

# Impact of Cancer on Work and Education Among Adolescent and Young Adult Cancer Survivors

Helen M. Parsons, PhD, MPH  
Assistant Professor

Department of Epidemiology and Biostatistics  
The University of Texas Health Science Center  
[parsonsh@uthscsa.edu](mailto:parsonsh@uthscsa.edu)

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# Work and Education after Diagnosis

AYA cancer survivors have a unique set of challenges after diagnosis

Ability to return to work or education after diagnosis can improve quality of life, reduce social isolation, and increase self-esteem

Understanding how patient and provider factors contribute to work and educational outcomes will aid in the development of effective survivorship programs



*Sources: Spelten ER et al. (2002). Psychooncology;*  
*Bradley CJ et al. (2007). Cancer Invest.*



# Research Objectives

- 1) To identify patient and provider characteristics associated with:
  - a) Return to work/school 15-35 months post-diagnosis
  - b) Belief that cancer negatively influenced plans for work/school
  
- 2) To identify changes in problems with work or studies over time



# Methods

## Data

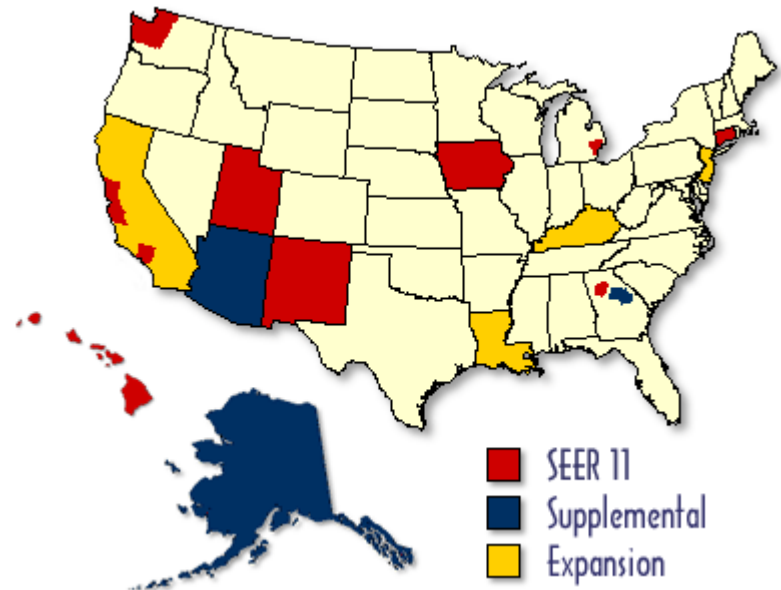
- **Adolescent and Young Adult Health Outcomes and Patient Experience (AYA HOPE) Study**
- Identified patients from 7 population based Surveillance, Epidemiology and End Results Program registries (Seattle/Puget Sound, Los Angeles County, San Francisco/Oakland, Greater California, Iowa and Louisiana).
- Initial self-administered patient survey queried patients 6 to 14 months after diagnosis (N=524):
  - Impact of cancer, quality of life, information and service needs, health care delivery, and clinical trial participation
- Follow-up survey 15-35 months after diagnosis (N=465):
  - Examined changes in psychosocial, work, and quality-of-life outcomes from the original survey

# Methods

## Patients

- Diagnosed July 1, 2007- October 31, 2008 in a participating SEER Area
- Age 15-39 at Diagnosis
- Germ cell cancer, Hodgkin's and non-Hodgkin's Lymphoma, acute lymphocytic leukemia, Ewing sarcoma, osteosarcoma or rhabdomyosarcoma
- Could read English
- **Participants completing both the initial and follow-up survey and had known employment/school status prior to diagnosis (N=463)**

## Surveillance Epidemiology and End Results Program Areas





## Outcomes

1) Return to full-time work/school 15-35 months after diagnosis

○ “What is your current school or employment status?”

Part-time student, Full-time student, Working part-time, Working full-time, unemployed/disabled, full-time homemaker

○ Classified as full-time work or school (yes or no)

2) Belief that cancer had a negative impact on work/school 15-35 months after diagnosis

○ “Indicate what kind of impact your cancer has had on ....plans for work....plans for school”

○ Somewhat or very negative classified as “yes”

○ No impact, somewhat positive, very positive classified as “no”

3) Problems with work/studies

○ Identified from the modified Work/School functioning scale from the Pediatric Quality of Life Inventory (PedsQL).

○ Report single item responses with “almost always” or “often” compared to other responses as well as the scale score

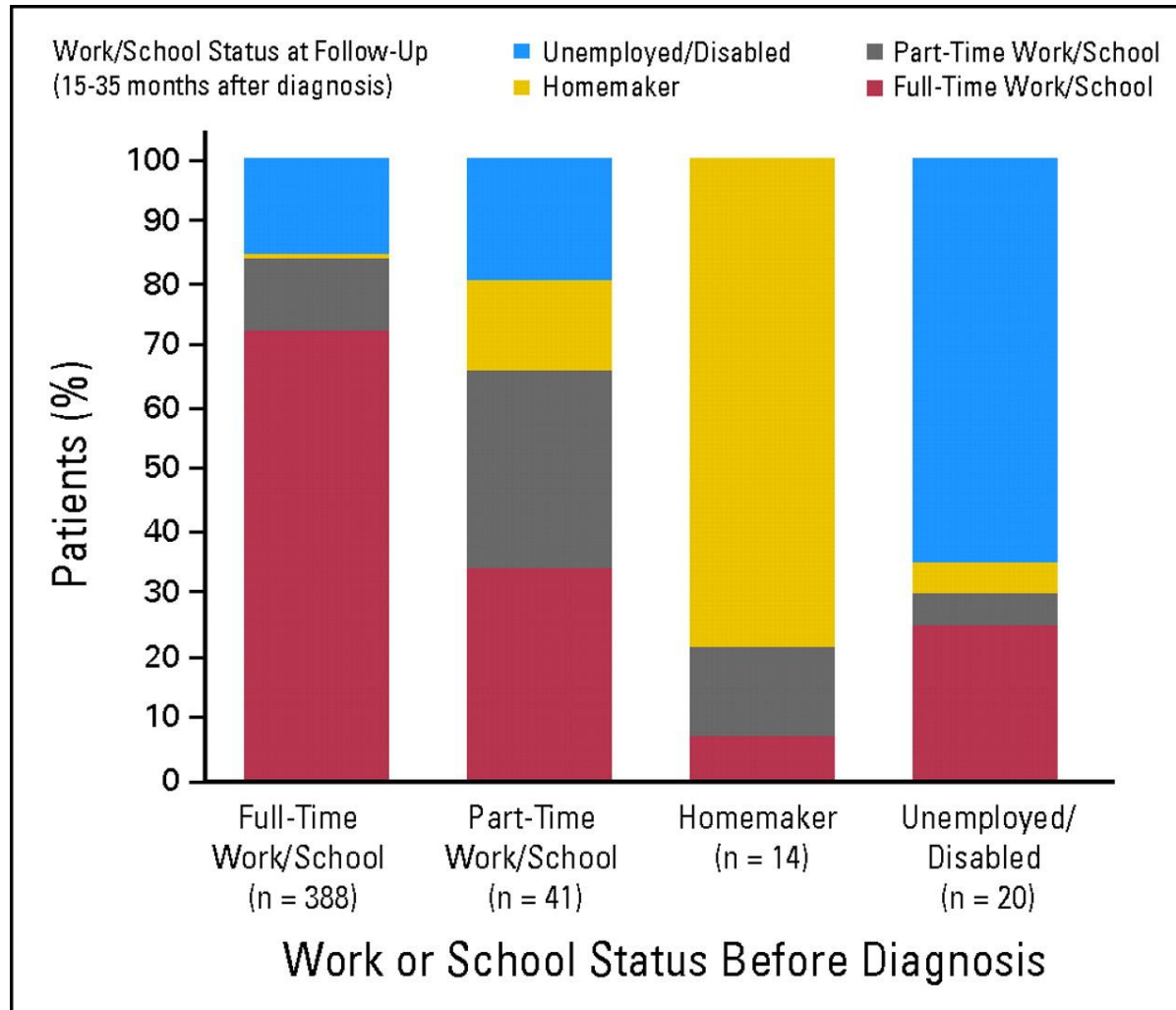


# Methods

## Analysis

- Identify patient and provider factors associated with each outcome
  - Chi-square analyses
  - Logistic regression (return to work/school and cancer impact)
- Descriptive statistics (problems with work/studies)
- Sensitivity analyses to examine potentially correlated factors

# Changes in Employment or School Status after Cancer Diagnosis (N = 463)



Parsons H M et al. JCO 2012;30:2393-2400



## Results-Full-Time Employment/School 15-35 Months after Diagnosis (N = 388)

|  |                                  | Yes (%) |
|--|----------------------------------|---------|
| <b>Cancer Site</b>   | NHL                              | 66.0    |
|  | HL                               | 78.2    |
|  | ALL                              | 46.7    |
|  | Germ Cell                        | 75.6    |
|  | Sarcoma                          | 72.2    |
| <b>Race/Ethnicity</b>  | Non-Hispanic White               | 76.6    |
|  | Non-Hispanic Black               | 53.8    |
|  | Hispanic                         | 60.6    |
|  | Other                            | 80.0    |
| <b>Treatment Intensity</b>                                   | Least Intensive                  | 87.2    |
|  | Moderately Intensive             | 72.2    |
|  | Very Intensive                   | 67.6    |
| <b>Age</b>   | 15-19                            | 68.6    |
|  | 20-24                            | 75.4    |
|  | 25-29                            | 70.8    |
|  | 30-34                            | 73.3    |
|  | 35-39                            | 74.4    |
| <b>Insurance</b>   | Employer/School                  | 85.1    |
|  | No Insurance                     | 45.8    |
|  | Self-Pay                         | 72.2    |
|  | Spouse's Employer/School         | 55.9    |
|  | Parent                           | 75.5    |
|  | Public Assistance                | 49.2    |
|  | Military/Tricare                 | 90.0    |
| <b>Change in Work/School Status Directly After Diagnosis</b> | No change                        | 88.6    |
|  | Took >2 weeks off                | 87.1    |
|  | Changed to part-time work/school | 81.1    |
|  | Quit completely                  | 47.6    |
|  | Other/unknown                    | 46.7    |

# Full-Time Work/School After Diagnosis: Multivariate Analyses

|  |                                  | OR (95% CI)              |
|--|----------------------------------|--------------------------|
| <b>Race/Ethnicity</b>  | Non-Hispanic White               | Ref.                     |
|  | Non-Hispanic Black               | 0.71 (0.25, 2.03)        |
|  | Hispanic                         | 0.83 (0.41, 1.68)        |
|  | Other                            | 1.21 (0.46, 3.17)        |
| <b>Treatment Intensity</b>                                   | Least Intensive                  | Ref.                     |
|  | Moderately Intensive             | 0.64 (0.22, 1.83)        |
|  | Very Intensive                   | 0.73 (0.23, 2.28)        |
| <b>Age</b>   | 15-19                            | Ref.                     |
|  | 20-24                            | 1.33 (0.46, 3.90)        |
|  | 25-29                            | 1.10 (0.34, 3.54)        |
|  | 30-34                            | 0.86 (0.24, 3.03)        |
|  | 35-39                            | 0.67 (0.19, 2.42)        |
| <b>Insurance</b>   | Employer/School                  | Ref.                     |
|  | No Insurance                     | <b>0.21 (0.07, 0.67)</b> |
|  | Self-Pay                         | 0.85 (0.23, 3.20)        |
|  | Spouse's Employer/School         | 0.41 (0.15, 1.12)        |
|  | Parent                           | 1.18 (0.36, 3.91)        |
|  | Public Assistance                | 0.61 (0.25, 1.47)        |
|  | Military/Tricare                 | 2.60 (0.23, 29.8)        |
| <b>Change in Work/School Status Directly After Diagnosis</b> | No change                        | Ref.                     |
|  | Took >2 weeks off                | 0.96 (0.38, 2.39)        |
|  | Changed to part-time work/school | 0.59 (0.18, 1.92)        |
|  | Quit completely                  | <b>0.15 (0.06, 0.37)</b> |

\* Adjusted for patient sex, comorbidity score, marital status, education, having a major source of support, and time from diagnosis to survey

## Belief that Cancer had a Negative Impact on Plans for Work/School (N = 388)

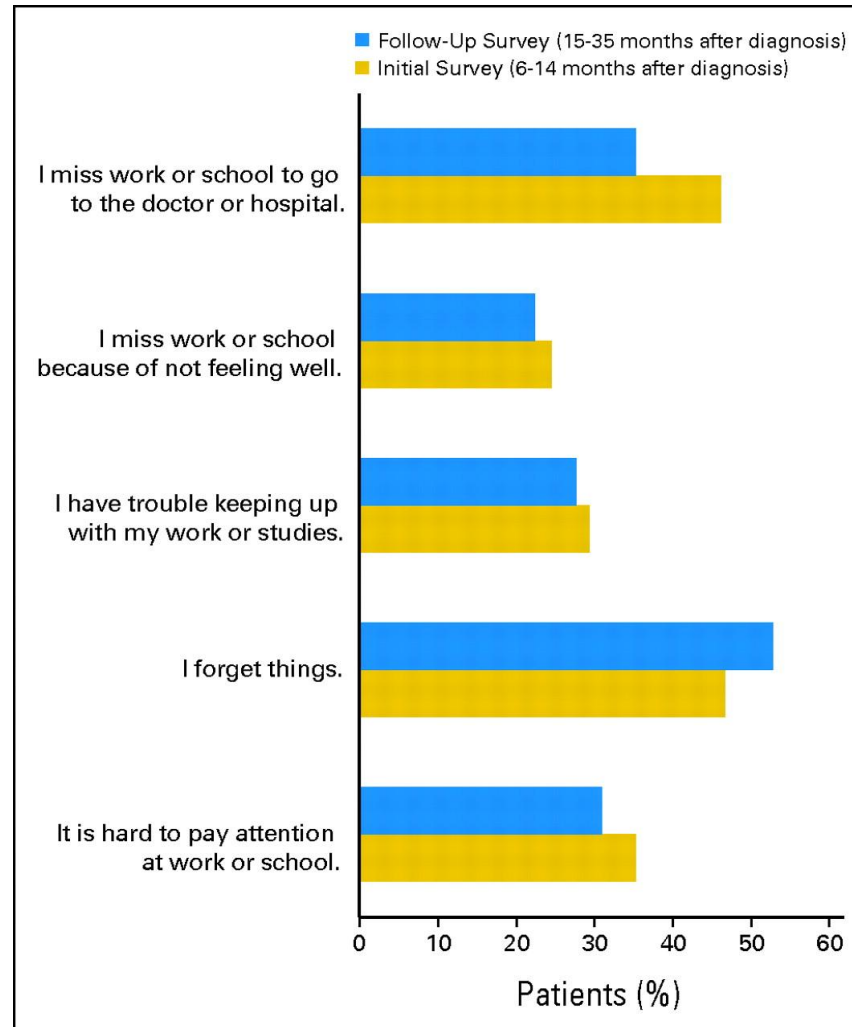
|  |                                  | Yes (%) |
|--|----------------------------------|---------|
| <b>Cancer Site</b>   | NHL                              | 42.6    |
|  | HL                               | 41.6    |
|  | ALL                              | 80.0    |
|  | Germ Cell                        | 20.0    |
|  | Sarcoma                          | 44.4    |
| <b>Race/Ethnicity</b>  | Non-Hispanic White               | 36.4    |
|  | Non-Hispanic Black               | 34.4    |
|  | Hispanic                         | 19.2    |
|  | Other                            | 42.5    |
| <b>Treatment Intensity</b>                                   | Least Intensive                  | 17.0    |
|  | Moderately Intensive             | 30.0    |
|  | Very Intensive                   | 51.4    |
| <b>Age</b>   | 15-19                            | 39.2    |
|  | 20-24                            | 37.7    |
|  | 25-29                            | 29.2    |
|  | 30-34                            | 40.0    |
|  | 35-39                            | 29.3    |
| <b>Insurance</b>   | Employer/School                  | 29.3    |
|  | No Insurance                     | 37.5    |
|  | Self-Pay                         | 27.8    |
|  | Spouse's Employer/School         | 32.4    |
|  | Parent                           | 39.6    |
|  | Public Assistance                | 49.2    |
|  | Military/Tricare                 | 30.0    |
| <b>Change in Work/School Status Directly After Diagnosis</b> | No change                        | 19.3    |
|  | Took >2 weeks off                | 29.8    |
|  | Changed to part-time work/school | 32.4    |
|  | Quit completely                  | 51.6    |
|  | Other/unknown                    | 26.7    |

# Belief that Cancer had a Negative Impact on Plans for Work/School

|  |                                  | OR (95% CI)               |
|--|----------------------------------|---------------------------|
| <b>Race/Ethnicity</b>  | Non-Hispanic White               | Ref.                      |
|  | Non-Hispanic Black               | <b>0.22 (0.07, 0.69)</b>  |
|  | Hispanic                         | 0.85 (0.45, 1.62)         |
|  | Other                            | 1.07 (0.49, 2.31)         |
| <b>Treatment Intensity</b>                                   | Least Intensive                  | Ref.                      |
|  | Moderately Intensive             | 1.65 (0.68, 3.98)         |
|  | Very Intensive                   | <b>4.00 (1.56, 10.26)</b> |
| <b>Age</b>   | 15-19                            | Ref.                      |
|  | 20-24                            | 1.35 (0.52, 3.51)         |
|  | 25-29                            | 0.98 (0.34, 2.85)         |
|  | 30-34                            | 1.93 (0.63, 5.89)         |
|  | 35-39                            | 1.18 (0.37, 3.75)         |
| <b>Insurance</b>   | Employer/School                  | Ref.                      |
|  | No Insurance                     | 1.44 (0.48, 4.27)         |
|  | Self-Pay                         | 0.90 (0.26, 3.06)         |
|  | Spouse's Employer/School         | 0.74 (0.28, 1.90)         |
|  | Parent                           | 1.13 (0.41, 3.14)         |
|  | Public Assistance                | 1.41 (0.62, 3.22)         |
| <b>Change in Work/School Status Directly After Diagnosis</b> | Military/Tricare                 | 0.89 (0.17, 4.49)         |
|  | No change                        | Ref.                      |
|  | Took >2 weeks off                | 1.87 (0.92, 3.78)         |
|  | Changed to part-time work/school | 1.78 (0.68, 4.65)         |
|  | Quit completely                  | <b>3.48 (1.62, 7.48)</b>  |

\* Adjusted for patient sex, comorbidity score, marital status, education, having a major source of support, and time from diagnosis to survey

# Reported Problems with Work and School from Baseline to Follow-up among Full-time Workers/Students (N = 388)



Parsons H M et al. JCO 2012;30:2393-2400



# Summary of Results

Most AYAs with Cancer return to work or school after cancer

- Estimates slightly lower than US national employment rates for this group
- Comparable to employment rates in older adult cancer survivors
- Uninsured and those who quit working completely directly after diagnosis less likely to return to work

Strong belief that cancer has a negative impact on work/education

- Patients with very intensive treatment, those who quit work completely after diagnosis and non-Hispanic Whites more likely to hold this view

More than 50% of full-time workers/students reported problems with work/studies after diagnosis



# Strengths and Limitations

## Strengths

- Large study of AYA patients with cancer that provides significant insights into important factors related to a successful return to work
- Identifies a series of risk factors, including lack of insurance and change in work/school status directly after diagnosis that influence return

## Limitations

- Patient reported work/educational outcomes only
- Unable to stratify sample by work/education
- Survey did not distinguish between the type and quality of work performed before and after cancer diagnosis
- Predominately White, non-Hispanic sample



# What do we still need to know?

## Future directions:

- Opportunities to understand best practices and interventions for transitioning cancer survivors back into the workplace/school
- Examine changes in the type and quality of work performed before and after diagnosis, which may have important socioeconomic implications for these survivors
- Expand evaluation to a broader range of financial and educational outcomes (bankruptcy, debt, etc.)
- Evaluate outcomes in an ethnically diverse sample of survivors
- With more than 500,000 AYA cancer survivors, future research should investigate best practices for effective transition and retention of cancer survivors into the workplace



# References

- Parsons HM, Harlan LC, Lynch CF, Hamilton AS, Wu XC, Kato I, Schwartz SM, Smith AW, Keel G, Keegan TH. (2012). [Impact of cancer on work and education among adolescent and young adult cancer survivors.](#) J Clin Oncol. 30(19):2393-400.
- Spelten ER, Sprangers MA, Verbeek JH et al. (2002). Factors reported to influence the return to work of cancer survivors: A literature review. Psychooncology 11: 132-131.
- Bradley CJ, Neumark D, Luo Z et al. (2007). Employment and cancer: Findings from a longitudinal study of breast and prostate cancer survivors. Cancer Invest 25 :47-54.

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**Questions?**