



Quantifying Cross-Disciplinary Research in the Health Sciences: A Bibliometric Analysis Using Author Affiliations

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OBJECTIVE: Develop a bibliometric method to quantify cross-disciplinary research activity.

BACKGROUND

- Growing recognition of value of cross-disciplinary research teams for innovation and translational research.
- Institutional investments in training and resources to promote team science.
- Methods needed to document and compare cross-disciplinary activities of individuals and groups within and across institutions.

METHODS

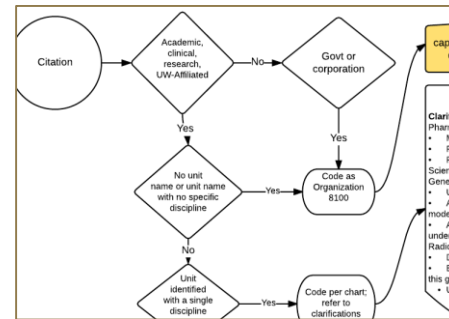
- 63 health sciences scholars selected.
- Research articles from Scopus used as evidence of scholars' research activity.
- Departmental affiliations of authors used as indications of discipline.
- NIH "field of training" classification scheme modified to enable classification of all affiliations named in the corpus of scholars' articles.
- Discipline count assigned to each article; average discipline count assigned to each author.

RESULTS

- Discipline counts permitted comparison of three peer groups who received NIH career development ("K") awards 2005-2010. *[manuscript submitted]*

PROJECT AT A GLANCE

63 Scholars from 27 Disciplines.
1283 Research Articles Examined.
11289 Authors from 111 Disciplines.
145 Disciplines in Classification Scheme.
2.6 = Median Number of Disciplines per Article.



Segment of classification flowchart

6100 ALLIED HEALTH	6800 Nuclear Medicine
6120 Anesthesiology	6800 OB/GYN
6120 Community Psychology	6910 Oncology
6120 Exercise Physiology (clinical)	6920 Orthopedic and Surgery
6140 Medical Genetics	6930 Orthopedic and Surgery
6150 Occupational Health	6940 Preventive Medicine
6160 Palliative Care	6950 Radiation, Interventional / Radiation Oncology /
6170 Physical Therapy	6955 Pathology
6180 Pharmacy / Pharmaceutical Sciences	6960 Preventive Medicine
6190 Social Work	6960 Pulmonary Diseases
6210 Speech-language Pathology	6970 Radiology, Diagnostic
6211 Rehabilitation	6980 Rehabilitation Medicine
6400 DENTISTRY / ORAL HEALTH	6990 Psychiatry
6500 CLINICAL DISCIPLINES (Medicine, Clinical Research, School of Medicine and other Schools)	7000 Sleep Medicine
6510 Allergy	7110 Surgery (general / transplant / unspecified)
6520 Anesthesiology	7220 Trauma
6530 Behavioral Medicine (clinical)	7130 Urology
6540 Cardiovascular Diseases	7140 Plastic Surgery
6545 Cardiothoracic Surgery	7150 Vascular Surgery
6550 Clinical Laboratory Medicine	7300 PEDIATRIC DISCIPLINES
6560 Clinical Nutrition	7310 Pediatric Endocrinology
	7320 Pediatric Hematology
	7330 Pediatric Oncology

Segment of "Exploratory Classification Scheme of Health Sciences Disciplines" bit.ly/nih_scheme

PublicationID	YearPub	NumberOf Authors	NumberOf Disc	DisciplinesOf Authors	LocationOf Affiliation	OrgType
1	2011	12	5	6930	1	30
1				4410	1	30
1				6935	1	30
1				3920	1	30
1				7110	1	20
1				3920	1	50
1				4410	1	50
1				6930	2	40
2	2008	8	4	6930	1	30
2				6935	1	30
2				3920	1	30
2				6930	1	20
2				3920	1	50
2				6930	2	30
2				8100	2	30
2				3900	1	50
3	2012	10	6	3920	1	50
3				4410	1	50
3				6930	1	30
3				7110	1	20
3				6500	1	50
3				6935	1	30
3				6930	2	20
3				3920	1	30
4	2008	12	5	3920	1	50
4				4410	1	50
4				3920	1	30
4				6930	1	30
4				6935	1	30
4				4410	1	30
4				7110	1	20
4				6930	2	30
4				6930	2	30
4				8100	1	50

Data collection form for discipline counts

DISCUSSION

- Bibliographic data limitations require analysis by departmental affiliation rather than by training.
- Concept of "discipline" not strictly defined.
- Not a 1:1 relationship between individual and affiliation.
- Publications may include multiple affiliations per individual or none at all.
- Affiliations described differently in academic, clinical, governmental, and corporate institutions.
- Department names and author affiliations can change over time.
- Authors in fields such as computer science and engineering often publish research findings as conference papers (excluded from this analysis).
- NIH classification oriented towards clinical medicine. Modified scheme accentuates this bias due to disciplines represented in scholars' articles.

IMPLICATIONS

- Discipline classification of author affiliations complements existing methods of describing cross-disciplinary research activity, including:
 - Journal discipline classification.
 - Citation analyses.
 - Network analyses.
- Method could be improved through development of a consensus classification scheme.