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2011



Washington University
Institute of **C**linical and
Translational **S**ciences

Tracking & Evaluation Program

ICTS Research Collaboration Survey Results

November 2011

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INTRODUCTION

In September 2007, Washington University (WU) was awarded a Clinical and Translational Science Award (CTSA). To ensure the intent of the CTSA, WU created the Institute of Clinical and Translational Sciences (ICTS). The overall goal of the ICTS is to serve as the intellectual and physical home for clinical and translational research, clinical research training, and career development to help overcome the traditional boundaries between disciplines, departments and institutions.

The Tracking & Evaluation (T&E) Program was established to conduct the evaluation of the overall goals of the ICTS. The vision of the T&E Program is to utilize evidence-based and innovative evaluation methods to 1) inform ICTS strategic planning and program improvement activities, and 2) assess the impact of ICTS on clinical and translational science that results in clinical applications and meaningful community health outcomes.

Report Purpose

This report provides the results from the ICTS Research Collaboration Survey. The ICTS Research Collaboration Survey was developed to better understand the collaborative research partnerships of ICTS members. The survey included demographic, collaboration network, and general attitude and satisfaction questions. Established scales (Mâsse et al., Measuring Collaboration and Transdisciplinary Integration in Team Science, 2008) were used to assess satisfaction with collaboration, the impact of collaboration and attitudes about transdisciplinary research. Additional items were developed to assess change over the last three years and barriers encountered.

Report Organization

This report is divided into three main sections. First we provide a description of the respondents including general demographics, affiliation, discipline, and academic rank. The next section presents the characteristics of the collaboration networks, both by ICTS membership and by ICTS member discipline. Finally, this report outlines the general attitudes toward, satisfaction with, and barriers to collaborative research.

An Executive Summary of this report can be accessed at <http://icts.wustl.edu/about/2011CollabES.pdf>.

CHARACTERISTICS OF SURVEY RESPONDENTS

The first administration of the ICTS Research Collaboration Survey occurred between March-April 2011 to all ICTS members (n=1041). Seventy one percent of members (n=737) responded to the survey. While a 71% response rate is reasonable for the first administration of this survey, it is important to increase response rate for future administrations to better describe the ICTS collaboration network.

The majority of respondents (89.8%) listed their primary institution as Washington University (Table 1). When applicable, respondents also listed their school, department and division affiliations. Of those reporting a school affiliation, the Washington University School of Medicine was noted by 86.4% of respondents. The most frequently cited departments included Internal Medicine (27.0%), Pediatrics (7.9%) and Neurology (6.6%). Frequently cited divisions included Adult Neurology (9.5%), Cardiology (7.8%) and Oncology (6.4%). (See Appendices A-C for complete lists of all identified school, department and division affiliations.) Men made up 63.6% of the sample and women made up 36.4%.

For the first administration of this survey, a 71% response rate is reasonable. However, it is important to increase response rate for future administrations to better describe the ICTS collaboration network.

Table 1. Primary Institution Affiliation (n=737)

| | Frequency | Percent (%) |
|---|-----------|-------------|
| Washington University in St. Louis | 662 | 89.8 |
| Saint Louis University | 40 | 5.4 |
| BJC HealthCare | 11 | 1.5 |
| University of Missouri at St. Louis | 9 | 1.2 |
| Southern Illinois University Edwardsville | 3 | .4 |
| Community Health Organization | 1 | .1 |
| Other | 11 | 1.5 |

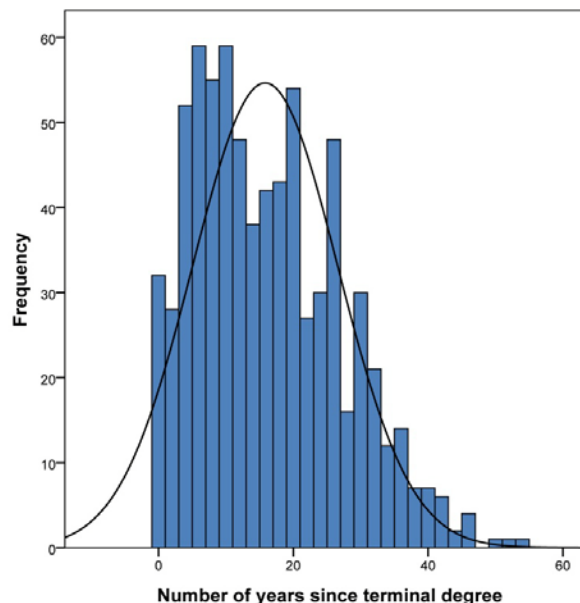
Respondents were also asked to report the discipline with which they most closely identified their current work. The list of disciplines they chose from came from the National Institutes of Health list of specialties. A total of 143 different disciplines were identified. The most frequently noted disciplines were Neurology (4.6%), Cardiovascular Diseases (4.3%) and Oncology (4.3%). (See Appendix D for the complete list of disciplines).

Table 2. Academic Rank

| | Frequency | Percent (%) |
|---------------------|------------|--------------|
| Assistant Professor | 228 | 30.9 |
| Professor | 213 | 28.9 |
| Associate Professor | 130 | 17.6 |
| Instructor | 66 | 9.0 |
| Student | 39 | 5.3 |
| Fellow | 26 | 3.5 |
| Staff | 14 | 1.9 |
| Resident | 10 | 1.4 |
| Other | 11 | 1.5 |
| Total | 737 | 100.0 |

Table 2 describes the academic rank among respondents. The greatest percentage identified themselves as Assistant Professors (30.9%) or Professors (28.9%). Associate Professors made up the next largest category (17.6%) and 5.3% of the sample identified themselves as students.

Respondents were also asked to report the number of years since obtaining their terminal degree. Figure 1 shows that the number of years since terminal degree responses were approximately normally distributed with a mean of 15.8 years and a standard deviation of 10.8 years.

Figure 1. Number of Years Since Terminal Degree

CHARACTERISTICS OF CURRENT COLLABORATION NETWORK

The survey included four items assessing the network of research collaborations. The first item asked respondents to identify their “most important research collaborations during the past 12 months.” Respondents were able to name up to 10 collaborators. Respondents indicated level of direct contact, scientific products submitted (grants and/or publications), and the primary role (e.g. theory, data collection) for each collaborator they named. This report focuses on who respondents named and the connections between them throughout the ICTS network.

ICTS Collaboration Network

All but 33 of the 737 respondents identified collaborators, with respondents identifying an average of 2.18 collaborators. This resulted in a network of 2,234 individuals, 868 (39%) of whom were ICTS members. Figure 2 shows the network of individuals with collaborators, color-coded by whether or not they were ICTS members.

Figure 2. ICTS Collaboration Network

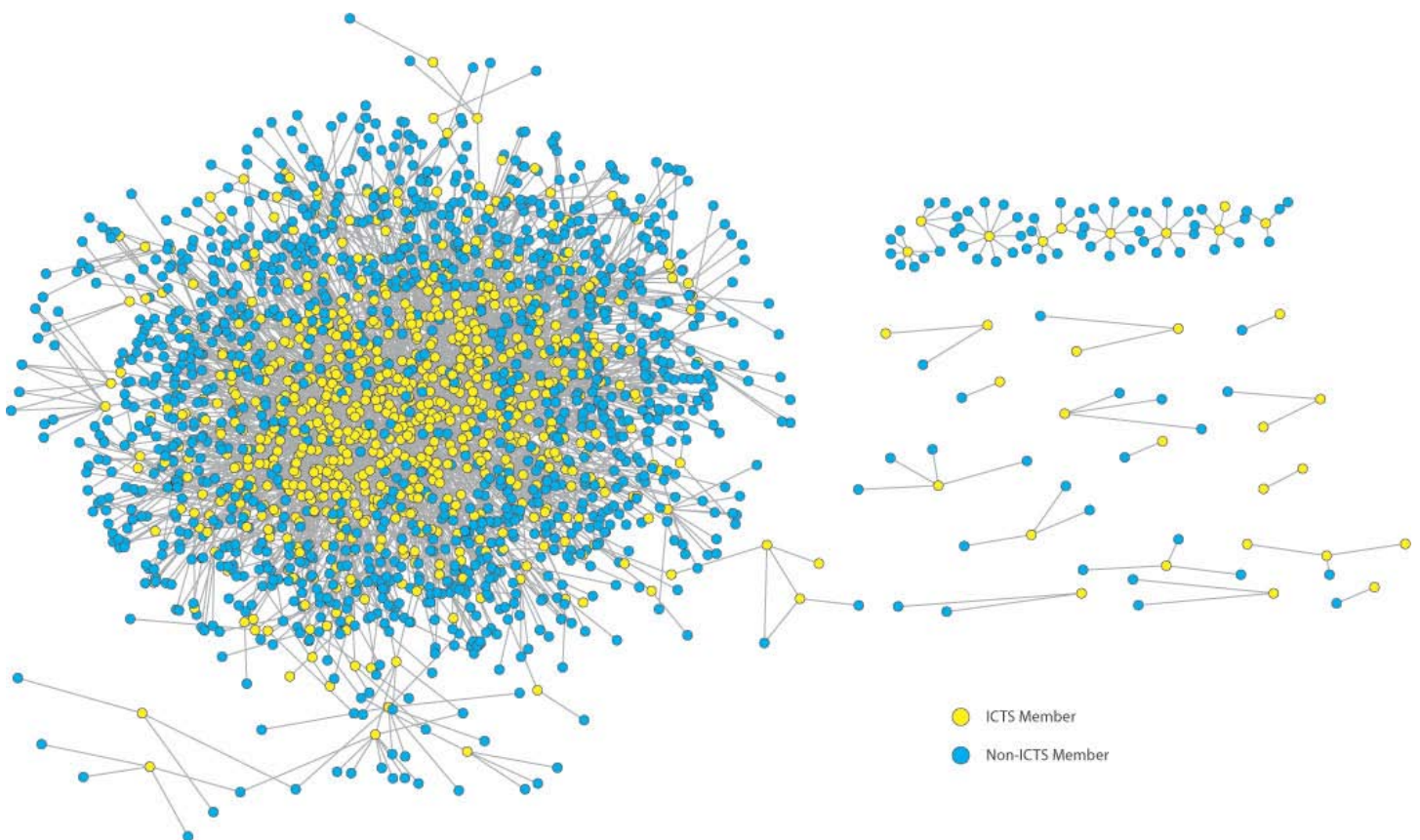


Table 3 displays the descriptive statistics for both the entire network as well as for ICTS members only. Density is the percentage of possible links in the network that actually exist. The density among ICTS members indicates that only .45% of the possible collaboration connections between members actually exist. With an average of only 3.91 collaborations among ICTS members in the network (average degree), there is room to expand the number of collaborators among members.

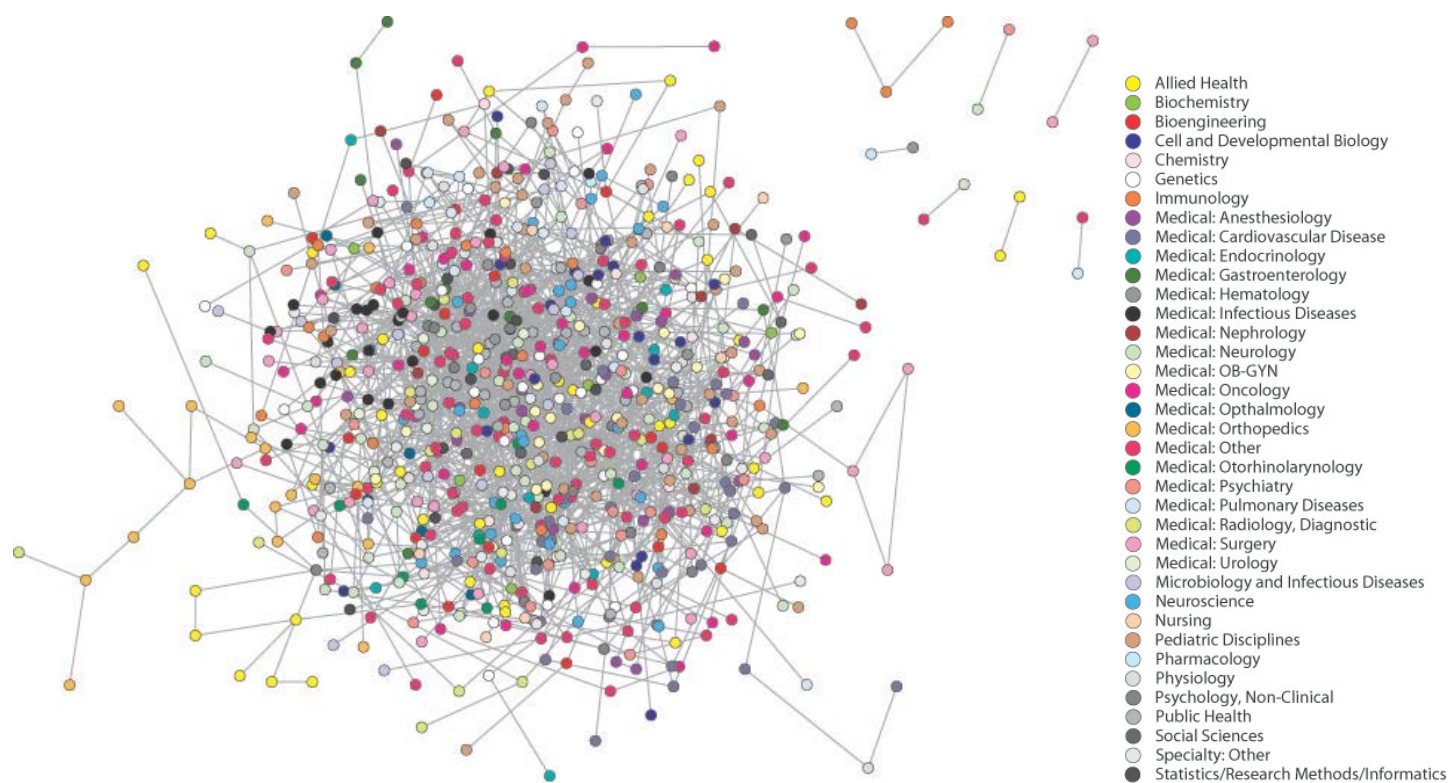
There is a strong tendency for ICTS members to collaborate with other ICTS investigators.

Table 3. Collaboration Network Descriptive Statistics

| Network | # of nodes | Density | Average Degree | Size of Largest component | Diameter |
|-------------------|------------|---------|----------------|---------------------------|----------|
| Full network | 2234 | .0014 | 3.13 | 2092 (93.6%) | 16 |
| ICTS members only | 868 | .0045 | 3.91 | 783 (90.2%) | 13 |

Figure 3 shows the network of ICTS members only, removing the 70 respondents with no ICTS collaborators, color coded according to a list of 37 disciplines (Table 4) collapsed from the initial 143 listed in Appendix D. In order to include discipline for members who did not participate in the survey, the disciplines that all ICTS members first chose when registering for ICTS were used.

Figure 3. Collaborations among ICTS Members Only



The ratio of inter-disciplinary to intra-disciplinary collaborations densities was .162, indicating that for every 1% of possible inter-disciplinary partnerships that actually exist, about 6% of the possible intra-disciplinary partnerships exist. Disciplines do not appear to be clumped together. For example, the yellow nodes (Allied Health) are spread throughout the entire network. This indicates that a fair amount of cross-discipline collaborations are occurring, though there is room for the ratio to shift towards more cross-disciplinary work.

There is a fair amount of interdisciplinary collaboration among ICTS members.

Table 4. Collapsed Disciplines and Number of Partners (n = 868)

| Discipline | # |
|---|----------|
| ALLIED HEALTH | 50 |
| BIOCHEMISTRY | 8 |
| BIOENGINEERING | 19 |
| CELL AND DEVELOPMENTAL BIOLOGY | 23 |
| CHEMISTRY | 11 |
| GENETICS | 32 |
| IMMUNOLOGY | 23 |
| MEDICAL DISCIPLINES : Anesthesiology | 23 |
| MEDICAL DISCIPLINES : Cardiovascular Diseases | 41 |
| MEDICAL DISCIPLINES : Endocrinology | 12 |
| MEDICAL DISCIPLINES : Gastroenterology | 14 |
| MEDICAL DISCIPLINES : Hematology | 12 |
| MEDICAL DISCIPLINES : Infectious Diseases | 24 |
| MEDICAL DISCIPLINES : Nephrology | 10 |
| MEDICAL DISCIPLINES : Neurology | 45 |
| MEDICAL DISCIPLINES : OB-GYN | 23 |
| MEDICAL DISCIPLINES : Oncology | 43 |
| MEDICAL DISCIPLINES : Ophthalmology | 5 |
| MEDICAL DISCIPLINES : Orthopedics | 24 |
| MEDICAL DISCIPLINES : Other | 80 |
| MEDICAL DISCIPLINES : Otorhinolaryngology | 10 |
| MEDICAL DISCIPLINES : Psychiatry | 21 |
| MEDICAL DISCIPLINES : Pulmonary Diseases | 18 |
| MEDICAL DISCIPLINES : Radiology, Diagnostic | 18 |
| MEDICAL DISCIPLINES : Surgery | 39 |
| MEDICAL DISCIPLINES : Urology | 6 |
| MICROBIOLOGY AND INFECTIOUS DISEASES | 16 |
| NEUROSCIENCE | 32 |
| NURSING | 14 |
| PEDIATRIC DISCIPLINES | 49 |
| PHARMACOLOGY | 8 |
| PHYSIOLOGY | 12 |
| PSYCHOLOGY, NON-CLINICAL | 19 |
| PUBLIC HEALTH | 36 |
| SOCIAL SCIENCES | 10 |
| Specialty: OTHER | 22 |
| STATISTICS AND/OR RESEARCH METHODS AND/OR INFORMATICS | 16 |

Top Collaborators

Table 5 lists the top 22 research collaborators identified by respondents. These top collaborators are also important leaders in the Washington University and ICTS communities, with 18 of the 22 individuals serving some kind of director, chair, or dean role, indicating the importance of leadership in collaborative work.

Table 5. Top 22 ICTS Key Collaborators

| Name | # of Collaborators | Discipline | ICTS/Institution Role |
|-----------------------|--------------------|---|---|
| Graham A. Colditz | 34 | Epidemiology, Disease Prevention & Control | Deputy Director, Institute for Public Health; Director, Program for the Elimination of Cancer Disparities, Siteman Cancer Center; Associate Director, Prevention and Control, Siteman Cancer Center |
| R. Reid Townsend | 26 | Hematology | Associate Director, Translational Pathology and Biomarker Development |
| Samuel Klein | 25 | Physiology, Integrative Biology, Nutritional Sciences | Director, Center for Applied Research Sciences; Director, Lifestyle Intervention Research Core |
| John C. Morris | 24 | Neurology | Director, Alzheimer's Disease Research Center |
| Tammie Benzinger | 23 | Neuroscience, Radiology | Director, Magnetic Resonance Imaging and Advanced Imaging Techniques |
| Tamara Hershey | 22 | Cognitive Neuroscience | Brain Behavior and Performance Unit Faculty |
| Matthew C. Ellis | 21 | Oncology | Director, Human and Mouse Linked Evaluation of Tumors |
| Steven M. Kymes | 21 | Health Economics | Director, Center for Economic Evaluation in Medicine |
| Donna Jeffe | 20 | Education | co-Director, Tracking & Evaluation |
| Joel S. Perlmutter | 20 | Neurology | Director, Brain, Behavior and Performance Unit |
| Mario Schootman | 19 | Epidemiology | Associate Director, Clinical Research Training Center |
| Elaine R. Mardis | 19 | Genomics | The Genome Institute Director of Technology Development |
| Enola Proctor | 18 | Allied Health | Associate Dean for Faculty |
| Ross C. Brownson | 18 | Epidemiology, Disease Prevention & Control | Director, Prevention Research Center; Core Leader, Dissemination & Implementation Research Core |
| Margaret A. Olsen | 18 | Epidemiology | co-Director, Center for Administrative Data Research |
| Jeffrey Peipert | 17 | OB/GYN | Vice Chair: Clinical Research OB/GYN Department |
| Mario Castro | 17 | Pulmonary Diseases | co-Director, Center for Community Engaged Research |
| Robert McKinstry | 17 | Radiology: Diagnostic | Director, Center for Clinical Imaging Research |
| Bradley Schlaggar | 17 | Neuroscience | Director, Pediatric Neurology Residency Training Program |
| Kenneth B. Schechtman | 17 | Biostatistics, Clinical Trials Methodology | Investigator, Research Design and Biostatistics Group |
| Eric Lenze | 17 | Medical: Other | Investigator, Center for Mental Health Services Research |
| Rakesh Nagarajan | 17 | Statistics & Informatics | Chair, Center for Biomedical Informatics; Director, ICTS Biomedical Informatics |

ICTS leadership collaborate at the highest degree.

SATISFACTION WITH COLLABORATION

The ICTS survey included eight items that assessed satisfaction with collaboration (Table 6). The scale was found to have high internal consistency (Cronbach $\alpha = .897$).

Survey respondents reported high satisfaction with collaborative experiences. All of the mean scores for the Satisfaction with Collaboration Items (Table 6) were above 4 (out of 5), with overall opinions in the Good to Excellent range. The highest mean score was 4.60, with 64.5% of respondents reporting that the acceptance of new ideas among collaborators was Excellent. Additionally, a majority of respondents (65.8%) felt that collaboration was Excellent for capitalizing on the strengths of different researchers.

Table 6. Satisfaction with Collaboration Items (Cronbach $\alpha = .897$)

| | Inadequate n (%) | Poor n (%) | Satisfactory n (%) | Good n (%) | Excellent n (%) | Mean ¹ |
|--|---------------------|---------------|-----------------------|---------------|--------------------|-------------------|
| 1. Acceptance of new ideas among collaborators (n=707) | 0 (0.0) | 0 (0.0) | 31 (4.4) | 220 (31.1) | 456 (64.5) | 4.60 |
| 2. Communication among collaborators (n=710) | 0 (0.0) | 8 (1.1) | 70 (9.9) | 281 (39.6) | 351 (49.4) | 4.37 |
| 3. Ability to capitalize on the strengths of different researchers (n=707) | 0 (0.0) | 1 (0.1) | 52 (7.4) | 189 (26.7) | 465 (65.8) | 4.58 |
| 4. Organization or structure of collaborative teams (n=689) | 0 (0.0) | 16 (2.3) | 102 (14.8) | 297 (43.1) | 274 (39.8) | 4.20 |
| 5. Resolution of conflicts among collaborators (n=554) | 0 (0.0) | 6 (1.1) | 82 (14.8) | 221 (39.9) | 245 (44.2) | 4.27 |
| 6. Ability to accommodate different working styles of collaborators (n=683) | 0 (0.0) | 5 (0.7) | 100 (14.6) | 306 (44.8) | 272 (39.8) | 4.24 |
| 7. Involvement of collaborators from outside Washington University (n=542) | 5 (0.9) | 19 (3.5) | 74 (13.7) | 176 (32.5) | 268 (49.4) | 4.26 |
| 8. Involvement of collaborators from diverse disciplines (n=670) | 1 (0.1) | 14 (2.1) | 72 (10.7) | 219 (32.7) | 364 (54.3) | 4.39 |

¹ These questions used Likert Scale from 1-5, 1= Inadequate, 5=Excellent

ICTS members reported high satisfaction with collaborative experiences.

IMPACT OF COLLABORATION

Six survey items assessed the impact of collaboration (Table 7, p.9). Respondents were asked to rate their views about their current research collaborations and to evaluate the overall quality of their research collaborations in terms of meeting productivity, product development, and overall productivity of collaboration. The scale had high internal consistency (Cronbach $\alpha = .789$).

Survey respondents felt strongly that collaboration has increased their productivity, as well as their quality of work.

Figure 4. In general, collaboration has improved your research productivity.

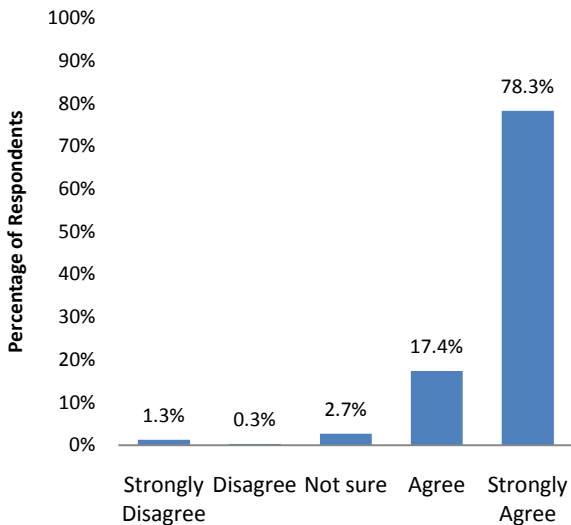


Figure 5. In general, collaboration has improved the quality of your research.

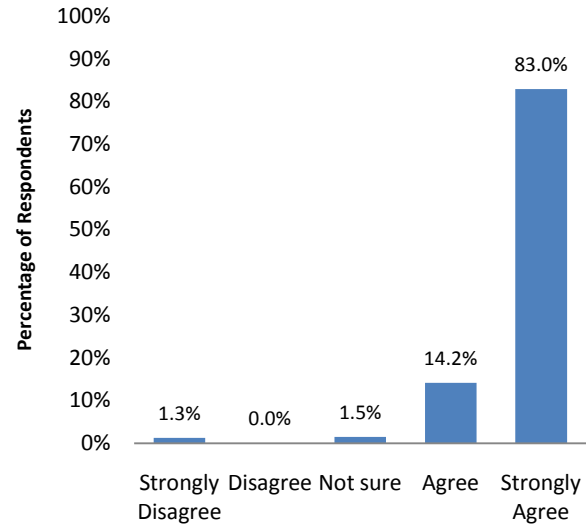
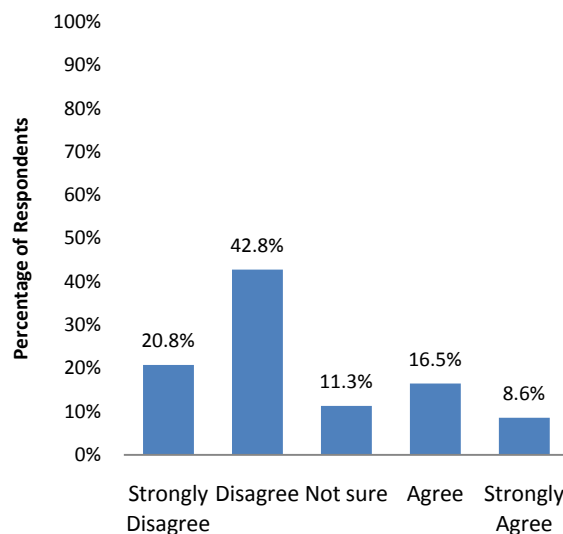


Figure 4 shows that the majority (78.3%) of respondents Strongly Agreed that collaboration has improved research productivity. Another 17.4% of respondents Agreed, for a total of 95.7% agreement with this statement. Figure 5 shows even stronger agreement (83.0% Strongly Agreed) with the statement that collaboration has improved the quality of research. Total agreement with this statement adds up to 97.2%.

Respondents also reported that collaboration had not posed a significant time burden, with a total of 63.6% disagreement with this statement (Figure 6).

Figure 6. Collaboration has posed a significant time burden in your research.



*Cronbach $\alpha = .669$ before removing "Collaboration has posed a significant time burden." Mâsse et al. (2008) also removed this item, noting that it did not load on the scale. However, the results for this item are still presented as they show a recognition of time burden.

Table 7. Impact of Collaboration Items (Cronbach α =.789)¹

| | Strongly Disagree n (%) | Disagree n (%) | Not Sure n (%) | Agree n (%) | Strongly Agree n (%) | Mean ² |
|---|----------------------------|-------------------|-----------------------|----------------|-------------------------|-------------------|
| 1. In general, collaboration has improved your research productivity. (n=711) | 9 (1.3) | 2 (0.3) | 19 (2.7) | 124 (17.4) | 557 (78.3) | 4.71 |
| 2. In general, collaboration has improved the quality of your research. (n=712) | 9 (1.3) | 0 (0.0) | 11 (1.5) | 101 (14.2) | 591 (83.0) | 4.78 |
| 3. Collaboration has posed a significant time burden in your research. (n=701) | 146 (20.8) | 300 (42.8) | 79 (11.3) | 116 (16.5) | 60 (8.6) | 2.49 |
| | Inadequate n (%) | Poor n (%) | Satisfactory n (%) | Good n (%) | Excellent n (%) | Mean ³ |
| 4. Productivity of collaboration meetings (n=692) | 0 (0.0) | 10 (1.4) | 83 (12.0) | 323 (46.7) | 276 (39.9) | 4.25 |
| 5. Productivity in developing new products (e.g., papers, proposals, courses) (n=659) | 0 (0.0) | 10 (1.5) | 114 (17.3) | 287 (43.6) | 248 (37.6) | 4.17 |
| 6. Overall productivity of collaboration (n=709) | 0 (0.0) | 3 (0.4) | 59 (8.3) | 291 (41.0) | 356 (50.2) | 4.41 |

¹ Cronbach α =.789 after removing "Collaboration has posed a significant time burden." Cronbach α =.669 for all six items.

² These questions used Likert Scale from 1-5, 1=Strongly Disagree, 5=Strongly Agree

³ Likert Scale from 1-5, 1=Inadequate, 5=Excellent

There was consensus that collaboration increases productivity and quality of work.

TRANSDISCIPLINARY RESEARCH

The survey included 15 items that assessed attitudes about transdisciplinary research (Table 8, p. 11). The scale had high internal consistency (Cronbach $\alpha = .839$).

Survey respondents expressed that they strongly valued transdisciplinary collaboration. While respondents recognized that a collaborative research article can take more time, overall, they felt that the benefits of transdisciplinary research outweighed the costs.

Figure 7 shows that a majority (83.2%) of respondents Strongly Agreed that they strongly value transdisciplinary collaboration. Total agreement with this statement was 97.6%.

There was some agreement that it takes more time to produce an article collaboratively with those of other disciplines, as shown in Figure 8. However, agreement with this statement was less strong, with total agreement adding up to a slim majority of 55.3%. Disagreement totaled 26.5% and 18.2% of respondents replied that they were Not Sure.

Figure 9 shows agreement among the respondents that the benefits of transdisciplinary collaboration outweigh the costs. A majority of respondents (67.1%) Strongly Agreed and 28.3% Somewhat Agreed, with overall agreement totaling to 95.4%

Figure 7. I would describe myself as someone who strongly values transdisciplinary collaboration.

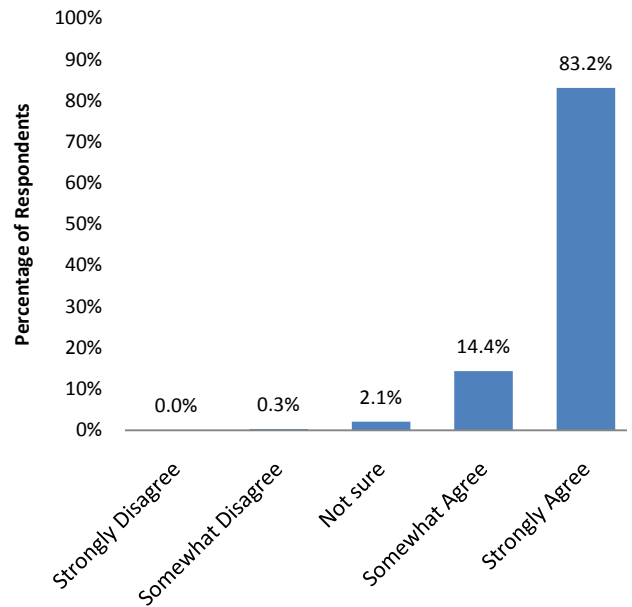


Figure 8. In transdisciplinary research, it takes more time to produce a research article.

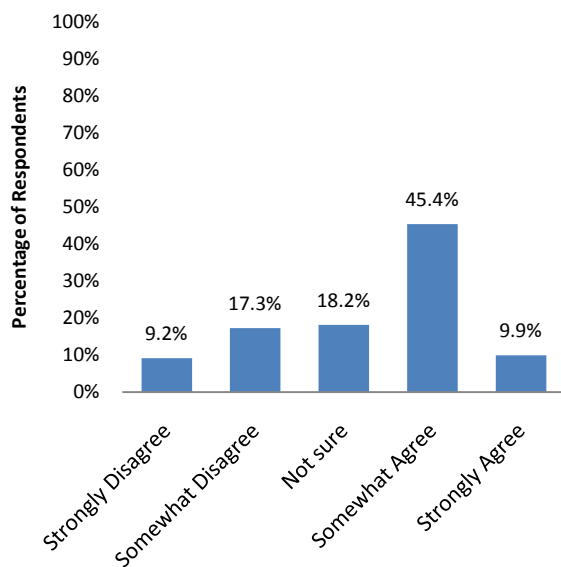


Figure 9. Generally speaking, I believe that the benefits of transdisciplinary scientific research outweigh the costs of such work.

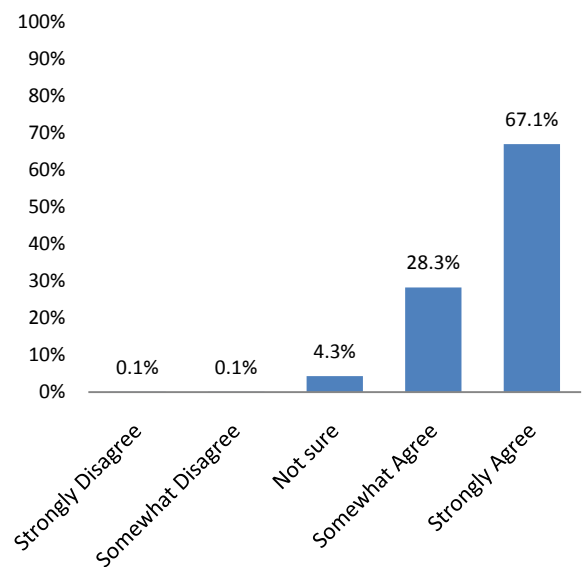


Table 8. Transdisciplinary Integration Items (Cronbach α =.839)

| | Strongly Disagree n (%) | Somewhat Disagree n (%) | Not Sure n (%) | Somewhat Agree n (%) | Strongly Agree n (%) | Mean ¹ |
|--|----------------------------|----------------------------|-------------------|-------------------------|-------------------------|-------------------|
| 1. I would describe myself as someone who strongly values transdisciplinary collaboration. (n=720) | 0 (0.0) | 2 (0.3) | 15 (2.1) | 104 (14.4) | 599 (83.2) | 4.81 |
| 2. Transdisciplinary research interferes with my ability to maintain knowledge in my primary area. (n=706) | 351 (49.7) | 220 (31.2) | 52 (7.4) | 40 (5.7) | 43 (6.1) | 1.87 |
| 3. I tend to be more productive working on my own rather than working as a member of a transdisciplinary research team. (n=710) | 208 (29.3) | 284 (40.0) | 112 (15.8) | 86 (12.1) | 20 (2.8) | 2.19 |
| 4. In a transdisciplinary research group, it takes more time to produce a research article. (n=707) | 65 (9.2) | 122 (17.3) | 129 (18.2) | 321 (45.4) | 70 (9.9) | 3.30 |
| 5. Transdisciplinary research stimulates me to change my thinking. (n=713) | 0 (0.0) | 5 (0.7) | 32 (4.5) | 280 (38.0) | 396 (53.7) | 4.50 |
| 6. I have changed the way I pursue a research idea because of my involvement in transdisciplinary research. (n=691) | 4 (0.5) | 28 (4.1) | 74 (10.7) | 255 (36.9) | 330 (47.8) | 4.27 |
| 7. Transdisciplinary research has improved how I conduct research. (n=696) | 2 (0.3) | 11 (1.6) | 61 (8.8) | 228 (32.8) | 394 (56.6) | 4.44 |
| 8. I am optimistic that transdisciplinary research among ICTS collaborators will lead to valuable scientific outcomes that could not have occurred without that kind of collaboration. (n=708) | 3 (0.4) | 6 (0.8) | 50 (7.1) | 192 (27.1) | 457 (64.5) | 4.55 |
| 9. Participating in a transdisciplinary team improves the interventions that are developed. (n=677) | 0 (0.0) | 1 (0.1) | 59 (8.7) | 224 (33.1) | 393 (58.1) | 4.49 |
| 10. Because of my involvement in transdisciplinary research, I have an increased understanding of what my own discipline brings to others. (n=698) | 2 (0.3) | 9 (1.2) | 52 (7.4) | 239 (34.2) | 396 (56.7) | 4.46 |
| 11. My transdisciplinary collaborations are sustainable over the long haul. (n=691) | 1 (0.1) | 10 (1.4) | 90 (13.0) | 241 (34.9) | 349 (50.5) | 4.34 |
| 12. Generally speaking, I believe that the benefits of transdisciplinary scientific research outweigh the inconveniences and costs of such work. (n=714) | 1 (0.1) | 1 (0.1) | 31 (4.3) | 202 (28.3) | 479 (67.1) | 4.62 |
| 13. I am comfortable working in a transdisciplinary environment. (n=711) | 0 (0.0) | 3 (0.4) | 22 (3.1) | 189 (26.6) | 497 (69.9) | 4.66 |
| 14. Overall, I am pleased with the effort I have made to engage in transdisciplinary research. (n=706) | 2 (0.3) | 18 (2.5) | 40 (5.7) | 232 (32.9) | 414 (58.6) | 4.47 |
| 15. ICTS investigators as a group are open-minded about considering research perspectives from fields other than their own. (n=686) | 4 (0.6) | 14 (2.0) | 124 (18.1) | 226 (32.9) | 318 (46.4) | 4.22 |

¹ These questions used Likert Scale from 1-5, 1=Strongly Disagree, 5=Strongly Agree

Transdisciplinary research is highly valued and the benefits of transdisciplinary research outweigh the costs.

CHANGE OVER THE PAST THREE YEARS

The survey included four items asking respondents to evaluate how their collaborative efforts have changed over the past three years (Table 9). The scale had high internal consistency (Cronbach $\alpha = .845$).

The survey responses indicated that ICTS may have helped increase collaboration over the last three years. The majority of respondents (85.5%) Agreed that they are more aware of collaborative opportunities (44.6% Somewhat Agreed and 40.9% Strongly Agreed). Additionally, Figure 10 shows that a majority (80.7%) Agreed that it is easier to engage in collaborative activities. This suggests that ICTS might not only be promoting awareness but also facilitating collaboration.

There also appears to be an opportunity for respondents to participate in new types of collaborative partnerships in the future. Although 58.0% of respondents Agreed that they are engaged in new types of collaborative partnerships, 16.5% Somewhat Disagreed and 5.3% Strongly Disagreed.

Figure 10. It is easier for me to engage in collaborative activities.

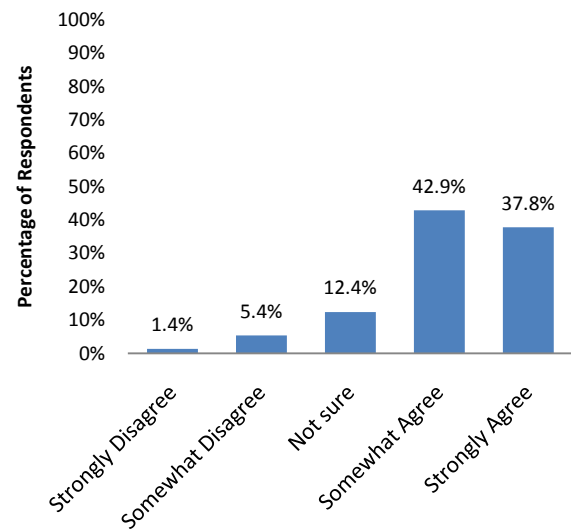


Table 9. Change Over Past Three Years Items (Cronbach $\alpha = .845$)

| | Strongly Disagree n (%) | Somewhat Disagree n (%) | Not Sure n (%) | Somewhat Agree n (%) | Strongly Agree n (%) | Mean ¹ |
|---|----------------------------|----------------------------|-------------------|-------------------------|-------------------------|-------------------|
| 1. I am more aware of collaborative opportunities. (n=706) | 11 (1.6) | 34 (4.8) | 57 (8.1) | 315 (44.6) | 289 (40.9) | 4.19 |
| 2. It is easier for me to engage in collaborative activities. (n=701) | 10 (1.4) | 38 (5.4) | 87 (12.4) | 301 (42.9) | 265 (37.8) | 4.10 |
| 3. I am more engaged in research with collaborators from a discipline or area of study that I would not have otherwise considered. (n=688) | 16 (2.3) | 47 (6.8) | 74 (10.8) | 252 (36.6) | 299 (43.5) | 4.12 |
| 4. I am engaged in new types of collaborative partnerships (e.g., industry, community, private, public, government) that I would not have otherwise considered. (n=624) | 33 (5.3) | 103 (16.5) | 95 (15.2) | 193 (30.9) | 200 (27.1) | 3.68 |

¹ These questions used Likert Scale from 1-5, 1=Strongly Disagree, 5=Strongly Agree

ICTS may have played a role in increasing collaboration over the past three years.

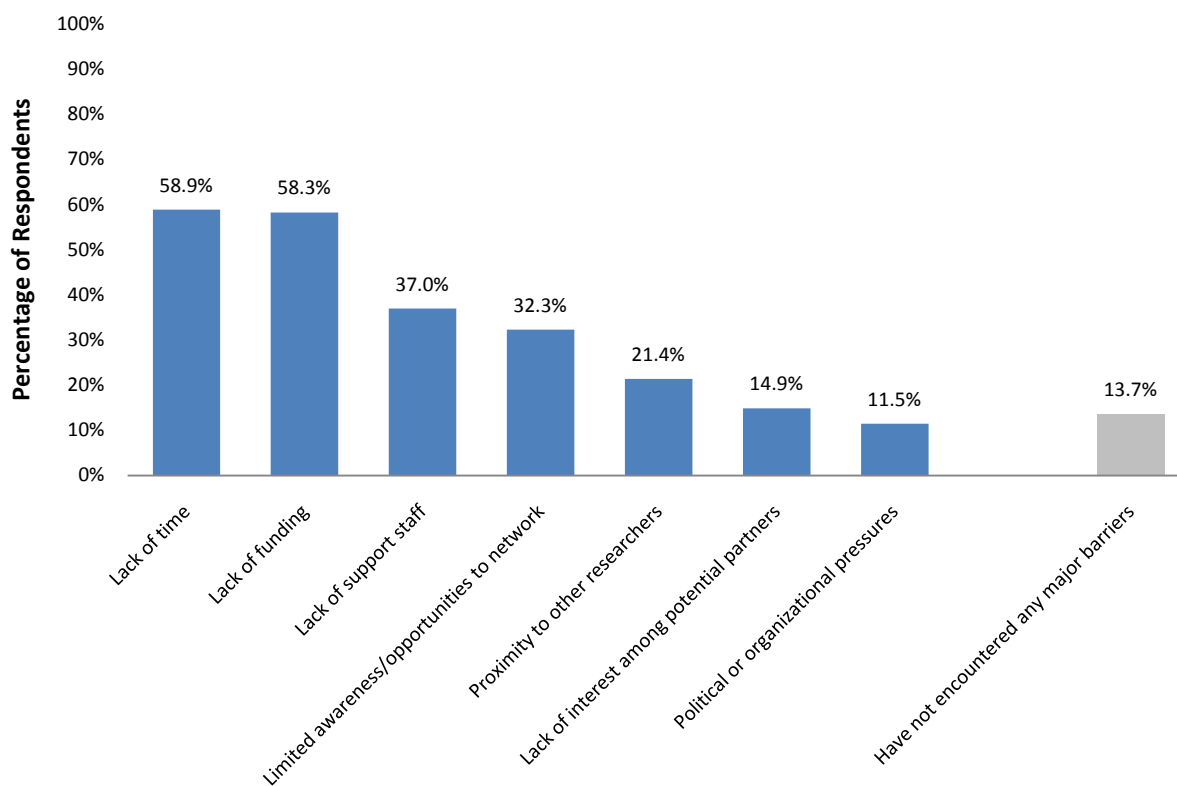
BARRIERS

The survey also asked respondents what barriers they have encountered when trying to establish research collaborations with investigators from other departments, institutions, and organizations. Lack of time and lack of funding were the most frequently cited barriers (58.9% and 58.3%, respectively). See Table 10 and Figure 11 below for all responses.

Table 10. Barriers Encountered When Trying to Establish Research Collaborations (n=737)

| | Frequency | Percentage (%) |
|---|-----------|----------------|
| Lack of time | 434 | 58.9 |
| Lack of funding | 430 | 58.3 |
| Lack of support staff to assist with collaborative research efforts | 273 | 37.0 |
| Limited awareness or opportunities to network with people outside my discipline | 238 | 32.3 |
| Proximity to other researchers | 158 | 21.4 |
| Lack of interest among potential partners | 110 | 14.9 |
| Political or organizational pressures | 85 | 11.5 |
| Have not encountered any major barriers | 101 | 13.7 |

Figure 11. Barriers encountered when trying to establish research collaborations with investigators from other departments, institutions, and organizations.



Lack of time and funding are barriers to establishing research collaborations with investigators from other departments, institutions, and organizations.

ADDITIONAL FEEDBACK

The final survey question asked respondents to provide any additional feedback about their collaborative research partnerships that would be helpful for ICTS leadership to consider in their program planning. Responses largely centered on praise for the information and resources provided by ICTS and the essential role that collaboration played in an individual's research. Many suggestions for future ICTS program planning were also provided. Increasing awareness of various forums (e.g., blogs, websites, and seminars) to identify potential collaborators was frequently mentioned.

SUMMARY

Overall, the ICTS survey provides valuable information about ICTS members' current research collaborations and their views regarding transdisciplinary research. Findings of particular interest include:

- Survey respondents reported high satisfaction with their current collaborative experiences. Across a scale of eight items, more than 80% of respondents viewed their experiences as Good to Excellent.
- Respondents reported that collaboration has improved both their research productivity and quality of work. Ninety-six percent agreed that collaboration has improved their productivity and 97.2% reported that collaboration has improved the quality of their research.
- Respondents strongly value transdisciplinary collaboration. 83.2% Strongly Agreed with the statement "I would describe myself as someone who strongly values transdisciplinary collaboration." An additional 14.4% Agreed with the statement.
- While respondents did recognize that it can take more time to produce a transdisciplinary research article, they also reported that collaboration has not posed a significant time burden in their research.
- Overall, the respondents feel that the benefits of transdisciplinary research outweigh the costs.
- Lack of time and lack of funding were identified as frequent barriers to establishing research collaborations with investigators from other departments, institutions, and organizations.

APPENDIX A: AFFILIATED SCHOOL, COLLEGE OR ENTITY

Primary School Affiliation (n=712)

| | Frequency | Percent (%) |
|---|-----------|-------------|
| School of Medicine (WU) | 615 | 86.4 |
| School of Medicine (SLU) | 28 | 3.9 |
| George Warren Brown School of Social Work (WU) | 19 | 2.7 |
| College of Arts and Sciences (WU) | 9 | 1.3 |
| School of Engineering (WU) | 9 | 1.3 |
| College of Nursing (UMSL) | 8 | 1.1 |
| Albert Gnaegi Center for Health Care Ethics (SLU) | 4 | .6 |
| Barnes Jewish Hospital (BJC) | 4 | .6 |
| Doisy College of Health Care Ethics (SLU) | 4 | .6 |
| Goldfarb School of Nursing (BJC) | 3 | .4 |
| School of Nursing (SIUE) | 3 | .4 |
| School of Public Health (SLU) | 3 | .4 |
| St. Louis Children's Hospital (BJC) | 2 | .3 |
| School of Law (WU) | 1 | .1 |

APPENDIX B: AFFILIATED DEPARTMENT, PROGRAM OR CENTER

Primary Affiliated Department, Program or Center (n=682)

| Department | School | Frequency | Percent |
|--|---------------------------------|-----------|---------|
| Internal Medicine (John T. Milliken Department of Medicine) | WU School of Medicine | 184 | 27.0% |
| Pediatrics | WU School of Medicine | 54 | 7.9% |
| Neurology | WU School of Medicine | 45 | 6.6% |
| Surgery | WU School of Medicine | 35 | 5.1% |
| Psychiatry | WU School of Medicine | 33 | 4.8% |
| Radiology | WU School of Medicine | 33 | 4.8% |
| Anesthesiology | WU School of Medicine | 26 | 3.8% |
| Pathology & Immunology | WU School of Medicine | 26 | 3.8% |
| Obstetrics & Gynecology | WU School of Medicine | 21 | 3.1% |
| Orthopaedic Surgery | WU School of Medicine | 20 | 2.9% |
| Occupational Therapy | WU School of Medicine | 17 | 2.5% |
| Physical Therapy | WU School of Medicine | 17 | 2.5% |
| Otolaryngology | WU School of Medicine | 13 | 1.9% |
| Biostatistics | WU School of Medicine | 11 | 1.6% |
| Radiation Oncology | WU School of Medicine | 10 | 1.5% |
| Neurology & Psychiatry | SLU School of Medicine | 10 | 1.5% |
| Ophthalmology and Visual Sciences | WU School of Medicine | 9 | 1.3% |
| Emergency Medicine | WU School of Medicine | 8 | 1.2% |
| Psychology | WU College of Arts and Sciences | 7 | 1.0% |
| Molecular Microbiology | WU School of Medicine | 7 | 1.0% |
| Pediatrics | SLU School of Medicine | 7 | 1.0% |
| Developmental Biology | WU School of Medicine | 6 | 0.9% |
| Genetics | WU School of Medicine | 6 | 0.9% |
| Other | WU School of Medicine | 6 | 0.9% |
| Health Communication Research Laboratory | GWB School of Social Work | 5 | 0.7% |
| Cell Biology & Physiology | WU School of Medicine | 5 | 0.7% |
| Neurological Surgery | WU School of Medicine | 5 | 0.7% |
| Mental Health Services Research, Center for | GWB School of Social Work | 4 | 0.6% |
| Biomedical Engineering | WU School of Engineering | 4 | 0.6% |
| Other | SLU School of Medicine | 4 | 0.6% |
| Institute for Public Health | GWB School of Social Work | 3 | 0.4% |
| Other | GWB School of Social Work | 3 | 0.4% |
| Anatomy & Neurobiology | WU School of Medicine | 3 | 0.4% |
| Audiology and Communication Sciences | WU School of Medicine | 3 | 0.4% |
| Biochemistry & Molecular Biophysics | WU School of Medicine | 3 | 0.4% |
| Physical Therapy and Athletic Training | SLU Doisy | 3 | 0.4% |
| Violence and Injury Prevention, Center for | GWB School of Social Work | 2 | 0.3% |
| Computer Science & Engineering | WU School of Engineering | 2 | 0.3% |
| Population Health Sciences | WU School of Medicine | 2 | 0.3% |
| Biochemistry & Molecular Biology | SLU School of Medicine | 2 | 0.3% |
| Internal Medicine | SLU School of Medicine | 2 | 0.3% |
| Community Health | SLU School of Public Health | 2 | 0.3% |

| | | | |
|---|---------------------------------|---|------|
| Biology | WU College of Arts and Sciences | 1 | 0.1% |
| Chemistry | WU College of Arts and Sciences | 1 | 0.1% |
| Obesity Prevention and Policy Research, Center for | GWB School of Social Work | 1 | 0.1% |
| Prevention Research Center in St. Louis | GWB School of Social Work | 1 | 0.1% |
| Electrical & Systems Engineering, Preston M. Green Department of | WU School of Engineering | 1 | 0.1% |
| Energy, Environmental & Chemical Engineering | WU School of Engineering | 1 | 0.1% |
| Mechanical Engineering & Materials Science | WU School of Engineering | 1 | 0.1% |
| Biology & Biomedical Sciences | WU School of Medicine | 1 | 0.1% |
| Clinical Investigation | WU School of Medicine | 1 | 0.1% |
| Siteman Cancer Center | WU School of Medicine | 1 | 0.1% |
| Clinical Laboratory Science | SLU Doisy | 1 | 0.1% |
| Family and Community Medicine | SLU School of Medicine | 1 | 0.1% |
| Center for Outcomes Research (SLUCOR) | SLU School of Medicine | 1 | 0.1% |
| Health Management and Policy | SLU School of Public Health | 1 | 0.1% |

APPENDIX C: AFFILIATED DIVISION

Primary Affiliated Division (n=422)

| Division | Department | Institution and School | Frequency | Percent |
|--|---------------------------|------------------------|-----------|---------|
| Adult Neurology | Neurology | WU SOM | 40 | 9.5% |
| Cardiology/Cardiovascular Diseases | Internal Medicine | WU SOM | 33 | 7.8% |
| Oncology | Internal Medicine | WU SOM | 27 | 6.4% |
| Division of General Surgery | Surgery | WU SOM | 22 | 5.2% |
| Infectious Diseases (Clinical) | Internal Medicine | WU SOM | 19 | 4.5% |
| Division of Radiological Sciences | Radiology | WU SOM | 18 | 4.3% |
| Gastroenterology | Internal Medicine | WU SOM | 15 | 3.6% |
| Geriatrics and Nutritional Science | Internal Medicine | WU SOM | 15 | 3.6% |
| Pulmonary and Critical Care Medicine | Internal Medicine | WU SOM | 15 | 3.6% |
| Division of Diagnostic Radiology | Radiology | WU SOM | 14 | 3.3% |
| Endocrinology/Metabolism/Lipid Research | Internal Medicine | WU SOM | 11 | 2.6% |
| Laboratory and Genomic Medicine | Pathology & Immunology | WU SOM | 11 | 2.6% |
| General Medical Sciences | Internal Medicine | WU SOM | 9 | 2.1% |
| Renal Diseases | Internal Medicine | WU SOM | 9 | 2.1% |
| Immunobiology | Pathology & Immunology | WU SOM | 9 | 2.1% |
| Newborn Medicine | Pediatrics | WU SOM | 9 | 2.1% |
| Clinical & Translational Research, Division of (DoCTR) | Anesthesiology | WU SOM | 7 | 1.7% |
| Allergy, Immunology & Pulmonary Medicine | Pediatrics | WU SOM | 7 | 1.7% |
| Maternal-Fetal Medicine and Ultrasound | Obstetrics and Gynecology | WU SOM | 6 | 1.4% |
| Health Behavior Research | Internal Medicine | WU SOM | 5 | 1.2% |
| Cardiology | Pediatrics | WU SOM | 5 | 1.2% |
| Critical Care Medicine | Pediatrics | WU SOM | 5 | 1.2% |
| Endocrinology and Diabetes | Pediatrics | WU SOM | 5 | 1.2% |
| Clinical Radiation Oncology | Radiation Oncology | WU SOM | 5 | 1.2% |
| Cardiothoracic Division | Anesthesiology | WU SOM | 4 | 0.9% |
| Critical Care Division | Anesthesiology | WU SOM | 4 | 0.9% |
| Infectious Diseases (Basic Science) | Internal Medicine | WU SOM | 4 | 0.9% |
| Medical Education | Internal Medicine | WU SOM | 4 | 0.9% |
| Rheumatology | Internal Medicine | WU SOM | 4 | 0.9% |
| Pediatric and Developmental Neurology | Neurology | WU SOM | 4 | 0.9% |
| General Obstetrics and Gynecology | Obstetrics and Gynecology | WU SOM | 4 | 0.9% |
| Gynecologic Oncology | Obstetrics and Gynecology | WU SOM | 4 | 0.9% |
| Anatomic and Molecular Pathology | Pathology & Immunology | WU SOM | 4 | 0.9% |
| Emergency Medicine | Pediatrics | WU SOM | 4 | 0.9% |
| Gastroenterology and Nutrition | Pediatrics | WU SOM | 4 | 0.9% |
| Hematology and Oncology | Pediatrics | WU SOM | 4 | 0.9% |
| Nephrology | Pediatrics | WU SOM | 4 | 0.9% |
| Bone and Mineral Diseases | Internal Medicine | WU SOM | 3 | 0.7% |
| Hematology | Internal Medicine | WU SOM | 3 | 0.7% |
| Reproductive Endocrinology and Infertility | Obstetrics and Gynecology | WU SOM | 3 | 0.7% |
| Infectious Diseases | Pediatrics | WU SOM | 3 | 0.7% |

| | | | | |
|--|------------------------------|---------|---|------|
| Division of Urology | Surgery | WU SOM | 3 | 0.7% |
| Basic Research, Division of (DBR) | Anesthesiology | WU SOM | 2 | 0.5% |
| Obstetrics | Anesthesiology | WU SOM | 2 | 0.5% |
| Pain Center, Washington University (WUPC) | Anesthesiology | WU SOM | 2 | 0.5% |
| Dermatology | Internal Medicine | WU SOM | 2 | 0.5% |
| Pediatric Neurosurgery | Neurological Surgery | WU SOM | 2 | 0.5% |
| Neuropathology | Pathology & Immunology | WU SOM | 2 | 0.5% |
| Cancer Biology | Radiation Oncology | WU SOM | 2 | 0.5% |
| Medical Physics | Radiation Oncology | WU SOM | 2 | 0.5% |
| Division of Plastic and Reconstructive Surgery | Surgery | WU SOM | 2 | 0.5% |
| Pediatric Anesthesiology and Pain Medicine, Division of | Anesthesiology | WU SOM | 1 | 0.2% |
| Bioorganic Chemistry and Molecular Pharmacology | Internal Medicine | WU SOM | 1 | 0.2% |
| Adolescent and Pediatric Gynecology | Obstetrics and Gynecology | WU SOM | 1 | 0.2% |
| Urogynecology | Obstetrics and Gynecology | WU SOM | 1 | 0.2% |
| Genetics and Genomic Medicine | Pediatrics | WU SOM | 1 | 0.2% |
| Hospitalist Medicine | Pediatrics | WU SOM | 1 | 0.2% |
| Laboratory Medicine | Pediatrics | WU SOM | 1 | 0.2% |
| Rheumatology | Pediatrics | WU SOM | 1 | 0.2% |
| Bioinformatics and Outcomes | Radiation Oncology | WU SOM | 1 | 0.2% |
| Division of Cardiothoracic Surgery | Surgery | WU SOM | 1 | 0.2% |
| Division of Pediatric Surgery | Surgery | WU SOM | 1 | 0.2% |
| Cardiology | Internal Medicine | SLU SOM | 1 | 0.2% |
| Infectious Diseases | Internal Medicine | SLU SOM | 1 | 0.2% |
| Health Policy | Health Management and Policy | SLU SPH | 1 | 0.2% |
| Biostatistics | Community Health | SLU SPH | 1 | 0.2% |
| Epidemiology | Community Health | SLU SPH | 1 | 0.2% |

APPENDIX D: DISCIPLINE

| | Frequency | Percent |
|--|-----------|---------|
| Medical Disciplines: Neurology | 34 | 4.6 |
| Medical Disciplines: Cardiovascular Diseases | 32 | 4.3 |
| Medical Disciplines: Oncology | 32 | 4.3 |
| Medical Disciplines: Orthopedics | 18 | 2.4 |
| Nursing | 18 | 2.4 |
| Public Health: Epidemiology | 18 | 2.4 |
| Medical Disciplines: General | 17 | 2.3 |
| Medical Disciplines: Infectious Diseases | 17 | 2.3 |
| Medical Disciplines: OB-GYN | 17 | 2.3 |
| Pediatric Disciplines: General | 16 | 2.2 |
| Medical Disciplines: Pulmonary Diseases | 15 | 2 |
| Medical Disciplines: Surgery | 15 | 2 |
| Cell and Developmental Biology: Cell Biology | 14 | 1.9 |
| Neuroscience: Systems/Integrative Neuroscience | 12 | 1.6 |
| Allied Health: Rehabilitation | 11 | 1.5 |
| Genetics: Genetic Epidemiology | 11 | 1.5 |
| Neuroscience: General | 11 | 1.5 |
| Allied Health: Physical Therapy | 10 | 1.4 |
| Medical Disciplines: Gastroenterology | 10 | 1.4 |
| Medical Disciplines: Nephrology | 10 | 1.4 |
| Genetics: Molecular Genetics | 9 | 1.2 |
| Medical Disciplines: Anesthesiology | 9 | 1.2 |
| Medical Disciplines: Radiology, Diagnostic | 9 | 1.2 |
| Genetics: Genomics | 8 | 1.1 |
| Molecular Biology | 8 | 1.1 |
| Neuroscience: Neurodegeneration | 8 | 1.1 |
| Bioengineering: Imaging | 7 | 0.9 |
| Immunology: General | 7 | 0.9 |
| Medical Disciplines: Otorhinolaryngology | 7 | 0.9 |
| Medical Disciplines: Psychiatry | 7 | 0.9 |
| Microbiology and Infectious Diseases: Pathogenesis of Infectious Diseases | 7 | 0.9 |
| Neuroscience: Cognitive Neuroscience | 7 | 0.9 |
| Pediatric Disciplines: Pediatric, Prematurity and Newborn | 7 | 0.9 |
| Public Health: General | 7 | 0.9 |
| Public Health: Disease Prevention and Control | 7 | 0.9 |
| Public Health: Health Services Research | 7 | 0.9 |
| Statistics and/or Research Methods and/or Informatics: Biostatistics and/or Biometry | 7 | 0.9 |
| Allied Health: Audiology | 6 | 0.8 |
| Allied Health: Social Work | 6 | 0.8 |
| Cell and Developmental Biology: Developmental Biology | 6 | 0.8 |
| Genetics: Developmental Genetics | 6 | 0.8 |
| Immunology: Inflammation | 6 | 0.8 |

| | | |
|--|---|-----|
| Medical Disciplines: Clinical Psychology | 6 | 0.8 |
| Medical Disciplines: Diabetes | 6 | 0.8 |
| Pharmacology: General | 6 | 0.8 |
| Genetics: Human Genetics | 5 | 0.7 |
| Medical Disciplines: Endocrinology | 5 | 0.7 |
| Medical Disciplines: Geriatrics | 5 | 0.7 |
| Medical Disciplines: Hematology | 5 | 0.7 |
| Medical Disciplines: HIV/AIDS | 5 | 0.7 |
| Medical Disciplines: Ophthalmology | 5 | 0.7 |
| Microbiology and Infectious Diseases: Virology | 5 | 0.7 |
| Neuroscience: Behavioral Neuroscience | 5 | 0.7 |
| Nutritional Sciences | 5 | 0.7 |
| Social Sciences: Bioethics | 5 | 0.7 |
| Statistics and/or Research Methods and/or Informatics: | 5 | 0.7 |
| Allied Health: General | 4 | 0.5 |
| Biophysics: General | 4 | 0.5 |
| Medical Disciplines: Clinical Laboratory Medicine | 4 | 0.5 |
| Medical Disciplines: Liver Diseases | 4 | 0.5 |
| Neuroscience: Developmental Neuroscience | 4 | 0.5 |
| Neuroscience: Neuropharmacology | 4 | 0.5 |
| Physiology: Integrative Biology | 4 | 0.5 |
| Psychology, Non-Clinical: Behavioral Medicine (non-clinical) | 4 | 0.5 |
| Allied Health: Pharmacy | 3 | 0.4 |
| Biochemistry: Metabolism | 3 | 0.4 |
| Bioengineering: Biomechanical Engineering | 3 | 0.4 |
| Cell and Developmental Biology: | 3 | 0.4 |
| Genetics: General | 3 | 0.4 |
| Immunology: Immunopathology | 3 | 0.4 |
| Immunology: Transplantation Biology | 3 | 0.4 |
| Medical Disciplines: Behavioral Medicine (clinical) | 3 | 0.4 |
| Neuroscience: Cellular Neuroscience | 3 | 0.4 |
| Pediatric Disciplines: Pediatric Endocrinology | 3 | 0.4 |
| Pediatric Disciplines: Pediatric Oncology | 3 | 0.4 |
| Public Health: Health Economics | 3 | 0.4 |
| Allied Health: Exercise Physiology (clinical) | 2 | 0.3 |
| Allied Health: Speech-language Pathology | 2 | 0.3 |
| Biochemistry: General | 2 | 0.3 |
| Biochemistry: Biological Chemistry | 2 | 0.3 |
| Bioengineering: Biomaterials | 2 | 0.3 |
| Bioengineering: Nanotechnology | 2 | 0.3 |
| Bioengineering: Rehabilitation Engineering | 2 | 0.3 |
| Chemistry: Medicinal Chemistry | 2 | 0.3 |
| Immunology: Asthma and Allergic Mechanisms | 2 | 0.3 |
| Immunology: Vaccine Development | 2 | 0.3 |
| Medical Disciplines: Immunology | 2 | 0.3 |
| Medical Disciplines: Metabolic Diseases | 2 | 0.3 |
| Medical Disciplines: Nuclear Medicine | 2 | 0.3 |

| | | |
|---|---|-----|
| Medical Disciplines: Rehabilitation Medicine | 2 | 0.3 |
| Medical Disciplines: Trauma | 2 | 0.3 |
| Medical Disciplines: Urology | 2 | 0.3 |
| Microbiology and Infectious Diseases | 2 | 0.3 |
| Microbiology and Infectious Diseases: Bacteriology | 2 | 0.3 |
| Neuroscience: Molecular Neuroscience | 2 | 0.3 |
| Pediatric Disciplines: Pediatric Hematology | 2 | 0.3 |
| Pharmacology: Molecular Pharmacology | 2 | 0.3 |
| Pharmacology: Pharmacogenetics | 2 | 0.3 |
| Physiology: General | 2 | 0.3 |
| Physiology: Aging | 2 | 0.3 |
| Physiology: Endocrinology (basic science) | 2 | 0.3 |
| Physiology: Molecular Medicine | 2 | 0.3 |
| Psychology, Non-Clinical: Personality and Emotion | 2 | 0.3 |
| Psychology, Non-Clinical: Social Psychology | 2 | 0.3 |
| Public Health: Health Education | 2 | 0.3 |
| Public Health: Occupational and Environmental Health | 2 | 0.3 |
| Social Sciences: General | 2 | 0.3 |
| Social Sciences: Education | 2 | 0.3 |
| Statistics and/or Research Methods and/or Informatics: Bioinformatics | 2 | 0.3 |
| Allied Health: Medical Genetics | 1 | 0.1 |
| Allied Health: Occupational Health | 1 | 0.1 |
| Bioengineering: Bioelectric/Biomagnetic | 1 | 0.1 |
| Bioengineering: Mathematical Modeling | 1 | 0.1 |
| Biophysics: Spectroscopy | 1 | 0.1 |
| Chemistry: Analytical Chemistry | 1 | 0.1 |
| Chemistry: Bioorganic Chemistry | 1 | 0.1 |
| Chemistry: Physical Chemistry | 1 | 0.1 |
| Genetics: Behavioral Genetics | 1 | 0.1 |
| Immunology: Autoimmunity | 1 | 0.1 |
| Immunology: Immunogenetics | 1 | 0.1 |
| Immunology: Immunoregulation | 1 | 0.1 |
| Medical Disciplines: Allergy | 1 | 0.1 |
| Medical Disciplines: Clinical Nutrition | 1 | 0.1 |
| Medical Disciplines: Connective Tissue Diseases | 1 | 0.1 |
| Medical Disciplines: Preventive Medicine | 1 | 0.1 |
| Medical Disciplines: Radiation, Interventional | 1 | 0.1 |
| Microbiology and Infectious Diseases: Mycology | 1 | 0.1 |
| Microbiology and Infectious Diseases: Parasitology | 1 | 0.1 |
| Neuroscience: Communication Neuroscience | 1 | 0.1 |
| Pharmacology: Pharmacodynamics | 1 | 0.1 |
| Psychology, Non-Clinical: Behavioral Communication Sciences | 1 | 0.1 |
| Psychology, Non-Clinical: Cognitive Psychology | 1 | 0.1 |
| Psychology, Non-Clinical: Neuropsychology | 1 | 0.1 |
| Psychology, Non-Clinical: Psychology of Aging | 1 | 0.1 |
| Radiation, Non-Clinical | 1 | 0.1 |
| Radiation, Non-Clinical: Nuclear Chemistry | 1 | 0.1 |

| | | |
|---|---|-----|
| Radiation, Non-Clinical: Radiation Physics | 1 | 0.1 |
| Radiation, Non-Clinical: Radiobiology | 1 | 0.1 |
| Social Sciences: Economics | 1 | 0.1 |
| Statistics and/or Research Methods and/or Informatics: Clinical Trials Methodology | 1 | 0.1 |
| Statistics and/or Research Methods and/or Informatics: Computational Science | 1 | 0.1 |
| Statistics and/or Research Methods and/or Informatics: Information Science | 1 | 0.1 |
| Trauma, Non-Clinical | 1 | 0.1 |