Sources of Medical Information for Oncology Physicians during the COVID-19 Pandemic: Results from a national cross-sectional survey

Helen M Parsons, PhD, MPH\textsuperscript{1}; Rachel I. Vogel, PhD\textsuperscript{2} Anne H. Blaes, MD, MS\textsuperscript{3}; Emil Lou, MD, PhD\textsuperscript{3}; Heather Beckwith, M\textsuperscript{3}; Jianling Yuan, MD PhD\textsuperscript{4}; Jane Yuet Ching Hui, MD, MS\textsuperscript{5}

\textsuperscript{1}University of Minnesota, Division of Health Policy and Management, School of Public Health, Minneapolis, MN

\textsuperscript{2}University of Minnesota, Department of Obstetrics, Gynecology and Women’s Health, Minneapolis, MN

\textsuperscript{3}University of Minnesota, Division of Hematology, Oncology, and Transplantation, Minneapolis, MN

\textsuperscript{4}University of Minnesota, Department of Radiation Oncology, Minneapolis, MN

\textsuperscript{5}University of Minnesota, Department of Surgery, Minneapolis, MN

© The Author(s) 2020. Published by Oxford University Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.
Corresponding Author:

Helen M. Parsons, PhD, MPH

Associate Professor

Division of Health Policy and Management

School of Public Health

University of Minnesota

420 Delaware Street SE

MC 729

Minneapolis, MN 55455

Phone: (612) 625-0404

Fax: (612) 626-6931

Email: pars0100@umn.edu
ABSTRACT

As the coronavirus disease 2019 (COVID-19) has completely transformed the accepted norms and approaches to cancer care delivery in the United States, we sought to understand the sources of medical information that oncology physicians seek and trust. We recruited 486 oncology physicians to an anonymous cross-sectional online survey through social media from March 27, 2020 to April 10, 2020, with 79.2% reporting their sources of medical information during the COVID-19 pandemic. We found a diverse array of reported sources for COVID-19 information that most commonly included professional societies (90.7%), hospital/institutional communications (88.6%) and the Centers for Disease Control and Prevention (69.9%); however, trust in these sources of information varied widely, with professional societies being the most trusted source. These results highlight the important role that professional societies, hospitals and the Centers for Disease Control and Prevention play in ensuring dissemination of consistent, high-quality practice recommendations for oncology physicians.
The coronavirus disease 2019 (COVID-19) has completely transformed the accepted norms and approaches to cancer care delivery in the US.¹ To stem growth of the pandemic and protect immunocompromised patients, governments, health systems and professional societies have upended their treatment guidelines to include widespread telemedicine, postponing or cancelling non-essential procedures and modifying courses of treatment.²⁻⁴ While many overarching recommendations are consistent across organizations, the rapid spread of COVID-19 has resulted in continually evolving guidance on treatment and protective measures for patients and physicians. Therefore, understanding the sources of medical information that oncology physicians seek and trust is critical to ensure consistent recommendations and practice concordant with the most current knowledge.

We enrolled 486 eligible oncology physicians (surgeons, medical and radiation oncologists) onto an anonymous cross-sectional online survey using snowball convenience sampling methods over social media platforms (Facebook, LinkedIn, Twitter, American Cancer Society discussion forums)⁵ from March 27, 2020 to April 10, 2020. All participants were provided with information about the study and confirmed eligibility as an oncology physician prior to completing the survey. Eligibility criteria included being a physician (MD or DO) who treats cancer patients in the US, age ≥18 years, and ability to read/write in English. Survey items included physician demographics, practice characteristics, cancer treatment decisions and sources of medical information. Validated measures were used or modified as appropriate (Supplementary Materials) and usability/technical functionality was tested prior to fielding the questionnaire. Participants could review/change answers as they...
progressed through the survey. Additional details on survey design can be found elsewhere.\textsuperscript{5} 385 physicians (79.2\%) reported their sources of medical information during the COVID-19 pandemic and degree of trust in these sources for general health information. Survey data were collected and stored using REDCap.\textsuperscript{6} We analyzed frequencies and conducted chi-square tests of the relationships between sources of COVID-19 information and trust in these sources by physician characteristics using SAS 9.4 (Cary, NC). P-values <0.05 were considered statistically significant. Statistical tests were two-sided. The University of Minnesota Institutional Review Board approved the study.

In our study, 56.1\% were surgeons, 23.6\% medical oncologists, 14.9\% radiation oncologists and 4.9\% other oncology physicians (Table 1). Participants were more commonly female (63.0\%), with an average age of 45.9 years (SD=9.7 years). The majority practiced in larger hospitals with 500 and more beds (46.0\%), were affiliated with academic institutions (54.3\%) and treated a wide range of cancers. Participants reported a variety of sources for COVID-19 information, mostly commonly professional society recommendations/guidelines (90.7\%), hospital/institution communications (88.6\%) and the Centers for Disease Control and Prevention (CDC, 69.9\%) (Table 2). However, 60.3\% also derived COVID-19 information from social media (physician groups) and traditional news/media (57.7\%). Physician trust in information about health and medical topics varied widely by source. Among all physicians, 63.1\% reported trusting information from professional society recommendations/guidelines ‘a lot’, followed by literature searches (50.2\%), the World Health Organization (46.4\%) and the CDC (45.3\%). Few reported ‘a lot’ of trust in social media (0.5\%) or news/media reports.
(1.8%), although over a quarter (25.2%) showed confidence in physician-only social media groups. When searching for COVID-19 information, over 73.0% were concerned about the quality of information, 42.1% felt it took a lot of effort to get needed information and 42.1% were frustrated during their search; however, only 16.6% felt the information was hard to understand. While sources of information generally did not vary by physician characteristics, we found surgeons were more likely to report using society recommendations (96.7% vs. 78.0% medical oncologists and 84.2% radiation oncologists; p<0.001) and were less likely to use grand rounds (31.0% vs. 51.6% medical oncologists and 47.4% radiation oncologists; p<0.001; data not shown).

In a sample of oncology physicians practicing across the US, we found a diverse array of reported sources for COVID-19 information that most commonly included professional societies, hospitals and the CDC; however, trust in these sources of information varied widely, with professional societies the most trusted source. However, while we found that oncology physicians trust sources such as professional societies, they also report concerns about the quality of COVID-19 related information which is consistent with early editorials and viewpoints published in the literature from leading healthcare professionals. These individuals recognized early on in the pandemic a need to balance rapid publication of information on disease transmission, characteristics and outcomes of individuals diagnosed with COVID-19 with rigorous reporting standards, extensive follow-up and validation which may translate into initial concerns with early published data on COVID-19 outcomes.

Initial reports suggest that COVID-19 may be particularly lethal in patients with cancer. These findings highlight sources of information most utilized by oncology
physicians that can be targeted for up-to-date information on best practices around cancer care delivery, treatment modifications, and allocation of limited healthcare resources during this crisis. Additionally, as professional societies are reported as one of the most trusted sources for COVID-19 information, these findings suggest that societies may consider added review to their posted information to ensure it is consistent with the continually evolving literature and of high scientific quality. Further, added efforts to ensure treatment standards and scientific evidence are easily accessible on these venues are warranted, as we report >40% of oncology physicians reported undertaking ‘a lot of effort’ to identify COVID-19 related information.

Limitations of the study include reliance on convenience sampling to identify respondents, an inability to directly compare characteristics of non-respondents, targeting of social media groups in order to reach a broad audience quickly, potential overrepresentation of female oncology physicians relative to the general oncology workforce, lack of detailed information on concerns with specific sources of COVID-19 information, and lower proportion of respondents from some states with highest impact from COVID-19.

Despite these limitations, we provide current insights on COVID-19 information seeking from a large population of physicians currently treating cancer patients around the US, highlighting the important role that professional societies, hospitals and the CDC play in ensuring dissemination of high-quality practice recommendations for oncology physicians. These data provide an important starting point for understanding to best provide information to oncology physicians as the pandemic evolves as well as plan for dissemination of information in future outbreaks.
FUNDING

This research was supported in part by the National Institutes of Health’s National Center for Advancing Translational Sciences, grant UL1TR002494 as well as the National Cancer Institute P30 Cancer Center Support Grant, grant CA77598.

NOTES

Role of the funder: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclosures: There are no financial disclosures or conflicts of interest to report.

Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health’s National Center for Advancing Translational Sciences or the National Cancer Institute.

Role of the authors: HP, JH, RV: Conception and design. RV: Data acquisition and analysis. HP: Drafted initial manuscript. All authors: Drafting, revising, editing manuscript.

DATA AVAILABILITY STATEMENT

Data available upon request from the corresponding author.

REFERENCES
1. Schrag D, Hershman DL, Basch E. Oncology Practice During the COVID-19 Pandemic [published online ahead of print, 2020 Apr 13]. JAMA. 2020;10.1001/jama.2020.6236. doi:10.1001/jama.2020.6236

2. American Society of Hematology. COVID-19 Resources. 2020; Accessed April 17, 2020 at https://www.hematology.org/covid-19#faq.

3. Society of Surgical Oncology. COVID-19 Resources. 2020; Accessed April 17, 2020 at https://www.surgonc.org/resources/covid-19-resources/.

4. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19): For Healthcare Professionals. 2020. Accessed April 17, 2020 at https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html.

5. Hui JYC, Yuan J, Teoh D, et al. Cancer management during the COVID-19 pandemic in the United States: results from a national physician cross-sectional survey. Am J Clin Oncol. In Press.

6. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377-81.

7. Pietrantonio F, Garassino MC. Caring for Patients With Cancer During the COVID-19 Outbreak in Italy. JAMA Oncol. 2020;6(6):821–822. doi:10.1001/jamaoncol.2020.1426

8. van de Haar, J., Hoes, L.R., Coles, C.E. et al. Caring for patients with cancer in the COVID-19 era. Nat Med 26, 665–671 (2020). https://doi.org/10.1038/s41591-020-0874-8

9. Wang H, Zhang L. Risk of COVID-19 for patients with cancer. The Lancet Oncology. 2020;21(4):e181.
10. Kutikov A, Weinberg DS, Edelman MJ, Horwitz EM, Uzzo RG, Fisher RI. A War on Two Fronts: Cancer Care in the Time of COVID-19. *Ann Intern Med.* 2020;172(11):756-758. doi:10.7326/M20-1133

11. Centers for Disease Control and Prevention. COVID-19 Case Surveillance Public Use Data. 2020. Accessed September 1, 2020 at https://data.cdc.gov/Case-Surveillance/COVID-19-Case-Surveillance-Public-Use-Data/vbim-akqf
Table 1. Demographic and Clinical Practice Characteristics of Oncology Physicians (N=385)

| Characteristic                                      | No. (%) |
|-----------------------------------------------------|---------|
| Mean age, years (SD) (n=342)                        | 45.9 (9.7) |
| Mean years in practice (SD) (n=363)                 | 13.0 (10.1) |
| Sex                                                 |         |
| Male                                                | 137 (35.5) |
| Female                                              | 241 (63.0) |
| Non-binary gender identification                    | 4 (1.0) |
| Missing                                             | 3 (0.5) |
| Race                                                |         |
| White, non-Hispanic                                 | 276 (71.7) |
| Asian Indian                                        | 38 (9.9) |
| Chinese                                             | 17 (4.4) |
| Hispanic                                            | 12 (3.1) |
| Other                                               | 25 (6.5) |
| Missing                                             | 17 (4.4) |
| Medical Specialty                                   |         |
| Surgeon                                             | 216 (56.1) |
| Medical Oncology                                    | 91 (23.6) |
| Radiation Oncology                                  | 57 (14.9) |
| Other                                               | 19 (4.9) |
| Missing                                             | 2 (0.5) |
| Practice at an academic institution                 |         |
| No                                                  | 172 (44.7) |
| Yes                                                 | 209 (54.3) |
| Missing                                             | 4 (1.0) |
| Hospital Size                                       |         |
| Small hospital (fewer than 100 beds)                | 30 (7.9) |
| Medium hospital (100-499 beds)                      | 163 (42.4) |
| Type of Hospital | Count (Percentage) |
|------------------|--------------------|
| Large hospital (500 or more beds) | 177 (46.0) |
| Ambulatory clinic only (no inpatients) | 12 (3.2) |
| Missing | 3 (0.5) |

| Type of Community (Practice) | Count (Percentage) |
|-----------------------------|--------------------|
| Rural area | 18 (4.7) |
| Small city or town | 82 (21.3) |
| Suburb near a large city | 95 (24.7) |
| Large city | 182 (47.3) |
| Missing | 8 (2.0) |

| Cancers Treated (Choose all that apply) | Count (Percentage) |
|----------------------------------------|--------------------|
| GU (bladder, renal, prostate) | 68 (17.6) |
| Bone | 37 (9.6) |
| Breast | 221 (57.4) |
| Gynecologic | 68 (17.7) |
| Colorectal | 161 (41.8) |
| Head/Neck | 85 (22.0) |
| Hematologic malignancy | 88 (22.8) |
| HPB (liver, pancreatic) | 115 (29.9) |
| Lung | 74 (19.2) |
| Skin/soft tissue | 161 (41.8) |
| Other | 72 (18.7) |
| Missing | 8 (2.1) |

| Number of COVID-19 cases in state where practicing (as of April 3, 2020) | Count (Percentage) |
|------------------------------------------------------------------------|--------------------|
| 101-500 | 13 (3.4) |
| 501-1000 | 80 (20.8) |
| 1001-5000 | 136 (35.3) |
| 5001 or more | 135 (35.1) |
| Missing (did not provide state where practice) | 21 (5.4) |

---

*a The number of COVID-19 cases in each state based on data reported to the Centers of Disease Control and Prevention (CDC)*

*b Percentages do not sum to 100*
Table 2. Sources of COVID-19 Information for Oncology Physicians

| Question                                                                 | No. (%) |
|--------------------------------------------------------------------------|---------|
| Total Sample                                                             | 385 (100) |
| Which of the following sources do you use for information about COVID-19? Select all that apply.a |         |
| Physician grand rounds/talks                                            | 158 (41.0) |
| Hospital/Institution communications/emails                               | 341 (88.6) |
| Social media                                                             | 118 (30.7) |
| Social media - physician-only groups                                     | 232 (60.3) |
| Literature search                                                        | 173 (44.9) |
| News/media reports                                                       | 222 (57.7) |
| Professional society recommendations/guidelines                          | 349 (90.7) |
| Centers for Disease Control and Prevention reports                       | 269 (69.9) |
| World Health Organization reports                                        | 166 (43.1) |
| Other                                                                    | 10 (2.6) |

In general, how much would you trust information about health or medical topics from…

| Question                                                                  | |
|--------------------------------------------------------------------------|---------|
| Physician grand rounds/talks                                            |         |
| Not at all                                                               | 9 (2.3) |
| A little                                                                 | 26 (6.8) |
| Some                                                                     | 147 (38.1) |
| A lot                                                                    | 192 (49.9) |
| Missing                                                                  | 11 (2.9) |
| Hospital/Institution communications/emails                               |         |
| Not at all                                                               | 13 (3.4) |
| A little                                                                 | 38 (9.9) |
| Some                                                                     | 194 (50.4) |
| A lot                                                                    | 135 (35.1) |
| Missing                                                                  | 5 (1.2) |
| Social media                                                             |         |
| Not at all                                                               | 139 (36.2) |
| Method                                    | A little | Some | A lot | Missing |
|-------------------------------------------|----------|------|-------|---------|
| Social media - physician-only groups      | 150 (38.9) | 82 (21.3) | 2 (0.5) | 12 (3.1) |
| Literature search                         |          |      |       |         |
| Not at all                                | 4 (1.0)  |      |       |         |
| A little                                  | 24 (6.2) |      |       |         |
| Some                                      | 153 (39.7) |      |       |         |
| A lot                                     | 193 (50.2) |      |       |         |
| Missing                                   | 11 (2.9) |      |       |         |
| News/media reports                        |          |      |       |         |
| Not at all                                | 36 (9.4) |      |       |         |
| A little                                  | 181 (47.0) |      |       |         |
| Some                                      | 151 (39.2) |      |       |         |
| A lot                                     | 7 (1.8)  |      |       |         |
| Missing                                   | 10 (2.6) |      |       |         |
| Professional society recommendations/guidelines |          |      |       |         |
| Not at all                                | 3 (0.8)  |      |       |         |
| A little                                  | 9 (2.4)  |      |       |         |
| Some                                      | 123 (31.9) |      |       |         |
| A lot                                     | 243 (63.1) |      |       |         |
| Missing                                   | 7 (1.8)  |      |       |         |
| Centers for Disease Control and Prevention reports |          |      |       |         |
| Not at all                                | 19 (4.9)  |      |       |         |
| A little                                  | 49 (12.7) |      |       |         |
| Some                                      | 131 (34.0) |      |       |         |
| A lot                                     | 174 (45.3) |      |       |         |
| Missing                                   | 12 (3.1) |      |       |         |
| World Health Organization reports         |          |      |       |         |
| Not at all                                | 20 (5.2)  |      |       |         |
| Level       | Number (%) |
|------------|------------|
| A little   | 31 (8.1)   |
| Some       | 144 (37.4) |
| A lot      | 179 (46.4) |
| Missing    | 11 (2.9)   |

Based on the results of your most recent search for information about COVID-19, how much do you agree or disagree with the following statements?

| Statement                                                      | Number (%) |
|---------------------------------------------------------------|------------|
| It took a lot of effort to get the information I needed.      |            |
| Strongly disagree                                             | 65 (16.9)  |
| Somewhat disagree                                             | 155 (40.3) |
| Somewhat agree                                                | 135 (35.1) |
| Strongly agree                                                | 27 (7.0)   |
| Missing                                                       | 3 (0.7)    |
| I felt frustrated during my search for the information.       |            |
| Strongly disagree                                             | 61 (15.8)  |
| Somewhat disagree                                             | 157 (40.8) |
| Somewhat agree                                                | 124 (32.2) |
| Strongly agree                                                | 38 (9.9)   |
| Missing                                                       | 5 (1.3)    |
| I was concerned about the quality of the information.         |            |
| Strongly disagree                                             | 30 (7.8)   |
| Somewhat disagree                                             | 70 (18.2)  |
| Somewhat agree                                                | 199 (51.7) |
| Strongly agree                                                | 82 (21.3)  |
| Missing                                                       | 4 (1.0)    |
| The information I found was hard to understand                |            |
| Strongly disagree                                             | 145 (37.7) |
| Somewhat disagree                                             | 171 (44.4) |
| Somewhat agree                                                | 59 (15.3)  |
| Strongly agree                                                | 5 (1.3)    |
| Missing                                                       | 5 (1.3)    |

*Percentages do not sum to 100*