

Long-term incidence of venous thromboembolism (VTE) among survivors of childhood cancer: A report from the Childhood Cancer Survivor Study (CCSS).

Arin L Madenci, Brent R Weil, Qi Liu, Todd M. Gibson, Yutaka Yasui, Wendy M. Leisenring, Rebecca M Howell, Christopher Tinkle, Larissa Nekhlyudov, Lisa Diller, Gregory T. Armstrong, Kevin C. Oeffinger, Christopher Bertero Weldon; Boston Children's Hospital, Boston, MA; University of Alberta Department of Public Health Sciences, Edmonton, AB; St. Jude Children's Research Hospital, Memphis, TN; Fred Hutchinson Cancer Research Center, Seattle, WA; The University of Texas MD Anderson Cancer Center, Houston, TX; Department of Radiation Oncology, St. Jude Children's Research Hospital, Memphis, TN, Memphis, TN; Department of Medicine, Brigham and Women's Hospital, Boston, MA; Dana-Farber Cancer Institute and Harvard Medical School, Boston, MA; Memorial Sloan Kettering Cancer Center, New York, NY

Abstract Text:

Background: This study aimed to estimate the incidence of late-occurring VTE among survivors of childhood cancer, and to identify associated demographic and clinical factors that define high-risk subgroups for potential screening and prevention.

Methods: Using data from CCSS, a multi-institutional, longitudinal cohort of 5-year survivors of childhood cancer (diagnosed 1970-1999) and their siblings, the primary endpoint of self-reported late VTE (occurring ≥ 5 years after diagnosis) was estimated using multivariable piecewise exponential models adjusted for age, sex, and race. Generalized estimating equations accounted for potential within-family correlation where applicable. **Results:** Among 23,601 survivors and 5051 siblings, the incidence of VTE was 1.15 and 0.48 events per 1000 person-years, respectively. For survivors, median age at last follow-up was 28.6 years (range 5.6-58.3) and median follow-up time from diagnosis was 21.2 years (range 5.0-39.3). The adjusted rate ratio (RR) for survivors compared to siblings was 2.2 (95% confidence interval [CI] = 1.7-2.8, $P < 0.01$). Among survivors, risk factors for VTE included BMI ≥ 30 kg/m² (ref. BMI 18.5-24.5; RR = 1.5, CI = 1.2-2.0, $P < 0.01$), increasing number of severe or life-threatening (i.e. CTCAE grades 3 or 4) non-VTE chronic conditions (ref. 0 conditions; 1-2 conditions: RR = 2.5, CI = 2.0-3.1, $P < 0.01$; ≥ 3 conditions: RR = 3.5, CI = 2.5-4.9, $P < 0.01$), and cancer recurrence or second malignant neoplasm (RR = 3.5, CI = 2.7-4.6, $P < 0.01$). Incidence of late VTE was associated with increased subsequent mortality, independent of non-VTE chronic conditions (RR 2.2, 95% CI = 1.7-2.8, $P < 0.01$). **Conclusions:** Survivors of childhood cancer remain at increased risk for VTE across their lifespan. While typically not causal, late VTE was associated with subsequent mortality. Care providers should be aware of this increased risk and consider interventions that target modifiable co-morbidities such as obesity. Surveillance and education should be directed toward high-risk survivors.

Title: Long-term incidence of venous thromboembolism (VTE) among survivors of childhood cancer: A report from the Childhood Cancer Survivor Study (CCSS).

Submitter's E-mail Address: arin.madenci@childrens.harvard.edu

Is this a late-breaking data submission? No

Is this abstract a clinical trial? No

Would like to be considered for a Merit Award: No

Have the data in this abstract been presented at another major medical meeting?No

Has this research been submitted for publication in a medical journal?No

Type of Research: Cohort Study

Research Category: Clinical

Continued Trial Accrual: No

Received Grant funding: Yes - Merit Award, 2015

Relevant to geriatric oncology: No

Sponsor: Christopher Bertero Weldon, MD, PhD

First Author

Presenting Author

Corresponding Author

Arin L Madenci, MD, MPH

Boston Children's Hospital

Boston, MA

Email: amadenci@partners.org

[Click to view Conflict of Interest Disclosure](#)

Second Author

Brent R Weil, MD

Boston Children's Hospital

Department of Surgery

300 Longwood Avenue, Fegan 3

Boston, MA 02115

Email: Brent.Weil@childrens.harvard.edu

[Click to view Conflict of Interest Disclosure](#)

Third Author

Qi Liu, MS

University of Alberta Department of Public Health Sciences

Edmonton, AB

Canada

Phone Number: 7804924220

Email: qliu@sph.ualberta.ca

[Click to view Conflict of Interest Disclosure](#)

Fourth Author

Todd M. Gibson, PhD

St. Jude Children's Research Hospital

262 Danny Thomas Pl

MS 735

Memphis, TN 38105

Phone Number: 901-595-8260

Email: todd.gibson@stjude.org

[Click to view Conflict of Interest Disclosure](#)

Fifth Author

Yutaka Yasui, PhD

St. Jude Children's Research Hospital

262 Danny Thomas Place
Mail Stop 735
Memphis, TN 38105
Email: yutaka.Yasui@STJUDE.ORG
[Click to view Conflict of Interest Disclosure](#)

Sixth Author

Wendy M. Leisenring, ScD
Fred Hutchinson Cancer Research Center
Seattle, WA 98109
Phone Number: 206-667-4374
Email: wleisenr@fhcrc.org
[Click to view Conflict of Interest Disclosure](#)

Seventh Author

Rebecca M Howell, PhD
The University of Texas MD Anderson Cancer Center
Houston, TX
Email: rhowell@mdanderson.org
[Click to view Conflict of Interest Disclosure](#)

Eighth Author

Christopher Tinkle, MD, PhD
Department of Radiation Oncology, St. Jude Children's Research Hospital, Memphis,
TN
Memphis, TN
Email: Christopher.Tinkle@stjude.org
[Click to view Conflict of Interest Disclosure](#)

Ninth Author

Larissa Nekhlyudov
Department of Medicine, Brigham and Women's Hospital
Boston, MA
Email: Larissa_Nekhlyudov@DFCI.HARVARD.EDU
[Click to view Conflict of Interest Disclosure](#)

Tenth Author

Lisa Diller, MD
Dana-Farber Cancer Institute and Harvard Medical School
450 Brookline Avenue
Boston, MA 02215
Phone Number: 617-632-5642
Email: lisa_diller@dfci.harvard.edu
[Click to view Conflict of Interest Disclosure](#)

Eleventh Author

Gregory T. Armstrong, MD, MSCE
St. Jude Children's Research Hospital
262 Danny Thomas Place
Mailstop 735
Memphis, TN 38105

Phone Number: 901-595-5892

Email: greg.armstrong@stjude.org

Click to view Conflict of Interest Disclosure

Twelfth Author

Kevin C. Oeffinger, MD

Memorial Sloan Kettering Cancer Center

New York, NY 10065

Phone Number: 646-888-4731

Email: oeffingk@mskcc.org

Click to view Conflict of Interest Disclosure

Thirteenth Author

Christopher Bertero Weldon, MD, PhD

Boston Children's Hospital

Boston, MA 2115

Email: christopher.weldon@childrens.harvard.edu

Click to view Conflict of Interest Disclosure

**If necessary, you can make changes to your abstract between now and the deadline of
Tuesday, February 7, 2017**

- To access your submission in the future, use the direct link to your abstract submission from one of the automatic confirmation emails that were sent to you during the submission.
- Or point your browser to [/asco/reminder.cgi](http://asco/reminder.cgi) to have that URL mailed to you again. Your username/password are 186154/285034.

Any changes that you make will be reflected instantly in what is seen by the reviewers. You DO NOT need to go through all of the submission steps in order to change one thing. If you want to change the title, for example, just click "Title" in the abstract control panel and submit the new title.