Is Content Really King?

An Objective Analysis of the Public's Response to Medical Videos on YouTube

PLoS ONE 8(12): e82469. doi:10.1371/journal.pone.0082469

Tejas Desai, MD

Assistant Professor of Medicine

Director, Nephrology Fellowship Program

Division of Nephrology & Hypertension

East Carolina University – Brody School of Medicine

Email: desait@ecu.edu Twitter: @nephOnDemand

Disclaimer

Why YouTube?

- Healthcare providers are using YouTube to teach patients
  - Topics: immunizations, prostate CA, kidney stones
- YouTube is the most popular video service known to healthcare providers & patients
  - Many patients are from a generation that enjoys watching television over reading or listening
  - The richness of videos seems to be an attractive quality of YouTube

Concerns about YouTube

- Developed for entertainment, not necessarily education
  - Are patients able to distinguish between the entertainment-focused components versus the education-focused components of YouTube?

- Creators of "educational" videos are not known
  - ?? Authority
  - ?? Credibility

Interim Results of Investigations 

- Since 2007, studies have reported negative results when using YouTube for education
  - Immunizations: many videos contradict standard medical practice [1]
  - Influenza: 23% of videos misleading [2]
  - Kidney Stones: 18% of videos misleading [3]
  - Prostate CA: YouTube "inadequate" to educate the public [4]
  - Myocardial Infarction: Videos can easily mislead the public [5]
  - CPR: 48% of videos authored by people of ?? credibility [6]
  - Anorexia: 29% of videos were in favor of anorexia [7]

Trends in YouTube Research

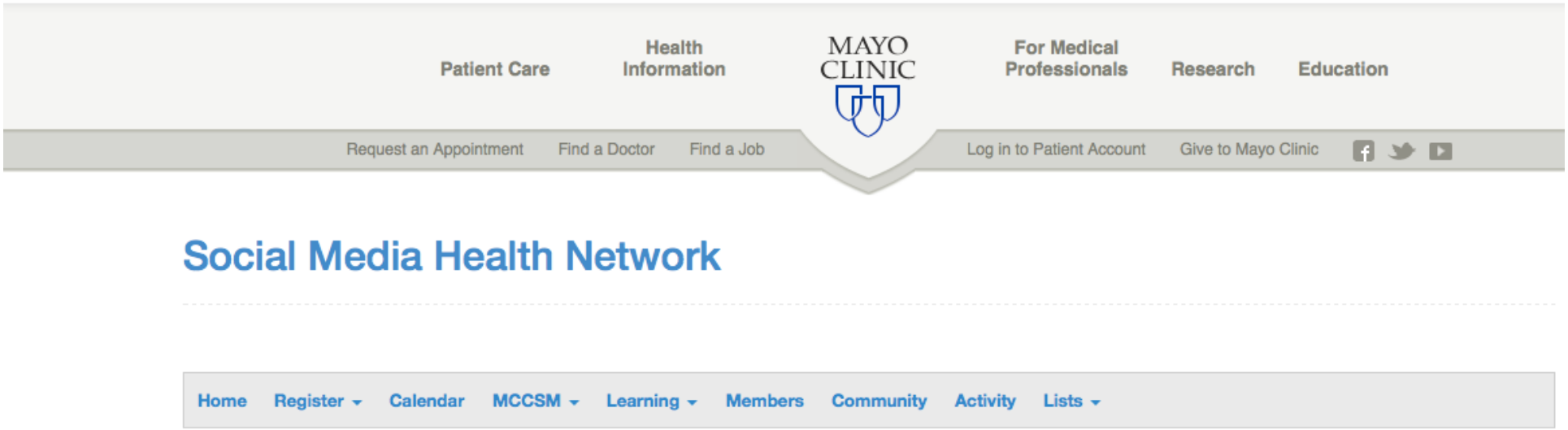
- Data consistently show that videos:
  - A large percentage are misleading
  - A large percentage are unacceptable as teaching instruments
  - Healthcare providers should be wary of recommending YouTube videos to their patients
- In just one calendar year, there was an 83% decrease in investigations focused on YouTube [8]

Shortcomings of many YouTube Investigations

- Many studies cannot assess the credibility and authority of the video creators
- Many studies cannot filter entertainment-focused videos and only analyze those videos created for educational purposes only

Our Investigation

- Address both flaws in order to obtain results that could be meaningfully interpreted
  - We accomplished this by turning to the Social Media Health Network
    - (http://network.socialmedia.mayoclinic.org)



Our Method

- Social Media Health Network at the Mayo Clinic
  - A network of healthcare institutions that have committed to patient education through social media [9-11]
  - Members of this network are:
    - Committed to patient education and not entertainment
    - Are credible and authoritative (or at least are transparent for a viewer to assess their credibility/authority)
- Prior YouTube investigations did not extract data from this network

What we analyzed

- We already knew we had YouTube videos created by organizations committed to education
  - And those creators were credible/authoritative
- Our focus:
  - Breadth of educational information in each video
  - Appropriateness of the video content

Breadth & Appropriateness

Breadth

Epidemiology

Pathophysiology

Screening

Diagnosis

Complications

Treatment/Management

Prevention

- Measured the presence or absence of each domain
  - Min score = 0
  - Max score = 7

Appropriateness [12,13]

Content

Literacy Demand

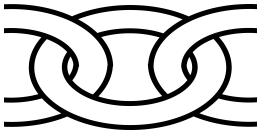
Graphics

Layout

Learning Stimulation

Cultural appropriateness

- Measured the presence or absence of each domain
  - Superior: 27-38
  - Adequate: 16-26
  - Inadequate: 0-15

Content Quality  Public Response

- How does the public respond to videos that have:
  - Greater educational information
  - Greater appropriateness
- Correlated Breadth and Appropriateness with 5 user engagement metrics
  - Video Views (VV), Likes (L), Dislikes (D), Favorites (F), Comments (C)
- Statistical threshold: $p < 0.01$

Breadth *v* Public Response

		Number of Domains Present							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
N[a] (%)		123 (20%)	122 (20%)	110 (18%)	93 (15%)	69 (11%)	46 (8%)	28 (5%)	15 (3%)
Video Views (No.)	Mean	557.20	380.32	1924.38	455.12	605.61	1325.29	849.68	1072.07
	Std Dev	1492.45	517.36	6928.36	962.84	1498.27	3343.78	2078.86	2406.10
ANOVA p 0.01									
Video Duration (minutes)	Mean	1.96	2.21	2.27	3.05	3.29	5.14	8.04	25.37
	Std Dev	1.77	1.79	1.28	2.53	2.41	5.16	10.70	18.35
ANOVA p<0.0001									
Likes (No.)	Mean	0.97	0.82	2.79	0.58	0.90	1.40	1.36	1.47
	Std Dev	2.90	2.22	9.66	1.10	1.51	2.85	3.28	3.58
ANOVA p 0.03									
Dislikes (No.)	Mean	0.09	0.04	0.13	0.05	0.10	0.07	0.14	0.00
	Std Dev	0.53	0.24	0.46	0.23	0.30	0.25	0.45	0.00
ANOVA p 0.6									
Favorites (No.)	Mean	0.71	0.62	3.99	0.57	0.35	1.59	0.14	0.17
	Std Dev	2.04	1.04	14.25	1.16	0.65	5.27	0.36	0.41
ANOVA p 0.01									
Comments (No.)	Mean	0.18	0.12	0.78	0.19	0.21	0.18	0.35	0.11
	Std Dev	1.04	0.35	2.81	0.57	0.76	0.56	1.57	0.33
ANOVA p 0.05									

		Qualitative SAM Score		
		Inadequate[b]	Adequate[c]	Superior[d]
N[a] (%)		128 (21%)	275 (45%)	203 (33%)
Video Views (No.)	Mean	558.8	1017.3	793.2
ANOVA p 0.4	Std Dev	1475.2	3959.0	3231.0
Video Duration (minutes)	Mean	1.9	2.8	5.4
ANOVA p<0.0001	Std Dev	1.8	2.1	9.1
Likes (No.)	Mean	0.9	1.6	1.1
ANOVA p 0.3	Std Dev	2.7	5.8	3.9
Dislikes (No.)	Mean	0.05	0.1	0.1
ANOVA p 0.06	Std Dev	0.4	0.4	0.2
Favorites (No.)	Mean	0.7	1.7	1.1
ANOVA p 0.4	Std Dev	1.9	7.8	6.6
Comments (No.)	Mean	0.2	0.4	0.2
ANOVA p 0.3	Std Dev	1.0	1.8	0.8

[a]Excludes 1 video.
[b]Represents raw SAM score of 0 to 15 (0–39%).
[c]Represents raw SAM score of 16 to 26 (40–69%).
[d]Represents raw SAM score of 27 to 38 (70% or greater).
doi:10.1371/journal.pone.0082469.t003

Appropriateness *v* Public Response

Breadth & Appropriateness *v* Public Response

		Lower Educational Breadth, Inadequate, or Adequate	Great Educational Breadth Only[b]	Superior Only[c]	Optimal[d]
N[a] (%)		320 (53%)	83 (14%)	128 (21%)	75 (12%)
Video Views (No.)	Mean	832.24	1024.84	810.80	763.47
	Std Dev	3502.49	2863.93	3891.62	1602.05
ANOVA p 0.96					
Video Duration (minutes)	Mean	2.23	3.56	2.59	10.30
	Std Dev	1.86	2.44	1.99	13.41
ANOVA p<0.0001					
Likes (No.)	Mean	1.36	1.32	1.13	1.03
	Std Dev	5.46	2.78	4.59	2.23
ANOVA p 0.93					
Dislikes (No.)	Mean	0.09	0.15	0.06	0.03
	Std Dev	0.43	0.39	0.28	0.16
ANOVA p 0.22					
Favorites (No.)	Mean	1.45	0.93	1.49	0.43
	Std Dev	7.02	3.91	7.96	1.34
ANOVA p 0.74					
Comments (No.)	Mean	0.35	0.29	0.22	0.12
	Std Dev	1.74	1.07	0.87	0.47
ANOVA p 0.67					

[a]Excludes one video.

Summary

- The public does not respond favorably to high quality YouTube videos
  - Even if these videos are meant for their education
  - Even if these videos are produced by credible/ authoritative sources

Next Steps

- Does the public respond to the manner in which educational information is displayed on a video?
  - Animations/graphic representations
  - Patient stories
  - Actors or real patients
  - Race/ethnicity/gender of the patient-actors
  - Physician interviews
  - Background music
  - Background narration

Until subsequent investigations are conducted, we cannot recommend healthcare providers use YouTube to educate the public about medical conditions

Thank you

PLoS ONE 8(12): e82469. doi:10.1371/journal.pone.0082469

References

[1] JAMA 2007; 298(21): 2482

[2] Am J Prev Med 2010; 38(3): e1

[3] Urology 2011; 77: 558

[4] Urology 2010; 75: 619

[5] Clin Cardiol 2012; 35(5): 281

[6] Resuscitation 2011; 82: 332

[7] JMIR 2013; 15(2): e30

[8] http://jolt. merlot.org/vol7no1/snelson_0311.htm

[9] http://www.healthtechnica.com/blogsphere/ 2011/02/14/mayo-clinic-center-for-social-media-launches-health-network-site

[10] http://www.healthcareitnews.com/news/mayo-clinic-launch- social-media-center

[11] http://soa.li/iHXKkqV

[12] Doak CC, Doak LG, Root JH (1996) Teaching patients with low literacy skills. 2nd ed. Philadelphia: Saunders

[13] http://www.hsph.harvard.edu/ healthliteracy/files/2012/09/ resources_for_assessing_materials.pdf