

## Leukaemia Foundation of Australia

### Position Statement: Hair dyes and lymphoma

Since the 1970's, the number of people diagnosed with *B and T-cell lymphomas* (*non-Hodgkin's lymphoma*, or *NHL*) has risen dramatically in Australia and in many countries overseas. Despite ongoing research into the causes of non-Hodgkin's lymphoma (NHL) the reasons for this rise remain largely unknown.

The possible link between exposure to chemicals found in hair dyes and lymphoma has been explored in a number of studies, the results of which remain to date inconsistent and inconclusive. Several studies have reported significantly elevated risks of lymphoma with long-term use of dark and permanent hair dyes<sup>1,2,3</sup>. Others have reported no such risk, regardless of the type of hair dye used, or the duration of its use<sup>4, 5, 6,7</sup>.

#### How common is lymphoma?

**Each year in Australia around 3,500 people are diagnosed with a type of B or T-cell lymphoma (non-Hodgkin's lymphoma). Lymphomas are currently the sixth most common cancer diagnosed in men and the fifth most common cancer diagnosed in women. In children, lymphoma is the third most common cause of cancer after acute lymphoblastic leukaemia, and cancers of the brain and central nervous systems<sup>8</sup>.**

**Between 1991 and 2001, the incidence (number of new cases diagnosed) of lymphomas increased in Australia by an average of 0.7% per year in men and 1.2% per year in women. Over the next five years (to 2011) the annual incidence is expected to remain stable for men but to continue to rise for women<sup>9</sup>.**

#### What does the research tell us?

Overall, there is little clear evidence linking hair dyes and lymphomas, or any other type of blood cancer. The results of several studies however suggest that certain characteristics of the hair dye used and the duration of its use may be significant and require closer scrutiny. A population based case control study by Zahm et al (1992)<sup>2</sup> found that women who used permanent hair colouring products had a higher risk of non-Hodgkin's those who used semi or non-permanent colourants. Risk was highest for users of black, red and brown/brunette dyes respectively, while users of blonde dyes were found to have no increased risk. In another study, Altekruze et al (1999)<sup>10</sup> found a two-fold increased risk of NHL-related death among users of dark permanent hair dyes.

More recently, Zhang et al (2004)<sup>3</sup> looked at non-Hodgkin's lymphoma risk according to the type of product used, sub-type of disease and time period of use. A significantly increased risk for follicular and B-cell lymphomas was seen with permanent hair dye use, while darker colours were associated with an increased risk of B-cell lymphomas. Light coloured hair dyes were found to increase the risk of follicular and low-grade lymphomas. Overall, a higher risk of non-Hodgkin's lymphoma was seen among women who started using hair colouring products prior to 1980. Risk was highest in women who reported using dark coloured permanent dyes for the longest time (more than 25 years) and in those who reported more than 200 applications. No increased risk was seen in women who started using hair dyes in 1980 or later. The authors suggested that this finding might be explained by changes to the chemical constituents of hair dyes over the years, or the long lag time between exposure and the presentation of the disease.

Other studies have found no evidence to support a link between hair dye use and non-Hodgkin's lymphoma, or any other type of blood cancer. In 1993 the International Agency for Research on Cancer<sup>11</sup> concluded that there was '*inadequate evidence* that personal use of hair colourants entails exposures that are carcinogenic' (capable of causing cancer). Grodstein et al (1994)<sup>7</sup> found no evidence of an association between the duration, frequency, or age of first use of permanent hair colouring products and lymphoma, or any other blood cancers. Similarly, a large population based case-control study by Holly et al (1998) found no convincing evidence linking hair dye use and lymphoma. In a recent comprehensive Meta analysis of previous studies, Takkouche et al (2005)<sup>6</sup> found no strong evidence that hair dyes increase the risk of any type of cancer. The researchers did however find a borderline increased risk of developing a blood cancer and concluded that 'the risks related to hematopoietic (blood) cancers (including NHL) should be investigated further'.

### **Summary**

To date, there is insufficient evidence to prove that the personal use of hair dyes causes lymphoma, or any other type of blood cancer. Many hair colouring products are however known to contain a variety of potentially hazardous chemicals including aromatic amines, some of which may be mutagenic (capable of changing DNA) and carcinogenic (capable of causing cancer) in animals<sup>12</sup>. When used inappropriately, these chemicals may pose significant risks to the health and safety of workers, the public and our environment. As such, the Leukaemia Foundation supports a cautious approach to the handling and use of hair dyes, and recommends that manufacturers and other relevant industry guidelines be followed during the preparation, use and disposal of these products.

## What causes lymphoma?

Like many cancers, lymphoma is thought to result from a series of changes in special proteins called genes, which normally control the growth and division of blood cells. The cause of changes remains unclear but there are likely to be a number of interrelated factors involved. Numerous studies have been conducted over the years to examine possible causes of lymphoma. Evidence to date suggests immunodeficiency (reduced immune function); either congenital (inherited) or acquired (developed during the person's lifetime) as the strongest risk factor for lymphoma. Certain types of infectious organisms may also play an important role, particularly in people whose immune system is already reduced as a result of disease or treatment<sup>13, 14</sup>.

For more information about lymphomas read the Leukaemia Foundation's *Understanding lymphomas (B and T-cell lymphomas or non-Hodgkin's lymphoma)- A guide for parents and families* and *Understanding lymphomas (Hodgkin's lymphoma)- A guide for parents and families* which can be found at [www.leukaemia.org.au](http://www.leukaemia.org.au)

## References

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