

Final Evaluation Report

For

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Task 14**

Outcome Evaluation of the Small Grants Program for Behavioral Research in Cancer Control

To

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I. Introduction

Battelle is currently conducting an outcome evaluation of the Small Grants Program of the Behavioral Research Program (BRP) within the Division of Cancer Control and Population Sciences (DCCPS), the National Cancer Institute (NCI), the National Institutes of Health (NIH). The mission of the Small Grants Program is to “facilitate the growth of a nationwide cohort of scientists with a high level of research expertise in behavioral cancer control research.” The DCCPS Behavioral Research Program contracted with Battelle Centers for Public Health Research and Evaluation to evaluate the effectiveness of the Small Grants Program in accomplishing its mission and to provide the basis for the reformulation of the Small Grants Program Announcement Request (PAR) for the next funding cycle (FY 2006).

Program History and Background

In 1998, DCCPS issued a Small Grants Program Announcement utilizing the R03 mechanism of support to attract new investigators to the field of behavioral cancer control research. The Small Grants Program supports projects that can be completed in a short period of time, such as pilot projects, development and testing of new methodologies, secondary data analyses, or innovative studies that provide a basis for more extended research. Since the program’s inception, there have been three announcements published in the NIH Guide, with the first published in April 1999:

- PAR 99-006 (December 1999 – November 2001)
- PAR 02-037 (December 2001 – December 2003)
- PAR 04-020 (December 2003 – December 2005)

The Small Grants Program is designed to encourage investigators from a variety of academic, scientific, and public health disciplines to apply their skills to behavioral research investigations in cancer prevention and control. The disciplines of behavioral research identified in the program literature include:

- Anthropology
- Economics
- Epidemiology
- Health Communications and Informatics
- Health Education and Sociology
- Health Policy
- Health Promotion
- Health Services Research
- Medicine
- Nursing Research
- Nutrition
- Psychology
- Public Health
- Social Work

Since the program's inception, a total of 120 grant awards have been made to behavioral researchers: 39 to those responding to PAR 02-037, 64 to those responding to PAR 99-006, and 17 to those responding to PAR 04-020. Eligible applicants are either new investigators who have not previously been funded as a Principal Investigator (PI) on an NCI-funded cancer control research grant (R03, R01, U01, P01, or R21) or established behavioral scientists who are refocusing their work on cancer prevention and control. Predoctoral investigators currently enrolled in an accredited doctoral degree program also are eligible to apply. The grant applications are not subject to Center for Scientific Review (CSR) study section review but rather are reviewed by a special study section within NCI that includes behavioral and prevention scientists with a primary interest in behavioral cancer control research. This special review process allows for a shorter turnaround time for small projects. Successful grantees receive funding for two years, with maximum allowable direct costs of \$100,000. As stated in NCI publication PA 04-034 (December 2003, p. 2), the R03 mechanism is distinguished from the R21 mechanism in that "new investigators use the R03 to learn the factors involved in leading an investigation in an area they may have been working in since graduate school or as a post-doc" and "there is a lesser emphasis on the continuation into the R01 for the R03 applicant."

Scope and Purpose of the Evaluation

The scope of the present evaluation is limited to those grantees funded through the PAR 99-006 (December 1999 – November 2001) since they have had sufficient time since the end of the grant cycle to complete data collection and analysis, begin publishing findings from their R03-funded research, and obtain additional funding in behavioral cancer control research. The cohort of grantees from the subsequent program announcement (PAR 02-037), who completed their research grants in April 2004 (assuming no extensions), would be less likely to have concluded their analysis and prepared manuscripts for publication. The evaluation design combines both quantitative and qualitative methodologies to assess the success of the program. Specifically, the evaluation assesses the key question:

What is the impact of the R03 Program on the careers of new investigators in the field of behavioral research in cancer control?

The outcomes evaluated include grantee research, publications, presentations, and professional interactions within the field of behavioral research in cancer control. For example, it is important to understand how participation in the Small Grants Program has encouraged grantees to apply their skills to behavioral research investigations in cancer prevention and control after completion of the grant period. Have they sought and won additional funding to continue their research in this area? What is the value of their research from the perspective of research mentors? How many funded applicants go on to receive funding via the Exploratory Developmental (R21) or Research Project (R01) mechanisms at NIH or other

funding sources (i.e., American Cancer Society)? How many continue on as “cancer control” investigators over time, for example, as measured by funded grants or publications in the area?

Additionally, the evaluation assesses whether individuals reviewing the small grant application have the appropriate expertise to do so. ‘Expertise’, as defined by NCI, is based on publication and funding records. Some key questions related to this issue include: Have the Small Grants reviewers published in the area of behavioral research in cancer control?; What is the NIH funding history of the reviewers (including calculating the average grant amount per reviewer, the average number of grants per reviewer, the type of grants by mechanism)?

II. Data Sources

The evaluation of the Small Grants Program is based on data obtained from various sources including (1) grantee surveys, (2) grantee curricula vitae, (3) mentor interviews, and (4) grant reviewer characteristics. An all inclusive grantee post-award activities database was developed to manage and facilitate the data collection and to support the qualitative and quantitative analysis. The post-award activities database is comprised of a number of data tables including grantee, grantee publication, mentor, and grant reviewer tables. A summary of all activities related to the evaluation is presented in Appendix A.

Grantee survey. A survey of grantees was conducted to obtain information about their experience with the R03 grant award. Results of a pilot survey supported preparation of a protocol and instrument for submission to the Office of Management and Budget (OMB). The approved survey was administered by telephone using a 47-item questionnaire covering five topics (grantee background, additional funding, grant oversight, mentoring, and impact on career). The total number of grantees surveyed was 54 (including the nine selected for the pilot study) from the entire cohort (n=64) who were successful in their applications to the first program announcement (PAR 99-006) covering the years 1999–2001 (see Appendix B), for a response rate of 84%.

Grantee curricula vitae. In order to capture the full scope of the grantees' post-award activities (i.e., publications and/or presentations) information was abstracted from each grantee's curriculum vitae including products produced directly as a result of the R03 and those produced outside of their R03 award either in behavior research, cancer control, or another discipline. Specifically, all articles published directly relating to the R03 grant award were extracted and entered into the grantee post-award database, along with articles not directly resulting from the R03 award. Each publication record included title, contributing authors, journal, publisher, and date of any publications; we also tallied the number of R03-related presentations made by each grantee since the grant award. After a review of the data for accuracy, consistency, and completeness, the information was submitted to the Manager of Battelle Library and Information Services to be used in the conduct of a bibliographic search to obtain data with which to conduct a bibliometric analysis.

Mentor interviews. Interviews were conducted with the individuals assigned to mentor the grantees from the Small Grants Program. The interview guide consisted of 16 open-ended questions covering three main topics: mentor background and experience, grantee impact, and field impact (see Appendix C). The protocol for the mentor pilot study called for a sample of nine mentors to be randomly selected from a group of researchers who served as formal mentors of the PAR 99-006 cohort of grantees

under study (n=64), covering the years 1999–2001 of the Small Grants Programs. Invitations to participate were sent to the universe of mentors (n=64); however, only 8 mentors were available and completed interviews due to difficulties scheduling interviews during the data collection period with these busy, high-profile individuals.

Grant reviewer characteristics. In order to assess the effectiveness of the Small Grants Program beyond grantees' post-award activities, information about reviewers was extracted and compiled from materials provided by NCI. Background information was compiled for the group of 64 grant reviewers serving on any of the six special study sections from May 1999 through May 2002 and included institutional affiliation, main research focus, publication history, and total number of grants awarded.

III. Method of Analysis

The data analysis procedures for the grantee surveys, grantee curricula vitae, and mentor interviews are described in detail below.

Grantee survey. A descriptive analysis of the quantitative data and a content analysis of the qualitative data were conducted to identify themes among responses and to produce narratives focusing on five key areas. These included grantee background, additional funding, mentoring, impact on grantee career, and impact of the program on the field of behavioral research in cancer control.

Grantee curricula vitae. Information was compiled to create three data files to conduct a bibliometric analysis of articles directly related to the grantee R03 research topics and funding, as well as a bibliographic analysis of grantee publications outside of their grant award and not directly related to their R03 research topic. The three data files included the following information:

- Citation of R03-related publications for each grantee.
- Summary of whether each R03-related publication has been published, is in press, or is in preparation, and the number of presentations given.
- Summary of journal information, such as main disciplines represented and whether it is peer-reviewed.

Using the citation data file, key information was assembled including a summary of R03-related publication activities, peer-review status, 5-year citation impact for the journal, and 5-year citation impact for that category of journal. The impact factor was calculated on an annual basis and consists of the number of citations in the current year to items published in the past two years (numerator) divided by the number of substantive items published in those same two years (denominator). Impact factors for journals and for their journal categories were taken from the Institute for Scientific Information (ISI) and other sources such as the *Journal Citation Reports (JCR)*.

A series of descriptive analyses were conducted to address (1) grantee productivity overall, within the behavioral research field in cancer control and within R03 sponsorship; and (2) grantee impact through the number of other publications citing their work and the quality of those publications. The analysis plan included the following:

- Total number and percentage of all grantees who have published
- Average number of publications per grantee
- Total number and percent distribution of publications by all grantees, by year, type of publication, and lead/contributing author status
- Total number and percentage of grantee publications cited by other publications

- Total number and percent distribution of grantee publications cited by other publications, by grantee lead/contributing author status
- Average number of citing publications per grantee among publishing grantees
- Average number of citing publications per grantee among publishing grantees, by year

Mentor interview. A content analysis of the responses from the mentor interviews was conducted to identify themes related to key issues concerning the impact of the Small Grants Program in furthering grantees' careers and the impact of their research in moving the field of behavioral research in cancer control forward. The information from the content analysis was synthesized across all interviews as the basis for drawing inferences to support findings from the grantee survey and publication analysis.

Grant reviewer characteristics. A series of descriptive analyses were conducted, along with a bibliographic review of grant reviewers' publication history, to assess whether (1) individuals who reviewed the Small Grant applications have the expertise to do so, particularly in terms of the ability to be responsive to emerging areas of behavioral research; (2) the reviewers have published in the area of behavioral research in cancer control; and (3) the reviewers have a reputable grant funding history. The analysis included the following:

- Total number of reviewers who have published
- Average number of publications per reviewer
- Total number of publications by journal title and discipline
- Total number of reviewers awarded grant funding by type
- Average number of NIH grants awarded to reviewers

IV. Evaluation Findings

The evaluation findings presented below are based on results from the descriptive analysis of the survey data, content analysis of responses from both the grantee survey and the mentor interviews, an analysis of grantees' publication history, and analysis of grant reviewer characteristics and background.

Grantee Background

A majority of the R03 grantees interviewed have a Ph.D. (93%), are affiliated with a university or university medical school (80%), and consider themselves junior investigators in the field of behavioral research in cancer control (59%). Although one-third of the grantees classified themselves as mid- to senior-level investigators, all of the grantees were relative newcomers to the field of behavioral research in cancer control. The table below provides a full summary of grantee characteristics. The cohort of grantees was fairly evenly split between males and females, with slightly more females (59% females versus 41% males).

Table 1 Summary of Grantee Characteristics

Grantee Characteristics	% (n) total
<i>Gender</i>	
Female	59% (32)
Male	41% (22)
<i>Education</i>	
PhD	93% (50)
MA	2% (1)
MPH, MD	5% (3)
<i>Institutional Affiliation</i>	
University	61% (33)
Hospital or health center	20% (11)
University medical school	19% (10)
<i>Classification in Field</i>	
Junior investigator	59% (32)
Middle investigator	31% (17)
Senior investigator	8% (4)
Skipped	2% (1)

Most of the grantees described learning about the R03 program primarily through “other” sources (60%) and their mentors (18%). Elaborating on their response, grantees overwhelmingly described “other” as NCI’s website. Grantees emphasized the ease with which they were able to locate NCI’s website and access information about the program, suggesting that NCI has been successful in improving the visibility of the Small Grants Program to new investigators.

In addition to identifying their mentor as one source for learning about the program, a number of grantees described a sequence of first hearing about the R03 program generally from their mentor, then

searching the NCI website for specific information and the grant application itself. This supports the mentors' description of their role in advising grantees on their future career development. Specifically, mentors worked with grantees to develop long-term funding strategies, including identifying and recommending funding sources, such as the R03 award, in addition to setting priorities for securing funds to ensure the sustainability of their research endeavors over time. Two of the mentors described the discussions about seeking funding as a relatively formal, institutionalized process undertaken with every post-doc or new faculty member. Other mentors advised grantees more informally, usually at the grantee's request.

When asked about where they had learned about the R03 mechanism, most of the mentors could not say where or when they had learned about the R03. "Been around forever" or "always known" were common responses. However, one mentor had received an R03 themselves early on and another mentor had learned about the mechanism while serving as part of a study session.

Additional Funding

Exactly one-half of the grantees surveyed responded that their interest in applying for an R03 grew out of participation in someone else's research (i.e., working with a mentor or through a previous fellowship). Most commonly this was an R01 (70%) funded primarily by NCI. However, R01s funded by the National Institute of Child Health and Human Development (NICHD) and the National Institute of Mental Health (NIMH) were also cited. About one-half of the mentors interviewed corroborated this finding, noting that the idea for seeking an R03 had come as a result of a research project on which the grantee and the mentor were already collaborating.

A majority of the grantees reported personally having other funds from both NIH (20%) and non-NIH (52%) sources prior to applying for the R03. The NIH sources of funding were reported to be fellowship and career development awards, while the non-NIH sources of funding were generally described as internal department funds, other federal agency funds (Centers for Disease Control and Prevention and Department of Defense), state funds, and foundation funds (i.e., Lance Armstrong Foundation, American Cancer Society, Susan G. Komen Foundation, Robert Wood Johnson Foundation). In reviewing grantee responses, it was not always clear whether the additional funding reported was for their own research on which they served as Principal Investigator (PI) or for someone else's, although there was some indication in the mentor interviews that the grantees pursued the additional funding on their own as PIs. Of the grantees who reported receiving additional funding from non-NIH sources, one-half said the funding was obtained through a peer-review process.

After obtaining R03 funding under the NCI Small Grants Program, grantees were active in submitting applications to NIH that were either directly related (n=75) or not directly related (n=52) to their R03 topic. One mentor advised the grantee with which he/she was working to seek additional

funding not related to the R03 saying, “I encourage all post-docs to develop two lines of research, kind of a diversified portfolio idea ...” A number of the grantees interviewed also submitted non-NIH applications linked to their R03 topic.

Of the applications submitted by grantees linked to their R03 topic, over 30% (n=25) were for an R01, with almost one-half of these receiving funding (n=12). Other funding mechanisms utilized were traditional research project and career development grants, primarily R21 (n=15) and K07 (n=7). Approximately one-quarter of the R21 (n=4) and over one-half of the K07 (n=5) applications were funded. Several of the mentors suggested to grantees that they seek K awards to cover their salaries, thereby leaving more funds from the R03 for research assistants, subject remuneration, and other expenses. Grantees also pursued additional grant funding to support their research beyond their R03 topic, mainly NIH research project and career development grants along with grants from advocacy organizations (e.g., American Cancer Society, Robert Wood Johnson Foundation, American Heart Association, etc.). Of the 52 NIH grant applications submitted, approximately 30% were funded, including R01 (n=11), R25 (n=3), and R21 (n=1). In addition, almost 40% (n=26) of the applications submitted to research foundations or associations were funded.

Table 2 below summarizes the number of applications submitted by grantees (both those linked and those not linked to their R03) and the status of each application. After obtaining their R03s, grantees on average submitted 1 application each linked to their R03 topic and 2 applications each overall. All the grantees interviewed responded they intended to apply for funds to support additional behavioral research in cancer control.

Table 2 Summary of Subsequent Applications Submissions by Grantees (n=54)

Status (n=54)	NIH application related to R03 research*	NIH application not related to R03 research*	Non-NIH application related to R03 research*	Total
Submitted Applications	75	52	70	197
Funded	30	17	26	73
Not Funded	28	18	19	65
Pending	15	12	6	33

Note: The total number of grants submitted is not entirely accounted for in the grant status categories (funded, not funded, and pending) due to grantee recall. Grantees were unable to recall the status of 2 NIH applications related to their R03 research; 5 NIH applications not related to their R03 work; and 19 non-NIH applications related to their R03 research.

Grantee Research and Impact

Nearly all of the grantees (85%) attributed their decision to conduct subsequent behavioral research in cancer control to their experience in applying for and obtaining an R03. A common sentiment among the grantees was that obtaining an R03 was a “confidence booster” and “motivator” to continue

their career as a principal investigator. Beyond these sentiments, grantees also described a number of tangible benefits of the process that influenced their decision to continue in the field, most of which relate to the support the R03 provided in their future research endeavors. Grantees emphasized that the R03 was important in that it supported a line of research inquiry not typically funded. In addition, the majority of grantees noted the importance of using the R03 to conduct a pilot study, through which to collect preliminary data to support development of a larger-scale grant proposal (e.g., an R01). As one grantee stated:

“It was the starting point that launched my career, and without it, it would certainly have been much more difficult to carry out the research. I wouldn't have been able to do it. And it certainly was the impetus to publications, presentations, and contributing to scientific conferences.”

An additional benefit influencing grantees' decisions to continue in the field was the knowledge and experience gained from the grant process itself. Many of the grantees stated that they felt much more “knowledgeable about the research and grant process” and that “the experience of managing an independent investigation at an early level of [their] career was a good experience to build on for future grant funding.” Put simply by one grantee:

“I learned a tremendous amount about directing a large project, working with another institution, the grant process itself, a good deal about the content area. So much that came out of that project has shaped what I am doing now.”

Grantee responses clearly indicate the value of the R03 in attracting new investigators to the field of behavioral research in cancer control and, more importantly, encouraging a future career in the field and fostering their professional development.

In terms of their current career as a Principal Investigator in behavioral research in cancer control, a majority of the grantees interviewed indicated that the R03 had had a positive impact on their research career in a variety of ways, as shown in the table below. All the grantees reported that the R03 award has encouraged them to engage in further Principal Investigator work, a fact that is supported by the grantees' additional funding applications and other research activities reported in previous sections of the survey. The majority of the grantees and mentors reported that the R03 award both encouraged and increased the number of grantee publications, presentations, and interactions with other researchers in the field. It is significant to note that 91% of grantees considered their research to be interdisciplinary, which underscores the effectiveness of program in “encouraging investigators from a variety of academic, scientific, and public health disciplines to apply their skills to behavioral research investigations,” a central programmatic objective.

Table 3 Impact of R03 Award Grantee Research Career.

Full Study (Pilot and Full combined)	%	Grantees
<i>Research</i>		
Consider your research (R03) to be interdisciplinary?	91%	49
<i>Impact of R03 on career</i>		
Encourage you to engage in further PI work?	70%	38
Increase the number of your publications?	72%	39
Increase the number of your presentations?	87%	47
Did you participate in any meetings or other presentations?*	84%	38
Encourage or enhance your interactions with other researchers in the field?	83%	45

*Note: This question was added after the pilot study and only includes responses from the second administration of the survey (n=45).

Beyond their R03 research, all grantees interviewed reported being involved in other activities related to behavioral research in cancer control, including having a significant role in preparing proposals and working on the grant research of others, teaching, supervising and mentoring post-doctoral students in the field, serving on professional committees or councils in the field, and providing clinical services to cancer patients. More notable activities included serving as a reviewer on various study sections and for a journal; serving on an advisory council; acting as a member on a committee or workgroup; being nominated to a directorship of a research center; and starting a center of excellence.

The mentorship aspect of the R03 seemed to be a particularly important facet of grantees' positive experience with the grant program and subsequent success. Grantees typically described their contact with their mentors as having a regular meeting (in some cases as often as weekly) and having a close working relationship. Over three-fourths of the grantees reported receiving substantial input from their mentors, which they found to be very helpful. Most mentors worked closely with grantees on the R03 research project by providing input into the original concept and design, acting as a peer reviewer on the application, and providing guidance on implementation of the study and interpretation of the findings. As one mentor stated:

“...I had done at least 10 years of research in testicular cancer and so I was able to provide a lot of helpful information on all aspects of the study. I sat in on the meetings while the study was being designed, while it was up and running, etc., and now we are at the very end of the study where she is beginning to write papers, and I will again be a co-author and senior mentor on the interpretation of findings.”

In addition, this relationship seemed to encourage the interdisciplinary nature of the research. In about one-half of the cases, mentors and grantees were not from the same discipline (although most considered themselves cancer control specialists) and collaborated by each bringing a different perspective to the research project.

Publication History

The impact of the Small Grants Program on the careers of new investigators in the field of behavioral research in cancer control was further assessed by analyzing the publication performance of grantees based on the number of publications, number citations of these publications, and other quality indicators including (1) whether or not the journal the article appears in is “peer reviewed” and (2) “impact factors”, which term refers to the frequency of citation to items published in a specific journal using a *bibliometric analysis* technique.

In addition, a *bibliographic analysis* involving a review of grantees’ non-R03 publication histories over the course of the grant (1998 to present) was conducted. This analysis was prompted by a finding from the bibliometric pilot study and subsequent full study indicating that grantees experienced some barriers to publishing articles related to their R03 research. This was due to the facts that either (1) grantees had utilized the R03 primarily as a means to gather pilot data for use in a subsequent R01 submission (or some other mechanism to support a larger study) and did not expect to publish findings until completion of the larger study; (2) findings from the pilot study were not suitable for publication; or (3) grantees had not yet completed their analyses and hence had not published the results.

The combined bibliometric and bibliographic analysis approach considers the full scope of the grantees’ publication history by assessing not only their R03-related publication activities but also their publication history as a whole within the field.

Bibliometric analysis (R03-related publications and presentations). The bibliometric analysis is based on information received from 47 grantees out of 64 within the PAR 99-006 cohort (73.4% response rate). Of the grantees who submitted a current curriculum vitae 73.2% (n=34) produced a total of 180 products directly related to their R03 research. These products included published articles (n=45), articles in press (n=12), articles in preparation (n=32), or presentations (n=91) (see Table 4). Almost one-half of the grantees who submitted their publication histories (n=23, 46.8%) had either published or had materials in press directly related to their R03 research.

Table 4 Summary of R03-Related Publications by Type

Grantee	Articles	In press	In preparation	Poster/ presentation/ abstract	Total
1	-	1	3	-	4
2	-	-	4	2	6
3	2	-	-	-	2
4	1	-	-	-	1
5	-	-	2	6	8
6	2	1	2	6	11
7	5	1	-	-	6
8	-	-	1	-	1
9	2	-	-	-	2
10	2	1	-	2	5
11	-	1	2	-	3
12	3	-	-	-	3
13	6	1	1	6	14
14	1	-	2	1	4
15	-	-	3	4	7
16	2	-	1	-	3
17	-	-	-	8	8
18	1	1	-	5	7
19	-	1	3	-	4
20	1	-	-	-	1
21	2	-	-	-	2
22	1	2	-	22	25
23	2	-	1	9	12
24	-	-	-	4	4
25	-	1	-	-	1
26	-	-	2	-	2
27	-	-	-	2	2
28	-	-	-	1	1
29	-	-	-	10	10
30	-	-	3	3	6
31	3	-	-	-	3
32	3	1	-	-	4
33	2	-	2	-	4
34	4	-	-	-	4
Total	45	12	32	91	180

*Received bibliometric information (CV) from 47 grantees out a total of 64

As shown in Table 5, the vast majority of materials produced by grantees published or in press (n=57) were journal articles (n=51/89.5%), while the remaining were book chapters or journal editorials/reviews.

Table 5 Number of R03-Related Articles Published by Type

Year	Number published
Article	51
Editorial	1
Review	1
Book Chapter	4
Total	57

A total of 53 articles were published or accepted in 41 journals covering 32 disciplines. The journal titles and main disciplines in which grantees most frequently published their R03-related articles are listed below (a full summary of the journal titles and disciplines can be found in Appendices D and E).

Journal Titles

- *Psycho-Oncology*
- *Addictive Behaviors*
- *Cancer*
- *Preventive Medicine*
- *Addiction*
- *Experimental & Clinical Psychopharmacology*
- *Journal of Behavioral Medicine*

Journal Disciplines

- Oncology
- Drug Abuse and Alcoholism
- Psychology
- Psychiatry and Neurology
- Obstetrics and Gynecology; Birth Control

As shown in Table 6 below, over the course of the grant cycle from 2001 to 2005, the 45 published articles – this excludes those in press – were cited by 85 journals (see Appendix F) a total of 134 times, with the grantee appearing either as lead author (n=40) or as contributing author (n=5).

Table 6 Number of R03-Related Articles Published and Cited by Year

Year	Number published	Number of citations
2001	2	40
2002	11	74
2003	14	12
2004	17	8
2005	1	-
Total	45	134**

*Includes 4 book chapters: 2 published in 2003; 1 published in 2004

**Includes 12 self-citations

Over one-third of the grantees (n=19, 40.4%) published a total of 40 articles as lead author that were cited by journals a total of 123 times from 2001 to 2005 (see Table 7).

Table 7 Number of R03-Related Articles Published with Grantee as Lead Author

Grantee	Number published	Number of citations
1	1	1
2	2	1
3	2	2
4	5	68
5	2	7
6	2	3
7	3	4
8	2	9
9	4	2
10	2	4
11	1	-
12	2	1
13	3	2
14	1	-
15	1	-
16	3	18
17	1	-
18	2	-
19	1	1
Total	40	123*

*Includes 12 self-citations

Impact factors. To further assess the value of the scientific research put forth by the grantees, a review of journal impact factors was conducted to augment the bibliometric analysis. Unlike a bibliometric analysis, which centers on interrelationships between authors, journals, and disciplines, an impact factor is a “measure of the frequency with which the ‘average article’ in a journal has been cited in a particular year or period” and can be used for ranking, categorizing, and comparing journals. The annual impact factor is a ratio between citations and recent citable items published, calculated by dividing the number of current year citations by the source items published in that journal during the previous two years. The citation data used to calculate the annual journal impact factors are compiled by the Institute for Scientific Information (ISI) and are published annually in the *Journal Citation Reports* (JCR).

Using impact factors to assess scientific quality of research should be done prudently with a full understanding of various caveats and resulting limitations in drawing conclusions. First, it is important to be mindful of the fact that an impact factor is a measure of citations to a journal only and not a measure of the quality of an individual author’s work. Secondly, because scientific fields have different citing patterns, journal impact factors should only be compared among disciplines not across disciplines. Typically, high impact factors are likely in journals covering large areas of basic research with rapidly expanding but short-lived literature that use many references per article (O Seglen, 1997). In addition, since emerging fields tend to develop quickly, researchers in those fields are more inclined to publish and cite more literature resulting in a much lower impact factor as compared to basic science, since ISI journal impact factors only contain journal citations not book citations. Finally, new journals – including journals that have undergone a name change – will not be included in ISI citation data for at least three years.

An overall five-year average journal impact factor of 2.44 was calculated for journals publishing the grantees' R03-related articles. The average was based on 31 of 41 journals in which grantees published their R03-related articles for which JCR publishes annual impact factor information (a full summary can be found in Appendix G). To provide a frame of reference to compare the average impact factor for journals publishing the R03-related articles, additional five-year average journal impact factors were calculated for similar discipline categories within the field such as: (1) Medicine: General and Internal; (2) Nursing; (3) Oncology; (4) Psychology; (5) Neurology; (6) Public, Environmental, and Occupational Health; and (7) Sociology (see Table 8).

Table 8 Average Impact Factors for Comparable Categories of Journals

Discipline Category	Number of Journals with an Impact Factor	Average Impact Factor*
Clinical Psychology	82	1.189
Clinical Neurology	135	3.980
Medicine, General & Internal	63	2.952
Nursing	31	0.877
Oncology	119	3.408
Public Environmental & Occupational Health	51	2.040
Sociology	93	1.615

Note: Averages were calculated using annual impact factor from JCR across 5 years

The overall average impact factor of 2.44 for journals publishing the R03-related articles is within the range of average impact factors for similar discipline categories (0.877 to 3.980), indicating that grantees were publishing their work in journals of comparable quality. Keeping in mind the caveats discussed previously regarding the use of impact factors, it is significant to note that, although the overall impact factor for R03-related journals (2.44) seems low, it is greater than those for 4 of the 7 comparable discipline categories. This suggests that grantees published their work in journals of similar visibility and have an equivalent opportunity to be viewed by potential citers.

Bibliographic analysis (non-R03-related publications and presentations). The bibliographic analysis was conducted using information from grantees' curricula vitae (n=47) about their publication histories. Using the Medical Subject Heading (MeSH) terms provided as part of PubMed (an archive of biomedical and life sciences journal literature), articles not related to the grantees' R03 awards and published from 1999 to 2005 were compiled and classified as being related to behavioral research (BR) in cancer control (CC). The bibliographic information was further classified into the categories represented in Table 9 below, namely:

- Articles published 1999 to the present
- Articles published with grantee as lead author

- Articles published related to behavioral research in cancer control (BRCC)
- Articles published related to BR CC with grantee as lead author

As shown in Table 9 below, from 1999 to 2005 all grantees participating in the evaluation to date (n=47) had been active in publishing in the field, as evidenced by a total of 701 articles. Well over one-half of the grantees' (n=476, 67.9%) publications were related to behavioral research in cancer control and over one-half (n=298, 62.6%) of these articles related to behavioral research in cancer control were as the lead author.

The 701 non-R03-related articles published by grantees were published in 315 journals covering 125 disciplines. The titles of journals and the main disciplines in which grantees most frequently published their non-R03-related articles are listed below (a full summary of the journal titles and disciplines can be found in Appendices H and I).

Journal Titles

- *Addictive Behaviors*
- *American Journal of Public Health*
- *Cancer Control*
- *Chest*
- *Psycho-Oncology*
- *Journal of Behavioral Medicine*
- *Health Education*
- *Journal of Clinical Oncology*
- *Preventive Medicine*
- *Food and Nutrition Bulletin*

Journal Discipline

- Drug Abuse and Alcoholism
- Obstetrics and Gynecology
- Oncology
- Psychiatry and Neurology
- Public Health and Safety
- Psychology

Table 9 Summary of Grantee Publication History 1999 to the Present for Non-R03 related Articles

Grantee	Articles published from 1999–present	Articles published with grantee as lead author	Articles published related to Behavioral Research in Cancer Control (BRCC)	Articles published related to BR CC with grantee as lead author
1	15	10	3	1
2	19	19	1	1
3	49	4	18	1
4	4	0	3	0
5	22	11	4	1
6	20	13	11	5
7	5	1	3	1
8	3	2	3	2
9	14	8	9	3
10	5	1	2	1
11	15	6	9	4
12	17	5	8	3
13	28	19	23	15
14	9	3	2	1
15	26	11	3	2
16	15	3	6	2
17	19	4	18	4
18	4	3	0	0
19	14	10	13	8
20	13	4	4	2
21	59	16	33	9
22	12	7	3	2
23	13	6	13	4
24	13	4	7	2
25	6	2	4	0
26	29	12	22	9
27	21	6	26	6
28	43	2	6	1
29	11	5	9	4
30	1	0	0	0
31	9	4	3	4
32	27	3	7	0
33	10	1	9	0
34	12	4	2	0
35	3	0	3	0
36	5	2	5	2
37	0	0	0	0
38	26	9	14	17
39	18	16	19	12
40*	19	8	12	5
41*	4	4	2	2
42*	8	2	8	2
43*	7	3	4	1
44*	13	4	7	2
45*	4	2	4	2
46*	4	2	4	2
47*	7	2	7	2
Total	701	286	476	298

*Grantees included in the pilot study

As shown in Table 10, grantees were actively publishing in the years following the completion of their R03 grant award. Almost one-half of the grantee publications (n=348, 49.6%) were published in the years following completion of the grant (2002 to 2005).

Table 10 Summary of Publication for Non-R03-Related Articles by Year

Year	Number published
1999	83
2000	100
2001	94
2002	91
2003	125
2004	114
2005	18
Not available	76
Total	701

Based on grantees' productivity overall, the impact of the Small Grants Program within the R03 sponsorship and within the behavioral research field in cancer control more generally was found to be noteworthy. The findings from the analysis of grantee publication histories strongly suggest that the Small Grants Program serves as a catalyst for grantees to focus and continue their research within the field of behavioral research in cancer control.

It is important to note that all the grantees participating in the evaluation (n=47) had either published an article, had one in press or in preparation, or had given a presentation on their R03 topic at a professional conference highlighting their grant-related research activities. The most significant findings regarding the grantees' research activities are:

- 72.3% (n=34) of the grantees published or had in press at least one article resulting from their R03 grant.
- Of these, 40.4% (n=19) published at least one article as a lead author.
- Published articles by the R03 grantee were cited a total of 134 times, while those published with the grantee as the lead author were cited a total of 123 times in 85 journals (with less than 10% being self-citations).
- Publications (including those in press) were accepted by 41 different journals covering 32 disciplines.

Considering the grantees' research activities beyond the R03 grant provides further details through which to evaluate the impact of the program in a broader scope. During the grant cycle (1999 to 2001) and three years after the award, grantees published a total of 701 articles, with over one-half of these (53.6%) related to behavioral research and/or cancer control. Approximately 42% of the articles were related to behavioral research and/or cancer control with the grantee as the lead author. In addition, the 701 articles were accepted by 125 journals covering 315 disciplines. Most notable is the fact that almost one-half of the total 701 non-R03 articles were published in the subsequent years following the

end of the grant cycle, which suggests that R03 grantees continue as Principal Investigators within the field of behavioral research in cancer control.

Perceived Impact of the Small Grants Program

A strong consensus existed among both the grantees and the mentors interviewed concerning the significance of the Small Grants Program, particularly the positive impact it had on grantees' research careers in the field. Both grantees and mentors viewed the program as having an important impact on the careers of new investigators because it provides funding opportunities for either investigators at an early stage in their careers or established investigators who have changed focus, two groups of investigators who are at a disadvantage in the typical NIH grant program. The program allows grantees to obtain funding for their research and establish a track record within a new field. Beyond the direct impact on their careers, both groups felt the R03 served as a "confidence booster" and as a source of "legitimacy." In addition, it was noted that the Small Grants Program provides an important opportunity for investigators to network with other professionals in the field and, more importantly, to develop relationships within the National Cancer Institute. For young investigators, both the grantees and mentors stressed that the R03 grant program is particularly valuable in providing an opportunity for grantees to gain experience in grant writing and become familiar with the NIH grant application process.

Emphasized by both grantees and mentors, the most significant impact of the Small Grants Program on the careers of new investigators was the fact that it provided an opportunity to collect pilot data, something that is becoming increasingly important in securing R01 grants. An overwhelming majority of grantees (96%) said they would recommend that others apply for an R03 and described it as an ideal mechanism for junior investigators to fund well-defined short-term projects, such as a pilot or developmental study in new areas of inquiry that have the potential to develop into larger R01 research projects.

From the mentors' point of view, most study sections within NIH require pilot data to support an R01 application, and currently the options for funding efforts to collect preliminary data are limited. The R03 award is one of the few options available to fund collection of pilot data in support of a subsequent R01 application or other funding opportunities. The R03 thus can be "*an important bridge to allow new investigators to continue this innovative work with an R01.*" The grantees and mentors interviewed agreed that this mechanism was an important opportunity for both junior and established researchers to build their research careers.

The mentor interview protocol included an additional focus on the impact of the Small Grants Program on the field as a whole. Specifically, respondents were asked "what in their view was the value of the R03 in moving the field of cancer control forward?" The key benefit to the field identified by the mentors interviewed was the focus of the grant on funding innovative projects that "*may be a little riskier and not quite ready for an R01.*" In the respondents' view, the specific focus of the R03 on innovative

research has been significant in bringing potentially pioneering studies to the field. Further, according to one respondent, the R03 mechanism is important:

“[in] building a new generation of cancer control researchers [by] encouraging young or new investigators to be thinking about new ideas rather than funding established investigators doing more conventional research, such as a follow-up survey that serves to build on their existing theories or body of research just a little bit.”

In addition, it was noted how the R03 “*encourages investigators to take a multidisciplinary approach in looking at the problem of cancer prevention, promoting looking for new ways in which to ask questions.*” The interdisciplinary nature of the R03 grants was a strong theme throughout the mentor interviews. The majority of mentors viewed the R03 grant projects as multi- or interdisciplinary. One mentor noted that the project he/she was involved in was interdisciplinary in nature in that it involved “*psychology, medical oncology....exercise experts, physiologists, people in sports medicine, so it was a broad project.*”

Lastly, a majority of the grantees highlighted the value of the Small Grants Meeting in facilitating interaction and encouraging collaboration with other investigators in the field. Particularly, many felt that this meeting gave them the opportunity to share data with researchers in interactions that might lead to future collaborations. Grantees also stated that simply having been awarded an R03 was key to increasing their interactions with other investigators in the field, mainly because having some pilot data gave them “legitimacy” or a substantive basis from which to initiate and develop contacts.

Suggested Improvements to Grant Oversight of the Program

Grantees’ perception of and experience with the Small Grants Program was closely aligned with whether or not their Program Officer was available, knowledgeable, and responsive not only during the application process but throughout the grant cycle. The key recommendation for change in the Small Grants Program – put forward by grantees both satisfied and dissatisfied with the program oversight – was that NCI provide additional support in terms of contact with Program Officers, training, and ongoing support. A majority of grantees expressed the view that it would have been very helpful to have had a more formal structure for regular communication with Program Officers in order to facilitate the addressing of obstacles and the receipt of feedback. Grantees strongly emphasized that, since most of them are young investigators, it is important to provide training at the beginning of the grant in areas such as budgeting, grant management, and how to engage the Program Officer. Finally, grantees felt the additional support should not only be provided during the application process but also throughout the grant cycle.

Aside from the funding issue, other important recommendations included (1) increasing the grant budget; (2) increasing the length of the grant term; (3) encouraging more interest on the part of NCI staff in the research topics they choose to fund; and (4) making the award more widely available.

Both grantees and mentors said they would like to see an increase in the grant budget. Speaking from their own experience, the grantees found the level of funding to be limiting because it was not sufficient to cover a majority of their time. This meant they were forced to find additional support, which created challenges in managing both the R03 research and their time.

“...wish there had been more funds available for salary support, so more of my effort could have been devoted to the project rather than juggling multiple projects.”

In addition, grantees felt that for projects involving clinical work requiring additional staff or equipment, the R03 *“funding can be very limiting.”* The mentors overwhelmingly stressed the need to increase both the R03 award funds and the grant period, reflecting their feeling that the costs associated with this type of clinical research or the collection of pilot data are quite high and that the current funding of the R03 limits what new investigators are able to do.

A more significant concern among the mentors was the two-year grant term. Most felt this was much too short a time in which to complete a study. One of the problems that arises with the short grant term is that:

“it’s very hard, especially for clinic-oriented research, to get the thing off the ground – especially if you are coming into something that is really different than what you have done before, which is really the intention; that is going to take a longer period of time than someone who already has a protocol in place.”

All mentors suggested extending the grant term from two to three years as a better reflection of the time and effort involved in conducting clinical research and facilitating the process of bringing these innovative studies to fruition. Two of the mentors noted in particular that behavioral or intervention research was different from other types of research (e.g., laboratory research) in that it takes substantially longer, and two years was insufficient to get everyone on board, train staff, recruit subjects, implement the project, collect and analyze the data, and make a final report. Added to this are considerations about the Health Insurance Portability and Accountability Act (HIPAA) and human subjects’ protection that can require additional time to get this type of research *“off the ground.”*

A number of grantees expressed the opinion that they would like to see more interest on the part of NCI staff in the research topics they choose to fund. In other words, NCI staff could serve as a resource and an advocate for continuing the grantees’ research in the future.

“...oversight during the R03 grant went well...however, the difficulties faced in obtaining subsequent funding has been discouraging; would have preferred more feedback and involvement from my project officer.”

Several of the mentors wondered if the R03 mechanism was not well enough known among investigators and suggested that NCI might do more to publicize it.

Lastly, the mentors expressed the view that it was important to make the R03 more widely available and easier to apply for than it is currently in order to maintain the program's original intent of facilitating development of new investigators in the field. Mentors noted how smaller grants like the R03 are "*becoming so much more competitive*" because of the increasing competitiveness of the R01 grants and decreases in the NIH budget overall. Specifically,

"with lowered budgets and the fact that money is getting tighter with the bigger grants, the small grants, which are meant to be easier to get, are becoming as competitive as those aimed at senior investigators so they need to make more opportunities available to fund more of the R03 grants."

Because the R03 is one of the only grant funding opportunities geared to new investigators, it was strongly recommended that either more small grant funding opportunities be created or that more R03 awards be funded in order to preserve the overall intent of the Small Grants Program. One mentor has become more cautious in recommending R03s to junior investigators because they have become so competitive that they are now nearly as much work to obtain as an R01, yet the funding level is much lower, making the R03 much less desirable than in the past.

Grant Reviewer Background and Characteristics

An assessment of the success of the Small Grants Program in fostering new investigators in the field of behavioral research in cancer control and in supporting innovative projects responsive to emerging areas of science cannot solely rely on grantee career advancement as a measure of effectiveness. Instead such an assessment should also include a broader view of the program, in particular the grant application review process. An important consideration is whether the scientists serving on the special study section within NCI have the appropriate "expertise" to do so since their reviews of the scientific merit of applications is a significant factor in the determination of which projects are funded. The measurement of grant reviewer "expertise" was accomplished by comparing the Center for Scientific Review (CSR) criteria for study section service selection against the Small Grants Program reviewer characteristics. Findings from an examination of how well the reviewers' characteristics match up with certain selected general, expertise, and section-specific requirements of the CSR selection criteria are outlined in Table 11.

**Table 11 Summary of Center for Scientific Review Study Section
Selection Criteria and Associated Outcome Measures**

CSR selection criteria	Reviewer characteristics
<i>General</i>	
Recognized authorities in their field	<ul style="list-style-type: none"> • Research focus • Publication history • Grant funding history
A Principal Investigator (PI) on a research project comparable to those being reviewed	<ul style="list-style-type: none"> • Grant funding history
Diversity with respect to geographic distribution, gender, race, and ethnicity	<ul style="list-style-type: none"> • Institutional affiliation • Geographical location by HHS regions
<i>Expertise</i>	
Study section should have appropriate expert representation	<ul style="list-style-type: none"> • Research focus • Publication history
<i>Study Section Specific</i>	
Breadth of science, multidisciplinary or interdisciplinary nature of the applications, and the types of applications or grant mechanisms being reviewed should be factored into the selection of appropriate members	<ul style="list-style-type: none"> • Research focus • Publication history

An appraisal and descriptive analysis of reviewers’ characteristics in these areas – including background, main research focus, institutional affiliation, and publication and funding histories – was conducted based on 62 reviewers serving on 6 special study sections from May 1999 to May 2002.

Reviewer selection criteria. Some fundamental aspects of a reviewer involve being a “recognized authority” with a research focus/expertise in the field of behavioral research in cancer control, a comprehensive publication history in disciplines relevant to the field, and a reputable history of obtaining funding for projects comparable to the R03.

All of the reviewers’ primary research focus was in the field of behavioral research in cancer control. Additionally, their research focus was cross-walked to one or more of the nine program areas designated by NCI as funding priorities for the Small Grants Program (see Table 12).

Table 12 Summary of Reviewers’ Research Expertise*

NCI Program Areas Priorities	Number of Reviewers	%
Applied Cancer Screening	7	11.3
Basic Bio-behavioral Research	16	25.8
Applied Health Monitoring, Methods and Outcomes Research	6	9.7
Health Communication and Informatics	10	16.1
Health Disparities Research	11	17.7
Health Promotion Research	16	25.8
Survivorship	9	14.5
Surveillance Research	3	4.8
Tobacco Control Research	9	14.5

*Reviewers’ research focus was cross-walked with the nine program areas designated in the current Small Grants PAR

The various areas of focus for the reviewers are reasonably distributed among NCI's nine program areas, with the majority concentrating in basic biobehavioral (25.8%) and health promotion (25.8%) research followed by health disparities (17.7%), health communications (16.1%), survivorship (14.5%), and tobacco control (14.5%). The distribution of reviewers' research focus not only speaks to the relevance of their expertise as qualifying them to serve on the special study sections but also highlights the "breadth of science" represented on each of the six study sections.

The reviewers published a total of 582 articles in 277 journals covering 47 separate disciplines, an average of approximately 10 articles per reviewer. The main disciplines of the journals in which reviewers most frequently published their articles are presented in Table 13. It is important to note that the reviewers' research expertise as reflected by the concentration of journal disciplines (i.e., oncology, psychology, nutrition and dietetics, etc.) represent the variety of academic, scientific, and public health disciplines from which the program intended to encourage new investigators and key priorities in behavioral research.

Table 13 Summary of Journal Disciplines Reviewers Most Frequently Published*

Discipline	Number of articles published	%
Oncology	71.00	13.0
Psychology	59.00	10.8
Public Health	50.00	9.17
Medical Sciences	44.00	8.07
Nutrition and Dietetics	31.00	5.68
Biology Biochemistry	28.00	5.13
Psychiatry	27.00	4.95
Drug Abuse and Alcoholism	26.00	4.77
Biology Microbiology	19.00	3.48
Biology Cytology	15.00	2.75
Nursing	15.00	2.75
Tobacco	14.00	2.57
Pediatrics	12.00	2.2
Social Services	10.00	1.83
Endocrinology	8.00	1.47

*A total of 582 articles were published in 277 journals covering 47 disciplines. The table summarizes the top 15 disciplines.

An important characteristic that underscores the reviewers' expertise in the field is their history of obtaining funding for comparable projects. Approximately 70% (n=42) of the reviewers had an established history of grant funding totaling 186 awards among them, with an average of 4 grants per reviewer. The awards spanned a variety of grant mechanisms offered by NIH including research grants, service awards, fellowships, career development, program/center projects, training, general clinical cooperative agreements, among others (see Table 14). The majority of the reviewers were funded through the traditional research grants, specifically the R01 (41%) and the R03 (7%) and general clinical research center grants such as the M01 (13%).

Table 14 Number of Past and Current Grants Awarded to Reviewers

Type of Mechanism	Number of Grants	Number of Current Grants
A03	1	-
A11	1	-
D08	1	-
D10	1	-
D18	1	-
D23	1	-
E04	1	-
F32	1	-
K07	1	-
K30	1	1
L40	1	-
M01	24	-
N01	4	-
N43	1	-
P01	5	1
P30	4	1
P42	1	-
P50	5	1
R01	76	15
R03	13	-
R13	4	-
R18	6	-
R21	7	2
R23	1	-
R25	4	-
R43	1	-
R44	1	-
R55	1	-
S07	3	-
T32	2	2
U01	8	4
U10	2	1
U24	1	1
U48	1	-
Total	186	29

Based on information available for 42 of the 62 reviewers.

Once more, the reviewers’ overall grant funding history not only attests to their qualifications to serve on the special study sections generally but also serves as a good measure of the appropriate “expertise” and the “breadth of science” representation desired among reviewers serving on the special study sections.

As a general requirement, the CSR criteria include diversity among the study section members including geography, gender, race, and ethnicity. Only information on the reviewers’ institutional affiliation and the geographical location of their home institution was available to assess the diversity of the special study sections. As shown in Table 15, members of the study sections represented an assortment of organizations in academia, policy, and advocacy. As would be expected, a majority of the study section members were researchers working in academic research institutions including universities (37%), schools of medicine (35%), and schools of nursing (3%). The remaining members were divided

relatively equally among advocates from foundations, associations, and the community (15%) on the one hand and federal policy makers (9%) on the other.

Table 15 Summary of Reviewers' Organizational Affiliation Type and Year

Organization Type	May '99	Oct '99	May '00	Oct '00	Jan '01	May '02	Total	%
University	2	4	5	4	10	4	29	36.7
Medical Center/ School of Medicine	6	4	3	2	8	5	28	35.4
School of Nursing	-	-	1	-	1	-	2	2.5
Federal Agency	-	-	2	2	2	1	7	8.9
Hospital	-	-	-	1	-	-	1	1.2
Advocate	-	2	1	1	5	3	12	15.1
Total	8	10	12	10	26	13	79	

A secondary feature of diversity is the geographic distribution of the reviewers' home institutions. As shown in Table 16, each of the special study sections across all years included reviewers located in states from all 10 Health and Human Services (HHS) regions, with the largest number of reviewers coming from Regions IX (mainly California), III (central east coast), IV (southeast), and V (midwest).

Table 16 Geographical Distribution of Reviewers' Home Institution by Year

HHS Regions	May '99	Oct '99	May '00	Oct '00	Jan '01	May '02	Total	%
Region I	1	-	1	1	1	2	6	7.5
Region II	-	1	-	-	2	1	4	5.1
Region III	-	-	3	4	6	4	17	21.5
Region IV	1	3	1	-	6	-	11	13.9
Region V	-	-	5	2	1	-	8	10.1
Region VI	1	1	-	2	2	2	8	10.1
Region VII	-	-	-	-	1	-	1	1.2
Region VIII	1	-	-	-	1	-	2	2.5
Region IX	4	5	2	1	6	3	21	26.6
Region X	-	-	-	-	-	1	1	1.2
Total	8	10	12	10	26	13	79	

Meeting the emerging areas of behavioral research. An issue equally important in assessing the effectiveness of the Small Grants Program is whether the expertise of the reviewers in the study sections is reflective of the emerging areas within behavioral research in cancer control and funding priorities designated by NCI and its Behavioral Research Program (BRP). One way to gauge capacity of the study sections to be responsive is to compare reviewers' areas of expertise to the challenges identified in the 1997 *New Agenda for Cancer Control Research: A Report of the Cancer Control Review Group* and further to link these challenges to the overall *Scientific Priorities in Cancer Research and Extraordinary Opportunities for Investments* outlined in the *National Plans & Priorities Report for fiscal year 2001*.

The critical challenges and opportunities outlined in the *New Agenda for Cancer Control Research* with the intended outcome of strengthening the "conduct of basic and applied research in the behavioral, social, and population sciences to create or enhance interventions that, independently or in

combination with biomedical approaches, reduce cancer risk, incidence, morbidity, and mortality” are summarized below.

- Create a unit focused on basic behavioral and social research in cancer control
- Create a research focus in informatics and communication
- Establish programs that recognize the role of behavioral prevention throughout the lifespan (e.g., tobacco control)
- Increase integration of and support for cancer screening research
- Create a research focus on rehabilitation and survivorship
- Establish links to various health care delivery systems
- Expand cancer surveillance and produce a “Cancer Report Card”
- Maintain strong support of the Biometry and Applied Research Branches within the Division of Cancer Control and Population Science
- Focus research efforts on underserved populations and those with a disproportionate cancer burden
- Expand training in cancer control research

The extraordinary funding opportunities presented in the *National Cancer Institute’s National Plans & Priorities Report for fiscal year 2001* are:

- Genes and the environment
- Cancer imaging
- Defining signatures for cancer cells
- Molecular targets for prevention and treatment
- Research on tobacco and tobacco related products
- Cancer communications informatics

The challenges outlined in the 1997 *New Agenda for Cancer Control Research: A Report of the Cancer Control Review Group* are allied with several of the overall *Scientific Priorities in Cancer Research and Extraordinary Opportunities for Investments*, chiefly in the areas of tobacco and tobacco-related products, genes and the environment (specifically in cancer screening), and cancer communication research. One aspect of achieving both these specific research goals in behavioral research in cancer control and the extraordinary opportunities to enhance the understanding of cancer is to fund more investigator-initiated research in areas of emerging trends. Although the R03 Small Grant is not the only or the most predominant funding mechanism available, it does play a role in meeting these research priorities to move the field forward. As such, it is important to note that all the reviewers serving on the special study sections specialized in an area of expertise pertinent to many of these key priorities. Expertise in biobehavioral research, health communications and informatics, health promotion, applied

cancer screening, health disparities, and survivorship seems well-suited to a function of reviewing applications and making assessments on the scientific merit, while remaining mindful of both the key research priorities and the extraordinary opportunities in cancer control.

V. Summary of Findings

The findings from this evaluation are quite promising with respect to the ability of the Small Grants Program to fulfill its original intent, not only in terms of fostering the career development of new investigators by providing funding opportunities and encouraging further research, but also in terms of enhancing progress in the field of behavioral research in cancer control through funding “innovative” or “developmental” research. A summary of the key findings from the evaluation are presented below.

- ▶ A majority of the R03 grantees interviewed have a Ph.D. (93%), are affiliated with a university or university medical school (80%), and consider themselves junior investigators in the field of behavioral research in cancer control (59%).
- ▶ Approximately 60% of the grantees interviewed described learning about the R03 program primarily through “other” sources (60%), specifically NCI’s website. Grantees emphasized the ease with which they were able to locate NCI’s website and access information about the program, suggesting that NCI has been successful in improving the visibility of the Small Grants Program to new investigators.
- ▶ The Small Grants Program was a significant factor in supporting grantees in continuing their respective lines of inquiry within the field as reflected by their post-award activities – such as obtaining additional funding (particularly R01), publishing within the field, conducting presentations and attending meetings – to continue as a Principal Investigator in behavioral research in cancer control.

Post-Award Grantee Funding

- A total of 197 grant applications were submitted by grantees to fund behavioral research in cancer control.
 - Approximately 40% (n=73) received funding.
- A total of 75 grant applications were submitted to NIH to fund research directly related to grantees’ R03 research.
 - 40% (n=30) of these applications received funding.
 - Of the funded applications 80% (n=25) were for an R01.

Post-Award Grantee Research Activities

- 91% of grantees interviewed considered their research to be interdisciplinary.
- 70% of grantees interviewed reported that the R03 award has encouraged them to engage in further Principal Investigator (PI) work.
- Approximately 80% of grantees interviewed reported that the R03 award both encouraged and increased the number of grantee publications, presentations, and meetings attended.
- 83% of grantees interviewed felt the R03 award encouraged and increased interactions with other researchers in the field.

Post-Award Grantee Publication History

- 72.3% (n=34) of the grantees published or had in press at least one article resulting from their R03 grant.
 - Of these, 40.4% (n=19) published at least one article as a lead author.
 - Published articles by the R03 grantees were cited a total of 134 times, while those published with the grantee as the lead author were cited a total of 123 times in 85 journals (with less than 10% being self-citations).
 - Grantee publications (including those in press) were accepted by 41 different journals covering 32 disciplines.
- A majority of both the grantees and the mentors interviewed stressed the significance of the Small Grants Program, particularly the positive impact it had on grantees' research careers in the field.
- A majority of both the grantees and mentors viewed the program as having an important impact on the careers of new investigators because it provides funding opportunities, particularly in supporting pilot studies, for either an investigator at an early stage in their career or an established investigator who has changed focus.
- 96% of the grantees interviewed said they would recommend that others apply for an R03 and described it as an ideal mechanism for junior investigators to fund well-defined short-term projects, such as a pilot or developmental study in new areas of inquiry that have the potential to develop into larger R01 research projects.
- Despite recommendations to improve the program oversight, a majority of the grantees interviewed were satisfied with the support provided by their Program Officer prior to and during the grant award.
- All of the grantees interviewed found the initial Small Grants Meeting to be an opportunity to interact with fellow researchers and foster future collaborations.
- The grant reviewers were found to have the appropriate "expertise" to make judgments regarding scientific merit. Their respective backgrounds corresponded well with the criteria espoused by the Center for Scientific Review (CSR) in terms of being a recognized authority in the field, having a notable publication history, and having a reputable history of obtaining NIH grant funding.

VI. Discussion

Although a key focus of this evaluation was to assess the impact of the R03 grant on the careers of new investigators in the field of behavioral research in cancer control, an equally important dimension of this assessment is determining the effectiveness of the Small Grants Program as a whole. This evaluation not only entailed assessing “effectiveness” by examining a variety of outcome measures – such as grantees’ post-award activities (e.g., continuation of research, publications, and collaborations), composition of study sections and expertise of reviewers, and perceived value of the research – but also by looking at how well these various components work together in meeting the goals of the program, namely attracting and fostering new investigators in the field by supporting innovative research in emerging areas of behavioral science, as well as supporting the broader priorities of NCI.

The preponderance of information obtained from both the grantee surveys and the mentor interviews strongly supports the view that the Small Grants Program is significant, particularly in providing investigators in the early stage of their careers with the opportunity to obtain funding for their “independent” research work, as well as providing them with an opportunity to conduct innovative research. In the views of grantees and mentors alike, this is particularly important because of the increasing competitiveness of the R01 grants, as dwindling funds render it increasingly difficult for new investigators to obtain funding.

The Small Grants Program was also found to be a significant impetus for new investigators to continue their research activities in the behavioral field by offering critical support to their career development. A majority of grantees and mentors felt that this program allows an investigator to establish a track record within the field, that it supports the exploration of new approaches and ideas, and that it encourages further Principal Investigator research. A particularly valuable aspect of the program is its intent to fund smaller studies collecting pilot data to support future funding such as an R01. The large number of NIH applications (n=75) submitted by new investigators to continue their R03 research, an average of approximately 2 per grantee, highlights the usefulness of the program in supporting the continuation of grantees’ research activities and lines of inquiry in the field of behavioral research in cancer control.

In the views of both grantees and mentors, the Small Grants Program also encourages further research as indicated by increased number of publications and presentations among grantees, the fostering of new research questions in the area of cancer control, the encouragement of more behavioral-focused research, and the provision of opportunities to interact with researchers within the field. These views are supported by the results from the analysis of grantees’ R03 and non-R03-related research activities. All of the grantees actively sought audiences for their R03 research, either through publication of their results in

a journal or through presentation at a professional conference. In the years following the conclusion of the grant cycle, grantees published 57 articles, had 32 articles in preparation, and gave 91 presentations on their R03 research. It is noteworthy that grantees published their R03 research in high-quality journals in the field and that their work has the potential to be viewed by possible citers, as indicated by the overall average five-year impact factors. Beyond the assessment of the grantees' post-award activities, one of the strongest endorsements of the program comes from the fact that all the grantees felt that, without the R03 funding, they would not have been able to conduct and continue their research.

The success of the grantees in continuing their respective lines of inquiry within the field as reflected by their post-award activities – such as obtaining additional funding (particularly R01) to continue as a Principal Investigators in behavioral research in cancer control – points toward the overall efficacy of the program oversight including the grant review process. The efficacy of the program was a central facet of the evaluation, i.e., exploring the quality of the special study sections since from these committees come judgments of scientific merit that have implications for the research priorities funded. It is important to emphasize that the grant reviewers' background and characteristics matched well with the Center for Scientific Review criteria in terms of being a recognized authority in the field, having a notable publication history, and having a reputable history of obtaining NIH grant funding. The Small Grants Program oversight process was also a key element, with the program having been successful in encouraging new investigators to apply for the R03 by increasing the program's visibility and simplifying access to information through the use of technology, such as NCI's website. Project Officers also provided worthwhile guidance during the grant period.

This evaluation has been able to demonstrate the value of the Small Grants Program by highlighting its success in fostering new investigators in the field through offering opportunities and support in “bringing potentially pioneering studies to the field.” The program has been critical in moving the field of behavioral research in cancer control forward and aligning its research priorities with the broader priorities of the National Cancer Institute, resulting in the funding of research with promise beyond the R03 program.

VII. Recommendations

The evaluation of the Small Grants Program provided a strong basis for continuation of the RFA for the next funding cycle (FY2006), as well as several recommendations for reformulation of the program. Some of the key recommendations to improve the existing program and future research are listed below.

Program

- ▶ **Re-institute the requirement that grantees have a mentor during the cycle of the grant.** A majority of the grantees found having a mentor valuable, not only in advising them about their future career development (i.e., developing long-term funding strategies and setting priorities for securing funds) but also in providing technical guidance.
- ▶ **Conduct a Small Grants Meeting annually instead of once at the outset of the award.** The grantees strongly emphasized how the Small Grants Meeting played a key role in their overall success with their grant and overwhelmingly recommended that the meeting occur annually.
- ▶ **Have NCI Project Officers provide more technical assistance.** Although a majority of the grantees were satisfied with the overall grant oversight, a majority felt more technical assistance in regard to administration of the grant would have greatly benefited them and made the grant process easier.

Future Research

- ▶ An opportunity for future research is to further examine the alignment of the R03 projects funded with NCI's strategic research and funding priorities. This evaluation was only able to assess the "expertise" of the reviewers and their capacity to evaluate applications within the behavioral research disciplines, but not the actual results of their review and how well their selections align with strategic research and funding priorities. It would further be beneficial to explore the articulation between R03 and R01 grants, that is, the subsequent success of R03 projects in being funded at the R01 level.

APPENDICES

Appendix A

Appendix A – Summary of Evaluation Activities

Key Project Markers/Deliverable Description	Date completed
Submitted revised evaluation plan with new design	August 1, 2004
TOO acceptance of evaluation plan	August 10, 2004
Prepared and submitted IRB package	August 13, 2004
Develop and maintain grantee post award database	September 20, 2004- December 15, 2005
Conducted grantee pilot study (including drafting and sending recruitment letter, and scheduling and conducting survey interviews)	September 20-October 20, 2004
Data collection for pilot grantee bibliometric study	October 1-December 31, 2004
Conducted mentor pilot study (including drafting and sending recruitment letter, scheduling and conducting survey interviews)	October 1- October 31, 2004
Analysis of grantee pilot survey data and preparation of interim report	November 20, 2004
Prepared OMB clearance package	December 2 2004
Submitted final OMB clearance package to TOO for submission and approval	January 13, 2005
Conducted a full bibliometric study of grantees (includes drafting and sending request for curricula vitas, follow-up, and processing information)	January 28-February 20, 2005
Prepared and submitted final bibliometric pilot study report	March 4, 2005
Prepared and submitted final mentor pilot study report	April 8, 2005
Submitted an interim evaluation report with preliminary results to TOO and NCI (including results from both grantee and mentor pilot studies and final results of bibliometric analysis of all grantees)	April 26, 2005
NCI internal funding meetings	May 10-14, 2005
Conduct analysis of grantee reviewer characteristics	July 1- September 15, 2005
Received OMB approval	July 30 2005
Conducted grantee survey study for all remaining grantees	July 31-September 20, 2005
Requested and granted a no-cost extension due to delay in OMB approval process	August 10, 2005
Conducted all data analysis (including qualitative and quantitative analysis of grantee survey data, reviewer characteristics, and updating pilot study data and bibliometric analysis)	October 31, 2005
Prepared draft final report to TOO and NCI Evaluation Advisory Group for review and comments	November 17 2005
Submitted final report following incorporation of feedback from TOO and NCI Evaluation Advisory Group	December 15, 2005

Appendix B

Appendix B - Interview Guide for NCI-Funded R03 Principal Investigators

OUTCOME EVALUATION OF THE SMALL GRANTS PROGRAM FOR BEHAVIORAL RESEARCH IN CANCER CONTROL

Verbal Informed Consent for Grantees funded by the NCI R03 Small Grants Program

<u>Respondent Name:</u>	<u>PA Number:</u>
<u>Interviewer:</u>	<u>Grant Number (Year 1):</u>
<u>Date and Time:</u>	<u>Grant Year:</u>

Estimated Time of Interview: 30 minutes

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. **An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.** Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: NIH, Project Clearance Branch, 6705 Rockledge Drive, MSC 7974, Bethesda, MD 20892-7974, ATTN: PRA (0925-xxxx*). Do not return the completed form to this address.

Interview introduction: We appreciate your taking time to talk to us today. You may recall, we scheduled an appointment with you for this interview a few weeks ago. Is this still a good time for you?

- If NO: Reschedule the telephone call.
- If YES: Proceed with introduction.

Battelle has been asked by the National Cancer Institute (NCI) to evaluate the Division of Cancer Control and Population Science's Small Grants Program (R03) for Behavioral Research in Cancer Control. The interview will take about 30 minutes to complete. Please be informed that Battelle will maintain all of the information you provide in confidence. The information you provide will not be reported in any way that reveals your identity or occupational identifiers. You may refuse to answer any of the questions in this interview. The outcomes to be evaluated will include continuation of grantee research in cancer control, publications, presentations, field interactions, and program administration. We are interested in understanding your experiences as an R03 grantee.

Several weeks ago you should have received a communication from Dr. Robert Croyle, Director, Division of Cancer Control and Population Sciences at the National Cancer Institute.

Did you receive this communication?

- If NO: May we fax a copy of the letter to you now?
- If YES: Proceed with obtaining informed consent.

Do you have any questions for me about this study?

- If YES: What are your questions?
- If NO: Proceed with obtaining informed consent.

Do you agree to complete the interview?

- If NO: Thank the respondent for his or her time, and end the call.
- If YES: Proceed

Participant's Background

1. We have you as funded in [year], is this correct?
2. At the time of the R03 award what was your educational level?
Probe: Ph.D., M.P.H., M.S., M.D.,
3. How did you learn about the NCI Small Grants Program?
 - Mentor
 - Colleague
 - NCI workshop (at professional conference)
 - Own institution
 - Other
4. How would you classify yourself in your field?
 - Junior Investigator
 - Mid-Career
 - Senior Investigator
5. Has the process of applying for and obtaining the R03 funding affected your decision to do subsequent behavioral research in cancer control?
 - 5a. If yes: In what way?

Additional Funding

6. Did your interest in applying for the R03 grow out of your participation in someone else's research?
 - Yes
 - No, go to Question 5c.
- 6a. Was their research funded by an R01?
 - Yes, go to Question 5c.
 - No
- 6b. Do you know the NIH Institute that funded this research?
Probe: 27 NIH institutes
- 6c. Did you personally have other NIH funding before applying for the R03?
 - Yes
 - No, go to Question 6
- 6d. If yes, what other NIH funding did you have before applying for the R03?
 - Fellowship award
 - Career development award
 - Minority Supplement
 - Exploratory or developmental research award
 - Other, please explain
7. Did you personally have other funds besides NIH funding to do your grant work?
 - Yes
 - No, go to Question 7

- 7a. If yes, please describe the type of funding and funding organization.
- 7b. Was the funding a result of a peer-review process evaluating the technical merits of the research?
- Yes
 - No, go to Question 7
- 7c. If yes, please describe the peer-review process.
8. Did you submit applications to the NIH during or after the R03 that are linked to your R03 research topic?
- Yes
 - No, go to Question 8
- 8a. How many? _____
- 8b. Can you tell me of those submitted how many were successful and the type of funding mechanism?
- Probe: R01, R21, K07*
- 8c. Can you tell me of those submitted how many were unsuccessful and the type of funding mechanism?
- Probe: R01, R21, K07*
9. Did you submit applications to the NIH during or after the R03 that are not linked to your R03 research topic?
- Yes
 - No, go to Question 9
- 9a. How many? _____
- 9b. Can you tell me of those submitted how many were successful and the type of funding mechanism?
- Probe: R01, R21, K07*
- 9c. Can you tell me of those submitted how many were unsuccessful and the type of funding mechanism?
- Probe: Type of research i.e., prevention, basic science, epidemiology, behavioral etc.*
10. Have you submitted applications to non-NIH funding sources related to other investigations on behavioral research in cancer control?
- Yes
 - No, go to Question 10
- 10a. If yes, how many? _____
- 10b. Please provide name of organization, name of funding mechanism if known, and if the application was successful, unsuccessful, or currently pending.

Grant Oversight

11. After you were awarded the grant did your contact with NCI include:

11a. Regular contact with Program Directors/Guidance from Program Officer?

Yes

No

11b. Assistance from NCI staff?

Yes

No

11c. Other contact, please describe.

12. What went well in terms of grant oversight?

13. Can you tell me more about how the grant oversight process may be improved for you as a grantee?

Probe: Were there any obstacles encountered in conducting the grant?

Mentoring

14. Please describe the relationship you maintained with your mentor as part of the requirement of the R03 funding.

15. Did you receive substantial input from your mentor?

Yes

No

15a. If yes, please describe.

Probe: Career development, guidance in conducting research, and/or acting as a resource

On grantee

16. Do you consider your research interdisciplinary?

Yes

No

16a. If yes, please describe your research activities and how is it interdisciplinary?

17. Overall, can you tell us what was the impact of the R03 on your research career? Did it:

17a. Encourage you to engage in further PI work on behavior research in cancer control?

Yes

No

17b. Increase the number of your publications related to behavior research in cancer control?

Yes

No

17c. Increase the number of your presentations related to behavior research in cancer control?

17d. Did you participate in any meetings related to behavioral research in cancer control?

Yes

No

17d.1 If yes, please provide a brief description of the meeting or presentation and your role (speaker, facilitator, or moderator).

17e. Encourage or enhance your interactions with other researchers in the field of behavioral research in cancer control?

Yes

No

Other, specify

17e.1 If yes, please describe in what way?

18. Aside from the R03, please describe what other activities related to behavioral research in cancer control you have a role in?

Probe: What is your role?

Probe: Outline applications pending for other research on cancer control

19. Would you suggest that others you know should apply for R03? Why or why not?

19a. If yes: describe any characteristics of a researcher or topic you feel are best suited to apply for R03.

19b. If no: why not?

20. From a grantee perspective, do you have any suggestions for changes to the Small Grants Program?

21. Is there anything else related to impact of the R03 on your career that you would like to comment on?

Conclusion

That brings us to the end of the formal interview, is there anything that you would like to add to what you have said?

Thank you again for taking time out of your busy schedule to talk to us about your experiences with the R03 Small Grants Program for Behavioral Research in Cancer Control. This has been very helpful. We really appreciate your participation in this project for NCI.

Appendix C

Appendix C - Interview Guide for NCI-Funded Mentors

OUTCOME EVALUATION OF THE SMALL GRANTS PROGRAM FOR BEHAVIORAL RESEARCH IN CANCER CONTROL

(FG465414)

Interview Guide for Mentors of funded R03 PI Involved in the Small Grants Program for Behavioral Research in Cancer Control

Participant's Background

1. We have you as the mentor for *NAME OF GRANTEE*, is this correct?
Probe: Were there other mentors for (name of grantee)?
Probe: Were you the primary mentor?
2. Have you formally mentored other NIH grantees?
3. For (Name of Grantee) were you involved in the grant application process- review before it was sent to NIH? Or, were you involved in the resubmission process (i.e., reading summary statements, review of second or subsequent funding attempts to R03)
4. Can you tell me about your involvement in the Small Grants Program as a Mentor?
Probe: What aspects of the grantees work were you responsible for?
Probe: Did the Grantee research grow out of working with you on another project?
5. What is your main discipline?
Probe: What is your area of research as related to behavioral cancer control?
Probe: Are you a cancer control specialist?

Grantee

6. Did/do you encourage R03 Small Grants Grantees to apply for additional NIH funding?
Probe: During the award
Probe: After the completion of R03 research
7. In your opinion, what is the impact of R03 on the new investigator(s) that you have been responsible for?
8. In your opinion, what is the value of the grantee research with respect to the field of cancer control?
Probe: How does this work advance the science of behavioral cancer control?

Field Impact

9. When or how did you first hear about the R03?
10. How does the Small Grants Program impact the field of behavioral research in cancer control?
Probe: Grantee Publications or Presentations
Probe: Developing Research Questions on Cancer Control
Probe: new investigators – junior or senior investigators
Probe: Encourages more research or behavior cancer control
11. Can you say more about the potential or promise it holds in developing cancer control investigators over time?
Probe: Does it encourage existing researchers to refocus research on behavioral research
Probe: Does it encourage new investigations in behavioral research in cancer control

12. In your opinion, what counts as field impact in an interdisciplinary area?
13. Do you have suggestions for changes in the Small Grants Program to increase impact on the field of behavioral research in cancer control?
14. Did/do you encourage R03 Small Grants Grantees to apply for funding from other sources?
15. Do you know anyone else who has held a small grant from NCI?
Probe: For differences between R03 and R21, or other mechanisms
16. Have you recommended that others submit applications to the R03 Small Grants Program at NCI?

Conclusion

That brings us to the end of the formal interview, is there anything that you would like to add to what you have said, or would like to cover?

Thank you again for taking time out of your busy schedule to talk to us about your experiences with the R03 Small Grants Program in Behavioral Research in Cancer Control. This has been very helpful. We really appreciate your participation in this project for NCI.

Appendix D

Appendix D - Summary of Journals for R03-related Published Articles

Disciplines	Accepted or published articles
	n
Addiction	2
Addictive Behaviors	3
American Journal of Neuroradiology	1
American Journal of Obstetrics and Gynecology	1
American Journal of Public Health	1
AMIA Symposium Proceedings	1
Applied Nursing Research	1
Behavior Analyst Today	1
Behavior Therapy	1
Behavioral Medicine	1
British Journal of Nutrition	1
Cancer	3
Cancer Control	1
Cancer Practice	1
Experimental & Clinical Psychopharmacology	2
Family Process	1
Geriatric Nursing	1
Health Psychology	1
Hematology/Oncology Clinics of North America	1
International Journal of Clinical and Experimental Hypnosis	1
Journal of Behavioral Medicine	2
Journal of Clinical Psychology	1
Journal of Genetic Counseling	1
Journal of Health Care for the Poor and Underserved	1
Journal of Health Psychology	1
Journal of Mental Health and Aging	1
Journal of Psychosomatic Research	1
Journal of Substance Abuse Treatment	1
Journal of the National Cancer Institute	1
Medical Care	1
Molecular Psychiatry	1
Neurology	1
Obstetrics and Gynecology	1
Perspectives on Sexual and Reproductive Health	1
Pharmacogenomics Journal	1
Prevention Science	1
Preventive Medicine	3
Psycho-Oncology	4
Psychotherapy and Psychosomatics	1
Social Science and Medicine	1
Women and Health	1
Total	53

Appendix E

Appendix E - Summary of Journal Disciplines for R03-related Published Articles

Disciplines	Published articles		Number of citations
	N	%	
Clinical Health Psychology	1	1.8	-
Cognitive Therapy; Behavior Therapy; Psychotherapy	1	1.8	-
Drug Abuse and Alcoholism	6	10.5	16
Forensic Psychology	1	1.8	-
Gerontology and Geriatrics; Medical Sciences-Nurses and Nursing	1	1.8	-
Gerontology and Geriatrics; Psychology	1	1.8	-
Medical Sciences-Communicable Diseases	1	1.8	3
Medical Sciences-Computer Applications	1	1.8	-
Medical Sciences-Hypnosis	1	1.8	-
Medical Sciences-Nurses and Nursing; Medical Sciences-Experimental Medicine, Laboratory Technique	1	1.8	-
Medical Sciences-Obstetrics and Gynecology	1	1.8	-
Medical Sciences-Obstetrics and Gynecology; Birth Control	2	3.5	-
Medical Sciences-Oncology	7	12.3	71
Medical Sciences-Oncology; Psychology; Medical Sciences-Psychiatry and Neurology	4	7.0	3
Medical Sciences-Psychiatry and Neurology	3	5.3	5
Medical Sciences-Psychiatry and Neurology; Biology	1	1.8	-
Medical Sciences-Psychiatry and Neurology; Psychology	2	3.5	3
Medical Sciences-Radiology and Nuclear Medicine	1	1.8	-
Medical Sciences; Public Health and Safety	4	7.0	3
Medical Sciences; Social Sciences: Comprehensive Works	1	1.8	-
Medical Sciences; Social Services and Welfare	1	1.8	-
Mental Health Services; Integrated Health Services; Primary Care (Medicine)	1	1.8	-
Nutrition and Dietetics	1	1.8	-
Pharmacy and Pharmacology	1	1.8	2
Psychology	4	7.0	17
Psychology; Medical Sciences-Psychiatry and Neurology	1	1.8	-
Psychology; Pharmacy and Pharmacology	2	3.5	7
Psychology; Sociology	1	1.8	-
Psychology; Medical Sciences	1	1.8	1
Psychology; Public Health and Safety	1	1.8	-
Public Health and Safety	1	1.8	-
Women's Health	1	1.8	3
Total	57	100%	134*

Appendix F

Appendix F - Summary of Citing Journals for R03-related Published Articles

Journals

Journal (n=85)

CA - a Cancer Journal for Clinicians
Journal of the National Cancer Institute
Behavioral and Brain Sciences
Blood
Journal of Clinical Oncology
Annual Review of Psychology
Archives of Internal Medicine
Clinical Cancer Research
Neurology
Current Opinion in Oncology
American Journal of Epidemiology
International Journal of Cancer
Oncologist
Cancer
Health Affairs
Journal of Consulting and Clinical Psychology
Cancer Epidemiology Biomarkers & Prevention
Osteoporosis International
European Journal of Cancer
American Journal of Public Health
Health Psychology
Breast Cancer Research and Treatment
Cancer Causes and Control
Chest
Medical Care
Seminars in Radiation Oncology
Oncology/ Basel
Medicine and Science in Sports and Exercise
Drug and Alcohol Dependence
Health Services Research
Journal of Clinical Epidemiology
Cancer Journal
Clinical Psychology Review
American Journal of Surgery
Journal of Health Economics
Medical Clinics of North America
Social Science and Medicine
Journal of Psychosomatic Research
Psychosomatics
Psychology of Addictive Behaviors
Pancreas
Preventive Medicine
Journals of Gerontology Series B-Psychological Sciences and Social Sciences
Current Problems in Surgery

Journals

Journal (n=85)

Experimental & Clinical Psychopharmacology
Academic Emergency Medicine
Health Education and Behavior
Psycho-Oncology
Cellular and Molecular Biology
European Journal of Surgical Oncology
BJU International
Academic Medicine
Behavior Therapy
Nuclear Medicine Communications
Cancer Detection and Prevention
American Surgeon
Addictive Behaviors
Journal of Alternative and Complementary Medicine
Journal of Substance Abuse Treatment
Research in Nursing & Health
Cancer Nursing
International Journal of Gynecological Cancer
Journal of Nursing Scholarship
Clinical Obstetrics and Gynecology
Behavioral Medicine
Psychiatric Annals
Journal of Health Care for the Poor and Underserved
Current Opinion in Psychiatry
Journal of Cancer Education
Journal of the National Medical Association
European Journal of Cancer Care
Journal of Drug Education
Archives of Psychiatric Nursing
Journal of Clinical Psychology in Medical Settings
Drugs: Education, Prevention & Policy
Hospital Medicine
Research on Social Work Practice
Family & Community Health
American Journal of Family Therapy
Teaching of Psychology
Pain Reviews
Nicotine and Tobacco Research
Oncology Nursing Forum

Appendix G

Appendix G - Summary of Impact Factors for Citing Journals

Journal (n=85)	Impact Factor (5-year average)
CA - a Cancer Journal for Clinicians	29.771
Journal of the National Cancer Institute	13.878
Behavioral and Brain Sciences	12.859
Blood	9.357
Journal of Clinical Oncology	9.200
Annual Review of Psychology	7.435
Archives of Internal Medicine	6.584
Clinical Cancer Research	5.293
Neurology	5.250
Current Opinion in Oncology	4.410
American Journal of Epidemiology	4.096
International Journal of Cancer	4.025
Oncologist	3.962
Cancer	3.838
Health Affairs	3.761
Journal of Consulting and Clinical Psychology	3.750
Cancer Epidemiology Biomarkers & Prevention	3.559
Osteoporosis International	3.268
European Journal of Cancer	3.196
American Journal of Public Health	3.192
Health Psychology	2.925
Breast Cancer Research and Treatment	2.914
Cancer Causes and Control	2.755
Chest	2.714
Medical Care	2.709
Seminars in Radiation Oncology	2.483
Oncology/ Basel	2.473
Medicine and Science in Sports and Exercise	2.461
Drug and Alcohol Dependence	2.457
Health Services Research	2.137
Journal of Clinical Epidemiology	2.125
Cancer Journal	2.121
Clinical Psychology Review	2.098
American Journal of Surgery	1.982
Journal of Health Economics	1.934
Medical Clinics of North America	1.922
Social Science and Medicine	1.781
Journal of Psychosomatic Research	1.713
Psychosomatics	1.698
Psychology of Addictive Behaviors	1.661
Pancreas	1.643
Preventive Medicine	1.642
Journals of Gerontology Series B-Psychological Sciences and Social Sciences	1.612
Current Problems in Surgery	1.559
Experimental & Clinical Psychopharmacology	1.554

Journal (n=85)	Impact Factor (5-year average)
Academic Emergency Medicine	1.538
Health Education and Behavior	1.510
Psycho-Oncology	1.495
Cellular and Molecular Biology	1.429
European Journal of Surgical Oncology	1.421
BJU International	1.375
Academic Medicine	1.367
Behavior Therapy	1.296
Nuclear Medicine Communications	1.246
Cancer Detection and Prevention	1.196
American Surgeon	1.130
Addictive Behaviors	1.119
Journal of Alternative and Complementary Medicine	1.100
Journal of Substance Abuse Treatment	1.036
Research in Nursing & Health	0.936
Cancer Nursing	0.892
International Journal of Gynecological Cancer	0.870
Journal of Nursing Scholarship	0.861
Clinical Obstetrics and Gynecology	0.822
Behavioral Medicine	0.796
Psychiatric Annals	0.706
Journal of Health Care for the Poor and Underserved	0.695
Current Opinion in Psychiatry	0.673
Journal of Cancer Education	0.583
Journal of the National Medical Association	0.577
European Journal of Cancer Care	0.497
Journal of Drug Education	0.496
Archives of Psychiatric Nursing	0.487
Journal of Clinical Psychology in Medical Settings	0.424
Drugs: Education, Prevention & Policy	0.401
Hospital Medicine	0.338
Research on Social Work Practice	0.329
Family & Community Health	0.317
American Journal of Family Therapy	0.301
Teaching of Psychology	0.273
Pain Reviews	0.237
Nicotine and Tobacco Research	0.000
Oncology Nursing Forum	0.000

Appendix G-1 - Summary of Impact Factors for Publishing Journals

Journals (n=41)	Impact Factors (5-year average)
Journal of the National Cancer Institute	13.878
Molecular Psychiatry	7.231
Neurology	5.250
Cancer	3.838
American Journal of Public Health	3.192
Psychotherapy and Psychosomatics	3.039
Health Psychology	2.925
Medical Care	2.709
American Journal of Obstetrics and Gynecology	2.573
Addiction	2.566
Obstetrics and Gynecology	2.370
American Journal of Neuroradiology	2.365
British Journal of Nutrition	2.291
Hematology/Oncology Clinics of North America	1.796
Social Science and Medicine	1.781
Journal of Psychosomatic Research	1.713
Preventive Medicine	1.642
Experimental & Clinical Psychopharmacology	1.554
Psycho-Oncology	1.495
Behavior Therapy	1.296
International Journal of Clinical and Experimental Hypnosis	1.233
Addictive Behaviors	1.119
Journal of Behavioral Medicine	1.083
Journal of Substance Abuse Treatment	1.036
Women and Health	0.968
Family Process	0.881
Cancer Practice	0.832
Behavioral Medicine	0.796
Journal of Clinical Psychology	0.729
Journal of Health Care for the Poor and Underserved	0.695
Applied Nursing Research	0.477
Geriatric Nursing	0.180
AMIA Symposium Proceedings	0.000
Behavior Analyst Today	0.000
Cancer Control	0.000
Journal of Genetic Counseling	0.000
Journal of Health Psychology	0.000
Journal of Mental Health and Aging	0.000
Perspectives on Sexual and Reproductive Health	0.000
Pharmacogenomics Journal	0.000
Prevention Science	0.000

Appendix G-2 – Highest Ranked Publishing Journals

Journal	Impact Factor (5 year average)
Journal of the National Cancer Institute	13.878
Molecular Psychiatry	7.231
Neurology	5.250
Cancer	3.838
American Journal of Public Health	3.192
Psychotherapy and Psychosomatics	3.039
Health Psychology	2.925
Medical Care	2.709
American Journal of Obstetrics and Gynecology	2.573

Appendix G-3 – Highest Ranked Citing Journals

Journal	Impact Factor (5 year average)
CA - a Cancer Journal for Clinicians	29.771
Journal of the National Cancer Institute	13.878
Behavioral and Brain Sciences	12.859
Blood	9.357
Journal of Clinical Oncology	9.200
Annual Review of Psychology	7.435
Archives of Internal Medicine	6.584
Clinical Cancer Research	5.293
Neurology	5.250

Appendix H

Appendix H - Summary of Journal for non-R03-related Published Articles

Journal Title	n
Academic Emergency Medicine	1
Academic Medicine	2
Academic Psychiatry	1
Acta Oncologica	1
Addictions	1
Addictive Behaviors	7
Addictive Disorders and Their Treatment	3
Advances in mind-body medicine	3
Aging and Mental Health	1
AHJ	1
AIDS	1
AIDS and Behavior	1
AIDS Education and Prevention	1
AJPM	1
Alcoholism: Clinical and Experimental Research	2
American College Surgeons	1
American Journal of Health Behavior	1
American Journal of Cardiology	2
American Journal of Clinical Nutrition	1
American Journal of Drug and Alcohol Abuse	1
American Journal of Geriatric Psychiatry	1
American Journal of Health Behavior	2
American Journal of Cardiology	1
American Journal of Clinical Nutrition	1
American Journal of Drug and Alcohol Abuse	3
American Journal of Geriatric Psychiatry	1
American Journal of Health Behavior	2
American Journal of Health Care Quality	1
American Journal of Health Promotion	2
American Journal of Human Biology	1
American Journal of Infection Control	1
American Journal of Obstetrics Gynecology	1
American Journal of Orthopsychiatry	1
American Journal of Physican Anthropology	1
American Journal of Preventive Medicine	3
American Journal of Public Health	7
American Journal of Surgery	1
American Journal of Surgical Pathology	2
American Journal on Addictions	1
American Surgeon	1
Anesthesia and Analgesia	1
Annals of Behavioral Medicine	9
Annals of Emergency Medicine	2
Annals of Epidemiology	1
Annals of family medicine	1
Annals of Internal Medicine	1
Annals of Oncology	1
Annual Reviews in Clinical Psychology	1
Anticancer Research	1
Archives of Dermatology	1

Journal Title	n
Archives of Pediatric and Adolescent Medicine	1
Archives of Sexual Behavior	1
Arthritis and Rheumatism	1
Arthritis Care and Research	2
Asian Americans and Pacific Islander Journal of Health	1
Basic and Applied Social Psychology	1
Behavior Therapy	1
Behavioral Psychology	1
Behavioral Sciences Law	1
Biofeedback	1
Biological Psychology	1
Biology of Blood and Marrow Transplantation	1
Biometrical Journal	2
Bone Marrow Transplantation	3
Brain, Behavior, and Immunity	1
Breast Cancer Research and Treatment	1
British Journal of Health Psychology	2
British Journal of Nutrition	1
British Medical Journal	1
British Medical Journal	1
Cancer	5
Cancer Causes and Control	3
Cancer Control	7
Cancer Detection and Prevention	1
Cancer Epidemiology Biomarkers and Prevention	1
Cancer Nursing	1
Cancer Practice	5
Cancer Research	3
Chest	7
Child Psychiatry and Human Development	1
Children's Services: Social Policy, Research, and Practice	2
Clinical Cancer Research	1
Clinical Psycho-oncology	2
Clinical Psychology: Science and Practice	1
Cognition, Crier, Comportament	2
Contraception	1
Control Clinical Trials	1
Current Directions in Psychological Science	1
Current Problems in Cancer	1
Diagnostic Cytopathology	1
Digestive Diseases and Sciences	1
Dimens Crit Care Nyrs	1
Drug Abuse and Dependency	1
Drug and Alcohol Dependence	3
Drug and Alcohol Review	1
Drugs and Society	1
Eastern Economics Journal	1
Econometrics Journal	1
Economics and Human Biology	1
Ethnicity and Disease	2
European Journal of Gynelological Oncology	1
European Journal of Health Economics	1
European Journal of Oncology Nursing	1
Clinical Cancer Research	1
Clinical Psycho-oncology	1
Clinical Psychology: Science and Practice	1
Evidence-Based Preventive Medicine	1

Journal Title	n
Experimental and Clinical Psychopharmacology	2
Experimental and Clinical Psychopharmacology	1
Expert Review of Pharmacoeconomics & Outcomes Research	1
Families, Systems, and Health	1
Family and Community Health	3
Family Relations	1
Fertility and Sterility	3
Food and Nutrition bulletin	24
Genetic Testing	2
Geriatric Nursing	1
Gynecologic Oncology	2
Head and Neck	1
Health Care Management Science	6
Health Economics	5
Health Education	10
Health Education and Behavior	2
Health Education Research	1
Health Psychology	3
Health Services Research	1
Herpes	1
Holistic Nursing Practice	3
Housing Policy Debate	3
Howard Journal of Communications	1
Infection Control and Hospital Epidemiology	1
International Journal of Behavioral Medicine	2
International Journal of Cancer Prevention	1
International Journal of Clinical and Experimental Hypnosis	4
International Journal of Emergency Mental Health	1
International Journal of Experimental and Clinical Hypnosis	1
International Journal of Gynecological Oncology	3
International Journal of Radiation: Oncology-Biology-Physiology	1
International Journal of Radiation: Oncology-Biology-Physiology	2
International Journal of Stress Management	1
International Journal of Technology Assessment in Health Care	2
IRB: Ethics and Human Research	1
Joint Commission Journal on Quality and Safety	1
Journal of Abnormal Psychology	1
Journal of Adolescent Health	1
Journal of Adolescent Research	1
Journal of Alcohol and Drug Education	3
Journal of Alternative Therapies	1
Journal of American Academy of Child & Adolescent Psychiatry	1
Journal of American College Surgeons	2
Journal of Applied Biobehavioral Research	2
Journal of Applied Developmental Psychology	1
Journal of Applied Economics	1
Journal of Applied Psychology	2
Journal of Applied Social Psychology	4
Journal of Behavioral Medicine	8
Journal of Behavioral Decision Making	2

Journal Title	n
Journal of Cancer Education	5
Journal of Child and Adolescent Substance Abuse	3
Journal of Clinical Child Psychology	1
Journal of Clinical Endocrinology & Metabolism	1
Journal of Clinical Epidemiology	1
Journal of Clinical Neuropsychiatry	1
Journal of Clinical Oncology	11
Journal of Clinical Psychology	2
Journal of Clinical Psychopharmacology	2
Journal of Community Health	1
Journal of Community Psychology	1
Journal of Consulting and Clinical Psychology	5
Journal of couple and relationship therapy	1
Journal of Dental Education	1
Journal of Developmental and Behavioral Pediatrics	2
Journal of Drug Education	1
Journal of Early Adolescence	1
Journal of Early Intervention	2
Journal of Econometrics	1
Journal of Economics and Finance	1
Journal of Epidemiology and Community Health	1
Journal of Experimental Criminology	1
Journal of Family Medicine	1
Journal of Family Psychology	1
Journal of Foot and Ankle Surgery	1
Journal of General Internal Medicine	2
Journal of Health and Psychology	1
Journal of Health Care for the Poor and Underserved	1
Journal of Health Communication	1
Journal of Health Communications	1
Journal of Health Economics	4
Journal of Health Outcomes and Research	2
Journal of Health Psychology	4
Journal of Healthcare for the Poor Underserved	1
Journal of Higher Education, Engagement, and Outreach;	1
Institute of Higher Education	
Journal of Humanistic Psychology	1
Journal of Immunology	1
Journal of Internal Medicine	1
Journal of Medical Internet Research	1
Journal of Meditation and Meditation Research	1
Journal of Nervous and Mental Disease	1
Journal of Neuropsychiatry and Clinical Neurosciences	1
Journal of Nutrition	1
Journal of Nutrition Education	1
Journal of Obstetrics and Gynecology	1
Journal of Occupational and Environmental Medicine	1
Journal of Oncology Management	1
Journal of Pediatric Psychology	4
Journal of Periodontology	1
Journal of Prevention and Intervention in the Community	1
Journal of Primary Prevention	1
Journal of Psycho-Oncology	1
Journal of Psychological Assessment	1
Journal of Psychosocial Oncology	2

Journal Title	n
Journal of Psychosomatic Research	1
Journal of Public Health	1
Journal of Public Health Management and Practice	1
Journal of Registry Management	2
Journal of Spirochetal and Tick-borne Diseases	1
Journal of Sport and Exercise Psychology	1
Journal of Sport Behavior	1
Journal of Studies on Alcohol	2
Journal of Supportive Oncology	1
Journal of the American Academy of Dermatology	1
Journal of the American Academy of Child and Adolescent Psychiatry	2
Journal of the American Board of Family Practice	1
Journal of the American Dental Association	1
Journal of the American Medical Association	1
Journal of the American Medical Women's Association	1
Journal of the American Podiatric Medical Association	1
Journal of the American Society of Nephrology	1
Journal of the National Cancer Institute	4
Journal of the National Medical Association	1
Journal of the Society of Obstetricians and Gynecologists of Canada	2
Journal of Traumatic Stress	2
Journal of Virology	1
Journal of Vision Impairment and Blindness	1
Journal of Women's Health	1
Journal of Youth and Adolescence	3
Lancet	1
Laryngoscope	3
Lung Cancer	3
Medical Care	6
Medical Decision Making	1
Medicine and Science in Sports and Exercise	2
Menopause	1
Neurology	1
Neuropsychopharmacology	1
Neurosurgery	1
New England Journal of Medicine	1
Nicotine & Tobacco Research	2
Nicotine and Tobacco Research	1
Nurse Author & Editor	1
Nursing Research	2
Obstetrics Gynecology	1
Obstetrics and Gynecology	1
Obstetrics Gynecology	6
Otolaryngology-Head and Neck Surgery	1
Pain	1
Papeles del Psicologo	1
Papers of the Psychologist	1
Patient Education and Counseling	4
Pediatric Nephrology	1
Pediatrics	5
Personal Relationships	1
Personality and Individual Differences	4
Personality and Social Psychology Bulletin	1

Journal Title	n
Peruvian Journal of Drug Dependencies: Investigation and Analysis	1
Pharmacoeconomic consideration in treating ovarian cancer	1
Population Health Metrics	1
Poverty and Race	2
Prevention Science	6
Prevention Sciences	1
Preventive Medicine	14
Progress in Cardiovascular Nursing	1
Psychology of Addictive Behaviors	1
PsycCritiques	1
Psychiatric Annals	1
Psycho-oncology	4
Psycho-Oncology	7
Psychological Assessment	1
Psychological Bulletin	1
Psychological Reports	1
Psychology and health	1
Psychology and Health	2
Psychology of Addictive Behaviors	4
Psychology, Health and Medicine	1
Psychology, Health, and Medicine	1
Psychoneuroendocrinology	1
Psychosocial Assessment	1
Psychosocial Oncology	3
Psychosomatic Medicine	1
Public Health Reports	1
Qualitative Health Research	2
Quality of Life Research	2
Research in Nursing and Health	1
Review Series Psychiatry	1
School Psychology Review	1
Seminars in Clinical Neuropsychiatry	1
Sleep	1
Sleep Medicine	1
Social Science and Medicine	6
Stereotactic and Functional Neurosurgery	1
Structural Equation Modeling	1
Substance abuse	1
Substance Use and Misuse	3
Support Care Cancer	1
Supportive Cancer Therapy	1
Supportive Care Cancer	1
Surgery	1
The International Journal of Clinical & Experimental Hypnosis	1
The Journal of Reproductive Medicine	1
Tobacco Control	1
Urology	1
Western Journal of Nursing Research	1
Women and Cancer	1
Women and Health	2
Yonsei Medical Journal	1
Total	563*

Appendix I

Appendix I - Summary of Journal Disciplines for non-R03-related Published Articles

Published Articles		
Discipline	n	%
Biology	5	.8
Biology: Cytology and Histology	1	.2
Biology: Microbiology	1	.2
Birth Control; Medical Sciences: Obstetrics and Gynecology	2	.3
Business and Economics	3	.5
Business and Economics: Management	2	.3
Children and Youth: About; Psychology	3	.5
Children and Youth: About; Psychology; Sociology	1	.2
Communications	1	.2
Criminology and Law Enforcement	1	.2
Drug Abuse and Alcoholism	26	4.1
Drug Abuse and Alcoholism; Children and Youth: About	3	.5
Drug Abuse and Alcoholism; Education	1	.2
Drug Abuse and Alcoholism; Psychology	4	.6
Education: Higher Education	1	.2
Education: Higher Education; Medical Sciences: Dentistry	1	.2
Education: Special Education and Rehabilitation; Children and Youth: About; Education: Teaching Methodology and Curriculum	2	.3
Education; Sociology	1	.2
Gerontology and Geriatrics; Medical Sciences: Nurses and Nursing	2	.3
Gerontology and Geriatrics; Medical Sciences: Psychiatry and Neurology	1	.2
Gerontology and Geriatrics; Medical Sciences: Psychiatry and Neurology; Psychology	1	.2
Handicapped: Visually Impaired	1	.2
Health Facilities and Administration	6	.9
Health Facilities and Administration; Business and Economics: Management	1	.2
Health Facilities and Administration; Medical Sciences; Public Health and Safety	2	.3
Housing and Urban Planning; Real Estate	1	.2
Journalism; Literature; Medical Sciences; Nurses and Nursing	1	.2
Medical Science: Psychiatry and Neurology	1	.2
Medical Science: Sports Medicine	2	.3
Medical Sciences	33	5.2
Medical Sciences : Oncology	1	.2
Medical Sciences: Allergy and Immunology; Psychology	1	.2
Medical Sciences: Anesthesiology	1	.2
Medical Sciences: Cardiovascular Diseases	2	.3
Medical Sciences: Cardiovascular Diseases; Nurses and Nursing	1	.2

Published Articles		
Discipline	n	%
Medical Sciences: Communicable Disease	13	2.1
Medical Sciences: Communicable Disease; Medical Sciences: Ophthalmology and Optomology	1	.2
Medical Sciences: Communications	1	.2
Medical Sciences: Computer Applications	2	.3
Medical Sciences: Dentistry	2	.3
Medical Sciences: Dermatology and Dendrology	2	.3
Medical Sciences: Endocrinology	1	.2
Medical Sciences: Experimental Medicine, Laboratory Medicine; Medical Sciences: Surgery	4	.6
Medical Sciences: Gastroenterology	1	.2
Medical Sciences: Hematology; Medical Sciences: Oncology	2	.3
Medical Sciences: Hypnosis	4	.6
Medical Sciences: Internal Medicine	4	.6
Medical Sciences: Nurses and Nursing	3	.5
Medical Sciences: Nurses and Nursing; Health Facilities and Administration	1	.2
Medical Sciences: Nurses and Nursing; Medical Sciences: Oncology	2	.3
Medical Sciences: Nurses and Nursing; Social Sciences: Comprehensive Works	2	.3
Medical Sciences: Obstetrics and Gynecology	36	5.7
Medical Sciences: Obstetrics and Gynecology; Endocrinology	1	.2
Medical Sciences: Occupational Health and Safety; Environmental Studies	1	.2
Medical Sciences: Oncology	48	7.6
Medical Sciences: Oncology; Medical Sciences: Radiology and Nuclear Medicine; Pharmacy and Pharmacology; Biology: Cytology and Histology	11	1.7
Medical Sciences: Oncology; Psychology; Medical Sciences: Psychiatry and Neurology	13	2.0
Medical Sciences: Orthopedics and Traumatology	4	.6
Medical Sciences: Otorhinolaryngology, Surgery	1	.2
Medical Sciences: Otorhinolaryngology	3	.5
Medical Sciences: Pediatrics	6	.9
Medical Sciences: Pediatrics; Medical Sciences: Obstetrics and Gynecology	1	.2
Medical Sciences: Pediatrics; Psychology	2	.3
Medical Sciences: Psychiatry and Neurology	13	2.0
Medical Sciences: Psychiatry and Neurology; Children and Youth: About	2	.3
Medical Sciences: Psychiatry and Neurology; Education: Higher Education	1	.2
Medical Sciences: Psychiatry and Neurology; Endocrinology	1	.2
Medical Sciences: Psychiatry and Neurology; Medical Sciences: Pediatrics; Education: Special Education and Rehabilitation	1	.2
Medical Sciences: Psychiatry and Neurology; Psychology	10	1.6
Medical Sciences: Public Health and Safety	1	.2
Medical Sciences: Radiology and Nuclear Medicine	3	.5
Medical Sciences: Respiratory Diseases; Medical Sciences: Cardiovascular Sciences	2	.3
Medical Sciences: Rheumatology	1	.2
Medical Sciences: Rheumatology; Medical Sciences: Nurses and Nursing	2	.3
Medical Sciences: Social Services and Welfare	1	.2

Published Articles		
Discipline	n	%
Medical Sciences: Surgery	6	.9
Medical Sciences: Surgery; Medical Sciences: Oncology	1	.2
Medical Sciences: Urology and Nephrology	2	.3
Medical Sciences: Women's Health	1	.2
Medical Sciences; Alternative Medicine	3	.5
Medical Sciences; Children and Youth: About	1	.2
Medical Sciences; Education: Adult Education	2	.3
Medical Sciences; Ethnic Interests	2	.3
Medical Sciences; Medical Sciences: Surgery	2	.3
Medical Sciences; Public Health and Safety	26	4.1
Medical Sciences; Social Sciences: Comprehensive Works	3	.5
Medical Sciences; Social Sciences: Comprehensive Works; Public Health and Safety	2	.3
Medical Sciences; Social Sciences: Comprehensive Works	2	.3
MS: Obstetrics and Gynecology	1	.2
Nutrition and Dietics	4	.6
Nutrition and Dietics; Education	1	.2
Nutrition and Dietics; Medical Sciences	1	.2
Pharmacy and Pharmacology	2	.3
Physical Fitness and Hygiene	3	.5
Physical Fitness and Hygiene; Nutrition and Dietics	1	.2
Physical Fitness and Hygiene	1	.2
Psychology	31	4.9
Psychology: Abstracting, Bibliographies, Statistical Abstracting	1	.2
Psychology: Abstracting, Bibliographies, Statistical Abstracting, and Indexing Services	1	.2
Psychology; Biology	1	.2
Psychology; Children and Youth: About	1	.2
Psychology; Education	1	.2
Psychology; Medical Sciences	3	.5
Psychology; Medical Sciences: Pediatrics	4	.6
Psychology; Medical Sciences: Psychiatry and Neurology	8	1.3
Psychology; Pharmacy and Pharmacology	2	.3
Psychology; Public Health and Safety	14	2.2
Psychology; Social Sciences: Comprehensive Works	5	.8
Psychology; Social Services and Welfare; Children and Youth: About	1	.2
Psychology; Sociology	3	.5
Psychology; Sports and Games; Medical Sciences: Sports Medicine	1	.2
Psychology; Women's Interests; Men's Interests	1	.2
Public Health and Safety	15	2.4
Public Health and Safety; Education: Adult Education	6	.9
Public Health and Safety; Medical Sciences	2	.3
Public Health and Safety; Physical Fitness and Hygiene	1	.2
Public Health Safety; Business and Economics; Management Insurance	1	.2
Social Sciences: Comprehensive Works; Biology	1	.2
Social Services and Welfare; Medical Sciences	5	.8
Sociology; Ethnic Interests	2	.3
Sports and Games; Psychology	1	.2

Published Articles		
Discipline	n	%
Tobacco Control	1	.2
Tobacco; Drug Abuse and Alcoholism; Public Health and Safety; Medical Sciences	3	.5
Women's Health	3	.5
Women's Health; Medical Sciences: Oncology	1	.2
No information	121	19.1
Total	635*	100%