safefood
Food Safety Promotion Board

Assessing the effectiveness of HACCP Implementation and Maintenance
in Food Production Plants on the Island of Ireland

safefood
Food Safety Promotion Board | **research**

Assessing the effectiveness of HACCP Implementation and Maintenance in Food Production Plants on the Island of Ireland

Table of Contents

Executive Summary

The primary objective of the study was to assess the effectiveness with which HACCP (Hazard Analysis Critical Control Point) has been implemented and maintained in food manufacturing plants in Northern Ireland and the Republic of Ireland.

Where inadequacies in implementation or maintenance of the HACCP system were highlighted the study sought to identify the contributory factors, with a view to making specific recommendations to overcome these limitations.

It should be noted that prior to HACCP many companies have been producing food without any food safety problems whatsoever. The main reason for HACCP is to adopt a systematic approach to food safety by anticipating possible hazards that might arise and ensuring that they are controlled effectively. Essentially it means that steps are being taken to reduce the possibility of something going wrong to the absolute minimum. Where weaknesses have been identified, further work will be needed if the lowest risk status is to be achieved.

The study is unique in that it involved an in-depth, two-day evaluation of HACCP on site. This approach has been extremely successful in providing a wealth of knowledge on the ways in which HACCP systems are being implemented at present.

The main results are summarised below:

- *There was no difference between companies in Northern Ireland and the Republic of Ireland in terms of HACCP implementation and maintenance.*

- *95% of companies had a formally documented food safety policy, which was generally well communicated to the staff.*

- *93% of companies had used a HACCP team to devise the plan and implement the system.*

- *In 95% of companies, the staff monitoring critical control points (CCPs) understood their role and their importance in the HACCP system.*

- *There was no real difference between the small to medium enterprises (SMEs) (<250 people) and the large corporations, except in management commitment and verification.*

- *16% of team leaders and 24% of team members did not have any formal training in HACCP.*

- *57% of companies had insufficient detail in the hazard analysis.*

- *20% of companies had not conducted hazard analysis on raw materials.*

- *25% of companies did not have an effective prerequisite programme (PRP).*

- *32% of companies did not have procedures for considering newly emerging hazards.*

- *48% did not have a verification schedule in place, and 23% of the verification auditors were not trained.*

- *Meat companies showed significantly higher scores for hazard analysis, HACCP control plan, implementation and total performance than the other industry sectors.*

- *Companies with British Retail Consortium (BRC) certification had significantly higher scores for verification and total performance than those with ISO 9000 only or no formal certification.*

It was concluded that shortage of technical expertise was a key factor contributing to many of the deficiencies observed. There are also limitations in the currently available HACCP training.

The following recommendations were made:

- *The results of this study should be widely disseminated to food companies, legislating authorities, enforcement agencies, educators, trainers, third party auditors and certification bodies.*

- *The syllabi for training courses should be up-dated. In particular, hazard analysis, verification and validation need to be covered in greater depth. There is a need for continuous professional development (CPD) for those who deliver HACCP training courses.*

- *Training programmes and inspection protocols for the enforcement authorities will need to be revised to take account of the results of this report.*

- *Third party Technical Standards, such as BRC and European Food Safety Inspection Service (EFSIS), relating to food safety/HACCP may need to be updated.*

1. Introduction

HACCP (Hazard Analysis Critical Control Point) is now well established as a food safety management system, which is capable of maintaining high standards of food safety in the production and distribution of food. The major thrust for HACCP development and implementation came from large manufacturers. By the late 1990s many larger food manufacturers/processors in developed countries in particular had established HACCP systems and HACCP has already become an important mandatory and voluntary trading standard in international food trade. This has been recognised by legislators and the use of HACCP will become mandatory in virtually all European food businesses if proposed EU legislation is ratified.

The primary objective of the study is to assess the effectiveness with which HACCP has been implemented and maintained in food manufacturing plants. Where HACCP has not been implemented and/or maintained effectively the study has attempted to identify the key constraints, with a view to making specific recommendations to overcome them, as pointers to improving the standard of food safety in the industry. The study, employing as it does, a two day in-depth evaluation of HACCP on site, is unique, and the outcome critically dependent on developing appropriate methodologies to benchmark HACCP across different industry sectors.

It is clear that the HACCP methodology is continually evolving. This is necessary and to be expected as it is developed to accommodate emerging hazards and new processing technologies. There has been the realisation that techniques to assess the effectiveness of HACCP must be defined in the HACCP plan. The different roles of Validation and Verification have been clarified [1] and the sequence of these activities clearly defined within the HACCP process [2]. In the same way the role of prerequisite programmes (PRPs) or good manufacturing practices has been acknowledged. Today it is accepted that PRPs are the essential foundation upon which HACCP must be based. Without this underpinning, HACCP is unlikely to succeed.

Motivation for implementing a HACCP system in a manufacturing operation may be prompted by regulatory requirements, customer pressure or commitment to self improvement. The move towards HACCP implementation in many manufacturing companies has been customer driven. This is very evident in companies that supply large retailers (supermarkets) where HACCP is a precondition of supply and whose contracts and specifications often require documented evidence of a HACCP system.

One of the most significant developments in the food industry over recent years has been the BRC Technical Standard and Protocol for Companies Supplying Retailer Branded Food Products [3]. Retailer branded products represent over 50% of all food sold in the UK, and the Standard was developed to assist retailers in their fulfilment of legal obligations and protection of the consumer, by providing a common base for the third party certification of companies supplying retailer branded food products. The BRC Standard requires a robust HACCP system, which is based on Codex Alimentarius principles [4].

This study has examined the impact of the BRC and other third party certification schemes (e.g. ISO 9000 series [5]) and attempted to assess the influence of the retailers' technologists in improving the standard of HACCP in their supplying companies. There is currently no internationally recognised standard for HACCP Certification, though national standards exist. The take up of I.S.343:2000 (The Irish Standard Specification for Food Safety Management incorporating Hazard Analysis and Critical Control Point (HACCP) [6]) was also considered.

HACCP based requirements were introduced into Northern Ireland (NI) and the Republic of Ireland (RoI) law through the implementation of a number of EU food hygiene directives. *Council Directive 93/43/EEC* on the hygiene of foodstuffs (transported into law in 1995 and 1998 in NI and RoI, respectively) requires a number of HACCP principles to be applied in food businesses. Vertical directives covering manufacturing units producing foods of animal origin, i.e. fish products, meat products, egg products and milk products are more specific, hence the NI and RoI regulatory requirements affect industry sectors to different degrees. The study covers meat and meat products, milk and milk products, beverages (soft and alcoholic drinks) and a miscellaneous category which includes cereals, fish, bakery, frozen vegetables and canned fruit.

The factors affecting the implementation and maintenance of HACCP are inextricably linked. This study also examined the effect of size (number of employees) and corporate structure, i.e. independent units or groups with several manufacturing sites. There have been very many texts, which considered the applicability of the HACCP system to SMEs, where it is felt that the full 1997 Codex HACCP system is too onerous in terms of technical skill and resources. Many SMEs find the process of hazard analysis extremely difficult and resort to the use of external consultants.

Effective training is essential for the successful implementation and maintenance of HACCP. There are currently no recognised international standards for HACCP training. The Royal Institute of Public Health (RIPH) and Chartered Institute of Environmental Health (CIEH) intermediate level certificates are becoming the choice of HACCP Team leaders in the UK. While in RoI a national training standard, outlining training outcomes ('Food Safety Skills for Management'), is available from the Food Safety Authority of Ireland. Training needs will differ throughout an organisation but it is essential that staff are motivated, and imperative that they develop the technical knowledge and expertise to implement HACCP. This study considers training at all levels in the organisation.

2. Methodology

This three year project commenced in December 2000 and was undertaken in four stages:

1. *Development of methodology/audit protocol*
2. *Selection of production sites and testing of methodology (Pilot studies)*
3. *Auditing of sites (Main study)*
4. *Analysis of data and site re-visits*

A Steering Group was established with representation from the Food Safety Promotion Board, Food Safety Authority of Ireland, The Irish Business and Employer's Confederation (IBEC), Northern Ireland Food and Drink Association (NIFDA) and Queen's University, Belfast. Regular meetings were held throughout the study to monitor progress.

2.1 Development of methodology/audit protocol

Whilst a number of studies have been undertaken using questionnaires to establish the status of HACCP in companies, a study of this type, involving an in-depth evaluation on site, has not been carried out before. An audit protocol was required to benchmark HACCP across the different industry sectors.

A system of HACCP auditing has been developed by Verner Wheelock Associates Ltd and adopted successfully by a number of environmental health officers and retailer technologists. The protocol was revised and extended to include seven key criteria for assessment, which could be used across all industry sectors:

Management Commitment
HACCP Team
Hazard Analysis
The HACCP Control Plan
Implementation
Verification
Maintenance

Documentation was designed to support the protocol. This included an introductory letter to participating companies, a pre-visit questionnaire (Annex 1) and an audit checklist (Annex II) to be used during the interviews with staff on site, which could include Senior Managers, the HACCP team and team leader, CCP monitors and their supervisors and other production staff. A scoring system was developed, which recognised the importance of hazard analysis in the HACCP system.

Auditors were selected carefully and limited to four in total. All were qualified HACCP specialists, and the emphasis was placed on practical experience of HACCP in manufacturing. To regulate consistency of auditor approach, a number of measures were taken. These included:

Provision of training and regular liaison with auditors
Joint (shadow) audits
Vetting of all reports by Project Manager

2.2 Selection of production sites and testing of methodology

Considerable difficulty was experienced in recruiting companies for the study and hence random selection was not possible. Product categories were as follows:

Dairy – Milk and Milk products
Meat – Meat and Meat products
Beverages – Soft and Alcoholic drinks
Miscellaneous – Cereals, fish, bakery, frozen vegetables, canned fruit

The number of companies in each category is shown in Table 1.

Table 1. Category of sites selected for study

Category	Pilot Study		Main Study		Total
	NI	ROI	NI	ROI	
Dairy	0	0	5	8	13
Meat	1	1	8	6	16
Beverages	0	0	2	4	6
Miscellaneous	1	1	7	4	13
Total	2	2	22	22	48

In order to maintain confidentiality, production sites were assigned a code and no reference has been made to product ranges manufactured on site.

In June 2001, four pilot studies were undertaken, two in Northern Ireland and two in the Republic of Ireland. The studies were designed to test the methodology and assess the level of auditor consistency. Two auditors were used for the pilot study. The results from the pilot study (Table 2) were analysed and as a result, the documentation was reviewed and a number of amendments were made to the questions on the checklist and the scoring system.

Table 2. Pilot studies - % scores for key criteria and total performance

	Company Characteristics					% Score							
Code	Location	Category	Number of Employees	Formal Certification	Management Commitment	HACCP Team	HACCP	HACCP Control Plan	Implementation	Verification	Maintenance	Total Performance
P01	ROI	Misc	>250	ISO 9002	0	90	20	50	83	50	50	57
P02	ROI	Meat	51-250	BRC	0	90	56	83	50	60	67	65
P03	NI	Meat	<51	None	67	0	20	50	33	0	17	29
P04	NI	Misc	>250	BRC	67	10	30	86	33	0	17	35

2.3 Auditing of sites (Main study)

44 site evaluations were undertaken from November 2001 to June 2003 following a defined, two-day audit programme, which included:

Opening meeting
Assessment of pre-visit questionnaire
Site evaluation, including audits of CCPs
Review of documentation
Interviews with site personnel
Completion of checklist
Closing meeting

A report was provided to each site with recommendations for HACCP improvement.

2.4 Analysis of data and site re-visits

The 44 companies were categorised in order to assess factors that may affect the implementation of HACCP. These characteristics are shown in Table 3.

Table 3. Main study – characteristics of companies (n=44)

Characteristics	Location		Corporate Structure* (Group or Independent)		Size (Number of Employees)			Retailer Brand Products		BRC Risk Rating** (High or Low)		Formal Certification			
	NI	ROI	G	I	<51	51-250	>250	Y	N	H	L	BRC	ISO 9000	None	BRC + ISO 9000
No. of units	22	22	29	15	11	22	11	22	22	27	17	18	12	6	8

* Group or Independent
**BRC risk rating – (High or Low)

Equal representation was obtained in Northern Ireland and the Republic of Ireland.

Companies with more than one manufacturing unit have been classed as Groups, single units as Independents. Three groups have more than one site represented in the study.

Criteria for classification of small and medium sized enterprises (SMEs) usually include number of employees, turnover and profit level. Size of company has been based on number of employees, as financial information was not readily available. 33 (75%) of the companies surveyed had less than 250 employees and hence may be considered as SMEs. The other 11 companies employed between 260 and 1200 staff.

50% of the companies supplied the multiple retailers with Retailer Branded product. 2 of the remaining companies supplied directly to factories supplying companies producing Retailer Brand.

A product category risk rating was assigned to the company, based on the BRC classification, rating 1 and rating 2 [3], where rating 2 is the higher risk.

Formal certification by third party certification bodies was established. Companies were assigned to the following groups:

BRC only
ISO 9000 only
BRC plus ISO 9000
No formal certification
IS343

No companies were certificated to IS343. BRC included third party certification body standards e.g. EFSIS and Checkmate International (CMi).

Initial analysis of the scores showed some difference between the various auditors used in the survey. The raw scores were adjusted for these auditor effects and then subject to analysis of variance to test for statistical differences between various factors categorising the food companies surveyed. These factors included Location (NI v ROI), Category (Meat v Dairy v Beverage v Miscellaneous), Corporate Structure (Group v Independent), Size of company (<51 v 51-250 v >250 employees), Certification Type (BRC v BRC+ISO9000 v ISO9000 v none), Retailer Branded Product (Yes v No) and Risk Rating (Rating 1 v Rating 2). All analyses were carried out using the Genstat statistical package.

To establish any time effect during the study, total scores were compared from the periods November 2001 to June 2002 and from July 2002 to June 2003. The increase in total score was significant ($p < 0.001$). As a result, re-visits were scheduled to six of the manufacturing sites. Factors considered in the selection included date of original audit, location, formal certification and total score. The first visits were undertaken between November 2001 and March 2002. Re-visits took place in August and September 2003. There was a time interval of 18 to 22 months between the two visits.

3. *Main Study*

3.1 Results

3.1.1 Summary
The results of the audits carried out on 44 manufacturing plants from November 2001 to June 2003 are shown in Table 4. Results for the seven key criteria and total performance are expressed as percentages. Figures have been adjusted for auditor effect.

Table 4. Main Study – Summary of % Scores, with company attributes (n=44)

Code	Location	Category	Audit Date	Size (employees)	* Corporate Structure	** Formal Certification	Retailer Brands	BRC Risk Rating	Management Commitm	HACCP Team	Hazard Analysis	The HACCP Control Plan	Implementation	Verification	Maintenance	Total Performance
MS01	NI	dairy	4/03	51-250	G	Y	N	2	63	100	65	44	75	91	53	68
MS03	ROI	misc	1/02	<51	I	N	N	2	83	88	55	63	86	73	72	72
MS06	ROI	misc	11/01	51-250	G	Y	Y	1	33	23	19	30	70	33	22	32
MS07	ROI	meat	1/03	51-250	G	Y	Y	2	76	90	76	80	90	79	79	81
MS08	ROI	meat	11/01	51-250	G	Y	Y	1	93	88	75	83	93	83	76	83
MS10	NI	bevs	3/02	<51	I	Y	N	1	36	65	41	54	65	54	46	50
MS11	NI	misc	1/02	<51	I	N	N	2	36	55	15	44	38	14	30	30
MS12	NI	meat	4/02	>250	G	Y	Y	2	76	50	37	87	88	81	46	65
MS13	NI	meat	3/02	51-250	I	Y	N	2	36	55	65	90	71	31	46	57
MS14	NI	meat	2/03	51-250	I	Y	Y	2	73	85	73	87	71	74	53	73
MS15	NI	misc	1/02	<51	I	N	N	2	73	35	15	44	88	21	30	41
MS16	NI	misc	3/03	>250	G	Y	Y	1	96	100	81	70	95	97	100	90
MS17	NI	meat	11/02	>250	I	Y	Y	2	65	67	40	57	69	47	56	55
MS18	NI	meat	9/02	51-250	G	Y	N	1	75	82	62	64	79	57	66	68
MS19	NI	misc	8/02	51-250	G	Y	Y	1	73	75	65	54	38	47	53	58
MS20	ROI	misc	1/03	>250	G	Y	Y	1	83	73	67	63	70	80	89	74
MS22	ROI	bevs	1/02	51-250	G	Y	N	1	50	33	41	53	70	10	6	38
MS23	ROI	misc	12/01	51-250	I	N	N	1	83	88	41	43	36	33	12	46
MS24	ROI	meat	3/03	51-250	G	Y	N	1	80	88	85	70	70	87	92	82
MS26	ROI	bevs	1/03	51-250	G	Y	N	1	46	45	34	40	67	69	53	49
MS28	ROI	bevs	4/03	>250	G	Y	N	1	76	70	72	63	57	63	43	64
MS29	NI	bevs	5/03	51-250	G	Y	N	1	97	100	74	73	80	30	50	71
MS30	NI	meat	4/03	>250	G	Y	Y	2	96	100	100	87	91	100	100	100
MS31	NI	meat	10/02	>250	G	Y	Y	2	75	67	74	70	69	77	56	70
MS32	ROI	meat	2/03	>250	G	Y	Y	2	86	88	87	86	70	87	89	85
MS33	NI	misc	4/02	>250	G	Y	Y	2	76	40	53	54	55	81	46	58
MS34	ROI	dairy	11/02	51-250	G	Y	Y	2	70	88	55	83	93	33	39	64
MS35	NI	meat	4/02	51-250	G	Y	Y	2	96	55	69	37	85	54	63	66
MS36	ROI	bevs	8/02	51-250	G	Y	N	1	70	68	55	46	93	87	89	71
MS37	NI	dairy	2/03	51-250	G	Y	N	2	80	88	75	96	70	83	86	82
MS38	ROI	dairy	5/03	<51	G	Y	N	2	76	90	70	70	64	23	33	60
MS39	ROI	dairy	11/02	51-250	I	Y	Y	2	56	65	24	46	50	19	36	40
MS42	ROI	dairy	11/02	<51	I	Y	N	2	83	75	36	63	90	76	69	67
MS43	NI	misc	3/03	<51	I	Y	N	1	83	80	50	63	80	69	59	67
MS44	ROI	dairy	11/02	<51	I	Y	N	2	83	80	70	56	84	63	69	72
MS45	ROI	dairy	3/03	<51	G	Y	Y	2	73	70	70	76	84	69	56	71
MS46	ROI	dairy	6/03	>250	G	Y	Y	2	83	65	26	60	77	89	49	61
MS48	NI	dairy	5/03	<51	I	N	Y	2	63	75	82	63	77	73	76	73
MS49	ROI	dairy	2/03	51-250	G	Y	N	2	50	53	41	46	46	33	36	43
MS50	ROI	meat	5/03	>250	G	Y	N	1	79	85	72	80	77	59	66	73
MS51	NI	dairy	3/03	51-250	I	Y	N	2	69	60	56	63	84	46	69	63
MS52	ROI	meat	5/03	51-250	G	Y	Y	1	86	75	80	80	90	76	66	79
MS53	NI	misc	5/03	<51	I	N	Y	2	63	70	58	66	47	26	46	53
MS54	NI	dairy	6/03	51-250	G	Y	Y	2	53	55	54	46	40	59	69	54

* Corporate Structure: G = Group, I = Independent
** Formal Certification includes BRC, ISO 9000 and BRC + ISO 9000

The distribution of percentage scores is plotted in Figures 1-8 for the seven key criteria and total performance.

Figures 1 – 8: Distribution of scores (%) for key criteria and total performance (n=44)
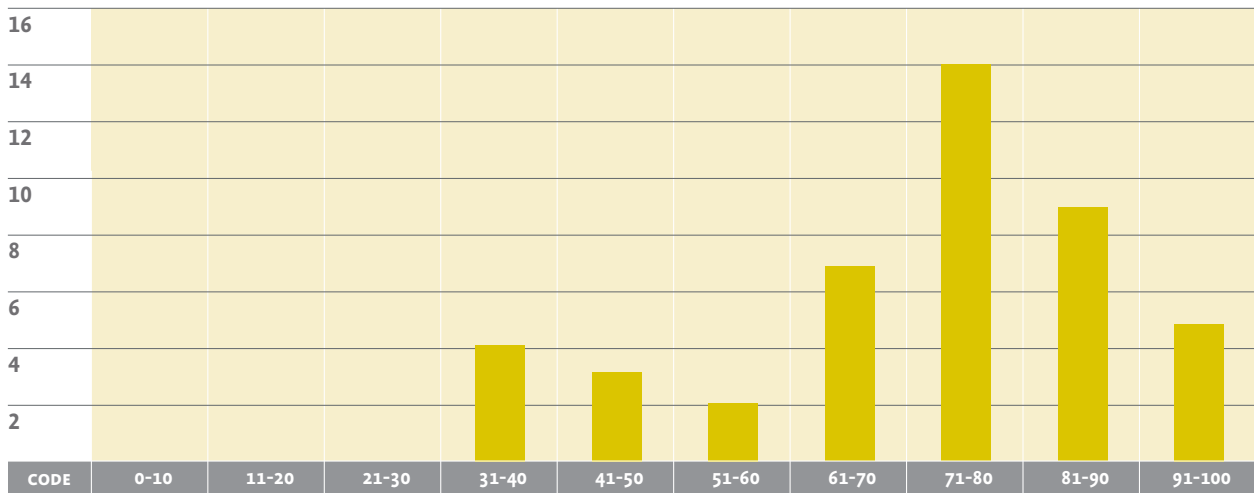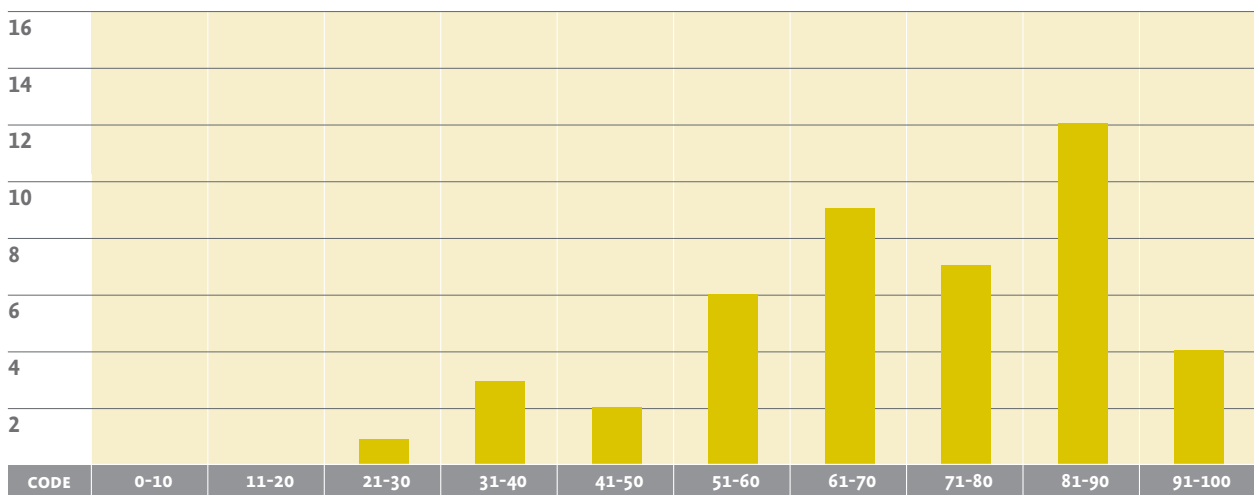
Fig 1: Management Commitment
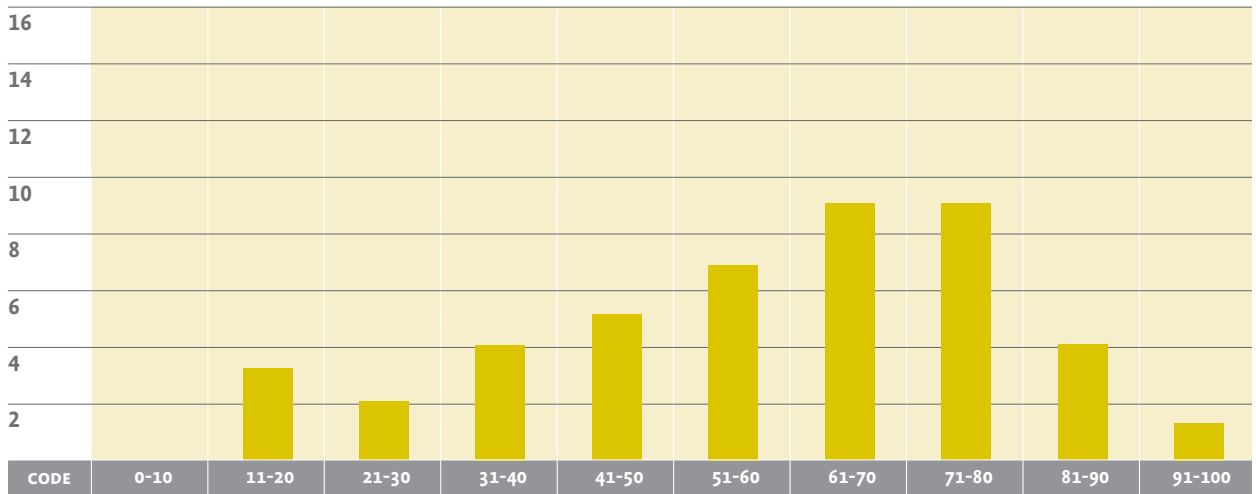

Fig 2: HACCP Team

Fig 3: Hazard Analysis
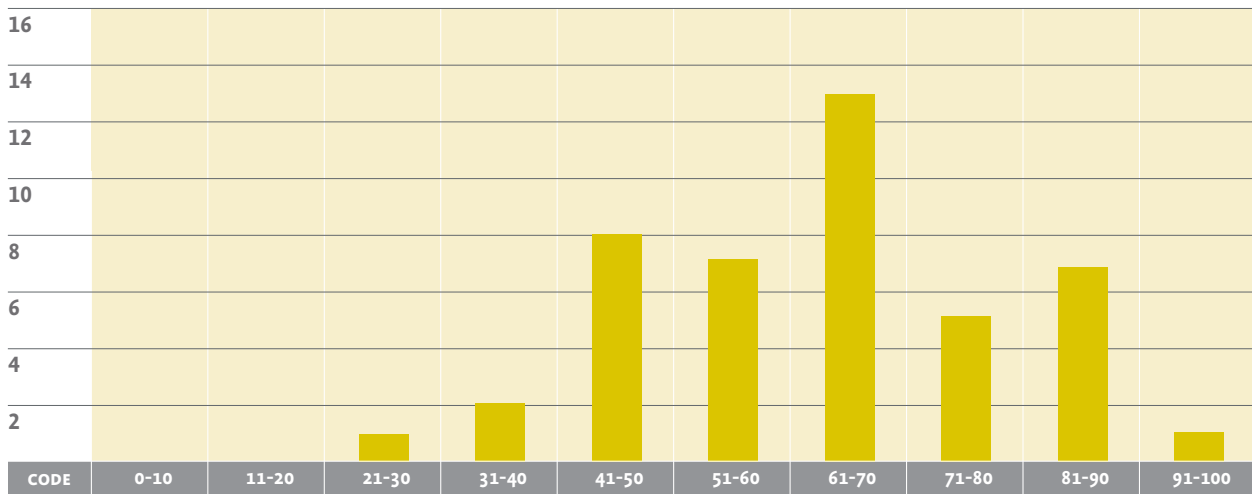
| CODE | 0-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |

Fig 4: The HACCP Control Plan

| CODE | 0-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |

Fig 5: Implementation

SCORE %	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

Fig 6: Verification

SCORE %	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

Fig 7: Maintenance

SCORE %	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Count	1	1	3.5	4.5	8.5	8.5	8.5	4.5	4.5	3.5

Fig 8: Total Performance

SCORE %	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Count			1.5	3.5	5.5	7.5	11.5	10.5	5.5	2.5
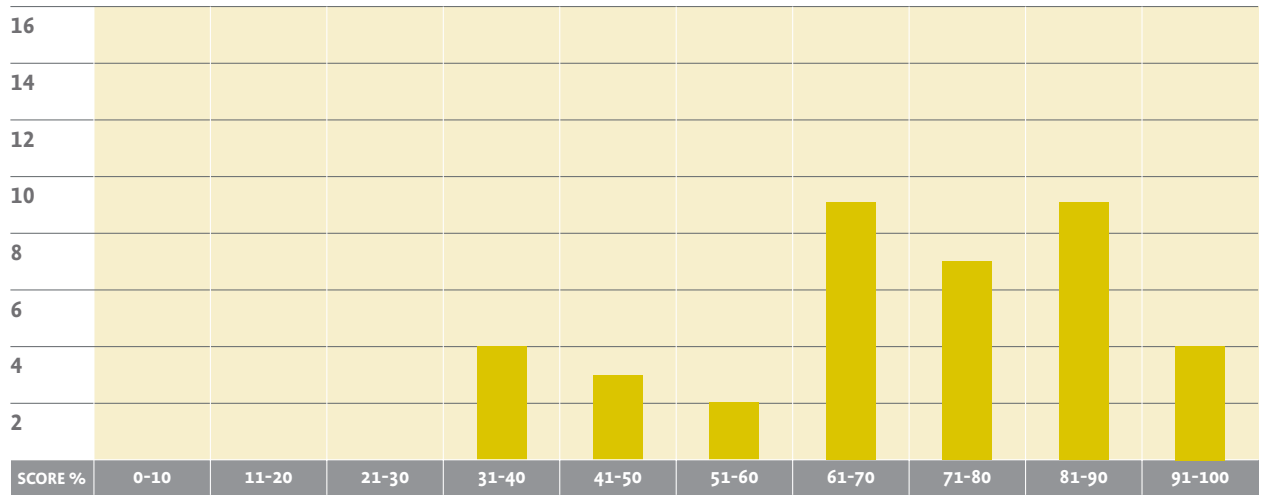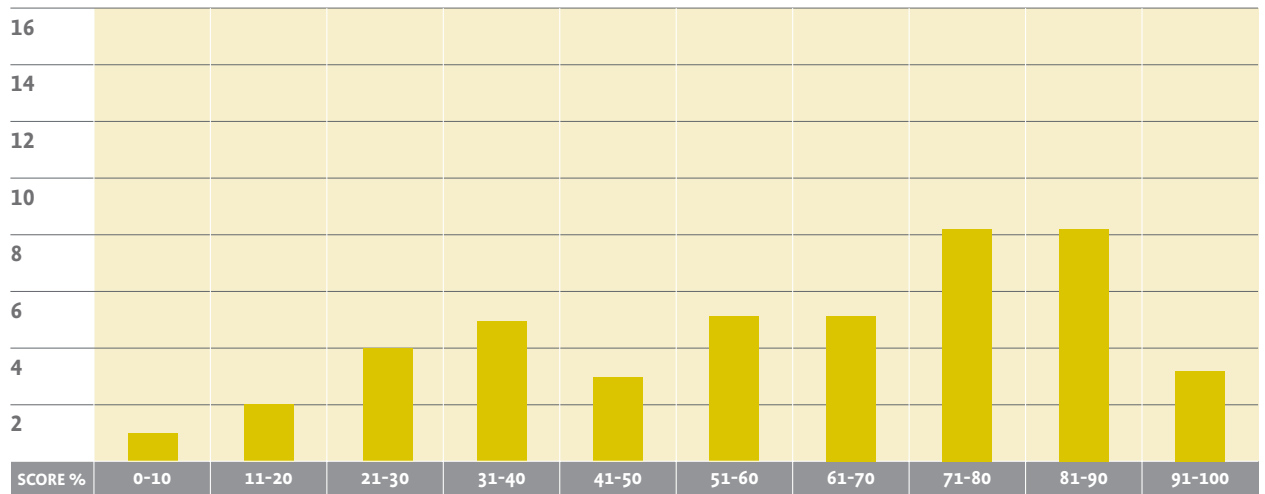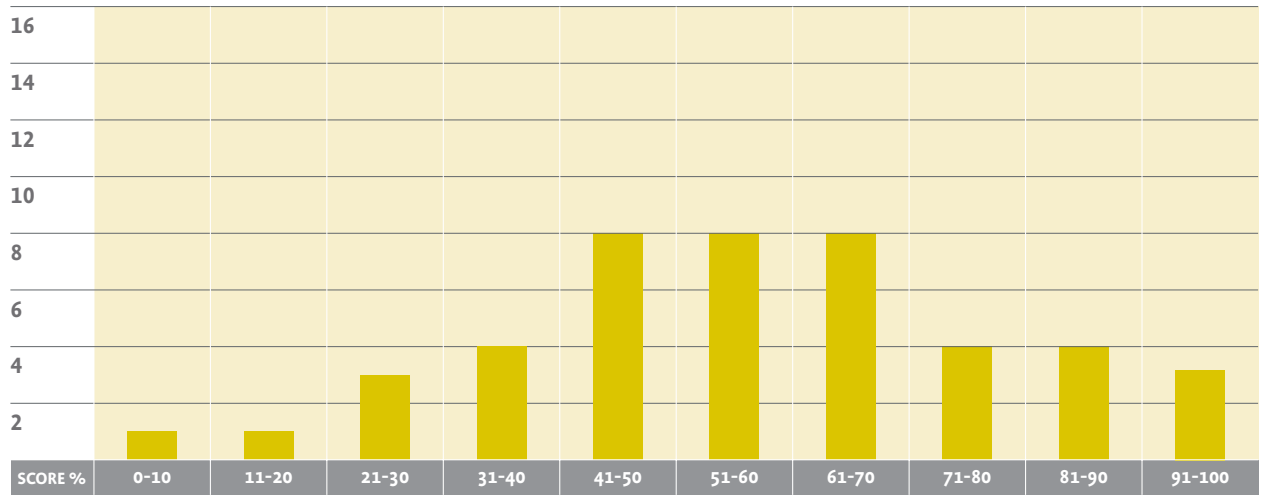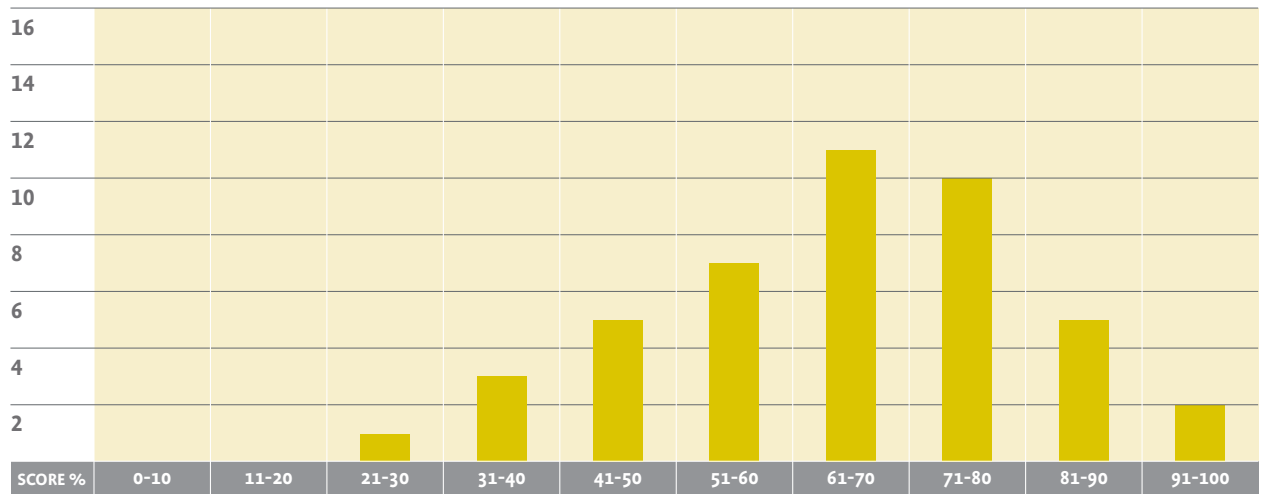
Mean scores (%) for the seven key criteria are plotted in Figure 9.

Figure 9: Mean Scores (%) Key Criteria
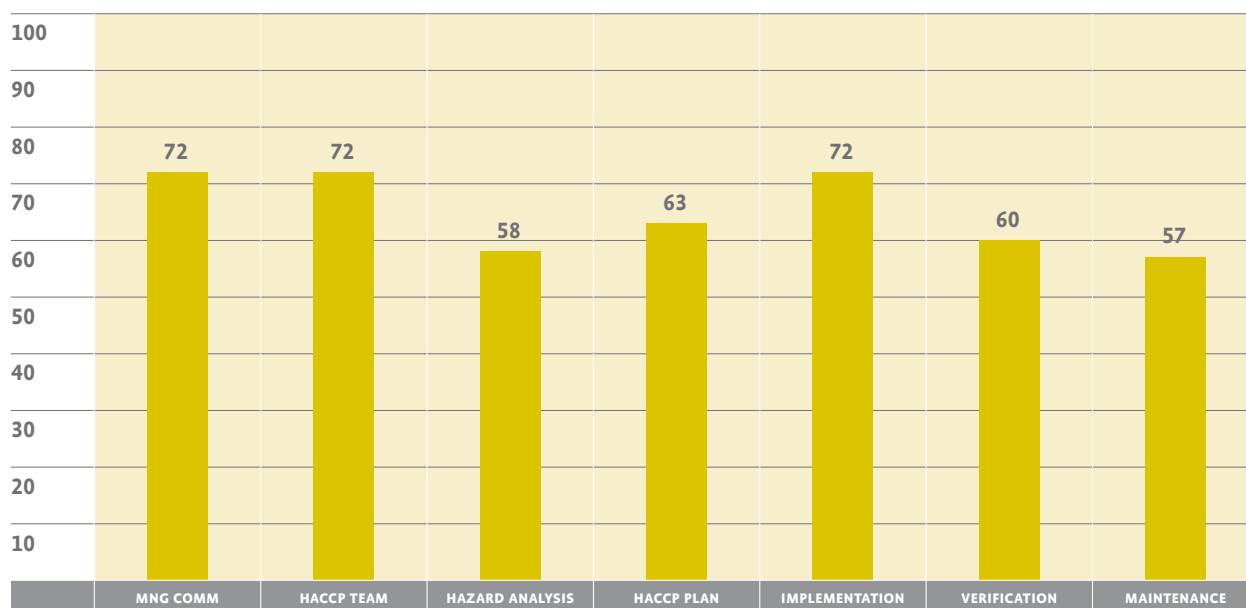
Hazard analysis, verification and maintenance, with means of 58, 60 and 57 respectively, are lower than the other key criteria.

Table 5 shows the range of percentages for each of the key criteria and total performance. Companies are graded as poor (<40%), average (40% - 80%) and good (>80%).

Table 5. Main Study – Grading of companies on key criteria and total performance

Key Criteria	Mean (%)	Range (%)	Poor (Score <40%)	Average (Score 40%-80%)	Good (Score >80%)
Management Commitment	72	33-97	4	26	14
HACCP Team	72	23-100	3	25	16
Hazard Analysis	58	15-100	8	31	5
The HACCP Control Plan	63	30-96	2	34	8
Implementation	72	36-95	3	26	15
Verification	60	10-97	12	21	11
Maintenance	57	6-100	10	27	7
Total performance	64	30-94	3	34	7

3.1.2 Key Criteria
The audit checklists and interview questions were analysed for each of the seven key criteria.

Management Commitment

(i) Only 2 of the companies (5%) did not have a formally documented food safety policy. Where the policy was in place, this was generally well communicated to staff, through training, display on notice boards and induction. Only 3 companies (7%) had not communicated the policy to staff.

(ii) Specific food safety budgets were designated in only 11 (25%) of the companies.

(iii) 10 of the companies (23%) had used external consultants, with varying degrees of success. 5 of these companies had not trained the HACCP team members.

The HACCP Team

(i) Only 3 of the companies (7%) had not used a team approach. Only one of the HACCP teams was not multi-disciplinary.

(ii) HACCP training was assessed at several levels in the organisation.

In only 3 of the companies (7%) were senior managers not able to explain how HACCP works.

The HACCP team leader had been formally trained in 35 of the companies (79%).

The nature of the HACCP training was examined. Table 6 shows the type of HACCP training provided for the team leader.

Table 6. Type of HACCP training provided to the HACCP team leader (n = 41)

Training	No formal training	2/3 day RIPH Intermediate Certificate	CIEH HACCP in Practice	Other training courses
No.	8	20	5	8

8 of the team leaders had not received any formal training. 25 of the team leaders had received CIEH or RIPH intermediate level training in the Application of HACCP Principles. Two of these had gone on to take the three/four day RIPH Advanced Certificate in Applied HACCP Principles.

Other members of the HACCP team did not have the same degree of training as the team leader. Table 7 shows the type of training provided for the HACCP team members.

Table 7. Type of training provided to HACCP teams (n = 41)

No formal training	In-house training	External training courses
10	16	15

Of the 41 companies with HACCP teams, 10 (24%) had not received any formal training. 16 companies had provided in house training that ranged from "briefings" to half-day awareness courses. External training courses included the CIEH and RIPH intermediate level HACCP courses. Some or all of the team leaders had been trained to this level.

(iii)   In 15 of the companies (34%) the HACCP team does not meet on a regular basis.

(iv)   Team meetings were minuted by 24 of the companies (55%).

(v)   14 of the HACCP teams (34%) did not review failures in the HACCP system.

Hazard Analysis

(i)   Process flow diagrams were found to be correct in 36 companies (82%). Where inaccuracies were found, the steps commonly omitted were water (14%) and re-work (36%).

The Process flow diagram had been validated in 80% of the companies.

(ii)   The hazard analysis contained insufficient detail in 25 cases (57%). 20% of companies had not carried out hazard analysis on raw materials. 12 of the 25 companies with inadequate hazard analysis had trained both the HACCP team leader and the team members.

(iii)   Prerequisite programmes had not been identified or put in place in 11 of the companies (25%). 30 (68%) of the companies had used the Codex decision tree in establishing CCPs. Of the 30 companies using the decision tree, 6 of these (20%) could not demonstrate that they had used it correctly. Of the 20 companies who had either not used the decision tree or not used it correctly, 12 (60%) of the team leaders had been formally trained in HACCP.

(iv)   The correct CCPs had not been identified in 9 companies (20%), five of which were categorised as BRC Risk Rating 2.

HACCP Plan

(i)   Only 1 company had failed to include all the products and processes within the HACCP plan, however 15 of the company plans (34%) did not contain sufficient detail.

(ii)   Codex terminology was generally well used with 7 (16%) companies who could not demonstrate understanding of the terms.

(iii)   Critical limits were accurate and justifiable in 37 of the companies (84%). Target levels were set and used in only 49% of the companies.

(iv)   Monitoring procedures were capable of detecting loss of control in 34 companies (77%). Only 11% of companies had inappropriate monitoring frequencies, but responsibility for monitoring was not defined in 11 companies (25%).

(v)   Corrective action procedures are not well defined, to cover all action levels, in 24 companies (55%). These procedures do not designate responsibility for corrective action in 14 companies (32%).

Implementation

(i)   A formal implementation plan was used in only 21 companies (48%) but 39 (87%) companies reported that the HACCP plan was implemented without problems.

(ii)   Evidence of HACCP was available on the factory floor in 31 companies (70%), in the form of notices and CCP highlighted records.

(iii)   Critical limits set for CCPs were achieved in 33 companies (75%).

(iv)   38 companies (86%) complied with monitoring procedures.

(v)   Relevant monitoring equipment was calibrated in 38 factories (86%).

(vi)   Corrective actions were always in place in 86% of companies, with 93% recording actions correctly.

(vii)   Staff monitoring CCPs understood their role and their importance to the HACCP system in 42 companies (95%).

Verification

(i)   Only 21 companies (48%) had a formal schedule of verification in place.

         Table 8 shows the size of the company and the number with formal verification schedules.

         Only 1 of the companies with >250 employees did not have a formalised verification system.

Table 8. Size of company and number of companies with verification schedules

Size	No of Companies	Verification schedule in place
<51	11	8 (73%)
51-250	22	12 (55%)
>250	11	10 (91%)

(ii)   Verification activities were documented in 37 companies (89%).

(iii)   Auditor training and independence were examined. The results are shown in Table 9.

Table 9. Assessment of auditor competence and independence (n = 44)

Auditor Assessment	Auditor training provided		Auditors independent of area		Auditors from >1 discipline involved	
	Y	N	Y	N	Y	N
No. of Companies	34	10	27	17	14	30
	(77%)	(23%)	(61%)	(39%)	(32%)	(68%)

10 companies (23%) were using untrained auditors for verification activities.

Auditors were not independent of the area being assessed in 17 companies (39%). The majority of the auditors undertaking HACCP verification were from the technical department. 30 companies (68%) did not use auditors from more than one discipline.

(iv)   Trend analysis (as a part of the verification process) was carried out by 40 companies (91%). Data and trend analysis included consumer complaints, non-conformances, microbiological testing, swab results and Key Performance Indicators (KPIs).

(v)   Senior managers in 9 of the companies (20%) did not appreciate the significance of verification activities.

Maintenance

(i)   Only 33 (75%) of companies maintain a record of changes to the HACCP system and in 6 companies (14%) there was no evidence that changes had been communicated to staff.

(ii)   14 of the companies (32%) do not have procedures in place for considering newly emerging hazards and building them into the plan.

(iii)   22 of the companies (50%) have included quality, legality or welfare in the HACCP plan.

3.1.3 Company Categorisation
Analysis was carried out at a 5% significance level and the following points identified:

(i)   There was no difference between companies in Northern Ireland and the Republic of Ireland.

(ii)   Companies with >250 employees on site had significantly higher scores for management commitment and verification.

(iii)   Companies, with more than 1 manufacturing unit, i.e. groups, had significantly higher scores than independent companies for hazard analysis, verification and total performance.

(iv)   Meat companies showed significantly higher scores for hazard analysis, HACCP control plan, implementation and total performance than the other industry sectors.

(v)   Companies with BRC certification had significantly higher scores for verification and total performance than those with ISO 9000 only or no formal certification.

(vi)   There was no significant difference identified for those companies producing retailer branded product.

(vii)   No significant differences were observed for companies with different risk ratings.

3.2 Discussion

3.2.1. Overview
This study provides information on the current Standards of HACCP in a sample of food manufacturing companies in both Northern Ireland and the Republic of Ireland. The majority of manufacturing companies surveyed have HACCP systems in place, which are average or good, but it is of concern that 3 (7%) were graded as poor and one of these was assigned a BRC 2 Rating, which places it in a high risk category.

The project extended over 3 years, with the audits for the main study undertaken during the period November 2001 to July 2003. There was evidence of ongoing improvement during the study.

3.2.2. Weaknesses in the HACCP system
3 weaknesses have been identified in the HACCP systems employed, i.e. hazard analysis, verification and maintenance.

Hazard analysis
8 (18%) of the companies were graded poor, 31 (70%) average and 5 (11%) good in respect of hazard analysis. Inadequacies in this element of the HACCP system were (percentage figures in parentheses refer to the proportion of companies involved):

- *Incorrect flow diagrams, often with missing process steps (18%).*

- *No validation of the process flow diagram (20%).*

- *Insufficient detail (57%), e.g. 20% had not carried out hazard analysis on raw materials.*

- *Failure to identify or put in place prerequisite programmes (25%).*

- *Failure to use Codex decision tree (32%).*

- *Incorrect use of the Codex decision tree (20% of those who had used it).*

- *Incorrect CCPs identified (20%) half of these were categorised as BRC Rating 2.*

Hazard analysis is probably the most difficult element to carry out correctly. Training in HACCP principles and techniques will not equip the HACCP team to carry out hazard analysis effectively unless they have the technical expertise and a proper understanding of microbiological and chemical hazards. The physical hazards are more easily understood and generally easier to manage. Due regard must be given to any relevant industry guidance or published information in identifying hazards, but again this relies on the underlying technical knowledge of the team.

Experience has shown that the most successful implementation of HACCP is done within an environment of well-managed PRPs. PRPs screen out the general hazards, allowing the company to focus on the significant hazards. This screening process generally results in a reduction in the number of CCPs and reduces the confusion of staff.

Verification
Verification should provide confirmation of the effectiveness of the HACCP system to ensure that the company continues to conform to the plan. 12 (27%) companies were graded poor, 21 (48%) average and 11 (25%) good in terms of verification.

The following issues were identified:

- *Fewer than half had a formal schedule in place (48%).*

- *HACCP audits were carried out but untrained auditors were being used (23%).*

- *Auditors were not independent of the area being assessed (39%).*

- *Data/trend analysis was carried out to some extent (91%).*

- *Senior managers did not appreciate the significance of verification (20%).*

Verification processes should contribute to improvement in HACCP performance. In order to do this it is essential that the verification process is incorporated in the HACCP plan and the frequency of verification activities (audit, data/trend analysis, sampling and testing) clearly defined. HACCP is a long-term commitment and the HACCP plan must be verified on a regular, planned basis to ensure that it remains appropriate.

Verification activities must be undertaken by trained personnel with both auditing skills and knowledge of HACCP. Verification reports must be evaluated by personnel who have the necessary skills and technical knowledge to assess and interpret results. It is essential that auditors do not assess HACCP systems that they have also helped to design or implement.

Management must ensure that actions arising from verification activities are carried out. Failures of the system e.g. monitoring or corrective actions not undertaken, can be addressed through regular verification activity.

Maintenance
Maintenance of the HACCP plans, i.e. keeping the HACCP system up to date was poor in 10 (23%) of the companies surveyed. 27 (61%) were graded average and 7 (16%) good. Manufacturing units are dynamic operations and products, processes and equipment are likely to change with time. There have been a number of food safety incidents that have resulted from a process change that has not been considered in the HACCP plan. To remain effective, HACCP plans must be continually renewed and updated. The following points were identified in the study:

- *32% did not have procedures in place for considering newly emerging hazards and building them into the plan.*

- *25% did not maintain a record of changes to the HACCP system. 14% could not provide evidence that changes had been communicated to staff.*

A system of management for the maintenance of the HACCP system is essential. Data from reviews must be documented and form part of the HACCP record keeping system.

3.2.3. Findings – other key criteria

Management Commitment
Management commitment is rightly cited as an essential requisite for implementation of HACCP. In practice this is extremely difficult for an auditor to assess and objective evidence of such commitment must be sought in terms of the budget and resources allocated to the HACCP system, the communication of the food safety policy to the staff and the awareness and involvement of senior managers.

Only 4 (9%) of the companies were graded poor in this area. 26 (59%) were graded average, 14 (32%) good. Most (95%) had a documented food safety policy (although this was incorporated within the quality statement in a number of cases) and the policy had been well communicated to staff.

No company reported inadequate funding for food safety systems although specific food safety budgets were designated in only 25% of companies. Money for food safety was generally made available from technical or training department budgets.

23 percent of the companies had used consultants. This was not restricted to the smaller companies; hence it was evident that the skills shortage was not limited to these units. Where consultants were used, there was considerable variation in results. (The study did not consider the extent of involvement or stage at which they were used.)

Ownership is an important part of any HACCP system and a company using consultants may lose sight of this and also overlook the need for HACCP training at management level. Half of the companies using consultants had not trained their HACCP team members.

HACCP Team
3 of the companies were graded poor (7%), 25 (57%) average and 16 (36%) good. The appointment of a HACCP team and team leader is generally the starting point of a HACCP study. There is general agreement that HACCP is best done with a multi-functional team with a knowledge base that covers the whole of the operation. This concept appeared to be well understood, and only 3 (7%) of the companies had not used a team approach. Only one of the HACCP teams was not multi disciplinary and generally teams had considerable knowledge, experience and expertise of their industry.

These team skills are essential for the development of the HACCP system. Training of the HACCP team leader and team members in the application of HACCP principles is also essential for both the development and the implementation of the system. 16% of the team leaders and 24% of the teams' members had not received formal training.

It is vital that the team is maintained, especially once the HACCP plan has been developed. In 34% of the companies, the HACCP team did not meet on a regular basis and 34% of the HACCP teams did not review failures in the HACCP system. The smaller the SME, generally the more difficult it is to release staff to attend meetings, however, there was no difference between the small and larger companies in maintaining the team meetings.

The HACCP Control Plan
2 (5%) of the companies were graded as poor, 34 (77%) average and 8 (18%) good. The majority of HACCP plans included all the products and processes but 34% of companies did not include sufficient detail. There is clearly confusion about what companies should include in the HACCP plan. Monitoring procedures were generally well written and capable of detecting loss of control in 77% of companies. On the other hand corrective action procedures were not well defined in 55% of companies.

Implementation
3 (7%) of the companies were graded poor, 26 (59%) average and 15 (34%) good. There are difficulties in comparing implementation in companies, as some systems are relatively new, others have been reviewed several times, others only recently implemented for the first time. 1 company was in the middle of a major review during the audit.

There were a number of positive indications of successful implementation. There was evidence that staff monitoring CCPs had been well trained and clearly understood their role in 42 companies (95%). 86% of companies were complying with the monitoring procedures. The equipment used for monitoring was calibrated in 86% of the companies.

3.2.4 Factors affecting HACCP performance

Size of Company (No. of employees)
In many texts SMEs are described as having limited technical expertise, staff, time and resources, and hence may find the implementation of HACCP extremely difficult.

Whilst companies with >250 employees on site scored significantly higher in terms of management commitment and verification, differences in other key criteria were not significant.

Corporate structure
In many cases manufacturing units that are part of a group are in the fortunate position of having a highly qualified, experienced, corporate technical team to assist in the development, implementation and maintenance of HACCP.

In the study, groups had significantly higher scores than single, independent manufacturing units in terms of hazard analysis, verification and total performance. This supports the view that for successful HACCP implementation, considerable technical expertise is an advantage.

Food product category
The meat companies showed significantly higher scores for hazard analysis, HACCP control plan, implementation and total performance than the other industry sectors surveyed.

The study has not considered the role of the enforcement authorities or their contribution to the company HACCP systems but the higher scores may be due in some part to legislation and the involvement of the regulatory authorities. The involvement of Veterinary Inspectors in the operation and increased inspection and testing may be a contributory factor.

Third party certification
Certification by third party bodies to Standards, such as the BRC Technical Standard for Companies Supplying Retailer Branded Food Products and ISO 9000, would be expected to improve company performance. Both Standards require a documented and effective quality management system and are based on a philosophy of continual improvement. In addition the BRC Standard requires the adoption and implementation of HACCP based on Codex Alimentarius HACCP principles. Specific clauses detail the need e.g. for a multi-disciplinary team, demonstration of competence, adequate training and experience of team members and the regular and appropriate review of the HACCP system.

Companies with BRC certification (including EFSIS and CMi) had significantly higher scores for verification and total performance than those with ISO 9000 only or no formal certification.

BRC Third Party auditors are required to have a minimum standard of HACCP training. Whilst HACCP is only one element of the BRC Standard and the HACCP system will not be evaluated in the same depth as a full HACCP audit, these evaluators are important in highlighting the need to review and strengthen the system.

It was expected that a number of companies might have been working towards the attainment of I.S. 343, the Irish Standard Specification for Food Safety Management incorporating Hazard Analysis and Critical Control Point (HACCP). This has not been the case and may reflect the increase in companies seeking to attain BRC certification.

Training

Effective implementation of the HACCP plan relies upon the adequate training of personnel at all levels in the operation. The study has examined training in terms of HACCP and auditor skills and assessed competence and provision of appropriate training for senior management, the HACCP team and team leader, CCP monitors and their supervisors and other production staff.

Many of the inadequacies/weaknesses identified in terms of hazard analysis, the use of PRPs and corrective action procedures were, however, in companies where the HACCP team had been trained.

It is clear that much of the knowledge and skill required for successful HACCP implementation and its maintenance is unlikely to be acquired solely through a short training course, since it relies on using qualified technical personnel with associated skills such as leadership and project management.

4. Re-Visits

4.1 Results

4.1.1 Summary

Table 10 shows the results of the re-visits, carried out in August and September 2003. No adjustments have been made for auditor effects.

Table 10. Re-visits – comparison of scores (%) for key criteria and total performance

Code	Location	Category	Size (employees)	* Corporate Structure	**Formal Certification	Retailer Brands	Risk Rating	Visit	Management Commitment	HACCP Team	Hazard Analysis	The HACCP Control Plan	Implementation	Verification	Maintenance	Total Performance
									| % score for key criteria							
RV01	ROI	misc	<51	I	N	N	2	1st visit	83	90	48	50	83	70	67	67
								Re-visit	87	85	66	77	77	83	90	79
RV02	ROI	misc	51-250	G	Y	Y	1	1st visit	33	25	16	17	67	30	17	28
								Re-visit	93	80	44	67	70	87	83	72
RV03	NI	bevs	<51	I	Y	N	1	1st visit	33	50	36	50	60	40	17	40
								Re-visit	67	70	92	90	73	40	60	72
RV04	NI	misc	<51	I	N	N	2	1st visit	33	40	10	40	33	0	0	21
								Re-visit	73	65	46	33	60	53	30	50
RV05	NI	meat	51-250	I	Y	N	2	1st visit	33	40	60	87	67	17	17	47
								Re-visit	50	55	40	67	77	60	80	60
RV06	NI	misc	<51	I	N	N	2	1st visit	70	20	10	40	83	7	0	31
								Re-visit	60	60	68	57	30	67	40	55

* Corporate Structure: G = Group, I = Independent   *** Formal Certification includes BRC, ISO9000 and BRC + ISO 9000*

Figures 10-17 plot the comparison between the % scores for the first visit and the re-visit for key criteria and total performance.

Improvements in the team score were significant (p=0.032). There was a doubling of score for hazard analysis (p=0.051). Verification, maintenance and total performance all showed a significant increase over time.

Figures 10-17: Comparison of individual company scores (%) for first visit and re-visit for key criteria and total performance

Fig 10: Management Commitment Score %
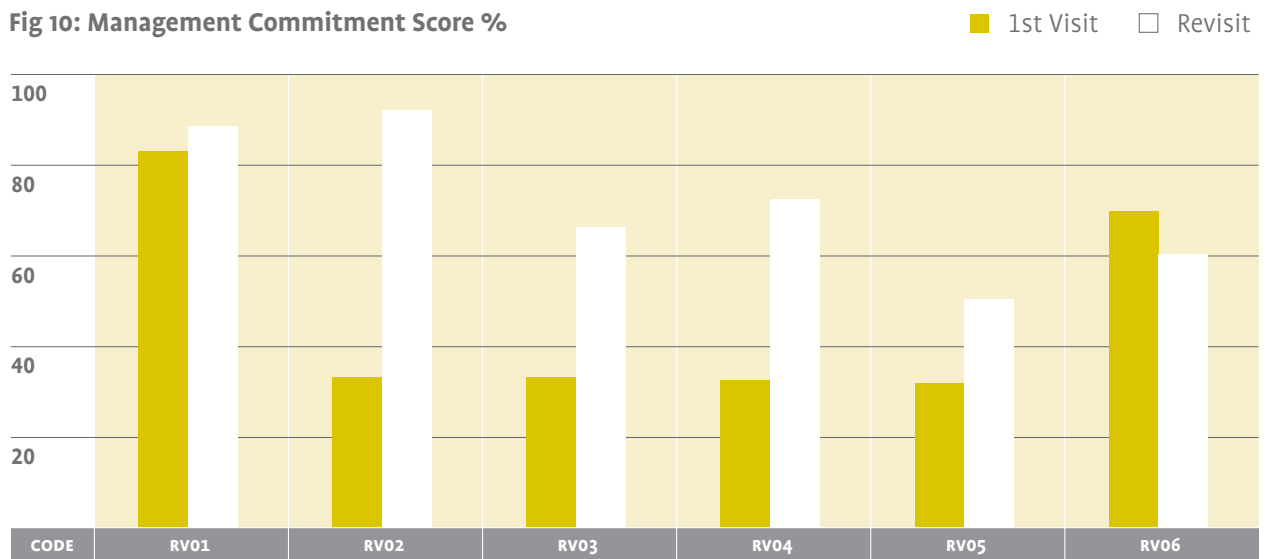
Fig 11: HACCP Team Score %
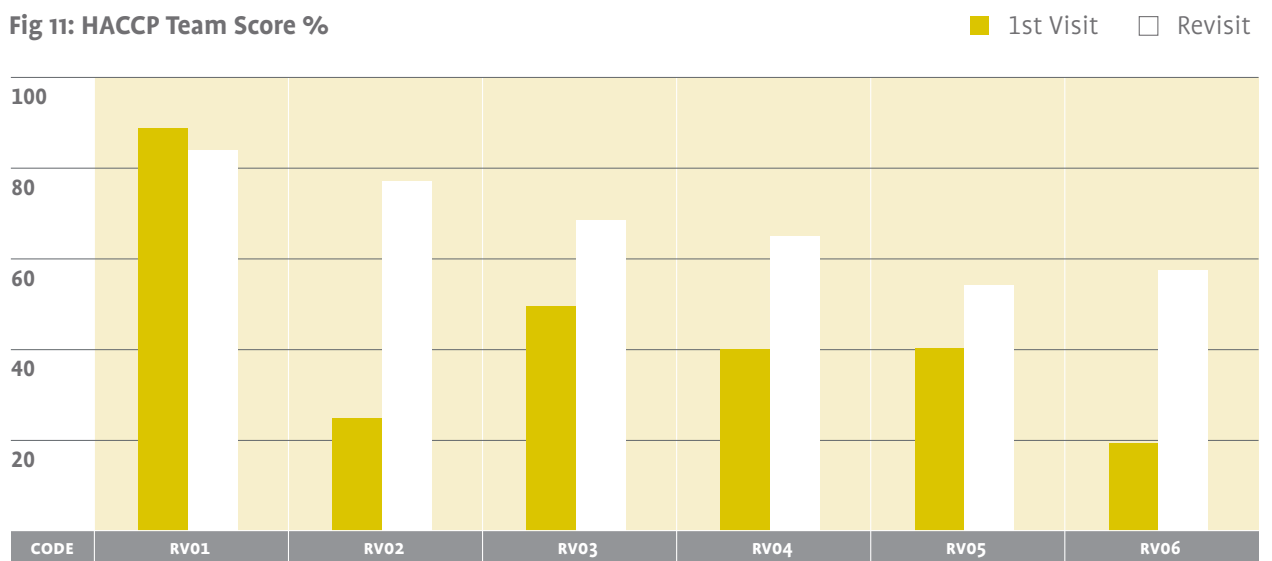
Fig 12: Hazard Analysis Score %

■ 1st Visit ☐ Revisit

| CODE | RV01 | RV02 | RV03 | RV04 | RV05 | RV06 |
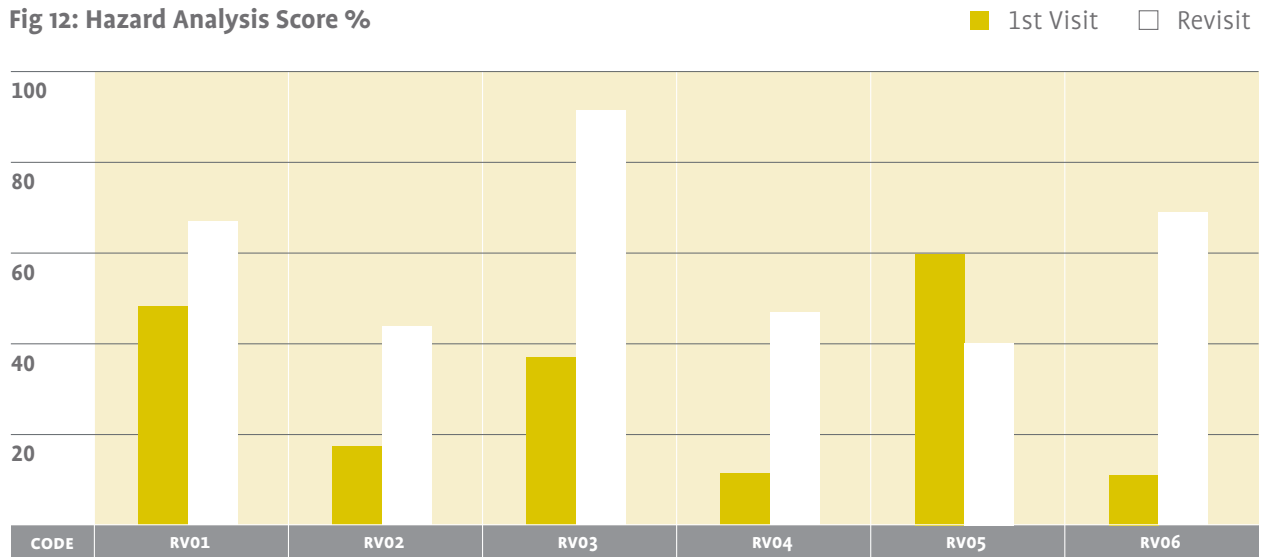
Fig 13: The HACCP Control Plan Score %

■ 1st Visit ☐ Revisit

| CODE | RV01 | RV02 | RV03 | RV04 | RV05 | RV06 |
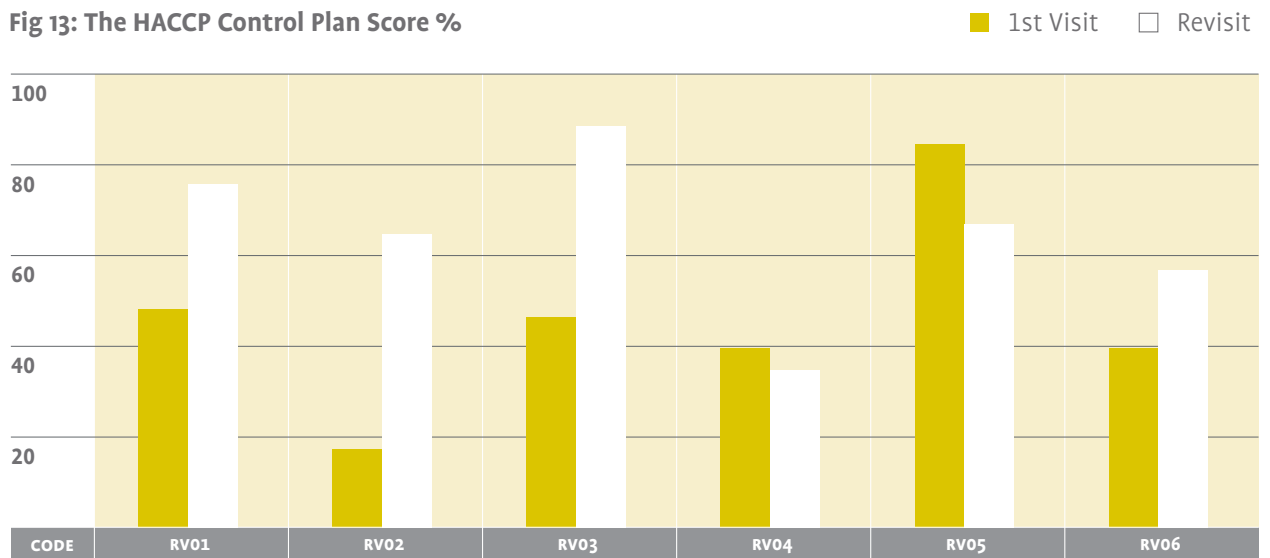
Fig 14: Implementation Score % ■ 1st Visit □ Revisit
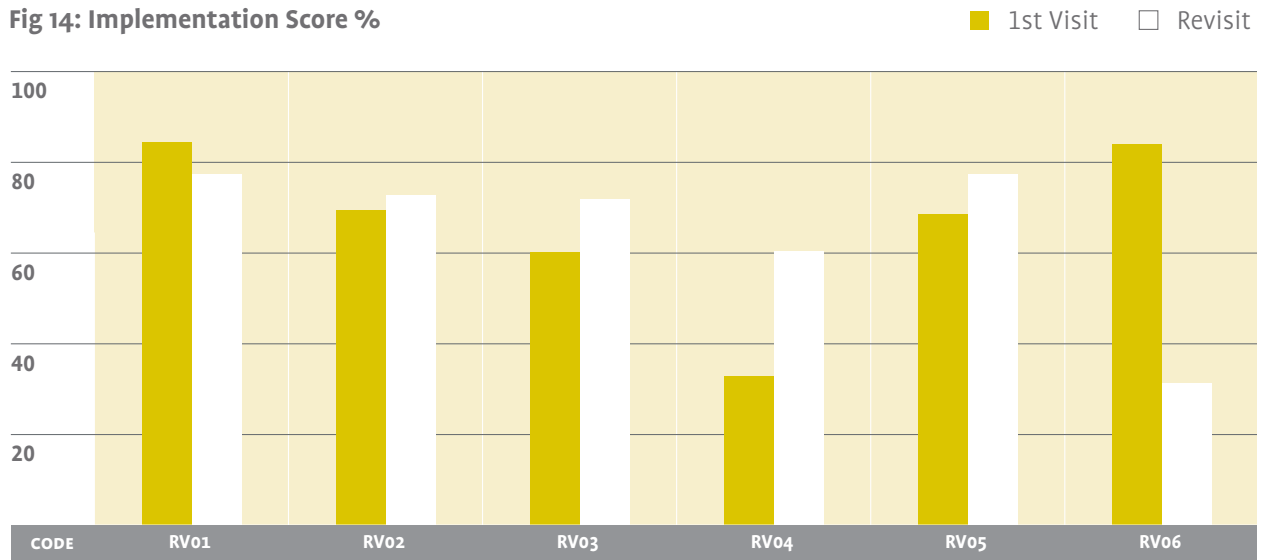
Fig 15: Verification Score % ■ 1st Visit □ Revisit
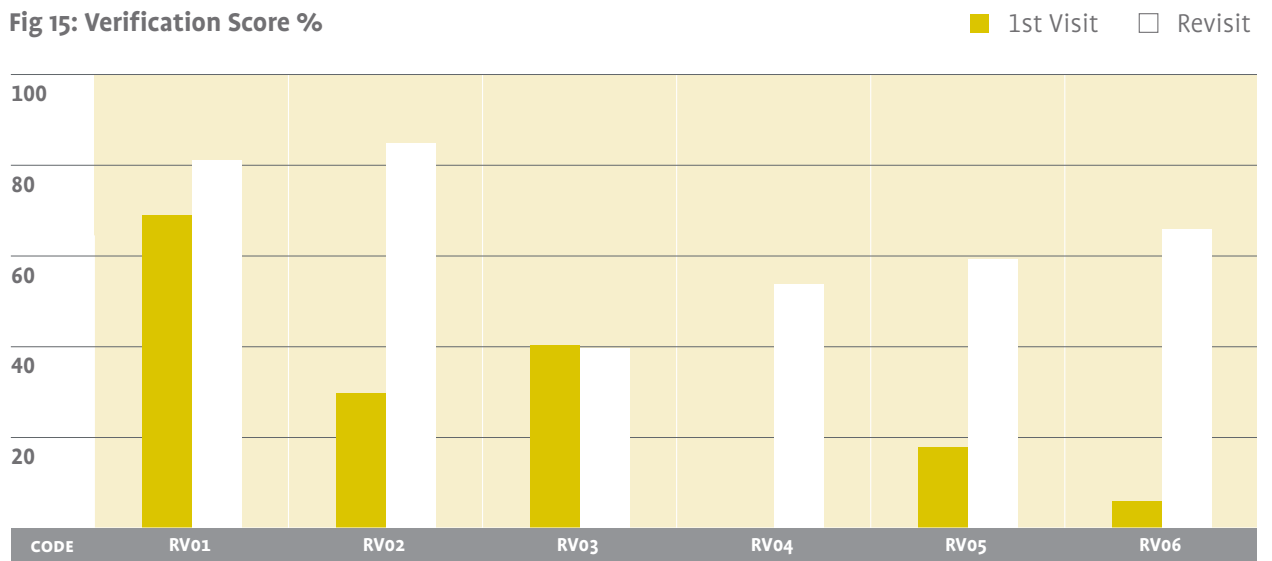
Fig 16: Maintenance Score %   ■ 1st Visit   ☐ Revisit
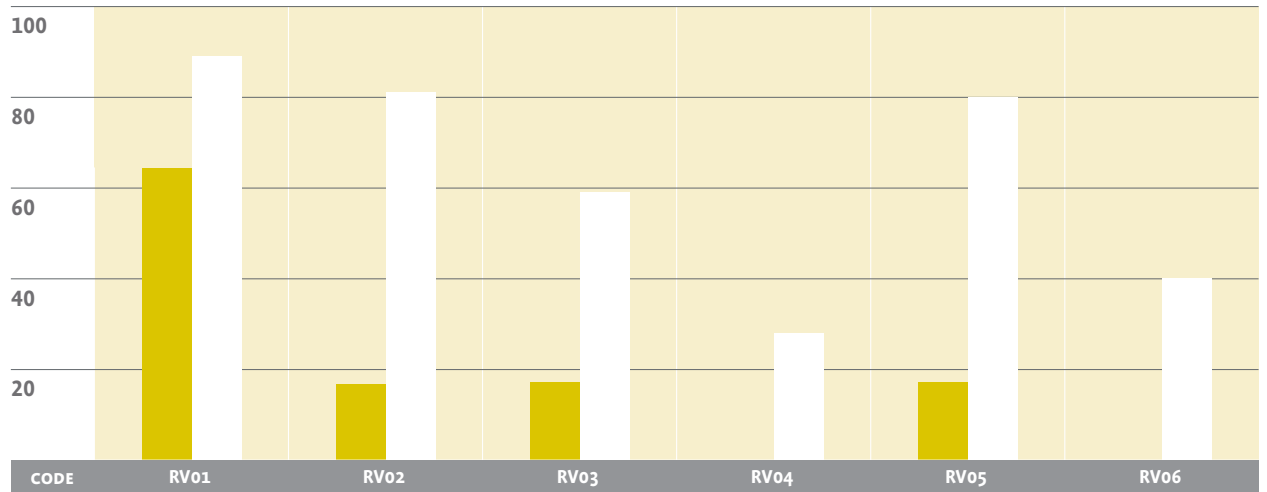
Fig 17: Total Performance Score %   ■ 1st Visit   ☐ Revisit
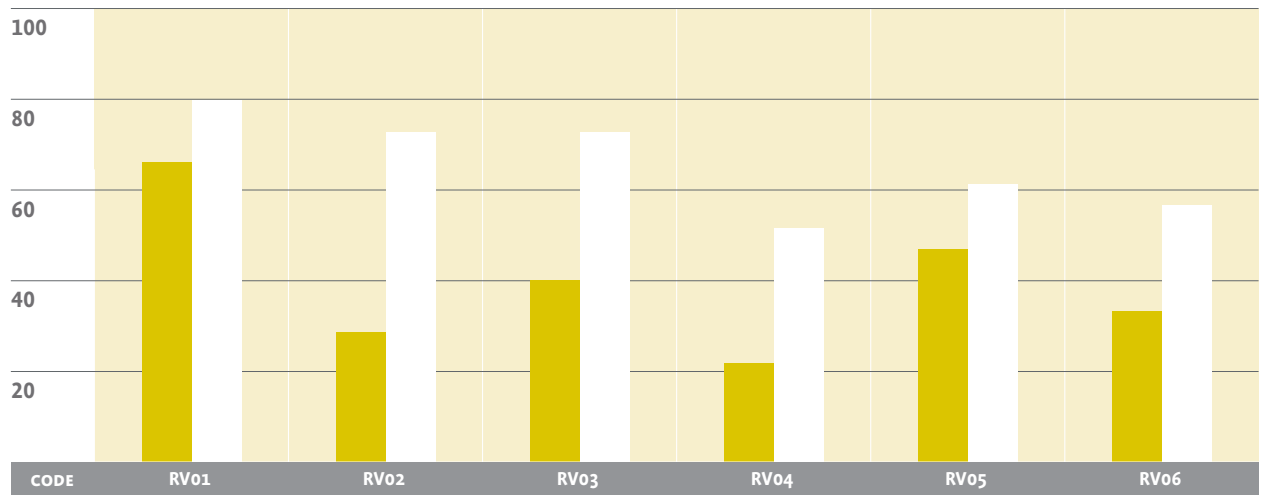
In Figure 18 the mean scores (%) of the six companies are compared for the first visit and the re-visit.

Figure 18: Mean scores % for first visit and re-visit for key criteria (n=6)   ■ 1st Visit □ Revisit
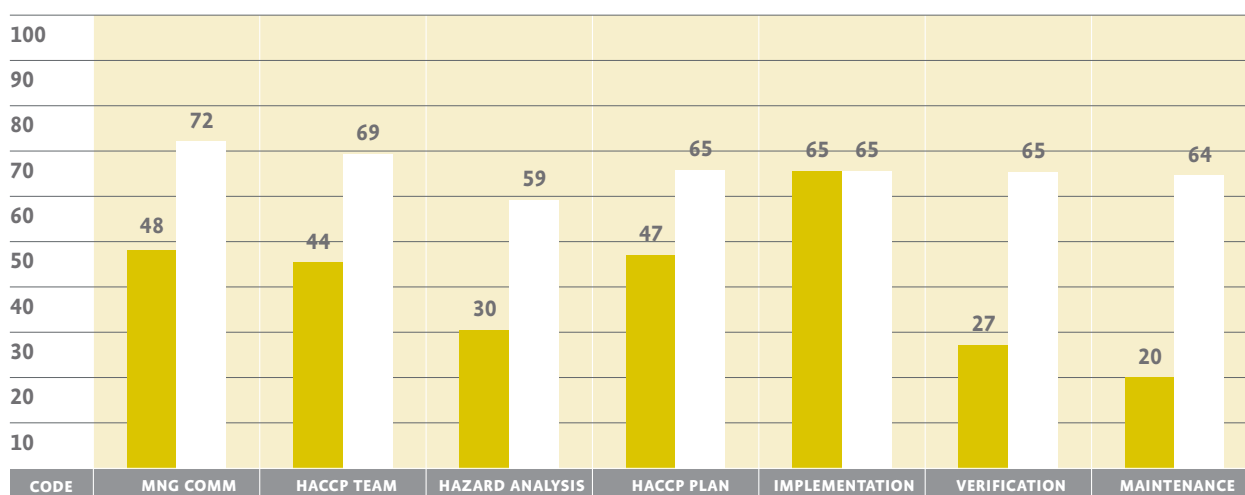

Table 11 shows the range of percentages for each of the key criteria and total performance for the first visit and re-visit. Companies are graded as poor (<40%), average (40-80%) and good (>80%).

Table 11. Re-visits - Grading of companies on key criteria and total performance (n=6)

Key Criteria	Visit	Mean (%)	Range (%)	Poor (score <40%)	Average (score 40%-80%)	Good (score >80%)
Management Commitment	1st visit	48	33-83	4	1	1
	Re-visit	72	50-93	0	4	2
HACCP Team	1st visit	44	20-90	2	3	1
	Re-visit	69	55-85	0	5	1
Hazard Analysis	1st visit	30	10-60	4	2	0
	Re-visit	59	40-92	0	5	1
The HACCP Control Plan	1st visit	47	17-87	1	4	1
	Re-visit	65	33-90	1	4	1
Implementation	1st visit	66	33-83	1	3	2
	Re-visit	65	30-77	1	5	0
Verification	1st visit	27	0-70	4	2	0
	Re-visit	65	40-87	0	4	2
Maintenance	1st visit	20	0-67	5	1	0
	Re-visit	64	30-90	1	3	2
Total Performance	1st visit	39	21-67	3	3	0
	Re-visit	65	50-79	0	6	0

4.1.2 Key Criteria
The audit checklists and interview questions were analysed for each of the seven key criteria.

Management Commitment

(i)   The company that had introduced a food safety policy since the first visit had not communicated it to staff.

(ii)   In all cases senior managers had become more aware of the costs of food safety to the company.

HACCP Team

(i)   1 of the companies had appointed a HACCP team and the expertise of the team had improved in 3 of the companies.

(ii)   Further training had been undertaken for operatives/supervisors by two of the companies.

Hazard Analysis

(i)   The process flow diagram was accurate in all cases.

(ii)   3 companies had validated the process flow diagram since the first visit.

(iii)   5 companies had improved the hazard analysis since the previous visit and as a result all 6 companies had identified all the significant hazards.

(iv)   3 companies had established prerequisite programmes (PRP's) since the previous visit.

HACCP Plan

(i)   3 companies had established appropriate monitoring frequencies and defined responsibilities for monitoring since the previous visit.

(ii)   3 companies had re-defined corrective action procedures to include the 3 levels. 3 companies had not improved the procedures.

Implementation

(i)   2 companies no longer had evidence of HACCP on the factory floor.

(ii)   Compliance with the necessary corrective actions had been achieved by three of the companies since the first audit.

(iii)   1 of the companies was no longer meeting all the critical limits.

(iv)   1 of the companies was no longer complying with the monitoring procedures, another company had achieved this since the first visit.

Verification

(i)   The 2 companies without a schedule of verification had not introduced one.

(ii)   All 6 companies were documenting verification activities.

(iii) The 2 companies with untrained auditors had not addressed this issue.

(iv)   Only 1 of the companies had auditors from more than 1 discipline involved in verification activities, which was an improvement since the previous visit.

(v)   Data/trend analysis was undertaken by 5 of the companies. 2 had introduced this since the previous visit as part of the verification activity. 1 company had not addressed this.

(vi)   In 2 companies, senior managers had become more aware of the importance of verification.

Maintenance

(i)   2 of the companies had removed issues of quality/legality from their HACCP plans.

(ii)   4 of the companies had built into their plan a procedure for examining newly emerging pathogens.

4.2 Discussion

Whilst the number of companies in the re-visit programme was small, 6 in total, and hence caution must be exercised in interpreting the results, each had shown significant improvement since the previous visit. These are particularly noticeable in the areas of hazard analysis, verification and maintenance.

There are a number of factors, which may have prompted this improvement: -

- *Use of external expertise - 1 company had responded to the weaknesses identified at the first visit and used an external consultant to review the system.*

- *Changes in factory key personnel - in small companies the change in key management personnel may have a significant effect on the operation as a whole. 1 factory had a new QA Manager, who had been in position only three months.*

- *Provision of training - there was evidence that 2 of the companies had provided training and in both of these companies the senior management were more aware of HACCP.*

- *Response to the report from the first visit - this undoubtedly had an impact, as many of the recommendations had been actioned.*

- *Increased pressure from customers/public perception of safety.*

5. Conclusions

In recent years, food companies have invested considerable time and effort in developing and implementing HACCP systems for their operations. So far, there has been little attempt to conduct detailed evaluations of their systems.

Inspections/audits/evaluations conducted by the authorities and by third parties usually have a broad brief with the result that HACCP is not normally subjected to a thorough examination.

In this investigation, each auditor spent two days dealing specifically with HACCP. It is clear that this approach has been extremely successful in providing a wealth of knowledge on the ways in which HACCP systems are being implemented at the present time.

It is evident that many companies have made excellent progress but the problems and difficulties must not be underestimated. It is therefore important to learn further from the experience of those directly involved.

The results provide valuable insight into the practicalities of implementing HACCP in food manufacturing plants. By addressing the key points that have been identified during this study, it should be possible to make further progress in improving the safety of the food produced. In particular:

1. **The shortage of technical expertise** – this is the critical issue, which must be of concern to the industry, authorities and consumers, especially in the light of other relevant trends, namely:

   - *The increasing demand for technical expertise because of the growing proportion of high-risk foods in the market, as demonstrated by the growth in further processing, e.g. prepared salads and the pressure to reduce preservatives.*

   - *The decline in the number of students enrolling for degrees in food science and technology.*

2. **The quality of training** – in recent years there has been a growth in the number of people taking courses in HACCP. Some but not all of these are based on the Codex HACCP principles, so that the details of the practical application have been left to the trainees themselves.

   This study provides useful insight into some of the systematic weaknesses that have arisen in practice, specifically in relation to hazard analysis, verification and validation.

   We believe that our results have important implications for training in HACCP, which should be taken into account when syllabi are being revised.

3. **There are major implications for the enforcement authorities** – existing training and inspection protocols should be up-dated to take account of the findings.

   It is clearly unrealistic to expect authorities or third parties to incorporate our approach into their evaluations, however if the verification and validation steps are completed properly it is then relatively easy to determine the effectiveness of the HACCP system.

4. **It is crucial that companies employ staff with the relevant technical expertise and qualifications.** Furthermore, all the staff involved in planning and implementing HACCP must have appropriate training. Although lack of resources is often given as a reason for failure to do so, companies must realise that a HACCP plan that is not implemented properly will not be effective in achieving high standards of food safety. Worse still, companies may be lulled into a false sense of security.

Although this study was conducted on the island of Ireland, it is likely that a similar position would be found in Great Britain because of the close links with food companies in Ireland.

- *Many companies on the island of Ireland supply the large retailers in Great Britain.*

- *Many food manufacturing units in Great Britain are owned by companies based on the island of Ireland.*

- *There is movement of staff between the island of Ireland and Great Britain, and a significant proportion of staff working in British companies have been educated on the island of Ireland.*

It is important, however, to emphasise that this is a relatively small study. Furthermore, all the companies involved are volunteers and presumably had confidence in their systems. It would be reasonable to conclude that they are above average with respect to the quality of their HACCP systems.

There is a compelling case for further studies using this approach. In particular, the authorities could supplement official inspections so that detailed information could be obtained on a genuinely random basis. Such results should show how and why problems arise thereby providing the means for continuous improvement in HACCP implementation.

Whilst this study was conducted in manufacturing, it has implications for other sectors that are required to implement HACCP systems. This applies especially to catering, where campaigns to promote HACCP are being developed in all parts of the British Isles. In light of our findings, it would certainly be advisable to conduct a similar investigation into catering operations, which have already implemented HACCP. The results would undoubtedly reveal limitations and weaknesses in current practice. It would be crucial to take these into account when developing material for the campaigns if they are to be effective and relevant.

6. Recommendations

- *The results of this study should be widely disseminated to food companies, legislating authorities, enforcement agencies, educators, trainers, third party auditors and certification bodies.*

- *The syllabi for training courses should be up-dated. In particular hazard analysis, verification and validation need to be covered in greater depth. There is a need for continuous professional development (CPD) for those who deliver HACCP training courses.*

- *Training programmes and inspection protocols for the enforcement authorities will need to be revised to take account of the results of this report.*

- *Third party Technical Standards relating to food safety/HACCP, such as BRC and EFSIS, may need to be updated.*

7. Acknowledgements

8. References

1. *International Life Sciences Institute (1999) Validation and Verification of HACCP. Report prepared by ILSI Europe Risk Analysis in Microbiology Task Force.*

2. *Campden and Chorleywood Food Research Association (2003) HACCP: A Practical Guide, 3rd edition, Guideline No 42.*

3. *British Retail Consortium (2002) Technical Standard for Companies Supplying Retailer Branded Food Products.*

4. *Codex Alimentarius (1997) General Requirements (Food Hygiene). Food and Agricultural Organisation of the United Nations/World Health Organisation.*

5. *International Standards Organisation (2000) ISO 9000 series.*

6. *National Standards Authority of Ireland (2000) I.S. 343 Food Safety Management Incorporating Hazard Analysis and Critical Control Point (HACCP).*

9. Acronyms and Abbreviations

BRC   British Retail Consortium
CCP   Critical Control Point
CIEH   Chartered Institute of Environmental Health
CMi   Checkmate International
CPD   Continual Professional Development
EFSIS   European Food Safety Inspection Service
HACCP   Hazard Analysis Critical Control Point
IBEC   Irish Business and Employers' Federation
ISO   International Standards Organisation
KPI   Key Performance Indicator
NI   Northern Ireland
NIFDA   Northern Ireland Food and Drink Association
PRP   Prerequisite programme
RIPH   Royal Institute of Public Health
ROI   Republic of Ireland
SMEs   Small and medium sized enterprises

Annex I

HACCP Assessment Pre-visit Questionnaire

Company Name:	
Address:	
Phone: Fax: E.U. Licence No.	

Company Profile:	
Are you part of a group or Independent	
No. of Workers on Site / Shift Patterns -	
Formal Accreditations / Certifications held (e.g. ISO, Q-Mark, BRC, other)	
Give details of the products manufactured on site.	

What markets do you supply	
Can you give a breakdown of your business, under the categories of Retail (own label / branded) Food Service Other (specify)	

Contacts:

Managing Director:

Technical/Quality Manager:

Sales Manager:

Other key Personnel:

Doc No.	VWApvQ
Amendment No.	0
Date	11/05/01

Where does responsibility for food safety lie within your organisation?	
What food safety qualifications and/or experience are held within your organisation?	

HACCP	Details
Is there a HACCP System in operation?	
Who designed your current HACCP plan?	
Is your HACCP plan certificated to a recognised standard? If Yes, please specify.	
How many HACCP plans do you have?	
Have you grouped any products together? If Yes, please specify.	
What system do you have in place to verify/maintain your HACCP system?	

Training:	Y/N	Comment
Is there a training plan within your organisation?		
What training are food handlers given?		
What training are Supervisors line leaders given?		
What training are Managers given?		
Are training records of all personnel held on file?		

Questionnaire Completed By:	
Position	
Signature	
Date	

Doc No.	VWApvQ
Amendment No.	0
Date	11/05/01

Annex II

Checklist

Company	Category	Code	Date

Management Commitment

Is there a Food Safety Policy, is this communicated and followed

Do you have a Food Safety Policy

Who is aware of this policy

Do Sen. Management know how much Food Safety costs their business

Do you know how much food safety costs your business

Do you know how much insurance costs

Is there a budget for Food Safety

Do you have a Food Safety Budget

Do Sen. Managers take an active interest in food safety

What are the areas of food safety which concern you

Do Sen. Managers involve themselves in external audits

Do you carry out any external audits

Are Sen. Managers aware of the current status of their HACCP system

What HACCP system do you have in place

Do you know what it covers

Do you think it is effective

When was it last updated

Can Sen. Managers explain how HACCP works

What does HACCP do

Can you explain how it works

Do Sen. Managers have involvement in food safety non conformances

Are you aware of any Food Safety non conformances

What corrective action was taken

What is Sen. Management's opinion on what HACCP achieves for their business

How important is HACCP to you

What benefit is there to your organisation

Why do you have HACCP

Has the system been designed internally or by external consultants, or head office

Who designed your HACCP system

Do Sen. Management feel HACCP gives them 100% assurance of food safety

You have a HACCP system in place, are you still worried about food safety

Is food safety discussed at Board level

Comments

The HACCP Team

Was a team approach used

Did you use a team

Was the team multi-disciplinary

Who was on the team

What were their positions

What expertise did the team members have

What product/process knowledge did they have

What experience (no. years) do they have

Who is the Team Leader

Has any training taken place and was this to a recognised standard

What HACCP training has the team leader had

What HACCP training have the other team members had

Do you feel that there are any HACCP training gaps

Do you feel there is a need for specific HACCP training

How was the effectiveness of the training measured

Do you formally evaluate training

If HACCP training was carried out was evaluation carried out

Was the HACCP training effective

Do the team meet regularly

How regularly do the team meet

Do the team only meet at the design stage

Are minutes of meetings recorded

Do you keep team meeting minutes

Can you show me minute records

Are all corrective actions followed through

Do the team meet beyond the design stages

Do the team meet after design

Are the team involved in implementation

Do the team review verification findings

Do the team review failures in the system

Do the team review verification findings

Comments

The Hazard Analysis Stage

Is the Process Flow Diagram accurate

Have you validated your PFD

Who validated the plan

Take copy of PFD onto floor / accurate

Does it contain sufficient detail

Has rework been included

Is water included (where appropriate)

Is there evidence of hazard analysis

How did you carry out hazard analysis

Where did you gain information from

Who carried out hazard analysis

Does the hazard analysis contain sufficient detail

Have all significant hazards been included

Have any irrelevant hazards been included

Have they included physical and chemical hazards

Are they consistent with hazards, considering them throughout the study

When necessary was external expertise used

Did they carry out hazard analysis on raw materials

Are Prerequisite programmes effective

Do you have pre-requisite programmes

What are included

How do you verify their effectiveness

Have the correct CCPs been identified

Question justification of CCP identification, can they be justified

How were CCPs identified

Was the decision tree used

Comments

The HACCP Control Plan

Have all products and processes been covered

What is the scope of your study

Have you grouped products together

Are there any distinct differences in any products within a group

Is Codex terminology used

Is codex terminology used correctly

Does the plan contain sufficient detail

Is manifestation and source of hazard stated

Are pathogens grouped together

If yes, is there background evidence to support this

Is there cross referencing to other procedures

CCP Identification

Can they demonstrate correct use of the Decision Tree

Are critical limits accurate and justifiable

How have they set critical limits

Can these decisions be justified

Do they use target levels

Do monitoring procedures relate to critical limits

Are monitoring activities capable of detecting loss of control

Are monitoring frequencies appropriate

Are monitoring procedures detailed

Are critical limits clear

Are monitoring personnel trained on procedures

Who carries out monitoring

Do procedures designate responsibilities

For monitoring

For corrective action

Is reference made to documentation

Is there cross referencing

Do corrective action procedures cover all three levels

Comments

Implementation

How was the plan implemented

Did you have a formal Implementation plan

How did you carry this out

Did you have any training

Did you have any problems implementing

Is HACCP visible

Is there evidence of HACCP on the factory floor

Are CCPs highlighted

Are critical limits being complied with

Are critical limits being met

Are there failures in any particular areas

Is there documentary evidence to substantiate this

Are monitoring procedures being met

Are monitoring frequencies being followed

Are there any particular areas causing a problem

Are monitoring procedures being followed accurately

Do monitoring personnel have access to appropriate procedures

Is monitoring equipment calibrated

Frequency

Records

Marked

Is there any uncalibrated equipment in use

Are corrective actions implemented and recorded as part of the HACCP plan

Are appropriate corrective actions put into place

Where are corrective actions recorded

Are corrective actions investigated and closed out

Is documentation being completed accurately

CCP monitoring data

Corrective actions

Are staff monitoring CCPs aware of their importance

Do you know what a CCP is

How do you check them

How frequently

Show me what you do

Have you been trained to do this

Who trained you and when

Comments

Verification

Is there a regular schedule of verification activities

Do you have a verification plan

What verification do you carry out

Are verification activities documented

Can I see records

Are those verifying the HACCP plan adequately trained, experienced and independent

Who carries out verification

What training have they had

What are their particular expertise / experiences

Are they independent

Are individuals from all disciplines involved in verification activities

Have verification findings been reported back to the team

Verbally or formally

What corrective action has been carried out

Did this instigate any reviews

Is there evidence that corrective actions are carried out in appropriate timescales

Has any data analysis / trend analysis been carried out

Are Sen. Management aware of significance of verification

Is your HACCP plan verified

By whom

Frequencies

What is the purpose of verification

Comments

Maintenance

Is there a record of changes and justifications

Is there amendment documentation

Who authorises changes to the plan

Are current status documents in circulation

How do you deal with new product changes

Equipment changes

Recipe changes

Process changes

How are changes communicated

Are relevant newly emerging hazards being built into the plan

Do you carry out ongoing hazard analysis

Do the team meet regularly to keep up to date

Do the team meet beyond the design stage

Are all changes agreed and signed off before implementation

Are other issues included such as Quality, Legality, Welfare

Comments

Notes

Notes