

Evaluation of Social Media Presence of Otolaryngology Residency Programs in the United States

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IMPORTANCE Over two-thirds of the adult population in the United States use Facebook. Despite the high interest in and use of social media by the general public, the presence and accessibility of health care organizations on social media has not yet been fully evaluated.

OBJECTIVE To determine the use and popularity of social media among otolaryngology residency programs in the United States.

DESIGN, SETTING, AND PARTICIPANTS A cross-sectional study of the presence of accredited otolaryngology residency programs in the United States in an internet data repository was conducted. Programs were stratified by Doximity Residency Navigator reputation rankings (dividing programs into quartiles) and *US News & World Report* (comparing programs affiliated with hospitals ranked in the top 50 vs programs affiliated with unranked hospitals). Social media sites and activity for each program were assessed using internet searches. The study was conducted in April 2017.

RESULTS Among 101 otolaryngology residency programs, 30 were found to have social media sites (29.7%). Facebook and Twitter were the most commonly used services, with 25 (24.8%) and 14 (13.9%) accounts, respectively. Based on Doximity Residency Navigator rankings, programs in the first quartile were more likely to have Facebook profiles than programs in the fourth quartile (42.3% vs 12.0%; absolute difference, 30%; 95% CI, 2.9% to 52.6%). First- and second-quartile programs showed increased Facebook activity. There was greater Twitter presence in first- vs fourth-quartile programs (19.2% vs 8.0%; absolute difference, 11.2%; 95% CI, -11.6% to 33.0%). Higher-quartile programs were more active on Twitter and exhibited increased numbers of likes and followers. Analysis of *US News & World Report* rankings revealed that ranked programs had higher rates of presence, activity, and popularity on both Facebook and Twitter. However, these were smaller differences than seen when comparing Doximity Residency Navigator rankings. Correlation between the 2 ranking systems was indicated (Spearman $\rho = 0.59$; 95% CI, 0.34 to 0.76).

CONCLUSIONS AND RELEVANCE This study suggests that otolaryngology residency programs with higher Doximity Residency Navigator reputation rankings have a stronger presence on social media. Smaller trends were observed for programs in the top 50 *US News & World Report* rankings. Overall, social media use among otolaryngology programs seems relatively low, and this may present an opportunity to increase communication with the public via these technologies.

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JAMA Otolaryngol Head Neck Surg. 2018;144(9):802-806. doi:10.1001/jamaoto.2018.1447
Published online August 23, 2018.

Current internet technology provides an unprecedented level of connectivity between individuals and organizations. Digital communication strategies are increasingly important in the public health domain, with over 70% of adults seeking health-related information online.¹⁻³ Social media, in particular, provides a unique niche for the health care industry, serving as a communication medium, marketing tool, and source of data.⁴⁻⁸ With over two-thirds of the adult population in the United States using Facebook,⁹ social media strategies have the potential to reach large numbers of people. Patients often rely on social media to identify health information, join support groups, and talk about their conditions. Nearly 20% of internet users have attempted to find individuals with health concerns similar to their own,^{2,10,11} demonstrating the personal nature of social media. Reports indicate that over 50% of patients were interested in their health care professionals using social media to communicate information, including appointments and test results. Furthermore, patients who did not use social media would join if given the option to connect with their health care professionals.¹¹ In addition to patient contact, social media can also enable health care organizations and departments to connect with job-seekers, potential trainees, and researchers. A recent Twitter analysis showed that commercial/for-profit organizations were the most common group to be tweeting about hearing loss.¹²

Previous literature suggests that increased presence and positive perceptions on social media have been associated with academic influence, patient satisfaction, and even 30-day mortality rate.^{13,14} Oyewumi et al¹⁵ recently reported that individual otolaryngology clinicians have a presence on social media, but were unsure how to capitalize on the benefits of this communication method. Given the high interest and use of social media by the general public, it is important to consider the accessibility of health care organizations on social media.

There has been interest in studying the use of social media among medical and surgical departments in a variety of subspecialties, including neurosurgery,¹⁶ radiology,^{17,18} urology,¹⁹ and pediatric dermatology.²⁰ These reports show varying levels of social media use, with no social media profiles for academic pediatric dermatology programs²⁰ compared with 18% of the largest academic radiology programs having a Facebook profile.¹⁷ In addition, private medical practices in radiology and neurosurgery appear to be outpacing their academic counterparts in social media use.^{16,17} The primary aim of this study was to investigate the social media presence and trends of academic otolaryngology programs. In addition, 2 commonly used program ranking systems—Doximity Residency reputation scores and *US News & World Report* (USNWR) hospital rankings—were used to stratify programs and assess for differences in social media presence based on ranking.

Methods

Data for this cross-sectional study were collected in April 2017 using 2 sources: (1) Doximity Residency Navigator, an online compilation of residency statistics and reputation scores based on peer nominations and reviews from over 53 000 physicians as of

Key Points

Question What is the characterization of social media profiles among otolaryngology residency programs in the United States?

Findings In this cross-sectional study including 101 otolaryngology residency programs, 29.7% of the programs have social media profiles. When stratified by Doximity Residency Navigator and *US News & World Report* rankings, higher-ranked programs tend to have a stronger social media presence, activity, and popularity.

Meaning The rate of social media use by otolaryngology residency programs appears to be low; this medium may represent an area of opportunity to improve communication and outreach with the public.

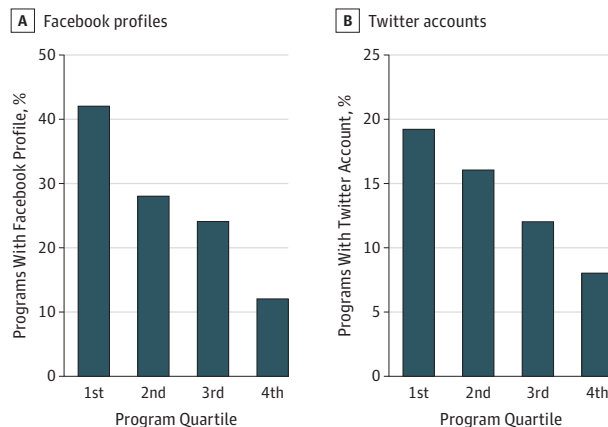
2015,²¹ and (2) USNWR 2017-2018 rankings, a media company ranking the top 50 Best Hospitals for Ear, Nose & Throat based on a combination of factors including patient survival (37.5% of score), patient safety (5%), other care indicators (30%), and expert opinion (27.5%).²² The expert opinion values are derived from surveys administered by Doximity Residency Navigator to physicians at the “16 Best Hospitals,” who then recommend up to 5 hospitals that they consider to be the best in their area.²¹ In 2017, approximately 16 000 physicians responded to these surveys. Based on study guideline criteria for human subjects research posted by the Vanderbilt University institutional review board, the study was exempt from approval.

Otolaryngology programs located in the United States were included in this study if they were accredited by the Accreditation Council for Graduate Medical Education. Military and osteopathic programs were excluded. Programs were divided into groups for comparison. For Doximity Residency Navigator rankings, the programs were divided into quartiles based on reputation scores. This was not possible for USNWR rankings, since only 50 programs receive formal rankings. We therefore compared residency programs affiliated with hospitals ranking in the top 50 USNWR with programs affiliated with hospitals that were unranked. Social media profiles for each program were identified by searching each program’s website for profile links, as well as by searching for the name of the program directly on social media sites. Only profiles directly sponsored by the department were included, and social media pages were excluded if they were unverified or division specific. Activity on Facebook was quantified by the number of posts in the previous 6 months and the number of likes and followers of each page were tabulated. Twitter activity was quantified by the total number of tweets, as well as the number of tweets posted in the previous 6 months. The number of followers, accounts being followed by the program, and number of likes were also collected.

Statistical Analysis

Differences in social media presence and activity were determined by computing the relative risks (RRs) and 95% CIs. Nonparametric Spearman rank order correlations were performed to assess for correlation between the 2 ranking systems. Statistical analysis, using 2-tailed, unpaired tests, was performed using GraphPad Prism, version 7 (Graphpad Software), with α .05 considered significant.

Figure 1. Social Media Use Based on Doximity Residency Navigator Reputation Ranking



Facebook (A) and Twitter (B) use among otolaryngology residency programs stratified by program quartile.

Results

Among the 101 otolaryngology residency programs meeting inclusion criteria, 30 distinct programs (29.7%) were found to have the following social media accounts in total: 25 Facebook (24.8%), 14 Twitter (13.9%), 2 Google+ (2.0%), 1 Pinterest (1.0%), and 1 Instagram (1.0%). Only Facebook and Twitter accounts were analyzed further owing to the small number of other social media accounts.

Doximity Residency Navigator Reputation Scores

A higher percentage of first-quartile programs had Facebook profiles compared with the remaining 3 quartiles (Figure 1A). A significant difference was identified between the percentage of first- and fourth-quartile programs with Facebook profiles, with mean values of 42.3% vs 12.0%, respectively (RR, 3.5; 95% CI, 1.2-10.9; and absolute difference, 30%; 95% CI, 2.9% to 52.6%). Differences between other quartiles were smaller, such as between second- and fourth-quartile programs, with mean values of 28.0% vs 12.0%, respectively (RR, 2.3; 95% CI, 0.7-7.7). Among programs with Facebook profiles, first- and second-quartile programs had larger numbers of posts within the past 6 months, with mean values of 31 and 34, respectively, while third- and fourth-quartile programs exhibited approximately half that number of posts (eFigure 1 in the Supplement). Popularity analysis based on the number of followers among programs with Facebook profiles revealed that second-quartile programs had the highest mean number of followers, with 864, trailed by third-quartile programs with 508 followers. First- and fourth-quartile programs had mean followers of 235 and 160, respectively. The mean number of likes had a similar distribution among programs with Facebook profiles, with the highest number of likes in the second quartile (872), followed by the third (512), first (239), and fourth (164) quartiles (eFigure 1 in the Supplement).

Quantification of Twitter use among otolaryngology residency programs showed that first-quartile programs had a larger

percentage of Twitter accounts than lower-quartile programs, with mean values of 19.2% vs 8.0%, respectively (RR, 2.4; 95% CI, 0.6 to 10.2; and absolute difference, 11.2%; 95% CI, -11.6% to 33.0%) (Figure 1B). Differences between other quartiles were smaller, such as between the second and fourth quartiles, with mean values of 16.0% vs 8.0%, respectively (RR, 2.0; 95% CI, 0.5 to 8.8). Overall use of Twitter among programs was lower than that of Facebook, with only 19.2% of first-quartile programs on Twitter compared with 42.3% on Facebook. Higher-quartile programs with Twitter accounts exhibited a higher mean number of total tweets, with mean values of 350 decreasing to 4 for first- and fourth-quartile programs, respectively (eFigure 2 in the Supplement). Recent activity was assessed by quantifying the mean number of tweets in the past 6 months among programs with Twitter accounts and showed increased activity in second- (57) and third- (65) quartile programs compared with first- (43) and fourth- (0) quartile programs. First- and second-quartile programs had much larger numbers of followers (359 and 326, respectively) than third- and fourth-quartile programs (69 and 24, respectively). First- and third-quartile programs with Twitter accounts had larger numbers of likes, with mean values of 18, compared with second- and fourth-quartile programs, with values of 9 and 1, respectively. The number of other Twitter accounts that are followed by otolaryngology program Twitter accounts was also determined, with first-quartile programs following a mean of 279 other accounts, which is more than 3 times the number of lower-quartile programs (eFigure 2 in the Supplement).

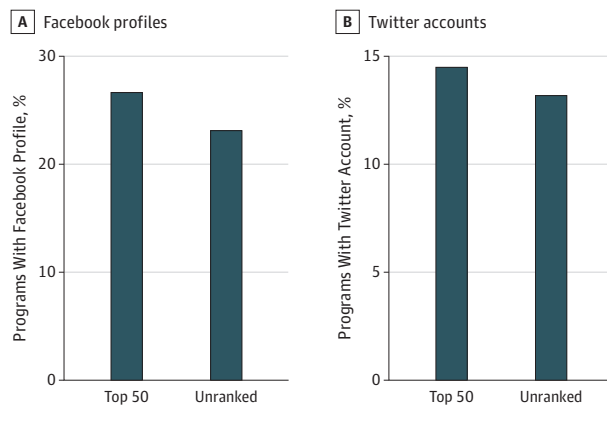
US News & World Report Rankings

Hospitals associated with the 101 otolaryngology residency programs described above were identified in the *USNWR* 2017-2018 rank list. Forty-one of those hospitals (40.6%) were among the top 50 hospitals (ranked programs), and 60 (59.4%) were unranked. The remaining hospitals were either unaffiliated with residency programs or had duplicate affiliations. Facebook profiles were identified for 11 of the top 41 ranked programs (26.8%), compared with 14 of the remaining unranked programs (23.3%) (difference, 3.5%; 95% CI, -14.3% to 22.5%) (Figure 2A). Ranked programs posted a mean of 47 times over the last 6 months, compared with a mean of 16 posts by unranked programs (eFigure 3 in the Supplement). Among programs with Facebook profiles, ranked programs exhibited a higher number of mean followers (579 vs 414) and page likes (584 vs 417) than the unranked programs.

Twitter profiles were identified for 6 ranked programs (14.6%) and 8 unranked programs (13.3%) (difference, 1.3%; 95% CI, -13.3% to 18.1%) (Figure 2B). There was a higher mean number of total tweets by ranked programs of 347 compared with 106 by unranked programs (eFigure 4 in the Supplement). Ranked programs also exhibited more recent activity, with a higher mean number of tweets in the past 6 months (58 vs 36) and higher popularity measures of mean number of followers and likes. Unranked programs had a higher mean number of accounts following their Twitter account of 163, compared with 120 by ranked programs (eFigure 4 in the Supplement).

Both *USNWR* and Doximity Residency Navigator reputation scores are commonly used to rank residency programs, and we therefore assessed whether there was any correlation between these ranking systems. Figure 3 shows the *USNWR* and Doxim-

Figure 2. Social Media Use Based on US News & World Report Ranking



Facebook (A) and Twitter (B) use among otolaryngology residency programs stratified by program quartile.

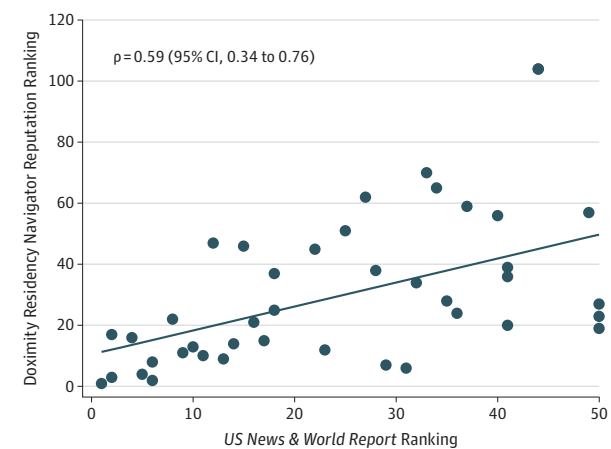
ity Residency Navigator reputation ranking plotted for each program, with a Spearman ρ value of 0.59 (95% CI, 0.34-0.76), indicating a correlation.

Discussion

Social media use is ubiquitous among the general population and could represent an important mode of communication between health care organizations, physicians, and patients in the future. In light of this, we have analyzed the current social media presence of otolaryngology programs in the United States and showed that 24.8% of programs have an active Facebook profile and 13.9% have an active Twitter account. The higher use of Facebook compared with Twitter may be expected because Facebook is a more established social media platform, with 1.94 billion monthly active users worldwide compared with 328 million for Twitter. We observed a trend of increased social media use among programs with higher rankings on Doximity Residency Navigator and *USNWR*. Despite the widespread popularity of social media, only 30 of 101 otolaryngology programs have social media accounts. Based on this study, there is an opportunity to expand the social media presence of otolaryngology programs to enhance communication and outreach.

In addition to otolaryngology, there are multiple reports in the literature describing how other health care organizations and specialties utilize social media. For example, 42 urology departments were found to have Twitter accounts in 2017.¹⁹ Approximately half of the posts from these accounts were intended for the general public, and 43% were directed at physicians.¹⁹ Social media is also being used within health care organizations for communication and professional development between physicians. A recent multi-institutional survey of surgeons with over 200 responses showed that 22% indicated that social media was their preferred networking modality and 70% believed that social media positively affected professional development.²³ Social media use also has the potential to affect trainee hiring and experience.^{8,24} In a survey of 110 general surgery program directors, the respondents reported frequently viewing social

Figure 3. Correlation Between Doximity Residency Navigator and US News & World Report Ranking



media profiles of students and residents, and 11% of respondents reported lowering the rank of a resident applicant based on social media postings.²⁵ These program directors also reported professionalism on social media as a key concern in 68% of responses and acknowledged that most programs did not have formal social media policies in place.²⁵

Social media use among academic otolaryngology programs is similar to use rates described in several other specialties. Prabhu and Rosenkrantz¹⁸ reported that 8.2% of academic radiology programs had Twitter accounts compared with 13.9% in otolaryngology. Some specialties, such as urology, appear to have increased use, with 42 departmental Twitter accounts in 2017.¹⁹ For neurosurgery, a 2016 search identified 158 social media accounts for neurosurgery departments, with 26% attributed to academic departments.¹⁶

In the present study, programs with higher reputation scores on Doximity Residency Navigator exhibited increased use of social media, as evidenced by an increased percentage of Facebook and Twitter accounts, as well as increased numbers of posts and tweets, particularly compared with fourth-quartile programs. The popularity of programs' social media efforts as judged by followers and likes was more variable, with second-quartile programs having the highest number of likes and followers on Facebook, and third-quartile programs having nearly the same number of Twitter likes as first-quartile programs. In all cases, programs ranked in the fourth quartile on Doximity Residency Navigator showed decreased presence and popularity on social media.

When *USNWR* groupings were compared, smaller, statistically nonsignificant increases in Facebook and Twitter use were observed between programs ranked in the top 50 compared with unranked programs. This difference may be due in part to the way these rankings are devised. Although 27.5% of the *USNWR* rankings are derived from physician reputation surveys, additional patient outcomes measures, such as survival and safety, are also ranking factors. In contrast, Doximity Residency Navigator reputation scores are determined only by peer nominations and reviews. There is some overlap between these 2 ranking systems, as evidenced by a correlation of 0.59; however, the programs with higher Doximity Residency Navigator reputation scores appear

to have higher use of social media. Similar findings were observed in urology, where programs with more active Twitter accounts were associated with higher *USNWR* reputation scores.¹⁹ Programs with increased social media presence may be more successful at alumni outreach and soliciting reviews that can ultimately contribute to higher reputation scores.

Limitations

There are several limitations to this study. We looked at the presence of active social media sites but did not explicitly study the content of the posts. It is therefore unknown what populations the posts are targeting (ie, patients or potential trainees) and how successful the posts are at providing information and user satisfaction. In addition, programs were grouped based on Doximity Residency Navigator reputation scores and *USNWR* rankings. It is unclear whether these are the optimal methods of ranking programs compared with other metrics, such as program research output or percentage of graduates who pass the board examination. It was also not possible to group programs into quartiles based on *USNWR* rankings because only the top 50 hospitals were

officially ranked. Finally, because of the limited use of social media among otolaryngology programs, the number of programs included in the analysis was small and likely contributed to the relative lack of statistically significant comparisons. Even so, the population was large enough to demonstrate a significant difference in Facebook use between first- and fourth-quartile programs on Doximity Residency Navigator, and large trends were observed across program quartiles for other comparisons.

Conclusions

Otolaryngology programs with high Doximity Residency Navigator reputation scores are more likely to have an active presence on social media than lower-ranked programs. Smaller trends in increased use were observed for programs ranked in the top 50 *USNWR* programs compared with unranked programs. Less than one-third of otolaryngology programs currently utilize social media for communication and outreach efforts.

ARTICLE INFORMATION

Accepted for Publication: May 9, 2018.

Published Online: August 23, 2018.
doi:10.1001/jamaoto.2018.1447

Author Contribution: Drs Dedmon and Haynes had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Dedmon, O'Connell, Haynes.
Acquisition, analysis, or interpretation of data: Xie, Dedmon, O'Connell, Yawn.

Drafting of the manuscript: Xie, Dedmon, O'Connell.
Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Xie, Dedmon, O'Connell.
Supervision: Dedmon, Yawn, Haynes.

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

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