of Key Persons

From the extracted, validated, and verified data, we counted the total number of appearances by an individual using a proportional representation approach. For example, if a person was identified in four separate Progress Reports, they received a count of 0.25 for each appearance. To illustrate: if Jo appeared on four separate R01's as a PI, but Jack only appeared with her on one of these (and Jo was the only Key Person on the other three), the tallies would be:

(a) R01-A: Jo, 0.25; Jack 1.0;

(b) R01-B: Jo, 0.25;

(c) R01-C: Jo, 0.25; and

(d) R01-D: Jo, 0.25.

For this example, the average number of persons on an R01 would be calculated as 0.50 (2 persons on 4 grants). These proportional appearance weights were generated for each grant, and an average weighted Persons-Per-Award (PPA) was generated for each research activity. To derive the total estimated Key Personnel supported on NIH extramural research grants in a given Fiscal Year, we multiplied PPA values for each research activity by the number of awards made for that activity and summed across all activities.

Results

Extraction Process

We processed 94% of all progress reports from FY 2005 to FY 2007. Of those progress reports containing a Key Persons table, we processed over 99% of documents. Our quality analysis shows greater than 90% agreement between automatically extracted and manually verified files. The automated extraction process has been tested across multiple years of data, with varying proportions of file types, electronic and PDF forms, and has proven to be resilient and effective.

Enumerating Research Personnel: Observed Records and Profiles per Progress Report

Overall, we found an average of 4.7 records per document, across all years and all activities, shown in **Table 5.** Applying the weighted-similarities algorithm, which identifies high-confidence duplicate records to resolve unique person profiles, reduced the total record count by 25% within each fiscal year.

Table 5. Overall records and persons per document for Progress Reports.

Fiscal Year	Documents with Extraction Results	Record Count	Records per Document	Unique Persons Count	Persons per Document
2005	30,745	153,706	5.0	116,168	3.8
2006	32,973	155,540	4.7	116,735	3.5
2007	32,024	140,270	4.4	107,623	3.4

Table 6 illustrates the striking differences in reported person-records and derived unique persons by research project activity.[8,9] We also found differences by type of form used to file a progress report and clear trends across the three year interval covered in the study. R01 grants represented 66% of the total number of progress reports, but only 45.6% of the total number of unique persons across the years was studied. ***P*** (Research Programs and Centers) and ***U*** (Cooperative Agreements) activities represented 10.2% of the total number of progress reports, but 24.4% of the total number of unique persons. Collapsing duplicate records had a greater impact on R01s compared to other activities. There was also a notable steady decrease in the records per document per year for ***K*** (Research Career), ***P***, and ***R*** (Research Project) activities.

Table 6. Records and persons per document by major activity and Fiscal Year.

Activity	% of All Docs	% of All Persons	FY05 Records / Doc	FY05 Persons / Doc	FY06 Records / Doc	FY06 Persons / Doc	FY07 Records / Doc	FY07 Persons / Doc
All K	9.8%	5.0%	2.54	1.91	2.47	1.91	2.28	1.87
All P	4.6%	14.0%	17.4	11.5	16.2	10.4	15.3	10.2
R01	66.0%	45.6%	4.16	3.21	3.83	2.93	3.53	2.79
All R	79.8%	57.1%	4.16	3.23	3.87	2.98	3.57	2.84
All S	0.16%	0.75%	22.3	19.1	22.9	19.9	22.2	20.0
All U	5.6%	10.4%	9.43	7.13	9.78	7.17	9.30	6.85

To further investigate the decrease in records per progress report, we performed a frequency analysis of persons per R01, for all fiscal years studied. We incorporated data from the FY 2003 NIH Enumeration study.[3] **Figure 2** shows a marked change in the distribution of records per R01, with the mean shifting from 4.6 person-records per award in 2003 to 2.79 in 2007.

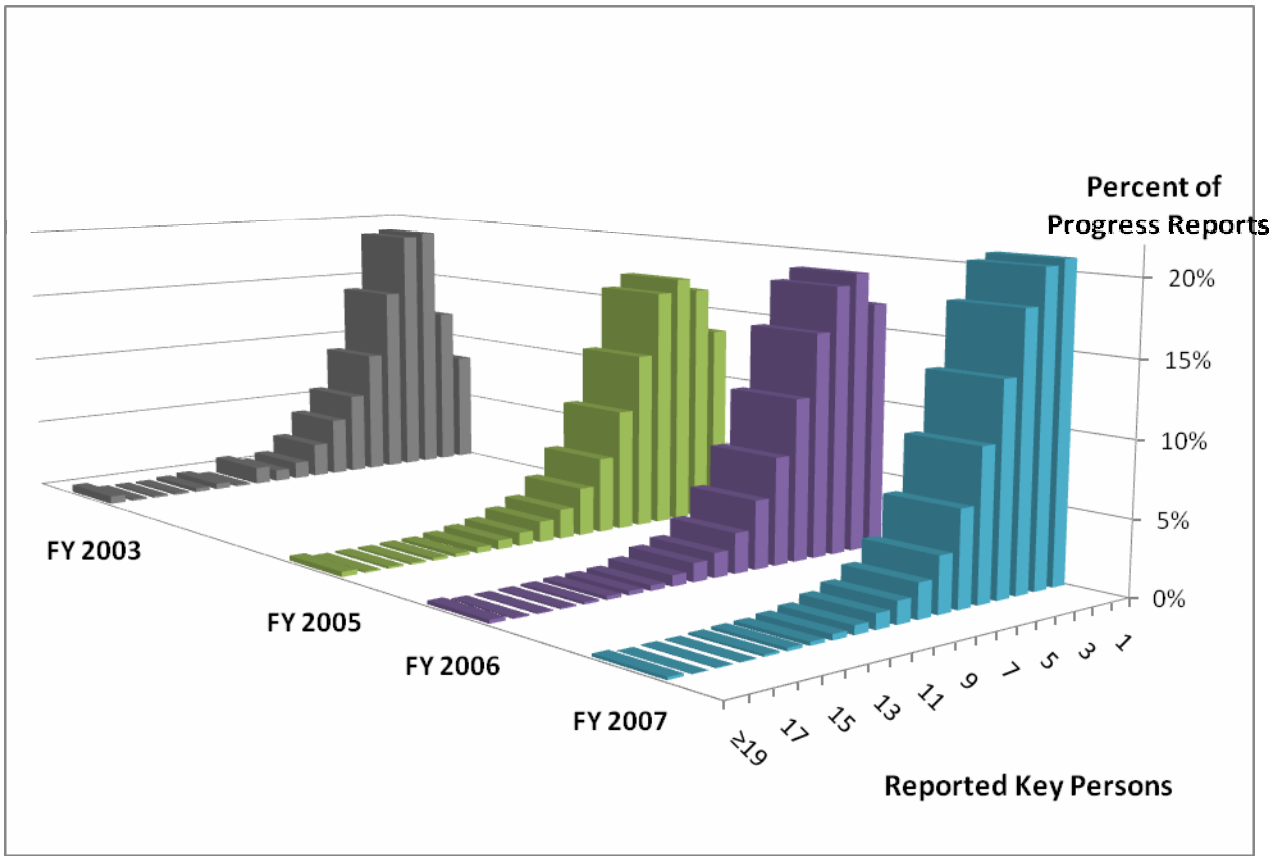


Figure 2. Records-per-R01 Progress Report

During this timeframe, as noted earlier, electronic applications were rolled out at NIH. In FY 2003, electronic filing did not exist. In FY 2005, 29% of R01 progress reports were filed using e-SNAP electronic forms. In FY 2006, 50% of progress reports were e-SNAPs, and in FY 2007, 71% were e-SNAPs. We investigated whether there was a correlation between form type and number of records per document using the same frequency analysis as shown in Figure 2. **Table 7** shows the proportion of each form type with 1, 2, or 3 reported Key Persons. We used a χ^2 test to compare the number of 2590 vs. e-SNAP forms with 1 vs. more than 1 record per form, 2 vs. more than 2 records per form, and 3 vs. more than 3 records per form. These tests showed significant differences ($p<0.001$) between the number of records reported on e-SNAP and 2590 forms for each Fiscal Year. We used the same statistical method to test whether the proportion of documents with 1 record changed between 2005-06 and 2006-07. Between FY 2005-06, 2590s and e-SNAPs showed a significant increase in the number of forms with only one person listed (e-SNAP $p<0.01$; 2590 $p<0.001$); whereas between FY 2006-07, e-SNAPs saw a larger jump in single records per form (e-SNAP $p<0.001$; 2590 $p<0.05$).

Table 7. Distribution of reported personnel on e-SNAP and 2590 Forms

Records / Document	2005		2006		2007	
	2590	e-SNAP	2590	e-SNAP	2590	e-SNAP
1	10.5%	16.2%	12.4%	18.2%	13.4%	21.6%
2	13.5%	18.5%	14.4%	20.2%	13.4%	21.1%
3	15.0%	17.1%	14.9%	18.0%	12.7%	18.1%

Enumerating Research Personnel: Observed Records and Profiles per Progress Report

To obtain an estimate of the total number of persons supported by NIH research grants, we applied the per-activity persons-per-document average to the total number of awards for each activity for each fiscal year.[13] Because progress reports list persons working on awards the previous year, we applied the per-activity averages from FY 2005 progress reports to FY 2004 total award numbers, and so on. The resulting estimate of total number of unique persons is shown in **Figure 3.** For FY 2007, then, the estimated total number of persons supported by NIH research grants was 156,062.

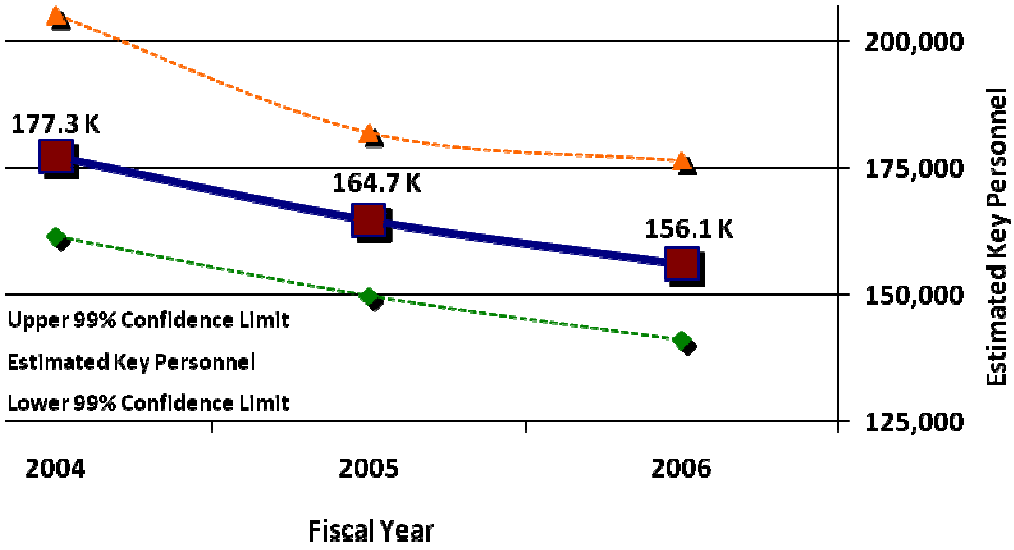


Figure 3. Estimated Key Personnel on NIH Research Grants, FY 2004 - FY 2006

Workforce analyses

In addition to estimating the number of researchers supported by NIH extramural research grants, we found data from Key Persons tables also provided insight into the characteristics of the NIH-supported research workforce.

We used the role fields reported on the progress report Key Personnel pages to dissect the composition of personnel for R01, P01, and U01 awards, activities representing 55% of all reported personnel (**Figure**

4). About 70% of reported personnel had some form of investigator role. Across activities, technicians represented 4% of listed personnel. Research support personnel were more prevalent on P01s than on R01s or U01s, and students and postdoctoral scholars were more prevalent on R01s. From FY 2005-2007, there is a trend toward listing fewer postdoctorates, students, and technicians, and more Principal Investigators. This is shown for R01 grants in **Figure 5**.

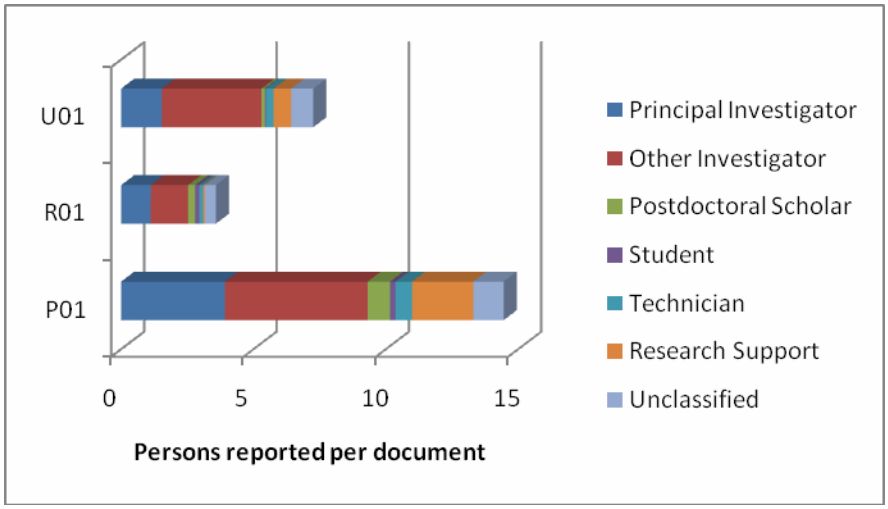


Figure 4. Personnel roles on selected grant activities, from FY 2007 progress reports

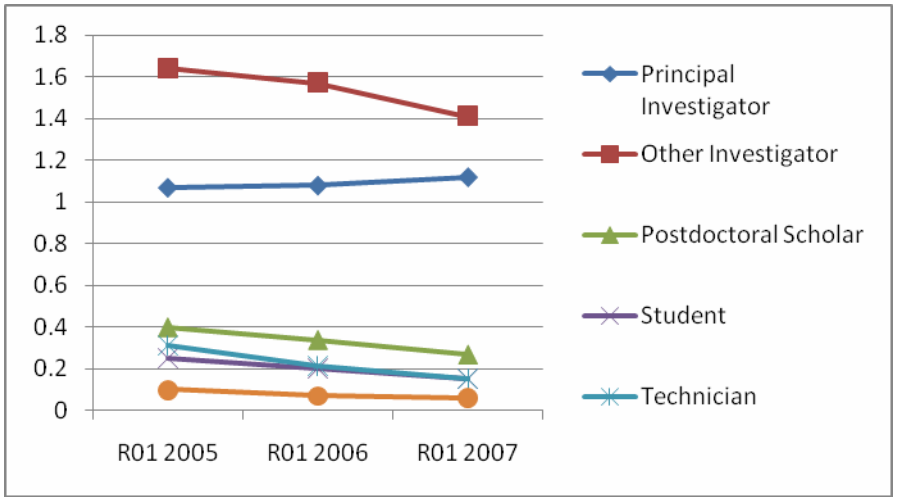


Figure 5. Trends in number of persons per role for R01 awards, FY 2005 – FY 2007 progress reports.[1]

[1] The values in excess of 1.0 for Principal Investigators may arise from multiple individuals – in free-form text entry – being named (or naming themselves) as Principal Investigators. No requirement exists that states that only PIs can designate themselves as such on a Progress Report.

The next step was to review the correlation between age and role (**Figure 6**). Recent data from NIH have shown that the age of PIs receiving their first R01 has been increasing and is estimated at 42 years for PhDs and 44 years for MDs and MD/PhDs.[14] Our analysis indicates that the average age of all persons listed in Key Personnel reports is 45.3 (*S.D.*: 11.55). In FY 2007 progress reports, PIs have an average age of 50.86 ± 0.07,[15] other investigators 47.40 ± 0.07, postdoctorates 34.21 ± 0.10, students 28.93 ± 0.17, technicians 37.46 ± 0.21, and research support staff 48.44 ± 0.13. We also investigated age by degree type. Academic doctorates averaged 46.5 ± 0.07 years old, professional doctorates 49.27 ± 0.11, and joint doctorates 48.25 ± 0.17.

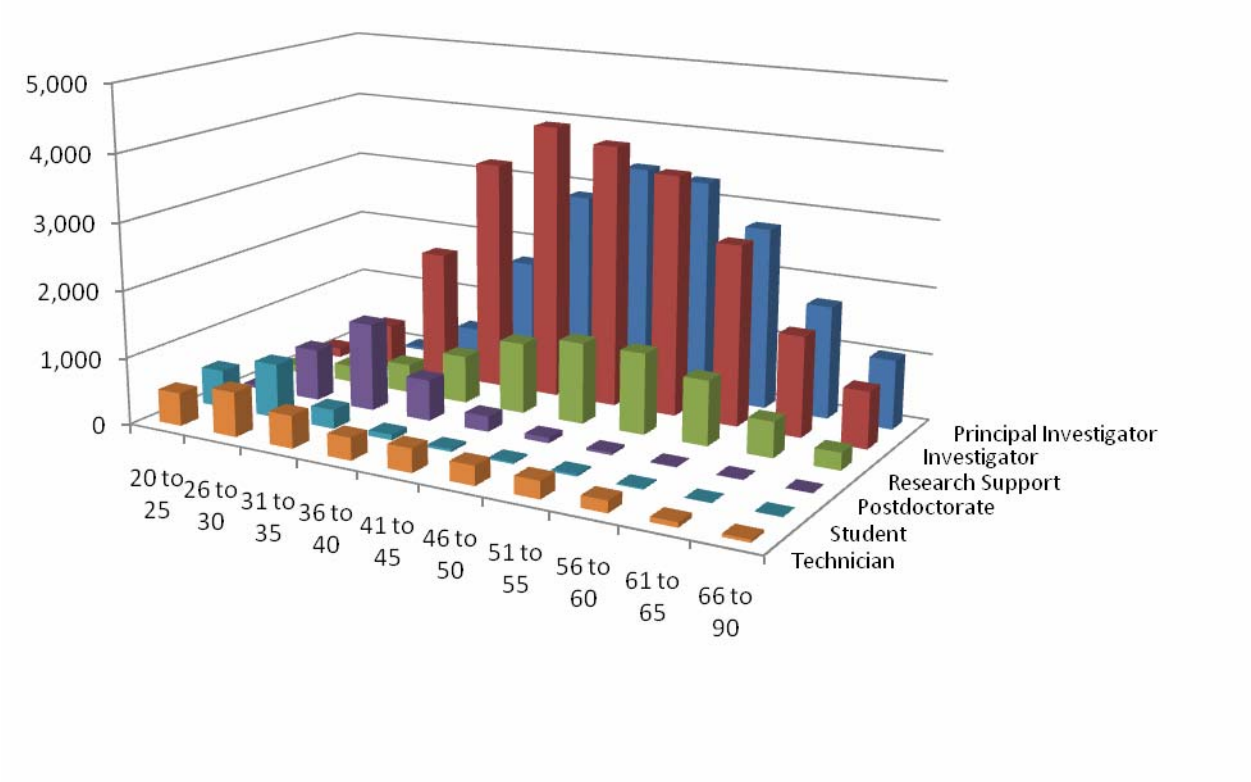


Figure 6. Age by Role distribution for personnel listed on FY 2007 progress reports

Another analysis made possible by this study is role by degree. We performed a similar frequency analysis of the roles held by academic doctorates, professional doctorates, joint doctorates, Bachelor's and Master's degrees, shown in **Figure 7**. We also investigated age by degree type. Academic doctorates were on average 46.5 (+/- 0.07) years old, professional doctorates were 49.27 (+/- 0.11), and joint doctorates were 48.25 (+/- 0.17).

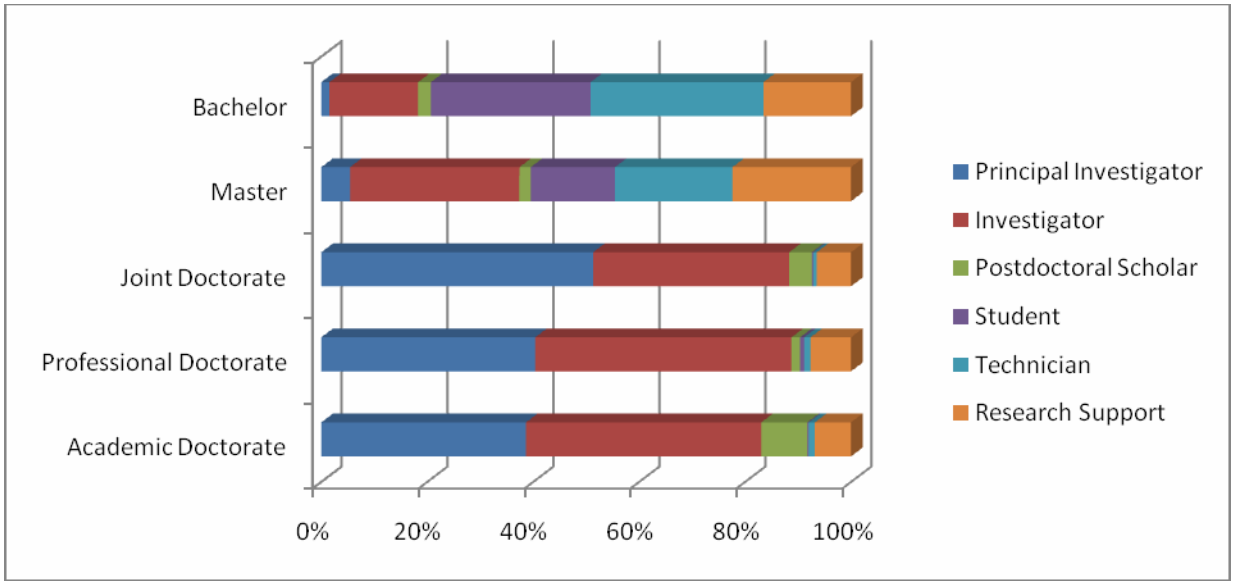


Figure 7. Role by degree, for personnel listed on FY 2007 progress reports

Discussion

We have shown that it is possible to perform high-quality extraction of text from electronic progress reports. We have developed a tool that can read multiple form types and form versions, and have created and documented a workflow to validate and verify results. We also have demonstrated that a weighted-similarities algorithm can be effectively applied to adjust for multiple person appearances.

Identification of Unique Individuals

We found that the key fields used to identify multiple appearances of an individual are the last name, first name, SSN, and DOB fields. We also found that identification of unique individuals was improved by about 5% when we included corroborating evidence from the source progress report, such as PI name and sponsoring institution. Changes in reporting requirements, particularly for SSN and DOB, will reduce the effectiveness of this algorithm and possibly decrease the utility of the Key Personnel tables in meeting the requirements for a workforce tracking database,[17] a key component of which is to be able to find unique individuals across years. ***We therefore recommend that the Key Personnel table***

continue to require reporting of at least the last 4 digits of the SSN and at least month and year of birth for all persons listed.

Differences in personnel by mechanism

With data from over 95% of progress reports filed for all research project activities between FY2005 and FY2007, we have an unparalleled view into personnel reporting patterns. We can perform analyses by sponsoring institution or by IC, or any number of other IMPAC-II fields associated with a progress report. We found striking differences in number of persons listed by activity, as one would expect due to the distinct purposes of the different activities. For example, a ***K*** award is typically intended to be an award for a single investigator, to help support their training and transition to larger awards such as R01s. Previous enumeration efforts had assumed 1 person per ***K*** award, but this study found an average of 2 persons per award, likely due to the listing of mentors on the key person page. On average, ***R*** awards support 3 persons per award, while the larger program project and cooperative awards had between 7-20 persons per award. In addition to number, there are also differences in the type and role of persons supported by various activities. More postdoctoral scholars were supported on ***R*** activities, while more research support personnel were supported on program project and cooperative awards.

Trends in persons-per-award

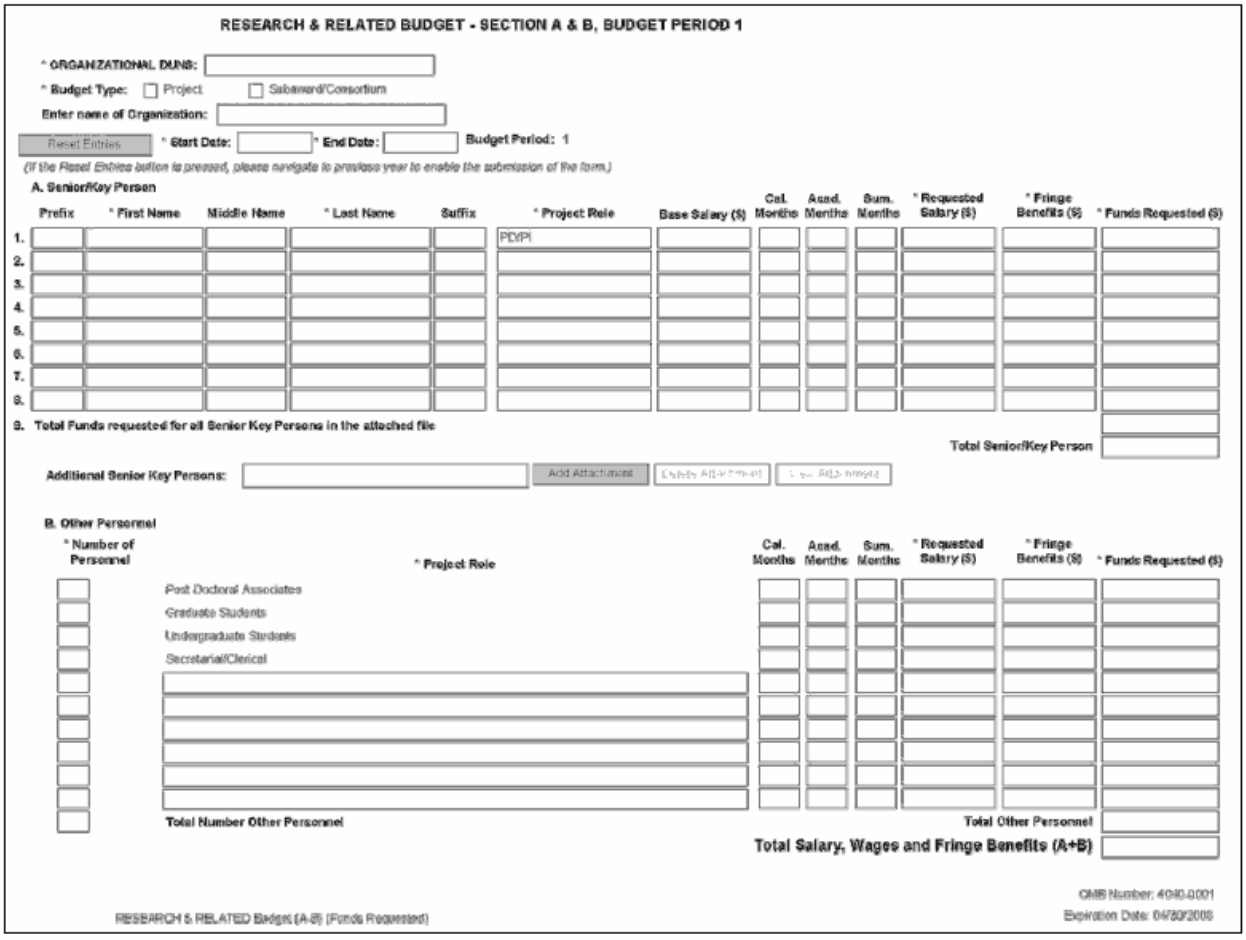
Our analysis of persons-per-grant shows a notable downward trend across the 3 years studied. While increasing costs in combination with flattened NIH budgets may contribute to this trend, we identified a number of other probable causes. First, we noted that PIs using e-SNAPs list significantly fewer persons on a Key Personnel report than PIs filing their reports using the paper 2590 form. This was not merely a function of which mechanisms had been rolled onto the NIH electronic grants system, as the decrease was seen even for the same grant activity. Among R01s, for example, more e-SNAPs than 2590s listed only 1 or only 2 persons on the form, so that the average person-per grant was 3.7 for 2590s and 2.3 for e-SNAPs in FY 2007. Upon closer investigation, we found that the e-SNAP form auto-populates the Key Personnel table with the PI name, SSN, and DOB, which may lead some PIs to believe that no additional personnel information is required.

A second possibility was the change in policy on who is a "Key" person. Earlier guidance recommended listing any individual who had made a substantive contribution to the research progress on the grant. The 2007 version of the 2590 Key Persons form instructs users to list "All Key Personnel for the Current Budget Period (do not include Other Significant Contributors)".[16] The instructions state:

> List **all Senior/Key Personnel** (salaried and unsalaried) **for the current budget period** at the applicant organization or elsewhere, who participated in the project during the current budget period. Include all degrees, role on project, number of person months devoted to the project, and the last four digits of the Social Security number. Individuals designated as "Other Significant Contributors," (e.g., those that may contribute to the scientific development or execution of the project, but are not committing any specified measurable effort to the project), should not be included.

At the same time, the new PHS-424 grant application form instructions classify postdoctorates and graduate students, undergraduates, and support staff as "Other Personnel" on the sample grant budget

page (**Figure 8**).[17] This may have caused some PIs to not list persons with these roles on their progress report Key Persons table, contributing to the reduction in reported personnel. ***We therefore recommend that either (1) post-doctorates, students, and staff not be listed as "Other" by default, or (2) that the Progress Report Key Persons page be revised to require listing of all Personnel supported by the grant for at least one month.***



RESEARCH & RELATED BUDGET - SECTION A & B, BUDGET PERIOD 1

* ORGANIZATIONAL DUNS:

* Budget Type: ☐ Project ☐ Subaward/Consortium

Enter name of Organization:

Reset Entries * Start Date: * End Date: Budget Period: 1

(If the Reset Entries button is pressed, please navigate to previous year to enable the submission of the form.)

A. Senior/Key Person

	Prefix	* First Name	Middle Name	* Last Name	Suffix	* Project Role	Base Salary ($)	Cal. Months	Acad. Months	Sum. Months	* Requested Salary ($)	* Fringe Benefits ($)	* Funds Requested ($)
1.						PD/PI							
2.													
3.													
4.													
5.													
6.													
7.													
8.													

9. Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

Additional Senior Key Persons: Add Attachment Delete Attachment View Attachment

B. Other Personnel

* Number of Personnel	* Project Role	Cal. Months	Acad. Months	Sum. Months	* Requested Salary ($)	* Fringe Benefits ($)	* Funds Requested ($)
	Post Doctoral Associates						
	Graduate Students						
	Undergraduate Students						
	Secretarial/Clerical						
	Total Number Other Personnel					Total Other Personnel	

Total Salary, Wages and Fringe Benefits (A+B)

OMB Number: 4040-0001

Expiration Date: 04/30/2008

RESEARCH & RELATED Budget (A-B) (Funds Requested)

Figure 8. Sample form provided in PHS-424 instruction guide.

To get a sense of whether underreporting is occurring, we examined a FY 2006 budget report from one university among the top 50 recipients of NIH extramural funding. This report captured all personnel who received monies from an NIH R01 grant in FY 2006, by grant. We compared personnel per budget report with the number of persons reported on the corresponding FY 2007 NIH Key Personnel Report. On average, the university budget reports listed 5.8 persons per R01, whereas the Key Personnel report listed 2.8 persons per R01. While 2% of grants on the budget report had one person listed, 38% of the Key Personnel Reports had one person listed. 60% of budget reports had 5 or more persons listed, compared to 16% of Key Personnel reports. Key Personnel listed PIs and co-investigators, and only very occasionally listed a postdoctorate or other research personnel.

In addition to form changes and clarification of the definition of Key Personnel, the NIH will need to communicate to the extramural community the importance of complete reporting of all research

personnel supported on research grants. Without an understanding of the NIH research workforce, including postdoctorates, graduate students, technicians, and other research support personnel, it is not possible to effectively assess allowed grant costs, evaluate outcomes of training programs, or to determine whether grant policies are having their intended effect.

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8. These are defined by NIH to include the following activity codes: DP1, G12, K01, K02, K05, K06, K07, K08, K12, K14, K18, K22, K23, K24, K25, K26, K30, K99, KL2, M01, P01, P20, P30, P40, P41, P50, P51, P60, PN2, R01, R03, R13, R15, R18, R21, R24, R25, R33, R34, R36, R37, R41, R42, R43, R44, R56, R90, S06, S11, S21, S22, U01, U10, U13, U18, U19, U24, U2R, U41, U42, U43, U44, U45, U54, U56, UC1, UC7, UH1, and UL1. This project did not examine progress reports from Block Grants (B), Research Construction Programs (C), Training Projects (D), Health Professions Programs (E), Community Services Programs (H), Research Career Programs (K), Loans and Repayments (L), Training Programs (T), V Programs (V), and Formula Grants (X).
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Appendixes

Appendix A: Data Field Coverage

	2005		2006		2007		Average
Rows in Table	153,706		155,540		140,270		
Field Name	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	
**** ProfilePersonID**		0.00%		0.00%		0.00%	
**** PersonID**		0.00%		0.00%		0.00%	
LastName	153,545	99.90%	155,477	99.96%	139,369	99.36%	99.74%
FirstName	149,011	96.95%	148,739	95.63%	130,949	93.35%	95.31%
MidInitial	45,513	29.61%	45,800	29.45%	41,458	29.56%	29.54%
NamePrefix	289	0.19%	270	0.17%	169	0.12%	0.16%
NameSuffix	662	0.43%	473	0.30%	400	0.29%	0.34%
DOB	114,537	74.52%	111,942	71.97%	62,465	44.53%	63.67%
SSN	109,464	71.22%	106,104	68.22%	90,281	64.36%	67.93%
Degree	139,137	90.52%	139,360	89.60%	121,841	86.86%	88.99%
DegBachelor	24,336	15.83%	26,450	17.01%	24,489	17.46%	16.77%
DegMaster	15,374	10.00%	16,875	10.85%	16,069	11.46%	10.77%
DegAcademicDoc	85,459	55.60%	88,475	56.88%	80,038	57.06%	56.51%
DegProfessionalDoc	38,145	24.82%	40,354	25.94%	36,598	26.09%	25.62%
DegOther	3,230	2.10%	2,762	1.78%	2,444	1.74%	1.87%
Role	147,408	95.90%	148,609	95.54%	131,540	93.78%	95.07%
RolePrincipalInv	36,241	23.58%	39,927	25.67%	39,908	28.45%	25.90%
RoleLeadInv	32,148	20.92%	35,765	22.99%	32,930	23.48%	22.46%
RoleSecondaryInv	25,430	16.54%	23,881	15.35%	19,395	13.83%	15.24%
RolePostdoc	10,881	7.08%	9,730	6.26%	7,494	5.34%	6.23%
RoleStudent	7,153	4.65%	6,202	3.99%	4,520	3.22%	3.95%
RoleTechnician	10,807	7.03%	8,566	5.51%	6,137	4.38%	5.64%
RoleResSupport	11,834	7.70%	12,686	8.16%	11,464	8.17%	8.01%
RoleUnclassified	24,561	15.98%	24,388	15.68%	22,558	16.08%	15.91%
PercentEffort	130,907	85.17%	116,424	74.85%	37,351	26.63%	62.22%
CalendarEffort	8,229	5.35%	24,495	15.75%	82,749	58.99%	26.70%
AcademicEffort	81	0.05%	2,474	1.59%	7,848	5.59%	2.41%
SummerEffort	1	0.00%	2,743	1.76%	7,153	5.10%	2.29%

Appendix B: Role Categories and Most Frequent Entries

Principal Investigator
PI
Overall PI
PD PI
Principal
Principal Investigator
Principal Research
Principal Scientist
Principal Research Scientist

Investigator	
Acting Instructor	Participating Investigator
Adjunct Clinical Pharm	Pediatrician
Analytical Chemist	Peds Investigator
Animal Surgeon	Periodontist
Asc Rsch Faculty	Pharmacist
Asc Veterinarian	Pharmacologist
Assistant Research Associate	Phlebotomist
Assistant Research Scientist	Physical Therapist
Assistant Researcher	Physician
Assistant Scientist	Physician Investigator
Assistant Staff Scientist	Physicist
Associate	Policy Analyst
Associate Director Research	Principal Engineer
Associate Investigator	Prot Clinician
Associate Research Scientist	Prot Res Assoc
Associate Researcher	Psychiatrist
Associate Scient Director	Psychologist
Associate Scientist	Psychometrist
Associate Staff Scientist	Pulmonologist
Audiologist	Radiation Oncologist
Biochemist	Radiochemist
BioEngineer	Radiologist
Bioinformatician	Research Associate Professor
Bioinformaticist	Research Associate
Biological Scientist	Research Chemist
Biomedical Engineer	Research Collaborator
Biophysicist	Research Consultant
Biostatistician	Research Dietician
Botanist	Research Director
Cardiologist	Research Engineer
Cardiovascular Nurse	Research Faculty
Cell Biologist	Research Instructor
Chemist	Research Investigator
Chief Biostatistician	Research Nurse
Clinical Associate	Research Nurse Coord
Clinical Co-Investigator	Research Pharmacist
Clinical Collaborator	Research Physician
Clinical Investigator	Research Physicist
Clinical Nurse	Research Professional
Clinical Psychologist	Research Psychiatrist
Clinical Res Assoc	Research RN
Clinical Scientist	Research Scientific Director
Clinical Veterinarian	Research Scientist
Clinician	Research Teaching Specialist
Co-Investigator	Researcher
Co-Lead Investigator	Scientific Associate
Collaborating Investigator	Scientific Co-Director

Postdoctoral Scholar
Fellow
GRA PostDoc
LS Fellow
Neurosurgery Resident
Ped Nephr Fellow
Pepper Scholar
PGR
PhD Student
Postdoc Chemist
Postdoc Research Assistant
Postdoc Research Scientist
Postdoctoral
Postdoctoral Associate
Postdoctoral Fellow
Postdoctoral Research Associate
Postdoctoral Research Fellow
Postdoctoral Researcher
Postdoctoral Scholar
Postdoctoral Scientist
Postdoctoral Student
Postdoctoral Trainee
PostDoctorate
PostDr Research Trainee
Postgraduate
Postgraduate Researcher
PRA
Regular Fellow
Research Fellow
Research Scholar
Senior Fellow
Senior Postdoc
Senior Research Fellow
Subcontract Postdoc
Visiting Postdoctoral
Visiting Postdoctoral Fellow
Visiting Scholar

Student
Graduate
Graduate Assistant
Graduate Fellow
Graduate Investigator
Graduate Research
Graduate Research Assistant
Graduate Research Associate
Graduate Research Student
Graduate Researcher
Graduate Student
Graduate Student Research Assistant
Graduate Student Researcher
Graduate Student Working
Intern
Medical Student
Ment Med Student
MS Student
Predoc Research Assistant
Predoctoral
Predoctoral Fellow
Predoctoral Student
Predoctoral Trainee
Research Student
Student
Student Assistant
Student Hourly
Student PreDoc
Student Research Assistant
Student Researcher
Student Tech
Student Trainee
Student Worker
Summer Intern
Summer Student
Trainee
Undergrad Research Assistant
Undergrad Tech
Undergraduate
Undergraduate Researcher
Undergraduate Student

Technician
Analyst
Animal Caretaker
Animal Technician
Animal Trainer
Ass Research Specialist
Assay Development
Assistant Research
Assistant Specialist
Associate Research Specialist
Associate Specialist
Biologist
Clinical Data Monitor
Clinical Evaluator
Clinical Monitor
Computer Analyst
Computer Programmer
Computer Specialist
Data Abstractor
Data Analyst
Data Clerk
Data Collector
Data Coordinator
Data Entry Specialist
Data Leader
Data Manager
Data Monitor
Data Specialist
Database Admin
Database Manager
Database Specialist
Dept Consult
Diagnostician
Dietary Aide
Electrical Engineer
Evaluator
Graphic Artist
Histology Tech
Imaging Analyst
Imaging Tech
Interviewer
IT Coordinator
IT Specialist
Junior Specialist
Lab Aide
Lab Specialist
Lab Technologist
Laboratory Assistant
Laboratory Technician
Machinist
Masked Examiner
Mechanical
Mechanical Engineer
Medical Monitor
Medical Officer

Research Support
Accountant
Accounting Assistant
Administrative
Administrative Assistant
Administrative Coordinator
Administrative Director
Administrative Manager
Administrative Secretary
Administrative Staff
Administrative Support
Administrator
Affiliate
Animal Manager
Assistant
Assistant Coordinator
Assistant Director
Assistant Leader
Associate Chair
Associate Director
Associate Director Clinical Research
Associate Leader
Associate PD
Associate Specialist
Bionut Manager
Business Manager
Case Manager
CCOP Administrator
CEO
Chair
CIO
Clinical Coordinator
Clinical Director
Clinical Leader
Clinical Research Coordinator
Clinical Trial Coordinator
Co-Coordinator
Co-DeputyDirector
Co-Director Dissemination
Co-Director
Co-Leader
Contracts Administrator
Cook
Coordinator
Coordinator Tech
Co-Supervisor
Counselor
Country Coordinator
Data Director
Data Entry Clerk
DDC Associate Director
Deputy Director
Director
Director Administration
Director Biostatistics
Director Chemistry

Unclassified
Administration
Advisor
Alzheimer's Consultant
Antiviral Studies
Assay validation
Assessor
Assistant Adj Professor
Assistant Instructor
Assistant Professor
Assistant Professor Research
Assistant Research Professor
Associate Professor
Backup ME
Backup Ophth
Bioengineering
Bioinformatics
Biostat
Biostatistics
Board Member
BRIN faculty
Cancer Control
Cedars Sinai
Chemistry
Clin Asst Professor
Clinic RN
Clinical
Clinical Consultant
Clinical Interface
Clinical Research
Collaborating
Collaborative
Committee Chair
Commy Liaison
Consultant
Content Expert
Contractor
CRA
CRC
Crystallography
CSO
Data
DBPPI
DPI
DSMB
EAB
EAC
ENT
Executive Cmte
Exercise Committee
External Advisor
External Advisor Committee
External Review Committee
Extramural
Facilitator
Faculty
Faculty Advisor
Faculty Participant

Collaborator	Scientific Curator
Principal Investigator, cont'd	
Computer Scientist	Scientific Director
Coord Physician	Scientist
Co-PI Research Scientist	Senior Associate
Co-Principal Investigator	Senior Biostatistician
Crystallographer	Senior Chemist
Curator	Senior Engineer
Design Engineer	Senior Epidemiologist
Dietitian	Senior Investigator
Director Research	Senior Programmer
Division Chief	Senior Research Associate
Economist	Senior Research Scientist
EDP Technician	Senior Researcher
Electron Microscopist	Senior Scientist
Electro-physiologist	Senior Staff Scientist
Engineer	Senior Statistician
Entomologist	Significant Contributor
Epidemiologist	Social Scientist
Ethnographer	Social Worker
Exercise Physiologist	Software Engineer
Faculty Associate	Special Investigator
Faculty Biostatistician	Spectroscopist
Faculty Consultant	Senior Biol Sclentist
Faculty Investigator	Senior Neurologist
Foreign Collaborator	Senior Research Investigator
Gastroenterologist	Senior Research Nurse
Genetic Epidemiologist	Scientific Director
Genetic Statistician	Scientist
Geneticist	Senior Associate
Geriatrician	Senior Biostatistician
Gyn Oncologist	Senior Chemist
Health Disp Faculty	Senior Engineer
Health Economist	Senior Epidemiologist
Health Educator	Senior Investigator
Health Worker	Senior Programmer
Hematologist	Senior Research Associate
Histologist	Senior Research Scientist
Human Geneticist	Senior Researcher
Immunologist	Senior Scientist
Instructor Researcher	Senior Staff Scientist
Intervention Nurse	Senior Statistician
Interventionist	Significant Contributor
Investigator	Social Scientist
Junior Faculty	Social Worker
Junior Investigator	Software Engineer
Junior Researcher	Special Investigator
Junior Scientist	Spectroscopist
Key Investigator	Senior Biol Sclentist
Lead Investigator	Senior Neurologist
Mathematician	Senior Research Investigator
Mechanical Engineer	Senior Research Nurse
Med Oncologist	Senior Staff Associate
Med One Hem	Senior Technician

Medical Technologist
Technician, cont'd
MRI Tech
Nurse
Nurse Tech
Pathologist
Patient Recruiter
Phone Interviewer
Photographer
Physician Assistant
Programmer
Programmer Analyst
Protocol Specialist
Reference Librarian
Rehab Tech
Research Aide
Research Analyst
Research Assistant
Research Biologist
Research Interviewer
Research Lab Technician
Research Programmer
Research Specialist
Research Support
Research Support Specialist
Research Technician
Research Technologist
RTS
Scientific Assistant
Scientific Programmer
Senior Analyst
Senior Data Analyst
Senior Data Manager
Senior Lab Research
Senior Lab Tech
Senior Research Assistant
Senior Research Specialist
Senior Research Tech
Senior Staff Scientist
Senior Tech Associate
Senior Technician
Software Developer
Specialist
Staff Assistant
Staff Associate Research
Staff Nurse
Staff Research
Staff Research Assistant
Statistical Analyst
Statistical Consultant
System Analyst

Director Data
Director Flow
Research Support, cont'd
Director Informatics
Dishwasher
Editor
Ethicist
Executive Director
Faculty Director
Field Coordinator
Field Supervisor
Financial Manager
First Leader
Grant Administrator
Grant Coordinator
Grants Manager
Head
Informatics Manager
Intake Counselor
Lab Co-Manager
Lab Coordinator
Lab Helper
Lab Research
Lab Supervisor
Laboratory Director
Laboratory Manager
Lead Technologist
Leader
Major Leader
Manager
Mentor Director
Methods Leader
Modality Leader
Module Director
National Coordinator
NMR Manager
Node Coordinator
Nurse Case Manager
Nurse Manager
Nurse Recruiter
Nursing Coordinator
Office Assistant
Operations Manager
Outreach Coordinator
PD
Pharmacovigil Manager
Recruiter
Recruiter Trainer
Recruitment
Recruitment Coordinator
Regulatory Affairs Manager
Regulatory Coordinator
Research Administration
Research Administrative Assistant
Research Affiliate
Research Associate Director
Research Coordinator
Research Leader
Research Manager
Research Managing Director
Research Officer

FHCRC
Unclassified, cont'd
Foreign
GCRC Staff
Genetic Counselor
Genetics
Genomics
Health Advocate
Helper
Hem One
Human Subjects
IAC Mentor SPID0001
In vivo studies
Informatics
Instructor
Internal Advisor
Intervention
Interventn Facil
JF Mentor
Key Personnel
Laboratory
Leadership
Lecturer
Life Science
LSRA
Major User
Measurement
Med Oncology
Med One
Medical Research
Member
Mentee
Mentor
Minigrant
Minority Supplement
Molecular
Molecular Genetics
Molecular Modeling
Monitor
New Hire
New Recruit
Paid Consultant
PAL
Participant
Participating
Partner Device
Pathology
PC
PDF
Personnel
PF Recipient
Pharmacotherapy
PHS
Primary CRA
Primary Mentor
Prof Research Asst
Professional
Professor
Program
Proteomics
Rad One
Radiation
Radiology
Regulatory
Regulatory Affairs
Regulatory Affairs Sp
Research

Invest	
Principal Investigator, cont'd	
Med One Invest	Staff Associate
Medical Consultant	Staff Investigator
Medical Director	Staff Research Associate
Methodologist	Staff Research Investigator
Microbiologist	Staff Scientist
Minority Investigator	Statistical Geneticist
Molecular Biologist	Statistician
Molecular Geneticist	Sub Co-Investigator
MR Physicist	Sub Investigator
Neuro-anatomist	Subcontract Co-I
Neuroimaging Scientist	Subcontract Co-PI
Neurologist	Subrecipient Co-I
Neuro-oncologist	Surgeon
Neuropath Co-Inv	Target Faculty
Neuropathologist	Thematic Leader
Neuro-psychologist	Therapist
Neuro-radiologist	Urologist
Neuroscientist	Veterinarian
Neurosurgeon	Virologist
Nurse Clinician	Vision Therapist
Nurse Practitioner	Visiting Professor
Nurse Specialist	Visiting Scientist
Nutritionist	
OB Investigator	
Oncologist	
Ophthalmologist	
Orthopaedic Surgeon	

System Architect
Technician, cont'd
Systems Administrator
Technical Assistant
Technical Associate
Technical Specialist
Technical Staff
Technical Support
Technician
Technologist
Telehealth Nurse
Trainer
Veterinary Technician
VF Examiner
Vision Tester
Visual Examiner
WebMaster

Research Supervisor
Research Support, cont'd
Resource Director
Resource Manager
Safety Officer
Secretary
Section Head
Senior Coordinator
Senior Director
Senior Lab Manager
Senior Leader
Senior Research Coordinator
Service Director
Shared Resource Director
Sub Director
Sub Leader
Supervisor
Team Leader
Technical Director
Technical Officer
Training Supervisor
Trial Coordinator
Vice Chair

Appendix C: Persons per Progress Report, by Mechanism and Year

Activity Code	FY 2005 Progress Reports				FY 2006 Progress Reports				FY 2007 Progress Reports			
	2004 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean	2005 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean	2006 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean
DP1	9	-1.84	1.62	5.09	22	0.40	1.16	1.93	35	0.74	1.48	2.21
G12	19	-41.69	47.08	135.86	17	11.82	24.39	36.95	17	-0.26	36.02	72.30
K01	766	1.78	1.98	2.18	812	1.68	1.87	2.05	825	1.62	1.78	1.93
K02	259	0.69	0.90	1.10	249	0.78	1.00	1.23	218	0.83	1.03	1.23
K05	93	0.33	0.60	0.87	90	0.38	0.68	0.98	79	0.48	0.71	0.94
K06	3	.	1.00	.	2	.	1.00	.	3	.	1.00	.
K07	139	1.93	2.51	3.08	151	1.85	2.29	2.74	165	2.07	2.70	3.32
K08	1,192	1.53	1.64	1.75	1,216	1.46	1.57	1.67	1,179	1.51	1.62	1.72
K12	138	4.06	5.43	6.80	143	4.04	5.40	6.76	154	3.34	4.78	6.21
K14	2	.	1.00	.	1	.	1.00	.	1	.	1.00	.
K16	3		1.00									
K18	7	-15.16	0.75	16.66	4	.	2.50	.	4	.	2.00	.
K22	141	1.78	2.26	2.75	149	1.47	1.79	2.10	150	1.42	1.71	2.00
K23	970	2.10	2.28	2.46	1,017	1.89	2.05	2.21	1,014	1.86	2.03	2.20
K24	260	0.78	1.01	1.24	264	0.77	0.96	1.16	264	0.91	1.08	1.25
K25	92	1.19	1.65	2.11	116	1.28	1.64	2.00	124	1.43	1.81	2.18
K26	13	0.01	0.88	1.76	11	-0.05	0.46	0.98	8	-0.60	0.63	1.86
K30	59	-168.47	6.58	181.64	53	4.43	6.00	7.57	53	4.80	6.43	8.06
K99		0.00	0.00	0.00		0.00	0.00	0.00	1	.	1.00	.
KL2		0.00	0.00	0.00		0.00	0.00	0.00	12	-0.88	2.17	5.22
M01	78	24.00	31.82	39.64	76	19.22	35.21	51.21	75	7.78	14.44	21.10
P01	954	10.20	10.95	11.71	924	8.67	9.32	9.98	862	8.28	8.90	9.53
P20	260	10.54	12.26	13.97	274	9.89	11.47	13.06	332	9.04	10.98	12.93
P30	349	8.26	10.57	12.87	358	8.73	11.06	13.40	348	8.39	10.13	11.87
P40	31	1.41	5.78	10.16	28	0.71	4.96	9.21	30	1.93	3.48	5.02
P41	92	6.25	8.00	9.74	103	4.89	6.28	7.67	111	4.83	6.20	7.57
P42	24		15.56		12	6.61	14.15	21.69	23	8.70	16.96	25.22
P50	348	12.49	13.97	15.45	318	11.64	13.18	14.72	316	11.17	12.74	14.30
P51	8	-6.01	16.56	39.12	8	-5.08	8.69	22.46	8	-13.40	12.33	38.05
P60	50	8.26	13.70	19.15	49	9.46	13.15	16.85	46	6.50	10.43	14.36
PN1	20		1.00									
PN2					4	-232.02	10.93	253.89	8	-171.58	6.13	183.83
R01	29,111	3.16	3.21	3.25	28,671	2.89	2.93	2.97	28,239	2.74	2.79	2.83
R03	1,645	2.05	2.20	2.34	1,611	2.00	2.17	2.33	1,417	1.95	2.12	2.29
R10	1											
R13	587	1.63	2.13	2.64	612	1.51	1.99	2.47	563	1.55	2.01	2.47
R15	195	-16.85	3.00	22.85	200	0.00	3.23	6.47	189	-14.83	1.08	17.00
R18	20	2.64	4.73	6.81	25	2.57	4.28	5.99	28	3.19	4.82	6.44
R21	2,936	2.37	2.49	2.61	3,066	2.41	2.54	2.68	3,139	2.39	2.51	2.64
R24	256	4.66	5.85	7.05	279	4.21	5.26	6.30	255	3.81	4.79	5.77
R25	564	6.25	7.37	8.50	581	5.39	6.62	7.86	594	5.17	6.22	7.28
R29	1											
R33	156	2.74	3.39	4.04	178	2.54	3.15	3.77	173	2.44	3.11	3.78
R34	19	0.44	5.08	9.72	89	2.95	3.72	4.49	140	2.93	3.82	4.71
R36	3	.	1.00	.	9	0.82	1.89	2.96	12	0.49	1.17	1.84
R37	858	3.02	3.28	3.54	878	2.62	2.85	3.09	884	2.45	2.69	2.92
R41	227	2.80	4.03	5.26	176	1.20	2.57	3.95	163	1.27	2.95	4.63
R42	78	2.53	4.36	6.19	96	3.39	4.52	5.65	93	3.39	4.46	5.52
R43	1,073	2.58	3.09	3.61	888	2.58	3.20	3.82	766	2.48	3.00	3.52
R44	817	3.87	4.22	4.57	773	3.91	4.26	4.62	813	3.83	4.15	4.46
R55	11		1.00		9				4			
R56					107	-7.38	2.85	13.09	113	1.05	2.04	3.04
R90	16	-4.18	1.78	7.74	16	-4.02	1.87	7.76	29	-0.15	4.79	9.73

Activity Code	2004 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean	2005 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean	2006 Awards	Lower 99% Confidence Limit for Mean	Mean	Upper 99% Confidence Limit for Mean
S06	75	14.61	23.20	31.79	76	14.33	25.09	35.85	77	11.37	24.29	37.20
S10	163		1.00		156		1.00		140		1.00	
S11	12	0.04	6.22	12.40	11	-2.56	4.48	11.52	9	-1.75	7.99	17.72
S21	10	-4.29	5.13	14.54	9	1.20	3.50	5.80	10	0.50	8.04	15.57
S22	4	.	5.00	.	2	.	3.50	.	3		4.25	
U01	1,400	5.14	5.57	6.00	1,415	4.97	5.40	5.82	1,509	4.70	5.16	5.63
U10	393	7.36	9.07	10.77	401	6.93	8.62	10.31	414	5.95	7.82	9.69
U13	29	-0.20	3.13	6.46	35	0.54	2.76	4.98	36	1.19	3.53	5.87
U18	7	1.05	4.25	7.45	15	4.02	5.94	7.86	15	3.56	5.27	6.99
U19	102	8.83	11.23	13.63	132	8.30	10.36	12.42	141	7.49	10.87	14.26
U24	49	3.58	6.25	8.93	59	3.03	5.01	6.99	63	3.40	5.92	8.44
U2R	9	-1.69	4.97	11.63	13	0.64	5.30	9.96	13	1.55	6.15	10.74
U41					1	.	4.50	.	1	.	4.08	.
U42	29	2.28	4.52	6.76	20	-0.09	6.38	12.84	19	2.11	4.31	6.51
U43		0.00	0.00	0.00	1				1	.	1.67	.
U44	5	-2.74	4.30	11.34	6	-91.99	3.50	98.99	8	-2.02	3.52	9.05
U45	26		11.95		26	5.18	12.41	19.64	26	3.82	11.49	19.16
U54	126	10.45	14.83	19.22	186	11.07	14.33	17.58	191	11.36	14.65	17.95
U56	41	5.62	9.06	12.50	29	4.83	8.05	11.28	26	2.71	7.70	12.70
UC1	25		8.62		16	5.59	8.56	11.54	-	2.52	8.68	14.85
UC7									2	-664.44	20.93	706.30
UH1	6	.	0.67	.	1	-9.78	0.83	11.44	2	-6.83	1.13	9.08
UL1									12	0.42	23.33	46.24