

# CAUTION! Consider Cancer: Common Symptoms and Signs for Early Detection of Cancer in Young Adults

Archie Bleyer

---

Because young adults frequently have longer delays in diagnosis of their cancers than younger or older persons, healthcare providers who encounter this age group should become more aware of diagnostic clues for early detection. The spectrum of cancer types and their relative frequencies is distinctly different in young adults than the array in younger and older persons, such that the symptoms and signs in aggregate are distinctly different. Of potential value in recognizing manifestations of cancer in young adults is a mnemonic-friendly list of seven symptoms each represented by a letter in CAUTION, and seven sites of signs starting with the letter B. These aids have the potential of assisting in early detection, accurate diagnosis, longer survival, and a reduced risk of premature death.

Semin Oncol 36:207-212. © 2009 Elsevier Inc. All rights reserved.

---

A major impetus for this issue of *Seminars in Oncology* is the lack of attention that has been paid to young adults with respect to cancer incidence and early detection. Cancer develops in seven to eight times more people in the 20- to 39-year-old age group than in those younger than 15 years of age, and the incidence of cancer has increased more rapidly in this older age group than in the younger population. Moreover, the relative improvement in the survival rate in young adults has not kept pace with that achieved in younger or older patients, as emphasized elsewhere in this issue.

Reasons for this lack of progress that relate to early detection include issues specific to this age group: some inherent in the disease or the patient (differences in biology), some pertaining to the healthcare system (delay in recognition of malignancy, treatment by physicians unfamiliar with the disease), and some influenced by the psychosocial milieu of the patient (feelings of invulnerability, separation from parental family, drive for independence, lack of awareness of potential diagnosis of cancer, delays in seeking medical attention, inadequacy or absence of health insurance, limitations in transportation, being unable to leave employ-

ment or school, and general financial status). A further consideration is that the physical, emotional, and social challenges posed by cancer in early adult life are often unique and especially difficult for patients, families, and healthcare providers alike.

## EARLY DETECTION

### Symptoms and Signs

In general, the symptoms and signs of individual types of cancer in young adults are similar to those of the same cancer in younger and older patients. Because the spectrum of cancer types and their relative frequencies is distinctly different in young adults than the array in younger and older persons, the symptoms and signs in aggregate are quite different. The healthcare professional who is not aware of this age-dependent pattern is likely to overlook cancer as the underlying cause. Common examples of cancers that predominate in this age group and that are not considered when evaluating a symptom or sign, taking the history, and performing the physical examination are sarcomas, lymphomas, thyroid and testicular cancer, melanoma, and brain tumors. Hence, knowing the most common sites of disease in this age group helps to direct the evaluation of the symptoms and to formulate the most appropriate differential diagnosis.

Table 1 lists the common symptoms and signs in young adults according to the relative incidence of cancer types in 20- to 39-year-olds described in the Introduction of this issue of *Seminars*<sup>1</sup> and those described in *Cancer in Adolescents and Young*

---

St. Charles Medical Center, Bend, OR; Oregon Health and Science University, Portland, OR; and CureSearch/National Childhood Cancer Foundation, Arcadia, CA.

Address correspondence to Archie Bleyer, MD, 2884 NW Horizon Dr, Bend, OR 97701. E-mail: [ableyer@cascadehealthcare.org](mailto:ableyer@cascadehealthcare.org)  
0270-9295/09/\$ - see front matter

© 2009 Elsevier Inc. All rights reserved.

doi:10.1053/j.seminoncol.2009.03.004

**Table 1. Common Symptoms and Signs of Cancer in Young Adults**

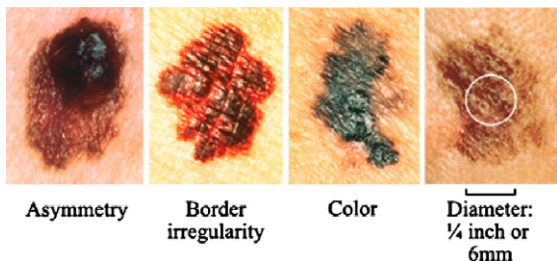
Cancer*	Symptoms	Signs
Breast cancer	Breast lump, discharge from nipple	Breast mass, nipple discharge, skin change (peau d' orange)
Melanoma	Increasing size, color change, bleeding, itching of skin lesion	Increasing size, irregularity of shape, color change, ulceration or bleeding of skin lesion
Thyroid cancer	Lump in neck, hoarseness, cough, difficulty in swallowing	Hard, irregular mass in neck
Testis cancer	Painless lump in testicle	Firm testicular mass
Non-Hodgkin lymphoma	Fever, night sweats, weight loss, enlarged lymph node(s)	Adenopathy, mediastinal obstruction, abdominal mass, hepatomegaly, splenomegaly, inflammatory skin infiltrates
Uterine cervix cancer	Abnormal vaginal discharge	Palpable pelvic, abdominal or rectal mass; abnormal vaginal examination
Hodgkin lymphoma	Fever, night sweats, weight loss, enlarged lymph node(s)	Adenopathy, mediastinal obstruction, hepatomegaly, splenomegaly
Colorectal cancer	Abdominal pain, weight loss, vomiting, constipation, diarrhea, loss of appetite, rectal bleeding, abdominal distension	Palpable abdominal, pelvic or rectal mass
CNS tumors	Headache, vomiting, deterioration in intellectual capacity, alteration in mood, limb weakness, bladder and bowel disturbance, seizures	Gait disturbance, loss of coordination, nystagmus, proptosis, dysconjugate eye movements, cranial nerve palsies, dysarthria, deafness, limb weakness
Soft-tissue sarcomas	Enlarging painless lump	Palpable mass, proptosis, cranial nerve palsy, or nasal obstruction
Oral cavity and pharynx cancer	Mouth sore or bleeding, difficulty in swallowing, neck swelling	Mouth or oropharynx lesion, palpable neck mass
Lung cancer	Cough, abnormal (especially blood-tinged) sputum	Rales, mediastinal obstruction
Kidney cancer	Blood in urine, back or pelvic pain	Hematuria, abnormal urethral discharge, abdominal or pelvic mass
Endometrial cancer	Pelvic pain, abnormal vaginal discharge or menstruation	Palpable abdominal or pelvic mass
Ovarian tumors	Abdominal pain, increasing abdominal girth	Palpable abdominal mass, abnormal vaginal discharge
Acute myelogenous leukemia	Fever, fatigue, abnormal bleeding, pallor	Petechiae, purpura, mucosal bleeding, hepatomegaly, splenomegaly
Stomach cancer	Abdominal pain, weight loss, diminished appetite, nausea, vomiting	Palpable abdominal mass
Bladder cancer	Lower abdominal pain, blood in urine	Palpable abdominal or pelvic mass
Acute lymphoblastic leukemia	Pallor, fatigue, fever, bone pain	Hepatomegaly, splenomegaly, petechiae, purpura, mucosal bleeding, palpable lymphadenopathy
Bone sarcomas	Pain, limping, swelling, non-resolution of prior athletic injury or other physical trauma, unusual limitation of daily activities	Joint swelling, palpable mass
Liver cancer	Abdominal enlargement, loss of appetite, weight loss, abdominal pain, jaundice	Hepatomegaly, jaundice, splenomegaly, spider angiomas, ascites, pallor

Compiled in part from *Cancer in Adolescents and Young Adults*, 2007, Chapters 6-20.<sup>2</sup>

\*In order of frequency in 20- to 39-year-olds, US Surveillance, Epidemiology and End Results (SEER) 2000-2004, with females and males combined.



## C



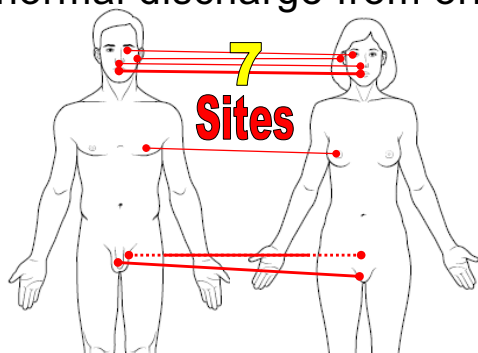
**Figure 1.** Seven symptoms of cancer in young adults: CAUTION! Consider Cancer.

Adults, ed. 2007.<sup>2</sup> This list can be collapsed into seven major symptom groups (Figures 1-7), seven major sites on physical examination of signs of cancer (Figure 8), and seven orifices of abnormal discharge that may signify cancer (Figure 9). As a mnemonic guide, the latter can each be identified with a word that starts with the letter B, and each major symptom can be identified by a letter in the expletive of “CAUTION! Consider Cancer.”

### Radiologic and Pathologic Considerations

Knowing the most common sites and histology of malignancies in young adults also can assist the physician in knowing what types of diagnostic imaging to order and can help radiologists to interpret them and advise on alternative or additional examinations. Positron emission tomography (PET scans) and selective radionuclide scans (eg, thyroid and bone scans) may be particularly helpful in evaluating symptoms in the young adult and in selecting the most appropriate biopsy procedures. Non-inva-

## A



**Figure 2.** Seven symptoms of cancer in young adults: CAUTION! Consider Cancer.

## U



PJ Buecker, MC Gebhardt, K Weber: Osteosarcoma. Liddy Schriver Sarcoma Initiative

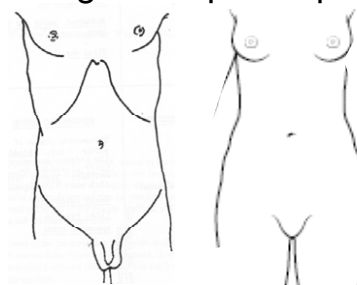
**Figure 3.** Seven symptoms of cancer in young adults: CAUTION! Consider Cancer.

sive imaging without the need for sedation, endoscopy, and minimally invasive surgery are all available for patients in this age group. It also is possible that diagnostic imaging is underused in this group, in comparison with younger and older patients, because of a lack of health insurance and other economic constraints, difficulty taking time off from work, transportation limitations, and a lack of understanding on the part of healthcare professionals as to what diagnostic and staging procedures are appropriate. The opposite tendency of ordering an excessive number of or inappropriate studies is likely in the age group given the under-appreciation of cancer risk in young adults, the kinds of cancer that do occur, less certainty of follow-through by the patient, and a heightened sense of the possibility of litigation.

### DIAGNOSTIC DELAY

Because of psychological and social issues in young adults, patients in this age range may be at higher risk for a delay in diagnosis, a factor that may impact their survival. In a study of the interval between symptom onset and diagnosis in 2,665 children participating in Pediatric Oncology Group therapeutic protocols between 1982 and 1988, Pollock and colleagues found by multivariate analysis that, for all solid tumors except Hodgkin lymphoma, as age increased, lag time increased.<sup>3</sup> Data on 15- to 29-year-olds with newly diagnosed, previously untreated cancer seen at the University of Texas M.D. Anderson Cancer Center indicate

## T



**Figure 4.** Seven symptoms of cancer in young adults: CAUTION! Consider Cancer.

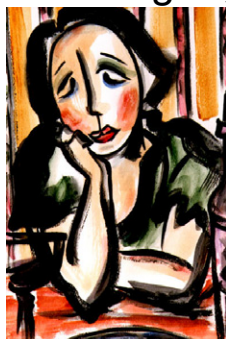
## I ncreasing lymph gland



**Figure 5.** Seven symptoms of cancer in young adults: **CAUTION!** Consider Cancer.

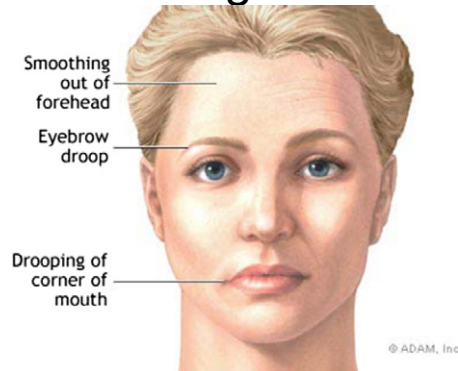
that, in this age group, the lag time to diagnosis was correlated with the quality of health insurance. Those with public or no health insurance had longer lag times, ranging from weeks to months, in all of the types of cancers evaluated except Hodgkin lymphoma. Those with statistically significantly longer lag times included patients with acute lymphoblastic leukemia, acute myelogenous leukemia, diffuse large-cell lymphoma, and osteosarcoma.<sup>4,5</sup> Non-statistically significant longer lag times were observed in young adults with gliomas, follicular thyroid cancer, and melanoma. In multivariate analysis, only the type of cancer and quality of health insurance were correlated significantly with lag time. Gender, age subgroup, race/ethnicity, religion, marital status, rural versus urban residence, and median household income and population density of the zipcode of residence were not correlated with lag time. The contribution of health insurance may be lessened in countries with universal health care coverage, but not eliminated, since the quality of national health services and their utilization by young adults are suboptimal in this age group.

## O bstinate fatigue, fever



**Figure 6.** Seven symptoms of cancer in young adults: **CAUTION!** Consider Cancer.

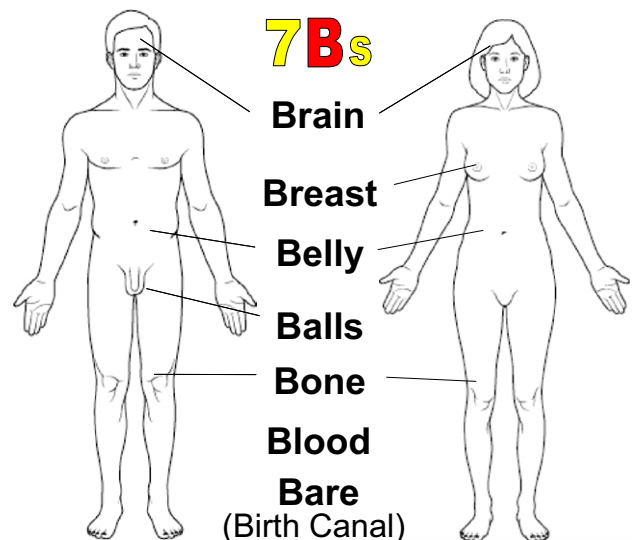
## N eurologic deficit



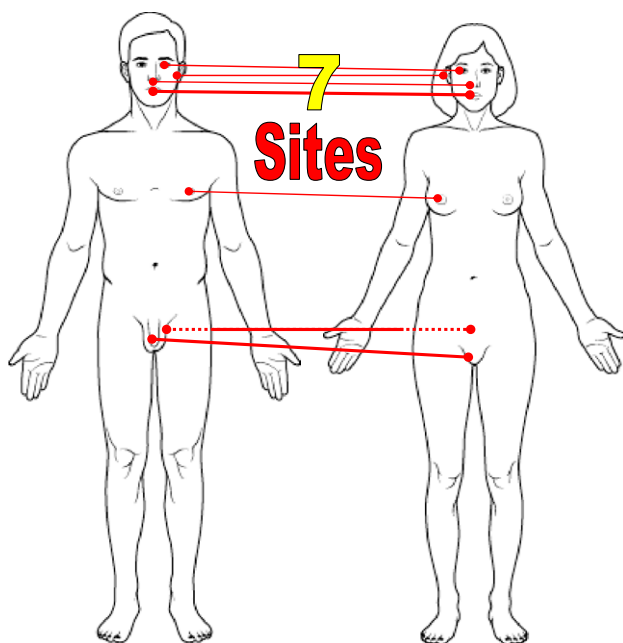
**Figure 7.** Seven symptoms of cancer in young adults: **CAUTION!** Consider Cancer.

The reasons for delay in seeking medical care and obtaining a diagnosis are multiple:

- Young adults have a strong sense of invincibility and invulnerability. Out of denial, they may delay seeing a physician for symptoms. And when a symptom is admitted, it is more often at this age than at any other regarded as psychosomatic, as interpreted by the person (“it must be in my head”) or expressed by friends (“get over it”). Even when seen, the young adult may give poor historical information, especially to a physician untrained to “read between the lines” of a young adult’s history. Some of the most advanced disease presentations occur in patients in their early 20s. Masses of the breast, testis, abdomen, pelvis, and extremity may be harbored for months because of embarrassment or uncertainty as to whether to bring the problem to anyone’s attention.



**Figure 8.** Seven signs of cancer in young adults.



**Figure 9.** Seven sites (signs) of abnormal discharge from orifices as signs of cancer in young adults.

- Young adults aren't "supposed to" have cancer. Clinical suspicion is low, and symptoms are often attributed to physical exertion, fatigue, stress, or other psychosomatic explanations, as described above.
- Too many young adults do not receive routine medical care. Regardless of health insurance status, young adults are more likely than younger or older patients to lack a usual source of care. Without a primary physician who knows the patient's baseline health status, the symptoms of cancer can be missed.
- Young adults are the most under-insured age group, at least in the United States, falling in the gap between parental coverage and programs designed to provide universal health insurance to children (Medicaid and Children's Health Insurance Programs), and the coverage supplied by a full-time secure job with an employer who provides health insurance. In the United States, the highest rate of un-insurance occurs in 19- to 24-year-olds, at 33.6% not insured for a whole year, followed by 25- to 34-year-olds at 26.1%.<sup>6</sup> Under-insured rates (insured for part of a year or insured with plans that provide minimal coverage) are even higher and probably exceed half of young adult Americans.<sup>7-10</sup>
- The evaluating medical professional may be poorly trained or unwilling to care for young adults.

Given the lack of routine care, empowering young adults for self-care and early detection of disease is important. Certainly, self-examination of the skin should be

encouraged. Self-breast and self-testicular examination, which historically had been recommended, are no longer considered to be of sufficient value, relative to rates of excessive diagnostic evaluations and anxiety on the part of the person, family, and even the healthcare providers, to recommend their routine application.<sup>11-13</sup> Also, it may be difficult to teach the importance of early detection of cancer to young adults, because at no other time in life is the sense of invincibility more pervasive. And for breasts and testes, education of young adults may be somewhat difficult to bring up and teach at this age. On the other hand, teaching testicular cancer awareness to high school and college students may not be as difficult as it may seem. A preliminary assessment of teaching testicular self-examinations showed that anxiety was no greater in students who were exposed to presentations on testicular cancer and testicular self-examination than in those who did not receive this training.<sup>14</sup> Additionally, efforts should be made to educate young adults about the treatment and high cure rates of early cancer in this age group in order to dispel the fatalistic perception that arises from knowing older individuals (grandparents, parents, uncles, aunts, others) who have died from cancer.

## CONCLUSIONS AND RECOMMENDATIONS

Given the many factors that lead to delays in seeking medical attention, including a sense of invincibility, lack of awareness of personal cancer risk, lack of health insurance, reluctance to leave school or work, general underutilization of medical services, and unreliability of keeping follow-up appointments, there is a greater need to consider cancer at the earliest possible encounter in a young adult than in younger or older patients. That delays and lack of compliance are greater in young adults than at any other age may help explain the relative lack of progress in survival prolongation and mortality reduction in young adults with cancer.

Since the array of cancers in young adults is unique—there is no other age which has a similar distribution—the symptoms and signs differ from other age groups. It is helpful to know the most common cancers in the age group, and their common symptoms and signs in aggregate. Of potential value in recognizing manifestations of cancer in young adults is a mnemonic-friendly list of seven symptoms each represented by a letter in CAUTION, and seven sites of signs starting with the letter B. These aids should be considered by all practitioners who encounter young adults for medical evaluation, whether physicians, nurses, psychologists, chiropractors, or allied health professionals. They have the potential of assisting in early detection, accurate diagnosis, longer survival and a reduced risk of premature death.

## REFERENCES

1. Bleyer A, Barr R. Cancer in young adults 20 to 39 years of age: overview. *Semin Oncol.* 2009;36:194-206.

2. Bleyer A, Barr RD, Albritton KH, Phillips M, Siegel S, editors. *Cancer in adolescents and young adults*. New York: Springer Verlag; 2007.
3. Pollock BH, Krischer JP, Vietti TJ. Interval between symptom onset and diagnosis of pediatric solid tumors. *J Pediatr*. 1991;119:725-32.
4. Bleyer A, Ulrich C, Martin S, Munsell M, Lange G, Taylor S. Status of health insurance predicts time from symptom onset to cancer diagnosis in young adults [abstract]. *Proc Am Soc Clin Oncol*. 2005;23 Suppl:547s.
5. Martin S, Ulrich C, Munsell M, Lange G, Taylor S, Bleyer A. Time to cancer diagnosis in young Americans depends on type of cancer and health insurance status. *Value Health*. 2005;8:344.
6. Steinbrook R. Health care reform in Massachusetts—a work in progress. *N Engl J Med*. 2006;354:2095-8.
7. Robert Wood Johnson Foundation, 2003; Report by Families USA & The Lewin Group.
8. General Accounting Office. Analysis of March 2000 current population survey of nonelderly <65 years, and of young adult, 18-24 year olds, Washington, DC.
9. Fishman E. Aging out of coverage: young adults with special health needs. *Health Affairs*. 2001;20.6:254-66.
10. White PH. Access to health care: health insurance considerations for young adults with special health care needs/disabilities. *Pediatrics*. 2002;110:1328-35.
11. U.S. Preventive Services Task Force, <http://www.ahrq.gov/clinic/uspstf/uspstfbrca.htm>; accessed October 12, 2008.
12. Howard F, Scott-Findlay S. Breast self-examination: when research contradicts accepted practice. *AWHONN Lifelines*. 2006;10:66-70.
13. U.S. Preventive Services Task Force, <http://www.ahrq.gov/clinic/uspstf/uspstfetest.htm>; accessed October 12, 2008.
14. Friman PC, Finney JW, Glasscock SG, et al. Testicular self-examination: validation of a training strategy for early cancer detection. *J Appl Behav Anal*. 1986;19:87-92.