

# Centre for Public Health Research



## **Report for a Survey of Low Cost Cosmetics (Hair Dye) For the Ministry of Health**

**Contact Person:**

Associate Professor Barry Borman  
Centre for Public Health Research  
Massey University, Wellington Campus  
PO Box 756, Wellington 6140  
Tel: +64 4 801 5799 extn 62180; Fax: +64 4 380 0600

# Introduction

The Centre for Public Health Research (CPHR), established in 2000, is a multi-disciplinary team of researchers based on the Massey University Wellington campus.

The research programme of the Centre covers all aspects of public health research, but with a focus on:

- non-communicable diseases (respiratory disease, cancer, diabetes)
- occupational health
- environmental health
- socio-economic determinants of health
- surveillance and health information
- Māori health
- Pacific health research

The report, prepared by Mathu Shanthakumar and Barry Borman, provides the methodology and results of a study to investigate claims that certain brands of cosmetic products sold at discount stores were non-compliant with the Cosmetics Products Group Standard (as amended 1 November 2010) under the Hazardous Substances and New Organisms Act 1996 (HSNO Act).

## Background

The Ministry of Health is an enforcement agency under the HSNO Act, where it is necessary to protect public health. Cosmetic products in NZ are regulated under the HSNO Act via the Cosmetic Products Group Standard. A copy of this Group Standard (and associated Schedules) is available from the Environmental Protection Authority's website at <http://www.epa.govt.nz/Publications/gs--cosmetic.pdf>.

The Cosmetic Products Group Standard 2006 sets a number of requirements that cosmetic products must comply with labeling, packaging, etc. It also sets restrictions on the types of hazardous properties that are allowable in cosmetic products, and sets restrictions on certain components that may or may not be used, either banning them completely or placing restrictions on their use such as setting maximum concentration levels.

## Aim

The purpose of the survey was to check the level of compliance of hair dye products from low cost retailers with the Cosmetic Products Group Standard 2006 under the HSNO Act. The survey focused only on the presence of meta, ortho and para-phenylenediamines in randomly selected hair dye products.

# Sampling Methodology

## Target population

As retail outlets could not be selected based on available cosmetic brand names, those operating in Auckland urban areas under names such as “The \$2 Shop”, “Dollar Store 1 2 3”, and “Price Busters”, which are reputed to sell low cost cosmetics (i.e. less than or equal to \$5), were the target population. Therefore retail outlets such as Farmers, Smith and Caughey, The Warehouse, supermarkets and pharmacies that sell brand name cosmetics such as “L’oréal”, “Revlon” and “Maybelline” were excluded.

## Sampling frame

The sampling frame was constructed using the online resources, ‘*Yellow Pages*’ (New Zealand Business search) and ‘*finda*’ (New Zealand business directory, listings and reviews). Businesses with keywords such as discount, dollar or the symbol ‘\$’ were searched for and selected if it was found to be a discount store.

The search identified 73 unique discount type businesses in Auckland urban areas. The sampling frame is subject to some bias as only businesses listed in the *Yellow Pages* or *finda* directories were eligible for selection. Businesses selling low cost cosmetic brands that were not listed in either of the online resources or with names other than those specified would have been missed.

## Sampling design

A multi-stage stratified cluster sampling design was used to detect whether cosmetic products (in this instance, hair dye) sold at ‘discount stores’ in Auckland urban areas comply with the maximum permissible levels as specified under the Cosmetic Products Group Standard as provided in the HSNO Act.

## Selection of the sample

A simple random sample of stores was to be selected assuming:

- a 95% level of confidence ( $z=1.96$ )
- a 3% precision rate or confidence interval of  $\pm 5$  ( $e=0.03$ )
- a 90% success rate for the indicator ( $p=0.9$ ;  $q=1-p=0.1$ )
- a population size of 73 stores ( $N=73$ )

$$n = \frac{z^2 \times p \times q \cdot N}{z^2 \times p \times q + (N-1)e^2}$$

$$n = 61.3432 \quad (\text{sample size})$$

Assuming a compliance rate of 75-85% (i.e. out of 100 stores, only 75-85 sell hair dye), the sample size was increased to 73 stores.

From each of the 73 discount stores, Auckland Regional Public Health Service Health Protection Officers purchased one hair dye (a random shade) from every brand that was available in stock. Data was collected on the location of the store, along with the cost, brand, batch number and colour of the product that was sampled. The samples were analysed by AsureQuality through contract with the Institute for Environmental Science and Research Ltd (ESR).

## **Maximum Permissible Levels as Defined in the Cosmetic Products Group Standard**

Para-phenylenediamine and its salts were authorized to be used at a maximum concentration of 6% (calculated as the free base) under the Cosmetics Products Group Standard. This value was subsequently amended in November 2010 to a maximum concentration of 2% calculated as the free base (entry 8a of Schedule 5 as inserted via the Cosmetics Products Group Standard (Amendment) Notice 2010 of November 2010). This change has a 12 month transitional period and so does not apply until November 2011 to cosmetic products that were lawfully on sale in New Zealand before November 2010. Products imported or manufactured in New Zealand after November 2010 must comply with the new requirement.

Meta and ortho-phenylenediamines are both listed in Schedule 4 of the Cosmetic Products Group Standard as prohibited components. Therefore hair dye products containing any of these substances are not allowed to be sold onto the New Zealand market.

Health Protection Officers who collected the samples could not identify whether or not the products were in New Zealand before November 2010. Therefore, for the purpose of the survey, it was assumed that these products were in New Zealand prior to the amendment taking place so can be lawfully sold until November 2011 with levels up to 6%.

## Results

Data for 90 hair dye samples were collected from 51 stores (Appendix 1). The remaining 22 stores in the sampling frame were found to have either closed down or not sell discount hair dye products. Different shades of a brand were sampled from several stores. There were 17 different brands that were sampled, with “Touch Color” being the most common brand (Appendix 2).

All the 90 samples tested had levels of meta-phenylenediamines and ortho-phenylenediamines below the limits of detection. All the 90 samples met the para-phenylenediamines maximum permissible level of 6%. With the amended maximum concentration of para-phenylenediamines dropping to 2% taking effect in November 2011, nine out of the 90 samples may exceed the acceptable level, with the maximum concentration recorded being 2.85% (Appendix 3).

Of the nine samples with para-phenylenediamine levels between 2.00% and 2.85%, five were of the brand “Touch Color” and there was one each from the brands “Siglo”, “New Star”, “Galaxy Care” and “Salon Care”.

## Conclusion

All hair dye samples that were tested for the presence of meta, ortho and para-phenylenediamines complied with the current Cosmetic Products Group Standard.

## Appendix 1 – Number of samples collected from each store

Total number of samples collected at a particular store	Frequency of stores	Percent of all stores
1	28	54.9
2	14	27.5
3	3	5.9
4	5	9.8
5	1	2.0

*The above table shows the frequency of discount stores (along with the percentage of all stores) that collected a certain number of hair dye samples.*

*E.g.: A total of one hair dye sample was collected from 28 stores (accounting for 54.9% of all stores); a total of two hair dye samples were collected from 14 stores (accounting for 27.5% of all stores)*

## Appendix 2 – List of brands sampled

Brand name	Frequency	Percent
Touch Color	36	40.0
Galaxy Care	12	13.3
L'ORVEL	8	8.9
Siglo	8	8.9
L'RQPO	6	6.7
Schwarzokdp	6	6.7
Beauty Extra	2	2.2
Feves	2	2.2
Lovia	2	2.2
Colorant Series	1	1.1
Elina	1	1.1
Long Easy	1	1.1
Lovely	1	1.1
New Star	1	1.1
Salon Care	1	1.1
Style New Star	1	1.1
Zhanghua	1	1.1

*The above table shows the frequency of brand names (along with the percentage of all samples) that were collected.*

*E.g.: 36 hair dye samples (accounting for 40.0% of all samples) collected were of the brand "Touch Color"; 12 hair dye samples (accounting for 13.3% of all samples) collected were of the brand "Galaxy Care"*

## Appendix 3 – Percentages of phenylenediamine present

<b>Meta-phenylenediamine*</b>	<b>Frequency</b>	<b>Percent</b>
<0.10 <sup>#</sup>	90	100.0

<b>Ortho-phenylenediamine*</b>	<b>Frequency</b>	<b>Percent</b>
<0.10 <sup>#</sup>	90	100.0

<b>Para-phenylenediamine*</b>	<b>Frequency</b>	<b>Percent</b>
<0.10 <sup>#</sup>	40	44.4
0.10-0.19	12	13.3
0.20-0.29	5	5.6
0.30-0.39	6	6.7
0.40-0.49	2	2.2
0.50-0.59	2	2.2
0.60-0.69	5	5.6
0.70-0.79	1	1.1
...	...	...
1.00-1.49	6	6.7
1.50-1.99	2	2.2
2.00-2.49	7	7.8
2.50-2.99	2	2.2

*The above tables show the frequencies in levels of meta, ortho and para-phenylenediamine (along with its percentages of all samples) detected in the hair dye samples collected.*

*E.g.: All 90 of the tested hair dye samples had levels of meta-phenylenediamine less than 0.10% of phenylenediamine; 12 of the tested hair dye samples (accounting for 13.3% of all samples) had levels of para-phenylenediamine between 0.10% and 0.19% of phenylenediamine*

*\* Hair dye results were reported to two decimal figures as a percentage (%) of phenylenediamine (calculated as the free base) present in the sample on as received basis.*

*# Values “<0.10” are below the limits of detection levels for the phenylenediamines.*