

Understanding Patients' Concerns and Expectations About Hospitals By Mining Feedback Data

Presented by:

Yuhao Liu, MPA

Research Associate

Center for Health Workforce Studies

School of Public Health | University at Albany, SUNY

yliu32@albany.edu

May 1, 2019

15th Annual AAMC Health Workforce Research Conference

Washington D.C.



Center for Health Workforce Studies

- The Center for Health Workforce Studies (CHWS) was established in 1996
- Mission: To provide timely, accurate information and conduct policy-relevant research about the health workforce
- Goal: To assist health, professional, and educational organizations, policy makers, and other stakeholders to understand issues related to the supply, demand, distribution, and the use of health workers

hospital

Rating at least
Any rating

All reviews

WRITE A REVIEW

All reviews

WRITE A REVIEW

Albany Memorial Hospital
2.9 ★★★★★ (68)
General hospital · 600 Northern Blvd

St. Peter's Hospital
3.4 ★★★★★ (139)
General hospital · 315 S Manning Blvd

Albany Med South Clinical Campus
3.3 ★★★★★ (18)
General hospital · 25 Hackett Blvd
Open until 5:00 PM

Bernard and Millie Duker Children's Hospital at Albany Med
3.2 ★★★★★ (9)
Children's Hospital · 43 New Scotland Ave

Albany Stratton VA Medical Center
4.0 ★★★★★ (66)
Veterans hospital · 113 Holland Ave

Albany Medical Center Eye Clinic
Hospital · 47 New Scotland Ave

Sort by: Most relevant

3.4 ★★★★★
139 reviews

5

4

3

2

1

Mr. Vacca
Local Guide · 17 reviews · 26 photos

★★★★★ a week ago

The nurses and doctors at this hospital are miracle workers. I can't speak highly enough about the facilities, the kindness of the staff and support from everyone...even the parking attendant! I highly recommend this hospital if you are looking for a place to have your baby! ☑☑

👍 1 Share

Sort by: Most relevant

2.5 ★★★★★
37 reviews

5

4

3

2

1

Jill Belcher
4 reviews

★★★★★ a month ago

Seen PA Jenna Locaputo on 2-4-19. Was way too much in a hurry and have seen her in the past, was not pleasant. Will never go to this urgent care again the worse experience ever. And top it off my grandson goes there and goes to his ...

[More](#)

👍 Like Share

Sheila Dempsey
1 review

★★★★★ 3 weeks ago

I only go here for blood work since it is convenient. I have never, not once, had a friendly phlebotomist. I sign in, go to sit and hear "Come in". She never got up or moved her face from the computer screen. I walked in and said "hi ...

[More](#)

👍 1 Share

Summer smith
1 review

★★★★★ 4 months ago

Had to go in for blood work, and I thought the

Showing results

Update results when map moves

Background and Purpose of Study

- Understanding patients' concerns and expectations regarding hospitals is crucially important for providers and administrators to improve service quality.
- In the internet era, information required for such attempts has become more accessible and affordable, as a huge and increasing amount of unsolicited feedback is provided on crowd-sourced review websites (Google Maps, Yelp, etc.).
- The purpose of this study is to better understand patients' concerns and expectations by analyzing feedback data collected on the internet.

Data Source for Study

- A list of all hospitals in U.S. was obtained from Data.gov
 - 'Hospitals', hospital name and address
- A web crawler was created to retrieve individual ratings and comments as well as hospitals' overall ratings from Google Maps.
 - 7,496 hospitals → 6,735 can be found in Google Maps
→ 5,888 have ratings and comments

Data Source for Study

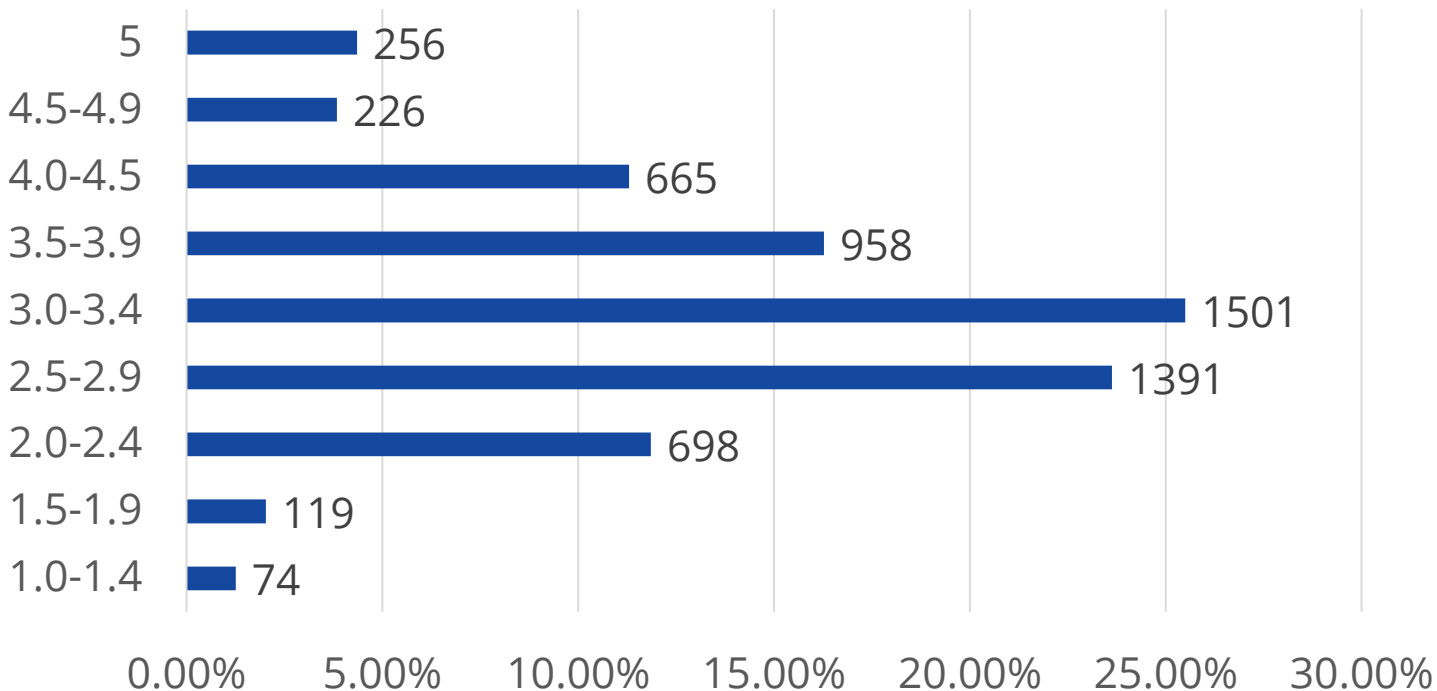
1	1	5	I had an amazing experience both times. Staff and nurses were very nice. I loved my nurses. I
2	2	2	Parking is still extremely bad! Today I went to visit my brother in law and went to main entra
3	3	1	The wait times in this ER are disgusting! I ve been here twice in the past month and each wait
4	4	5	They did a great job getting me in to be seen for an emergency. I lost the ability to swallow ar
5	5	5	Very long story short after memorial hospital in North Conway almost killed my mom CMC sa
6	6	5	Had labwork stellar staff stellar experience and I have a LOT of experiences in this. Front desl
7	7	4	I had a very positive experience. I was well cared for and well taken care of. My only compla
8	8	5	I had to go into the ER a year ago and have an emergency surgery. All the nurses treated me v
9	9	5	In the past few weeks I have sought medical care at Monadnock Community Hospital with var
10	10	5	The psychiatry office here is great. Dr Stevens is thorough and very helpful. Not all psychiatri:
11	11	5	Both my boyfriend and I are pretty healthy people overall so when we had to take my boyfrie
12	12	1	Got billing for something that I have no record of and have to wait until Monday to figure this
13	13	3	Mixed reviews over the years but mostly good- I have been to the ER twice with potential he
14	14	1	One of The worst Hospitals in New England. No Compassion for the patient. Doctors are no w
15	15	5	WOW! What an incredible company to work for! When I arrive at work every morning I am alv
16	16	4	Almost a 5 star but one Doctor I had there took it away. He was from Serbia and moved on fro
17	17	5	had to go in for blood work, and I thought the

Methods

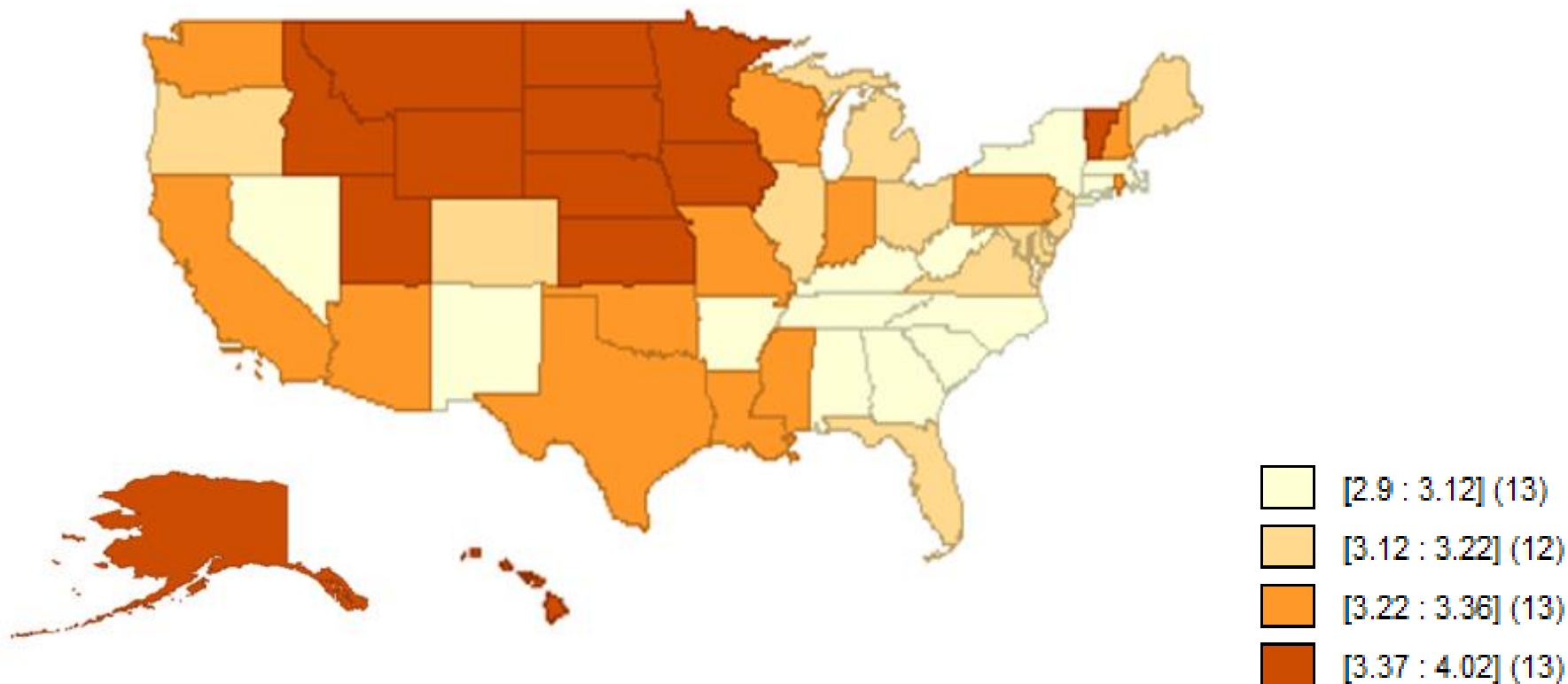
- Overall ratings:
 - Distributions of score range
 - Mean values by 50 states
- Individual ratings and comments:
 - Classify as positive, neutral and negative
 - Most frequent two-gram terms
 - Text clustering analysis

Mean, Median and Distribution of Overall Ratings of Hospitals

- Distribution of hospitals by overall rating groups
 - N=5,888, scale of 1 to 5

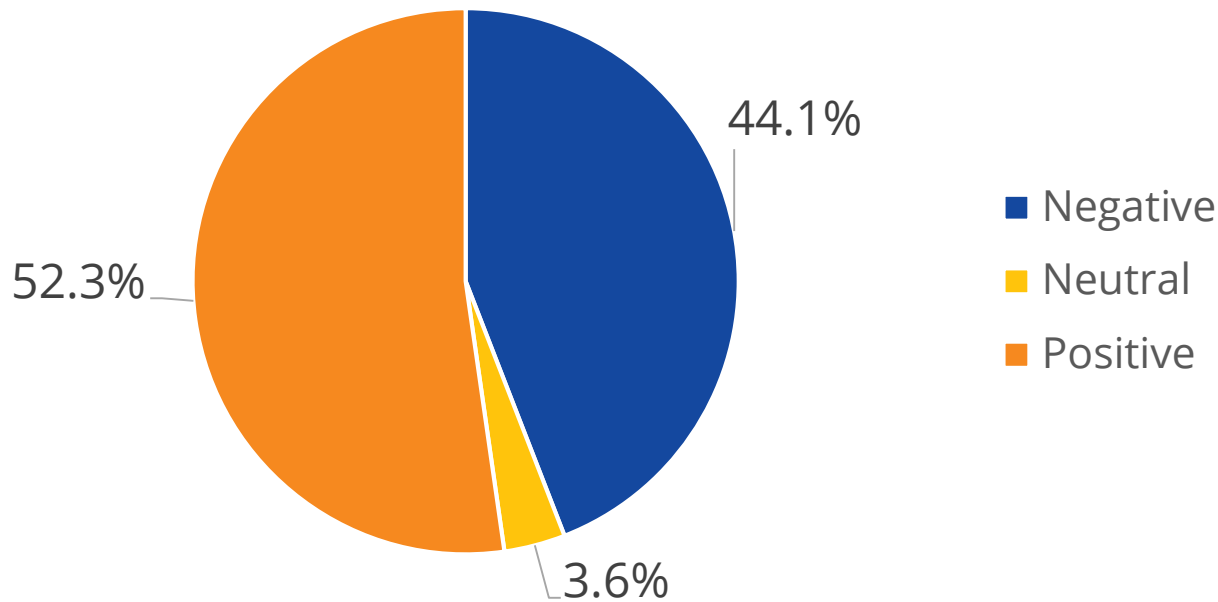


Mean value of Overall Ratings of Hospitals by 50 States



Classification of Individual Ratings and Comments

- Individual rating ≤ 2 → Negative rating and comment
- Individual rating = 3 → Neutral rating and comment
- Individual rating ≥ 4 → Positive rating and comment



N=26,141

Data Cleaning for Text Analysis on Comments

- Remove punctuation
- Covert all letters to lower-case
- Remove stop words (the, also, to, and)
- Stemming (looks, looked, looking → look)

Most Frequent Two-gram Terms

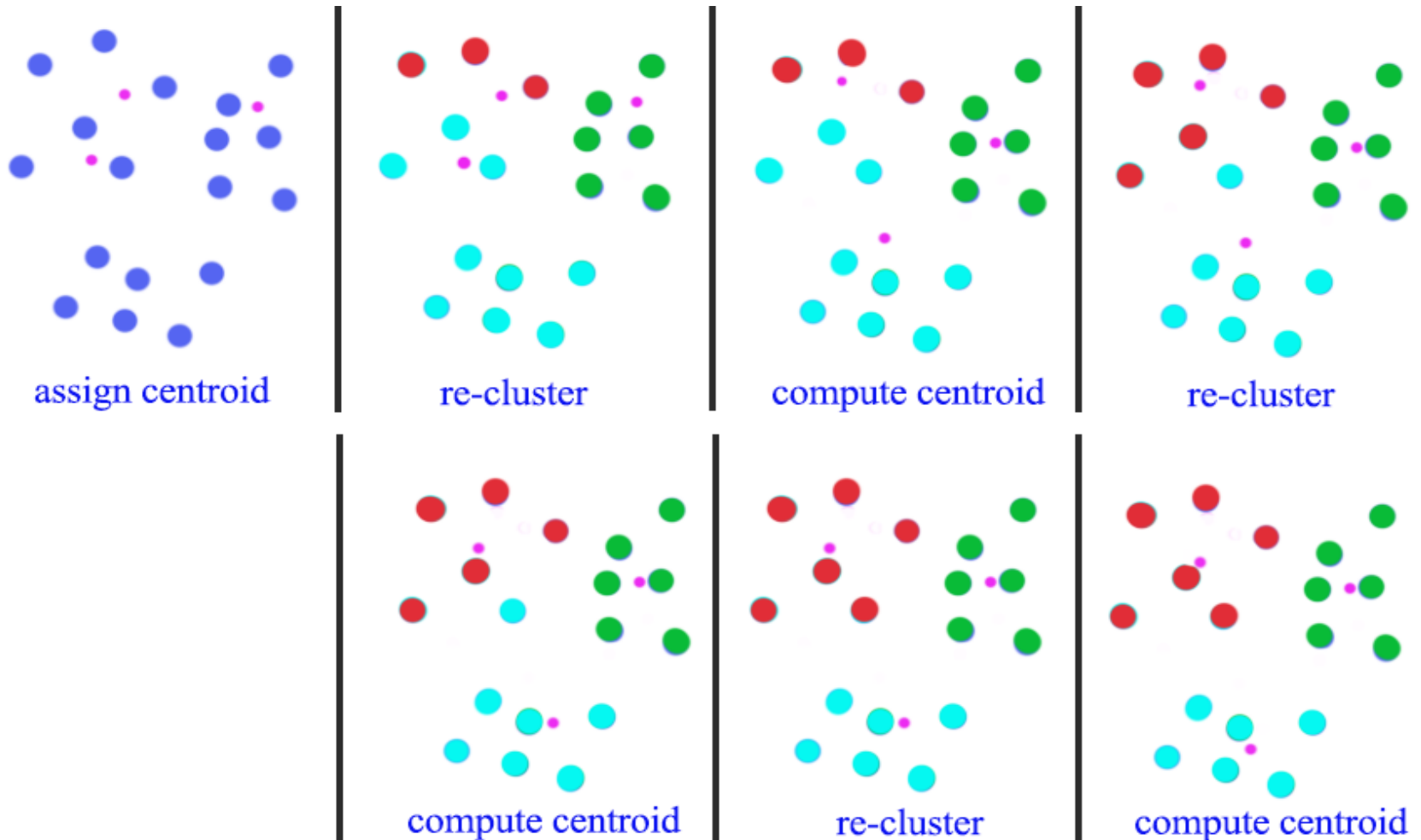
Positive comments

highly recommend	639
emergency room	557
doctors (and) nurses	499
great care	478
excellent care	451
nursing staff	413
nurses doctors	413
staff friendly	392
good care	381
recommend hospital	373
hospital staff	355
great experience	341
best hospital	322
make sure	311
medical center	306
staff great	297
great staff	290
taken care	289
best care	271
care received	268

Negative comments

emergency room	771
waiting room	681
worst hospital	470
sent home	392
don('t) know	382
year old	342
don('t) care	300
family member	300
went (to) er	273
loved ones	254
treated like	254
blood pressure	249
care (about/for) patients	247
make sure	245
feel like	236
urgent care	234
waited hours	222
waste time	216
worst experience	208
customer service	202

K-mean Clustering Algorithm



Top Representative Words for Four Clusters

1st Cluster

insurance
billing
pay
department
bills
paid
collections
payment
received
company

2nd Cluster

wait
hour
seen
waited
minutes
appointment
long
30
finally
blood

3rd Cluster

family
mother
loved
mom
days
facility
member
surgery
ones
father

4th Cluster

bad
better
want
service
work
treated
terrible
really
unprofessional
daughter

Key Findings and Implications: Hospital Administrators

- Most hospitals in US receive a neutral rating from their visitors on average, which varies by state and region.
- Hospital administrators may wish to improve billing and payment processes, reduce waiting times, make facilities more accessible for aged patients and improve service quality.
- Hospitals administrators may wish to make patients feel they are receiving excellent and friendly care from hospital staff.

Key Findings and Implications: Methods

- Patient feedback on crowdsourced review websites is readily available for analysis and can be informative.
- Text mining techniques can dramatically improve the efficiency of classifying patients' feedback and identifying their underlying meaning.

Limitations of Study

- Some overall ratings are based on very few users' feedback, which might lead to biased conclusions.
- Does not investigate reasons for disparities of overall ratings by state and region.
- Subjective decision on the number of clusters.

Questions?

- For more information, please email me at: yliu32@albany.edu
- Visit us at:



@CHWS_NY



@Centerforhealthworkforcestudies



www.linkedin.com/company/center-for-health-workforce-studies