SLEEP-DISORDERED BREATHING(SDB) RESEARCH PAPERS ABOUT OBESITY

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GOAL

- Investigation of sleep-disordered breathing(SDB) research about obesity
 - Who did more research in this field?
 - What are their connections look like?
 - Who is expert?
 - What are topics?
 - When and where the paper was published?

DATASET

- 4087 papers sleep-disordered breathing(SDB) research papers about obesity from PubMed
- Use Genism with Python(LDA) to cluster title and abstract into 6 topics for each record
- One paper may have
 - None author: because of the limitation of data scraped
 - Many authors: need transform data to create social network
 - Here we just use the first author in each record
- Use Stanford Named Entity Recognizer (NER) to extract organization and location information

ID	TITLE	ABSTRACT	YEAR	MAGAZINE	AUTHORI	TOPIC	ORGANIZATIO N	LOCATION
25197813	Combined effects of sleep disordered breathing and	To examine the combined impact of sleep disordered	2014	Sleep.	Korcarz CE	3	Barnet, University of Wisconsin	
25499598	Sleep-disordered breathing, sleep duration, and	To examine independent associations between sleep-disordered	2015	J Pediatr.	Bonuck K	2	Medical Research Council	Bristol, United Kingdom
24048143	Central sleep apnea in obese children with sleep-	In contrast to obstructive sleep apnea (OSA), central sleep	2014	Int J Obes (Lond).	Chou CH	2	Department of Otolaryngology , National	

DATASET - SOCIAL NETWORK

JSON file for creating social network graph

Nodes: author

Edges: co-work in same paper

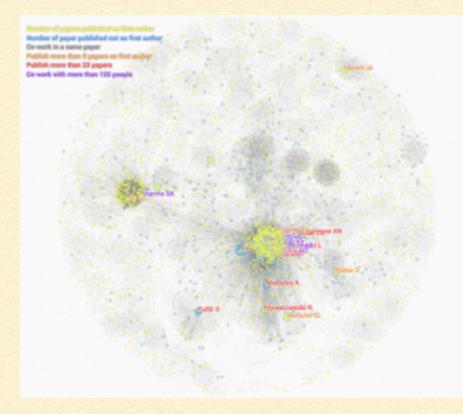
```
{"nodes":[
    {
        "name":"Gozal D",
        "Count":65, //number
    of papers
        "Topic0":0, //number of
        papers in topic0
        "Topic1":6,
        "Topic2":0,
        "Topic3":5,
        "Topic4":0,
```

"Topic5":0, "Countfirst":11,// number of papers as first author "Countother":54,// number of papers not as first author "Connections":179 // number of people working on same paper },

```
...
"links":[
    {
        "source":5705,
        "target":9164,
        "weight":1 //number of
    times publish paper
    together
    },
......
],
```

VISUALIZATION

- <u>http://yilinwei.com/project/SDB_about_obesity</u>
- Tools
 - D3.js, Crossfilter.js, Dc.js, HTML, Bootstrap
- Structure
 - A force-layout to present relation between all authors
 - Bar charts to show number of articles by topic, author, magazine, organization, location and year
 - A table to list filter results and link to PubMed for further information

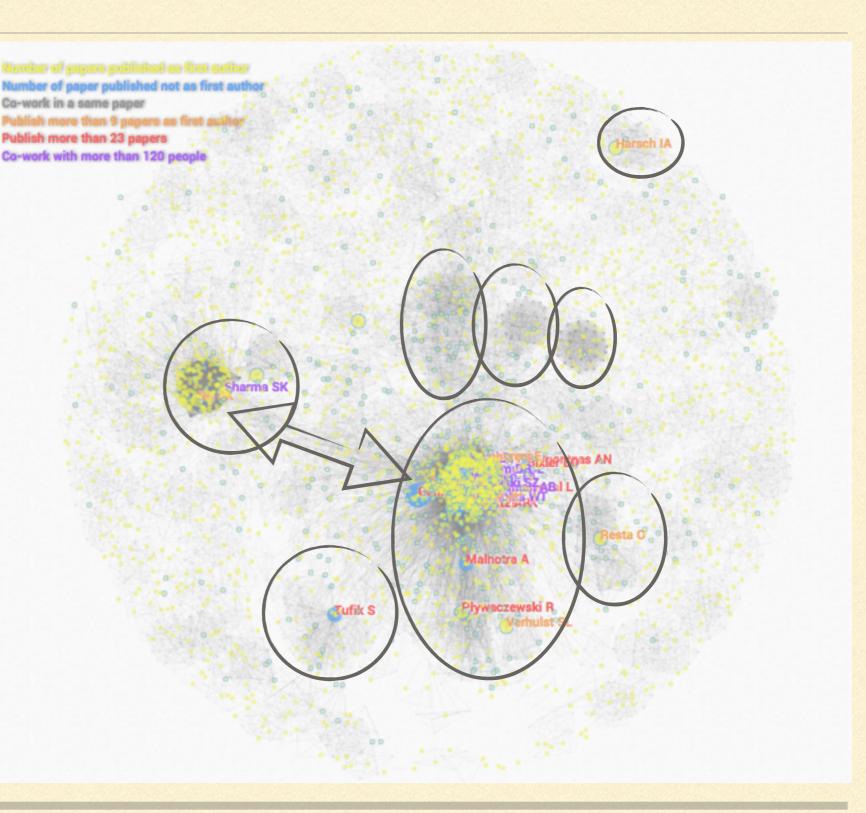




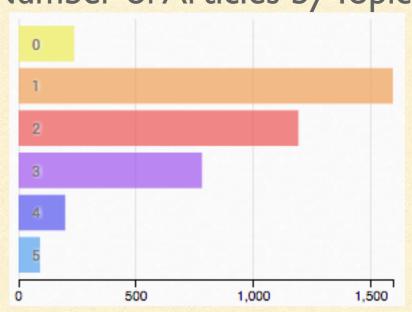
 There are 8 main cluster doing research about
 SDO and obesity

The most
 important two are
 Malnotra A
 community and
 Sharma SK
 community

 Resta O, Harsch IA etc. are experts in this field



- Cluster of title and abstract give us these 6 topics
 - topic diff=0.607451, rho=0.577350
 - topic #0 (0.167): 0.003*gh + 0.003*imt + 0.002*craniofacial + 0.002*osa + 0.002*osahs + 0.002*dimensions + 0.002*pws + 0.002*cephalometric + 0.002*soft + 0.002*maxillomandible
 - topic #1 (0.167): 0.005*osa + 0.004*cardiovascular + 0.003*disease + 0.003*apnea + 0.003*osas + 0.003*syndrome + 0.002*obstructive + 0.002*hypertension + 0.002*treatment + 0.002*airway
 - topic #2 (0.167): 0.006*osas + 0.005*cpap + 0.003*+/- + 0.003*p + 0.003*osa + 0.003*0 + 0.003*patients + 0.002*treatment + 0.002*airway + 0.002*pulmonary
 - topic #3 (0.167): 0.004*osa + 0.003*cardiovascular + 0.003*osas + 0.003*hypertension + 0.002*inflammation + 0.002*patients + 0.002*bradyarrhythmia + 0.002*disease + 0.002*+/- + 0.002*0
 - topic #4 (0.167): 0.005*pickwick + 0.004*stroke + 0.002*syndrome + 0.001*aspects + 0.001*disorders + 0.001*imbalance + 0.001*advancements + 0.001*modifiable + 0.001*snoring + 0.001*pathogenesis



Number of Articles by Topics

Topic I has the largest number of paper

- Most of research was conducted at
 - City: Boston, Cleveland, Rochester, Chicago, Beijing, Baltimore etc.
 - Country: USA, Italy,
 Brazil, Japan, France,
 Sweden, UK, China etc.

USA	
Italy	
Brazil	
Boston, MA	
Japan	
Cleveland, USA	
France	
Sweden	
UK	
Rochester, USA	
Chicago, IL	
Beijing, China	
Cleveland, Ohio	
Baltimore, MD	

Boston

- Brigham and Women's Hospital most important research organization
- Eckert DJ, Jordan AS andShore SA
 experts





Chest.

Number of Articles by Organization

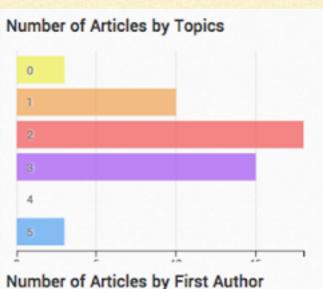


Number of Articles by Location reset

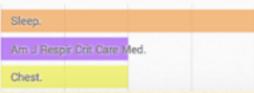
Cleveland

Case Western Number of Articles by Topics Reserve 0 University most important research organization

- Patel SR and Redline S experts
- Researches in Cleveland focus more on topic 2 and 3







Number of Articles by Organization

Case Western Reserve University Case Western Reserve University School of Medicine Rainbow Babies and Children's Hospital, Case Western Re Case School of Medicine

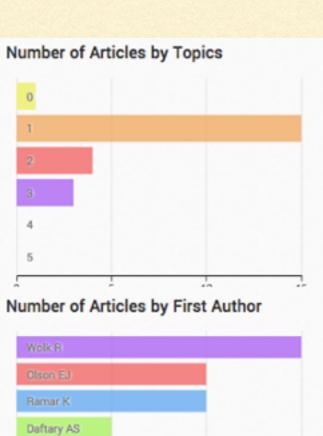
Department of Medicine, Case Western Reserve University Department of Epidemiology and Biostatistics, Case West Department of Anesthesia, Case Western Reserve Univers Clinical Epidemiology, Case Western Reserve University, F Department of Epidemiology and Biostatistics, School of Department of Gastroenterology and Hepatology, Digestiv Department of Gastroenterology, Digestive Disease Institu Department of Hospital Medicine (Medicine Institute, Clev Department of Hospital Medicine, Cleveland Clinic Founds Department of Internal Medicine, Fairview Hospital Western Reserve University, MetroHealth Medical Center Department of Medicine, Louis Stokes VA Medical Center Department of Medicine, University Hospitals Case Medic Department of Obstetrics and Gynecology, Case Western Department of Orthodontics, School of Dentistry Department of Pathology, Case Western Reserve Universi Department of Pediatrics, Case Western Reserve Universit Department of Pediatrics, Case Western Reserve Universi Department of Pediatrics, Case Western Reserve Universit Digestive Disease Institute, Cleveland Clinic GM, Case Western Reserve University Maternal Fetal Medicine, MetroHealth Medical Center-Cas Western Reserve University, Mahidol University Pediatric Pulmonology, Rainbow Babies and Childrens Ho Rainbow Babies & Children's Hospital, Case Western Resi Rainbow Babies and Children's Hospital Center for Sleep Disorders Research, Case Western Reser Sleep Medicine and Center for Clinical Investigation, Univ Sleep Medicine, Case Western Reserve University Turan, Department of Outcomes Research University Hospital Case Medical Center, Case Western R-University Hospital and Case Western Reserve University University Hospitals Case Medical Center Department of 1 University Hospitals of Cleveland Western Reserve University Western Reserve University MetroHealth Medical Center MetroHealth Medical Center, Case Western Reserve Unive Department of Pediatrics, Pritzker School of Medicine Affiliated Jinxiang Hospital of Jining Medical College Affiliated Sixth People's Hospital, Otolaryngology Institute Ahima, University of Pennsylvania School of Medicine

Ahmanson-UCLA Cardiomyopathy Center, School of Medi

Number of Articles by Location reset

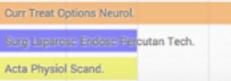
Rochester

- Mayo Clinc College of Medicinemost important research organization
- Wolkr R,
 Olson EJ and
 Ramar K experts
- Researches in Rochester focus more on topic I





ander of Articles by Magazine



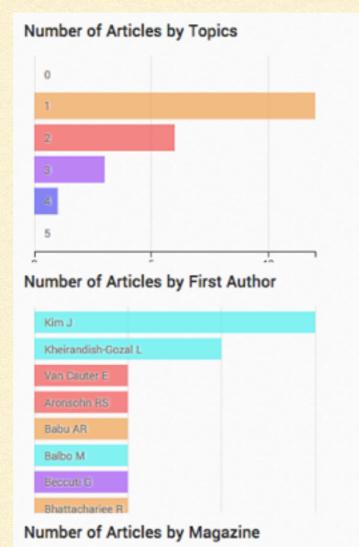
Number of Articles by Organization

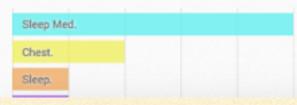
Center for Sleep Medicine, Mayo Clin Critical Care Medicine, Mayo Clinic Department of Internal Medicine, Mayo Clinic Mayo Clinic Sleep Medicine, Mayo Clinic and Foundation BJ, Mayo Clinic Center for Sleep Medicine Cardiovascular Diseases, Mayo Clinic Department of Anesthesiology, College of Medicine Department of Anesthesiology, Mayo Clinic Department of Anesthesiology, Mayo Clinic College of Me Department of Internal Medicine, Cardiovascular Disease: Department of Medicine, Cardiovascular Diseases and Div Department of Medicine, Mayo Clinic College of Medicine Department of Medicine, Mayo Medical School Department of Surgery, Mayo Clinic Mayo Clinic College of Medicine Mayo Clinic College of Medicine, Critical Care Medicine Pediatric Surgery, Mayo Clinic Department of Pediatrics, Pritzker School of Medicine AG, Metabolic Diseases Group AG, Samuel Lunenfeld Research Institute AG, University of Thessaly School of Medicine AG, University of Thessaly School of Medicine and Lariss AG, Wayne State University- School of Medicine AO, Pediatric Gastroenterology, Hepatology and Nutrition AO, Reproductive Endocrinology AO, Reproductive Endocrinology & Infertility AO, University of Utah AP, Department of Medicine and Therapeutics AP, Department of Mental Health AP, Department of Pulmonology AP, Maastricht University ASL Roma Academic Department of Endocrinology, Beaumont Hospi Adelaide Institute for Sleep Health, Repatriation General F Administrative Pharmacy, University of Iowa Colleges of 1 Adolescent Medicine, Queen Mary Hospital Adolescent Psychopathology Unit, VII University Adult Health Nursing Department, University of South Ala Advocate Illinois Masonic Family Medicine Residency Aerospace Medicine, Mayo Clinic Affiliated Communities Medical Center, Willmar Avenue S Affiliated Jinxiang Hospital of Jining Medical College Affiliated Sixth People's Hospital, Otolaryngology Institut Ahima, University of Pennsylvania School of Medicine Ahmanson-UCLA Cardiomyopathy Center, School of Medi a label a small and a tail, some last a f

Number of Articles by Location reset

Chicago

- University of Chicago and Pritzker School of Medicine most important research organization
- Kim J and Kheirandish-Gozal L experts
- Researches in Chicago focus more on topic





Number of Articles by Organization

University of Chicago Department of Pediatrics, Pritzker School of Medicine Comer Children's Hospital, Pritzker School of Medicine Department of Medicine, University of Chicago University of Chicago Pritzker School of Medicine Advocate Illinois Masonic Family Medicine Residency Chronobiology and Neuroendocrinology Research Laborat Comer Children's Hospital, The University of Chicago Comer Children's Hospital, University of Chicago Department of Anesthesiology, Northwestern Memorial H Metabolism and Health Center, Department of Medicine Pediatric Sleep Medicine, The University of Chicago Rush University Medical Center Sleep Research Laboratory, Department of Neurology Department of Anesthesia, University Hospital of Northeri AG, Chest Medicine AG, First University Department of Pediatrics AG, General Internal Medicine, University of Colorado Sch AG, Massachusetts General Hospital AG, Metabolic Diseases Group AG, Samuel Lunenfeld Research Institute AG, University of Thessaly School of Medicine AG, University of Thessaly School of Medicine and Lariss: AG, Wayne State University- School of Medicine AO, Pediatric Gastroenterology, Hepatology and Nutrition AO, Reproductive Endocrinology AO, Reproductive Endocrinology & Infertility AO, University of Utah AP, Department of Medicine and Therapeutics AP, Department of Mental Health AP, Department of Pulmonology AP, Maastricht University ASL Roma Academic Department of Endocrinology, Beaumont Hospi Adelaide Institute for Sleep Health, Repatriation General F Administrative Pharmacy, University of Iowa Colleges of 1 Adolescent Medicine, Queen Mary Hospital Adolescent Psychopathology Unit, VII University Adult Health Nursing Department, University of South Ala 105th Hospital, PLA Aerospace Medicine, Mayo Clinic Affiliated Communities Medical Center, Willmar Avenue S' Affiliated Jinxiang Hospital of Jining Medical College Affiliated Sixth People's Hospital, Otolaryngology Institute Ahima, University of Pennsylvania School of Medicine Ahmanson-UCLA Cardiomyopathy Center, School of Medi

Number of Articles by Location reset

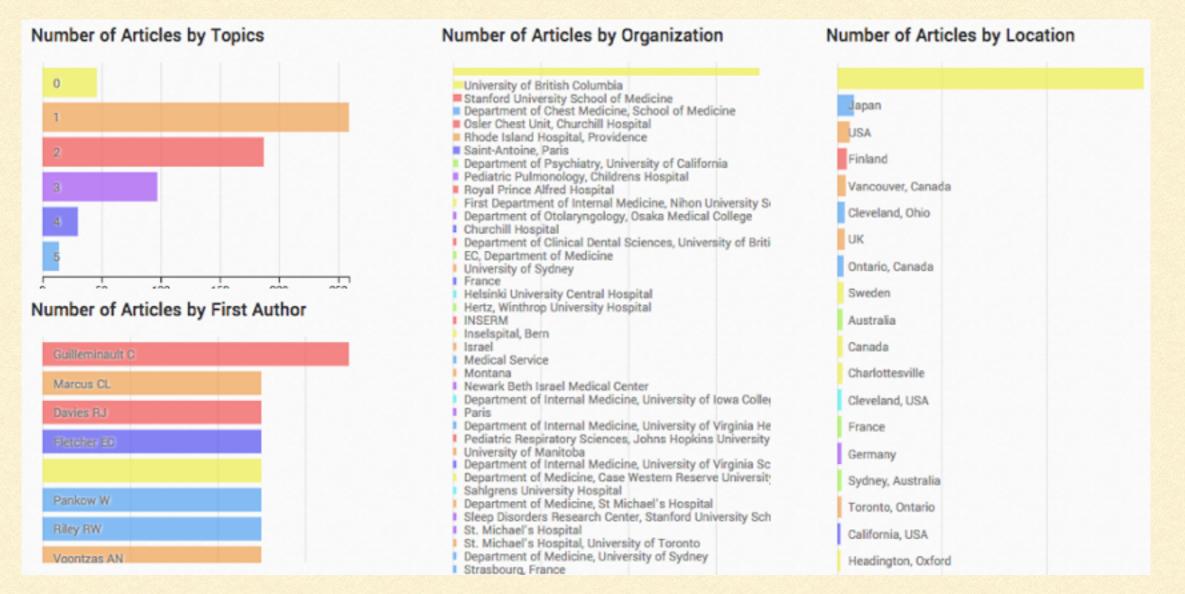
Beijing, China

- Pekin University People's Hospital and Third Hospital and Capital Medical University most important research organization
- Zhang LQ and Xu Z - experts
- Researches in Beijing focus more on topic 2 and have almost no research in topic 4 and 5



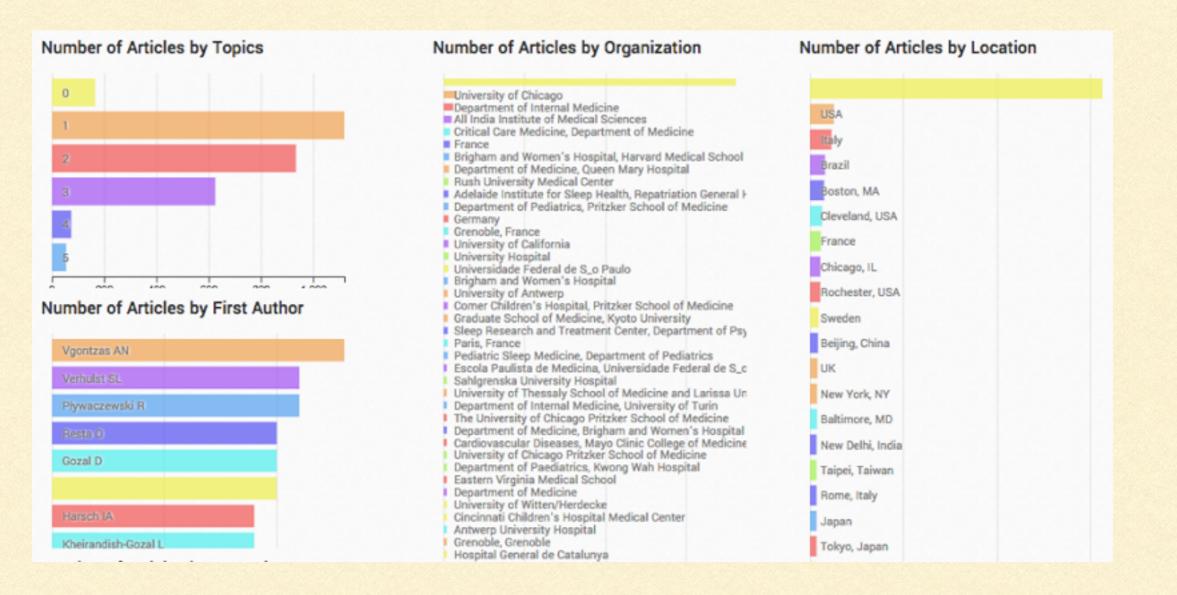
Number of Articles by Location reset Peking University People's Hospital Peking University Third Hospital Respiratory Department, Capital Medical University Third Hospital of Peking University USA YM, Department of Otorhinolaryngology Italy Beijing Children's Hospital Affiliated to Capital University Beijing Institute of Respiratory Medicine, Capital Medical Brazil Department of Biomedical Engineering, Peking University Department of Plastic Surgery, Beijing Chaoyang Hospiata Boston, MA PUMC Hospital, CAMS Peking Union Medical College Hospital Peking Union Medical College Hospital, Peking Union Med Japan People's Hospital, Beijing Medical University Cleveland, USA Respiratory Department, Capital University of Medical Sci Department of Pediatrics, Pritzker School of Medicine France AG, Chest Medicine AG, First University Department of Pediatrics AG, General Internal Medicine, University of Colorado Sch Sweden AG, Massachusetts General Hospital AG, Metabolic Diseases Group UK AG, Samuel Lunenfeld Research Institute AG, University of Thessaly School of Medicine Rochester, USA AG, University of Thessaly School of Medicine and Lariss: AG, Wayne State University- School of Medicine Chicago, IL AO, Pediatric Gastroenterology, Hepatology and Nutrition AO, Reproductive Endocrinology Beijing, China AO, Reproductive Endocrinology & Infertility AO, University of Utah Cleveland, Ohio AP, Department of Medicine and Therapeutics AP, Department of Mental Health AP, Department of Pulmonology Baltimore, MD AP, Maastricht University Taipei, Taiwan ASL Roma Academic Department of Endocrinology, Beaumont Hospi Canada Adelaide Institute for Sleep Health, Repatriation General H Administrative Pharmacy, University of Iowa Colleges of ? New York, NY Adolescent Medicine, Queen Mary Hospital Adolescent Psychopathology Unit, VII University Tokyo, Japan Adult Health Nursing Department, University of South Ala Advocate Illinois Masonic Family Medicine Residency Germany Aerospace Medicine, Mayo Clinic Affiliated Communities Medical Center, Willmar Avenue S' Rome, Italy Affiliated Jinxiang Hospital of Jining Medical College Affiliated Sixth People's Hospital, Otolaryngology Institute Ahima, University of Pennsylvania School of Medicine Philadelphia, Pennsylvania Ahmanson-UCLA Cardiomyopathy Center, School of Medi Chicago, Illinois

1985-2000



Japan, Finland and Canada was leading countries in this research field during 1985-2000

2000-2015



USA, Italy, Brazil, France etc. replaced Japan and Finland during 2000-2015

RECOMMENDATION

- Researchers publishing most paper as first author, publishing most paper and cooperating with most people are not always the same person
 - When invite a research as a consultant, a company should distinguish the value of his/her paper
- Different organizations and researchers concentrate on certain research domain
 - When choose an institute to cooperate on research about SDB and obesity, a company should pay attention to organizations' and researchers' research domain/topic

FURTHER IMPROVEMENT

- Merge organization and location with same meaning, e.g. Bethesda, MD and Bethesda, USA
- Present location with map not bar chart
- Find a way to load social network for a large dataset faster on webpage

The End

Yilin Wei