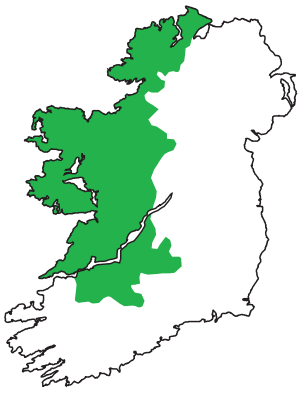
Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Western Region
Public Analyst's Laboratory
Régiún an Iarthair
Saotharlann an Anailisí Phoiblí

Annual Report 2013
Tuarascáil bhliantúil 2013



FOR YEAR ENDED 31ST DECEMBER, 2013

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ACKNOWLEDGEMENTS

This report summarises the work carried out by the Public Analyst's Laboratory, Galway during the year 2013.

This year saw the implementation of the Haddington Road Agreement which resulted in an increase in working hours for all staff along with an effective reduction in pay. This was coupled with increased pressure due to the non filling of staff vacancies.

I would like to commend the forbearance and flexibility demonstrated by staff in the face of these challenges, and acknowledge their continued commitment to the highest standards.

Rory Mannion
Public Analyst

August 2014

This report is also available on the HSE website (www.hse.ie) in both Irish and English.

1. INTRODUCTION

1.1 Public Analyst's Laboratory Service

This laboratory is one of three Public Analyst's Laboratories in the Republic of Ireland. The other two are located in Dublin and Cork. The primary role of the laboratories is in the protection of public health by providing an independent analytical and advisory service to the HSE, various other government agencies and the general public.

The service areas provided by this laboratory are as follows:

1.1.1 Food

A food surveillance programme is agreed each year between the Public Analyst's Laboratories, the Food Safety Authority of Ireland (FSAI), and the Environmental Health Service (EHS). The samples are submitted to the laboratory by the latter. Samples are also received from the general public, local industry and other government agencies.

1.1.2 Water

Most of the waters received by the laboratory are drinking waters. These are received from EHOs on behalf of Local Authorities, directly from Local Authorities, from the general public and from local industry.

1.1.3 Pharmaceuticals

The Pharmaceutical Section has been appointed an Official Medicines Control Laboratory (OMCL) by the Irish Medicines Board (IMB). Pharmaceutical samples are primarily received from the IMB, the European Directorate for the Quality of Medicines and Healthcare Products (EDQM) as well as other European OMCLs. Samples are also occasionally tested for the Department of Health and Children, Pharmaceutical Society of Ireland and Galway University Hospital.

1.1.4 Toxicology

Hospital Pathologists and Physicians as well as Veterinary Surgeons and the general public submit samples for toxicological analysis.

1.1.5 Air Monitoring

An air pollution monitoring service is provided by the laboratory to Galway City Council.

1.1.6 Cosmetics

Samples of cosmetics are received from EHOs as part of a nationally agreed surveillance program between the IMB, the EHS and the Public Analyst's Laboratories. Complaint samples are also received.

1.2 Finance

The laboratory receives a budget to cover both pay and non-pay costs for the year. The budget received for the year 2013 was €2.539 million. The income received for the year was €257,851. The laboratory operated within budget. The laboratory is grateful to have benefited from an additional capital allocation for the purchase of some essential testing equipment in 2013.

1.3 Administration

The laboratory is administered by the Primary, Community and Continuing Care (PCCC) Directorate within the Health Service Executive.

2. HUMAN BIO-MONITORING AND DEMOCOPHES STUDY

2.1 Human Bio-Monitoring (HBM)

Human Bio-Monitoring (HBM) involves the determination of the levels of various parameters, contaminants etc, in human tissues (urine, blood, hair etc).

In 2011/2012 Ireland participated in a HBM study called DEMOCOPHES, involving 17 European Member States. In Ireland the DEMOCOPHES study was performed by the HSE, http://www.hse.ie/go/democophes/ .The study determined levels of mercury in human hair, and cadmium, phthalates and environmental tobacco smoke (via cotinine) in urine. Data from 120 children and their mothers in each of 17 European countries were generated. In Ireland, the testing was performed by the Public Analysts' Service, details are contained in the 2012 PALG annual report.
http://www.hse.ie/eng/services/Publications/corporate/wrpalannualrep.html.

2.2 Publication of the Results

A considerable number of publications arose from the DEMOCOPHES study between 2012 and 2013.

An overview of the study and a summary of the results are available in the so-called "Layman's Report", see http://www.eu-hbm.info/euresult/media-corner/press-kit.

Further details of all aspects of the EU DEMOCOPHES Human Bio-Monitoring project can be found on the website http://www.eu-hbm.info/democophes.

For details of the Irish results, the "National report on the implementation of the project including data analysis and integrated interpretation" (Report for Ireland) can be accessed at:
http://www.hse.ie/eng/services/news/newsfeatures/democophes/democophes%20ireland%20results.pdf

2.2.1 Scientific Journal Publications

In addition to the overall reports published above, a number of papers have been published in scientific journals including:

• Economic Benefits of Methylmercury exposure control in Europe: Monetary value of neurotoxicity prevention. Environmental Health 2013, 12:3

• Urinary excretion of phthalate metabolites, phenols and parabens in rural and urban Danish mother–child pairs.
Int. J. of Hygiene and Environmental Health,Volume 216, Issue No.6, Nov 2013

• A systematic approach for designing a HBM Pilot Study for Europe.
Int. J. of Hygiene and Environmental Health,Volume 217, Issues 2-3, March 2014

• Hair mercury and urinary cadmium levels of Belgian children and their mothers within the framework of the COPHES/DEMOCOPHES projects.
Science of the Total Environment,Volume 472, Feb 2014

• The COPHES/DEMOCOPHES project: Towards transnational comparability and reliability of human biomonitoring results.
Int. J. of Hygiene and Environmental Health,Volume 217, Issue 6, July 2014

In 2014, The Journal of Environmental Research: A multidisciplinary Journal of Environmental Sciences, Ecology and Public Health are planning to publish a special edition on the DemoCophes project.

The articles in this special edition will cover various aspects of the study, including:

- Mercury Analysis and Quality Assessment;
- Communication in HBM studies;
- Policy Recommendations and Cost;
- Gender Differences (Cd & Cotinine);
- Feasibility and Challenges of European-wide HBM studies ;
- Cadmium Exposure;
- Tobacco Smoke Exposure;
- Exposure to Phthalates;
- Interpreting Biomarker Data;
- Applying HBM in Small Populations;
- Several articles on individual countries' results for the Biomarkers will also be included.

3. FOOD

3.1 Service Provided

Food in our region (HSE Western Area) is monitored for chemical safety* and legislative compliance. National surveillance is also performed, in line with the developed national specialisations (see 3.2.2). The Environmental Health Officers (EHOs) of the HSE, and the Food Safety Authority of Ireland (FSAI, www.fsai.ie) are our main clients, see Table 3.1. The service provided includes programmed surveillance and also ad-hoc testing (food complaints and alerts, 'inspection' samples etc.) as required. The authorised officers and FSAI, as appropriate, have the responsibility for dealing with the incidents of detected non-compliances referred-to in this report.

Some applied research projects are carried out in conjunction with safefood, www.safefood.eu

*see *Reports of the Food Microbiology Laboratory, UHG for a summary of the results of Microbiological testing of foods in HSE West area.*

3.2 HSE Food Safety Laboratory Service – Updates/Developments etc.

3.2.1 General/Review

A Food Safety Laboratory Service (FSLS) is provided by the HSE's seven Official Food Microbiology Laboratories (OFMLs) and three Public Analysts' Laboratories (PALs). In July 2004, a report entitled "A Strategic Developmental Review of Health Board Food Control Laboratories (safefood 2004)" was published; http://www.safefood.eu/Publications/Research-reports/Strategic-Development-Review-of-Health-Board-Food.aspx.

The Report contains 16 recommendations including, *inter alia*, combining the Laboratories into a unified, multi-sited Food Safety Laboratory Service. The recommendations have yet to be officially implemented.

A key recent development within HSE food surveillance has been the enhanced national co-ordination of food sampling, with a move to increased sampling from earlier stages (wholesale, import, manufacturing, etc.) in the food chain.

3.2.2 Public Analysts' Laboratory Service

3.2.2.1 New Emphases of Surveillance (Chemical)

Over the past few years, following discussions at FSAI-HSE food committee level, there has been an increased national focus on surveillance of certain food categories, including:

- Infant- & Follow-on Formula, and Weaning Foods - see Section 3.5
- Bottled Waters – see Section 3.4
- Allergen-free' Foods – see Section 3.4.2
- Food Contact Materials (Packaging etc….)[1]
- Meat Products and Cereal Products (for GMO/DNA testing etc)[2]
- 'Salted' Foods (Na/K) – see Section 3.5.1.
- Food Supplements (General and Body-building) - see Section 3.5.2.2

[1] *Testing in Public Analyst's Lab, Dublin.*
[2] *Testing in Public Analyst's Lab, Cork.*

These food categories were included in the 2013 Programme (see Appendix 1). The HSE annual Programmes also endeavour to incorporate surveys of other food types not normally catered-for in the routine surveillance. In 2013, some such surveys included in the HSE West Programme were: Sea Vegetables (Heavy Metals, Labelling etc); Low-fat Minced Meats (Fat content and adulteration); Hospital Meals (Examination vs product specifications - Fat, Protein etc); Christmas Bakery products (Salt and labelling/general examination). See results in Tables 3.4, 3.5 and 3.6 in Sections 3.4 & 3.5.

3.2.2.2 Specialised Testing in the PA Lab Service

The Public Analysts agreed a specialisation document in 2012 which includes all food testing performed by PALs, designated as Specialised or Core. The process is ongoing, with updating as required. Some of the principal national food specialisations agreed to date are outlined in Appendix 3.

3.2.2.3 Widened Client base/Authorised Officers

Because of the enhanced national coordination of HSE food surveillance programmes, each of the regional Public Analysts' Laboratories (PA Labs) now receive food samples from authorised officers (EHOs) in all HSE Areas.

In addition, the development of national specialisations within the overall food control laboratories in Ireland, means that the PA Labs now have a wider range of agencies and authorised officers (Food Control) as clients. In particular Veterinary Officers, Sea Fishery Protection Officers and the FSAI are now important clients of the service, in addition to our traditional, main clients, the Environmental Health Officers (EHOs) - see Table 3.1. Under the coordination of the FSAI, the official 'chemical' surveillance laboratories (from all departments, Health.., DAFM, State Lab etc) have begun to meet nationally.

3.2.2.4 Reporting and Designation of Results of Analysis: Consistency Document

The national coordination of the Public Analysts' service, in conjunction with new EU/EFSA reporting requirements, has demanded that the 3 Public Analysts' Labs report to clients in a highly consistent manner. Test Reports must now include, *inter alia*, Results of analysis, and associated Uncertainty of Measurement (UM), LOD, LOQ etc. All test results are to be designated with respect to compliance with associated statutory limits (or acceptable ranges) for each test parameter. In the case of Nutritional Testing, results are compared to the acceptable tolerances set in the *"EC Guidance Document for Competent Authorities …. with regard to the setting of tolerances for nutrient values declared on a label"* (Issued Dec. 2012). To accommodate the new reporting requirements, the Public Analysts have agreed a National Reporting Consistency Document covering report format, structure and test parameter details. This Reporting Consistency Document includes a process of consultation with FSAI specialists for an opinion when toxicological assessment is needed.

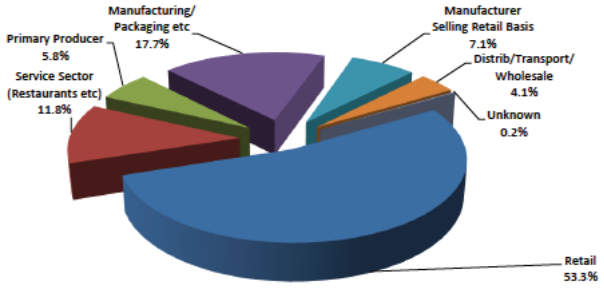
3.3 Food Testing (Chemical) Results for 2013

3.3.1 Regional Chemical Surveillance Programme 2013

Nationally co-ordinated, Regional Food Surveillance (Chemical) Programmes are produced between the HSE (PA Laboratories and Environmental Health Officers (EHOs)) in conjunction with the FSAI, drawing largely on risk-based priorities and sampling requirements identified by the group. HSE West's Chemical Testing Programme for 2013 is outlined in Appendix 1.

3.3.2 2013 Samples

A total of 2,223 samples was received in 2013. The Figure below indicates the 'stage' at which EHO samples (excluding complaints) were taken in 2013. There has been a decrease in retail-level sampling over the past number of years and a significant increase in sampling from further back the food chain.



3.3.3 Statistics for 2013

Tables 3.1 and 3.2 summarise the work for 2013 according to the sampling source (all samples). The samples consisted of 97 complaints (see section 3.6) and 2,126 others. Out of the 2,126 samples "Non-compliant" reports (i.e. test results indicating non-compliances with standards in Irish Food Law) were issued on 169 (7.9 %), - see figures for previous years below:

"Non-complying" Reports (as % of samples tested, excluding complaints).

Year	%
2013	7.9
2012	6.4
2011	6.5
2010	8.3
2009	6.4
2008	7.4
2007	8.3
2006	5.4
2005	4.7
2004	5.0
2003	4.5
2002	5.1

Of the 169 non-compliances, the majority (117) were due to labelling deficiencies, many in samples from ethnic, retail premises; it should also be noted that the category of labelling deficiencies in non-compliant foods also includes foodstuffs where undeclared allergens were detected as well as discrepancies between the labelled and analytically determined values for the composition of the foodstuff (e.g. salt/sodium content, fat content etc). The categories of foodstuffs and infringements for complaints and other samples received from HSE West and the General Public are summarised in Appendix 2.

Table 3.2 includes a breakdown of EHS samples (excluding complaints) per head of population in each HSE Community Care Area.

Table 3.1 Food Sample Sources (2013)

Submitted by / Sample Type	No. of Samples	No. on which Adverse Reports were issued
Environmental Health Officers (all regions)		
Informal Routine (Sampling Programme)	1,184	146
Public (Food Complaints via EHOs)	86	46
Follow-up samples (non-programmed)	71	15
General Public		
Complaints	11	5
Others	448	1
Food Safety Authority of Ireland	267	0
Sea Fisheries Protection Agency	21	5
DAFM & BIP	37	0
Local Authority Veterinary Service	33	2
Laboratory QA & Method Development etc.	58	Not applicable
NSAI	7	0
OVERALL TOTAL	**2,223**	**220**

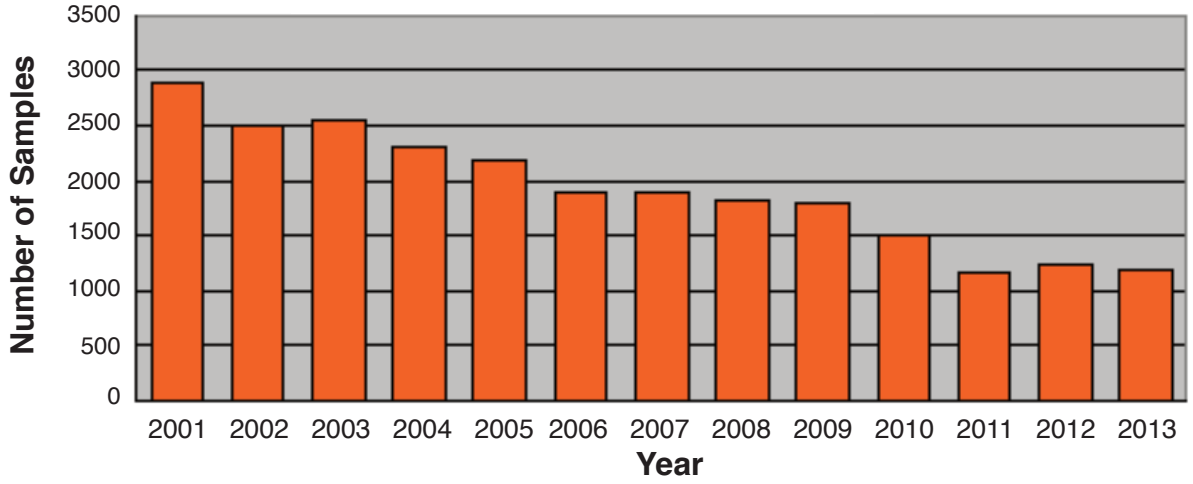
Table 3.2 HSE Food Sample Sources (2013)

Community Care County Area E.H.O. Service (all sample types)	Number of Samples Submitted (excluding complaints)	Number per 1,000 population*
Galway	185	0.74
Mayo	124	0.95
Roscommon	60	0.94
Clare	100	0.97
Limerick	139	0.82
North Tipperary/East Limerick	105	0.99
Donegal	130	0.81
Sligo/Leitrim/West Cavan	104	1.06
HSE South	114	-
HSE Dublin Mid-Leinster	60	-
HSE Dublin North East	63	-

*Based on 2011 census and 2011 HSE Community Care data.

There has been a decrease in HSE programmed samples submitted in recent years (see figure overleaf), possibly stabilised from 2011.

EHS programmed samples (excluding food complaints) received



3.3.4 Overall Summary of Data and Food Quality 2013

A range of surveillance for allergens, contaminants, additives, labelling and nutritional testing (Salt, Folic Acid, etc.) was carried out in 2013. Results are reported by test parameter in sections 3.4 to 3.6. As in previous years, some instances of non-compliances were found and these were dealt with by the EHOs and FSAI as appropriate. The number of received food complaint samples remains decreased, compared to previous years (see section 3.6). The number of Food Hazard/Contamination Reports (see section 3.7) issued in 2013 was 12.

Once again the results reported here for the year (2013) indicate a high level of legislative compliance and a generally high quality of food with respect to chemical safety. Overall, a continuing low level of non-compliances due to food contamination is indicated.

Note: *To obtain an overall picture of the safety and hygiene of our food supply, see Annual Reports of FSAI, www.fsai.ie and those of the agencies (Dept. of Agriculture, Food and the Marine; Local Authorities; HSE etc.) involved in the official control and surveillance of food.*

3.4 Food Allergens, Contaminants etc.

3.4.1 General

'Chemical' contaminants, allergens and residues in foods are monitored to ensure their safety and legislative compliance. They include Natural Toxins, Industrial/Environmental contaminants, Food Processing/Packaging contaminants, Allergens, Plant- and Animal-treatment Residues, and Foreign Bodies etc.

Notes:
(i) Other Official Agencies and FSAI (see Appendix 3 and www.fsai.ie) also monitor contaminants & residues in food. The Ashtown Food Research Centre (Teagasc) produces an annual National Food Residue Database for Ireland - (see http://nfrd.teagasc.ie/).

(ii) Data on microbiological contamination of food are to be found in the reports of the Official Food Microbiology Laboratories, in reports of other Departments/Agencies (see Appendix 3) and in FSAI (www.fsai.ie) reports.

3.4.2 Food Allergens and Related Testing

Food Allergens' testing is one of this laboratory's national specialisations. This area of surveillance is being developed in conjunction with service users and FSAI. Table 3.3 summarises 2013 results.

Table 3.3: Food Allergens and related parameters: Summary of Results for 2013.

Allergen/Parameter	Limit(s) (Legal Source)	Sample Types	Total	Complying With Standard	Non-complying with standard
Gluten (EHO sampling)	20 ppm* (Reg (EC) 41/2009)	Gluten-free foods	198	187	11
Gluten (private samples)[1]	20 ppm* (customer specification)	Gluten-free foods	399	376	23
Gluten (DAFM)	20 ppm* (Reg (EC) 41/2009)	Infant Formula	20	20	0
Gluten (LAVS)	20 ppm* (Reg (EC) 41/2009)	Gluten-free pork products (sausages, pudding)	14	14	0
Peanut protein	Directive 2003/89/EC	Confectionery	78	77	1
Lactose[2] (EHO Sampling)	Directives: 2000/13/EC & 2006/141/EC	Soy desserts, Soy & lactose-free infant formula, confectionery	25	25	0
Egg	Directive 2003/89/EC	Various foods labelled as "egg-free"	47	44	3
Casein	Directive 2003/89/EC	Various foods labelled as "milk-free"	35	34	1
Sulphites	Directive 2003/89/EC Regulation 1333/2008, & 1129/2011	Meat/Meat products (114), Fruit/veg (26), Dried Fruit (20), Beers /Wines (14), Soft drinks/juices (2), Confectionery (4), Prawns/scampi (10), Miscellaneous (5)	195	169	8[3] 18[4]

**EU Regulation (EC) 41/2009: 20 mg/kg for "Gluten-free" foods and 100 mg/kg for "foods rendered gluten-free". All foods received in 2013 were labelled as 'gluten free' and did not indicate the use of de-glutenised wheat flour.*

1 *These samples were tested for private food business operators, in connection with their listing in the Coeliac Society of Ireland Food List, or with product development for the gluten-free foods market.*

2 *Lactose is not a legally defined food allergen under EU food law (Directive 2003/89/EC) but is rather a dairy sugar to which some people (mainly infants) are intolerant.*

3 *These 8 samples contained undeclared Sulphur Dioxide (SO_2)*

4 *These 18 samples were non-compliant with the additives legislation (Regulation (EC) No 1333/2008 as amended by Regulation (EC) No 1129/2011, Pre June 1st 2013:Dir 95/2/EC as amended), for excessive SO_2 or non-permitted SO_2. EU Directives require member states to monitor their usage and intake of Additives.*

Gluten: The Gluten proteins contained in wheat, barley, rye and their cross-bred varieties are toxic to coeliacs. CODEX and EC Commission Regulation No. 41/2009 set gluten limits as follows:

• 100 mg/kg for "very low gluten" foods, having one or more gluten-containing ingredients
• 20 mg/kg for naturally gluten-free foods.

In 2013, a diverse range of gluten-free foods from pharmacies, health food shops, supermarkets and local manufacturers was received. Nine of the HSE programmed samples, labelled as gluten-free were non-compliant (with gluten levels > 20 mg/kg) with the legislative limits (all were bakery products produced in small quantities by cafés, restaurants etc). In addition, two complaint samples (received via the EHOs) from the service sector were also found to be non-compliant (a sample of sausages sold as 'gluten free' & a sample of 'ordinary' wheat bread that was sold (verbally) as gluten free). Follow-up action was taken by the authorised officers. The results for mainstream, pre-packaged produce once again indicate an overall high quality (with respect to gluten levels) of gluten-free foods available to the consumer.

Peanut: An ELISA-based analysis for Peanut in foods, based on the use of polyclonal antibodies to the allergenic peanut proteins Ara h1 and Ara h2, is in use in this laboratory. In 2013, 78 samples of foods (mainly chocolate and other types of confectionery) were analysed for the presence of Peanut, with an emphasis on products labelled as nut- or peanut-free. The testing indicated one non-compliance in a condiment product.

For information regarding allergens and labelling see details of the FSAI survey, -*"Food Allergens and Labelling Survey June 2011"* (http://www.fsai.ie/resources_publications.html).

Designations of all allergen test results (other than Gluten and Sulphur Dioxide) are based on the presence or absence of detectable allergens as Directive 2003/89/EC does not prescribe a permitted level for these allergens in foods.

Following on from invitations to participate in ring-trials for allergen analysis, this laboratory has been invited to attend a number of meetings of large-scale EU funded food allergy research projects. Our attendance at these meetings was funded by *safe*food under their Training and Mobility programmes for laboratory staff. These meetings were very informative and useful as they gave us an insight into the 'cutting-edge' of food allergen research at all levels, from clinical trials to patient treatment and risk assessment up to the latest developments in food allergen detection. We have been invited to continue our involvement with these researchers on a more formal basis into the future and we hope that this will be possible and also be as useful and informative as it has been so far.

3.4.3 Food Contaminants – EC Regulation 1881/2006 and Others.

EC Regulation 1881/2006 (& 333/2007, 1126/2007, 629/2008, 420/2011 - amending) sets limits for a range of chemical contaminants in food. Relevant testing results for 2013 are summarised in Table 3.4.

Table 3.4: Food Contaminants EC Regulation 1881/2006 and Others – Main Results for 2013

Contaminant	Sample Types	Total	Complying
Lead[1] & Cadmium[1] (Pb & Cd)[1a] & Arsenic[1] (As)	Fish/shellfish etc. Infant Food & Baby Foods Spices, Herbs, Condiments Vitamins & Supplements Edible Seaweed Miscellaneous Foods	50 35 20 69 36 29	50 35 20 69 36 29
	Sub-total (Pb, Cd, As)	239	239
Mercury[1] (Hg)	Fish & Fishery products Infant Food & Baby Foods Miscellaneous Foods	17 22 17	17 22 17
	Sub-total (Hg)	56	56
Histamine/ Biogenic Amines[1b]	Scombroid Fish etc (Tuna, Mackerel…)	94	91
Marine Biotoxins[2]			
DSP & AZA Toxins[3,4] ASP Toxins[5] PSP Toxins[6]	Mussels, Oysters, Scallops, Clams, Crab	17	17
Anti-bacterial Substances (ABS)[7] (EC Four-Plate test)	Chicken (8), Pork (5), Others (3)	16	16
	Totals	422	419

1 *EC Regulation 1881/2006.*

1a *Chromium, Nickel and Selenium levels also monitored on these samples*

1b *Amines tested for: Histamine; Tyramine; Cadaverine; Putrescine. Biogenic amines are sometimes produced by bacteria in fish etc from amino acid Histamine- or Scombroid poisoning is an allergy-like intoxication, rather than a food allergy.*

2 *These toxins may accumulate in shellfish grown in seawater with excessive marine algae. Retail/Catering level (largely) sampling by EHO service. Analysis out-contracted to Marine Institute. Principal official monitoring is at production level by Dept. of CMNR/Marine Institute.*

3 *Diarrhetic Shellfish Poisoning (DSP)* [4] *Azaspiracid (AZA)* [5] *Amnesic Shellfish Poisoning (ASP)* [6] *Paralytic Shellfish Poisoning (PSP)*

7 *The EC Four-plate test is used to screen meats for anti-bacterial (antibiotics etc) residues. Principal official monitoring is at production level (meat plants etc) by the DAFM and LAs.*

The HSE Sampling/Analysis Programmes include increased surveillance of **bottled waters**. The surveillance is coordinated nationally by the HSE-FSAI food surveillance group. The testing covers mineral waters, spring waters, and 'other' bottled waters, both imported and Irish produce.166 samples of bottled water were examined here in 2013; 141 of these were from domestic water bottling plants (Natural Mineral Water, Spring Water & 'other' bottled ground water) at all stages of production from the well head to finished product.

The intensity of this sampling is related to production volumes in the plant in question; all of these samples were found to comply with the required compositional criteria (S.I. 225 of 2007). 25 samples of imported bottled water (Natural Mineral Water and Spring Water) were analysed here in 2013, these were sampled from retail and service sector establishments. 12 of these samples were designated as non-compliant with the relevant legislation, 10 were not labelled in English and 2 were food complaints in relation to the presence of foreign objects/other material.

National testing covers Audit or Check suites (see Section 4), including chemical and microbiological parameters, as set out in S.I. 225 of 2007. In 2013, 109 samples were programmed for the HSE, and 166 were received and tested here (chemical testing). All bottled water samples were screened (by ICP-MS) for metals, and none were found to exceed the legislative limits.

94 fish samples were tested here in 2013 for Histamine and 3 other **biogenic amines**, viz. Putrescine, Cadaverine and Tyramine. These included 10 (10 x 9 subsamples) samples submitted by the Sea-Fisheries Protection Authority (SFPA), 4 (4 x 9 subsamples) Border Inspection Post (BIP) samples from The Department of Agriculture, Fisheries and Food (DAFF) and 80 samples from Environmental Health Officers.

3 of the 94 samples had excessive Histamine. 7 Samples contained elevated (>100 mg/kg) Cadaverine, 1 sample contained elevated Putrescine (>100mg/kg) and 1 sample contained elevated Tyramine (>100mg/kg).

For a general report on Histamine poisoning see http://www.fda.gov/downloads/Food/GuidanceRegulation/UCM252400.pdf

Testing for contaminants has decreased substantially in this laboratory in recent years, in particular as many of the established test groups (processing contaminants, mycotoxins etc.) have recently been devolved to the Dublin Public Analyst's Laboratory (as national specialisations). The relatively high level of testing of foods for Lead & Cadmium is performed partly to generate data for dietary intake.

3.5 Nutrition, Composition, Additives, Labelling etc.

There has been an increase in nutritional/compositional testing in the laboratory in recent years, in particular in the areas of 'Salt'/Sodium, Folic Acid and general nutritional labelling.

3.5.1 Sodium/Salt in Food

A considerable international effort is being made to reduce population dietary intakes of 'Salt'/Sodium, - see e.g. *"Salt and Health: Review of the Scientific Evidence and Recommendations for Public Policy in Ireland"*, www.fsai.ie/uploadedFiles/Science_and_Health/salt_report-1.pdf. Data quoted in the report, and applied to Ireland, would yield a significant reduction in deaths in Ireland per year from strokes and ischemic heart disease, if recommended reductions in population intake of salt are achieved. Since 2002, the FSAI has implemented a programme, in association with the food industry, to reduce salt levels in the major, salt-containing, processed foods, - see http://www.fsai.ie/science_and_health/salt_and_health.html for an update. The stated aim was to reduce the average intake of salt to 6 grams per day (from 10 grams per day) by 2010, see 2011 report from IUNA *"Report on Salt Intakes in Irish Adults –Executive Summary"* - http://www.fsai.ie/uploadedFiles/Science_and_Health/Salt_and_Health/Salt_exec_summary.pdf

The 2013 results for the FSAI surveys and other programmed HSE surveillance are summarised in Table 3.5.

Table 3.5 and 3.5a Include Summary of 'Salt' (Sodium & Potassium) Testing Results 2013

Parameter(s)	Food Types etc.		Samples Tested	Average Results[1] (g/100g)	Sodium/Potassium Ratio
'Salt' (Sodium & Potassium)	Snack Food Survey FSAI survey	Sodium	102	0.76	0.7
		Potassium	102	1.09	
	Soup Survey FSAI survey	Sodium	42	0.29	2.4
		Potassium	42	0.12	
	Bread Survey FSAI survey	Sodium	123	0.43	2.5
		Potassium	123	0.17	
	Ethnic Foods' Survey HSE Regional Survey	Sodium	26	1.25	3.7
		Potassium	26	0.34	
	Body-Building Supplements Survey HSE Survey	Sodium	13	0.29	0.56
		Potassium	13	0.52	
	Bottled Waters Survey[2] HSE Survey	Sodium	139	28mg/L	-
	Low Salt/Reduced Salt Survey[3] HSE Regional Survey	Sodium	27	3.67	0.57
		Potassium	27	6.46	
	Locally Produced Foods HSE Regional Survey	Sodium	29	0.38	1.5
		Potassium	29	0.26	
	Christmas Bakery Products HSE Regional Survey	Sodium	23	0.18	0.58
		Potassium	23	0.31	
	Weaning Foods/Infant Formulae HSE Survey	Sodium	35	0.05	0.24
		Potassium	35	0.21	

1 *In the calculation of the average result in each category, the value (<0.01g/100g) where present has been replaced by 0.005g/100g.*

2 *Samples analysed in the Water Section as part of an extended Audit suite of analysis. Samples include Irish and Imported brands of still and sparkling Natural Mineral Waters, Spring Waters and 'Other' Waters.*

3 *11 of these samples are 'concentrates', Lo-Salts, Seasonings, Gravy Granules, Stock Cubes etc.*

Tables 3.5 and 3.5a include the Sodium/Potassium ratios for each food category. Potassium is to be found in many foods, including fruits, vegetables, pulses, nuts, milk, meats, fish etc. A balanced intake of Sodium and Potassium is recommended, whilst some authorities advocate reducing Sodium and increasing Potassium to achieve lower Sodium/Potassium intake ratios.

FSAI Work: The 2013 surveillance work above for FSAI is a continuation of the work dating from 2003, see FSAI report "*Monitoring of Salt in Processed Foods – September 2003 to July 2014*" http://www.fsai.ie/uploadedFiles/Science_and_Health/Salt_and_Health/Salt_Surveys_2003_onwards.pdf

Table 3.5a summarises data from 8 surveys of particular food categories (most recent surveys only).

Table 3.5a: Summary of Results for most recent Food Surveys for FSAI.

Food Categories	No. of Samples	Sodium Results Average (g/100g)	Potassium Results Average (g/100g)	Sodium/Potassium Ratio
Breakfast Cereals (2011 data)	330	0.21	0.31	0.68
Dairy & Non-Dairy Spreads (2012 data)	62	0.49	0.04	12.3
Processed Meats (2012 data)	127	0.93	0.23	4.0
Cheeses (2012 data)	56	0.64	0.08	8.0
Sauces (2012 data)	145	0.32	0.18	1.8
Breads (2013 data)	123	0.43	0.17	2.5
Soups (2013 data)	42	0.29	0.12	2.4
Snacks (2013 data)	102	0.76	1.09	0.7

HSE regional Surveys etc: several HSE surveys, including low-salt foods, locally produced foods, Christmas bakery products, weaning foods etc, were carried-out in 2013 (Table 3.5). These HSE surveys monitor foodstuffs to ensure that manufacturers are complying with their labelled salt/sodium levels. Just 3 of the samples analysed were found to be non-compliant, i.e. the Sodium results differed significantly from the labelled value.

3.5.2 Other Nutritional Testing

Table 3.6 summarises other nutritional testing carried out here in 2013.

Table 3.6: Other Nutritional/Compositional Testing 2013.

Parameter(s)	Food Types etc.	Samples Tested	Range of Results
Folic Acid	Infant Foods (Dry)-HSE survey Infant and Follow-on Formulae-HSE survey Infant and Follow-on Formulae-DAFM survey	8 23 20	<8-28µg/100kcal (73-141% of Labelled) 12-59µg/100kcal (75-204% of Labelled) 12-33µg/100kcal (75-184% of Labelled)
	Folic Acid Supplements, Multi-vitamins etc.	22	Range of Results (as % of Labelled value) 45% to 4000%
Fat	Sausages	12	8.9 - 25.2 (g/100g)
	Minced Meat/Beef	35	1.5 – 19.7 (g/100g)
	Burger Meat	12	4 - 18.7 (g/100g)
	Prepared Dishes	21	1.5 – 16.3 (g/100g)
	Baby Food	24	<0.4 – 6.9 (g/100g)
	Cereal-based Infant Formula	8	1 – 12.7 (g/100g)
	Follow-on Milk	3	2.9 – 4.3 (g/100g)
	Body-building Supplements	15	<0.4 – 11.6 (g/100g)
	Processed Meats (Puddings)	8	2.5 – 16.1 (g/100g)
DNA*	Sausages, Minced Meats, Burger Meat, Prepared Dish, Processed Meats (Puddings)	22	21 Compliant 1 Non-compliant
Protein	Sausages	7	8.4 – 12.2 (g/100g)
	Minced Meat/Beef	5	17.9 – 20.7 (g/100g)
	Burger Meat	2	12.6 – 14.3 (g/100g)
	Prepared Dishes	8	6.1 – 11.0 (g/100g)
	Baby Food	16	2.4 – 12.4 (g/100g)
	Cereal-based Infant Formula	8	2.5 – 13.9 (g/100g)
	Follow-on Milk	3	1.3 – 1.5 (g/100ml)
	Body-building Supplements	16	0.1 – 90 (g/100g)
	Miscellaneous (Puddings)	6	7.6 - 10.9 (g/100g)
Parameter(s)	**Food Types etc.**	**Samples Tested**	**Non-compliant Samples**
Boron, Magnesium, Manganese, Iron, Cobalt, Copper, Zinc, Molybdenum	Vitamins & Supplements	3	2**

** Tested by Public Analyst's Laboratory, Cork for equine DNA; bovine, porcine and ovine DNA also included.*

*** 2 samples designated non-compliant due to disparity between actual and labelled magnesium, copper and molybdenum levels.*

Summary of Results for Food Supplements Surveys 2013

Survey	Sample Numbers[2] Received	Test Parameters and Non-compliant results[1]							
		Folic Acid	Minerals/Metals (Cr, Se, Mg, Fe etc)[3]	Food Irrad'n[4]	DMAA[5]	Fat	Protein	Salt (Na/K)	Labelling[6]
Irish Manufacturers[7]	33	2/22	4/33	1/22	N/T	N/T	N/T	N/T	1/2
Imported Body-building Supplements[8]	28	N/T	0/28	1/28	0/24	0/15	0/16	0/13	13/28

[1] E.g. "2/22" indicates that 2 samples were non-compliant with standard, out of 22 tested for that parameter.
[2] Programmed number of samples in each survey was 30.
[3] Tested parameters: Cr, Se, Mg, Mn, Fe, Cu, Zn, Ni, As, Pb and Cd
[4] Food Irradiation test (PPSL)
[5] DMAA = Dimethylamylamine.
[6] Examination for general, nutritional & PARNUTS labelling……
[7] All samples taken from premises of 7 x Irish Manufacturers of food supplements.
[8] Survey targeted Imported food supplements only.

3.5.2.1 Monitoring of Folic Acid:

In 2013, 43 samples of infant formula were tested for folic acid fortification level. The determined folic acid values ranged from 12-34µg/100kcal for standard formulae (S.I. No.852 of 2007 permitted range: 10-50µg/100kcal) and 26-59µg/100kcal for pre-term formula (ESPGHAN (2010) recommended range: 32-90µg/100kcal). The results ranged from 75 to 204% of the labelled values; 10 samples within 75-100% of the labelled value, 26 samples 101-150%, 6 samples 151-200% and 1 sample was 204% of the labelled value. 8 cereal-based weaning foods were tested and found to have a range of <8-28µg folic acid/100kcal (S.I. No. 776 of 2007 sets a max. limit of 50µg/100kcal) , corresponding to 73-141% of labelled value. 22 multivitamins/food supplements were tested for folic acid content, 2 of which were at significant variance with the labelled value. Further investigation of the highest result (4000% of labelled value) by the EHS and the company involved indicated a formulation error at manufacturing level.

3.5.2.2 Food Supplements

Food supplements constitute a food category which has seen recent increases in consumption in Europe, including Ireland. These foodstuffs, which supplement the normal diet, are covered in law by Directive 2002/46/EC, as amended, transposed in Irish law by the European Communities (Food Supplements) Regulations - SI No 506 of 2007, as amended. Following a need identified by HSE Environmental Health Officers, who are authorised officers for the food supplements legislation, two surveys of food supplements were scheduled into the HSE national surveillance programmes. The range of potential test parameters is enormous and that chosen for 2013 initially was agreed between FSAI and HSE, based largely on listed ingredients, risk and lab capacity.

HSE National Survey of Food Supplement Manufacturers:
Environmental Health Officers targeted 7 Irish supplement manufacturers for the samples in this survey (see Table above for results). Overall there were 8 detected non-compliances (in 7 samples); two for excessive folic acid, four for discrepancies between the labelled value and the determined value for minerals, one failure to declare food irradiation on its label, and one non-compliance with the labelling requirements.

Imported Body-building Supplements
1,3-dimethylamylamine (DMAA), also known as geranamine, methylhexanamine or dimethylpentylamine, is a stimulant related to amphetamine and ephedrine. It may occur illegally in some food supplements marketed typically as performance-enhancing or fat-loss products. In April 2013, the U.S. FDA determined that DMAA was potentially dangerous and did not qualify as a legal dietary supplement; it warned supplement manufacturers and consumers of potentially serious health risks associated with DMAA-containing products. An LC-MSMS literature method was introduced to perform testing. No DMAA was found

(<0.2 mg/kg) in any of the 24 products tested . The supplements surveys involved considerable method development as the wide range of sample types (powders, oils, capsules etc) created difficulties in some of the test methods. For that reason a number of samples had lengthy turnaround times. It is envisaged that national surveillance of food supplements will continue and develop in future years.

3.5.3 Additives/Labelling/Compositional Quality Results 2013

The choice of additives to be monitored is made by the HSE and FSAI on a year-to-year basis, depending on known usage, risk of exceedance of the acceptable daily intakes (ADIs), and risk/previous results history. The testing is performed to monitor for legislative compliance and also to collect data for the EU on food levels and dietary intakes. The results (see Table 3.7) for 2013 indicate a high level of compliance with the standards. Non-complying cases are dealt with by the authorised officers.

Table 3.7: Summary of Additives/Labelling/Compositional/Quality Results 2013

Parameter(s)	Food Types etc	Number of Samples Tested & Results		
		Total	Complying with Standard	Non-Complying with Standard
Additives				
Sulphur Dioxide (Sulphites)	See details in Table 3.3, Food Allergens			
Nitrites & Nitrates[1]	Cured Meats (50) , Sausages (43), Brines (15), White Pudding (2), Pork Loin (1) & Pickle Mix (1)	112	93[3]	14[2]
Food Irradiation[4] 1) Photo-stimulated luminescence screening	Herbs/Spices (11), Vitamins/Food supplements (26), Body building supplements (26), Seeds (1), Noodles (1), Seasonings (5), Fruit/veg (1)	71	71	0
2) Confirmatory (TL) Test	Food supplements (3)	3	1	2
Dairy Testing[5]	Dairy products (Cheese, yogurts, butter, cream etc)	14	5	9[6]
General Labelling	Miscellaneous Packaged Foods	320	216	104
Alcoholic Strength	Pub-level Spirits	20	18	2
Ref Index/Soluble solids	Jam, Sauce	2	2	0
Starch (indicates use of cereal filler)	Minced Meat/Beef etc	20	20	0

[1] Authorisation and limits are set in Annex II Part E of Regulation (EC) No 1333/2008 as amended by Regulation (EC) No. 1129/2011. (Pre-June 1st 2013: Statutory Instrument No. 40 of 2008 (Directive 2006/52/EC).

[2] Excessive Sodium Nitrate &/Sodium Nitrite was determined in 14 Bacon Ribs' samples (3 of the 14 samples analysed were Follow-up samples).

[3] 5 brines were "not designated" (no legislative limits apply directly to brines).

[4] S.I. 297 of 2000 authorises irradiation of herbs, spices and vegetable seasonings. Irradiated foods must be labelled as such. 3 x samples required confirmatory testing (TL, Thermoluminescence. Testing by SUERC, Scotland)

[5] Varying Tests: ALP ('Pasteurisation' efficiency), Inhibitory Substances (Delvo test), FPD/Extraneous water, General Labelling etc. Samples largely imported produce.

[6] These 9 samples are non-complying only for labelling/presentation

General Labelling

Statutory Instrument No. 483 of 2002 consolidates legislation on the labelling of foodstuffs in general. An overview of labelling legislation and enforcement procedures etc. is outlined in a FSAI publication (The Labelling of Food in Ireland – FSAI 2007); http://www.fsai.ie/assets/0/86/204/5dfb809a-7902-4f03-bb6a-6e25a5a09736.pdf

The European Commission carried out a consultation process leading to an overhaul of European food labelling legislation which was completed in October 2011 and led to the publication of Regulation (EC) 1169/2011 on "the provision of food information to consumers". This is a full re-draft of the EU general and nutritional labelling rules and includes the introduction of certain new labelling requirements to cover, for example, compulsory nutritional labelling as well as an extension of country-of-origin labelling to meat other than bovine meat; it also extends the provisions of the 'old' labelling rules to "distance" sales (i.e. internet sales) and to temporary advertising (e.g. chalk boards). The vast majority of the provisions of this legislation are to come into force on the 13th of December 2014 and it is anticipated that there will need to be an increase in the monitoring of labelling compliance around that time. The requirements in relation to the labelling of food sold without pre-packaging regarding the presence of allergens will come into force on this date. This will require a large change in practice for food businesses, and will need domestic legislation to define how this information is to be imparted, as well as how it will be enforced in this country.

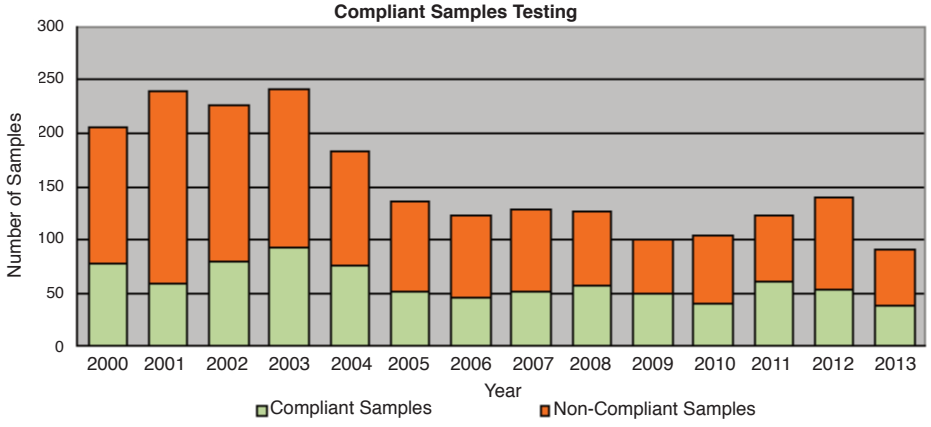
In 2013, 320 samples were examined here for compliance with labelling legislation and 104 were designated as being non-compliant. Many of the problems arise from East European and other 'ethnic' processed foods with the absence of labelling in English or Irish, with Quantitative Ingredients Declaration (QUID) labelling deficiencies, and from issues in relation to the labelling of foodstuffs with nutritional and/or health claims that are not permitted under the terms of Regulation (EC) 1924/2006.

3.6 Food Complaints

Complaint samples arise when consumers find contamination or other defects in foods. Complaints are generally made to the EHO service or to the FSAI. Some complaints arise from food poisoning incidents (these samples are tested primarily in the Food Microbiology laboratories, but may also require chemical testing). Complaint samples analysed in this laboratory usually involve the presence of foreign bodies such as insects, metal, unidentified material or abnormal odours/tastes in food. A total of 97 complaint samples, received from EHO services around the country (86) and directly from the public (11), were investigated here in 2013. Of the 97, the number of adverse reports issued was 51 (52.6%).

Appendix 2 gives a breakdown of food complaints received, by food category, from the HSE Environmental Health Service (total 86). The number of food complaints received in this laboratory has decreased from a steady average of ca. 230 per annum (1999-2003) to an average of ca. 127 (2004 – 2013). The reason for this reduction may be related to better handling of complaints by retailers.

The number of food complaints received represents a very small fraction of the total number of food items consumed in our region.



3.7 Food Alerts (RASFF) and Food Hazard/Contamination Reports

The EU Rapid Alert System for Food and Feed (RASFF) is activated when a member state reports significant contamination/risk/legislative issue associated with a batch of food or feed. The EU RASFF Notifications Report for 2013 is available on http://ec.europa.eu/food/safety/rasff/docs/rasff_annual_report_2013.pdf. A summary of the RASFF notifications for 2013 is given by Hazard group below:

Hazard / Risk Group	Number of Notifications 2013
Food: Chemical and Physical Hazards[1]	2,153
Food: Microbiological Hazards[2]	854
Food: Other Hazard / Risks[3]	178
Animal Feedstuffs Hazards[4]	14

[1] Mycotoxins, Heavy Metals, Pesticides and Veterinary Residues, Food Additives & Flavourings, Allergens, Marine biotoxins, GMOs, Foreign Bodies, Radiation, Migration from food contact materials, Composition, Contaminants & Biocontaminants, Adulteration & Fraud, etc.
[2] Pathogenic Micro-organisms, TSEs, Parasites, Other Microbiological Contamination.
[3] Insufficient controls, Absent Labelling etc., Defective Packaging, Organoleptic defects, others.
[4] Feed additives.

The main issues (400+ notifications each) dealt with in 2013 were: mycotoxins, pesticide residues and pathogenic micro-organisms, all regular and recurring issues. 2013 did throw up a major RASSF event, the discovery of horse meat contamination of beef products which led to over 500 notifications in 2013 and the introduction of a new EU Commission-launched monitoring programme for food fraud (Commission Recommendation 2013/99/EU) which is designed to detect and disseminate information in relation to food fraud. The contamination of beef products with horse meat was first discovered via an FSAI survey in late 2012 of beef products for sale at retail level in Ireland; this analysis was carried out using DNA technology (see: https://www.agriculture.gov.ie/media/migration/publications/2013/EquineDNAreportMarch2013190313.pdf for more details)

FSAI Incident Notifications are issued by the laboratory to the EHO service and the FSAI when 'significant' contamination/hazard is detected. Upon assessment by FSAI, a Food Alert notification may be issued (to the EU) depending on their evaluation of the risk. In 2013, 11 Food Hazard/Contamination Reports were issued by the laboratory, relating to: excessive and/or undeclared sulphur dioxide in apple pie filling (1), in sausages (1); in fresh chips (1), non-permitted sulphur dioxide in diced carrot & parsnip (1), excessive sodium nitrite and nitrate in bacon ribs (4); excessive sodium nitrite in bacon ribs (2), Undeclared egg detected in swiss roll (1).

Numbers of Food Hazard/Contamination Reports issued from this laboratory are outlined below:

2013	11	2008	7
2012	12	2007	24
2011	11	2006	26
2010	11	2005	23
2009	14	2004	16

4. WATERS / EFFLUENTS

4.1 Introduction

The quality of water, whether used for drinking, domestic purposes, food production or recreational purposes has an important impact on health. Water of poor quality can cause disease outbreaks and it can contribute to background rates of disease manifesting themselves on different timescales. Initiatives to manage the safety of water do not only support public health, but often promote socioeconomic development and well-being.

The European Communities (Drinking Water) No. 2, Regulations, 2007, S.I. 278 of 2007 assign the Environmental Protection Agency (EPA) the role of supervisory authority over public water supplies and provides powers of enforcement to ensure actions are taken where the quality of public drinking water is deficient. The EPA also coordinates and oversees implementation of the Water Framework Directive (WFD). The objectives of the WFD are to protect all high-status waters, prevent further deterioration of all waters and to restore degraded surface and ground waters to good status by 2015.

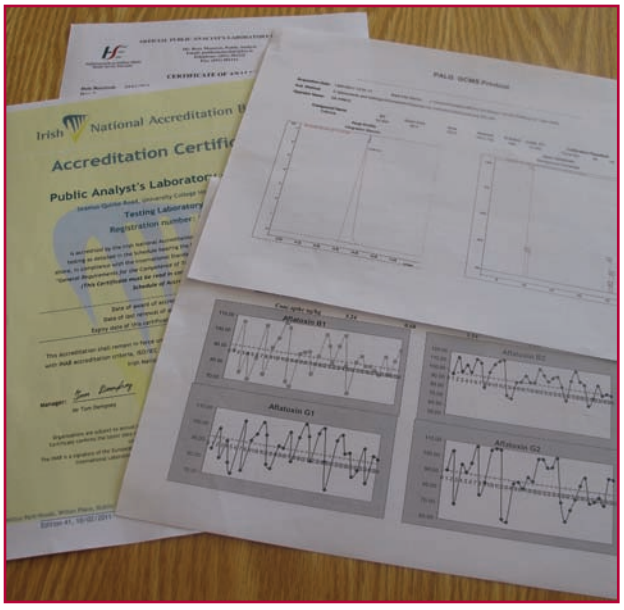
To ensure that the EU and national drinking water standards are met, each water supply must be monitored on a regular basis. The monitoring frequency is legally set out in the regulations, and minimum monitoring frequencies for drinking water depend on the size of the supply in question. Chemical aspects of water are only one part of the total safety of water. The other aspects are microbial and radiological. Further information on all aspects of drinking water safety can be found on the EPA website at www.epa.ie.

The health concerns associated with chemical constituents in drinking water arise primarily from the ability of chemical constituents to cause adverse health effects after prolonged periods of exposure. There are few chemical constituents of water that can lead to health problems resulting from a single exposure, except through massive accidental contamination of a drinking water supply. Experience has shown that in many, but not all, such incidents, the water becomes undrinkable owing to the unacceptable taste, odour or appearance.

4.2 Drinking Water Management

The Water Services Act 2013 and the Water Services (No 2) Act 2013 transfer responsibility for the supply of water from over 1000 public water supplies from local authorities to Irish Water, the new national water services authority, from 1st January 2014. Further information on Irish water is available at www.water.ie

From 1st January 2014, Irish Water is responsible for the production, distribution and monitoring of drinking water for 82.0% of the population. The remainder of the population (18%) is supplied by group water schemes (6.6%), small private supplies (0.8%) and private wells (10.6%). Responsibility for the quality of water for this 18% of the population rests with the manager/operator of the supply, while monitoring these supplies remains the responsibility of the local authorities. Information on these and other water issues (i.e. charges, conservation etc) can be found on the citizen's information website at www.citizensinformation.ie



4.3 Sample Sources 2013

In 2013, the laboratory received a total of 6,994 water samples. These consisted of drinking waters, bathing waters, pool waters, effluents, haemodialysis samples and miscellaneous samples. More than 100,000 tests were carried out on these samples. Most of the samples analysed were drinking waters, which are tested for compliance with the European Communities (Drinking Water) Regulations 2007, S.I. 278 of 2007. Samples were received from a wide variety of sources, as shown in Table 4.1.

Table 4.1 Source of samples received in 2013

Source	Number
Galway (HSE)	552
Galway County Council	79
Galway City Council	530
Mayo	1,151
Roscommon	256
Donegal	1,675
Sligo / Leitrim	346
North Tipperary	553
Clare	348
Limerick	429
Haemodialysis (Hospitals)	514
Private	546
Miscellaneous	15
TOTAL	**6,994**

4.4 Water Quality

A full appreciation of the overall quality of drinking water can only be obtained by also considering the bacteriological quality along with additional chemical parameters as published by the EPA.

The World Health Organisation (WHO) has published a Water Quality and Health Strategy, 2013-2020. This has the principal aim of managing water quality with a view to protecting and promoting human health.

The testing by this laboratory indicates, in general, a very high level of compliance for those parameters tested in public supplies, with two thirds of all non-compliant drinking water samples originating from private sources. In 2013, a total of 1,960 exceedances were detected. 250 of these exceedances were due to elevated Trihalomethanes (THMs). As detailed in Table 4.4 and 4.5, 940 of these exceedances were due to metals, while the remaining 731were non-metal exceedances. As some samples were found to be non-compliant for more than one parameter, the 1,960 exceedances in 2013 were from 1,175 samples, with over half the samples in question coming from private sources.

Based on scientific studies, the International agency for research on cancer (IARC) has classified water contaminants into 5 groups based on their carcinogenicity, as shown in Table 4.2. Results from IARC studies, along with relevant publications can be viewed on www.iarc.fr

The WHO takes the IARC classifications into consideration when determining guideline values for drinking water quality. Further information on the work carried out on drinking water quality by the WHO can be viewed on www.who.int

Table 4.2 Classification of water contaminants from the IARC

Group	Classification
1	Carcinogenic to humans
2A	Probably carcinogenic to humans
2B	Possibly carcinogenic to humans
3	Not classifiable as to its carcinogenicity to humans
4	Probably not carcinogenic to humans

4.5 Fluoridation of Public Water Supplies

Fluoride accounts for about 0.3% of the earth's crust. It's wide range of uses include fluoridation of water supplies, and use in most general anaesthetics, anti-reflective coatings, antibiotics, refrigeration and air-conditioning systems. Fluoride may be an essential element for humans; however, this has not been demonstrated unequivocally.

Public water fluoridation was introduced into Ireland in July 1964, on the grounds of being a low-cost public health measure considered to be safe to human health and of benefit to all sections of society, and not restricted by social

boundaries. Surveys have been conducted on a regular basis to measure the effectiveness of water fluoridation in the Republic of Ireland. These studies include: National Survey of Children's Dental Survey 1984; National Survey of Adult's Oral Health 1990; Regional Surveys of Children's Oral Health 1990-1999; National Survey of Adult's Oral Health 2001 All-Island Survey of Children's Oral Health 2002 (which included a comparison with caries levels in Northern Ireland) and Cross-Border Study of impact of water fluoridation in 16 year olds, 2006.

All of these studies showed a substantial benefit in terms of the reduction in tooth decay. The Irish Expert Body on Fluorides and Health is of the opinion that there continues to be overwhelming evidence that water fluoridation significantly benefits dental health. The Expert Body is satisfied, having studied current peer reviewed scientific evidence worldwide, that water fluoridation, at the optimal level, does not cause any ill effects and continues to be safe and effective in protecting the oral health of all age groups. These views are supported by reputable international agencies and valid scientific articles and reviews. The Journal of the Irish Dental Association published a supplementary Fluoride article in June/July 2012, in which it looks back at 50 years of Fluoridation in Ireland.

In 1984, the WHO issued a maximum guideline value of 1.5mg/L for fluoride in drinking water. This value was reaffirmed in 1993 and again in 2011. The WHO reports that more than 200 million people in 39 countries benefit from artificially fluoridated drinking water.

Currently, two separate pieces of legislation are applicable to the levels of fluoride in drinking water; The Fluoridation of Water Supplies Regulations 2007, S.I. No. 42 of 2007, specifies a concentration range of 0.6mg/L to 0.8mg/L Fluoride and the European Communities (Drinking Water) Regulations 2007, S.I. 278 of 2007 apply a Parametric Value of 0.80mg/L to drinking water supplies. These regulations also require that water supplies to which Fluoride has been added shall be monitored for Fluoride at intervals not exceeding one calendar month. This laboratory carries out the official monthly fluoride testing on all fluoridated supplies in the region. The results can be viewed in Appendix 5. In total, 1,106 drinking water samples were analysed for fluoride in 2013.

4.6 Non-Metals in drinking Water

The results for 2013 are summarised in Table 4.3 and 4.4.

4.6.1 Volatile Organic Compounds (VOCs)

Disinfection is a critical part of drinking water treatment and is fundamental to preventing the spread of waterborne infectious diseases. The use of disinfectant chemicals can result in the formation of disinfection by-products (DBPs). Chlorination is the most common disinfection method used in Ireland and chlorine use is regulated primarily to minimise the formation of DBPs. One class of DBP are the Volatile Organic Compounds (VOCs). These compounds include Trihalomethanes (THMs), Benzene, 1,2 Dichloroethane, Trichloroethene and Tetrachloroethene. THMs (Chloroform, Bromodichloromethane, Dibromochloromethane and Bromoform) are not naturally occurring compounds, and are formed when chlorine (a strong oxidising agent) reacts with naturally occurring organic matter in raw water. There is a direct relationship between the degree of colour in water prior to chlorination and the concentration of THMs after chlorination.

While the DBPs mentioned above are dealt with in the 2007 Drinking Water Regulations (S.I. 278 of 2007), a further group of chlorine associated DBPs, haloacetic acids (HAAs), are of increasing concern but are not included in the 2007 drinking water regulations, although they may well be included in future regulations. Because most water supplies in Ireland are surface water sources and some of our groundwater sources may be influenced by surface water, raw water is likely to contain high levels of particulate and organic matter. This can be much greater after heavy rainfall or flooding. THMs are formed when there is either inadequate pretreatment of the water and/or poor control over the disinfection process itself. THM formation is dependent on several variables; the concentration and nature of the organic material in the raw water, chlorine contact time, the residual chlorine concentration in the water and the pH and temperature of the water. Optimum filtration and coagulation before disinfection is therefore important in preventing the formation of THMs.

Chlorine is used not only as a primary disinfectant in water treatment but is also added to provide a stable disinfectant residual to preserve the quality of the water throughout the distribution network. While this characteristic of chlorine makes it most suitable as a disinfectant it also means that it is more prone to DBP formation because it has more contact time with organic matter in the water that was not removed during treatment. Additional chlorine may be added in order to maintain an adequate residual

concentration throughout the distribution system particularly at end points. Temperature and pH of drinking water vary across supplies and from season to season. Optimum control over all of these factors is necessary to keep THMs to a minimum.

Chloroform is the most common THM and the principal disinfection by-product in chlorinated drinking water. In the presence of bromides, brominated THMs are formed preferentially, and chloroform concentrations decrease proportionally. Chloroform and bromodichloromethane are classified as group 2B agents by the IARC. While bromoform and dibromochloromethane are classified as group 3 agents. The EU has set a health-based parametric value of 100µg/L for THMs (S.I. 278 of 2007). The WHO has issued guideline values of 300µg/L for chloroform, 100µg/L for bromoform, 100µg/L for dibromochloromethane and 60µg/L for bromodichloromethane.

A summary of results for 2013 is shown in the Table 4.3. The high results can be attributed to a limited number of water supplies that were analysed repeatedly.

Table 4.3 Trihalomethane results 2013

Trihalomethane (µg/L).							
Concentration Range	≤ 10	11-50	51-100	101-150	151-200	201-300	> 300
No. of Samples	117	217	230	124	66	43	17

Trichloroethene is used primarily in metal degreasing. It is emitted mainly to the atmosphere, but it may also be introduced into ground water and, to a lesser extent, surface water in industrial effluents. Poor handling and improper disposal of trichloroethene in landfills have been the main causes of ground water contamination. Tetrachloroethene has been used primarily as a solvent in the dry cleaning industry and to a lesser extent as a degreasing solvent. It is widespread in the environment and is found in trace amounts in water, aquatic organisms, air, foodstuffs and human tissues. In anaerobic ground water, tetrachloroethene may degrade to form more toxic compounds, including vinyl chloride. 1,2 Dichloroethane is used mainly as an intermediate in the production of vinyl chloride and other organic chemicals. Benzene is present in petrol, and vehicular emissions constitute the main source of benzene in the environment. Benzene may be introduced in drinking water by industrial effluents and atmospheric pollution. Benzene is principally used in the production of other organic chemicals. The results for 2013 for these parameters can be viewed in Table 4.4.

4.6.2 Ammonium

Ammonia in the environment originates from metabolic, agricultural and industrial processes and from disinfection with chloramines. Natural levels in both groundwater and surface water are generally below 0.1mg/L. The EU has set a parametric value of 0.50mg/L in drinking water; a stricter limit of 0.30mg/L is set in Irish Legislation (S.I. 278 of 2007). Ammonia levels greater than the parametric value may be an indicator of possible bacterial, sewage and animal waste pollution. The threshold odour concentration of ammonia at alkaline pH is approximately 1.5mg/L. The WHO has not issued a health-based guideline value for ammonia in drinking water, as toxicological effects are only observed at exposures above 200mg/kg body weight. However, ammonia can compromise disinfection efficiency, result in nitrite formation in distribution systems, cause the failure of filters for the removal of manganese and cause taste and odour problems. 93% of the exceedances in 2013 were private samples.

4.6.3 Chloride

Chloride in drinking water originates from natural sources, sewage and industrial effluents. The main source of human exposure to chloride is the addition of salt to food. The WHO has not issued a guideline value for chloride in drinking water, as the concentrations found are not of health concern; however levels above 250mg/L may give rise to detectable taste in water. In 2013, 13 exceedances were found. 10 of these exceedances were for private samples, while the other 3 were from one public supply.

4.6.4 Chlorine

Chlorine is the most widely used disinfectant for the inactivation of water-borne pathogens in drinking water supplies and historically has arguably made the greatest contribution to the public health protection of consumers. Chlorine is not only used as a primary disinfectant in water treatment, but is also added to provide disinfection residual to preserve water in distribution. The WHO has published detailed information on the formation of DBPs in drinking water and while they recommend that DBP levels in drinking-water be kept as low as practicable (section 4.6.1), it emphasizes that the microbial safety of drinking-water should never be compromised and effective disinfection to prevent waterborne infectious diseases must take precedence over efforts to meet DBP legislative limits. There is no statutory limit for the levels of chlorine in drinking water, but the level of residual chlorine present at the consumers tap is constrained between being acceptable to consumers and still providing disinfection. Samples with a chlorine odour are analysed for residual chlorine. While 18 samples contained >1.0mg/L free chlorine and 2 samples contained >1.0mg/L total chlorine, only 3 samples were found to be in breach of the WHO guideline value of 5.0mg/L chlorine.

4.6.5 Colour

Ideally, drinking water should have no visible colour. Colour in drinking water is usually due to the presence of coloured organic matter (primarily humic and fulvic acids) associated with the humus fraction of soil. It is also strongly influenced by the presence of iron and other metals. There is no WHO health-based guideline value for colour, although a level of 20mg/L Pt-Co, is generally used. As discussed previously (section 4.6.1), a direct relationship exists between the degree of colour in water prior to chlorination and the concentration of THMs after chlorination. The predominant mechanism for removal of dissolved coloured substances such as humic and fulvic acids is the coagulation/sedimentation process. Removal of organic material by coagulation with aluminium and iron salts has been shown to be effective. In high colour raw waters, the initial point of chlorine application should follow the coagulation/sedimentation process in order to lower the levels of DBPs in the final water.

4.6.6 Conductivity/Total Dissolved Solids (TDS)

Conductivity is the ability of a solution to conduct electric current. It is the reciprocal of electrical resistivity. Therefore, conductivity is a measure of the dissolved solids which have been ionised in the water. Total dissolved solids (TDS) comprise of inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulphates) and small amounts of organic matter that are dissolved in the water. Drinking water becomes significantly and increasingly unpalatable at TDS levels greater than 1,000mg/L. This corresponds to a conductivity of approximately 1,250µS/cm. In 2013, 19 samples had conductivity levels in excess of 1,250µS/cm, with 18 of these samples coming from private sources. 3 samples (all from private sources) had conductivity levels in excess of the EU limit of 2,500µS/cm.

4.6.7 Hardness/Calcium Hardness

Hardness in drinking water is caused by a variety of dissolved polyvalent metallic ions, predominantly calcium and magnesium cations. Hardness is usually indicated by precipitation of soap scum and the need for excess use of soap to achieve cleaning. Public acceptance of the degree of hardness of water may vary considerably from one community to another. Depending on the interaction of other factors, such as pH and alkalinity, water with hardness above approximately 200mg/L may cause scale deposition in the treatment works, distribution system and tanks within buildings. 771 out of the 1,737 samples tested here in 2013 contained >200mg/L $CaCO_3$, with 118 containing >400mg/L $CaCO_3$. On the other hand, soft water (but not necessarily cation exchanged softened water) with a hardness of less than 100mg/L may have a low buffering capacity and thus be more corrosive for water pipes. 618 out of the 1,737 samples tested here in

2013 contained <100mg/L $CaCO_3$. Calcium hardness is a term for the level of calcium carbonate in water. It is used in the calculation of the Langelier Index. This is an index used to determine if a water sample has a tendency to dissolve or deposit calcium carbonate. Strictly speaking, it is not a corrosion predictor. There is no corrosion prediction index that applies to all materials, and in fact indices related to calcium carbonate saturation, have given mixed results. In particular, it should be noted that the Langelier Index is not considered a good corrosion prediction model for copper systems. The calcium hardness results for 2013 ranged from <10 to 388mg/L $CaCO_3$.

4.6.8 Nitrate and Nitrite

Nitrate and nitrite are naturally occurring ions that are part of the nitrogen cycle. The nitrate concentration in both groundwater and surface water is normally low, but can reach high levels as a result of leaching or run-off from agricultural land or contamination from human or animal wastes as a consequence of the oxidation of ammonia. Nitrite is the intermediate in the oxidation of ammonia to nitrate, and so any water containing appreciable levels of nitrite is of questionable quality. In general, the most significant source of human exposure to nitrate and nitrite is through vegetables and meat in the diet (nitrite is used as a preservative in many cured meats). In the case of bottle-fed infants, drinking water can be the major external source of exposure to both nitrate and nitrite. In 2013, the 7 samples with nitrate exceedances and the 11 samples with nitrite exceedances were from private sources.

4.6.9 Odour

To a large extent, consumers have no means of judging the safety of their drinking water themselves, but their attitude towards their water will be affected to a large extent by the aspects of water quality that they are able to perceive with their own senses (taste, odour and appearance). The provision of drinking water that is not only safe, but also acceptable in appearance, taste and odour is of high priority. Water that is aesthetically unacceptable will undermine the confidence of consumers, will lead to complaints and more importantly, could lead to the use of water from sources that are less safe. In most cases, aesthetic problems can be prevented by optimizing conventional treatment processes such as coagulation, sedimentation and chlorination. The taste and odour thresholds of hydrogen sulphide in water are estimated to be between 0.05 and 0.1mg/L. The "rotten eggs" odour of hydrogen sulphide is a result of oxygen depletion and the subsequent reduction of sulphate by bacterial activity. Hydrogen sulphide in drinking water can be removed by techniques like aeration, granular activated carbon, filtration and oxidation. As it is unlikely that a person could consume a harmful dose of hydrogen sulphide from drinking water, the WHO has not issued a health-based guideline value for hydrogen sulphide in drinking water. In 2013, 173 samples were found to exude an odour other than chlorine. The odours were categorised as follows: Objectionable (44), Hydrogen sulphide (18), Sulphur (14), Musty (67), Stale (8), Sweet (12), Earthy (1), Hydrocarbon (6) and Phenol (3). 103 of the non-complying samples were from private water sources.

4.5.10 pH

Although pH usually has no direct impact on consumers, it is one of the most important operational water quality parameters. Careful attention to pH control is necessary at all stages of water treatment to ensure satisfactory water clarification and disinfection. For effective disinfection with chlorine, the pH should preferably be less than 8.0, although waters with a pH less than 7.0 are more likely to be corrosive. 94 out of the 102 exceedances were samples with a pH < 6.5, with 73% of these samples being from private sources. 5 of the 8 samples with pH values >9.5 were private samples.

4.6.11 Sulphate

Sulphates occur naturally in numerous minerals and are used in the chemical industry. They are discharged into water in industrial wastes and through atmospheric deposition; however, the highest levels usually occur in ground water and are from natural sources. The presence of elevated sulphate levels in drinking water can cause noticeable taste, and very high levels can cause a laxative effect in unaccustomed consumers. The taste threshold for sulphate in drinking water ranges from approximately 250mg/L for sodium sulphate to 1,000mg/L for calcium sulphate. The WHO has not issued a health-based guideline value for sulphate in drinking water, as the levels found in drinking water are not of health concern. However, due to gastro-intestinal effects resulting from ingestion of high sulphate containing water, the WHO recommend that health authorities be notified of sources of drinking water containing more than 500mg/L sulphate. 14 samples were analysed in 2013, with the results ranging from <10 to 220mg/L.

4.6.12 Total Alkalinity

Alkalinity is a measure of the capacity of water or any solution to neutralize or "buffer" acids. This measure of acid-neutralizing capacity is important in figuring out how "buffered" the water is against sudden changes in pH. Alkalinity should not be confused with pH. pH is a measure of the hydrogen ion (H^+) concentration, and the pH scale shows the intensity of the acidic or basic character of a solution at a given temperature. The reason alkalinity is sometime confused with pH is because the term alkaline is used to describe pH conditions greater than 7 (basic). The most important compounds in water that determine alkalinity include the carbonate and bicarbonate ions. Carbonate ions are able to react with and neutralize 2 hydrogen ions and the bicarbonate ions are able to neutralize H^+ or hydroxide ions present in water. The ability to resist changes in pH by neutralizing acids or bases is called buffering. Alkalinity is especially important in areas where acid rain is a problem. 1,731 samples were analysed in 2013. The results ranged from <10 to 557mg $CaCO_3$/L. 427 samples were found to contain < 100mg $CaCO_3$/L.

4.6.13 Turbidity

Turbidity in water is caused by suspended particles or colloidal matter that obstructs light transmission through the water. Turbidity can seriously interfere with the efficiency of disinfection by providing protection for organisms, and much of water treatment is directed at removal of particulate matter before disinfection. Turbidity is measured in nephelometric turbidity units (NTU) and can generally be noticed by the naked eye above 4 NTU. However, to ensure the effectiveness of disinfection, turbidity should be no more than 1 NTU and preferably much lower. Of particular importance is the fact that this will be a good indicator that chlorine-resistant pathogens such as Cryptosporidium are being removed. 86 % of the exceedances in 2013 were private samples.

Table 4.4 Summary of Non-Metals in drinking water results for 2013

Parameter	IARC Rating	Parametric Value (S.I. 278 of 2007)	WHO Guideline Value	No. of Samples	No. of Exceedance (%)
Benzene	Group 1	1.0 µg/L	10 µg/L	814	0
Trichloroethene	Group 2A	10 µg/L	20 µg/L		
Tetrachloroethene			40 µg/L	814	0
1,2 Dichloroethane	Group 2B	3.0 µg/L	30 µg/L	814	0
Odour	n/a	Acceptable to consumers and no abnormal change	Acceptable to consumers	4,027	[1]173 (4.3%)
Colour	n/a			4,027	[2]184 (4.6%)
Turbidity	n/a			4,023	[2]209 (5.2%)
pH	n/a	6.5 – 9.5	-[4]	4,013	97 (2.4%)
Conductivity	n/a	2,500 µS/cm		4,073	3 (0.1%)
Nitrate	n/a	50 mg/L	50 mg/L	4,022	7 (0.2%)
Nitrite	n/a	0.50 mg/L	3.0 mg/L	4,031	11 (0.3%)
Ammonium	n/a	0.30 mg/L	-[4]	4,031	88 (2.1%)
Free Chlorine	Group 3[3]	-	5.0 mg/L	904	[5]3 (0.3%)
Chloride	n/a	250 mg/L	-[4]	102	13 (12.7%)
Total Chlorine	Group 3[3]	-	5.0 mg/L	154	0
Total Hardness	n/a	-	-[4]	1,737	n/a
Calcium Hardness	n/a	-		26	n/a
Total Alkalinity	n/a	-	-[4]	1,731	n/a
Sulphate	n/a	250 mg/L	-[4]	14	0

[1] The number of samples not having chlorine or none detected as their odour.
[2] Although there are no health-based guideline values for colour or turbidity, levels of 20mg/L Pt-Co and 4.0 NTU respectively are generally used as guideline values.
[3] This classification refers to hypochlorite (one of the breakdown products of chlorine)
[4] Guideline value not established as the levels found in drinking water are not of health concern.
[5] The number of samples having in excess of 5mg/L free chlorine.

4.7 Metals in Drinking Water

The results for 2013 are summarised in Table 4.5.

4.7.1 Aluminium

Aluminium is the most abundant metallic element and constitutes about 8% of the earth's crust. Aluminium salts are widely used in water treatment plants as coagulants to reduce organic matter, colour, turbidity, and microorganism levels. The Aluminium is subsequently removed, but traces may persist in the treated water. The parametric value of 200µg/L in treated water is not a health based value, but prevents the deterioration of water quality (turbidity and colour) in the distribution network due to the deposition of aluminium hydroxides. The contribution of drinking water to the total oral exposure to aluminium is usually less than 5% of the total intake.

Currently, there are uncertainties as to the extent of aluminium absorption from drinking water, which depends on a number of parameters, such as the aluminium salt administered, pH (for aluminium speciation and solubility), bioavailability and dietary factors. In 2013, 37 of the 89 recorded exceedances were from private sources.

4.7.2 Antimony

Elemental antimony forms very hard alloys with copper, lead and tin and is often used in solders as a replacement for lead. Total exposure from environmental sources, food and drinking water is very low compared with occupational exposure. 4 of the 1,262 samples analysed for antimony contained >5.0µg/L. 1 of these samples was found to contain >20µg/L (The WHO guideline value). All 4 non compliant samples were from private sources.

4.7.3 Arsenic

Arsenic and inorganic arsenic compounds are principally used as alloying agents in the manufacture of transistors, lasers and semi-conductors. Arsenic is usually present in natural waters at concentrations of less than 1 – 2µg/L. However, in waters, particularly ground waters, where there are sulphide mineral deposits and sedimentary deposits deriving from volcanic rocks, the concentrations can be significantly elevated. To date, arsenic has not been shown to be essential in humans and its acute toxicity is predominantly a function of the rate of removal from the body. The results for the year 2013 are summarised in Table 4.5. It should be pointed out that all 45 of the exceedances were from private samples.

4.7.4 Boron

Boron compounds are used in the manufacture of glass, soaps and detergents and flame retardants. Naturally occurring boron is present in groundwater, primarily as a result of leaching from rocks and soils containing borates and borosilicates. The borate content of surface water is frequently a consequence of the discharge of treated sewage effluent, arising from its use in some detergents. In 2013, 5 samples exceeded the EU Parametric Value (Table 4.5). All 5 were from private sources. In 2011, the WHO revised the Boron Guideline Value from 1.0mg/L to 2.4mg/L in drinking water. 3 of the 5 non-compliant samples exceeded the WHO guideline value.

4.7.5 Cadmium and cadmium compounds

Cadmium metal is used in the steel industry and in plastics. Cadmium compounds are widely used in batteries. Cadmium is released to the environment in wastewater, and diffuse pollution is caused by contamination from fertilizers and local air pollution. Contamination in drinking water may also be caused by impurities in the zinc of galvanized pipes and solders and some metal fittings. In 2013, the 3 non-compliant samples were from private sources.

4.7.6 Chromium

Chromium is widely distributed in the earth's crust. It has found a wide range of applications, mainly due to its hardness and resistance to corrosion. It is also known for its remarkable magnetic property. It is mainly used in the manufacture of stainless steel, as it prevents corrosion and discoloration of steel. Chromium (III) or trivalent chromium is required in the human body, but in very small amounts. It is mainly required for carrying out lipid and sugar metabolism. In 2013, two samples were found to be non-compliant with regard to chromium levels.

4.7.7 Copper

Copper is an essential human nutrient. It is also used to make pipes, valves and fittings and is present in alloys and coatings. Copper concentrations in drinking water vary widely, with the primary source most often being the corrosion of interior copper plumbing. This corrosion is greater when the water is acidic or very soft. Copper can stain laundry and sanitary ware at concentrations above 1mg/L. Although copper can give rise to a taste in water, it should be acceptable at the WHO health-based guideline value of 2.0mg/L. In total, 37 exceedances were detected in 2013, of which 21 were from private supplies.

4.7.8 Iron

Iron is the second most abundant metal in the earth's crust, and is an essential element in human nutrition. Elemental iron is rarely found in nature, as the iron ions Fe^{2+} (ferrous) and Fe^{3+} (ferric) readily combine with oxygen- and sulphur-containing compounds to form oxides, hydroxides, carbonates, and sulphides. In drinking water supplies, ferrous salts are unstable and are precipitated as insoluble ferric hydroxide, which settles out as a rust-coloured silt. Anaerobic groundwaters may contain ferrous iron at concentrations of up to several milligrams per litre without discoloration or turbidity in the water when directly pumped from a well. Staining of laundry and plumbing fixtures may occur at concentrations above 300µg/L. Iron also promotes the growth of "iron bacteria", which derive their energy from the oxidation of ferrous iron to ferric iron and in the process deposit a slimy coating on the piping. Iron (particularly ferrous iron) is an essential element in human nutrition. 366 samples were found to be non-compliant with regard to iron levels. 132 of these samples contained >1,000µg/L, and indeed 18 samples contained > 10,000µg/L iron. 242 of these non-complying samples were from private sources.

4.7.9 Lead

Lead is used primarily in the production of lead-acid batteries, solders and alloys. Lead affects the developing nervous systems and intellectual and behavioural developments. Consequently, foetuses and children under six years of age are most at risk.
Owing to the decreasing use of lead-containing additives in petrol worldwide and of lead-containing solder in the food processing industry, concentrations of lead in the air and food are declining, and intake from drinking water constitutes a greater proportion of total intake. Lead is rarely present in water as a result of dissolution from natural sources. Its presence is primarily due to household plumbing systems containing lead in pipes, solder, fittings or the service connection to homes. The amount of lead dissolved from the plumbing system depends on several factors, including pH, temperature, water hardness and the standing time of water in the pipes. "Lead (Pb) in Drinking Water", a position paper has been jointly developed by the Health Service Executive (HSE) and the Environmental Protection Agency (EPA). It was issued in December 2013 and provides a summary of the issues in relation to lead in drinking water including health, legislation and interventions. The full document is available at
http://www.epa.ie/pubs/advice/drinkingwater/leadpositionpaper.html

The parametric value of 25µg/L for lead (S.I. 278 of 2007) was reduced to 10µg/L at the end of 2013. Based on this new Parametric Value, 49 samples analysed in 2013 would be non-compliant.

4.7.10 Manganese

Manganese is one of the most abundant metals in the earth's crust, usually occurring with iron. It is an essential element for humans and other animals. Its major uses include steel production, and as an oxidant for cleaning, bleaching and disinfection (as potassium permanganate). It can also be used as an additive in unleaded petrol, to increase the octane rating and reduce engine knocking. Manganese occurs naturally in many food sources, and the greatest exposure to manganese is usually from food. At levels above 100µg/L, manganese in water supplies causes an undesirable taste in beverages and stains sanitary ware and laundry.

Although the WHO have not issued a guideline value for manganese, as the levels found in drinking water are generally not of health concern, a health-based guideline value of 400µg/L has been derived. Over 83% of the samples which exceeded the EU parametric value of 50µg/L in 2013 were from private sources. 92 samples were found to contain manganese levels exceeding the WHO health-based guideline value of 400µg/L.

4.7.11 Nickel

Nickel is used mainly in the production of stainless steel and nickel alloys. Food is the dominant source of nickel exposure in the non-smoking, non-occupationally exposed population. Nickel is an essential metal for human development, although its metabolism is not fully clear. Allergic contact dermatitis is the most prevalent effect of nickel in the general population. Of the 1,275 samples analysed in 2013, 28 exceeded the EU parametric value of 20µg/L. 3 of these samples also exceeded the WHO guideline value of 70µg/L.

4.7.12 Potassium

Potassium is an essential element in humans. It is seldom, if ever found in drinking waters at levels that could be a concern for healthy humans, thus the WHO has not issued a health-based guideline value for potassium in drinking water. The recommended daily requirement of potassium is about 3g. Potassium occurs widely in the environment, including all natural waters, and can occur in drinking water as a result of the use of potassium permanganate as an oxidant in water treatment.

4.7.13 Selenium and selenium compounds

Selenium is an essential element for humans, and foodstuffs such as cereals, meat and fish are the principal source of selenium for the general population. Selenium plays a crucial role in controlling the effects of the thyroid hormone on fat metabolism. There are indications that selenium status may be marginal in many parts of the world, including Western Europe. Selenium and selenium compounds are used principally in glass making and as pigments (colouring agents) for paints, plastics, ceramics and glazes.

4.7.14 Sodium

Sodium salts (e.g. sodium chloride) are found in virtually all foods and drinking water. Foods are the main source of exposure. The WHO has not issued a guideline value, as the contribution from drinking water to daily intake is small. Although the taste threshold concentration of sodium in drinking water depends on the associated anion and the temperature of the solution, the average threshold is 200mg/L at room temperature. Of the 73 samples found to exceed the parametric value, 3 were found to contain >1,000mg/L.

4.7.15 Zinc

Zinc is an essential trace element found in virtually all food and drinking water in the form of salts or organic complexes. It is vital for many biological functions such as disease resistance, wound healing, digestion and reproduction. The major uses of zinc include anti-corrosion coatings on steel (galvanizing), construction materials, brass, pharmaceuticals and cosmetics.

Zinc imparts an undesirable astringent taste to water at the taste threshold of 3mg/L (as zinc sulphate). Water containing zinc at levels above this threshold may appear opalescent and develop a greasy film on boiling. Although levels of zinc in drinking water normally do not exceed 0.1mg/L, concentrations in tap water can be much higher, due to dissolution of zinc from household plumbing. In 2013, 115 samples contained >0.10mg/L zinc, although only 2 of these were found to contain >3.0mg/L.

4.8 Haemodialysis Water

Haemodialysis units operate water treatment systems to produce purified water for use in Dialysis machines. The laboratory performed 8,000 tests on the 512 samples submitted in 2013. The parameters analysed include pH, conductivity, sodium, potassium, total hardness, fluoride and a range of metals.

4.9 Private Samples

The laboratory provides a comprehensive testing service for the general public to investigate concerns or complaints about water quality. These concerns are predominantly associated with private wells. The number of samples tested for private individuals in 2013 was 546.

4.10 Bathing Waters

Bathing waters and inlet streams to bathing areas were tested for compliance with the Quality of Bathing Water Regulations 1992, (S.I. No. 155 of 1992) and Bathing Water Quality Regulations 2008 (S.I. No. 79 of 2008) for the 2013 bathing water season. In 2013, 85 samples were analysed. The parameters analysed include dissolved oxygen (where the % oxygen saturation ranged from 79 to 111), pH (results ranged from 7.1 to 8.7), colour (results ranged from 2.4 to 74.4mg/L Pt-

Co), along with presence/absence tests like mineral oils, surface active substances and tarry residues. The vast majority of samples analysed were in full compliance with the legislation. Further details and results for both local and national bathing water quality can be found at www.splash.epa.ie

4.11 Pool Waters

The laboratory analyses chlorine/bromine levels, along with total dissolved solids and alkalinity of swimming pools, jacuzzis, hot tubs and spa pools. In 2013, 244 samples were analysed. At present there is no legislation for the control of these parameters. 14 of the samples were found to contain > 5mg/L free chlorine. 5 of these 14 were also found to contain > 10mg/L free chlorine. In the case of the total chlorine levels, 26 of the samples were found to contain > 5mg/L total chlorine, while 10 of the 26 also contained > 10mg/L total chlorine. The total dissolved solids varied from 38 to 26,000mg/L, with 10 samples found to contain more than 5,000mg/L. The alkalinity levels varied from <10 to 1,928mg/L.

4.12 Effluents

The laboratory carries out a wide range of analysis on effluent samples. These samples include samples for discharge licences and suspected pollution samples. In 2013, 18 samples were analysed. The parameters tested include Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), suspended solids, fats, oils and greases (FOGs), dissolved oxygen, phosphate (both soluble and total), nitrate, nitrite, ammonia and a range of metals.

Table 4.5 Summary of Metals in drinking water results for 2013

Parameter	IARC Rating	Parametric Value (S.I. 278 of 2007)	WHO Guideline Value	No. of Samples	No. of Exceedance (%)
Aluminium	n/a	200 µg/L	-[4]	4,060	87 (2.1%)
Antimony	Group 2B[3]	5.0 µg/L	20 µg/L	1,262	4 (0.3%)
Arsenic	Group 1	10 µg/L	10 µg/L	1,271	45 (3.5%)
Boron	n/a	1.0 mg/L	2.4 mg/L	1,249	5 (0.4%)
Cadmium	Group 2A	5.0 µg/L	3.0 µg/L	1,260	3 (0.2%)
Chromium	Group 1[1]	50 µg/L	50 µg/L	1,260	2 (0.2%)
Copper	n/a	2.0 mg/L	2.0 mg/L	1,368	37 (2.7%)
Iron	n/a	200 µg/L	-[4]	4,064	351 (8.6%)
Lead	Group 2A	25 µg/L	10 µg/L	1,556	15 (1.0%)
Manganese	n/a	50 µg/L	-[4]	4,061	288 (7.1%)
Nickel	Group 2B	20 µg/L	70 µg/L	1,275	27 (2.1%)
Potassium	n/a	-	-[4]	12	n/a
Selenium	Group 3	10 µg/L	40 µg/L	1,246	1 (0.1%)
Sodium	n/a	200 mg/L	-[4]	465	73 (15.7%)
Zinc	n/a	-	-[4]	1,260	[2] 2(0.2%)

[1] *Classification refers to hexavalent Chromium*
[2] *The number of zinc samples which gave results >3.0mg/L. (There is no health-based guideline value for zinc although a level of >3mg/L may not be acceptable to consumers.)*
[3] *Classification refers to antimony as antimony trioxide.*
[4] *Guideline value not established as the levels found in drinking water are not of health concern.*

5. AIR POLLUTION MONITORING

5.1 European Legislation

The European Commission set out a legislative basis for the management of air quality in 1996 with the Air Quality Framework Directive. Four daughter directives set out limits for specific pollutants. The Framework directive along with the first, second and third daughter directives were replaced by the **Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive 2008/50/EC**. The fourth daughter directive (2004/107/EC) will be included in CAFÉ in the future. This CAFÉ directive sets out how Air Quality should be monitored, assessed and managed, and sets limits for the following parameters.

- Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead.
- Benzene, carbon monoxide and ozone.

Directive 2004/107/EC sets target limits for the following parameters.

- Arsenic, cadmium, mercury, nickel
- Polycyclic aromatic hydrocarbons.

5.2 National Legislation

Directive 2004/107/EC was transposed into Irish Legislation in 2009 by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009). The CAFÉ Directive was transposed into Irish Legislation by the Air Quality Standards Regulations 2011, S.I. No. 180 of 2011 in May 2011. The country is divided into four zones for the purpose of assessment and management of air quality. Galway City is in zone C along with Limerick City, Waterford City and 18 other towns and urban areas around the country. The number of monitoring stations within each zone is also stipulated.

5.3 Laboratory Results

This laboratory operates air monitoring stations at two locations in the city, near the Bodkin roundabout (adjacent to Currys) and at Terryland Waterworks. This work is performed on behalf of Galway City Council. The parameters monitored are Sulphur Dioxide, Black Smoke and PM_{10}. Data recorded by the laboratory is reported to and published by the EPA. The EPA has made available an "Air Quality Index for Health" on their website at http://www.epa.ie/air/quality/.

5.3.1 Sulphur Dioxide

Sulphur Dioxide may enter the air from the natural environment or from the combustion of fuels which contain Sulphur. High levels of SO_2 can cause respiratory problems and lead to damage to the ecosystem. It is a major precursor to acid rain. The regulations stipulate one SO_2 monitor in zone C. The EPA operates a mobile monitoring station in this zone. The laboratory continues to monitor for SO_2 at both stations in the city. The results for 2013 are shown in Appendix 6. The daily limit value set for the protection of public health of 125 $\mu g/m^3$ was not exceeded at any time during the year.

5.3.2 Black Smoke

Black smoke measurement was the traditional method for determining the amount of particulate matter in the air. Legislative guidelines date back to 1980. Since Jan 2005, there is no legislative requirement to measure this parameter; however the laboratory continues to perform this measurement at both monitoring stations. Given the data that has been collected over many years, it is considered useful to continue this measurement to facilitate the observation of long term trends.

5.3.3 PM_{10}

PM_{10} is the term used to describe particulate matter which is 10µm or less in diameter. These particles may consist of a complex mixture of soot, organic, and inorganic matter. There are many sources of PM_{10}s, which include the combustion of diesel and solid fuels and dust from road traffic. Concern about PM_{10} levels relate to the respiratory problems caused by their inhalation.

The Air Quality Regulations require monitoring at two locations in Zone C. The EPA operates one such monitoring unit in a mobile facility. The other monitoring unit is operated by the laboratory at the Bodkin roundabout monitoring station. The Regulations set a 24 hour average limit of 50$\mu g/m^3$ which is not to be exceeded more than 35 times a calendar year, and a yearly average limit of 40$\mu g/m^3$ for PM_{10}s. The 24 hour average limit was exceeded eleven times during the year. The highest value recorded was 74$\mu g/m^3$. The daily average for the year was 21$\mu g/m^3$. The results for the year 2013 are shown in Appendix 6.

6. PHARMACEUTICALS & TOXICOLOGY

6.1 Pharmaceutical Laboratory

Since 1976, the laboratory has provided an analytical service to the Irish Medicines Board (IMB) and its predecessor, the National Drugs Advisory Board, to test drug products and medicines, as well as providing technical advice and support related to the testing of medicines. The Pharmaceutical Section of the Public Analyst's Laboratory, Galway has been appointed an Official Medicines Control Laboratory (OMCL) under the framework of the European Directorate for the Quality of Medicines and Healthcare (EDQM) and the Council of Europe.

6.1. Role as an Official Medicines Control Laboratory (OMCL)

The function of the IMB is to protect and enhance public and animal health through the regulation of human and veterinary medicines and medical devices available for sale or manufactured in Ireland and to participate in systems designed to do the same throughout the EU.

At a National level, the laboratory contributes to the protection of public health and the regulatory function of the IMB by providing independent analytical data and technical advice on medicinal products that enable the IMB to make informed decisions on the quality and the compliance status of medicines.

At a European level, the laboratory actively participates in activities of the General European OMCL Network (collaboration between regulatory medicine testing laboratories designed to improve communication, enhance cooperation and to harmonise methods of work across the EU and other states). These activities include the testing of Centrally Authorised Medicinal Products (CAP), testing of Mutually Recognised/Decentralised Products (MRP/DCP), Market Surveillance Studies (MSS) and participation in EDQM organised Proficiency Testing Schemes (PTSs). (for more information see http://www.edqm.eu/en/General-european-OMCL-network-46.html))

6.1.2 Analysis

Testing of Pharmaceuticals in the laboratory is carried out according to the monographs of the European Pharmacopoeia, the British Pharmacopoeia, the United States Pharmacopoeia and/or company methods. Both Active Pharmaceutical Ingredients and Finished Medicinal Products are analysed, as well as some herbal products.

A wide variety of tests are carried out on each sample. Tests carried out during 2013 included Identification and Assay by HPLC, Dissolution by UV, Dissolution by HPLC, Identification and Assay by UV-Vis, Appearance Testing, Packaging Check, Identification by IR, Average Mass, Uniformity of Mass, Subdivision of Tablets, pH, Density, Preservative Content by HPLC, Optical Rotation, Related Substances by HPLC, Ethanol content by GC, Assay of Iron, Ionic Iron Content, Identification by TLC, Uniformity of Dosage Units, Water Content by Karl Fischer, Uniformity of Delivered Dose from Multidose Containers, Extractable Volume, Visual Inspection of Vials, Loss on Drying, Manganese by ICP-MS and Melting Point.

6.1.3 Sample Numbers

The number of samples submitted to the laboratory during 2013 was 119. One food complaint sample was also tested for the presence of a medicinal product.

Irish Medicines Board	101
EDQM - Centrally Authorised Medicinal Products	5
Galway University Hospital, HSE West	2
Proficiency Tests	11
Food Complaint Sample	1

A summary of analytical findings may be found in the IMB 2013 Annual Report (see www.imb.ie).

6.1.4 Quality System

To ensure quality and comparability of results within the Network, OMCLs must operate to a quality system based on ISO/IEC 17025. The laboratory has been accredited for the analysis of Pharmaceuticals since 1991 (EN45001) and, since 2006, to the current standard, ISO/IEC 17025:2005. A "Flexible Scope" approach has been applied to a number of tests in the laboratory. Following an INAB audit in November 2013, the scope of accreditation for the OMCL has been expanded to include the tests Uniformity of Dosage Units, Subdivision of Tablets and Uniformity of Dose from Multidose Containers. As an OMCL, the laboratory is also required to operate to Quality Management Guidelines issued by the EDQM-OMCL Network and accepted by the EA (European Accreditation Cooperation), (see http://www.edqm.eu/en/EDQM-Publications-Quality-Management-Guidelines-86.html for more information).

Mutual Joint Audits (MJAs) of OMCLs are carried out by experts from the Network, trained in Quality Management to ensure that the quality systems of the OMCLs comply with the requirements of ISO/IEC 17025 and the OMCL Network Quality Management Guidelines. The OMCL has previously undergone a MJA by auditors from other European countries and one member of staff has been trained as a MJA auditor.

The OMCL is also audited periodically by the Irish Medicines Board.

6.1.5 Proficiency Testing Schemes (PTSs)

The laboratory regularly takes part in PTSs, such as those organised by EDQM and LGC-Pharmassure. The methods covered by PTSs during 2013 included: Identification by IR, Assay by HPLC, Related Substances by HPLC, Karl Fischer, Specific Optical Rotation, Ethanol by GC, pH, Density, Melting Point, Loss on Drying, Identification by TLC, Uniformity of Mass and UV-Spectrophotometry.

6.1.6 Attendance at Meetings

A member of staff attended the Annual Meeting of the EDQM European Network of OMCLs held in Helsinki in June 2013 and the Annual CAP and MRP/DCP meetings held in Prague in November, as well as a MJA Auditors meeting in Strasbourg in March.

Attendances were funded by the Irish Medicines Board and the Council of Europe.

6.1.7 Student Placement

One 3rd year student from the Forensics Science and Analysis Course, Galway Mayo Institute of Technology worked in the OMCL on a six month placement during 2013.

6.2 Toxicology Laboratory:

A basic toxicology service is offered to Consultant Pathologists and Physicians, Veterinary Surgeons and members of the public, mainly for alcohol (ethanol) testing. Some other parameters are tested for periodically e.g. Strychnine and Paraquat, as well as solvents such as Acetone, Methanol, Acetaldehyde, Propanol etc.

6.2.1 Ethanol Testing

The majority of samples submitted for alcohol testing are submitted by Consultant Pathologists in HSE West. Blood and urine "B-samples", taken under the Road Traffic Act, are also independently analysed for alcohol. The current limits for ethanol in drink driving offences are 67 mg/100 ml in urine and 50 mg/100 ml in blood for experienced drivers, with lower limits for new or learner drivers and drivers of buses, lorries, trailers, work vehicles, taxis and other public service vehicles.

Seventeen samples taken under the Road Traffic Act were tested during 2013, of which 13 (i.e. 76 %) were above the legal limit at the time of testing.

The total number of samples tested for ethanol was 223 while 51 samples were tested for other volatile compounds such as methanol, acetone etc. (see table below);

Ethanol in Biological Fluids (Post Mortem)	110
Ethanol in Biological Fluids (Road Traffic Act)	17
Ethanol Proficiency Tests	24
Ethanol (Herbal, Medicines etc.)	21
Ethanol (Foodstuffs, Cosmetics, Misc.)	51
Methanol, Acetone, Acetaldehyde, Propanol (Foodstuffs, Cosmetics, Misc.)	51

6.2.2 Quality System

The laboratory takes part in a Proficiency Testing Scheme coordinated by the LGC, where samples of blood and urine are each received on a monthly basis and analysed for ethanol.

7. COSMETICS

7.1 Cosmetics Legislation

The European "Recast" Cosmetics Regulation (EC No. 1223/2009) came into effect from 11th July 2013. This 'Recast' Regulation is the principal EU legislation governing cosmetics safety and quality and it has been transposed into Irish law by SI 440 of 2013. The Regulation sets out standards which must be met by the Cosmetics Industry.

7.2 Official Control and Enforcement of Cosmetics Legislation in Ireland

Official control of cosmetics in Ireland is coordinated by The Irish Medicines Board (IMB) as the national Competent Authority for cosmetics legislation, along with the Environmental Health Officers and Public Analysts' Laboratories, as authorised officers and official laboratories, respectively. A Cosmetics Surveillance Committee, with membership from the IMB, EHS and PA Labs has been established to facilitate the planning and coordination of control and market surveillance activities. European collaboration of the Official Cosmetics Control Laboratories is facilitated by the OCCL network, of which we are a member. This is a network of Official Cosmetics Control Laboratories formed within the European Directorate for the Quality of Medicines and HealthCare (EDQM), with cross-functional links to the European Commission PEMSAC Analytical Methods Group (Platform of European Market Surveillance for Cosmetics).
RAPEX is the EU rapid-alert system for notifying hazards/risks associated with cosmetics and other consumer products:
http://ec.europa.eu/consumers/safety/rapex/alerts/main/
In Ireland the National Consumer Agency (NCA) administers RAPEX. www.consumerconnect.ie

7.3 Results for 2013

Table 7.1 below summarises testing of cosmetics performed in this laboratory in 2013 (see Appendix 7 for an outline of the Surveillance Programme for 2013). The service is provided to authorised officers (EHOs) from all HSE Regions. Cosmetics samples are submitted by the HSE authorised officers (Environmental Health Officers) to monitor compliance with the cosmetics regulations. Non-complying samples are dealt-with by the EHOs, in conjunction with the IMB, as appropriate.

Table 7.1 Summary of Cosmetics Testing Results 2013

Parameter	Cosmetic Types	Samples Tested	Complying	Non-complying
Formaldehyde	Irish Manufactured Cosmetics, Hair Straightening products, & Children's 'leave-on' Cosmetics	59	56	3[1]
Lead	Face paints, Children's & General make up etc.	61 (128 Subsamples)	60	1
Cadmium	Face paints, Children's & General make up etc.	61 (127 Subsamples)	61	0
Mercury	Creams, Soaps etc. (Whitening)	31	30	1
Arsenic	Face paints, Children's & General make up etc.	56 (124 Subsamples)	56	0
Chromium	Face paints, Children's & General make up etc.	52 (116 Subsamples)	52	0
Nickel	Face paints, Children's & General make up etc.	61 (125 Subsamples)	61	0
Hydrogen Peroxide	Teeth whitening products, toothpaste	3	3	0
p-Phenylenediamine	Hair Dyes	30 (64 Subsamples)	30	0
Hydroquinone	Creams, Soaps "Lightening"	13	13	0
Dioxane[2]	Shampoo & bath gel	1	1	0
Methyldibromo glutaronitrile (MDBG)	Wipes	31	31	0
3-Iodo-2-propynyl butylcarbamate (IPBC)	Wipes	31	30[3]	0
Benzene, Chloroform	Wipes	30	30	0
Residual Solvents	Hair Care Products	15 (35 Subsamples)	15	0
General Labelling Exam'n	Make up, face paints, soaps, shower gels, hair products, wipes, creams etc	125	85	40

Note: 79 samples consisting of 213 sub-samples were screened by x-ray fluorescence for lead & cadmium.

[1] *Including 2 samples with Formaldehyde >0.05%- not labelled with warning "contains formaldehyde".*
[2] *Testing was out-contracted to CVUA, Karlsruhe, Germany; sample contained dioxane but at levels deemed technically unavoidable.*
[3] *One sample of baby wipes was designated as 'Not Determined'.*

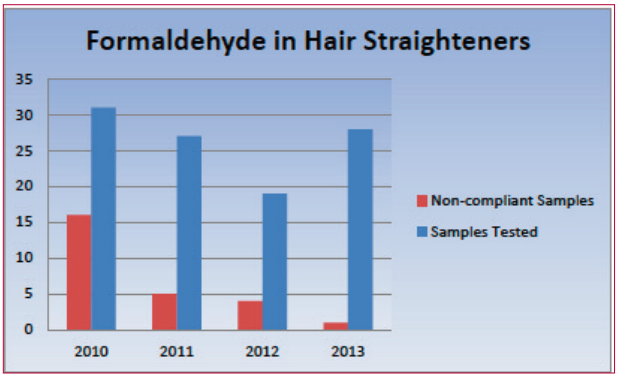
7.3.1 Formaldehyde in Hair-straighteners, etc

General: Formaldehyde, formalin, and methylene glycol solutions are forms of formaldehyde and can be treated as one in terms of safety and toxicity. These solutions can release formaldehyde gas under certain conditions. Formaldehyde has high inhalation toxicity and is also a known skin 'sensitiser'. EU cosmetics legislation (see Section 7.1) regulates formaldehyde strictly, setting a maximum limit of 0.2% for formaldehyde in general cosmetics products. All finished cosmetics products containing formaldehyde (or other preservatives which release formaldehyde) must be labelled with the warning "contains formaldehyde" where the concentration of the formaldehyde exceeds 0.05%.

7.3.1.1 Results in 2013:

59 cosmetic samples consisting of various Irish manufactured cosmetics products (28), hair-straighteners/smoothing products (23), children's leave-on cosmetics (5), and 3 miscellaneous products were tested in 2013. Formaldehyde results ranged between < 0.04% and 2.3%, with just 1 sample (a hair straightening product at 2.3%) exceeding the statutory limit of 0.2%, resulting in a single Cosmetics Hazard/Contamination Report being issued to the EHOs and IMB. Two further samples were found to contain formaldehyde at a level >0.05% (but <0.2%) without a warning label stating that the product "contains formaldehyde". The problem of usage of excessive formaldehyde in hair-straighteners has decreased from 2010 levels (non-compliances 2010: 52% (16/31), 2011: 19% (5/27), 2012: 21% (4*/19), 2013: 4% (1/28)**

** this includes 3 samples of the one product,*
*** not including labelling non-compliances*



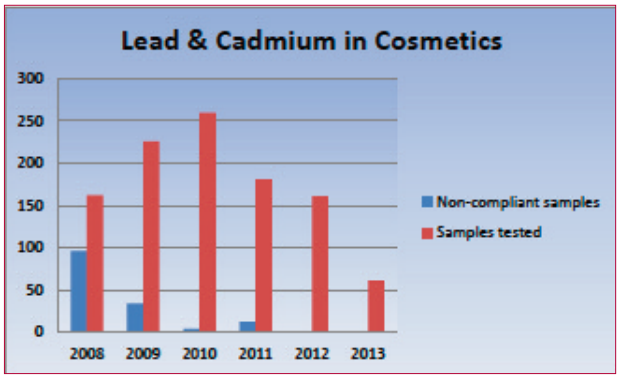
7.3.2 Heavy Metals

Lead and Cadmium: 61 samples (childrens face paints, childrens general cosmetics, adult products) were tested in 2013. Some of these samples were multi-component cosmetics sets consisting of different sub-sample types and colours. In all 128 sub-samples were tested by ICPMS and 213 sub-samples were screened by XRF.

A Lead (Pb) limit of 20mg/kg and a Cadmium (Cd) limit of 5mg/kg (limits developed by BfR/Germany) have been adopted in HSE as an interim 'limit'. In 2013 one sample contained non-compliant levels of lead in three individual portions of a face paint set. In 2013 a number of samples/subsamples contained levels of lead between 5 and 11mg/kg (20 subsamples). Work is ongoing at a European level to determine if the BfR/German limit should be reduced from 20mg/kg. As yet no new limits have been decided.

Year	No of Samples Tested	No of sub components	No. of Non-complying components
2008	162	798	96
2009	226	946	34
2010	260	1,020	4
2011	181	680	12
2012	161	635	0
2013	61	213	1

The overall results for Lead and Cadmium indicate a significant decrease in recent years. Metals testing emphasis will increase from contaminants to allergens/sensitisers in future work.

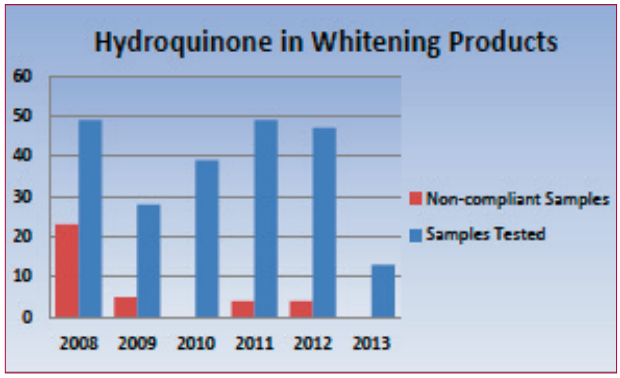


61 samples were also tested for Arsenic, Chromium and Nickel (or various combinations thereof). Arsenic results ranged from < 0.5 to 2.95mg/kg. Chromium levels ranged from < 0.5 to 28 mg/kg (apart from a single seaweed-based sample containing almost 5000mg/kg Chromium; this contained a permitted chromium colourant). Levels of Nickel of up to 70mg/kg were found in some samples in 2013, and although observed Nickel levels were lower than in 2012, this is still of concern. Whereas there are no specific limits for Nickel in cosmetics, cosmetics products must (a): be safe and (b): must not contain prohibited substances unless "…technically unavoidable in good manufacturing practice". To minimise the risk of sensitisation (to Nickel) in sensitive persons Nickel levels in cosmetics should be kept low. Some studies report 5 mg/kg as a 'threshold' for leave-on cosmetics (Basketter et al., Contact Dermatitis, 2003 Jul; 49(1):1-7).

7.3.3 Hydroquinone and Mercury in Creams, etc.

Hydroquinone products are popular for their skin-lightening properties in Asian and African cosmetics markets and Hydroquinone is sometimes found in cosmetic products sold in "ethnic" shops. RAPEX reports involving hydroquinone are relatively common (on a European level). Hydroquinone (at any level) is prohibited for use as a skin-lightening agent. Mercury (as various mercury compounds) is also occasionally used in skin-whitening products, even though such use is prohibited.

During 2013, none of the 13 'whitening/lightening' samples tested here were found to contain hydroquinone. These results compare to non-compying rates of 47% (23/49), 18% (5/28), 0% (0/39), 8.0% (4/49) and 8.5% (4/47) for 2008, 2009, 2010, 2011 and 2012 respectively.



31 samples were also tested for mercury, and one was found to be non-compliant (freckle cream, 5.2% mercury). Of note is that this product has been tested repeatedly over the last number of years, both in this laboratory and in other European laboratories and has been found to contain high levels of mercury. Non-complying mercury results for skin-whitening products have been sporadic with 0% (0/9), 4.5% (1/22), 0% (0/43), 8.3% (4/48), 0% (0/44) for 2008, 2009, 2010, 2011 and 2012 respectively.

7.3.4 para-Phenylenediamine in Hair Dyes

In 2013, 30 samples (64 subsamples) of hair dyes were tested for para-phenylenediamine (PPD), a permitted hair colourant with allergic properties and an upper limit of 2%. None of the samples exceeded the limit of 2% para-phenylenediamine which came into effect on July 15th 2010 (Directive 2009/130/EC).

7.3.5 Residual Solvent Testing

30 samples of liquid extracted from wipes (primarily wipes intended for use on children) were tested for residual benzene and chloroform. However, none of the products showed the presence of these solvents. Both benzene and chloroform are prohibited in cosmetic products. 15 samples (35 subsamples) of hair-care products were tested for a number of solvents (ethanol, methanol, acetone, propan-1-ol and propan-2-ol). No levels of concern were observed.

7.3.6 Hydrogen Peroxide

"Tooth-whitening" products, toothpastes, gels, etc., and related products are currently in widespread use by the public. Hydrogen peroxide is permitted in "oral hygiene products…available generally to public" up to a maximum limit of 0.1% (see SI 396 of 2012), or up to 6.0% for professional use. 3 samples were tested for peroxide content in 2013; all were found to be in compliance.

7.3.7 General Labelling of Cosmetics

125 samples were examined in 2013 for compliance with the labelling requirements in the Cosmetics Regulations (Regulation No 1223/2009 & S.I. 440 of 2013). 40 (32%) samples were found to be non-compliant; these non-compliances related to the omission of some of the following labelling information: Responsible Persons (RP) address, date of minimum durability (or 'period after opening' symbol), batch number and list of ingredients.

7.3.8 Other Cosmetics Testing

7.3.8.1 Methyldibromoglutaronitrile (MDBG) and Iodopropynylbutylcarbamate (IPBC)

These compounds are permitted preservatives in Cosmetics as per Regulation (EC) No. 1223/2009, at varying levels depending on the product type and intended use. There are potential allergenic/sensitisation risks with the use of such preservatives on susceptible persons, who may purchase cosmetics labelled as "preservative / allergen free". 31 samples, primarily wipes for use on children, but also including adult hygiene wipes, were tested. No MDBG was observed in any of the samples. Just one of the 31 samples was found to contain a trace of IPBC (0.0005%).

7.4 Summary of Cosmetics Hazard/Contamination Reports issued in 2013

Cosmetics samples are tested to ensure their safety and compliance with specific or general safety standards. Cosmetics Hazard/Contamination Reports are issued by the laboratory when the results of analysis indicate a particular hazard. Such reports require risk analysis to assess if the hazard represents a significant risk to consumers.

In 2013, the laboratory issued 5 Cosmetics Hazard/Contamination reports concerning: formaldehyde (1), Mercury (1), Lead (1), MDBG (1) and hydroquinone (1). The MDBG alert related to the material being listed as an ingredient, however subsequent analysis showed it not to be present at a quantifiable level.

7.5 Overall Summary

The recent surveillance results indicate continuing improvements in the quality of cosmetics on the Irish market. Non-compliances have shown a decrease since 2008 for almost all parameters. There continues to be some incidents of non-compliances which are dealt with by the EHOs in conjunction with IMB, as appropriate. The 2013 results will inform future surveillance programmes, as will observation of trends in RAPEX reports, communication with other European surveillance authorities etc.

8. MISCELLANEOUS TESTING

Thirty seven 'miscellaneous' samples were received in 2013. These consisted of:

- 10 veterinary samples as part of an investigation into a reported blindness case
- 1 foreign object in a kettle
- 1 sample of insects for identification
- 1 suspected rodent dropping
- 1 sample of calcium carbonate powder for export certification
- 1 part of a metal gate as part of an investigation into lead poisoning
- 6 samples of horse hair & blood as part of an investigation into horse deaths
- 1 sample of larvae from water in a paddling pool
- 12 private seaweed samples
- 2 samples of deposits taken from a water boiler and from sanitary ware
- 1 sample of children's clothing as part of an investigation into a reported allergic reaction

9. QUALITY ASSURANCE

The quality of the analysis carried out in the laboratory, and the reliability of the results supplied to our customers is ensured by having a quality assurance system in place which covers all aspects of the laboratory's work. This laboratory complies with an International standard for testing laboratories i.e. - ISO/IEC 17025 'General requirements for the competence of testing and calibration laboratories'. The standard contains detailed requirements for both the management of laboratory operations and technical aspects such as method validation, measurement traceability and measurement uncertainty. The pharmaceuticals section is also subject to audits by the IMB, and mutual joint audits carried out by EDQM/OMCL staff.

9.1 Accreditation

Gaining accreditation to the ISO 17025 standard means that this laboratory can demonstrate to its customers that it has been successful in meeting the requirements of an international accreditation standard. Member states of the EU have established a network of national accreditation bodies which seeks to ensure that the competence of all EU laboratories are assessed to the same principles. In Ireland, the Irish National Accreditation Board (INAB) is the body with responsibility for awarding accreditation, in accordance with the relevant ISO 17000 series of standards and guides. This laboratory has continuously added to its list of accredited tests, and now is accredited for a wide range of analytes, using a variety of testing procedures in Food, Water, Cosmetic and Pharmaceutical products. A full list of our accredited tests is available on the INAB website http://www.inab.ie/directoryofaccreditedbodies/laboratoryaccreditationtesting/009T.pdf

9.2 INAB Surveillance Visit.

The laboratory receives regular surveillance and re-assessment audits from INAB. Their purpose is to determine whether a laboratory is continuing to comply with the ISO 17025 and INAB Regulations. Our annual INAB surveillance audit took place in November 2013. Once again, we successfully maintained our accreditation status and indeed added to our scope of testing in the Food and Pharmaceuticals sections. Additional testing accredited in 2013, include the testing of snack foods for Sodium and Potassium and Subdivision of Tablet and Uniformity of Dosage Unit tests for Pharmaceutical samples.

9.3 Proficiency Testing

As part of our external quality control, the laboratory participates in a range of international proficiency testing schemes. Participation in the testing schemes enables the laboratory to monitor the quality of its measurements and demonstrates our competence to customers and accreditation bodies. In 2013 we participated in a large number of proficiency testing rounds, covering a wide range of parameters, analytical procedures and sample types (see table). The proficiency testing schemes in which we participate include schemes organised by:

- FAPAS: The Food and Environment Research Agency, http://www.fapas.com/
- CHEK: Food and Consumer Product Safety Authority, The Netherlands.
- Quasimeme: Quality Assurance of Information for Marine Environmental Monitoring in Europe
- QDCS: Quality in Dairy Chemistry, Laboratory of the Government Chemist (LGC), U.K.
- AQUACHECK: Proficiency testing scheme for water testing, LGC, U.K. http://www.lgcpt.com/productviewnarrow.aspx?SchemeID=77
- Pharmassure: Proficiency testing for Pharmaceuticals, LGC, U.K.
- EDQM: European Directorate for the Quality of Medicines and Health Care.
- LGC standards proficiency testing.

Proficiency Testing Schemes (Food Testing) 2013

Scheme	Analyte	Matrix Tested
QDCS	Acid Titration	Milk
FAPAS	Alcoholic Strength	Whiskey
FAPAS	Allergens – Casein (New method under development)	Infant Soya Formula
FAPAS	Allergens – Egg (New method under development)	Cake Mix
FAPAS	Allergens - Gluten	Infant Formula, Cake Mix,
FAPAS	Allergens - Histamine	Canned Fish samples
FAPAS	Allergens - Peanut	Chocolate Sample
QDCS	Antibiotic Residue (Delvo Test)	Milk
FAPAS	Ash	Snack Food, Canned Meat
FAPAS	Fat (Werner Schmidt Method)	Snack Foods, Canned Meat
FAPAS	Fat (Gerber and Rose Gottlieb Methods)	Milk
FAPAS	Freezing Point Depression (Adulteration)	Milk
National Measurement Institute Australia	Folic Acid	Bread, Flour and Breakfast Cereal samples
FOBS	Microscopy/ Identification	Miscellaneous Samples
FAPAS	Moisture	Snack Foods, Canned Meat
QDCS	Pasteurisation (Alkaline Phosphatase)	Milk
FAPAS	pH	Tomato Sauce
FAPAS	Potassium	Breakfast Cereal
FAPAS	Preservatives – Nitrate & Nitrite	Meat
FAPAS	Preservatives – Sorbic Acid	Wine
FAPAS	Preservatives – Sulphur Dioxide	Meat, Dried Fruits
CHEK	Preservatives – Sulphur Dioxide	Wine
FAPAS	Protein (Nitrogen)	Snack Food, Canned Meat
FAPAS	Refractive Index (Soluble Solids as Sucrose)	Tomato Sauce
FAPAS	Sodium	Snack Food, Tomato Sauce, Canned Meat and Breakfast Cereal samples
FAPAS	Total Solids	Milk
FAPAS	Trace Metals - Arsenic	Milk Powder, Meat
FAPAS	Trace Metals - Cadmium	Milk Powder, Meat
FAPAS	Trace Metals - Chromium	Infant Cereal
FAPAS	Trace Metals – Lead	Milk Powder, Meat
FAPAS	Trace Metals - Mercury	Meat
FAPAS	Trace Metals - Selenium	Infant Cereal

Proficiency Testing Schemes (Water Testing) 2013

Scheme	Analyte	Matrix Tested
AQUACHECK	Alkalinity, Hardness, Colour, Turbidity, Conductivity, pH, Fluoride, Chlorine	Water
AQUACHECK	Nitrate, Nitrite, TON, Ammonia	Water
AQUACHECK	Trace Metals (Antimony, Aluminium, Arsenic, Boron, Cadmium, Chromium, Iron, Manganese, Copper, Lead, Nickel, Selenium, Zinc)	Water
AQUACHECK	Volatile Organic Compounds	Water

Proficiency Testing Schemes (Pharmaceutical & Toxicology Testing) 2013

Scheme	Analyte	Matrix Tested
Pharmassure	Assay & Identification by HPLC	Pharmaceuticals
Pharmassure	Assay & Identification by UV	Pharmaceuticals
EDQM & Pharmassure Schemes	Assay of Related Substances by HPLC	Pharmaceuticals
Pharmassure	Average Mass & Uniformity of Weight	Pharmaceuticals
Pharmassure	Density	Cod Liver Oil, Sucrose Syrup, Lemon Oil, Rosemary Oil
EDQM	Dissolution (Immediate Release and Dissolution Profile)	Pharmaceuticals
Pharmassure	Identification – FT-IR	Pharmaceuticals
Pharmassure	Identification - Thin Layer Chromatography	Pharmaceuticals
Pharmassure	Loss on Drying	Pharmaceuticals
Pharmassure	Melting Point	Urea, Benzoic Acid derivatives, Benzophenone
Pharmassure	Optical Rotation	Sucrose Solution
EDQM & Pharmassure Schemes	pH Testing	Solutions
EDQM	Water Content (Karl Fischer Titration)	Pharmaceuticals
LGC Toxicology Scheme	Alcohol	Blood, Urine

Proficiency Testing Schemes (Cosmetic Testing) 2013

Scheme	Analyte	Matrix Tested
CHEK	Formaldehyde	Finger Paint, Body Lotion
CHEK	Hydroquinone	Body Lotion
CHEK	Metals (Arsenic, Cadmium, Chromium, Lead and Nickel)	Tattoo Ink
LGC Cosmetic Testing	Metals (Lead, Cadmium, Chromium, Nickel)	Cosmetic Powder
CHEK	Hydrogen Peroxide	Whitening Gel

10. STAFF TRAINING

The need for staff training and on-going professional development are emphasised in both the Service Contract with FSAI and various specific legislation relating to food control. Both internal and external training is offered to staff in the use of Analytical Methods and Instrumentation, Health & Safety (including Manual Handling & a Fire Lecture), Information and Communication Technology and training organised by HSE (including Data Protection). Staff also attended seminars on marine contaminants & the applications of analytical instrumentation such as GC-MS, ICP-MS, LC-MS & UV Spectrometry in the work-place. In-house induction and HSE induction training is provided for all new staff. General management training has also been undertaken. Due to budgetary constraints staff training has continued to be significantly reduced this year. Most of the staff training received was on a budget neutral basis. Unfortunately, it was not possible to attend other important training courses, which could lead to further improvements and developments in the service, due to the significant expense involved.

11. MEETINGS/COMMITTEES

FSAI:
- Liaison Meetings with Public Analysts' Group
- Service Contract Meetings with Western Area HSE
- Allergen Labelling & Analysis Working Group
- EHO-PAL Liaison Group
- FSAI-EHO-PAL National Group on Sampling Programmes
- Molluscan Shellfish Safety Committee
- Legislation Committee (FSAI-Dept. of Health & Children…) & Sub-Committees
- Bottled Water Guidance Note Drafting Committee
- Scientific Sub-committee (Additives, Contaminants..)

***safe*food/HSE:** IT system for Laboratory Service
HSE Regional Food Committee: (HSE West)
Cosmetics Control Group HSE and Cosmetics Safety Steering Group (IMB, HSE…)
OCCL: Organisation of Cosmetics Control Laboratories (EU EDQM)
Zoonoses Committee (Western Region)
Fluoridation Committee (HSE West)
HSE/County Council Water Group Meetings
HSE Water Group Meetings
Chemistry Network of Accredited Laboratories: Forum for Quality Managers from INAB Accredited Chemistry Laboratories
Irish Medicines Board: Liaison Meetings
EDQM European Network of Official Medicines Control Laboratories: Annual Meeting, EDQM/OMCL CAP Meeting, MRP/DCP Meeting, MJA Auditors Meeting
NSAI: Working group on the revision of Irish Standard 432 (I.S. 432:2009) on bottled ground water
Community Services Management Meetings

12. INFORMATION AND COMMUNICATION TECHNOLOGY

The LabWare laboratory information management system (LIMS), funded nationally by safefood has been 'live' since 01 January 2007. The LIMS is in continuous use in the laboratory and is undergoing expansion and development. This development has included the integration of various instruments, involved in water and pharmaceutical analysis, into the LIMS enabling paperless transfer of results. In 2008, an electronic reporting link was set-up between this laboratory and the FSAI, using the government VPN (Virtual Private Network), whereby summaries of all relevant sample details and results are automatically created and sent to the FSAI for inclusion in a national database of food testing. Further development of the LIMS was planned for 2010 - 2011 (connection to the EPA Environmental Data Exchange Network (EDEN)) but this project was paused while a new national information technology system for the Environmental Health Services in the HSE is procured. Once this is in place, it is anticipated that the HSE Public Analysts Laboratories and Public Health Microbiology laboratories will be connected to both the EHS and EDEN systems via the LabWare LIMS.

Due to budgetary constraints the development of other aspects to the LIMS system (e.g. the connection to the new Environmental Health Information System (EHIS)) has been put on hold.

Appendix 1. Outline Summary of HSE West Food Sampling – Analysis (Chemical) Programme for 2013

Jan 7 – 14		35 **Locally Manufactured produce Gluten-free Foods** (Gluten, Labelling etc)		
Jan 14– 31	40 **Sausages** (SO_2 , $NaNO_2$ & $NaNO_3$)		30 **Low- or Reduced-Salt Foods** (Na/K)	**LC-MS Method Development** (DMAA)
Feb. 1 – 15	2(x9) **Various Port-level Fish** (Biogenic Amines)	35 **'Peanut-free' Foods** (Peanut Protein)	30 **Imported Seafood** (Pb/Cd, Labelling…)	
Feb. 15 – 28	40 **Herbs, Spices, Seasonings, Herbal teas, Seeds, Noodles** (Food Irradiation screening, Pb/Cd…)	25 **Scombroid fish** (Biogenic Amines)		150 **FSAI Salt Reduction Programme Soups** (Na & K)
Mar. 1 – 15	25 **Prepared Hospital Meals etc.** (% Protein & %Fat …)		35 **Various Sulphited Foods** Local Processors (SO_2)	
Mar. 16- 31		20 **Imported Dairy products etc** (ALP, Inhibitory Substances, Adulteration….)		
Apr. 1- 15	~6 **Meats & Brine solutions** ($NaNO_2$ & $NaNO_3$)			30 **Local/Regional Produce with labelled Salt/Sodium values** (Na & K, labelling, Gen.Exam.etc)
Apr. 16 – 30			40 **Cured Meats** (Sodium Nitrite & Sodium Nitrate)	
May 1 – 15		30 **Sea Vegetables** (Heavy Metals)		35 **"Egg-free" Foods** (Egg Protein)
May 16 – 31		35 **Foods Labelled as "Milk-free"** (Milk Protein/Casein etc)	20 **Pub-level Spirits** (Alcoholic strength)	
June 1 – 15	1(x9) **Various Port-level Fish** (Biogenic Amines)	20 **Infant Formula, Follow on Formula, Premature Infant Formula** (Allergens, Folic Acid, Labelling…..)		75 **Lactose- free Foods** (Lactose)
June 16 – 30	30 **Irish Manufacturers Food Supplements' National Survey** (Folic Acid, Minerals etc)		25 **Scombroid fish etc** (Biogenic Amines)	

Appendix 1. Outline Summary of HSE West Food Sampling – Analysis (Chemical) Programme for 2013 (continued)

July 1 – 15	2(x9) **Various Port-level Fish** (Biogenic Amines)	35 **Meat Products** (SO_2 & Fat)	35 **Locally Manufactured produce** **Gluten-free Foods** (Gluten, Labelling etc)	150 **FSAI Salt Reduction Programme Breads** ((Na & K)
July 16 – 31		35 **'Peanut-free' Foods** (Peanut Protein)		
Aug. 1 – 15	3(x9) **Various Port-level Fish** (Biogenic Amines)		35 **Gluten-free Foods** (Gluten)	
Aug. 16 – 31	~6 **Brine Solutions** (Nitrate & Nitrite)	25 **Scombroid Fish** (Biogenic Amines)		30 **Body building Supplements (Imported)** (Proximates, Minerals, Food irradiation, DMAA)
Sept. 1 – 15	3(x9) **Various Port-level Fish** (Biogenic Amines)	35 **Various Sulphited Foods** (SO_2)	35 **Weaning Foods** (Folic Acid, Na/K, Pb/Cd, Other Nutritional Testing, General/Nutritional labelling, etc)	10-15 **Shellfish – imports etc** (AZA, DSP, ASP)
Sept. 16 - 30		25 **Low Fat Survey Minced Meats/Beefs** (Fat Content, Adulteration)		5-10 **Imported Shellfish** (DSP/AZA, ASP, Pb/Cd)
Oct. 1 - 15		35 **'Peanut-free' Foods** (Peanut Protein)	ca. 10 **Bottled Waters** (Audit suite)	50-100 **FSAI Salt Reduction Programme Snacks** Na & K)
Oct. 16 – 31	~6 **Brine Solutions** (Nitrate & Nitrite)	35 **Gluten-free produce** (Gluten)	**FSAI Folic acid**	
Nov. 1 – 15	1x9 **Various Port-level Fish** (Biogenic Amines)	25 **Ethnic Foods** (General Exam., Na & K & labelling…)	~20 **Bottled Waters** DW Check/Audit suite	
Nov. 16 – 30		20 **Raw, unprocessed meats** (ABS)		
Dec. 1 – 15	2x9 **Various Port-level Fish** (Biogenic Amines)		20 **Christmas Bakery Products** (Na/K, General Examination & Labelling….)	
Dec. 16 – 31	**Food Complaints, Food 'Alerts' etc., 'suspect' samples, Follow-up samples etc**			
Jan - Dec	**-Bottled waters from manufacturing premises – CHECK or AUDIT suite – approx 104 samples – HSE west production** **-Food Complaints, Food 'Alerts' etc., 'suspect' samples and tap waters from food premises (where relevant)** **-'Inspection Support' samples from Manufacturing/ Processing etc. premises when required, and in consultation with lab.**			

Appendix 2: Routine Official samples received from H.S.E., for the period from 01/01/2013 to 31/12/2013
Appendix 2: Food Complaint samples (from H.S.E. & the Public) from 01/01/2013 to 31/12/2013

Food Category	No. of Samples with Infringements		Chemical / Physical Contamination		Compositional		Labelling (1) & Presentation		Other		No. of Samples Received		% with infringements	
	Routine	Complaint	Routine	Complaint	Routine	Complaint	Routine	Complaint	Routine	Complaint	Routine	Complaint	Routine	Complaint
1. Dairy Products	10	5	0	5	0	0	10	0	0	0	17	6	58.82	83.33
2. Egg and Egg Products	1	0	0	0	0	0	1	0	0	0	1	0	100.00	0.00
3. Meat and Meat Products, Game and Poultry	29	2	0	2	22	0	7	0	0	0	190	8	15.26	25.00
4. Fish, Shellfish and Molluscs	17	1	2	1	1	0	14	0	0	0	130	5	13.08	20.00
5. Fats and Oils	0	0	0	0	0	0	0	0	0	0	1	0	0.00	0.00
6. Soups, Broths and Sauces	3	0	0	0	0	0	3	0	0	0	35	3	8.57	0.00
7. Cereals & Bakery Products	11	10	0	8	0	1	11	1	0	0	101	17	10.89	58.82
8. Fruit and Vegetables	9	6	0	6	3	0	6	0	0	0	57	10	15.79	60.00
9. Herbs and Spices	4	1	0	1	0	0	4	0	0	0	26	1	15.38	100.00
10 Non-Alcoholic Beverages	16	2	0	2	0	0	16	0	0	0	81	12	8.84	16.67
11 Wine	0	0	0	0	0	0	0	0	0	0	6	0	0.00	0.00
12 Alcoholic Beverages (Other than Wine)	0	2	0	0	0	0	0	0	0	0	27	2	0.00	100.00
13 Ices and Desserts	0	0	0	0	0	0	0	0	0	0	4	0	0.00	0.00
14 Cocoa and Cocoa Preparations, Coffee & Tea	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
15 Confectionery	2	2	0	2	0	0	2	0	0	0	46	2	4.35	100.00
16 Nuts & Nut Products, Snacks	4	2	0	2	0	0	4	0	0	0	9	2	44.44	100.00
17 Prepared Dishes	11	8	0	8	3	0	8	0	0	0	59	13	18.64	61.54
18 Foodstuffs Intended For Special Nutritional Uses	6	3	1	2	5	0	0	0	0	0	213	5	2.82	60.00
19 Additives	6	0	0	0	1	0	5	0	0	0	13	0	46.15	0.00
20 Materials & Articles Intended to come into contact with Foodstuffs	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
21 Others	17	7	0	6	3	1	14	1	0	0	68	11	25.00	63.64
Totals	**146**	**51**	**3**	**45**	**38**	**2**	**105**	**2**	**0**	**0**	**1184**	**97**	**12.33**	**52.58**

Note 1: Refers to labelling infringements under the Dept. of Health enacted legislation only

Appendix 3: Outline of Principle Official Surveillance of Foodstuffs in Ireland (ROI).

Department/Agency Authority	Principal Food Categories	Principal Sampling Stage(s)	Principal Sampling Officers	Principal Official Laboratories[1]	Test Parameters and Groups
Department of Agriculture Food & the Marine (DAFM)	Foods of Animal Origin (Meats, etc.) Fruit/Vegetables, etc. Milk/Dairy, etc. Fish, Shellfish, etc.	'Production' Meat Plants, Farms, etc. Dairy Plants, etc. Fishing Boats, Processing plants, Fish Farms, etc.	DAFM Veterinary Officers & Agricultural Officers, etc. Sea Fishery Officers etc. (Sea Fisheries Protection Authority (SFPA))	Veterinary Public Health Regulatory Laboratory Ashtown Food Research Centre Labs State Laboratory Pesticides Laboratory Dairy Science Labs Marine Institute (also BIM Lab)	Microbiology & Veterinary Residues, Contaminants, etc. Pesticides etc., Microbiology, Residues etc., Microbiology (incl. virology), Marine Biotoxins, Residues & Contaminants etc.
Health Service Executive (HSE)	All foodstuffs (Food, Drink, Food-contact Materials)	All stages Manufacturing, wholesale, Retail, Catering, Import etc.	HSE Environmental Health Officers (EHOs)	HSE Food Microbiology Labs & **HSE Public Analysts' Labs[2]**	Microbiology Contaminants, Complaints, Compositional & Additives, Nutritional, Labelling, etc.
Local Authorities	Meat, Dairy, Brines....	'Production' plants, etc.	Veterinary Officers, etc.	Local Authority Labs, Dept. of Agriculture Labs, etc.	Microbiology, Residues, etc.
Radiological Protection Institute of Ireland (RPII)	Marine products, Meats, Others	Any stage	Various	Radiological Protection Institute of Ireland	Ionising Radiation
FSAI (surveys)	Any Foodstuff	Any stage	FSAI, etc.	Dependent on Testing Parameter(s) and laboratory capacity	'New' Parameters of concern. Any Other Parameter.

[1] The Irish Equine Centre performs official testing on behalf of DAFM. Some testing is also performed by the Veterinary Laboratory Service, including the Central Veterinary Research Laboratory, and by the Interim Salmonella Reference Laboratory, UCHG, Galway.
- see Directory of Food Safety Laboratory Services, Safefood, for more details on food testing labs in Ireland.

[2] The Public Analysts' Laboratory Service operates as a single, co-ordinated service, with a system of national Specialisations and Core Testing in place (and ongoing).
***Core Testing:** Microscopy/Complaints; General Examination/labelling etc.*
*Examples of **Specialisations** include:*

- ***Dublin PAL:*** *Mycotoxins (Aflatoxins , Ochratoxin, DON, Zearalenone, Patulin, Ergot Alkaloids, Tricothecenes, Fumonisins, Citrinin, Sterigmatocystein etc); Food Contact Materials (Overall Migration, PAAs, ESBO, Furan, Aromatic amines, Migratory Metals (Pb, Cd etc), Phthalates, Melamine, BPA, ITX etc.); Food Processing Contaminants (PAHs, Melamine, Furan, 3-MCPD, Benzene, PFAS, Acrylamide, Solvent Residues etc…) etc*
- ***Cork PAL:*** *Heavy Metals (Pb, Cd, Hg, As, Sn, Cu, Zn…, Hg &As speciation) ; Vitamins (A,Bs,C.Ds, E...) and Other Compositional/Nutritional testing (Nucleotides, Omega-3 FAs, Cholesterol, Saturated/Unsat'd Fat etc.); GMO Testing; Pesticides (Bottled Waters & Infant Formulae..); Adulteration/Food Fraud (Congeners (spirits etc.), Meat and Fish Speciation, Olive Oil quality etc, Food Irradiation screening;*
- ***Galway PAL:*** *Food Allergens (Gluten, Lactose, Peanut, Milk, Egg, Soy protein etc); 'Salt' (Na/K) - national salt reduction programme, surveys etc; Folic Acid; Other Compositional/Nutritional testing; VOCs in Drinking & Bottled Waters; Food Irradiation-PSL screening; Specialist Labelling /Legislation work.*

A Service is provided to HSE and increasingly to Agencies other than HSE, eg to FSAI, SFPA, DAFM…

Appendix 4: Annual Results Summary for Food Contaminants etc. PAL Galway (results for all foods tested)

	Non-complying or "Excessive" Samples/Total Samples tested										
Parameter	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Aflatoxins	4/250 1.6%	8/231 3.5%	6/233 2.6%	13/220 5.9%	8/220 3.6%	1/149 0.7%	3/115 2.6%	0/49 0%	1/26 3.8%	N/T	N/T
Fumonisins	1/86 1.2%	1/44 2.3%	0/52 0%	0/51 0%	0/24 0%	1/10 10.0%	3/40 7.5%	0/21 0%	N/T	N/T	N/T
Ochratoxin A	0/83 0%	2/109 1.8%	1/109 0.9%	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Patulin	0/4 0%	N/T	0/52 0%	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Lead (Pb)	0/170 0%	0/330 0%	1/248 0.4%	1/143 0.7%	2/479 0.4%	2/512 0.4%	4/422 0.9%	0/390 0%	0/207 0%	0/128 0%	0/375 0%
Cadmium (Cd)	0/120 0%	0/273 0%	0/205 0%	0/130 0%	2/403 0.5%	0/512 0%	1/415 0.2%	4/381 1.0%	0/204 0%	0/129 0%	0/375 0%
Mercury (Hg)	0/96 0%	2/140 1.4%	0/176 0%	0/74 0%	0/54 0%	0/20 0%	4/169 2.4%	2/233 0.9%	0/38% 0%	0/80 0%	0/105 0%
Arsenic (As)	0/188 0%	0/154 0%	0/42 0%	0/47 0%	0/163 0%	0/238 0%	0/51 0%	0/67 0%	0/7 0%	0/34 0%	0/366 0%
Benzo-[a]-pyrene	4/282 1.4%	2/84 2.4%	2/75 2.7%	2/98 2.0%	19/102 18.6%	0/115 0%	0/65 0%	0/57 0%	N/T	N/T	N/T
3-MCPD	0/90 0%	0/62 0%	0/35 0%	2/73 2.7%	0/96 0%	0/30 0%	N/T	0/18 0%	0/33 0%	N/T	N/T
Nitrates	N/T	N/T	0/42	0/39 0%	0/35 0%	0/3 0%	N/T 0%	N/T	N/T	N/T	N/T
Marine Biotoxins: **DSPs**	0/103 0%	0/99 0%	1/52 1.9%	0/21 0%	0/11 0%	0/20 0%	1/22 4.5%	0/14 0%	0/15 0%	0/13 0%	0/17 0%
AZAs	0/108 0%	0/108 0%	0/47 0%	0/20 0%	0/29 0%	0/20 0%	1/23 4.3%	0/14 0%	0/8 0%	0/13 0%	0/17 0%
ASPs	0/108 0%	0/65 0%	0/41 0%	0/23 0%	0/39 0%	0/36 0%	0/30 0%	0/30 0%	0/18 0%	0/15 0%	0/17 0%
Gluten **Gluten Free (GF) Foods**	22/240 9.2%	11/252 4.4%	15/134 11%	4/144 2.8%	1/175 0.6%	2/102 2.0%	17/394 4.3%	4/333 1.2%	6/270 2.2%	8/476 1.7%	34/631 5.4%
Benzene	N/T	N/T	N/T	3/90 3.3%	0/64 0%	0/29 0%	0/58 0%	N/T	N/T	N/T	N/T
Anti-bacterial Substances (ABS) EC 4-Plate Test	0/119 0%	0/69 0%	0/73 0%	0/38 0%	0/37 0%	0/38 0%	0/51 0%	0/32 0%	0/24 0%	0/20 0%	0/16 0%
AV/DPTGs(Oils)	14/74 18.9%	4/62 6.5%	6/37 16.2%	2/17 11.8%	9/32 28.1%	5/27* (18.5%)	N/T	N/T	N/T	N/T	N/T
Histamine/ **Biogenic Amines**	1/297 0.3%	1/114 0.9%	6/129 4.7%	4/139 2.9%	16/131 12.2%	2/128 1.6%	15/320 4.7%	5/289 1.7%	1/218 0.5%	5/204 2.5%	3/94 3.2%
Sorbates/ Benzoates	2/63 3.2%	18/163 11.0%	3/46 6.5%	2/36 5.6%	2/59 3.4%	6/72 8.3%	0/47 0%	0/34 0%	N/T	N/T	N/T
Sulphites	1/120 0.8%	6/444 1.4%	7/135 5.2%	6/198 3.0%	1/166 0.6%	8/190 4.2%	8/206 3.9%	9/213 4.2%	6/176 3.4%	15/160 9.4%	26/195 13.3%
Nitrites / Nitrates	7/172 4.1%	4/282 1.4%	10/158 6.3%	13/85 15.3%	11/94 11.7%	2/64 3.1%	0/8 0%	4/32 12.5%	25/79 31.6%	7/86 8.1%	14/112 12.5
Artificial Sweeteners (i.e. Acesulfame K, Aspartame & Saccharin)	0/8 0%	1/2 50.0%	4/208 1.9%	0/38 0%	N/T	0/41 0%	0/3 0%	N/T	N/T	N/T	N/T
Food Irradiation	0/115 0%	3/248 1.2%	19/246 7.7%	3/291 1.0%	2/335 0.6%	0/253 0%	2/136 1.5%	0/56 0%	0/88 0%	0/55 0%	2/71 2.8%
Food Complaints	149/241 61.8%	108/183 59.0%	84/136 61.8%	77/122 63.1%	77/129 59.7%	69/126 54.8%	50/100 50%	64/105 61.0%	62/122 50.8%	85/139 61.2%	51/97 52.6%
Lactose	New testing introduced in 2012									0/67 0%	0/25 0%
Casein	New testing introduced in 2012									0/27 0%	1/35 2.9%
Soya	New testing introduced in 2012									1/32 3.1%	N/T
Peanut	Testing introduced in 2010							0/169 0%	0/34 0%	0/113 0%	1/78 6.4%
Egg	New testing introduced in 2013										3/47 6.4%

N/T = Not tested, i.e. discontinued/postponed etc.

** Results exceed Dutch DPTGs limit of 15% or Acid value of 4.0 (results not designated as non-complying)*

Appendix 5: Fluoridation of Water Supplies – HSE West for 2013

FLUORIDATION OF WATER SUPPLIES :- GALWAY

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Ballinasloe	11	0.62 – 0.72	0.67
Carna	9	< 0.10 – 0.70	<0.10
Clifden	11	<0.10-0.76	0.58
Dunmore/Glenamaddy	11	0.62 – 0.70	0.66
Galway City	118	0.65 – 0.74	0.70
Kinvara	12	0.55 – 0.75	0.67
Luimnagh	37	0.62 – 0.73	0.65
Mid-Galway Regional	11	0.50 – 0.82	0.67
Mountbellew	11	0.55 – 0.92	0.70
Oughterard	12	<0.10 - 0.76	0.66
Portumna	11	0.54 - 0.86	0.73
Spiddal	12	0.47 - 0.71	0.63

FLUORIDATION OF WATER SUPPLIES :- MAYO

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Achill	12	0.58 - 0.85	0.64
Ballina	24	0.56 - 0.92	0.71
Erris	12	0.60 - 0.71	0.65
Kiltimagh	12	0.74 - 0.89	0.79
Lough Mask Regional	12	0.65 - 0.75	0.72
Shrule	12	0.61 - 0.69	0.66
Swinford	12	0.65 - 0.84	0.73
Westport	12	0.54 - 0.71	0.63

FLUORIDATION OF WATER SUPPLIES :- ROSCOMMON

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Ballinlough Loughglynn	12	0.13 - 0.75	0.65
Boyle/Ardcarne	12	0.13 - 0.79	0.56
Castlerea Regional	12	0.60 - 0.69	0.67
Castlerea Urban	12	0.63 - 0.78	0.69
Mount Talbot	12	0.11 - 0.82	0.70
North East Regional	12	0.15 - 0.83	0.78
North Roscommon Regional	12	0.48 - 0.80	0.64
Roscommon Town (Central)	12	0.47 - 0.76	0.58
South Roscommon Regional	12	<0.10 - 0.84	0.13

Appendix 5: Fluoridation of Water Supplies HSE West for 2013

FLUORIDATION OF WATER SUPPLIES :- DONEGAL

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Buncrana	17	0.47 - 0.83	0.65
Bundoran	14	0.67 - 0.77	0.69
Cardonagh Mixed	14	0.62 - 0.75	0.65
Cranford	15	0.66 - 0.83	0.73
Creeslough/Dunfanaghy	19	<0.10 - 0.73	0.67
Donegal/River Eske	15	0.55 - 0.62	0.58
Falcarragh/Gortahork	14	< 0.10	<0.10
Frosses/Inver	13	0.52 - 0.65	0.64
Glenties/Ardara	13	<0.10	<0.10
Inishowen East	18	0.59 - 0.75	0.68
Letterkenny	31	0.55 - 0.73	0.64
Lettermacward	14	0.62 - 0.70	0.67
Lough Mourne	19	<0.10 - 0.83	0.72
Milford	15	0.67 - 0.70	0.68
Rosses Regional	37	<0.10 - 0.69	<0.10

FLUORIDATION OF WATER SUPPLIES :- SLIGO/LEITRIM

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Kinsellagh	11	0.65 - 0.70	0.67
Lough Gill/ Cairnes	12	0.64 - 0.68	0.64
Lough Easkey	12	<0.10 - 0.70	0.61
Lough Talt	12	0.61 - 0.73	0.66
North Leitrim Regional	11	<0.10 - 0.68	0.65
South Leitrim Regional	12	0.69 - 0.83	0.72
North Sligo Regional Supply	13	0.65 - 0.88	0.73
South Sligo Regional	12	0.48 - 0.77	0.66
Killaraght	13	0.16 - 0.80	0.59
Lough Gill/ Foxes Den	12	0.49 - 0.67	0.64
Kinlough Tullaghan	12	0.71 - 0.75	0.73

Appendix 5: Fluoridation of Water Supplies – HSE West for 2013

FLUORIDATION OF WATER SUPPLIES :- LIMERICK

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Limerick City	23	0.58 - 0.68	0.65
Ballyneety	12	0.59 - 0.69	0.66

FLUORIDATION OF WATER SUPPLIES :- CLARE

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Ballyvaughan	1	0.68	0.68
Ennis	14	0.72 - 0.78	0.74
Kildysart	13	0.61 - 0.73	0.65
Rockmount	13	0.60 - 0.94	0.74
North Clare	12	0.57 - 0.74	0.69
Shannon	14	0.60 - 0.78	0.69
West Clare New Doolough	13	0.54 - 0.80	0.64
West Clare Old Doolough	12	0.58 - 0.79	0.71

FLUORIDATION OF WATER SUPPLIES :- NORTH TIPPERARY

Location	Number of Samples	Range (mg/L)	Median (mg/L)
Borrisokane	12	0.63 - 0.72	0.66
Murroe	13	<0.10	<0.10
Nenagh	14	0.19 - 0.77	0.62
Roscrea	14	0.58 - 0.73	0.67
Thurles	24	<0.10 - 1.19	0.67
Templemore	12	0.12 - 0.54	0.13

Appendix 6A:

Concentration of Smoke and Sulphur Dioxide in the atmosphere at the Galway Waterworks site.

	Micrograms Per Cubic Metre					
	Smoke			Sulphur Dioxide		
	Average Reading	Highest Reading	Lowest Reading	Average Reading	Highest Reading	Lowest Reading
January	10	33	1	9	20	3
February	8	23	1	11	25	3
March	11	30	1	9	20	3
April	5	11	1	18	34	7
May	2	6	1	20	47	3
June	4	15	1	20	40	4
July	5	22	1	12	24	3
August	2	7	1	21	37	7
September	6	19	1	17	27	5
October	7	21	1	9	19	3
November	9	38	1	14	32	4
December	3	11	1	8	23	3
Average	6	20	1	14	29	4

Concentration of Smoke and Sulphur Dioxide in the atmosphere at the Bodkin Roundabout site.

	Micrograms Per Cubic Metre					
	Smoke			Sulphur Dioxide		
	Average Reading	Highest Reading	Lowest Reading	Average Reading	Highest Reading	Lowest Reading
January	4	12	1	13	29	4
February	2	6	1	21	43	5
March	3	8	1	22	41	9
April	1	7	1	25	53	5
May	1	3	1	31	51	6
June	1	3	1	32	68	9
July	1	3	1	28	43	9
August	1	3	1	37	53	15
September	2	3	1	21	59	5
October	2	6	1	26	60	11
November	3	21	1	30	66	6
December	1	5	1	16	21	6
Average	2	7	1	25	49	8

Appendix 6B:

PM_{10} RESULTS MASS CONCENTRATION (M.C) µg/m³ 2013

Station: Bodkin Roundabout **Galway City Council** **24 Hour M.C. µg/m³**

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
01	18	16	47	33	16	28	20	10	45	-	25	17
02	-	15	56	28	45	12	11	19	19	15	11	22
03	62	-	56	28	17	11	9	11	14	13	19	14
04	16	-	66	33	19	20	20	13	13	8	23	15
05	22	-	68	28	18	25	25	7	10	10	12	21
06	11	15	54	32	32	49	32	8	7	7	14	11
07	8	-	-	42	39	64	12	16	8	15	17	10
08	35	20	17	67	12	24	18	12	11	9	11	21
09	26	20	19	61	9	21	19	11	17	11	18	16
10	24	7	24	45	19	30	13	10	11	35	9	19
11	18	24	27	20	19	7	27	12	<5	28	20	26
12	20	17	15	16	15	30	17	11	7	23	22	14
13	21	14	12	20	21	-	17	8	20	23	19	17
14	12	14	9	41	15	12	11	<5	16	39	22	19
15	18	25	12	22	31	15	19	6	14	30	23	17
16	16	12	14	35	7	19	33	14	18	16	18	20
17	16	37	9	15	13	15	18	12	9	22	6	15
18	10	22	19	17	8	13	20	7	12	12	10	22
19	25	-	22	13	8	24	28	16	19	13	14	13
20	32	44	33	12	11	19	16	17	26	9	14	18
21	44	48	21	22	14	11	-	8	8	12	19	21
22	35	33	12	19	18	21	-	35	11	16	39	11
23	30	42	25	18	22	48	-	10	15	18	34	17
24	32	39	49	9	23	14	-	11	37	18	27	28
25	11	-	43	11	19	23	-	5	42	11	24	20
26	12	54	36	13	12	22	-	11	34	13	16	15
27	14	37	28	23	15	10	-	10	48	22	16	23
28	39	30	40	18	16	<5	-	19	37	10	27	10
29	28		74	14	17	12	-	<5	36	16	21	10
30	25		32	28	10	25	-	12	32	22	19	16
31	29		26		15		-	31		20		12
Monthly Mean	**23**	**26**	**32**	**26**	**18**	**22**	**19**	**13**	**20**	**17**	**19**	**17**
No. of Days exceeding 50µg/m³	**1**	**1**	**6**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

No. of days exceeding 50µg/m³ for year 2013 = 11 Mean daily value for 2013 =21 µg/m³

Appendix 7:

Outline Summary of Cosmetics Chemical Surveillance Programme 2013 (HSE West, Dublin Nth East & Mid Leinster)

Period	Survey/Samples	Number of Samples	Chemical Test Parameter(s)
Feb 1st-8th	Miscellaneous Childrens' Low-cost Cosmetics	35	Heavy Metals
Mar 1st-8th	Miscellaneous Irish-manufactured Cosmetics	20	Formaldehyde, Labelling, Heavy Metals
Apr 1st-5th	Hair-straightening Products (Salons etc)	20	Formaldehyde…(Other aldehydes, methanol)
May 1st-10th	Miscellaneous Lips' Cosmetics etc & Ethnic Eye Cosmetics (Kohl , Eye Liners etc) &Tattoo Products	20	Heavy Metals
June 3rd -7th	Baby Wipes & Other Wipes	25	Methanol, Others (IPBC), General Exam'n, including labelling etc
June 3rd-7th	Hair Dyes , Black Henna Tattoos & Hair Products	20	p-Phenylenediamine, Oxidation Colourants (Pb, Cd, Cr, Ni, As)
July 1st-5th	Childrens''Leave-on' Cosmetics	20	Allergens, Methanol, Preservatives
Aug 1st – 9th	Infants' Leave-on Cosmetics, Nappy Area	20	Methanol, Others, General Exam'n, including labelling etc
Sept 2nd-6th	Tooth-whitening products	30	Hydrogen peroxide
Sept 2nd-6th	Hair Bleaches	15	Peroxide(s)…
Oct 1st-4th	Halloween Cosmetics	25	Heavy Metals
Nov 1st-8th	Skin-lightening Creams, Lotions & Soaps	20	Hydroquinone & Hg. (also Kojic Acid etc testing in PALCork)
Dec 2nd-6th	Christmas Cosmetics	15	Heavy Metals, Others
	Total	285	
January - December	**General: Non-routine samples (Complaints, RAPEX etc); Some Method development work etc ongoing. Hydroquinone & Hg in Skin-Lightening Creams: testing ongoing; available by prior consultation with Laboratory. General and Labelling examination ongoing.**		

Appendix 8:

Public Analyst:	Mr. Rory Mannion
Deputy Public Analyst:	Vacant (Since Nov 2009)
Deputy Public Analyst:	Dr. Padraig Burke
Quality Manager:	Dr. Helena McGrath
Executive Analytical Chemists:	Ms. Sharon Crowe Dr. Michelle Cuffe Dr. Caroline Lardner Dr. Brenda Lennon Dr. Christopher Laffey Dr. Andrew Flanagan Dr. Leonie Wallace Dr. Declan Costello Dr. Katie Coyle Dr. Gayle Kealy
Chief Technician:	Vacant (Since Aug 2007)
Senior Laboratory Technicians:	Mr. John Creaven Mr. Martin Patten Ms. Mary Finan Ms. Patricia Thornton Ms. Eithne Clasby Ms. Elaine Goldrick Ms. Suzanne Davoren
Laboratory Technicians:	Ms. Cecily Gilmore Mr. Martin Gilligan Ms. Noelle Brennan Mr. Tom Fogarty Mr. Eric Costello Ms. Caitriona Greaney Ms. Sylvia O'Flynn Ms. Nora Madden Ms. Amanda McCarron Ms. Deirdre Muldoon Ms. Aileen Maughan Mr. Tommy Heneghan Ms. Mary Rabbitte Ms. Caroline Lupton Ms. Louise Mannion Ms. Hilary Hardy
Asst. Staff Officer:	Vacant (Since 2010)
Clerical Officers:	Ms. Eileen Mannion Mrs. Attracta Lohan Ms. Aine Mahoney Vacant position (Since Oct 2007)
Housekeeper:	Ms. Theola Busch
Student:	Ms. Leanne Kelly (Jan- June)

Glossary of Abbreviations

ADI	Acceptable Daily Intake
BfR	German Risk Assessment Authority
BIP	Border Inspection Posts
BOD	Biochemical Oxygen Demand
CAP	Centrally Authorised Products
COD	Chemical Oxygen Demand
CODEX	Codex Alimentarius Commission
COPHES	Consortium to Perform Human Bio-Monitoring on a European Scale
DAFM	Department of Agriculture, Food and the Marine
DOH	Department of Health
EA	European co-operation for Accreditation
EDEN	Environmental Data Exchange Network
EDQM	European Directorate for the Quality of Medicines and HealthCare
EFSA	European Food Safety Authority
EHO	Environmental Health Officer
EHS	Environmental Health Service
ELISA	Enzyme-linked immunosorbent assay
EPA	Environmental Protection Agency
EQUAS	External Quality Assurance Scheme
FSAI	Food Safety Authority of Ireland
FSLS	Food Safety Laboratory Service
HACCP	Hazard Analysis and Critical Control Point
HBM	Human Bio-Monitoring
HPLC	High Performance Liquid Chromatography
HSE	Health Service Executive
HVP	Hydrolysed Vegetable Protein
IARC	International Agency for Research on Cancer
ICIs	Inter-laboratory Comparison Investigations
ICP-MS	Inductively coupled plasma mass spectrometry
IMB	Irish Medicines Board
INAB	Irish National Accreditation Board
IR	Infra-Red
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
MJA	Mutual Joint Audit
MRP/DCP	Mutually Recognised Products/Decentralised Products
NCA	National Consumer Agency
NMR	Nuclear Magnetic Resonance
NRL	National Reference Laboratory
NSAI	National Standards Authority of Ireland
NTU	Nephelometric Turbidity Units
OCCL	Official Cosmetic Control Laboratories
OMCL	Official Medicines Control Laboratories
PAL	Public Analyst Laboratory
PCCC	Primary Continuing and Community Care
PEMSAC	Platform of European Market Surveillance Authorities for Cosmetics
PTS	Proficiency Testing Schemes
QA	Quality Assurance
RAPEX EU	Rapid Alert System for Non-Food Products
RASFF EU	Rapid Alert System for Food and Feed
*safe*food	*safe*food, The Food Safety Promotions Board
S.I.	Statutory Instrument
SOPs	Standard Operating Procedures
THMs	Trihalomethanes
UV	Ultra-violet
VOCs	Volatile Organic Compounds
VWA	Food and Consumer Product Safety Authority of The Netherlands
WHO	World Health Organisation
XRF	X-Ray Fluorescence

Notes: