



# Hodgkin's Disease and Non-Hodgkin's Lymphoma

*Is the risk worth the worry?*

*Article for the general public culled from various scientific studies.*

Less than 50 years ago, if a doctor told a patient “you have cancer,” he effectively sentenced that patient to death. Although cancer is still the leading cause of death in the United States today, a cancer diagnosis is no longer considered an automatic death sentence.<sup>1</sup> Advances in diagnosis and treatment have resulted in more cancer patients living longer lives or even realizing cures.<sup>2</sup> The scientific and medical communities continue the search for more effective cancer treatments, but study is not limited to treatment alone. Today, we can be warned with certainty that smoking causes lung cancer, and that long periods of unprotected sun exposure result in skin cancer. These warnings can be issued because researchers understand the need to investigate the causes of cancers as well as the cures, and know that once information is made public, the population can decide what steps they should take to avoid cancer risks.<sup>2</sup>

One family of cancers that is of increasing interest for study is lymphatic cancer. Over the past 30 years, physicians and researchers have noted a significant increase in the United States of the incidence of these cancers (categorized as Hodgkin’s Disease and non-Hodgkin’s lymphoma).<sup>3</sup> Numerous studies have been conducted attempting to pinpoint their causes. These studies have investigated the effects of environment, avoidable risks, diet, and even genetics on this group of cancers. For individuals who are directly or indirectly affected by lymphomas, such studies should offer some concrete course of action they can take to lower their risk of developing these cancers. Unfortunately, scientists have been unable to determine the causes of lymphoma,<sup>4</sup> and some study findings may leave the population wondering if anything at all can be done to avoid developing these diseases.

## **The lymphatic system**

In order to understand more fully how lymphatic cancers affect the body, it is important to learn something about the lymphatic system itself — what it is, where it is, and what it does.

The lymphatic system is comprised of several components that are situated throughout the head, neck, chest, abdomen, and groin — components that primarily function to keep a person healthy, to fight off disease, and help the body build up immunities. The system includes organs like the spleen and the thymus, bone marrow, lymphatic vasculature (vessels), and lymph nodes.<sup>5</sup> All of these structures work together to circulate an invisible fluid called “lymph” through this immune system.

Lymph is a component of blood plasma — the part that remains after cells have absorbed all the plasma’s nutrients. Lymph “is responsible for collecting and removing waste products left behind in the tissues.... The role of tissue fluid is to deliver the ‘groceries’ to the cells. The role of lymph is to ‘take out the trash’ that is left behind and to dispose of it.”<sup>6</sup>

Once lymph has gathered waste products from the body's cells and tissues, it enters the lymph nodes, groups of tiny organs designed to filter the impurities from the lymph and send clean fluid back through the system where it begins its work again.<sup>6</sup>

The other major components of the lymphatic system work to create lymphocytes — white blood cells critical to fighting infection — or to remove additional debris. The bone marrow and the thymus, the primary lymphatic organs, create B-cell lymphocytes (which mature in the bone marrow) and T-cell lymphocytes (which mature in the thymus). Though both these cell types help to fight infection, they each recognize different kinds of antigens, or infection markers, and so help the body fight specific diseases.<sup>7</sup> The spleen, which sits behind the rib cage and diaphragm on the left side of the body, destroys old red blood cells, holds a reservoir of blood, and removes other waste materials from the bloodstream.<sup>8</sup>

## **Lymphoma**

Sometimes, damage occurs to our DNA structure, which causes cells to mutate. Often, these damaged DNA cells are repaired by the body or just die off without causing long-lasting or permanent changes to the cells.<sup>9</sup> When the damaged cells begin to grow uncontrollably, however, cancer is diagnosed.<sup>9</sup>

Lymphoma is cancer of the lymphatic system and was first described more than 300 years ago.<sup>10</sup> There are two general types of lymphoma: Hodgkin's Disease and non-Hodgkin's lymphoma.

Hodgkin's Disease is named for Dr. Thomas Hodgkin, the physician credited for discovering it in 1832.<sup>10</sup> It is the rarer of the two types, accounting for less than one percent of all cancers in the United States.<sup>11</sup> Hodgkin's Disease is diagnosed when tests reveal the presence in the lymph nodes of Reed-Sternberg cells, which have an appearance different from non-Hodgkin's or other cancer cells.<sup>12</sup> Hodgkin's Disease spreads in a more systematic pattern than non-Hodgkin's lymphoma and most commonly occurs in men and women ages 15 to 30, and in people aged 55 or older.<sup>12</sup>

The more common type of lymphatic cancer is called non-Hodgkin's lymphoma, or NHL. NHL is the general category for all other lymphomas that cannot be called Hodgkin's Disease. NHL usually strikes between the ages of 45 and 60<sup>13</sup> and is the fifth leading cause of cancer-related deaths in the United States.<sup>14</sup> This cancer spreads more randomly throughout the lymphatic system than does Hodgkin's Disease, though both Hodgkin's and NHL begin in the lymph nodes and result in enlargement of these nodes. If left unchecked,

these growing lymph nodes begin to affect negatively the structure and function of other systems in the body, which can result in death.<sup>15</sup> The most important reason to distinguish between Hodgkin's Disease and NHL is because different treatments are used to affect remission or cure.

## Symptoms

In its early stages, lymphoma is usually painless and symptoms are not pronounced. Most likely, a person will notice only an enlarged lymph node or a "swollen gland," perhaps in the neck, behind the ear, or in the armpit.<sup>16</sup> But enlarged lymph nodes do not automatically signal cancer. Remember that it is the job of the lymphatic system to fight infection and disease, so the lymph nodes often enlarge when infection is present from something as simple as a cold or flu. If lymph nodes remain enlarged for several weeks, however, or swell without any indication of infection, a doctor should be consulted. Symptoms of both Hodgkin's Disease and NHL include:<sup>17</sup>

- painless swelling of the lymph nodes
- severe, soaking night sweats
- unintended weight loss
- fever without obvious cause that may appear only at night, may disappear for several weeks, and then return
- itching all over the body
- headache
- seizures
- bloody stools
- nausea and vomiting

## Diagnosis and treatment

Surgical biopsies, needle biopsies, bone marrow biopsies, and spinal taps are used to detect both Hodgkin's and NHL by removing suspect tissue or fluid and examining it microscopically, which helps the physician determine the stage of the disease and recommend the best treatment. Imaging technology similar to, but more advanced than, an X-ray (normally CT scans, PET scans or MRIs) is also used. This technology can determine the location and extent of the cancer cells.<sup>18</sup> The most common treatment for lymphomas involves a combination of radiation, which is targeted to specific cancer cells, and chemotherapy, using a "recipe" of various drugs administered on a regular schedule. The success of these therapies depends on many factors, including the mix of drugs used, the duration of the treatments, the ability of the patient to tolerate the treatment, the stage of the cancer, as well as the age and the general health of the patient.<sup>19</sup>



A study released earlier this year by The New England Journal of Medicine detailed encouraging results for a new lymphoma drug called Bexxar. According to the study, of patients diagnosed with later stage follicular NHL (the most common form of slow growing lymphoma<sup>20</sup>), 95% showed improvement on this drug and 75% were cured. Survival rate after five years was 59%.<sup>21</sup>

So, advances in treatment and cure continue to be made.

## Risk factors

As incidences of NHL and Hodgkin's Disease continue to increase, researchers have attempted to define factors that may put people at a greater risk for contracting these diseases. Studies have been done investigating environmental factors, such as exposure to certain chemicals in the workplace; avoidable risks, such as the voluntary use of products containing suspect ingredients; dietary factors, and even family history. It seems reasonable to assume that since these kinds of studies have been conducted for more than 30 years, researchers would be able to offer the public a large number of concrete conclusions about the causes of lymphoma, which could then translate into solid courses of action that may help us avoid the risks. However, this does not seem to be the case.

One example of the inconclusive nature of these studies was published in *Occupational and Environmental Medicine* in 2001, in a report on the effects on workers of the manufacture of herbicides. The premise of the study seemed to suggest that workers involved in the manufacture of herbicides were more heavily exposed to their toxins than were the farmers who used the chemicals and so may experience higher levels of lymphoma. But the report stated that "[n]o excess of non-Hodgkin [sic] lymphoma was found among the workers."<sup>22</sup>

These types of results were discovered in almost all the research studies gathered for this report. Phrases such as "no significant increase in lymphoma,"<sup>23</sup> "no increase in deaths from non-Hodgkin's lymphoma,"<sup>24</sup> and "little evidence that either a general history of allergy or commonly reported specific allergies are associated with NHL"<sup>25</sup> were typical of studies researching NHL instances and such things as exposure to chemicals, previous presence of allergies, use of hair dye, and occurrence of lymphomas among other family members.

Even general information about risk factors provided by leading cancer organizations offers no strong theories about the causes of lymphoma. The Leukemia & Lymphoma Society, for example, admits that the "principle cause of the increase in lymphoma is unknown" and the "cause of Hodgkin [sic] lymphoma is uncertain. Many studies of environmental... linkages have been conducted with ambiguous results."<sup>26</sup>

The National Cancer Institute acknowledges that “doctors can seldom explain why one person develops non-Hodgkin’s lymphoma and another does not.... Most people who *have* known risk factors *do not* get non-Hodgkin’s lymphoma. On the other hand, people who *do* get the disease often have *no known risk factors.*”<sup>27</sup> (emphasis added)

Similarly, the American Cancer Society notes that “lifestyle-related risk factors... includ[ing] exposing skin to strong sunlight, a diet high in fat and low in fruits and vegetables, and habits such as smoking and excessive drinking of alcohol... do not strongly affect a person’s risk of developing non-Hodgkin [sic] lymphoma.”<sup>28</sup> The ACS also admits that while exposure to radiation therapy “slightly increased [the] risk of developing non-Hodgkin [sic] lymphoma,”<sup>28</sup> recent studies regarding increased risk due to chemical exposure “is not certain,”<sup>28</sup> and a “direct cause and effect relationship has not yet been definitely established” between use of chemotherapy drugs to treat other cancers and increased risk of non-Hodgkin’s lymphoma.<sup>28</sup>

Researchers also seem reluctant to suggest that diet can cause an increased risk of lymphoma. A recent study of dietary factors and increased lymphoma risk reported that diet “could influence NHL risk by modulating the immune system, although evidence is limited.”<sup>29</sup> The study went on to say that although “red meat, white meat, and seafood intake were not associated with NHL risk... there *was* a positive association between increased consumption of *fried* meat, particularly fried red meat” and NHL.<sup>29</sup> (emphasis added) In addition, these researchers suggested that no correlation existed between the degree of frying and NHL, and while grilling might increase risk for the disease, the association was not consistent.<sup>29</sup>

So what is to be concluded from the information offered by professional cancer organizations and clinical trials about the causes and risk factors of lymphoma? And what steps should someone take to diminish his or her likelihood of contracting these cancers? From the available information, it is difficult to say. Though overall health benefits may be realized by altering the diet and limiting exposure to chemicals and toxins, it appears from the current evidence that little can be done that will make a significant difference in whether or not an individual will contract non-Hodgkin’s lymphoma or Hodgkin’s Disease in his or her lifetime. The best course for those who believe themselves to be at risk may be to recognize the early symptoms and seek prompt evaluation and treatment.

## References

- <sup>1</sup>Detailed Guide: What is Cancer? Retrieved Aug. 13, 2005 from [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_1x\\_What\\_Is\\_Cancer.asp?sitearea=](http://www.cancer.org/docroot/CRI/content/CRI_2_4_1x_What_Is_Cancer.asp?sitearea=)
- <sup>2</sup>Annual Report to the Nation Finds Cancer Incidence and Death Rates on the Decline: Survival Rates Show Significant Improvement. (Posted June, 2004). Retrieved Aug. 13, 2005 from <http://www.nci.nih.gov/newscenter/pressreleases/ReportNation2004release>
- <sup>3</sup>Non-Hodgkin's Lymphoma. Retrieved Aug. 15, 2005 from [http://www.leukemia-lymphoma.org/all\\_page?item\\_id=7087](http://www.leukemia-lymphoma.org/all_page?item_id=7087)
- <sup>4</sup>Lymphoma. Retrieved Aug. 15, 2005 from [http://www.leukemia-lymphoma.org/all\\_page?item\\_id=7030](http://www.leukemia-lymphoma.org/all_page?item_id=7030)
- <sup>5</sup>The Lymphatic System. *Lymphoma Information Network*. Retrieved Aug. 8, 2005 from <http://www.lymphomainfo.net/lymphoma/lymphsys.html>
- <sup>6</sup>Introduction to the Lymphatic System. Retrieved Aug. 8, 2005 from <http://www.lymphnotes.com/article.php/id/151>
- <sup>7</sup>Lymphatic System. Retrieved Aug. 8, 2005 from <http://en.wikipedia.org/wiki/Lymph>.
- <sup>8</sup>Spleen. Retrieved Aug. 8, 2005 from <http://en.wikipedia.org/wiki/Spleen>.
- <sup>9</sup>Cancer basics: What is cancer and why does it occur? Retrieved Aug. 9, 2005 from <http://mayoclinic.com/voke.cfm?id=CA00003>
- <sup>10</sup>Hodgkin's Disease — Historical Timeline. *Lymphoma Information Network*. Retrieved Aug. 8, 2005 from <http://www.lymphomainfo.net/hodgkin's/timeline.html>
- <sup>11</sup>What is Hodgkin's Disease? Retrieved Aug. 10, 2005 from [http://www.medicinenet.com/hodgkin's\\_disease/article.htm](http://www.medicinenet.com/hodgkin's_disease/article.htm)
- <sup>12</sup>Detailed guide: What is Hodgkin's Disease? Retrieved Aug. 11, 2005 from [http://www.cancer.org/docroot/cr/content/cr\\_2\\_4\\_1x\\_what\\_is\\_hodgkin's\\_disease\\_20.asp?sitearea=cri](http://www.cancer.org/docroot/cr/content/cr_2_4_1x_what_is_hodgkin's_disease_20.asp?sitearea=cri)
- <sup>13</sup>Retrieved Aug. 8, 2005 from [http://www.umm.edu/patiented/artilces/what\\_risk\\_factors\\_non-hodgkin's\\_lymphoma\\_000084\\_2.htm](http://www.umm.edu/patiented/artilces/what_risk_factors_non-hodgkin's_lymphoma_000084_2.htm)
- <sup>14</sup>Retrieved Aug 8, 2005 from [http://webmd.com/content/article/9/1680\\_54909.htm](http://webmd.com/content/article/9/1680_54909.htm)
- <sup>15</sup>Detailed guide: What is Hodgkin's Disease? Retrieved Aug. 11, 2005 from [http://www.cancer.org/docroot/cr/content/cr\\_2\\_4\\_1x\\_what\\_is\\_hodgkin's\\_disease\\_20.asp?sitearea=cri](http://www.cancer.org/docroot/cr/content/cr_2_4_1x_what_is_hodgkin's_disease_20.asp?sitearea=cri)
- <sup>16</sup>Retrieved Aug. 8, 2005 from [http://adam.about.com/reports/000084\\_2.htm](http://adam.about.com/reports/000084_2.htm)
- <sup>17</sup>Retrieved Aug. 9, 2005 from [http://adam.about.com/reports/000084\\_2.htm](http://adam.about.com/reports/000084_2.htm)
- <sup>18</sup>Retrieved Aug. 9, 2005 from <http://www.thebody.com/Forums/AIDS/Cancer/Archive/lymphomas/Q141592.html>
- <sup>19</sup>Retrieved Aug. 9, 2005 from [http://adam.about.com/reports/000084\\_4.htm](http://adam.about.com/reports/000084_4.htm)
- <sup>20</sup>Retrieved Aug. 9, 2005 from [http://adam.about.com/reports/000084\\_4.htm](http://adam.about.com/reports/000084_4.htm)
- <sup>21</sup>Kaminski, Mark S. et.al. (Feb. 2005). 131I-Tositumomab Therapy as Initial Treatment for Follicular Lymphoma. *The New England Journal of Medicine*, Vol. 352: 441-449. retrieved Aug. 11, 2005 from <http://www.my.webmd.com/content/article/9/54910.htm>
- <sup>22</sup>Burns, C.J., Beard, K.K., and Cartmill, J.B. (Jan. 2001). Mortality in chemical workers potentially exposed to 2, 4-dichlorophenoxyacetic acid (2, 4-d) 1945-94: an update. *Occupational and Environmental Medicine*, 58(1): 24-30. Retrieved Aug. 8, 2005 from <http://www.lymphomaresearch.org/researchupdates.php>
- <sup>23</sup>Cantor, K.P., et.al. (Feb. 2003) risk of non-Hodgkin's lymphoma and prediagnostic serum organochlorines: df-hexchlorocyclohexane, chloradane/heptachlor-related compounds, dieldrin, and hexachlorobenzene. *Environmental Health Perspectives*, 111(2): 179-183.
- <sup>24</sup>Cocco, P., Kazerouni, N., Zahm, S.H. (Jan. 2000). Cancer mortality and environmental exposure to DDE in the United States. *Environmental Health Perspectives*, 108 (1): 1-4.
- <sup>25</sup>Briggs, Nathaniel C., Levine, Robert S., & Brann, Edward A. (Apr. 2002) Allergies and Risk of Non-Hodgkin's Lymphoma by Subtype. *Cancer Epidemiology Biomarkers and Prevention*, Vol. 11, 401-407.
- <sup>26</sup>Lymphoma. Retrieved Aug. 9, 2005 from [http://www.leukemia-lymphoma.org/all\\_page?item\\_id=7030](http://www.leukemia-lymphoma.org/all_page?item_id=7030)
- <sup>27</sup>What you need to know about non-Hodgkin's lymphoma. Retrieved Aug. 11, 2005 from <http://www.cancer.gov/cancertopics/wyntk/non-hodgkin's-lymphoma/page4>
- <sup>28</sup>Detailed Guide: Lymphoma, Non-Hodgkin's type What are the risk factors for non-Hogkin [sic] lymphoma? Retrieved Aug. 11, 2005 from [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_2X\\_What\\_are\\_the\\_risk\\_factors\\_for\\_non-Hodgkin's\\_lymphoma\\_32.asp?sitearea=](http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_What_are_the_risk_factors_for_non-Hodgkin's_lymphoma_32.asp?sitearea=)
- <sup>29</sup>Chang, Ellen T., et.al. (Feb. 2005) Dietary Factors and Risk of Non-Hodgkin's Lymphoma in Men and Women. *Cancer Epidemiology Biomarkers & Prevention*, Vol. 14, 512-520.