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Non-Hodgkin Lymphoma Survival Among Adolescents

The risk of dying from non-Hodgkin lymphoma (NHL) has been found to be higher among young adults than children,[1] and mortality from all invasive cancers is higher among adolescents compared with other pediatric age groups.[2] We examined the extent to which the 5-year NHL survival rate varied by age group (child, adolescent, and young adult).

Methods. In an analysis of 2442 cases of NHL among US children (age, 0-14 years), adolescents (age, 15-19 years), and young adults (age, 20-29 years) diagnosed from 1992 through 2001 and reported to 13 Surveillance, Epidemiology and End Results registries, we assessed risk of death within 5 years of cancer diagnosis for members of each age group. We also assessed the effects of 9 independent variables (sex, race/ethnicity, NHL stage at diagnosis, year of diagnosis, histology, radiation treatment, poverty status, household income, and patient migration) on this risk. We modeled 5-year overall cause-specific survival with multivariate Cox proportional hazards to obtain hazard ratios (HRs) and their 95% confidence intervals (CIs). In the final model, we adjusted for NHL subtype, year of diagnosis, race/ethnicity, and NHL stage at diagnosis.

Table. Multivariate Cox Proportional Hazards Analysis for Death From Non-Hodgkin Lymphoma

Characteristic	Proportional HR[a] (95% CI)	*P* Value
Age group, y		
0-14	1 [Reference]	
15-19	2.36 (1.68-3.31)	<.01
20-29	3.09 (2.32-4.13)	<.01
Race/ethnicity		
White	1 [Reference]	
Hispanic	1.23 (0.97-1.56)	.09
Black	1.24 (0.92-1.67)	.16
Other	1.52 (1.14-2.01)	<.01
Stage		
I	1 [Reference]	
II	1.34 (0.98-1.84)	.07
III	1.74 (1.21-2.49)	<.01
IV	3.20 (2.47-4.14)	<.01

Abbreviations: CI, confidence interval; HR, hazard ratio.
[a] Stratified by diagnosis time period (1992 to 1994, 1995 to 1998, and 1999 to 2001) and histologic subtype (Burkitt lymphoma, diffuse large B-cell lymphoma, indolent, lymphoblastic, lymphoma, not otherwise specified, and peripheral T cell/natural killer/other T cell).

Results. Adolescents were more likely to die within 5 years of NHL diagnosis compared with children (HR, 2.4; 95% CI, 1.7-3.3) (**Table**). Young adults were also more likely to die within 5 years of NHL diagnosis compared with children (HR, 3.1; 95% CI, 2.3-4.1). Patients with NHL aged 29 years or younger with stage III or stage IV disease were more likely to die within 5 years of diagnosis compared with those with stage I disease (HR, 1.7; 95% CI, 1.2-2.5; and HR, 3.2; 95% CI, 2.5-4.1, respectively).

Comment. We found that 5-year NHL survival rates were lower among adolescents and young adults than among children and lower among patients with advanced disease than among those with early disease. Adolescents are increasingly being recognized as a group with unique biological and psychosocial traits that may affect their cancer survival.[3] The types and distribution of cancers among adolescents differ significantly from those among children and adults.[2] Factors that may contribute to adolescents and young adults having poorer NHL survival rates than children include a lower rate of enrollment in clinical trials, poorer adherence to treatment regimens, and less access to optimal cancer services.[4,5] Only 10% to 15% of adolescents with cancer were enrolled in clinical trials from 1997 to 2003 compared with 60% of children with cancer.[5] Issues associated with adolescents' transition from the dependence of childhood to the autonomy of adulthood, including disagreements with authority figures, confusion about responsibilities, lack of communication, and failure to accurately perceive the severity of their cancer and the risk it poses,[4] may negatively affect the quality of cancer care they receive and their chances of survival. The NHL survival rate among young adults was also lower than that among children, and for many of the same reasons it was lower among adolescents, including lower rates of enrollment in clinical trials

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and less treatment at comprehensive cancer centers.[5] Young adults are also more likely to be uninsured.[5]

The survival of all NHL patients is dependent on their receiving appropriate cancer therapy. Efforts to improve NHL survival rates among adolescents and young adults should include increasing their enrollment in clinical trials and improving their access to insurance and optimal cancer services.

Eric Tai, MD
Lori A. Pollack, MD
Julie Townsend, MS
Jun Li, MD
C. Brooke Steele, DO
Lisa C. Richardson, MD

Author Affiliations: Centers for Disease Control and Prevention, Atlanta, Georgia.
Correspondence: Dr Tai, Centers for Disease Control and Prevention, 4770 Buford Hwy NE, MS-K57, Atlanta, GA 30341 (cvn5@cdc.gov).
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COMMENTS

Varicella Vaccine Refusal May Not Be Bad

The purpose of the article by Glanz et al[1] is to help clinicians counsel families and to encourage acceptance of the varicella vaccine. As a counselor and parent, I need to know the absolute risk, rather than the relative risk, of catching varicella if I refuse the vaccine. Approximately 1.6% of the almost 87 000 children in the Kaiser system do not get the vaccine because of parental refusal (10 children of 626 cases and controls); 5.26% of varicella disease was associated with vaccine refusal. Thus, 1390 children whose parents refused the vaccine (eg, "refusers") were at risk and an estimated 16 refusers got varicella, for an attack rate of 1.17%. Similarly, the attack rate for children not vaccinated for reasons other than refusal ("acceptors") is 0.34% (293 cases among 85 600 acceptors, a rate similar to the annual rate reported in Portland).[2] Including children who were seen with a history of, but not active, varicella would represent a truer attack rate and estimation of resource consumption.

I do agree that information on costs of home care of a sick child may be relevant to some parents, but a discussion of the likelihood of severe complications is more relevant to the parent trying to "protect" his child from harm. Among the estimated 4 000 000 annual cases of wild varicella in the 1980s, about 4000 children were hospitalized and 50 to 100 died.[3] According to data from the Vaccine Adverse Event Reporting System (VAERS), about 2.6 serious adverse events (death, meningitis, zoster, and convulsions) per 100 000 vaccine doses occur at all ages.[4]

From a societal perspective, the vaccine makes sense, since herd immunity keeps the risk of varicella low (1.17% vs over 90%, 4 000 000 cases per year with approximately 4 000 000 births per year). However, from an individual's perspective, the risk of a serious adverse event after the vaccine at 2.6 of 100 000 is perhaps higher than after a potential case of varicella at 1.17 hospitalizations (100 of 100 000 cases of varicella × 1.17% risk of varicella) and 0.03 deaths (2.5 × 1.17%) per 100 000 children during the period of observation in the study by Glanz et al.[1] It is not so obvious that refusal of vaccine is an inappropriate decision, as long as the risk of getting varicella is kept low by the 95% of children who get the vaccine.

Kenneth Harkavy, MD

Author Affiliations: Emergency Medicine Associates, Germantown, Maryland, and Reston Hospital Center, Reston, Virginia.
Correspondence: Dr Harkavy, 9709 Hall Rd, Potomac, MD 20854 (klhark46@gmail.com).
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In reply

We thank Dr Harkavy for his letter. We agree with Dr Harkavy that the absolute risk of contracting varicella is low. However, we must also acknowledge that the author's attack

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