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Director, Women’s Cancers, Lifespan Cancer Institute
Director, Medical Oncology, Rhode Island Hospital
Professor of Medicine, Brown University

Digital Health: Evolution and Evidence
The digital (r)evolution

THE FOUR INDUSTRIAL REVOLUTIONS

1750 1800 1850 1900 1950 2000

FIRST (1784)
Mechanical production, railroads, and steam power

SECOND (1870)
Mass production, electrical power, and the advent of the assembly line

THIRD (1969)
Automated production, electronics, and computers

FOURTH (NOW)
Artificial intelligence, big data, robotics, and more to come

MEDICINE IS HERE

Courtesy: Eric Topol
Social Media and SWOG

Our Definition

The SWOG digital engagement committee defines “digital tools” broadly, in an attempt to embrace any tool that involves web-or smartphone-based technologies that allow for two-way interaction.

These tools include:

• Web or smart phone apps
• Online videos
• Social media platforms, pages, and campaigns
• Interactive webpages that allow for comments, surveys, or other forms of information sharing
• Wearable devices, such as symptom trackers or fitness monitors, which allow for the transmission of clinical trial-related data from patient to doctor, or vice versa
• Web-based videoconferencing

The digital engagement committee does not consider standard email blasts or surveys, or simple static, web pages to be digital tools, as they do not promote two-way interaction.
When it comes to social media and digital therapeutics:

- Distinguish between Support and Intervention
- Differentiate aims to improve *wellness* versus *health*
- Characterize the goals we have as researchers and as clinicians
Organizing Online Health Content: Developing Hashtag Collections for Healthier Internet-Based People and Communities

Matthew S. Katz, MD1; Patricia F. Andersen, MSL2; Michael A. Thompson, MD, PhD3; Lila Salim4,5; Janet Freeman-Dally, MS4; Audra Slinger6, MBA7; Don S. Dixon, MD4; Charlie Blehrer, MS4; David E. Cooke, MD1; Dee Sparano, MS7; Alicia C. Starley, MBA, MS7; Michael J. Fisch, MD, MPH8; Colleen Young9; and Deanna J. Altai, MD10

Twitter use has increased among patients with cancer, advocates, and oncology professionals. Hashtags, a form of metadata, can be used to share content, organize health information, and create virtual communities of interest. Cancer-specific hashtags modeled on a breast cancer community, #bcsm, led to the development of a structured set of hashtags called the cancer tag ontology. In this article, we review how these hashtags have worked with the aim of describing our experience from 2011 to 2017. We discuss useful guidelines for the development and maintenance of health-oriented communities on Twitter, including possible challenges to community sustainability and opportunities for future improvement and research.

JCO Clin Cancer Inform. © 2019 by American Society of Clinical Oncology

Abstract

OBJECTIVE To examine physician attitudes toward and perceptions of social media use for therapeutic trial recruitment of patients with cancer.

Physician Perceptions of the Use of Social Media for Recruitment of Patients in Cancer Clinical Trials

Mira S. Sedrak, MD, MS; Virginia Sun, RN, PhD; Jennifer Liu, BS; Kevin George, BS; Andrew R. Weng, BA; William Dole, MD, PhD; Don S. Dixon, MD
Cancer Tag Ontology

- First published: 2016 (JAMA Oncology)

<table>
<thead>
<tr>
<th>Hashtag</th>
<th>Disease</th>
<th>Regular Online Chat</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adcsm</td>
<td>Adrenal cancer</td>
<td></td>
</tr>
<tr>
<td>#amsm</td>
<td>Advanced metastatic cancer</td>
<td></td>
</tr>
<tr>
<td>#ancsm</td>
<td>Anal cancer</td>
<td></td>
</tr>
<tr>
<td>#ayacsm</td>
<td>Adolescent and young adult cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>#bcsm</td>
<td>Breast cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>#blcsm</td>
<td>Bladder cancer</td>
<td></td>
</tr>
<tr>
<td>#btsm</td>
<td>Brain tumors</td>
<td>Yes</td>
</tr>
<tr>
<td>#ccsm</td>
<td>Colorectal cancer</td>
<td></td>
</tr>
<tr>
<td>#esocsm</td>
<td>Esophageal cancer</td>
<td></td>
</tr>
<tr>
<td>#gencsm</td>
<td>Genetic/hereditary cancer</td>
<td></td>
</tr>
<tr>
<td>#gynocsm</td>
<td>Gynecologic cancers</td>
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</tr>
<tr>
<td>#hnrcsm</td>
<td>Head and neck cancers</td>
<td></td>
</tr>
<tr>
<td>#hpbcsm</td>
<td>Hepatobiliary cancer</td>
<td></td>
</tr>
<tr>
<td>#kcsm</td>
<td>Kidney cancer</td>
<td></td>
</tr>
<tr>
<td>#lcsm</td>
<td>Lung cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>#leusm</td>
<td>Leukemia</td>
<td></td>
</tr>
<tr>
<td>#lymsm</td>
<td>Lymphoma</td>
<td></td>
</tr>
<tr>
<td>#melsm</td>
<td>Melanoma</td>
<td></td>
</tr>
<tr>
<td>#mmmsm</td>
<td>Multiple myeloma</td>
<td>Yes</td>
</tr>
<tr>
<td>#mpnsm</td>
<td>Myeloproliferative neoplasms</td>
<td></td>
</tr>
<tr>
<td>#pancsm</td>
<td>Pancreatic cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>#pedcsm</td>
<td>Pediatric cancer</td>
<td></td>
</tr>
<tr>
<td>#pcsm</td>
<td>Prostate cancer</td>
<td></td>
</tr>
<tr>
<td>#scsm</td>
<td>Sarcomas</td>
<td></td>
</tr>
<tr>
<td>#skcsm</td>
<td>Skin cancers (nonmelanoma)</td>
<td></td>
</tr>
<tr>
<td>#stcsm</td>
<td>Stomach cancer</td>
<td></td>
</tr>
<tr>
<td>#thncsm</td>
<td>Thymoma and thymic cancer</td>
<td></td>
</tr>
<tr>
<td>#thycsm</td>
<td>Thyroid cancer</td>
<td></td>
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Organizing Online Health Content: Developing Hashtag Collections for Healthier Internet-Based People and Communities

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Social media: Community or Digital Tool
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Social media: Community or Digital Tool

Physician Perceptions of the Use of Social Media for Recruitment of Patients in Cancer Clinical Trials

Abstract

IMPORATANCE Social media campaigns have been successfully implemented in nontherapeutic trials. However, evidence to support their utility in cancer therapeutic trials is limited.

OBJECTIVE To examine physician attitudes toward and perceptions of social media use for therapeutic trial recruitment of patients with cancer.

Key Points

Question What are physicians’ attitudes toward and perceptions of using social media to recruit participants for cancer clinical trials?

Findings In this qualitative study of 44
Twitter as a Digital Tool

- Sedrak: Semistructured interviews (n=44)
  - Private Practice: 45%
  - City of Hope: 55%
  - 68% >10y of practice
  - Women comprised 36% of volunteers
Second Coming of the Gutenberg Press: Digital emination of Information to Patients and Physicians

Dr. Mark A. Lewis, MD

Connection and Knowledge: Where do we go...
Digital therapeutics defined...

Interventions
Aims:
- Prevent
- Manage
- Treat

Advanced technology coupled with rigorous evidence-seeking evaluation:
- Clinical validation
- Peer-reviewed research
- Usability
- Data security
FDA Approvals are here:

reSET-O: Prescription cognitive behavioral therapy for patients with Opioid Use Disorder (OUD)
**Open-label multi-site, unblinded, controlled 12-week clinical trial:**

- Volunteers in an OUD outpatient program
- Intervention: Buprenorphine + Behavioral therapy program + reSET-O (clinic desktop version)
- Control: Buprenorphine + Behavioral therapy program
- Outcomes:
  - Significant increase in program retention at 12 weeks (82 versus 68%)
  - No reduction in illicit drug use
  - No improvement in abstinence rates
  - No adverse events
Proteus Digital Management Program

- Proteus: Wireless skin patch + Ingestible Event Marker (IEM)
- 1st FDA approval with Aripiprazole (AbilifyMyCite)

SWOG 1916 (PI, Sherry Shen)
The Wellness Industry

All activities promoting physical and mental wellbeing:
- Yoga and Meditation
- Personal care and beauty
- Nutrition and weight-loss
- Spa retreats, Workplace wellness
- Wellness tourism

4.2 million dollar industry
Intersection or Parallel?

<table>
<thead>
<tr>
<th>Digital Therapeutics</th>
<th>Wellness Industry</th>
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<tr>
<td>• FDA regulated</td>
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- Evidence basis
- Specified objective
- Clarified risks

Wellness Industry
- Not regulated
- Self-care
- Wide reaching
- Direct to consumer

Digital Wellness
Digital wellness: Is there a role for data?

**Pro (Investigator):**
- Define benefits more clearly
- Delineate risks
- Back up claims

**Cons (Industry):**
- Not part of traditional business model
- Public not asking for it
- Requires market segmentation
- Requires capital
Exploration of Step Counts

37 ongoing studies with FitBit in clinicaltrials.gov

As a measure of:

- Performance status
- Functional recovery
- Quality of life
- Coping
Moving ahead

• What can wellness data tell us that we do not already know → **Digital biomarkers**
Moving ahead

• What can wellness data tell us that we do not already know → Digital biomarkers
• Can digital health improve endpoints that matter to patients?
Moving ahead

- What can wellness data tell us that we do not already know → Digital biomarkers
- Can digital health **improve** endpoints that matter to patients?
  - Why do people engage with wellness products?
  - What wellness products do patients treated for cancer engage in?
Moving ahead

• What can wellness data tell us that we do not already know → Digital biomarkers
• Can digital health improve endpoints that matter to patients?
• What is the role of the cooperative groups in partnering with both digital therapeutics developers and innovators in the wellness industry?
Moving ahead

• What can wellness data tell us that we do not already know → Digital biomarkers
• Can digital health improve endpoints that matter to patients?
• What is the role of the cooperative groups in partnering with both digital therapeutics developers and innovators in the wellness industry?
Welcome to SWOG!

Digital Transformation of Trials and Treatments:
It’s Not (All) About the Technology

Bonnie J. Spring, PhD
Director, Institute for Public Health and Medicine
Chief of Behavioral Medicine,
Department of Preventive Medicine
Professor of Preventive Medicine,
Psychiatry and Behavioral Sciences
Northwestern University Feinberg School of Medicine
#SWOGOnc is a hashtag

The influencers of #SWOGOnc

- SWOG Cancer Research Network @SWOG
- Cristiane D Bergerot @crisbergerot
- Mark Lewis @marklewismd
- Krishna Soujanya Gunturu MD @kgunturuMD
- Michael Fisch MD MPH @fischmd
- Don S. Dizon MD @drdonsdizon
- The Hope Foundation for Cancer Research @SupportingSWOG
- Anne Marie Mercurio (formerly Ciccarella) @chemobrainfog
- Sumanta Pal @montypal
- Jun J. Mao @JunMaoMD

Tweet Activity of #SWOGOnc
Announcements

The Hope Foundation has approved funding to help bring **tech and digital partners** to SWOG to explore collaborations.

For your reading pleasure:
A new column at The Oncologist:
The Hope Foundation has approved funding to help bring tech and digital partners to SWOG to explore collaborations.

For your reading pleasure:

Welcome to Discussions with Don S. Dizon

Don S. Dizon is the Director of Women's Cancers at Lifespan Cancer Institute, Founder of The Oncology Sexual Health First Responders Clinic at Lifespan Cancer Institute, and Director of Medical Oncology at Rhode Island Hospital. Dr. Dizon is a Professor of Medicine at the Warren Alpert Medical School of Brown University.

For Physicians, Is There Ever a Thing About Being Too Social?

Thursday, October 3, 2019

A Discussion with Dr. Charles Blanke
Thank you
don_dizon@brown.edu