OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

# BIOGRAPHICAL SKETCH

NAME: **Warner, Echo L.**

eRA COMMONS USER NAME: ECWARNER

POSITION TITLE: Assistant Professor

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| EDUCATION/TRAINING |  |  |  |
| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  (MM/YYYY) | FIELD OF STUDY |
| University of Utah, Salt Lake City, UT | BS | 05/2011 | Behavioral Science and Health |
| University of Utah, Salt Lake City, UT | Graduate  Certificate | 05/2012 | Global Health |
| University of Utah, Salt Lake City, UT | MPH | 05/2013 | Public Health |
| University of Utah, Salt Lake City, UT | PhD | 12/2019 | Nursing |
| University of Arizona Cancer Center, Tucson, AZ | T32  Postdoctoral Fellowship | 01/2020 | Cancer Health Disparities |

# Personal Statement

I am an early-stage investigator, first generation college student from rural Utah, and an assistant professor at the University of Utah College of Nursing and an associate member of the Huntsman Cancer Institute Cancer Control and Population Sciences Department. As a first-generation college student from a frontier rural community in Utah I meet the NIH criteria for individuals from socioeconomically disadvantaged backgrounds. For over a decade I have been immersed in research on cancer prevention and cancer health outcomes with a special emphasis on cancer health disparities, adolescents and young adult health experiences, and mixed methods approaches, all of which are relevant to the current proposal. My current research integrates novel theoretical and technical development of the ONline Cancer Misinformation (**ONC-M**) conceptual framework to study how engaging with online cancer misinformation influences cancer related perceptions, behaviors, and clinical decision making. This research is responsive to multiple national initiatives related to online health misinformation research, cancer prevention and control, and health equity. I have received numerous national, state, and local awards and recognitions for my work, including Best Dissertation Award from the University of Utah College of Nursing in 2020 and the Society of Behavioral Medicine Cancer Significant Interest Group Student Award in 2019.

I have published over 75 first or co-authored publications in online social support, social media use among cancer patients, cancer health disparities, and online health misinformation. At the University of Utah, I completed a Bachelor of Science in Behavioral Science and Health, a Master’s in Public Health with a graduate certificate in Global Health, and a Doctorate in Nursing Research. As a pre-doc, I received two notable national fellowship awards, a Ruth L. Kirchstein National Research Service Award (NCI 1F31CA221000) and was a Jonas Nursing Research Scholar, to study use of social media for online support during the first six months of cancer caregiving. In 2021, I completed NCI-sponsored postdoctoral training in the University of Arizona Cancer Prevention and Control Health Disparities program (NCI 5T32CA078447 -20) where I received the Eleanor Bauwens’ Research Award and the University of Arizona Postdoctoral Research Award in 2020, earning a prestigious nomination of a University of Arizona Sursum Fellow. My postdoctoral research focused on the interpretation and spread of cancer misinformation and vaccine misinformation on social media, including on Facebook, Instagram, Pinterest, and Twitter.

As an assistant professor at the University of Utah College of Nursing, I teach doctoral level courses on mixed methods, social determinants of health, and health systems. My career goal is conducting cancer-related research to improve health equity. Toward this goal, in 2022 I was awarded an American Cancer Society Institutional Research Grant to study exposure to online cancer misinformation and disparities associated with exposure (e.g., health literacy, gender identity). Given the direct financial impacts of online misinformation, I applied for and received funding through the National Cancer Institute Sponsored- Geographical Management of Cancer Health Disparities (GMaP) Region 6 pilot award in May 2022. While I am an early-stage investigator, my productive research experiences, excellent and established collaborations, background in adolescent and young adult development, and prior mixed methods training and expertise are evidence of my ability to lead the proposed project.

Ongoing and recently completed projects that I would like to highlight include:

1R01CA268037-01A1

Klein Blundell Sub-Contract/NIH – NCI (R01)

**Bueller and Sussman (MPIs) Role: Co-I**

**09/08/2022-8/31/2027**

#4Corners4Health: A Social Media Cancer Prevention Program for Rural Young Adults

**Kepka (PI) Role: Co-I**

Merck Investigator Studies Program

10/1/2022 – 09/30/2024

Multi-component Assessment of HPV Vaccine Hesitancy in Utah.

Warner (PI)

NCI Geographical Management of Cancer Health Disparities Program Region 6 Pilot Award

05/2022-04/2023

Cancer Care Crowdfunding among LGBTQ+ Cancer Survivors Study

Relevance to the proposal: Documenting funding for unproven symptom management and treatment claims.

Warner (PI)

American Cancer Society Huntsman Cancer Institute’s Institutional Research Grant

03/2022-02/2023

Cancer misinformation exposure measurement among cancer patients

Relevance to proposal: Pilot testing of the protocol and procedures for the current proposal.

R01CA242729-01

Kirchhoff (PI),

Role: Co-Investigator

07/2019-06/2022

Improving Health Insurance Experiences for Adolescent and Young Adult Cancer Patients

Relevance to proposal: I provide expertise in mixed methods data collection, analysis, and integration.

Warner (PI)

Eleanor Bauwen’s Research Award

08/2020-08/2021

Investigating developmental-age differences in the efficacy of psychosocial intervention sequencing to reduce depression and anxiety among adolescent and young adult cancer dyads.

Relevance to proposal: Experience leading research under COVID-19 precautions, recruitment and retention.

Warner (PI)

University of Arizona 2020 Postdoctoral Research Development Grant

08/2020-07/2021

Cancer patient and caregiver's exposure to cancer misinformation in the new media environment Relevance to proposal: Examined and described differential influence of cancer misinformation exposure.

5T32CA078447-17

Harris (PI), Role: Postdoctoral Research Associate Trainee

01/2020-08/2021

Cancer Prevention and Control Health Disparities Training Program

Relevance to proposal: Conducted the preliminary work including creation and validation of the ONC-M.

1F31CA221000-01

Warner (PI) 08/2017-12/2019

Acquisition of social support through social media among young adult informal cancer caregivers: A mixed methods study

Relevance to the proposal: Led mixed methods research about online cancer information seeking and first identified online cancer misinformation exposure.

Citations (Underline indicates Co-Investigators for the current proposal)

* 1. **Warner EL,** Easterly C, Waters AR, Turner C, Kirchhoff AC, Rains S, Guo J, Cloyes KG. Crowdfunding Cancer Costs Online and LGBTQ+ Equity. To be presented at the 44th Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine. April 2023.
  2. **Warner EL**, Basen-Engquist KM, Badger TA, Crane TE, Raber M. The Online Cancer Nutrition Misinformation: A framework of behavior change based on exposure to cancer nutrition misinformation. Cancer. 2022 Apr 5. doi: 10.1002/cncr.34218. PMID: 35383913.
  3. Rains S, Leroy G, **Warner EL**, Harber P. Psycholinguistic Markers of COVID-19 Conspiracy Tweets and Predictors of Tweet Dissemination. Health Communication. May 2021. 20;1-10. doi: 10.1080/10410236.2021.1929691. PMID: 34015987
  4. **Warner EL**, Waters AR, Cloyes KG, Ellington L, Kirchhoff AC. Young adult cancer caregivers' exposure to cancer misinformation on social media. Cancer. 2021 Apr 15;127(8):1318-1324. doi: 10.1002/cncr.33380. PMID: 33368215.

# Positions, Scientific Appointments, and Honors

# Positions and Scientific Appointments

2021-current Assistant Professor, College of Nursing, University of Utah, Salt Lake City, Utah

2021-current Associate Member, Huntsman Cancer Institute, Salt Lake City, Utah

2020-2022 Society of Behavioral Medicine Patient Reported Outcomes Task Force Member

2020-2021 Postdoctoral Research Associate, University of Arizona Cancer Center, Tucson, Arizona

2020-2021 Member, Arizona Cancer Center Cancer Prevention and Control Program, Tucson, Arizona

2016-2021 Graduate Research Assistant, Huntsman Cancer Institute, Salt Lake City, Utah

2019 University of Utah College of Nursing Social Media Taskforce, Salt Lake City, Utah

2016 Research Assistant, Medical Appointment Planner (MAP) Pilot Project, College of Nursing, University of Utah, Salt Lake City, Utah

2015-2017 University of Utah College of Nursing Research Committee

2013-2021 Delta Omega Honors Society in Public Health-Alpha Theta Chapter

2013-2015 Senior Research Analyst, Huntsman Cancer Institute, Salt Lake City, Utah

2014-2015 Research Assistant, Development of a social resource visualization tool to support cancer family caregivers, College of Nursing, University of Utah, Salt Lake City, Utah

2012-2014 Co-Investigator Childhood Poisoning Research, Global Health Study Abroad, Ghana

2012-2013 Graduate Research Assistant, Huntsman Cancer Institute, Salt Lake City, Utah

2011-2012 Graduate Research Assistant, Diabetes Case Management, International Rescue Committee, Salt Lake City, Utah

**Honors**

2021-2023 Vice President's Clinical and Translational (VPCAT) Research Scholars Program

2020 NCI Geographical Management of Cancer Health Disparities Region 3 Travel Award

2020 University of Utah College of Nursing Best Dissertation Award

2020 University of Arizona Sursum Fellow

2019 Society of Behavioral Medicine Student Award, Cancer Significant Interest Group, “Young adult cancer caregivers’ use of social media and acquisition of social support”

2019 College of Nursing Nominee and Runner Up for the Elizabeth Fuhriman Gardner Prize for Outstanding Woman Student in the University of Utah Health Sciences

2019 Top scoring abstract “Caregiver intention to restart vaccinations after childhood cancer treatment” at the American Society of Preventive Oncology Meeting

2016, 18, 19 NCI Geographical Management of Cancer Health Disparities Program Region 6 Travel Award

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| 2016-18 | Jonas Veteran Healthcare Scholar |
| 2016 | Top Rated Abstract 2016 State of the Science Council for the Advancement of Nursing Science |
| 2015,16 | Donal Hutchison Scholarship |
| 2015, 16 | University of Utah Graduate Student Travel Assistance Award |
| 2015,16 | Helene Druke Shaw Memorial Graduate Scholarship |
| 2015,16 | Echomae Anderson and Esther Pritchard Doctoral Scholarship |
| 2015,16 | Frederick Q. Lawson Graduate Fellows Scholarship |
| 2014 | Utah Public Health Association Student Spotlight November |
| 2012 | University of Utah Graduate School Travel Assistance Award |
| 2012 | University of Utah Ed Yeates Public Health Media Endowment Award |
| 2011 | Student Fee Scholarship-Study Abroad |
| 2008-2010 | Leadership Scholarship-University of Utah |
| 2008-2010 | New Century Scholarship-State of Utah Department of Education |
| 2008 | Top Ten Scholarship-University of Utah |

# Contribution to Science

The focus of my research is on developing psychosocial support interventions for cancer patients and caregivers using novel technology and social media. I prioritize studying at-risk populations that experience health disparities because of their socioeconomic status, language or cultural background, or stigma associated with their disease. These populations include cancer patients, survivors, and caregivers, rural and frontier communities, sexual and gender minorities, and racial/ethnic minorities. My drive for improving self- sufficiency and community capacity for using technology to improve psychosocial support and health outcomes among at-risk populations is evidenced by the scientific contributions below.

# Social media and digital technology for supportive oncology

My research into social media as a mechanism for improving unmet psychosocial cancer needs addresses the shift to digital technology for health-related communication. This work includes my formative dissertation project studying social media use for social support during the first six months of caregiving, and intervention research in which I supported the development of a technology- enabled intervention for evaluating cancer caregiver’s social support networks. My most prominent scientific contributions relate to studying communication patterns of social support on social media, identifying unmet supportive needs (e.g, financial, caregiver) and features associated with misinformation.

* + 1. **Warner EL,** Wilson A, Ellington L, Sun Y, Cloyes KG, Waters AR, Nelson T, Kirchhoff AC. Cancer content and social media platform influence young adult cancer caregivers' social support on social media. J Psychosoc Oncol. 2021 Aug 31:1-8. doi: 10.1080/07347332.2021.1968987. PMID: 34463191.
    2. **Warner EL**, Kirchhoff AC, Wilson A, Cloyes KG, Sun Y, Waters AR, Nelson T, Ellington L. Social support enactments on social media during the first 6 months of young adult cancer caregiving. J Cancer Surviv. 2022 Feb;16(1):61-72. doi: 10.1007/s11764-021-01004-y. PMID: 33666872.
    3. **Warner EL**, Kirchhoff AC, Ellington L, Waters AR, Sun Y, Wilson A, Cloyes KG. Young adult cancer caregivers' use of social media for social support. Psycho-oncology. 2020 Jul;29(7):1185-1192. doi: 10.1002/pon.5402. PMID: 32364665.
    4. **Warner EL**, Ellington L, Kirchhoff AC, Cloyes KG. Acquisition of social support and linguistic characteristics of social media posts about young adult cancer. J Adolesc Young Adult Oncol. 2018 Apr; 7(2):196-203. doi: 10.1089/jayao.2017.0076. PMCID: PMC5899277

# Impacts of cancer and health misinformation on social media

An unexpected discovery of research is that exposure to cancer misinformation on social media is a common yet potentially harmful outcome of social media use. My research in this area has unearthed multiple domains of cancer misinformation on Facebook, Instagram, and Pinterest. By developing the ONC-M, I articulated how online cancer misinformation influences relationships, behaviors, and cancer decisions, extending across the cancer continuum. Recently, I have used natural language processing, machine learning, and mixed methods to study online cancer misinformation, vaccine misinformation from Russian Internet Research Agency (“trolls”) to study conspiracy theories, and vaccine misinformation about COVID-19 on Twitter. These skills are applied in the current proposal.

* + 1. **Warner EL**, Ellington L, Waters AR, Cloyes KG, Kirchhoff AC. Misinformation on social media among young adult cancer caregivers. *Cancer.* 2020 Apr 15;127(8):1318-1324.
    2. Rains S, Leroy G, **Warner EL**, Harber P. Psycholinguistic Markers of COVID-19 Conspiracy Tweets and Predictors of Tweet Dissemination. Health Communication. May 2021. 20;1-10. doi: 10.1080/10410236.2021.1929691. PMID: 34015987
    3. **Warner EL**, Basen-Engquist KM, Badger TA, Crane TE, Raber M. The Online Cancer Nutrition Misinformation: A framework of behavior change based on exposure to cancer nutrition misinformation. Cancer. 2022 Apr 5. doi: 10.1002/cncr.34218. PMID: 35383913.
    4. **Warner EL**, Barbati JL, Duncan KL, Yan K, Rains SA. Vaccine misinformation types and properties in Russian troll tweets. Vaccine. 2022 Feb 7;40(6):953-960. doi: 10.1016/j.vaccine.2021.12.040. PMID: 35034832.

# Young adult cancer caregiving

Building upon my prior research studying young adult cancer patient experiences, I my doctorate work focused on studying young adult cancer caregivers use of technology and social media. Young adult, or millennial caregivers, comprise nearly half of all caregivers and their economic contribution in the U.S. is estimated at $67 billion. This growing and poorly supported population requires immediate attention to reduce unmet needs in the coming decades. My focus on young adult caregivers is unique. These caregivers are increasingly taking on caregiving roles for aging generations and balance multiple other care responsibilities. I learned about how young adult cancer caregivers of pediatric cancer patients make decisions regarding pediatric vaccinations.

* + 1. **Warner EL,** Wilson A, Rainbow JG, Ellington L, Kirchhoff AC. Employment of young adult cancer caregivers, other disease caregivers, and non-caregiving adults. Int J Environ Res Public Health. 2021 Jul 13;18(14):7452. doi: 10.3390/ijerph18147452. PMID: 34299903; PMCID: PMC8305716.
    2. **Warner EL,** Vaca Lopez PL, Kepka D, Mann K, Kaddas HK, Fair D, Fluchel M, Knackstedt ED, Pannier ST, Martel L, Kirchhoff AC. Influence of provider recommendations to restart vaccines after childhood cancer on caregiver intention to vaccinate. J Cancer Survivorship. 2020 Oct;14(5):757-767. doi:10.1007/s11764-020-00890-y. PMCID: PMC7505103
    3. Kirchhoff AC, Mann K, **Warner EL**, Kaddas HK, Fair D, Fluchel M, Knackstedt ED, Kepka D. HPV vaccination knowledge, intentions, and practices among caregivers of childhood cancer survivors. Hum Vaccin Immunother*.* 2019 Jun; 15(7-8):1767-1775. PMCID: PMC6746484
    4. **Warner EL**, Kirchhoff AC, Nam GE, Fluchel M. Financial burden of pediatric cancer for patients and their families. J Oncol Pract. October 2014; 11(1): 12-8. doi: 10.1200/JOP.2014.001495. PMCID: PMC4295420

# Cancer health disparities

My efforts to reduce health disparities is reflected by my research among cancer survivors, racial and ethnic minority populations, rural residents, and HIV-positive women. As key personnel with Dr. Deanna Kepka on a P30 from NCI, I established the Intermountain West HPV Vaccination Coalition to reduce barriers to HPV vaccination in the Mountain West. The coalition now spans 20 states with over 400 members. As project manager I led the execution of a Prevention Care Management program designed by the Centers for Disease Control and Prevention for low-resource settings to improve knowledge of recommended cancer screenings among Latinas in Utah. I led medical students in a cancer needs assessment in Dominica. Through these experiences I have gained cultural competence working in Hispanic/Latinx and Spanish-speaking communities, indigenous peoples, and rural/frontier populations.

* + 1. Warner ZC, Reid B, Auguste P, Joseph W, Kepka D, **Warner EL**. Awareness and Knowledge of HPV, HPV Vaccination, and Cervical Cancer among an Indigenous Caribbean Community. Int J Environ Res Public Health. 2022 May 7;19(9):5694. doi:10.3390/ijerph19095694. PMCID: PMC9105034.
    2. **Warner EL**, Martel L, Ou JY, Nam G, Carbajal-Salisbury S, Fuentes V, Kirchhoff AC, Kepka D. A Workplace-Based Intervention to Improve Awareness, Knowledge, and Utilization of Breast, Cervical, and Colorectal Cancer Screenings Among Latino Service and Manual Labor Employees in Utah. J Community Health*.* 2019 Apr;44(2):256-264. Doi 10.1007/s10900-018-0581-2.
    3. **Warner EL,** Fowler B, Martel L, Kepka D. Improving HPV vaccination through a diverse multi-state coalition. J Community Health. 2017 Oct;42(5):911-920. doi.10.1007/s10900-017-0334-7.
    4. **Warner EL**, Park ER, Stroup A, Montenegro R, Kinney AY, Kirchhoff AC. Health care concerns of rural childhood cancer survivors. J Health Care Poor Underserved*.* 2014 May;25(2):901-912.

A full list of my published work can be found at <https://www.ncbi.nlm.nih.gov/sites/myncbi/1DqNc31Dbl9Q7/bibliography/42533244/public/?sort=date&direction=ascending>