

**COMPARATIVE ANALYSIS OF ENVIRONMENTAL HEALTH OFFICERS
IN THE EUROPEAN UNION WITH A FOCUS ON THE STANDARD
OPERATING PROCEDURES OF MALTA'S ENVIRONMENTAL HEALTH
DIRECTORATE**

Christine Farrugia

A dissertation submitted to the Faculty of Economics, Management and
Accountancy at the University of Malta, in partial fulfilment of the requirements
for the Master of Arts in Evidence-Based Management & Effective Decision
Making

University of Malta

December 2024



L-Università
ta' Malta

University of Malta Library – Electronic Thesis & Dissertations (ETD) Repository

The copyright of this thesis/dissertation belongs to the author. The author's rights in respect of this work are as defined by the Copyright Act (Chapter 415) of the Laws of Malta or as modified by any successive legislation.

Users may access this full-text thesis/dissertation and can make use of the information contained in accordance with the Copyright Act provided that the author must be properly acknowledged. Further distribution or reproduction in any format is prohibited without the prior permission of the copyright holder.

ACKNOWLEDGEMENTS

I am deeply grateful to Professor Sandra C. Buttigieg, my thesis supervisor, for her invaluable guidance and unwavering support. Her mentorship has been a true gift, helping me overcome obstacles and deliver a project we can both be proud of. Thank you for your enduring commitment throughout this journey.

I am immensely thankful to Professor Vincent Cassar for his steadfast support, guidance, and encouragement. His insight and dedication have been instrumental, and his mentorship truly inspiring.

I extend my gratitude to all the participants and my colleagues, including the intermediary and the observers who provided invaluable support throughout this study. I am also deeply thankful to everyone who offered their ongoing feedback and encouragement, all of which were essential in making this study a success.

ABSTRACT

This master's dissertation addresses two key research questions: How do the roles, responsibilities, and practices of Environmental Health Officers (EHOs) vary across different member states in the European Union? To what extent are the Standard Operating Procedures (SOPs) within the Maltese Environmental Health Directorate aligned with its vision and mission? By reviewing pertinent literature, the study sought to understand the regulatory framework and legal responsibilities outlined by the European Union, aiming to uncover common practices undertaken by environmental health officers (EHOs) across these member states. Understanding the diverse roles and practices of EHOs was essential in contextualising the operational challenges faced by the Maltese Environmental Health Directorate and evaluating the alignment of its SOPs with its vision and mission. It specifically focused on the SOPs for food inspections and bathing water sampling employed by the Maltese Environmental Health Directorate. Within the framework of evidence-based management, the research evaluated these SOPs on ensuring food safety and safeguarding bathing water quality. By analysing current operational protocols, the study identified gaps and provided evidence-based recommendations to enhance the Directorate's capacity to address evolving challenges.

Methodologically, this study employed a triangulated approach, combining descriptive statistics and thematic analysis. A questionnaire distributed across EU member states enabled comparative analysis, identifying prevalent practices. The findings aimed to provide evidence-based knowledge to EHOs to better safeguard public health, to improve food inspections, and to maintain bathing water quality. The questionnaire revealed that while core responsibilities like food safety and water quality monitoring are consistent across the EU, areas such as pollution control and occupational health vary. Malta's centralised approach offers

coordination advantages but highlights the need for clearer responsibilities and inter-agency collaboration. Although EHO roles vary across the EU, an emerging shared commitment to One Health principles emphasises collaboration across sectors.

In the second part of the study, interviews with Executive EHOs and analysis of SOPs related to food inspection and seawater sampling were conducted. The research identified inconsistencies in Malta's SOP implementation, suggesting targeted improvements in training, equipment management, and safety measures. The research passed ethical approval and serves as a valuable resource for guiding policy decisions and future research.

TABLE OF CONTENTS

Acknowledgements	i
Abstract	ii
List of Tables	xii
List of Figures	xvi
List of Abbreviations	xvii
Dedication	xviii
Chapter 1 Introduction	1
1.1 Introduction	1
1.2 Statement of the Problem	1
1.3 Overall Rationale	2
1.4 Research questions	4
Research question 1	4
Research question 2	5
1.5 Objectives	5
1.6 Mission and Vision of the Maltese Environmental Health Directorate	6
1.7 Implications of the Study	6
1.8 Scope and Limitations	7
1.9 Dissertation Structure	8
Chapter 2 Literature Review	10
2.1 Introduction	10
2.2 Research Strategy and Criteria	10
2.2.1 Search Strategy and Databases	11
2.2.2 Keywords and Search Terms	11
2.2.3 Inclusion and Exclusion Criteria	11
2.3 Literature overview	12

2.4 Historical Context of Malta and Environmental Health Officers	13
2.5 European Member States and Environmental Health	15
2.5.1 Training and Education	25
2.5.2 Challenges and Barriers	26
2.5.3 Emerging Trends	26
2.5.4 Cultural Contexts	26
2.6 Importance of Food Inspections	27
2.7 Bathing Water Monitoring in the EU	30
2.7.1 Malta’s Bathing Water Monitoring Programme	32
2.7.2 Role of Standard Operating Procedures (SOPs)	33
2.7.3 Innovations and Challenges in Bathing Water Monitoring	34
2.8 Writing Effective Standard Operating Procedures (SOPs)	35
2.8.1 Conclusion	38
Chapter 3 Methodology	39
3.1 Introduction	39
3.2 Research Philosophy	40
3.3 Research Design	43
3.3.1 Research Question 1 (RQ1): Environmental Health Officers’ Roles and Practices Across the EU	43
3.3.2 Mixed methods approach for RQ1 to investigate EHO Practices across the EU	43
3.3.3 Data Analysis for a Multi-faceted Picture of EHO Duties	44
3.3.4 Understanding EHO Adherence to Standard Operating Procedures - RQ2	44
3.3.5 Case Study Methodology for Understanding SOP Implementation (RQ2)	44
3.3.6 Yin's Multi-Method Approach for Contextual Analysis	45
3.3.7 Data Collection Strategy	46

3.3.8 Framework for the Case Study (RQ2)	46
3.4.1 Defining the case Study	47
3.4.2 Mapping Standard Operating Procedures to Strategic Goals	49
3.5.1 Case Selection: Instrumental Approach to SOP Implementation	49
3.6.1 Collecting and analysing the data	50
3.6.2 Participants	52
3.6.3 Survey Participant Breakdown	52
3.6.4 Non-Targeted Professionals (Excluded from Analysis)	53
3.7 Validation of Online Survey, Interview Questions and Observation Checklists (RQ1 and RQ2)	56
3.7.1 Validation of online questionnaire	56
3.7.2 Validation of interview questions and observation checklists	57
3.8 Appraisals of data	58
3.9 Ethical Considerations	58
3.9.1 Constraints and Possible Barriers	59
3.9.2 Conclusion	60
Chapter 4: Findings	61
4.1 Overview of EU Environmental Health Officer Duties	61
4.1.1 Analysis of EU Survey (RQ1):	61
4.2 Comparative Analysis of Member States	63
4.2.1 Themes and Categories	63
4.2.2 Key findings	64
1. Implementation of Legislation	64
1.1 National and EU Legislation	64
2. Enforcing Regulation and giving evidence in court	64
3. Investigation of Public Health Issues	65
4. Disease Control and Food Safety	66

4.1 Infectious Disease & Pandemic Control	66
5.1 Monitoring the Wholesomeness of Food Products	67
5.2 Foodborne Investigations and Complaints	68
5.3 Sampling of Food	68
6. Nutrition and Health Claims, Standards, and Labelling	69
7. Water Quality Monitoring	70
7.1 Drinking Water	70
7.2 Swimming Pools and Spas	71
7.3 Bathing Water	71
7.4 Other Recreational Water	72
8. Specialized Audits and Inspections	73
8.1 Legionella Audits and Investigations	73
8.2 Food Establishments	74
8.3 Institutions and Hospitals	74
9. Import/Export and Drug Control	75
9.1 Control of Importation and Exportation of Food Stuffs	75
9.2 Drug Control Related to Narcotics and Psychotropic Drugs	76
10. Public Facility Monitoring and Health Certificates	76
10.1 Public Facility Monitoring:	76
10.2 Health Certificate Issuance	77
10.3 Non-Food Establishments and Health Certificates	77
11. Consultation and Complaint Investigation	78
11.1 Consultation Services to Food Establishments	78
11.2 Investigating Unhygienic Conditions	78
12. Environmental Health Concerns	79
12.1 Illegal Dumping, Refuse Accumulations, Stagnant Water	79
12.2 Pest Infestation Control	80
12.3 Vector Control and Complaint Investigation	80
12.4 Matters related to construction of Houses and Drains Regulations	81
13 Public Health Matters	81
13.1 Tobacco Regulation	81
13.2 Malpractice Investigations (Tattoo Clinics, Beauty Parlours)	82
13.3 Immunisation	82
14. Education of Food Handlers and International Information Exchange	83
14.1 Education of Food Handlers	83

14.2 International Exchange of Information	84
15. Environmental and Occupational Health	84
15.1 Atmospheric Pollution	84
15.2 Noise Control	85
15.3 Occupational Health and Safety	85
16. Waste and Pollution Control	86
16.1 Pollution Control	86
16.2 Waste Management:	86
17. Animal feed, Slaughterhouses and Fraud Prevention	87
17.1 Animal Feed Monitoring	87
17.2 Slaughterhouses	87
17.3 Protection Against Deception and Fraud	88
18. Alert Systems and Radiation Hygiene	89
18.1 National and European Alert Systems	89
18.2 Radiation Hygiene	89
19. Hygiene in Educational Institutions	90
20. Cosmetic Products and Data Collection	91
20.1 Cosmetic Product Monitoring	91
20.2 Data Collection for Other Departments	91
21. Cemeteries and Repatriation of Human Remains	92
21.1 Monitoring of Cemeteries and Burials	92
21.2 Supervision of Internment and Repatriation of Human Remains	92
22. E-commerce, Ship Sanitation, and Harbor Vessel Inspection	93
22.1 E-commerce Food Safety Monitoring	93
22.2 Ship Sanitation Certificates and Harbor Vessel Inspection	93
23 Additional Public Health Responsibilities	94
23.1 Other Duties	94
4.2.3 Malta's EHO Role: A Comparative Analysis	95
4.2.4 Conclusion	96
4.3 Mapping SOPs to Strategic Goals	97
4.3.1 Key Elements of the Directorate's Vision and Mission	97
4.4 Interviews and Observations	99
4.4.1 Introduction	99
4.4.2 The analysis of interviews (RQ2):	99

4.4.3 Part 1: Interviews	100
4.4.4 Team Management:	100
4.4.5: Performance Evaluation	101
4.4.6: Quality Assurance	102
4.4.7: Resource Management	103
4.4.8: Leadership Styles and Decision-Making	104
4.5 Part 2: Onsite Observations	105
4.5.1 Observations' analysis (RQ2)	110
4.5.2 Emerging Themes from Food inspection Observations	110
4.5.3 Emerging Themes from Bathing water sampling Observations	111
4.5.4 Conclusion	113
4.6 Summary of Findings	114
4.6.1 Conclusion	117
Chapter 5 Discussion	118
5.1 Introduction	118
5.2 EHO Roles and Practices	118
5.3 Comparison of Findings with Literature	120
5.4 Summary of SOP Alignment	121
5.4.1 Alignment of SOPs with Strategic Goals.	121
5.4.2 Detailed Analysis of Gaps	122
5.4.3 Analysis of SOP Implementation Among Environmental Health Officers	123
5.4.4 Onsite Observations and Implementation Analysis	124
5.4.5 Discrepancies Between Stated Practices and Observed Implementation	124
5.4.6 Evaluating Innovations and Consistencies in Food Safety and Bathing Water Quality Monitoring from Literature and Maltese Practices	125
5.4.7 Aligning Local Practices with EU Standards in Environmental Health	127
5.5 Conclusion	128
Chapter 6 Conclusion and Recommendations for Improvement	129
6.1 Conclusion	129
6.2 Evidence-based recommendations	129

6.3 Evidence to Support Recommendations	131
6.4 Recommendations for Further Research	132
6.5 Final Remarks	133
References	134
Appendix A	154
Literature Review for Food Inspections	154
Appendix B	160
Literature Review for Bathing Water Monitoring	160
Appendix C	165
Literature review for Standard Operating Procedures	165
Appendix D	171
Appendix E	172
Frec Ethics Email and REDP form Details	172
Appendix F	174
Director's Letter of Authorisation, Data Protection Clearance	174
Appendix G	176
G.1: Online questionnaire	176
Appendix H	181
H.1 Questions for interview with Executive Environmental Health Practitioner responsible for Bathing water monitoring	181
H.2 Questions for interviews with Food Executive Environmental Health Practitioner	185
Appendix I	190
I.1 Observation checklist for Food Environmental Health Officers during onsite inspections	190
I.2 Observation checklist for Environmental Health Officers during bathing water	

sampling programme	193
Appendix J	195
Consent forms:	195
J.1 Consent Form of Intermediary	195
J.2 Consent Form Observer accompanying the author during onsite observations..	196
J.3 Consent form for participation in Interview For Executive Environmental Health Practitioners	197
J.4 Consent Form for Participation in Observation Study	198
Appendix K	200
K.1 APPRAISAL OF QUESTIONNAIRE (Munn et al., 2020)	200
K.2 Appraisal for Qualitative Study (Lockwood et al., 2015)	201
Appendix L	202
Comparative table of 26 EU Member States	202

LIST OF TABLES

Table 1 Overview of Key EU Regulations and Documents on Food Safety and Public Health	17
Table 2 Environmental Health Officers’ duties (Part 1)	19
Table 3 Environmental Health Officers’ duties (Part 2)	20
Table 4 Confirmed salmonellosis cases and rates per 100,000 people by country and year in EU/EA from 2018 to 2022	23
Table 5 Dissertation Research Steps based on Evidence-Based Principles	41
Table 6 Case study framework	47
Table 7 Trustworthiness of Data	51
Table 8 Survey Respondent Expertise	54
Table 9.1 Implementation of legislation.....	64
Table 9.2 Enforcing Regulation and giving evidence in court.....	65
Table 9.3 Investigation of Public Health Issues	66
Table 9.4 Infectious Disease and Pandemic Control.....	67
Table 9.5 Monitoring the wholesomeness of food products	67
Table 9.6 Foodborne Investigations and Complaints.....	68
Table 9.7 Sampling of food	69
Table 9.8 Nutrition and Health Claims, Standards, and Labelling	70
Table 9.9 Monitoring drinking water	70

Table 9.10 Swimming pools and spas	71
Table 9.11 Monitoring bathing water	72
Table 9.12 Other recreational water	73
Table 9.13 Legionella audits and investigations	73
Table 9.14 Food establishments	74
Table 9.15 Institutions and hospitals	75
Table 9.16 Controls of importation and exportation of foodstuffs	75
Table 9.17 Drug control related to narcotics and psychotropic drugs	76
Table 9.18 Public facility monitoring	76
Table 9.19 Health certification issuance	77
Table 9.20 Non-food establishments and health certification	77
Table 9.21 Consultation services to food establishments	78
Table 9.22 Investigating unhygienic conditions	79
Table 9.23 Illegal dumping, refuse accumulation, stagnant water	79
Table 9.24 Pest infestation control	80
Table 9.25 Vector control and complaint investigation	80
Table 9.26 Matters related to construction of houses and drains	81
Table 9.27 Tobacco Regulation	82
Table 9.28 Malpractice investigation (tattoo clinics, beauty parlours)	82

Table 9.29 Immunisation	83
Table 9.30 Education of food handlers	83
Table 9.31 International exchange of information	84
Table 9.32 Atmospheric pollution	84
Table 9.33 Noise control	85
Table 9.34 Occupational health and safety	85
Table 9.35 Pollution control	86
Table 9.36 Waste management	87
Table 9.37 Animal feed monitoring	87
Table 9.38 Slaughterhouses	88
Table 9.39 Protection against deception and fraud	88
Table 9.40 National and European alert systems	89
Table 9.41 Radiation hygiene	90
Table 9.42 Hygiene in educational institutions	90
Table 9.43 Cosmetic product monitoring	91
Table 9.44 Data collection for other departments	91
Table 9.45 Monitoring of cemeteries and burials	92
Table 9.46 Supervision of internment and repatriation of human remains	92
Table 9.47 E-commerce food safety monitoring	93

Table 9.48 Ship sanitation and harbour vessel inspection	93
Table 9.49 Participants' responses to additional duties	94
Table 10 SOP: Sampling of bathing water	97
Table 11 SOP: Food business inspections	98
Table 12.1 Team management	100
Table 12.2 Performance evaluation	102
Table 12.3 Quality assurance	103
Table 12.4 Resource management	104
Table 12.5 Leadership styles and decision making	105
Table 13 Summary of findings during observations of food inspections	106
Table 14 Summary table of bathing water sampling observations	108
Table 15 Comparative Summary of Key Findings	116
Table 16 Different types of triangulation	171
Table 17 Comparative table of 26 EU Member States	202

LIST OF FIGURES

Figure 1 The four sources of evidence-based management	7
Figure 2 Percentage of bathing waters with excellent quality in European countries in 2023	31
Figure 3 Map of bathing water quality in Malta	33
Figure 4 Job description and responsibilities with the Environmental Health Directorate...	48
Figure 5 Number of participants per country	62

LIST OF ABBREVIATIONS

SOP - Standard Operating Procedures

EHD - Environmental Health Directorate

EHO - Environmental Health Officer

EHP - Environmental Health Practitioner

HEHP - Higher Environmental Health Practitioner

EEHP – Executive Environmental Health Practitioner

EU - European Union

EFSA - European Food Safety Authority

EEA - European Economic Area

ECDC - European Centre for Disease Prevention and Control

EEA - European Environment Agency

FBOs - Food Business Operators'

BWQI - Bathing Water Quality Index

FIB - Faecal Indicator Bacteria

RQ1 - Research question 1

RQ2 - Research question 2

DEDICATION

I dedicate this dissertation to my husband Michael, whose love is invaluable to me. To my daughters Khloe' and Ella, always pursue your dreams fearlessly and never let anyone deter you. Remember, with every door that closes, another one opens. Embrace change without hesitation. Additionally, I dedicate it to my mum Josephine, whose unwavering support and guidance have been my strength. As she always says, "Believe in yourself, and the world will believe in you."

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

In an era of evolving environmental challenges, Environmental Health Entities in European Member States are increasingly vital in managing the link between environmental factors and public health. This research investigates the practices of environmental health officers across EU member states, leveraging this background to focus on the Standard Operating Procedures (SOPs) for food inspections and bathing water sampling within the Maltese Environmental Health Directorate. The goal is to better inform environmental health management in Malta as a small European island member state. The findings will guide policy development, empower officers, and enhance public health and bathing water integrity.

1.2 STATEMENT OF THE PROBLEM

Environmental health officers (EHOs) have been recognized for their crucial role in protecting public health by enforcing health regulations and conducting inspections. However, limited research exists on common practices among EHOs across the European Union, particularly regarding Standard Operating Procedures (SOPs) for food inspections and bathing water quality monitoring.

Following its accession to the EU in 2004, Malta, as a small island member state, was required to adhere to European Directives. Although Malta already had well-established policies for bathing water sampling and food inspections prior to 2004, gaining a thorough understanding of the current state-of-the-art practices across the EU helped to refine Malta's positioning in these fields. The Maltese Environmental Health Directorate developed SOPs to ensure food safety and bathing water quality, but their effectiveness in addressing current

public health challenges has not been fully explored. This gap in research on EHO practices across the EU and the lack of focus on SOPs for food inspections and bathing water monitoring has hindered the development of best practices.

This dissertation sought to address these gaps by analysing the practices of environmental health officers in EU member states, providing a foundation for evaluating and refining the SOPs of the Maltese Directorate for food inspections and bathing water sampling. The goal was to identify weaknesses in the system and provide evidence-based recommendations to standardise resources and improve processes, ensuring consistency and measurable outcomes. Ultimately, this research sought to enhance the efficiency of Environmental Health Directorates and improve public health outcomes.

1.3 OVERALL RATIONALE

This dissertation is written by an experienced environmental health practitioner with over 25 years in the field. In the food sector, this professional works with a team that certifies food businesses, ensuring they meet all regulations before opening to the public. Additionally, the writer holds a first-class Honours bachelor's degree in environmental studies, demonstrating a strong foundation and commitment to the field.

The initial dissertation title, "The Standard Operating Procedures and Risk Mitigation Strategies of the Maltese Environmental Health Directorate," aimed to explore Malta's environmental health procedures. However, the literature review revealed significant challenges due to a lack of primary evidence on the tasks and responsibilities of environmental health officers (EHOs) across the European Union, and insufficient online information. Additionally, in some EU countries, EHO duties are handled by other professionals, complicating comparisons. To overcome these issues, the author developed an online

questionnaire to gather primary data from EHOs across the EU, identifying 51 different duties. This broadened the research scope, leading to a new title: "Comparative Analysis of Environmental Health Officers in the European Union with a Focus on the Standard Operating Procedures of Malta's Environmental Health Directorate." The revised title reflects the study's expanded focus and allows for a more comprehensive analysis of EHO roles across the EU.

This study prioritised SOPs for food inspection and bathing water because of their critical influence on human health. As Khan and Rahman (2021) have noted, both contaminated water and food can transmit similar diseases, particularly gastrointestinal illnesses, through common exposure routes. Insufficient hygiene practices increase the risk of infection from pathogens in both environments. Gallo et al. (2020) further emphasised the importance of standardised procedures, as pathogens can spread through oral exposure during recreational water activities and various stages of food production.

SOPs ensure consistency and efficiency at work, serving as essential tools for training, reference, and quality control (Cook et al., 2021). However, as Zito et al. (2020) argued, SOPs must be grounded in strong legal frameworks to maintain consistent public health and safety standards. Knill and Liefferink (2013) explained that legislation forms the operational backbone for organisations, guiding the management of public health issues like environmental safety, waste disposal, and food hygiene. The synergy between SOPs and legislation is key to effective environmental health management.

1.4 RESEARCH QUESTIONS

RESEARCH QUESTION 1

How do the roles, responsibilities, and practices of Environmental Health Officers (EHOs) vary across different member states in the European Union?

Population: Environmental Health Officers (EHOs) in the European Union

Intervention: Analysis of roles, responsibilities, and practices

Comparison: Differences and similarities across various EU member states

Outcome: to identify common practices and operations carried out by various governmental bodies, authorities, and entities.

Context: Public health and environmental protection within the EU regulatory framework

This framework is designed to systematically investigate and compare the roles, responsibilities, and practices of EHOs across all the EU countries, focusing on understanding the extent and nature of work practices and variations.

RESEARCH QUESTION 2

To what extent are the standard operating procedures within the environmental health directorate aligned with the Maltese environmental directorate's vision and mission?

Population: Environmental Health Officers in Malta

Intervention: Analysis of standard operating procedures (SOPs)

Comparison: Alignment of SOPs with the vision and mission of the Maltese

Environmental Health Directorate

Outcome: Degree of alignment and identification of gaps or areas for improvement

Context: Operational practices within the Maltese Environmental Health Directorate

This framework aims to evaluate how well the standard operating procedures within the Environmental Health Directorate align with the stated vision and mission of the Maltese Environmental Health Directorate, identifying strengths and areas for enhancement.

1.5 OBJECTIVES

The two research questions of this study have been formulated to achieve the following objectives:

1. To identify common practices and operations conducted by various governmental bodies, authorities, and entities across the European Union.
 2. Evaluate the uniformity in implementing the standard operating procedures among the environmental health officers of the Environmental Health Directorate of Malta.
 3. Suggest tools to improve the consistency and uniformity of work practices among environmental health officers in alignment with standard operating procedures.
-

4. Raise awareness about the significance of standard operating procedures and confirm their efficacy in fulfilling their intended purpose.

1.6 MISSION AND VISION OF THE MALTESE ENVIRONMENTAL HEALTH DIRECTORATE

In alignment with its mission statement, which states:

“The Environmental Health Directorate promotes and safeguards the well-being and health of the public from adverse environmental effects.” (Environmental Health Directorate, 2021, para. 1)

This commitment to public health is further emphasised by the Directorate's vision, which aspires:

“...to be the leader as an official control body in the fields of environmental health and food control.” (Environmental Health Directorate, 2021, para. 2)

To achieve this, the Directorate fosters a work culture that prioritises stakeholder awareness, accountability, flexibility, and professionalism, aiming to be a leading authority in environmental health and food control (Environmental Health Directorate, 2021). This strategic vision is vital as it establishes long-term goals. It unifies decision-making, aligning with evidence-based management principles (Barends and Rousseau, 2018).

1.7 IMPLICATIONS OF THE STUDY

This study holds significant implications as it systematically investigates and compares the roles, responsibilities, and practices of Environmental Health Officers (EHOs) across different EU member states, aiming to uncover common practices and operational variances within public health and environmental protection frameworks. This analysis not

only identifies shared and divergent practices across the EU but also enhances the understanding of how regulatory frameworks influence EHO operations. Additionally, the study includes a comprehensive evaluation of Malta's Environmental Health Directorate's operational framework, to align with best practices in environmental health management. The findings aim to guide the Maltese Environmental Health Directorate, similar jurisdictions, and the wider EU, with broader implications for governance, public health, research, and the value of evidence-based practices.

1.8 SCOPE AND LIMITATIONS

Evidence-based management, like evidence-based medicine, integrates multiple evidence sources into decision-making. Barends and Rousseau (2018) identified four key sources (refer to Figure 1):

1. Scientific literature: Empirical or theoretical studies relevant to the topic.
2. Expertise: Insights from practitioners and literature.
3. Organisational data: Internal information, including manuals, and reports.
4. Stakeholders: Individuals impacted by decisions, such as customers, suppliers, employees, and nearby parties.

Figure 1

The four sources of evidence-based management



Note: Adapted from Barends et al. (2014).

This study applied the 6 A's framework (Ask, Acquire, Appraise, Aggregate, Apply, Assess) by Barends and Rousseau (2018) to gather and evaluate data for evidence-based management decisions. Critical thinking was essential throughout the process. The focus was on comparing the roles, responsibilities, and practices of EHOs in the Environmental Health Directorate of a European Member State with those in other EU countries, whilst examining SOPs for food inspection and bathing water sampling. However, due to limitations in the availability of published SOPs from other EU Member States, the research did not include these comparisons.

Limitations of this study encompass potential constraints on information availability due to confidentiality concerns within the Environmental Health Directorate. Additionally, the research is confined to the specific contextual parameters of the selected European Member State.

1.9 DISSERTATION STRUCTURE

The dissertation unfolds methodically, with each chapter enriching the exploration. Chapter 1 introduces the study's objectives, rationale, scope, limitations, research questions, and framework. Chapter 2 reviews literature on the environmental health inspectorate in Malta and the role of EU member states, focusing on regulations, legal obligations, and practices related to food inspections, bathing water monitoring, and standard operating procedures.

Chapter 3 outlines the research methodology, including design, case study approach, data collection, and ethical considerations. Chapter 4 presents the findings, highlighting key discoveries and their implications for evidence-based management in member states. It unveils insights from interviews with executive environmental health practitioners and

observations, providing a comprehensive understanding of the current landscape, challenges, and opportunities for improvement in environmental health practices.

Chapter 5 serves as the nexus of synthesis and reflection, where the discussion section meticulously analyses and interprets the findings against the backdrop of existing scholarship. Finally, chapter 6, is the pivotal chapter that not only brings closure but also propels further inquiry, offering concrete recommendations to fortify standard operating procedures, enrich training programs, and craft tailored strategies for European member states. Moreover, it lays down a roadmap for future research endeavours, ensuring ongoing evolution and expansion of scholarly discourse.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature and historical context, laying the groundwork for the study. It outlines the research strategy and criteria used to select and evaluate sources, ensuring a systematic approach. The literature overview synthesises existing research on environmental health practices, highlighting key themes and knowledge gaps. It includes a brief history of Malta and a historical perspective on Maltese environmental health officers, tracing the evolution of this profession. The chapter further discusses the practices and regulatory frameworks of EU member states, focusing on the importance of food inspections and bathing water monitoring for public health. It concludes with insights on writing effective standard operating procedures (SOPs) to ensure consistency and quality in environmental health practices. Overall, this chapter establishes a solid foundation for addressing both research questions, emphasising the role of SOPs in aligning practices with the strategic goals of the Maltese environmental health directorate and setting the stage for the analysis and recommendations in subsequent chapters.

2.2 RESEARCH STRATEGY AND CRITERIA

To address the PICOC question in this dissertation with an evidence-based approach, a systematic literature review methodology was employed. This approach ensured a comprehensive examination of existing literature, gathering robust evidence to support a reliable conclusion. The review process facilitated the identification, selection, and synthesis of relevant studies, aligning with best practices for evidence mapping in public health and regulatory frameworks.

2.2.1 SEARCH STRATEGY AND DATABASES

An extensive literature search was conducted using a combination of electronic databases, manual searches, and grey literature sources to ensure comprehensive coverage of the topic. The primary databases included PubMed, the University of Malta (UM) Library Repository, Hydi, Emerald Insight, Scopus, Web of Science, and the Psychology Database (ProQuest). Additionally, manual searches were carried out in books, book chapters, dissertations, and relevant governmental and institutional reports to supplement the findings from the databases.

2.2.2 KEYWORDS AND SEARCH TERMS

The search strategy employed a diverse set of keywords to ensure comprehensive coverage of the topic, including "Standard Operating Procedures," "European Union Regulations," "Public Health Act," "Food Inspectors," "Health Inspectors," "Environmental Health Officers," "Food Inspections," "Bathing Water," and "Evidence-Based Management." Boolean operators (AND, OR) and truncation techniques were utilized to refine search queries and enhance the relevance of retrieved articles.

2.2.3 INCLUSION AND EXCLUSION CRITERIA

2.2.3.1 INCLUSION CRITERIA

Studies were included if they met the following criteria:

- Published from 2012 onwards, ensuring contemporary relevance.
 - Peer-reviewed journal articles, books, book chapters, and authoritative reports.
 - Focused on public health regulations, food safety inspections, environmental health officers, and evidence-based management within the European Union or comparable jurisdictions.
-

- Empirical studies, systematic reviews, meta-analyses, and government policy documents relevant to food, bathing water, standard operating procedures and health inspections.
- Studies available in English to ensure accessibility and comprehension.

2.2.3.2 EXCLUSION CRITERIA

The following studies were excluded:

- Studies published before 2012, unless deemed foundational to the research.
- Non-peer-reviewed sources, opinion pieces, editorials, and blog posts.
- Research focusing solely on non-European regulatory frameworks unless comparative insights were necessary.
- Articles with insufficient methodological rigor, including those lacking empirical data or transparency in methods.
- Duplicates and studies without full-text availability.

This structured approach to research ensured the collection of high-quality, relevant evidence, reinforcing the reliability and validity of the dissertation's findings.

2.3 LITERATURE OVERVIEW

Historically most of the research into evidence-based practice has focused on the medical profession, with less emphasis placed on environmental health officers. As highlighted by Eendebak and the World Health Organization (WHO) in 2015, environmental health interventions are credited with contributing to roughly 15 of the additional 20 years of life expectancy we enjoy today compared to a century ago. Whiley et al., (2019) argued that environmental health holds the most significant influence on human well-being. This profound impact stems from essential measures like safe food and water, proper sewage

disposal, clean air and water, and vaccination programs. Building on the work of German et al., (2001), this research recognizes environmental health officers (EHOs) as professionals with a unique and multifaceted skill set. This highlights the importance of ongoing research to fully understand the distinctive characteristics of their roles. Due to the limited literature available, it is unclear how evidence-based practice is implemented and adopted within the public health inspectorates.

Standard operating procedures (SOPs) are defined by Akyar (2012) as documented instructions that detail the steps for carrying out routine or repetitive tasks. A quick search on PubMed on ‘What are standard operating procedures?’ provides 408,919 results in a few seconds. They act as a valuable reference, promoting uniformity, and provide guidance to both apprentice and experienced health officers, who need to comprehend, learn, and later review the detailed instructions for performing the varied health inspectorate duties. Robert (2022) underscored the critical role of aligning standard operating procedures with regulatory requirements to strengthen organisational practices within environmental health directorates. He emphasised the importance of maintaining dynamic standard operating procedures, advocating for regular updates to reflect feedback, technological advancements, and evolving legal and regulatory landscapes. This ensures the directorates' effectiveness and compliance in their daily operations.

2.4 HISTORICAL CONTEXT OF MALTA AND ENVIRONMENTAL HEALTH OFFICERS

Malta, a Mediterranean archipelago linking Europe and North Africa, spans 316 km² and is the most densely populated country in Europe, with over 1,300 people per km² (Sammut and Agranovska, 2021). Public health regulation dates back to the Aragonese era (1283–1438), when '*kattapani*' managed food quality and pricing (Vella, 1993). In 1458, quarantine

measures for plague-affected ships were introduced, with strict penalties for violations, highlighting early disease prevention efforts (Savona-Ventura, 1997).

Under the Knights of St. John, public health structures became more formalized. They adopted the Rhodes Code of Health Laws, establishing a health commission in 1538 and creating '*Magistri Sanitatis*' to oversee sewage and water laws, some of which persist today (Environmental Health Directorate, Malta, 2013). Efforts to maintain street cleanliness began in the 16th century, with fines for littering imposed in Valletta, Senglea, and Vittoriosa in 1586.

A Royal Commission in 1838 merged the Water Police and Quarantine Departments under the Superintendent of Quarantine, leading to new disease prevention laws (The Royal Army Medical Corps and the Maltese Garrison – 1904, n.d.). British colonization in the late 19th century established the Public Health Department. In 1903, Sanitary Inspectors were sent to England for training, earning Diplomas in Public Health (The Royal Army Medical Corps and the Maltese Garrison – 1904, n.d.).

Sir Temi Zammit identified *Brucella Melitensis* as the cause of Malta Fever in 1887 and advocated for water chlorination, balancing public health needs with local dependence on goat milk (Environmental Health Directorate, Malta, 2013; Wyatt, 2010). In 1907, the Public Health Department reorganized its Sanitary Branch into three districts, with medical officers and sanitary inspectors managing drainage, isolation, disinfection, and food safety (Environmental Health Directorate Malta, 2013).

The title of Sanitary Inspector changed to Health Inspector in 1957 and to Environmental Health Officer in 2003, leading to the formation of the Environmental Health Directorate. Today, the Directorate employs about 81 Environmental Health Officers within a structured hierarchy, headquartered in St. Venera, Malta. The evolution of these roles reflects

the strategic alignment of environmental health practices with Malta's public health objectives, ensuring the continued effectiveness of standard operating procedures in safeguarding public health.

The evolving role of Environmental Health Officers (EHOs) reflects the Maltese Environmental Health Directorate's strategic goals. Tracing public health developments in Malta highlights how standard operating procedures (SOPs) have consistently safeguarded public health, reinforcing their relevance within Malta's environmental health governance.

2.5 EUROPEAN MEMBER STATES AND ENVIRONMENTAL HEALTH

The European Union spans over 4 million km² and has a population of 448.4 million, with Malta as its smallest member state (European Union, n.d.). The diversity among EU states, noted by Thomson (2015), includes variations in size, population, and influence, affecting the economic power of smaller nations like Malta compared to larger ones like France.

Malta's unique environmental context, characterised by limited land, high population density, and a tourism-dependent economy, requires stringent food safety and water quality management. Environmental Health Officers (EHOs) are vital for enforcing both national and EU regulations through carefully developed Standard Operating Procedures (SOPs). According to Sammut and Agranovska (2021) and Bulmer and Lequesne (2020), EU regulations supersede national laws, necessitating rigorous compliance to align food safety and environmental health standards with European directives. While SOPs provide a structured approach, they must adapt to Malta's specific circumstances, including local food production and diverse culinary practices.

Rizzo et al. (2020) emphasise that Malta's coastline is vital for tourism and recreation, making high bathing water quality essential. Through robust food inspections and bathing water control, Malta's Environmental Health Directorate protects public health and tourism (Environmental Health Directorate, 2021).

The EU aims to create a healthier and safer environment by prioritising public health, food safety, and ecosystem well-being, including building a strong European Health Union and protecting crops and forests. National, regional, and local governments enforce regulations, while the EU consults stakeholders, proposes laws, supports projects, and aids authorities to achieve its mission (European Commission, 2024).

EU policies and directives play a critical role in shaping the roles and responsibilities of Environmental Health Officers (EHOs) across member states. These regulatory frameworks establish baseline standards for public health, food safety, and environmental protection, which EHOs are tasked with enforcing. In the late 1990s, food incidents highlighted the need for EU-wide food and feed regulations (European Commission, n.d.). Consequently, the European Commission launched a 'from farm to fork' approach to food safety, outlined in the White Paper on Food Safety (EUR-Lex, n.d.). In 2002, the European Parliament and Council adopted Regulation (EC) No 178/2002, or the General Food Law Regulation (EUR-Lex, 2022), which established a legislative framework for food safety at both EU and national levels. This regulation created the European Food Safety Authority (EFSA) for scientific advice and introduced the Rapid Alert System for Food and Feed (RASFF) for crisis management, aiming to protect human life and consumer interests (European Commission, n.d.).

Under Regulation (EC) No 178/2002, EFSA ensures food and feed safety, prohibiting unsafe food sales and supporting scientific testing and crisis management. Regulation (EU)

2019/1381 further enhances transparency in risk assessment by allowing public access to EFSA studies and strengthening governance (Eur-Lex Access to European Law, 2022).

Table 1 below, summarises key EU regulations and their impact on food safety and environmental health:

Table 1

Overview of Key EU Regulations and Documents on Food Safety and Public Health

Regulation/Document	Year	Key Provisions	Governing & Scientific Bodies
Regulation (EC) No 178/2002 (General Food Law Regulation)	2002 (last updated 2024)	Establishes EU food safety framework, creates EFSA, introduces RASFF for crisis management	European Parliament & Council, European Commission (DG SANTE), EFSA (scientific role)
Regulation (EU) 2019/1381	2019	Enhances transparency in food safety risk assessments, ensures public access to EFSA studies	European Parliament & Council, European Commission (DG SANTE), EFSA (scientific role)
White Paper on Food Safety	2000	Outlines 'farm to fork' approach to food safety	European Commission
European Commission Annual Reports on Official Controls	Ongoing	Assesses compliance with EU food safety, animal health, and plant protection laws	European Commission, DG SANTE
European Green Deal & One Health Approach	2022	Integrates human, animal, and environmental health for sustainability	European Commission (DG SANTE, DG ENV, DG AGRI)
Treaties of the European Union	Various	Establish EU governance, Commission's role as 'Guardian of the Treaties'	European Council, Member States, European Commission (guardian/enforcement role)
European Centre for Disease Prevention and Control (ECDC) Regulations	Ongoing	Conducts disease surveillance, manages Early Warning and Response System (EWRS)	ECDC, European Commission (DG SANTE)

Note: Adapted from European Commission (n.d.), EUR-Lex (2022), (EUR-Lex, n.d.), European Commission (2016), European Commission (2023a), European Commission (2023b), and (European Centre for Disease Prevention and Control, 2024).

Member States delegate decision-making to collective institutions, fostering democratic governance on shared interests (European Commission, 2022). As the 'Guardian of the Treaties,' the Commission ensures compliance and enforces infringement procedures (European Commission, 2016). It publishes annual reports assessing food law, animal health, and plant protection compliance, supporting food safety and trade (European Commission, 2023). National authorities implement controls, with the Commission auditing compliance and recommending improvements (European Commission, Directorate-General for Health and Food Safety, 2023). DG SANTE oversees public health, food safety, and animal welfare, promoting a unified regulatory framework. In 2022, it advanced food safety and animal welfare under the European Green Deal, adopting the "One Health" approach to integrate human, animal, and environmental health (European Commission, 2023). This collaborative model addresses interconnected health challenges for sustainable solutions (Zinsstag et al., 2023).

The author has compiled Tables 2 and 3 to summarize both the shared and unique responsibilities of Environmental Health Officers (EHOs) across various EU member states and the United Kingdom, included due to its historical ties to Malta (DGAL, 2015; Envesca, 2024; Environmental Health Directorate, 2021; EU Food Safety Almanac, 2021; Food Safety Authority of Ireland, 2024; Food Standards Agency, 2021; International Federation of Environmental Health, Cyprus, n.d.; International Federation of Environmental Health, Portugal, n.d.; The Royal Environmental Health Institute of Scotland, 2016–2024). EHOs commonly oversee food safety, conduct hygiene inspections, and monitor water quality across these countries. Licensing and inspection of food businesses are standard duties, with many countries adding roles in public health education, occupational safety, and pollution control.

However, responsibilities vary in certain areas. For example, some countries lack information on environmental complaints or waste management oversight, which may fall under other agencies. Similarly, duties like animal feed oversight, immunization control, and setting food quality standards are country specific. The tables also reveal widespread duties, such as import/export control and burial oversight, though administrative structures differ. These variations suggest a need for clearer roles in health management, with differences potentially arising from incomplete information or the distribution of tasks across different authorities.

Table 2

Environmental Health Officers' Duties – Part 1

Duty of Health Inspector	Malta	Cyprus	Ireland	Scotland	United Kingdom	Germany	France	Portugal	Poland
Food Safety Enforcement	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hygiene Inspections of food premises	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental Complaints and hygiene (illegal dumping, accumulation of refuse and stagnant water etc)	✓	No available information	✓	✓	✓	No available information	No available information	No available information	No available information
Occupational Health and Safety	No	No available information	✓	✓	✓	✓	✓	✓	✓
Drinking water, pools and bathing water quality monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓
Licensing and Inspection of food premises	✓	✓	✓	✓	✓	✓	✓	✓	✓
Infectious Disease Control	✓	No available information	✓	✓	✓	✓	✓	✓	✓
Public Health Education	No	✓	✓	No available information	✓	No available information	✓	No available information	No available information
Noise and Pollution Control	No	No available information	✓	No available information	✓	No available information	✓	✓	No available information
Tobacco Control	✓	No available information	✓	✓	✓	No available information	✓	✓	✓
Vector Control	✓	No available information	✓	✓	✓	No available information	✓	No available information	✓

Table 3*Environmental Health Officers' Duties – Part 2*

Duties of Health Inspector	Malta	Cyprus	Ireland	Scotland	United Kingdom	Germany	France	Portugal	Poland
Regulation Basis	National & EU	National & EU	National & EU	National & Local	National & Local	National & EU	National & EU	National & EU	National & EU
Supervise interment and repatriation of human remains	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental Protection	✓	No available information	✓	✓	✓	✓	✓	✓	✓
Food quality Standards	✓	✓	✓	✓	✓	No available information	No available information	✓	No available information
Animal Feed Oversight	No	No available information	✓	✓	✓	No available information	✓	No available information	✓
Import and Export control of foodstuffs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Immunization Control	✓	No available information	✓	No available information	✓	No available information	✓	✓	✓
Built Environment Inspection	✓	No available information	✓	✓	✓	No available information	No available information	✓	No available information
Atmospheric and Noise Control	No	No available information	✓	✓	✓	✓	✓	✓	✓
Water and Soil Pollution Monitoring	✓	No available information	✓	✓	✓	✓	✓	✓	✓

Despite the overarching goal of harmonisation across the EU, significant variations persist in how environmental health regulations are implemented among member states. In 2022, Borraz et al. conducted a study exploring the underlying factors behind the divergence in risk-based inspection practices among France, the Netherlands, England, and Germany, despite the EU's efforts to harmonise food safety regulations. During the study, it was noted that France primarily targets large food business operators based on process hazards, while the Dutch prioritise food business operators' compliance history, often overlooking larger businesses. Conversely, both England and Germany consider both hazards and food business operators' behaviour, resulting in broader inspection coverage. This variation is unexpected

given the EU's emphasis on regulatory alignment and the principles of better regulation advocating for efficiency and consistency. SOPs are adjusted to account for variations in risk-based inspection practices across EU countries, ensuring local contexts and challenges are considered.

This divergence is particularly significant in the context of Malta, where limited resources and the need for efficient regulatory compliance pose additional challenges to aligning with the EU's broader directives.

Further analysis of the SOPs within Malta's Environmental Health Directorate reveals that while there is a structured framework aimed at ensuring compliance with EU regulations, gaps may exist in how these procedures align with Malta's specific environmental health challenges. The EU's regulatory emphasis on food safety, while essential, may not fully accommodate the unique needs of Malta, particularly its dependence on tourism and the critical importance of maintaining high bathing water quality, a key factor not only for public health but also for economic sustainability (Rizzo et al., 2020). For example, the Standard Operating Procedures (SOPs) for bathing water quality sampling in Malta mandate more frequent or specifically tailored samples than those required in other EU states. This is due to Malta's unique challenges, including its high population density and the intense pressures from tourism, which can significantly impact water quality.

According to Steinebach (2022), the divergence between EU regulatory frameworks and national implementation highlights the need for a more nuanced understanding of how environmental health standards are applied across different member states. In Malta's case, the rigid application of EU-wide regulations may overlook the need for localised adjustments that account for the island's environmental realities (Sammut and Agranovska, 2021). By examining these discrepancies, particularly through the lens of SOPs and their application in

Malta, this study aims to address significant gaps in the literature concerning the alignment of national public health practices with EU directives. This investigation is crucial for developing a deeper understanding of the role of EHOs in safeguarding public health across the EU, particularly in smaller states with unique environmental health challenges.

Additionally, the establishment of the European Centre for Disease Prevention and Control (ECDC) enhances the EU's capacity to respond to health crises. The ECDC's duties encompass surveillance, detection, and risk assessment of threats, along with conducting epidemiological surveillance and managing the Early Warning and Response System (EWRS) (Renda and Castro, 2020). Experts from the European Centre for Disease Prevention and Control (ECDC) evaluate the risks facing Europe and offer recommendations to assist countries in preventing and addressing outbreaks and public health emergencies, thereby supporting regulatory frameworks and SOPs for effective prevention (European Centre for Disease Prevention and Control, 2024).

Table 4

Confirmed salmonellosis cases and rates per 100,000 people by country and year in EU/EA from 2018 to 2022

Country	2018		2019		2020		2021		2022	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Austria	1 538	17.4	1 866	21.1	817	9.2	993	11.1	1 192	13.3
Belgium	2 958	26.0	2 527	22.1	1 595	13.8	2 084	18	2 375	24.1
Bulgaria	586	8.3	594	8.5	187	2.7	241	3.5	310	4.5
Croatia	1 323	32.2	1 308	32.1	786	19.4	593	14.7	1 047	27.1
Cyprus	44	5.1	62	7.1	70	7.9	41	4.6	66	7.3
Czechia	10 901	102.7	13 009	122.2	10 516	98.3	9 894	92.5	7 563	71.9
Denmark	1 168	20.2	1 119	19.3	614	10.5	692	11.8	898	15.3
Estonia	314	23.8	150	11.3	91	6.8	112	8.4	134	10.1
Finland	1 431	26.0	1 175	21.3	516	9.3	474	8.6	666	12.0
France	8 936	27.8	8 935	27.7	7 071	21.9	9 315	28.7	11 162	16.4
Germany	13 293	16.1	13 494	16.3	8 664	10.4	8 144	9.8	9 064	10.9
Greece	640	6.0	643	6.0	381	3.6	284	2.7	640	6.1

Country	2018		2019		2020		2021		2022	
	Number	Rate								
Hungary	4 161	42.6	4 452	45.6	2 964	30.3	3 298	33.9	3 249	33.5
Iceland	63	18.1	50	14.0	32	8.8	53	14.4	42	11.2
Ireland	352	7.3	347	7.1	214	4.3	173	3.5	340	6.7
Italy	3 635	6.0	3 256	5.4	2 713	4.5	3 768	6.4	3 302	5.6
Latvia	409	21.1	438	22.8	296	15.5	218	11.5	90	4.8
Liechtenstein	NDR	NRC	NDR	NRC	NDR	NRC	7	17.9	5	12.7
Lithuania	779	27.7	736	26.3	419	15.0	281	10.1	234	8.3
Luxembourg	135	22.4	131	21.3	93	14.9	133	21.0	161	24.9
Malta	116	24.4	131	26.5	176	34.2	249	48.2	199	38.2
Netherlands	1 061	9.6	1 197	10.8	695	6.2	862	7.7	1 027	9.1
Norway	961	18.1	1 092	20.5	441	8.2	389	7.2	712	13.1
Poland	9 064	23.9	8 373	22.0	5 192	13.7	7 708	20.4	6 054	16.1
Portugal	302	2.9	432	4.2	262	2.5	361	3.5	412	4.0
Romania	1 410	7.2	1 383	7.1	408	2.1	518	2.7	1 010	5.3
Slovakia	6 791	124.8	4 992	91.6	3 385	62.0	4 439	81.3	3 669	67.5
Slovenia	274	13.3	362	17.4	214	10.2	185	8.8	384	18.2
Spain	8 730	NRC	5 087	NRC	3 526	NRC	6 168	17.8	8 832	25.5
Sweden	2 041	20.2	1 990	19.5	825	8.0	933	9.0	1 128	10.8
EU/EEA (30 countries)	83 416	21.0	79 331	20.9	53 163	14.2	62 610	16.7	65 967	15.5
United Kingdom	9 466	14.3	9 718	14.6	NDR	NRC	NA	NA	NA	NA
EU/EEA (31 countries)	92 882	20.0	89 049	20.0	53 163	14.2	NA	NA	NA	NA

Source: Country reports.

NDR: No data reported.

NRC: No rate calculated.

NA: Not applicable.

No data for 2020-2022 were reported by the United Kingdom, due to its withdrawal from the EU on 31 January 2020.

Note: Adapted from European Centre for Disease Prevention and Control (2022).

The European Centre for Disease Prevention and Control (ECDC) plays a critical role in public health by conducting surveillance and managing health threats across member states. One prime example is the surveillance of Salmonellosis, which is one of the leading causes of foodborne illness (Ehuwa et al., 2021). Table 4 above presents data collected from 2018 to 2022, highlighting its role as a significant contributor to food poisoning outbreaks (European Centre for Disease Prevention and Control, 2022). In 2022, Czechia reported the highest notification rate at 71.9 cases per 100,000 people, followed by Slovakia (67.5) with Malta placing third (38.2). The lowest rates were observed in Portugal, Bulgaria, and Latvia (European Centre for Disease Prevention and Control, 2022). Such surveillance and data capture underscores the necessity for robust environmental health officers' practices to ensure effective food safety management across Europe.

Environmental health officers (EHOs) play a critical role in maintaining food safety standards throughout the production, processing, and distribution chain. Monitoring confirmed cases and rates helps assess inspection effectiveness, with consistently low rates indicating robust systems and fluctuations highlighting areas needing improvement (Kettunen et al., 2018). Comparative analyses across countries enhance understanding of inspection practices, informing regulatory adjustments and resource allocation. International collaboration promotes best practices and standardisation, while trend analysis supports long-term strategic planning for public health protection (Welter et al., 2020). Overall, EHOs are vital to EU food safety, and their performance metrics can indicate environmental health officer's' effectiveness.

The roles and responsibilities of EHOs vary significantly across EU countries, shaped by local contexts and regulations. Ensuring Malta's SOPs align with EU directives is essential

for upholding food safety and environmental health standards, which supports national public health goals and the EU's collective efforts.

2.5.1 TRAINING AND EDUCATION

Due to limited information, the training and professional development of Environmental Health Officers (EHOs) likely varies across EU member states, impacting the implementation and effectiveness of Standard Operating Procedures (SOPs). Comprehensive training programs focusing on current environmental health practices are essential for equipping EHOs to address regulatory demands and public health challenges (Bulmer and Lequesne, 2020). Inconsistent training quality highlights the need for standardised educational frameworks to ensure uniformity in environmental health efforts.

A key initiative is Better Training for Safer Food (BTSF), a European Commission program that enhances EHO training on EU food safety regulations. BTSF aims to uphold high consumer protection standards, promote harmonised control systems, and facilitate safe food trade, particularly with developing countries (BTSF Academy, 2024). Training is delivered through workshops, virtual classrooms, and eLearning, employing a train-the-trainer approach. Workshops involve small groups from various countries, while sustained training missions focus on specific topics led by experts. The BTSF Academy also offers self-paced online courses for officials in EU member states to keep them updated on Union law and effective control measures (BTSF Academy, 2024). Investing in programs like BTSF can strengthen EHO capabilities, resulting in more consistent and effective environmental health practices across the EU.

2.5.2 CHALLENGES AND BARRIERS

EHOs in various member states encounter common challenges and barriers that can hinder their effectiveness. Issues such as resource limitations, regulatory inconsistencies, and public compliance challenges complicate the enforcement of health standards (Eyler, 2020). These obstacles can lead to variability in the implementation of environmental health policies, ultimately affecting public health outcomes and the efficacy of SOPs.

2.5.3 EMERGING TRENDS

Emerging trends, such as climate change, technological advancements, and public health crises like COVID-19 are reshaping EHO practices and SOPs. These factors require adaptive strategies that enable EHOs to respond effectively to new challenges, including enhanced data collection, risk assessment, and public communication (Ferrinho, 2024). Recognizing these trends is vital for developing resilient environmental health policies capable of addressing future challenges.

2.5.4 CULTURAL CONTEXTS

Cultural differences among EU member states significantly influence the implementation of Standard Operating Procedures (SOPs) and the overall role of Environmental Health Officers (EHOs). Variations in societal norms, public attitudes towards health and safety, and trust in government can lead to disparities in the acceptance and adherence to SOPs (Whiley et al., 2019). Understanding these cultural contexts is essential for identifying best practices and fostering effective environmental health initiatives tailored to diverse populations.

2.6 IMPORTANCE OF FOOD INSPECTIONS

Food safety inspections are critical for safeguarding public health by ensuring adherence to hygiene standards and mitigating food safety risks. The extensive literature reviewed, detailed in Appendix A, reveals a complex landscape of food inspection practices and their effectiveness. Research emphasizes the need for consistency, risk-based targeting, and effective communication, while identifying areas for improvement.

Key findings reveal both the effectiveness and limitations of food safety inspections across EU member states. Barnes et al. (2022) explore diverse societal perspectives on food safety inspections, emphasising how social factors influence inspection practices. Kettunen et al. (2018) identifies inconsistencies in enforcement among Finnish food control units, suggesting that stricter penalties for repeat offences could enhance compliance. Borraz et al. (2022) further emphasise that EU member states interpret and implement "risk-based" inspections differently, impacting prioritisation of inspections for various businesses.

Challenges for smaller businesses are significant. Törmä et al. (2019) discuss the difficulties small-scale slaughterhouses face in implementing Hazard Analysis Critical Control Point (HACCP) systems due to associated costs. Powell et al. (2013) reveals limitations in audits and inspections, advocating for a strong culture of safety within food businesses and suggesting that simplifying regulations or strengthening audits could improve effectiveness.

Effective communication and collaboration are vital for successful food safety initiatives. Mari et al. (2013) underscores the importance of clear communication between food business operators (FBOs) and inspectors, while Food Safety News (2019) recommends improved stakeholder engagement in the UK. Lijana (2021) emphasises the need for positive

relationships between regulators and food businesses, although more specific strategies for building these relationships are required.

Additionally, Eliasson et al. (2022) explore the complexities of transforming food systems towards sustainability in Sweden, indicating that policy alignment with industry practices is essential. The European Commission's Farm to Fork Strategy (2020) outlines a vision for a sustainable food system in the EU, dependent on effective stakeholder collaboration to craft viable policies.

The global perspective is also crucial; the European Centre for Disease Prevention and Control (2022) highlights the importance of cross-sector collaboration in outbreak control, while Hald et al. (2016) stress the persistent challenge of foodborne diseases worldwide.

Several studies provide insights into specific national contexts. For example, Stadlmüller et al. (2017) utilise official control data to assess hygiene in Austrian food production facilities, while Harris et al. (2015) investigates the impact of cultural differences on food safety outcomes in the US. Kovács et al. (2020) examine potential "grade inflation" in restaurant hygiene inspections due to inspector familiarity in Los Angeles.

Ensuring food safety requires a multifaceted approach that incorporates consistency, risk-based targeting, effective communication, and collaboration. Addressing the challenges faced by smaller businesses and considering the broader context of sustainable food systems are critical for comprehensive food safety protection. EU food regulations, including Regulation EC No 852/2004, mandate hygiene standards for food business operators, and Regulation EC No 854/2004 requires authorities to verify compliance through official controls (EUR-Lex, 2021; EUR-Lex, 2019). These inspections aim to prevent foodborne illnesses, promote good hygiene practices, and ensure adherence to regulations.

Despite their crucial role in mitigating contamination risks, food inspections often face criticism for inconsistencies and ineffectiveness (Barnes et al., 2022). Implementing robust Standard Operating Procedures (SOPs) is essential to tackle these issues, as SOPs standardise inspection processes and ensure reliability through clear guidelines for preparation, execution, and follow-up. Adherence to SOPs improves efficiency and equips Environmental Health Officers (EHOs) with the tools to manage food safety risks effectively.

However, significant gaps remain. Most studies focus on specific national or regional contexts, limiting their broader applicability. The research by Kettunen et al. (2018) and Borraz et al. (2022) shows that food safety regulations are applied inconsistently across EU member states. Kettunen et al. found that, in Finland, local variations persist despite national guidelines, while Borraz et al. revealed differing approaches to risk-based inspections in four countries due to unique regulatory histories. These studies suggest that EU-wide regulations may lead to different outcomes depending on local contexts, making their findings not universally applicable. Additionally, while challenges in enforcement and implementation are noted, there is insufficient exploration of integrating new methodologies into existing SOPs or adapting them to emerging risks.

A major gap is the lack of comparative analysis of food inspection practices and SOPs across EU member states. Understanding these variations is key for aligning practices with regional health missions. Moreover, research is needed on integrating advanced monitoring techniques into SOPs and adapting them to new health risks and changing demands.

Overall, the literature highlights the complex nature of food safety inspections and highlights the need for consistent, risk-based approaches. Addressing these gaps, particularly in comparative analysis and adaptability, will enhance food safety inspection efficacy. Aligning Malta's SOPs with both national and EU standards is vital, given Malta's unique

context with its high population density and tourism focus. Effective training programs, like the Better Training for Safer Food (BTSF), are essential to harmonise EHO practices and uphold high public health standards across Europe.

2.7 BATHING WATER MONITORING IN THE EU

Europe's stunning beaches and bathing spots attract millions of tourists, making clean and safe water essential for public health. Currently, over 95% of bathing sites adhere to the minimum standards outlined in EU legislation (European Environment Agency, 2024). Bathing water monitoring identifies risks like bacterial contamination, allowing prompt action to protect public health. This process underscores the importance of water quality for both human and environmental health.

The EU's Bathing Water Directive, first established in 1976 and revised in 2006 (2006/7/EC), mandates strict monitoring and reporting protocols across member states, focusing on designated bathing areas. This directive has significantly improved water quality, with the proportion of "excellent" rated waters rising from 53% in 1991 to 85% in 2019 (Globevnik et al., 2020). Compliance with the directive is crucial for protecting public health, especially in regions reliant on tourism, where pristine bathing waters are a key attraction (Džal et al., 2021).

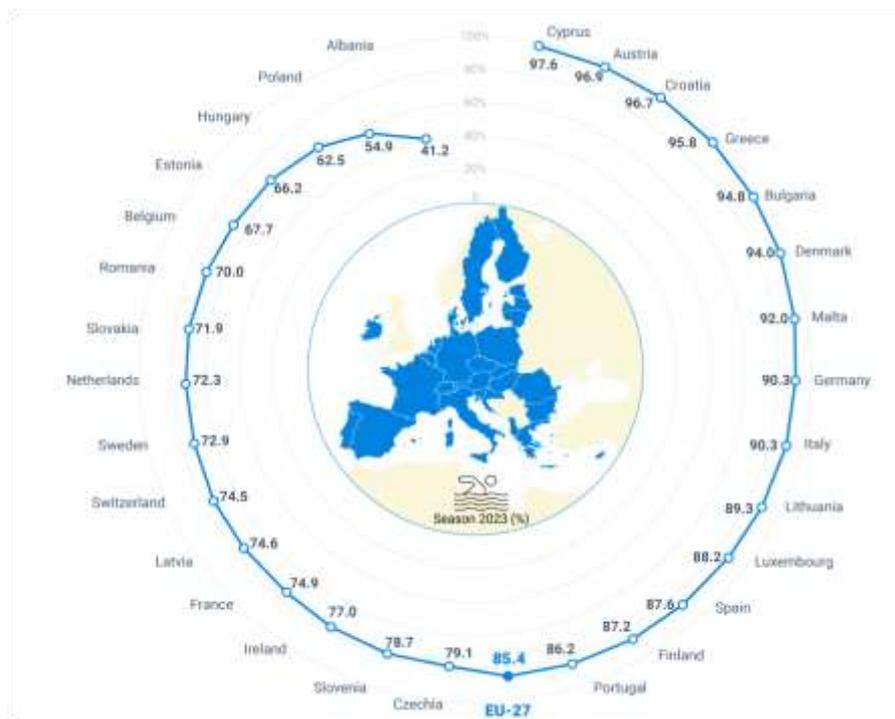
Following the directive, EU member states, including Malta, must manage their beaches through detailed annual plans. These plans include identifying bathing areas, defining seasonal monitoring durations, and establishing testing protocols for both coastal and inland waters (European Environment Agency, 2023). The Directive aims to prevent illnesses from sewage and manure contamination but excludes swimming pools. Testing focuses on key indicators of faecal contamination, specifically *E. coli* and intestinal enterococci, with water

quality classified as excellent, good, sufficient, or poor based on bacterial levels (European Environment Agency, 2023).

The European Environment Agency's 2023 report shows progress: 85% of nearly 22,000 assessed bathing waters in Europe, achieved "excellent" status, and 96% met minimum quality standards, although 1.5% need better management to address pollution and climate change challenges (European Environment Agency, 2023). Continued efforts are necessary to maintain healthy aquatic environments, aligning with the EU's Zero Pollution Action Plan.

Figure 2

Percentage of bathing waters with excellent quality in European countries in 2023



Note: Data from the European Environment Agency, 2023.

The data presented in Figure 2 illustrates the high performance of bathing water monitoring systems across EU countries, serving as an indicator of Environmental Health Officers' (EHOs) effectiveness. In 2023, Malta ranked 7th in the EU for bathing water quality, a testament to the diligent work of its EHOs. Their efforts reflect an ability to maintain high

standards despite challenges such as tourism density and limited coastal resources, ensuring both public health and environmental protection.

2.7.1 MALTA'S BATHING WATER MONITORING PROGRAMME

Malta's Environmental Health Directorate has developed a comprehensive bathing water monitoring programme that aligns closely with the EU Bathing Water Directive. The programme, managed by the Water Regulatory and Auditing Unit in collaboration with the Gozo Region, runs for 23 weeks during the official bathing season from mid-May to mid-October, with pre-season sampling beginning in late April (Environmental Health Directorate, 2021).

Malta's approach is particularly rigorous, with weekly tests conducted at 87 official bathing sites, far exceeding the EU's requirement of four samples per season (refer to Figure 3 below). Specific sites, such as those in Marsamxett Harbour and 16 Dog Friendly Beaches, receive additional weekly monitoring. EHOs play a crucial role in this process, handling repeat samples, reporting sewage overflows, and coordinating temporary closures of bathing sites when necessary (Environmental Health Directorate, 2021).

Figure 3*Map of bathing water quality in Malta*

Note: Data from the Bathing water country fact sheet, 2023

2.7.2 ROLE OF STANDARD OPERATING PROCEDURES (SOPS)

Standard Operating Procedures (SOPs) are essential for reliable and consistent water quality monitoring, ensuring compliance with EU standards and aligning with Malta's environmental goals. SOPs in Malta guide every aspect of sample collection, analysis, and reporting, supporting the Environmental Directorate's mission to protect public health and ecosystems. As Akhtar et al. (2021) note, water quality monitoring provides insights into ecosystem health, enabling targeted interventions.

SOPs are critical for data-driven decision-making, helping authorities identify trends, emerging risks, and the effectiveness of management actions. Monitoring faecal contamination through indicators like *E. coli* allows Environmental Health Officers (EHOs) to address potential health threats promptly. However, Farrell et al. (2021) highlight a key gap: monitoring efforts often overlook emerging risks such as antimicrobial-resistant bacteria, even as these pose significant threats to public health. Current SOPs focus predominantly on faecal indicators, underscoring the need to expand monitoring frameworks to encompass a broader range of threats.

2.7.3 INNOVATIONS AND CHALLENGES IN BATHING WATER MONITORING

This dissertation dives deep into the complexities of bathing water quality monitoring, showcasing both the progress made and the ongoing challenges in protecting public health. By analysing a diverse range of research endeavours documented in Appendix B, this review synthesises key findings and unveils crucial insights into the intricate processes involved in assessing and managing bathing water quality.

Bathing water management is a critical aspect of EHO responsibilities. SOPs and monitoring programs, guided by regulations like the EU Bathing Water Directive, are essential for safeguarding public health and protecting aquatic ecosystems. This synthesis of literature highlights key advancements, strengths, and limitations of existing studies while identifying gaps in the field. Studies by Džal et al. (2021) and Bonamano et al. (2021) illustrate innovations such as predictive models and the Bathing Water Quality Index (BWQI) for enhanced monitoring. However, their region-specific focus, Croatia and Italy, limits their applicability across different EU member states, revealing a gap in comparative analysis of EHO practices.

The literature also emphasises the need for expanded monitoring beyond traditional faecal indicator bacteria (FIB), as highlighted by Madonia et al. (2020) and Tiwari et al. (2021). Yet, there is insufficient exploration of how these advanced methods align with existing SOPs or specific health missions, such as those of their respective competent authorities.

Additionally, Oliver et al. (2014) and Tiwari et al. (2021) provide insights into molecular methods and comparative monitoring practices but do not fully address regulatory challenges or specific regional differences. Ongoing issues like non-point source pollution and antibiotic-resistant bacteria, discussed by Jozić et al. (2021) and Fewtrell and Kay (2015), underscore the need for improved risk assessment methods.

Addressing gaps in EHO practices, aligning SOPs with novel techniques, and expanding monitoring frameworks are crucial for improving public health outcomes. By adopting innovative methods and fostering harmonization across the EU, environmental health authorities can ensure safer bathing waters and better protect aquatic ecosystems.

In conclusion, maintaining bathing water safety requires a multi-faceted approach involving advanced monitoring, robust policies, and proactive management of emerging risks. For Malta's Environmental Health Directorate, these measures are essential not only for protecting local communities but also for sustaining the country's tourism-dependent economy. Bridging gaps in monitoring practices will strengthen policy implementation and uphold public health standards across the EU.

2.8 WRITING EFFECTIVE STANDARD OPERATING PROCEDURES (SOPS)

A detailed review of academic sources in Appendix C emphasises the crucial role of Standard Operating Procedures (SOPs) in maintaining operational consistency and quality

across multiple industries. SOPs serve as essential guidelines, providing a structured framework for practices ranging from laboratory protocols to healthcare services. By minimising errors and promoting transparency, they are critical for maintaining high operational standards. Moreover, SOPs enhance risk and project management, facilitate regulatory compliance, and support continuous improvement initiatives across organisations. Research consistently emphasises the necessity of clear and concise SOPs for stakeholder understanding and adherence (Amare, 2012; Akyar, 2012; Garg, 2023; Gough and Hamrell, 2009). Effective SOPs act as safeguards against errors and standardise practices, ensuring reliable outcomes. For instance, Akyar (2012) highlights that SOPs foster knowledge transfer and skill development, which are essential for sustaining operational continuity during personnel changes. In the healthcare sector, SOPs grounded in best practices significantly improve patient care and safety (Garg, 2023; Bischoff et al., 2015). Crafting effective SOPs requires a focus on clarity, conciseness, and user-friendliness (Schniepp, 2020). These documents should evolve alongside process improvements and technological advancements while ensuring data integrity through explicit instructions on data recording (Hollmann et al., 2020). Implementing SOPs can encounter resistance, particularly within established work cultures, as staff may perceive increased time commitment or limitations on their autonomy. Effective communication strategies are crucial for overcoming such hurdles, as addressing staff concerns and demonstrating the benefits of standardisation can foster a sense of ownership among employees (Lo-Fo-Wong, 2023). The versatility of SOPs is evident in their application across various contexts, addressing specific challenges unique to each setting (Barbé et al., 2016; Peres, 2022). In environmental health, effective SOPs ensure consistent, safe, and efficient task execution, serving as vital guidelines for personnel. They not only enhance operational performance but also contribute to a motivated workforce by instilling confidence and a sense of achievement. According to Barends and Rousseau (2018),

developing evidence-based SOPs begins with identifying specific organisational processes that require standardisation to improve efficiency. This involves gathering relevant data through internal analysis, literature reviews, and industry benchmarks. The clarity and precision of instructions within SOPs are crucial for effective implementation (Bhargav et al., 2020). Each procedure should detail required materials and equipment, specify safety measures, and outline compliance protocols to ensure personnel can follow the SOPs accurately. Regular reviews and the involvement of stakeholders and subject matter experts are essential for keeping SOPs relevant and effective (Amare, 2012). Testing SOPs in practical settings is vital for validating their efficacy and usability in real-world scenarios. In their research, Winder (2017) stresses the importance of finalising SOPs across an organisation and providing comprehensive training for relevant personnel. This training is paramount in ensuring staff members understand and correctly apply SOPs within their roles. Keeping SOPs easily accessible to staff for quick reference fosters adherence to established procedures and maintains operational consistency (Hollmann et al., 2020). Furthermore, Schniepp (2020) cautions against overloading SOPs with excessive details, which can lead to deviations. Instead, she recommends focusing on essential information while ensuring that enough context is provided to prevent ambiguity. To validate SOPs, a systematic approach is necessary, incorporating evidence-based frameworks that emphasise feedback mechanisms, stakeholder agreement, scientific rigour, and continuous improvement (Barends and Rousseau, 2018; Grainger and Burnett, 2012). SOPs should be grounded in proven methods, allowing for adaptability to different contexts while maintaining core principles. Regular assessments of SOP effectiveness, along with input from practitioners, are crucial for their ongoing relevance.

Feedback mechanisms are essential for the effective development and continuous improvement of Standard Operating Procedures (SOPs). By systematically gathering data on

the effectiveness of SOPs, organisations can identify areas for enhancement and ensure that their procedures align more closely with overarching organisational goals. Regular evaluation of SOPs through feedback not only fosters accountability but also encourages a culture of continuous improvement, ultimately leading to more consistent and reliable outcomes in operational practices (Barends and Rousseau, 2018; Hollmann et al., 2020). Incorporating stakeholder input and performance metrics can further refine SOPs, enabling organisations to adapt to evolving regulatory requirements and best practices (Grainger and Burnett, 2012).

However, existing research has limitations. Many studies focus on specific contexts, such as resource-limited laboratories (Barbé et al., 2016), which may not be broadly applicable. Additionally, there is a lack of emphasis on integrating new methods into existing SOPs and addressing emerging risks and evolving practices.

Gaps in the literature include the need for comparative analysis of SOPs and EHO roles across different EU member states, practical strategies for integrating advanced monitoring methods, and adapting SOPs to manage new health risks and operational demands.

2.8.1 CONCLUSION

In summary, while the literature highlights the importance of SOPs in maintaining consistent environmental health practices among SOPs provide Environmental Health Officers (EHOs) across EU member states, gaps remain in comparative analysis, practical integration, and adaptability across member states. Effective SOPs provide a unified framework, yet aligning these procedures with local contexts, as in the Maltese Directorate, is essential for compliance, operational success, and enhanced public health outcomes. Addressing these gaps through targeted training, ongoing updates, and change management strategies is crucial to optimize SOP impact and consistency across the EU.

CHAPTER 3 METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the research methodology, shaped by gaps identified in the literature, particularly the lack of comparative analysis of Environmental Health Officers' (EHOs) roles across EU member states and the integration of advanced monitoring methods into Standard Operating Procedures (SOPs). These gaps informed the adoption of a comparative case study approach, examining EHOs' practices across multiple EU countries and emphasising qualitative data collection, including document analysis, interviews, and observations. This approach ensured a thorough understanding of how different practices across Europe are implemented and adapted in diverse contexts, with a specific focus on the alignment of SOPs with the Maltese environmental directorate's vision and mission.

Although primarily qualitative using the case study approach, this research is grounded in a mixed methods framework, combining descriptive quantitative and qualitative methodologies (Creswell and Clark, 2017). This research allowed for both a broad examination of EHO roles across the EU and a focused exploration within Malta's Environmental Health Directorate. This chapter also discusses the philosophical underpinnings of the research, outlines the distinct phases of the project, and details the objectives and methodologies employed. Strategies for ensuring rigour in data collection, analysis, and interpretation are highlighted, alongside ethical considerations aimed at protecting participant rights and ensuring research integrity.

Guided by the following research questions, the subsequent sections will detail the research philosophy, design choices, data collection, analysis methods, and ethical considerations:

Research Question 1 (RQ1): How do the roles, responsibilities, and practices of Environmental Health Officers (EHOs) vary across different member states in the European Union?

Research Question 2 (RQ2): To what extent are the standard operating procedures within the environmental health directorate aligned with the Maltese environmental directorate's vision and mission?

3.2 RESEARCH PHILOSOPHY

This research adopted a pragmatic epistemology, as outlined by Creswell and Clark (2017). This philosophy acknowledged the value of both objective data, derived from observable phenomena, and subjective interpretations informed by personal experiences and meanings (Maarouf, 2019). Unlike some research philosophies that prioritise one over the other, pragmatism allowed the research question itself to guide the most suitable methodological approach. This approach allows for a comprehensive investigation of EHO practices across the EU using quantitative descriptive statistics from an online questionnaire, while qualitative methods such as interviews and observations are employed to assess SOP alignment with Malta's environmental health objectives. Pragmatism facilitates the effective use of both methodologies to address the complex research questions.

The study employed an evidence-based methodology, integrating subjective analysis of existing literature on EHO roles and Malta's Environmental Health Directorate with an objective examination of EU legislation, bathing water monitoring data, and SOPs. Following the six-step 6A's approach (Barends and Rousseau, 2018), the research ensured a structured and rigorous investigation (see Table 5).

Table 5

Dissertation Research Steps based on Evidence-Based Principles

Step	Evidence-Based Principle	Description	Research Question
1. Identify Research Question	Ask	Defined research questions to guide the study.	Both RQs
1.1 RQ1: EHO Roles Across EU		Compiled a table of EHO duties across EU member states.	RQ1
1.2 RQ2: SOP Alignment in Malta		Focused on SOP alignment in the Maltese Environmental Health Directorate as an instrumental case study.	RQ2
2. Literature Review	Acquire	Conducted a comprehensive review of literature on EHO roles, bathing water, food inspections, and SOPs.	Both RQs
3. Evaluate Research Quality	Appraise	Assessed literature for relevance, methodological rigor, and potential bias.	Both RQs
4. Data Collection	Aggregate	Gathered data through literature reviews, survey, interviews, and observations.	Both RQs
4.1 RQ1: EHO Roles Across EU		Conducted a literature review and online survey across EU member states.	RQ1
4.2 RQ2: SOP Alignment in Malta		Reviewed SOPs interviewed Executive Env. Health Practitioners and observed EHO practices in Malta.	RQ2

Step	Evidence-Based Principle	Description	Research Question
5. Analyse Data	Aggregate and Analyse	Examined collected data to answer research questions.	Both RQs
5.1 RQ1: EHO Roles Across EU		Analysed information from literature and EU member states to compile the table of common EHO duties.	RQ1
5.2 RQ2: SOP Alignment in Malta		<ul style="list-style-type: none"> Analysed SOPs to understand their content and procedures. Analysed interviews/observations data to understand how SOPs are implemented in practice. 	RQ2
6. Interpret Findings & Develop Recommendations	Apply & assess	Developed insights and recommendations based on findings.	Both RQs
6.1 RQ1: EHO Roles Across EU		<ul style="list-style-type: none"> Identified common practices and variations in EHO duties across the EU. Discussed these findings in the context of public health and environmental protection within the EU regulatory framework. 	RQ1
6.2 RQ2: SOP Alignment in Malta		Assessed SOP alignment with the Directorate's vision and identified areas for improvement.	RQ2

Note: Adapted from Barends and Rousseau (2018).

3.3 RESEARCH DESIGN

3.3.1 RESEARCH QUESTION 1 (RQ1): ENVIRONMENTAL HEALTH OFFICERS' ROLES AND PRACTICES ACROSS THE EU

During the literature review, the researcher encountered difficulty defining the roles of Environmental Health Officers (EHOs) across EU member states due to a lack of primary evidence. Attempts to create a comprehensive table of EHO tasks were hindered by insufficient data from online sources.

To address these challenges and gather comprehensive data on EHO roles and practices (RQ1), a structured online questionnaire was created using Google Forms (see Appendix G). The questionnaire was informed by a thorough literature review, the author's professional experience, and consultations with colleagues across units within the Maltese Environmental Health Directorate. It comprised 51 EHO duties and responsibilities.

3.3.2 MIXED METHODS APPROACH FOR RQ1 TO INVESTIGATE EHO PRACTICES ACROSS THE EU

This research employed a cross-sectional survey design (Creswell, 2014) to investigate variations in Environmental Health Officer (EHO) roles and practices across the European Union (EU) for research question 1 (RQ1). A structured online survey was developed using Google Forms (see Appendix G) to collect data from EHOs across the EU. The survey design combined closed ended (yes/no) and open-ended questions.

- Closed-ended questions focused on capturing information on core EHO responsibilities, allowing for efficient data collection and analysis of prevalence (Polit and Beck, 2017).
-

- Open-ended questions provided opportunities for EHOs to elaborate on typical work practices and any additional duties beyond the pre-defined options, enriching the understanding of EHO roles (Denzin and Lincoln, 2018).

3.3.3 DATA ANALYSIS FOR A MULTI-FACETED PICTURE OF EHO DUTIES

The data analysis used a mixed methods approach to capture a comprehensive view of EHO duties. Descriptive statistics summarised closed-ended responses, highlighting common responsibilities (Creswell, 2014). Thematic analysis of open-ended data identified patterns and nuances in EHO work practices (Braun and Clarke, 2015; Tashakkori and Teddlie, 2009). This dual approach offers a multifaceted understanding of EHO roles across the European Union.

3.3.4 UNDERSTANDING EHO ADHERENCE TO STANDARD OPERATING PROCEDURES - RQ2

This research aimed to understand, through the lens of lived experiences, how Environmental Health Officers (EHOs) navigate following Standard Operating Procedures (SOPs) in their daily work. By setting aside preconceived notions (Willig, 2021), the study prioritised EHOs' perspectives on challenges and facilitators of SOP adherence. This in-depth approach aligned with the exploratory nature of the research question (RQ2: EHOs' perspectives on SOP adherence) as it allowed for a deeper exploration of the topic and the potential for unexpected themes to emerge (Parahoo, 2014).

3.3.5 CASE STUDY METHODOLOGY FOR UNDERSTANDING SOP IMPLEMENTATION (RQ2)

To gain an in-depth and comprehensive understanding of Environmental Health Officers' (EHOs) experiences and practices regarding Standard Operating Procedures (SOPs)

in their work environment, this study utilised a case study methodology (RQ2). Creswell (2006) noted that case studies excel in exploring specific phenomena in rich detail, making them ideal for examining EHOs' lived experiences. This in-depth approach aligns seamlessly with the research objective of understanding how EHOs navigate SOP implementation in their daily work.

3.3.6 YIN'S MULTI-METHOD APPROACH FOR CONTEXTUAL ANALYSIS

This study is based on Yin's (2014) case study approach, emphasising the importance of triangulating data from multiple sources for a comprehensive understanding within a specific context (Yazan, 2015). This involved:

- **SOP Analysis and Interviews:** Maltese Environmental Health Directorate SOPs for food inspection and bathing water were critically analysed, informing semi-structured interviews with Executive Environmental Health Practitioners (EEHPs) about their experiences and perspectives on these SOPs.
- **Observational Assessments:** Direct observation of EHOs performing their duties allowed for an assessment of how closely daily practices aligned with the established SOPs, revealing potential discrepancies between policy and practice.

By employing this multi-method approach aligned with Yin's case study principles, the research achieved a nuanced understanding of the impact of SOPs on EHOs' work in the Maltese context. This in-depth case study provided a rich and multifaceted portrayal of SOP implementation within the Maltese Environmental Health Directorate.

3.3.7 DATA COLLECTION STRATEGY

The case study approach allowed for a multi-faceted data collection strategy including:

- Interviews: Interviews with Maltese Executive Environmental Health Practitioners (EEHPs) provided valuable insights into their perspectives on SOP implementation.
- Direct Observation: Observing EHOs performing their actual duties allowed assessment of how closely daily practices aligned with SOPs.

This triangulation of data sources provided a comprehensive picture of EHO work within the Maltese context.

3.3.8 FRAMEWORK FOR THE CASE STUDY (RQ2)

To systematically investigate Environmental Health Officers' (EHOs') experiences with Standard Operating Procedures (SOPs) (RQ2), this study followed the five-stage framework outlined by Crowe et al. (2011). This framework provided a structured approach, guiding the research process towards a well-defined research question, a focused investigation of EHO experiences, and a clear presentation of the case study findings. (refer to Table 6).

Table 6*Case study framework*

Stage	Description	Action in this Study (RQ2)
Defining the Case Study	Clearly identify the phenomenon under investigation.	Focused on understanding how EHOs in Malta experience and implement SOPs.
Selecting the Case(s)	Choose specific participants or situations relevant to the research question.	Identified and recruited Maltese EEHPs for in-depth interviews.
Data Collection and Analysis	Gather information through interviews, observations, documents, etc. Analyse data to identify patterns and insights.	<ul style="list-style-type: none"> ● Conducted interviews with EEHPs to explore their perspectives on SOP implementation and identify potential variations in practices. ● Employed direct observation of EHOs performing their duties to assess the uniformity in applying SOPs across different work settings. ● Analysed the collected data (interviews and observations) to identify patterns and themes related to the consistency with which EHOs adhere to SOPs.
Data Interpretation	Draw conclusions about the case study in light of existing research.	Interpreted analysed data to draw conclusions about the case study in relation to SOP implementation.
Reporting the Findings	Present research question, methodology, findings, and conclusions.	Presented research question (RQ2), five-stage framework methodology, key findings, and interpretations.

Note: Based on Crowe et al. (2011).

Overall, the case study methodology provided the flexibility and depth necessary to capture the complexities of EHOs work and their relationship with SOPs.

3.4.1 DEFINING THE CASE STUDY

The case study for research question 2 focused on evaluating the Standard Operating Procedures (SOPs) of the Maltese Environmental Health Directorate, focusing on food inspections and bathing water monitoring. It involved interviews with executive environmental health practitioners and observations of Environmental Health Officers (EHOs) to assess SOP adherence.

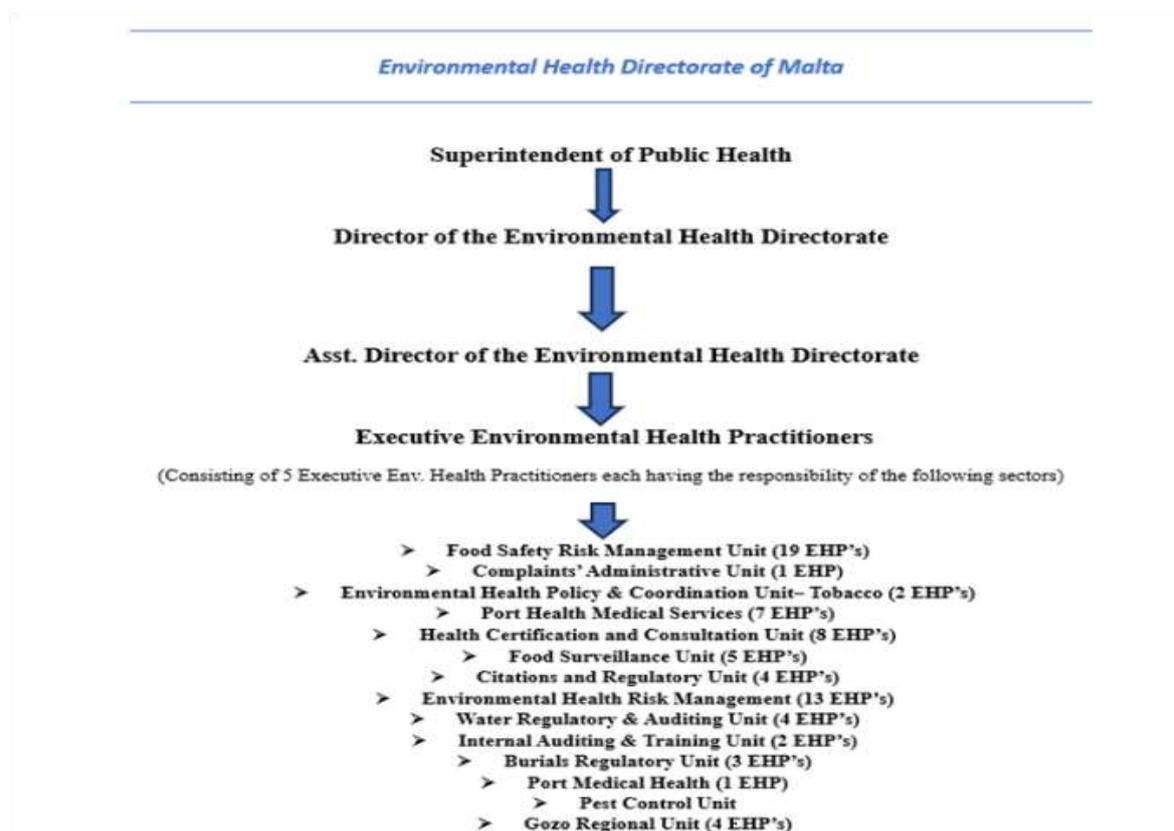
A comprehensive literature review provided background on the Directorate's mission, vision, and EHO duties, highlighting their role in public health and environmental sustainability. The review detailed the evolution of the health inspectorate in Malta and summarised the critical functions of EHOs. This foundational understanding guided the analysis of SOPs to ensure they aligned with best practices.

The study also included developing validated checklists from the literature review, existing SOPs and theoretical frameworks to facilitate interviews and observations, ensuring a thorough evaluation of SOP consistency and effectiveness.

The diverse duties and responsibilities of EHOs were detailed, providing a clear understanding of their critical functions, as illustrated in the Figure 4.

Figure 4

Job description and responsibilities with the Environmental Health Directorate



3.4.2 MAPPING STANDARD OPERATING PROCEDURES TO STRATEGIC GOALS

In this study, the author performed a mapping exercise to systematically assess how each Standard Operating Procedure (SOP) contributed to the key elements of the Directorate's vision and mission. To facilitate this process, the author created two tables (refer to Tables 10 and 11 in Chapter 4: Findings), with one column listing the key elements of the vision and mission and an adjacent column detailing the corresponding SOPs. Each entry included a description of how the specific SOP supported or aligned with these strategic goals, providing a clear visual representation of the connection between operational practices and the overarching objectives of the Directorate. This approach aimed to enhance understanding of the role of SOPs in promoting public health and environmental safety.

3.5.1 CASE SELECTION: INSTRUMENTAL APPROACH TO SOP IMPLEMENTATION

This research utilises an instrumental case study design, which focuses on a single case (in this case, the Maltese Environmental Health Directorate) to gain insights into a broader phenomenon (Yin, 2014). Here, the objective is to understand how well Standard Operating Procedures (SOPs) are implemented by Environmental Health Officers (EHOs) within this directorate.

The Maltese Environmental Health Directorate was chosen as the primary case study for several reasons:

- **Centrality:** It plays a central role in enforcing environmental health regulations across Malta. By studying this directorate, the research gains a representative view of SOP implementation by EHOs nationwide.
-

- **Depth of Inquiry:** Focusing on a single directorate allows for an in-depth examination of SOP implementation practices within that specific organisation. This can reveal valuable details and nuances that might be missed in a broader study.
- **Accessibility:** Access to data and personnel within the Maltese Environmental Health Directorate might be easier to obtain compared to a wider research scope.

By employing an instrumental case study approach and focusing on the Maltese Environmental Health Directorate, this research aims to gain valuable insights into the uniformity of SOP implementation by EHOs. This knowledge can then be used to improve the effectiveness of environmental health regulations and enhance overall consistency in enforcement practices.

3.6.1 COLLECTING AND ANALYSING THE DATA

This study adopts a multi-faceted approach, utilising triangulation techniques described by Streubert and Carpenter (2011) (see Table 14, Appendix D) to strengthen the credibility of its findings. Drawing from Pace and Buttigieg (2017), it combines data and methodological triangulation, incorporating "person data triangulation" across participants at different managerial levels, "vertical triangulation" across management hierarchies, and "horizontal triangulation" among similar roles within the organisation.

An EU-wide survey identified commonalities in EHO duties, while interviews with top management (Executive Environmental Health Practitioners, EEHPs) and observations of EHOs in Malta provided insights from both leadership and frontline staff. The research design combined document analysis of SOPs, interviews with EEHPs, and observations of EHOs, offering a comprehensive view of EHO practices and SOPs' impact. By applying Yin's case study approach, which emphasises multiple data sources and contextual analysis (Yazan, 2015), the study achieved a nuanced understanding of the phenomenon under investigation.

In the initial phase of the study, an in-depth review of academic sources on food inspections, bathing water, and SOPs was conducted (see Appendices A–C). This review informed the subsequent case study of Malta's Environmental Health Directorate in Phase 2, providing in-depth insights and utilising multiple sources of evidence for robust analysis (Abela et al., 2019). To ensure the trustworthiness of qualitative data, interviews with EEHPs were transcribed verbatim, adhering to guidelines by Rowlands (2021) and Holstein and Gubrium (2001). High-quality audio recordings were used, and transcripts were validated by participants to confirm accuracy (Pace and Buttigieg, 2017). In Phase 3, the research involved observing EHOs during inspections and using a checklist to verify SOP consistency and the reliability of interviews, following the rigorous data collection and analysis strategies outlined by Kalu and Bwalya (2017) and Creswell and Clark (2017). All these procedures are reflected in Table 7:

Table 7

Trustworthiness of Data

Criterion	Description	Actions to Enhance Trustworthiness
Credibility	The extent to which the research findings are believable and trustworthy.	<ul style="list-style-type: none"> • Used multiple data sources (document analysis, interviews, observations) • A designated research intermediary was appointed. • Multiple observers were appointed during the observations to minimise individual bias. • Performed Pilot testing. • Validated survey and checklists for observations • Shared findings with participants for verification. • Triangulation of data (survey, interviews, and observations) • Transcribed the interviews verbatim.

Criterion	Description	Actions to Enhance Trustworthiness
Transferability	The degree to which the findings can be applied to other contexts.	<ul style="list-style-type: none"> ● Transparency ● Provided rich descriptions of the research setting and participants. ● Discussed limitations of the study and generalizability.
Dependability	The consistency of the research findings over time and with different researchers.	<ul style="list-style-type: none"> ● Maintained a detailed audit trail (recorded data collection procedures). ● Used member checking to ensure consistent interpretation of data.
Confirmability	The degree to which the research findings are due to the research process and not researcher bias.	<ul style="list-style-type: none"> ● Used a neutral and objective voice when reporting findings. ● Documented researcher reflexivity (acknowledging potential biases). ● Used data triangulation (using multiple data collection methods).

Note. The table summarises actions taken to ensure the trustworthiness of the qualitative data, following guidelines by Kalu and Bwalya (2017), Creswell and Clark (2017), Pace and Buttigieg (2017), Rowlands (2021), and Holstein and Gubrium (2001).

3.6.2 PARTICIPANTS

The seven-week data collection period spanned all three research projects, incorporating the total population and eliminating selection bias. This research utilised a census approach with 26 of 27 target countries participating (Creswell, 2006). This method eliminates selection bias, a common concern when drawing a sample from a larger population (Rea and Parker, 2014). Raw data from Google Forms was downloaded into Excel, reviewed for accuracy, and verified by a second individual to minimize errors. Detailed notes were recorded for future reference.

3.6.3 SURVEY PARTICIPANT BREAKDOWN

The survey targeted Environmental Health Officers but also received responses from a variety of professionals working in related fields.

3.6.4 NON-TARGETED PROFESSIONALS (EXCLUDED FROM ANALYSIS)

Five participants from non-target professions were excluded from the analysis. These included roles such as doctor, consulting bodies, Assistant Professor, Head of Division (Food Safety), Senior Epidemiologist, and Ministerial Advisor, from the Czech Republic, Slovenia, Portugal, Greece, and Luxembourg. Their responses were mostly negative as they do not perform related duties, which inaccurately suggested that certain tasks were not conducted in their countries. In fact, these tasks are managed by Environmental Health Officers (EHOs) or other departments. Most excluded countries had other valid responses, except Portugal and Luxembourg, which had only one participant each. Despite reminders, Portugal added a participant, but Luxembourg could not provide additional responses due to access issues, leading to the exclusion of Luxembourg data from the analysis.

The survey was conducted to reach Environmental Health Officers (EHOs) across the European Union. Contact information was gathered from websites and email addresses provided by several colleagues within the Directorate, sourced from ongoing courses pertinent to their professional activities. Upholding ethical standards, the survey was disseminated via Google Forms through an intermediary. The Intermediary's email outreach yielded 63 responses. He sent 26 initial emails to 891 participants and followed up with 29 gentle reminders to 983 participants. Respondents primarily comprised of 36 environmental health officers, and other closely affiliated personnel, (see Table 8).

Table 8*Survey Respondent Expertise*

Category	Number of Respondents	Countries
Environmental Health Officers	36	Austria (1), Germany (1), Poland (2), Slovakia (2), Finland (2), Malta (4), Cyprus (3), Slovenia (1), Belgium (1), Italy (2), Czech Republic (1), Spain (2), Latvia (3), Ireland (1), Romania (2), France (1), Hungary (1), Greece (1), Lithuania (1), Netherlands (2), Estonia (2)
Veterinarians	8	Italy (3), Latvia (1), Denmark (1), Poland (1), Czech Republic (1), Portugal (1)
Chemists	2	Cyprus (1), Romania (1)
Environmental Health Technician	1	Spain (1)
Directors for Environmental Health	1	Bulgaria (1)
Head of National Environmental Service	1	Ireland (1)
Communicable Disease Coordinator	1	Sweden (1)
Doctor (Water Hygiene)	1	Czech Republic (1) - Omitted nil responses only
Assistant Professor	1	Slovenia (1) - Omitted nil responses only
Head of Division (Food Safety and Quality)	1	Croatia (1)
Senior Epidemiologist	2	Spain (1), Romania (1)

Category	Number of Respondents	Countries
Special Legal Advisor	1	Denmark (1)
Ministerial Advisor	1	Finland (1)
Head of Department – State Inspectorate of Croatia	1	Croatia (1)
Head of Marine Ecotoxicology Laborat	1	Italy (1)
Director General Control Policy	1	Belgium (1)
General Directorate of Agriculture and Rural Development	1	Portugal (1) - Omitted nil responses only
Technical Expert at Central Level Federal Agency for the Safety of the Food Chain	1	Belgium (1)
DS Consulting Food and Agricultural Production and control system	1	Greece (1) - Omitted nil responses only
Chief Officer for plant protection pro plant health and organic farming	1	Luxembourg (1) - Omitted nil responses only

Notably, all 27 member states responded to the online questionnaire. While only one participant responded from 11 member states, two or more participants replied from the remaining member states. This diversity in responses facilitated comparisons across various sources, thereby enhancing the research's reliability. Since 5 participants were excluded from the study, the initial number of 63 was reduced. The total number of valid respondents amounted to 58 (N=58). Several

email reminders were sent to ensure a complete response from all member states. Moreover, participants from other countries generously offered their assistance by forwarding the questionnaire to their contacts in other EU countries after completing it, thereby aiding in achieving the desired total number of participants.

3.7 VALIDATION OF ONLINE SURVEY, INTERVIEW QUESTIONS AND OBSERVATION CHECKLISTS (RQ1 AND RQ2)

3.7.1 VALIDATION OF ONLINE QUESTIONNAIRE

To ensure content validity and reliability (Barends and Rousseau, 2018), the questionnaire (Appendix G) underwent a rigorous validation and refinement process, incorporating expert feedback and pilot testing results.

- **Face Validity:** Wording was refined to minimize measurement and comprehension errors. Input was gathered from colleagues within the Maltese Environmental Health Directorate and an Executive Environmental Health Practitioner specializing in EU relations and sanitary laws.
 - **Content Validity:** The comprehensiveness and relevance of the questionnaire were evaluated through consultations with Health Officers from specialized units and an Executive Environmental Health Practitioner. This ensured all key duties were accurately represented.
 - **Reliability and Pilot Testing:** A pilot test involving 12 Environmental Health Officers (EHOs) was conducted to evaluate the feasibility, clarity, consistency, and respondent interpretation of the questionnaire. This sample size, representing approximately 20.69% of the final study population, aligns with best practices for pilot studies, which generally recommend using 10–20% of the main sample size (Bujang et al., 2024). The pilot aimed to refine the research instrument rather than establish statistical
-

significance. Based on the feedback, several modifications were made before finalizing the questionnaire:

- Designation of Work, Country, and Organization/Department/Entity were included at the beginning of the questionnaire.
- The question “Do you perform this duty?” was revised to “Does your organization perform this duty?” to better reflect institutional responsibilities rather than individual actions.
- Certain terminologies were simplified to enhance readability and ensure consistency in understanding across different respondent groups.
- The response options were refined to provide clearer distinctions between different levels of involvement in environmental health duties.
- An "If you stated No, kindly explain further" section was added to Yes/No questions to capture additional context, such as conditions or limitations.
- Formatting improvements were made, including restructuring certain sections for better flow and reducing ambiguity in complex questions.

3.7.2 VALIDATION OF INTERVIEW QUESTIONS AND OBSERVATION CHECKLISTS

The interview questions and observation checklist (Appendices H-I) were developed based on a literature review of survey design and an analysis of the Maltese Environmental Health Directorate's Standard Operating Procedures (SOPs) for food inspection and bathing water monitoring. A rigorous multi-step validation process was conducted (Creswell, 2014; Polit and Beck, 2017), leading to several refinements:

- **Blind Assessment:** Independent evaluators objectively reviewed the instruments, leading to revisions in question phrasing to improve clarity.
-

- **Challenging Assumptions:** The author and colleagues critically examined underlying assumptions and alternative perspectives, resulting in the rewording of certain questions to minimize bias.
- **Regulatory Compliance:** The design adhered to relevant legislation, prompting minor adjustments to ensure compliance with updated regulatory frameworks.
- **Literature Review:** Established methodologies and checklists were referenced for validity, leading to the inclusion of additional validated indicators.
- **Stakeholder Input:** Feedback ensured alignment with the Maltese Environmental Health Directorate's priorities, resulting in modifications to reflect real-world operational challenges.
- **Final Amendments:** After incorporating feedback from all validation stages, the instruments were revised for consistency, clarity, and practical applicability.

These refinements ensured the final online questionnaire, interview questions and observation checklists accurately captured environmental health practices while maintaining validity, reliability, and usability, making them robust for evaluating EHO roles and SOP adherence (RQ1 and RQ2).

3.8 APPRAISALS OF DATA

The JBI Critical Appraisal Checklist (Appendix K) was systematically employed to evaluate the literature review, questionnaires, interviews, and observations, affirming the reliability of all methods and findings. Utilising these checklists contributed to enhancing the overall quality and credibility of the research.

3.9 ETHICAL CONSIDERATIONS

Ethical approval for this study was obtained from the Faculty Research Ethics Committee (FREC) (Appendix E). All research procedures adhered strictly to ethical

guidelines as outlined in the approved FREC forms. Data was collected anonymously, and participant consent was obtained. The study design ensured that no harm would befall participants or the involved organisations.

3.9.1 CONSTRAINTS AND POSSIBLE BARRIERS

Ethical clearances were required before obtaining permission from the directorate to access standard operating procedures, data, and information for this dissertation. Authorization was secured to access relevant documents, and any data limitations were documented (Appendix F).

During interviews in Part 2, participants were recorded for transcription, with anonymity and transparency maintained as per consent forms. To reduce socially desirable responses, the author crafted neutral, adequately detailed questions to avoid leading biases.

A research intermediary was appointed to minimise perceived coercion during participant recruitment and ensure confidentiality (Appendix J.1). This intermediary also managed survey distribution and clarified ethical considerations in the introductory email (Appendix G.1).

To address potential observer influence during observations, the author used a non-intrusive approach and involved multiple observers who completed and compared observation checklists (Appendix J.2). This strategy enhanced the reliability of the observations and upheld ethical standards.

Since the author was an environmental health practitioner and worked in the same directorate as the participants, the author stayed open-minded and did her best not to make assumptions and conclusions before analysing the data. The author refrained from reviewing

SOPs within her unit, focusing solely on standard operating procedures related to food inspections and the bathing water sampling, thus minimising potential bias.

In addition to the authorised supervisor, the author had appointed a proofreader, creating a diverse research team with a broad range of perspectives. The author promised to be transparent about all the limitations in this dissertation, ensuring the research was credible and vigorous.

While the questionnaire design offered valuable insights, it is acknowledged that the findings cannot be generalised to the entire EHO population in the EU. The data represents the experiences of the surveyed participants, and future research with a larger sample or a different design might be necessary for broader generalisation.

3.9.2 CONCLUSION

This chapter detailed the methodological foundation of the research, including the philosophical underpinnings, research design, data collection, and analysis methods. It examines the five phases of the research process, defining the case, selecting the case, collecting and analysing data, interpreting results, and reporting findings (Crowe et al., 2011), ensuring the study's trustworthiness and credibility. By employing a mixed-method approach and ensuring ethical rigour, the research aims to provide a comprehensive understanding of EHO roles and practices within the EU, with a specific focus on SOP implementation in the Maltese Environmental Health Directorate.

CHAPTER 4: FINDINGS

4.1 OVERVIEW OF EU ENVIRONMENTAL HEALTH OFFICER DUTIES

This chapter delves into the first research question that guides this study:

How do the roles, responsibilities, and practices of Environmental Health Officers (EHOs) vary across different member states in the European Union?

The author's objective is to identify the nuances in EHO duties and practices across the EU. This was achieved by examining the variations in responsibilities assigned to EHOs employed by different governmental bodies within the member states. Additionally, the author explored common threads and shared practices among EHOs across the European Union.

4.1.1 ANALYSIS OF EU SURVEY (RQ1):

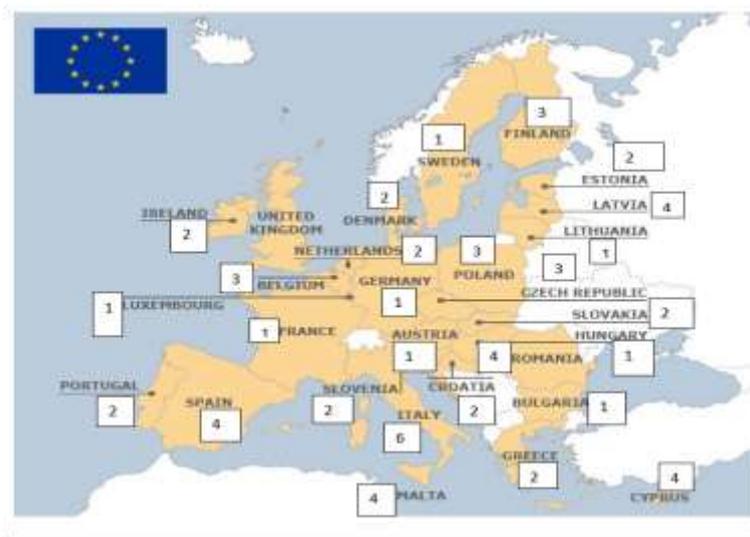
A detailed comparative table of all the results is provided in Appendix L. The analysis of the survey data revealed that the duties of an Environmental Health Officer (EHO) are not universally defined, leading to a lack of standardised responsibilities. Italy, with six participants, exemplifies the significant variation in responses to the same questions across a single country. This highlights the impact of administrative structures on EHO roles. EHOs might operate under different ministries, municipalities, or authorities, leading to substantial differences in responsibilities even within national borders. For example, in some areas, EHOs might focus on inspecting and sampling bathing water due to specific health regulations and environmental conditions. Conversely, other areas might lack bathing water altogether (perhaps mountainous) or have a different authority responsible for sampling.

These discrepancies highlight how governing bodies prioritise environmental health based on context. For instance, an area with a coastline might prioritise sampling bathing water quality due to its specific needs. Conversely, another part of the same country, operating under a different municipality and lacking a coastline, might not have bathing water sampling as a focus. This demonstrates how priorities adapt to the specific environmental health challenges faced by different areas. Consequently, the scope of an EHO's work can vary widely, making it challenging to establish a uniform job description. This variation can lead to different answers to the same question from the same country, such as two "yes" responses and four "no" responses. To address this discrepancy, a colour-coded system was implemented in the table to distinguish between responses: marking "No" replies in red, "Yes" replies in green, and responses indicating both "yes" and "no" in amber.

Figure 5 shows the number of participants per country.

Figure 5

Number of participants per country



Note: Adapted from *European Union Maps* (2014).

4.2 COMPARATIVE ANALYSIS OF MEMBER STATES

4.2.1 THEMES AND CATEGORIES

The data collected from the survey was organised into twenty main themes, which were further subdivided into categories:

- Implementation of Legislation
 - Enforcing Regulation and Giving Evidence in Court
 - Investigation of Public Health Issues
 - Disease Control and Food Safety
 - Monitoring the Wholesomeness of Food Products
 - Nutrition and Health Claims, Standards, and Labelling
 - Water Quality Monitoring
 - Specialized Audits and Inspections
 - Import/Export and Drug Control
 - Public Facility Monitoring and Health Certificates
 - Consultation and Complaint Investigation
 - Environmental Health Concerns
 - Public Health Matters
 - Education of Food Handlers and International Information Exchange
 - Environmental and Occupational Health
 - Waste and Pollution Control
 - Animal feed, Slaughterhouses and Fraud Prevention
 - Alert Systems and Radiation Hygiene
 - Hygiene in Educational Institutions
 - Cosmetic Products and data collection
-

- Cemeteries and Repatriation of Human Remains
- E-commerce, Ship Sanitation, and Harbor Vessel Inspection
- Additional public health responsibilities

The following sections explored each theme and its subcategories in detail. Participant excerpts directly reflect their experiences and insights. The participant numbers in each table correspond to the participant identifiers used in the Google Form.

4.2.2 KEY FINDINGS

1. IMPLEMENTATION OF LEGISLATION

1.1 NATIONAL AND EU LEGISLATION

Environmental Health Officers (EHOs) play a crucial role in enforcing both national and European environmental health legislation. In 25 of 26 European countries, EHOs implement national and EU legislation; Slovenia is the exception. Participant 58 from Slovenia highlights Slovenia's unique model, where government bodies play a central role in overseeing environmental health legislation, even if EHOs are not the primary enforcers (see Table 9.1).

Table 9.1

Implementation of legislation

Excerpts	Participant	Country
<i>"The competent ministries are responsible implementation of legislation".</i>	58	Slovenia

2. ENFORCING REGULATION AND GIVING EVIDENCE IN COURT

This responsibility is universal. Participants varied on enforcement roles: some noted legal professionals in court, others highlighted EHOs in local authorities. All agreed the

ministry holds ultimate legislative responsibility, indicating a potential need for legal expertise in complex cases (see Table 9.2).

Table 9.2

Enforcing Regulation and giving evidence in court

Excerpts	Participant	Country
<i>"We are represented in court by lawyers."</i>	4	Poland

3. INVESTIGATION OF PUBLIC HEALTH ISSUES

Twenty-one countries investigate public health concerns, with France, Germany, Hungary, Lithuania, and Sweden as exceptions, where specialised organisations handle these tasks. This highlights a segmented approach focusing on non-food industrial products. Conversely, some countries have dedicated agencies for food safety and animal health, showing specific expertise areas.

Involvement in One Health principles varies; some organisations work with health boards on foodborne illnesses, while others focus on food legislation enforcement, reflecting the diverse responsibilities of EHOs and related agencies. Despite these variations, there's often a commitment to One Health principles. The findings showcase Europe's varied landscape of public health responsibilities, with some countries integrated and others segmented (see Table 9.3).

Table 9.3*Investigation of Public Health Issues*

Excerpts	Participant	Country
<i>"...doesn't have any more the responsibility of security in food. But still for industrial products as cosmetics, manufactured products, toys, etc."</i>	44	France
<i>"Our organisation is responsible for food chain and animal health."</i>	47	Hungary
<i>"The mandate of the Swedish Food Agency is only based on food legislation, not public health."</i>	40	Sweden

4. DISEASE CONTROL AND FOOD SAFETY**4.1 INFECTIOUS DISEASE & PANDEMIC CONTROL**

This responsibility is carried out in 23 countries, except Bulgaria, France, Germany, Hungary, Lithuania, and Slovenia. Participants highlighted varied roles in investigating infectious diseases and pandemic control. Bulgaria uses distinct national bodies, showing a segmented approach. Some organisations focus specifically on food or animal health issues, reinforcing the division of responsibilities. Authorities like the National Institute of Public Health or regional health agencies dedicate themselves to specific public health areas, such as organic production control or general hygiene. This spectrum, from segmented systems to integrated approaches with EHOs handling broader aspects, showcases Europe's diverse landscape of public health responsibilities (see Table 9.4).

Table 9.4*Infectious Disease and Pandemic Control*

Excerpts	Participant	Country
<i>"In Bulgaria we have a separate national body, dealing with infectious diseases"</i>	54	Bulgaria
<i>"this is another service which is responsible of it (ARS - regional agency of health)"</i>	44	France
<i>"National Institute of Public Health"</i>	58	Slovenia

5.1 MONITORING THE WHOLESOMENESS OF FOOD PRODUCTS

Twenty-three countries perform this duty, except Bulgaria, France, Germany, Lithuania, and the Netherlands. Participants highlighted diverse organisational roles in monitoring food product safety, indicating a separation of duties among government bodies. This suggests specific responsibilities within the broader food safety landscape, with dedicated agencies handling distinct food categories (see Table 9.5).

Table 9.5*Monitoring the Wholesomeness of Food Products*

Excerpts	Participant	Country
<i>"...these missions are the ministry of agriculture's responsibility."</i>	44	France
<i>"Any item that could impact food safety."</i>	12	Italy
<i>"...Health Inspectorate of the Republic of Slovenia (HIRS) for food supplements and food for special groups, and Administration for Food Safety, Veterinary Sector and Plant Protection (AFSVSPP) for all other foodstuffs."</i>	58	Slovenia

Excerpts	Participant	Country
<i>"The focus of environmental health is not on the nutritional value to ensure compliance with provisions... and to protect the health economic interests of consumers."</i>	66	Finland
<i>"Another organisation Food and Veterinary Board,"</i>	61	Estonia

5.2 FOODBORNE INVESTIGATIONS AND COMPLAINTS

This is widely practised in 26 countries, except Bulgaria and Slovenia. Participants shared insights into their organisations' roles in investigating foodborne issues and complaints, highlighting challenges like limited resources. This suggests a reactive approach, triggered by monitoring projects or customer complaints. In contrast, some noted a proactive approach with designated authorities, such as municipal health authorities, leading investigations. Responsibilities varied, with Slovenian participants pointing to public health agencies. Collaboration with public health directorates and an emphasis on organic production control show diverse approaches to food safety concerns (see Table 9.6).

Table 9.6

Foodborne Investigations and Complaints.

Excerpts	Participant	Country
<i>"Our determinations are contained in national monitoring projects and on demand from customers."</i>	63	Romania
<i>"Duty of the municipal health authorities."</i>	14	Finland
<i>"National Institute of Public Health"</i>	58	Slovenia

5.3 SAMPLING OF FOOD

Sampling of food is performed in twenty-four countries, except Bulgaria and Germany, stating that their organisation does not take food samples. Perspectives on food

sampling vary widely: in most countries, EHOs handle it, but there are exceptions. Germany uses a decentralised approach with regional and municipal authorities leading, while Finland involves both local and national agencies for a collaborative effort. Collaboration with public health institutions and specialised labs is common. These diverse approaches reflect the complex nature of food safety and quality control, all aimed at ensuring safe, high-quality food across Europe (see Table 9.7).

Table 9.7

Sampling of Food

Excerpts	Participant	Country
<i>“In Germany, food sampling is performed by the competent authorities in the regions/municipalities.”</i>	2	Germany
<i>“Duty of the municipal health authorities and National Food Agency.”</i>	7	Finland
<i>“Additional explanation regarding competence: HIRS – sampling of food supplements, food for special groups. AFSVSPP sampling of all other foodstuffs.”</i>	58	Slovenia

6. NUTRITION AND HEALTH CLAIMS, STANDARDS, AND LABELLING

All participating countries ensure compliance with nutrition, health standards, and labelling regulations, but their approaches vary widely. Participants revealed diverse roles their organisations play, with some handling not just analyses but also nutrition, health claims, and labelling. These varied methods highlight the complex nature of ensuring compliance across Europe (see Table 9.8)

Table 9.8*Nutrition and Health Claims, Standards, and Labelling*

Excerpts	Participant	Country
<i>“Just physio-chemical and microbiological analysis are mostly, made”.</i>	41	Romania
<i>“This is organised in other institutions such as the National Institute of Public Health and/or the National Laboratory for Health, Environment and Food”</i>	58	Slovenia

7. WATER QUALITY MONITORING**7.1 DRINKING WATER**

Twenty-two countries monitor drinking water quality, with exceptions like Denmark, France, Germany, the Netherlands, and Sweden. The survey revealed varied approaches: Belgium uses a decentralised system with regional and federal authorities, while Germany's health authorities lead monitoring. In other countries, responsibilities are divided among separate institutions or shared between municipalities and environmental authorities. These differences highlight Europe's multifaceted approach to ensuring safe drinking water, emphasising the need for collaboration and clear communication (see Table 9.9).

Table 9.9*Monitoring Drinking Water*

Excerpts	Participant	Country
<i>“The competence regarding the control of the quality of water intended for human consumption is complex in Belgium and does not fall entirely within the competence of the Agency.”</i>	22	Belgium
<i>“In Germany, this is the task of the health authorities.”</i>	2	Germany

Excerpts	Participant	Country
<i>“Competency of the another institution”</i>	5	Poland

7.2 SWIMMING POOLS AND SPAS

Fifteen countries, including Austria, Belgium, Bulgaria, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Netherlands, Portugal, and Sweden, do not monitor swimming pool and spa safety. Unlike the widespread monitoring of drinking water, this task is not commonly handled by the participating organisations. However, this does not imply a lack of regulation; other regional authorities, like Italy’s local agencies or Denmark’s Environment Administration, oversee these duties (refer to Table 9.10).

Table 9.10

Swimming Pools and Spas

Excerpts	Participant	Country
<i>“a different unit at the regional level coordinate these aspects.”</i>	30	Italy
<i>“That is Another department - The Environment Administration”.</i>	23	Denmark
<i>“Duty of the municipal health authorities”</i>	14	Finland

7.3 BATHING WATER

Participants from thirteen countries: Austria, Belgium, Bulgaria, Denmark, France, Germany, Greece, Hungary, Latvia, Lithuania, Netherlands, Slovenia, and Sweden, indicated that bathing water quality monitoring is managed by other institutions. This reveals a decentralised approach across Europe. Regional variations exist, with different entities overseeing bathing water quality within the same country, such as municipal health authorities in Finland or specialised public health institutions in other countries (refer to Table 9.11).

Table 9.11*Monitoring Bathing water*

Excerpts	Participant	Country
<i>"Responsibility of local authorities"</i>	40	Sweden
<i>"another institution"</i>	1	Czech Republic
<i>"Competency of another institution"</i>	2	Germany
<i>"In Marche Region a different organisation (ARPAM) monitoring quality of bathing water"</i>	19	Italy
<i>"a different unit at regional level coordinates these aspects."</i>	30	Italy
<i>"Duty of the municipal health authorities."</i>	14	Finland
<i>"This is organised in other institutions such as the National Institute of Public Health and/or the National Laboratory for Health, Environment and Food."</i>	57	Spain

7.4 OTHER RECREATIONAL WATER

This duty is among the least common, with only eleven countries, Croatia, Cyprus, Czech Republic, Estonia, Finland, Italy, Malta, Poland, Romania, Slovakia, and Spain, reporting it as part of their organisation's responsibilities. Participant quotes reveal how this task is managed differently across countries, highlighting a divide between public health and environmental agencies (see Table 9.12).

Table 9.12*Other Recreational Water*

Excerpts	Participant	Country
<i>"This monitoring another organisation (Public Health Authority of the Slovak Republic)"</i>	21	Slovakia
<i>"This is responsibility of Health or Environmental inspection"</i>	18	Latvia
<i>"Responsibility of local authorities"</i>	40	Sweden
<i>"This is not in the competence of our organisation but on another organisation"</i>	46	Belgium

8. SPECIALIZED AUDITS AND INSPECTIONS**8.1 LEGIONELLA AUDITS AND INVESTIGATIONS**

These audits vary across the surveyed countries. Ten nations, including Belgium, Bulgaria, France, Germany, Greece, Hungary, Latvia, Lithuania, Netherlands, and Sweden, reported not conducting these audits within their organisations. Participant responses suggest that public health agencies might handle this responsibility, illustrating the diverse range of authorities overseeing Legionella audits and investigations in different countries (see Table 9.13).

Table 9.13*Legionella Audits and Investigations*

Excerpts	Participant	Country
<i>"Belongs to Human Health Authority,"</i>	47	Hungary
<i>"Duty of the National Institute for Health and Welfare."</i>	66	Finland

Excerpts	Participant	Country
<i>"Responsibility of another authority - Health Board"</i>	65	Estonia
<i>"we are federal, and the water is community level"</i>	22	Belgium

8.2 FOOD ESTABLISHMENTS

Monitoring and inspecting food establishments is nearly universal among the surveyed organisations, except in Bulgaria and Germany, where other authorities handle it. This suggests cooperation between health units and veterinary bodies, with responsibility varying by country, involving local authorities, health units, or veterinary oversight (see Table 9.14).

Table 9.14

Food Establishments

Excerpts	Participant	Country
<i>"Another department is responsible for inspections".</i>	54	Bulgaria
<i>"In Germany, inspections of food premises is performed by competent authorities in the regions/municipalities"</i>	2	Germany
<i>"Duty of the municipal health authorities"</i>	14	Finland
<i>"Official controls are ordinarily performed by the local health unit. UO Veterinarian overview the local health units activity"</i>	12	Italy

8.3 INSTITUTIONS AND HOSPITALS

Monitoring institutions and hospitals is inconsistent across surveyed countries. While nineteen countries reported conducting such monitoring, Austria, Bulgaria, Germany, Hungary, Lithuania, Netherlands, and Sweden did not (see Table 9.15).

Table 9.15*Institutions and Hospitals*

Excerpts	Participant	Country
<i>"Not hospitals but institutions such as elderly/care homes"</i>	66	Finland
<i>"Only education and sanitary condition checks"</i>	53	Croatia
<i>"Only for food safety. There is another agency that inspects standards in these facilities".</i>	43	Ireland

9. IMPORT/EXPORT AND DRUG CONTROL**9.1 CONTROL OF IMPORTATION AND EXPORTATION OF FOOD STUFFS**

The survey shows a shared, though not universal, responsibility for controlling food imports and exports. Twenty-four countries reported their environmental health officers handle this, but Bulgaria and France delegate it to other authorities. Participant quotes highlight the varied approaches countries take in managing this duty (see Table 9.16).

Table 9.16*Control of Importation and Exportation of Food Stuffs*

Excerpts	Participant	Country
<i>"Together with veterinary offices"</i>	6	Slovakia
<i>"This is organised in other institutions such as the Administration for Food Safety, Veterinary Sector and Plant Protection."</i>	58	Slovenia
<i>"Duty of the Customs"</i>	14	Finland
<i>"Import controls are under Ministry of Health responsibility. Controls on exported foodstuffs are carried out by the local health units under the supervision of the regional UO"</i>	35	Italy

9.2 DRUG CONTROL RELATED TO NARCOTICS AND PSYCHOTROPIC DRUGS

The survey revealed that drug control for narcotics and psychotropic drugs is rarely handled by environmental health officers, with only ten countries, including Bulgaria, Croatia, Cyprus, Czech Republic, Italy, Latvia, Netherlands, Poland, Portugal and Spain performing this task. In other countries, different authorities manage it (see Table 9.17).

Table 9.17

Drug Control Related to Narcotics and Psychotropic Drugs

Excerpts	Participant	Country
<i>"Responsibilities of the Medicines Authority"</i>	34	Malta
<i>"These aspects are verified by the Directorate for the Investigation of Organized Crime and Terrorism"</i>	41	Romania
<i>"Yes, their use in animals"</i>	4	Poland
<i>"This is responsibility of drug agency".</i>	18	Latvia

10. PUBLIC FACILITY MONITORING AND HEALTH CERTIFICATES

10.1 PUBLIC FACILITY MONITORING:

Thirteen countries reported their Environmental Health Officers handle monitoring for areas like schools and swimming pools, while others (Austria, Belgium, Bulgaria, Denmark, France, Germany, Greece, Hungary, Ireland, Lithuania, Netherlands, and Sweden) delegate this to other authorities (see Table 9.18).

Table 9.18

Public Facility Monitoring

Excerpts	Participant	Country
<i>"Responsibility of other authorities,"</i>	40	Sweden

Excerpts	Participant	Country
<i>“Not in the area of responsibility of our organisational unit within the ministry”</i>	64	Austria
<i>“That is Another department”.</i>	23	Denmark

10.2 HEALTH CERTIFICATE ISSUANCE

Issuing health certificates is common but not universal. Bulgaria, France, Germany, Netherlands, and Slovenia report that other authorities handle this task, indicating a more centralised approach to food safety control (see Table 9.19).

Table 9.19

Health Certificate Issuance

Excerpts	Participant	Country
<i>“Administration for Food Safety, Veterinary Sector and Plant Protection”.</i>	58	Slovenia

10.3 NON-FOOD ESTABLISHMENTS AND HEALTH CERTIFICATES

The picture changes for non-food establishments. This is even less common, with eight countries practising this duty, these were Croatia, Czech Republic, Estonia, Italy, Malta, Poland, Slovakia and Spain (see Table 9.20).

Table 9.20

Non-Food Establishments and Health Certificates

Excerpts	Participant	Country
<i>“Does not fall within the competencies”</i>	25	Belgium
<i>“It is a responsibility of the local authorities”.</i>	29	Spain
<i>“No, these businesses are not regulated in Ireland. Tanning Salons are regulated and we licence and inspect them”.</i>	37	Ireland

11. CONSULTATION AND COMPLAINT INVESTIGATION

11.1 CONSULTATION SERVICES TO FOOD ESTABLISHMENTS

The survey showed diverse consultation services for food establishments by EHOs/EHPs. Sixteen countries, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, Hungary, Ireland, Lithuania, Malta, Netherlands, Poland, Slovakia, and Spain, offer these services, though the nature of support varies. Overall, the findings reveal a range of approaches to food establishment consultations (see Table 9.21).

Table 9.21

Consultation Services to Food Establishments

Excerpts	Participant	Country
<i>"We don't provide consultation services."</i>	68	Portugal
<i>"Under the jurisdiction of another Services (Private Sector),"</i>	24	Cyprus
<i>"that's private sector work".</i>	56	Netherlands
<i>"We offer information and official guidance but not consultation"</i>	66	Finland
<i>"We are a public service of investigation only"</i>	44	France
<i>"We do not provide the service, but we explain the requirements, provide instructions, answer the queries, perform in info seminars etc".</i>	61	Estonia

11.2 INVESTIGATING UNHYGIENIC CONDITIONS

The survey revealed varied approaches to investigating complaints about unhygienic conditions. Nineteen of the twenty-six countries handle these investigations, but Bulgaria, France, Germany, Greece, Hungary, Ireland, Lithuania, and Sweden do not. This suggests that in some countries, other authorities may address such complaints (see Table 9.22).

Table 9.22*Investigating Unhygienic Conditions*

Excerpts	Participant	Country
<i>"Only as they relate to food businesses/ tanning salons."</i>	43	Ireland
<i>'Only Food and Veterinary establishments'</i>	52	Latvia
<i>"This is under Consumer Protection activity"</i>	15	Romania
<i>"Services of the ministry of agriculture do it."</i>	44	France

12. ENVIRONMENTAL HEALTH CONCERNS**12.1 ILLEGAL DUMPING, REFUSE ACCUMULATIONS, STAGNANT WATER**

The survey found that monitoring illegal dumping, refuse accumulations, and stagnant water is not common for environmental health officers. Only eight countries: Croatia, Czech Republic, Finland, Hungary, Italy, Malta, Slovakia, and Spain, reported doing this. Participant quotes reveal the reasons for this limited involvement and suggest the role of other agencies (see Table 9.23).

Table 9.23*Illegal Dumping, Refuse Accumulations, Stagnant Water*

Excerpts	Participant	Country
<i>"Environment and Energy Inspectorate"</i>	58	Slovenia
<i>"There is another competent authority with this responsibility in my country"</i>	49	Czech Republic
<i>"Responsibility of Min. Housing ...Environment"</i>	62	Netherlands
<i>"Other agencies/local authorities do this".</i>	43	Ireland

12.2 PEST INFESTATION CONTROL

The survey showed that pest control and complaint investigation are more commonly handled by EHOs than illegal dumping. Twenty-one countries, excluding Bulgaria, France, Germany, Greece, and Sweden, reported handling this duty, though the scope and approach vary (see Table 9.24).

Table 9.24

Pest Infestation Control

Excerpts	Participant	Country
<i>"if it is food related"</i>	56	Netherlands
<i>"This is under municipalities and household communities apartment associations"</i>	65	Estonia
<i>"That's questions are normally competence of health departments in the municipalities, until their solicit some collaboration"</i>	57	Spain

12.3 VECTOR CONTROL AND COMPLAINT INVESTIGATION

This duty varies widely across the EU. Ten countries: Austria, Belgium, Bulgaria, Estonia, Germany, Greece, Lithuania, Slovakia, Slovenia, and Sweden, reported it is managed by different departments, indicating a decentralised approach (see Table 9.25)

Table 9.25

Vector Control and Complaint Investigation

Excerpts	Participant	Country
<i>"National Institute for Health and Welfare,"</i>	14	Finland
<i>"It is covered by Food veterinary office,"</i>	21	Slovakia

Excerpts	Participant	Country
<i>"This is carried out by Local Councils."</i>	4	Poland

12.4 MATTERS RELATED TO CONSTRUCTION OF HOUSES AND DRAINS REGULATIONS

This duty is among the least common for EHOs, with only twelve countries (Croatia, Cyprus, Czech Republic, Finland, France, Ireland, Italy, Latvia, Malta, Portugal, Slovakia, and Spain) regularly involved. Quotes indicate variations, suggesting shared responsibility or intervention based on health risks. This highlights significant differences in EHO responsibilities across the EU, with some countries using dedicated agencies or a distributed approach (see Table 9.26).

Table 9.26

Matters related to construction of Houses and Drains Regulations

Excerpts	Participant	Country
<i>"Indoor air problems due to construction... if there is reason to believe that the conditions are hazardous to health we can also use the general provisions on health protection act."</i>	66	Finland
<i>"The responsibility of another institution"</i>	63	Romania

13 PUBLIC HEALTH MATTERS

13.1 TOBACCO REGULATION

Only thirteen countries (Croatia, Cyprus, Czech Republic, Estonia, Finland, Ireland, Malta, Netherlands, Poland, Romania, Slovakia, Slovenia and Spain) reported actively regulating tobacco in public health contexts (see Table 9.27).

Table 9.27*Tobacco Regulation*

Excerpts	Participant	Country
<i>“This is not in the field of competency of our organisation”.</i>	46	Belgium
<i>“Ministry of Health”</i>	52	Latvia
<i>“Usually these are powers of the state at the central level”</i>	57	Spain
<i>“Another department is responsible for this”</i>	24	Cyprus

13.2 MALPRACTICE INVESTIGATIONS (TATTOO CLINICS, BEAUTY PARLOURS)

This duty showed significant variation. Eleven countries, including Austria, Bulgaria, Cyprus, Denmark, France, Germany, Greece, Ireland, Lithuania, Romania and Sweden, reported EHOs not being involved in these investigations (see Table 9.28).

Table 9.28*Malpractice Investigations (Tattoo Clinics, Beauty Parlours)*

Excerpts	Participant	Country
<i>“Not our responsibility”</i>	40	Sweden
<i>“Yes, but only for control of PPP in agricultural practices”</i>	46	Belgium
<i>“Only, education, analysis and sanitary checks and labelling”</i>	48	Croatia

13.3 IMMUNISATION

Twelve countries reported EHOs practising this duty (Croatia, Czech Republic, Estonia, Ireland, Italy, Malta, Poland, Portugal, Romania, Slovakia, Slovenia and Spain). The participants’ quotes provide valuable insights into these variations and the potential involvement of other healthcare or regulatory bodies (see Table 9.29).

Table 9.29*Immunisation*

Excerpts	Participant	Country
<i>"Falls under the jurisdiction of another Service".</i>	24	Cyprus
<i>"medical"</i>	56	Netherlands
<i>"Our medical colleagues in the HSE do this but Environmental Health Officers do not"</i>	43	Ireland

14. EDUCATION OF FOOD HANDLERS AND INTERNATIONAL INFORMATION EXCHANGE**14.1 EDUCATION OF FOOD HANDLERS**

Most countries (18) involved in the survey reported providing education for food handlers. However, eight countries, Belgium, Bulgaria, Estonia, France, Germany, Greece, Slovenia, and Sweden, indicated that EHOs are not directly involved in this activity (see Table 9.30).

Table 9.30*Education of Food Handlers*

Excerpts	Participant	Country
<i>"Duty of National Food Agency"</i>	14	Finland
<i>"Generally, these courses are delivered by the local health units with the support of the regional UO"</i>	30	Italy
<i>"We provide instructions, guidelines but not courses."</i>	61	Estonia
<i>"It is done by private organisations".</i>	51	Greece

14.2 INTERNATIONAL EXCHANGE OF INFORMATION

Most countries reported involvement in international information exchange related to food safety. However, Finland and France reported that this task is the responsibility of other organisations (see Table 9.31).

Table 9.31

International Exchange of Information

Excerpts	Participant	Country
<i>"Different authority"</i>	7	Finland
<i>"It is the governmental officials that have the responsibility, we get the necessary information through them."</i>	66	Finland

15. ENVIRONMENTAL AND OCCUPATIONAL HEALTH

15.1 ATMOSPHERIC POLLUTION

While nine countries (Bulgaria, Croatia, Cyprus, Czech Republic, Ireland, Italy, Romania, Slovakia, and Spain) reported EHO involvement in atmospheric pollution monitoring, others indicated different authorities handle this responsibility (see Table 9.32).

Table 9.32

Atmospheric Pollution

Excerpts	Participant	Country
<i>"Atmospheric pollution is investigated by ARPA".</i>	35	Italy
<i>"There is some air pollution monitoring done in certain areas, it is probably in conjunction with local councils."</i>	37	Ireland
<i>"We used to do this, monitor air pollution. If we receive a complaint we usually refer them to the Environmental and Resources Authority"</i>	50	Malta

15.2 NOISE CONTROL

Noise control showed a slightly wider EHO involvement, with thirteen countries (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Ireland, Italy, Malta, Poland, Romania, Slovenia and Spain) reporting such activities (see Table 9.33).

Table 9.33

Noise Control

Excerpts	Participant	Country
<i>“Police are responsible, For health hazard in apartments: Duty of the municipal health authorities, for outdoor noise:”</i>	22	Belgium
<i>“Ministry of Labour and Municipalities”</i>	13	Cyprus

15.3 OCCUPATIONAL HEALTH AND SAFETY

This area had the least EHO involvement, with only nine countries reporting such activities: Bulgaria, Croatia, Czech Republic, Italy, Netherlands, Poland, Romania, Slovakia, and Spain (see Table 9.34).

Table 9.34

Occupational Health and Safety

Excerpts	Participant	Country
<i>“Not within Directorate remit”</i>	10	Malta
<i>“We used in the past but now it is being investigated by Occupational Health and Safety Authority”.</i>	50	Malta
<i>“Not in the area of responsibility of our organisational Unit within the ministry”</i>	64	Austria

16. WASTE AND POLLUTION CONTROL

16.1 POLLUTION CONTROL

While eleven countries (Bulgaria, Croatia, Cyprus, Czech Republic, Finland, Italy, Malta, Poland, Portugal, Romania, and Spain) reported EHO involvement in pollution control, participant quotes highlight the complex nature of these responsibilities (see Table 9.35).

Table 9.35

Pollution Control

Excerpts	Participant	Country
<i>“This is in the hands of another organisation Environmental Board. We investigate drinking water pollution, bathing water pollution, indoor air. the environment surveillance is under the other organisation”</i>	65	Estonia
<i>“Combined responsibilities for Min. Housing, Min. Agriculture, local authorities providing permissions”.</i>	62	Netherlands
<i>“Yes and no. not on our own (plus regions, other government organisations) and always in the context of food safety”</i>	25	Belgium

16.2 WASTE MANAGEMENT:

EHO involvement in waste management was slightly more widespread, with thirteen countries (Croatia, Czech Republic, Estonia, Finland, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovenia, Slovakia and Spain) reporting such activities. However, the quotes again suggest a shared responsibility (see Table 9.36).

Table 9.36*Waste Management*

Excerpts	Participant	Country
<i>“Other Authorities do this”.</i>	13	Cyprus
<i>“This is primarily environmental protection officials. Our role is marginal if needed again the general provisions of health protection act can be used”</i>	66	Finland

17. ANIMAL FEED, SLAUGHTERHOUSES AND FRAUD PREVENTION**17.1 ANIMAL FEED MONITORING**

Animal feed monitoring emerged as a more common activity, with sixteen countries (Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, and Spain) reporting EHO involvement (see Table 9.37).

Table 9.37*Animal Feed Monitoring*

Excerpts	Participant	Country
<i>“Not within Directorate remit”</i>	10	Malta
<i>“Administration for Food Safety, Veterinary Sector and Plant Protection”</i>	58	Slovenia

17.2 SLAUGHTERHOUSES

EHOs in eighteen countries (Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania,

Slovakia, Spain, and Sweden) reported involvement in slaughterhouse inspections. However, participant quotes highlight shared responsibilities with other authorities (see Table 9.38).

Table 9.38

Slaughterhouses

Excerpts	Participant	Country
<i>“In Germany, inspections of food premises and slaughter houses are performed by the competent authorities in regions/municipalities”.</i>	2	Germany
<i>“Falls under the jurisdiction of another Services (Municipality)”</i>	24	Cyprus
<i>“It is covered by Food veterinary office”.</i>	13	Cyprus

17.3 PROTECTION AGAINST DECEPTION AND FRAUD

Many countries (all except Bulgaria) reported EHO involvement in protecting against food fraud and deception. This suggests that while EHOs play a role in fraud prevention, other authorities may share this responsibility, especially for fraud types outside their core competencies (see Table 9.39).

Table 9.39

Protection Against Deception and Fraud

Excerpts	Participant	Country
<i>“this is the responsibility of another institution”</i>	54	Bulgaria
<i>“Yes, but only food fraud”.</i>	3	Spain
<i>“Partially, if food fraud do no have effect on human health, it is carried out by the Trade Inspectorate”.</i>	4	Poland

Overall, the data indicates that EHOs are involved in many countries, but collaboration with other agencies, such as veterinary services, regional authorities, or specialised departments, is common.

18. ALERT SYSTEMS AND RADIATION HYGIENE

18.1 NATIONAL AND EUROPEAN ALERT SYSTEMS

Most countries (25) reported EHO involvement in national and European alert systems for food and feed safety, except for France (see Table 9.40).

Table 9.40

National and European Alert Systems

Excerpts	Participant	Country
<i>“Duty of National Food Agency”</i>	14	Finland
<i>“The regional UO acts as a hub at regional level”</i>	30	Italy

18.2 RADIATION HYGIENE

In contrast, radiation hygiene is not a common EHO responsibility. Fourteen countries (Belgium, Bulgaria, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Lithuania, Malta, Netherlands, Slovenia, and Sweden) indicated that other authorities handle this (see Table 9.41).

Table 9.41*Radiation Hygiene*

Excerpts	Participant	Country
<i>“Falls under the remit of radiation protection commission”</i>	50	Malta
<i>“This issue is dealt with in our country by the Institute for Nuclear Safety”</i>	28	Czech Republic
<i>“Only in food”</i>	52	Latvia
<i>“Radiation investigation is carried out by ARPA – physician department”</i>	35	Italy

Overall, the findings suggest a core role for EHOs in food safety alert systems, but a more limited involvement in radiation hygiene.

19. HYGIENE IN EDUCATIONAL INSTITUTIONS

While fourteen countries (Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Ireland, Italy, Latvia, Malta, Poland, Romania, Slovakia, and Spain) reported EHO involvement in monitoring hygiene in teaching processes, the extent of their responsibilities varies (see Table 9.42).

Table 9.42*Hygiene in Educational Institutions*

Excerpts	Participant	Country
<i>“No other professionals do this,”</i>	43	Ireland
<i>“The cleaning and hygiene aspect are covered with inspections but the health care professionals and infection control nurses are the key persons in promoting these processes”</i>	66	Finland

20. COSMETIC PRODUCTS AND DATA COLLECTION

20.1 COSMETIC PRODUCT MONITORING

EHOs in seventeen countries (Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, France, Germany, Hungary, Ireland, Italy, Netherlands, Poland, Romania, Slovakia, Slovenia, and Spain) are involved in monitoring cosmetic products (see Table 9.43).

Table 9.43

Cosmetic Product Monitoring

Excerpts	Participant	Country
<i>"Another area of the health department does it"</i>	29	Spain
<i>"Pharmaceutical Authorities do this".</i>	13	Cyprus
<i>"Remit of Malta Competition and Consumer Affairs Authority (MCCAA)."</i>	50	Malta

20.2 DATA COLLECTION FOR OTHER DEPARTMENTS

This is performed by seventeen countries: Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain (see Table 9.44).

Table 9.44

Data Collection for Other Departments

Excerpts	Participant	Country
<i>"Not regularly if something is noticed we inform about observations".</i>	66	Finland

Excerpts	Participant	Country
<i>"Data for other competent authorities may be incidentally collected during official controls by the veterinary services, but this is not a structured activity".</i>	30	Italy

21. CEMETERIES AND REPATRIATION OF HUMAN REMAINS

21.1 MONITORING OF CEMETERIES AND BURIALS

Nine countries (Cyprus, Czech Republic, Ireland, Italy, Malta, Poland, Slovakia, Slovenia, and Spain) reported EHO involvement in cemetery monitoring (see Table 9.45).

Table 9.45

Monitoring of Cemeteries and Burials

Excerpts	Participant	Country
<i>"Municipalities"</i>	52	Latvia
<i>"Local Authorities."</i>	13	Cyprus

21.2 SUPERVISION OF INTERNMENT AND REPATRIATION OF HUMAN REMAINS

Ten countries (Croatia, Cyprus, Czech Republic, Finland, Italy, Malta, Poland, Slovakia, Slovenia, and Spain) reported EHO involvement in this area (see Table 9.46).

Table 9.46

Supervision of Internment and Repatriation of Human Remains

Excerpts	Participant	Country
<i>"other competent authorities."</i>	16	Denmark
<i>"this is the responsibility of another institution"</i>	63	Romania

22. E-COMMERCE, SHIP SANITATION, AND HARBOR VESSEL INSPECTION

22.1 E-COMMERCE FOOD SAFETY MONITORING

Twenty-three countries engage in monitoring e-commerce food safety, Bulgaria, Greece, and Portugal reported that this responsibility lies with other organisations (see Table 9.47).

Table 9.47

E-commerce Food Safety Monitoring

Excerpts	Participant	Country
<i>“Not our frame of work, is another organisation”.</i>	68	Portugal

22.2 SHIP SANITATION CERTIFICATES AND HARBOR VESSEL INSPECTION

Fourteen countries (Belgium, Bulgaria, Croatia, Cyprus, Estonia, Finland, Ireland, Italy, Malta, Poland, Portugal, Slovakia, Slovenia, and Spain) are involved in issuing ship sanitation certificates and inspecting harbour vessels (see Table 9.48).

Table 9.48

Ship Sanitation Certificates and Harbor Vessel Inspection

Excerpts	Participant	Country
<i>“No ships on our region”</i>	7	Finland
<i>“But just only river boats”</i>	21	Slovakia
<i>“There is no sea in my country”</i>	28	Czech Republic

23 ADDITIONAL PUBLIC HEALTH RESPONSIBILITIES

23.1 OTHER DUTIES

Participant responses indicate a broad spectrum of additional public health responsibilities undertaken by EHO beyond their core functions, reflecting diverse public health landscapes and organisational structures, as shown in the Table 9.49 below:

Table 9.49

Participants' responses to additional duties

Excerpts	Participant	Country
<i>"Behavioural, Environmental health, Occupational health, Toxicological and Mental Health issues."</i>	54	Bulgaria
<i>"Nutritional properties of meals in institutions - kindergartens, schools, elderly people."</i>	48	Croatia
<i>"Side effects of food supplements."</i>	16	Denmark
<i>"Indoor air problems in private houses, especially when the tenant and the landlord do not agree, can be assessed."</i>	66	Finland
<i>"Management of unprocessed meat, game, and eggs in restaurants and public kitchens."</i>	49	Czech Republic
<i>"We investigate all issues regarding animal health - from farm to fork."</i>	68	Portugal
<i>"Chemical European legislation."</i>	3	Spain
<i>"All food safety related matters including food contact materials, toys, cosmetics, hygiene products, contaminants, residues in food, etc."</i>	64	Austria

Excerpts	Participant	Country
<i>“Our organisation is a local authority, so every control is implemented on local operators... we try to be involved in decision-making on a local level and give advice to prevent possible environmental health issues.”</i>	7	Finland
<i>“We are involved in national and international public health related research projects as well”</i>	65	Estonia
<i>“We are consulted on Planning Applications, Pollution Control Licences, Environmental Impact Assessments by other agencies. We contribute to the national Climate Change Programme.”</i>	43	Ireland
<i>“We also carry out monitoring of alcohol promotions/minimum unit pricing/retail separation of alcohol”</i>	37	Ireland
<i>“Research materials for contact with food.”</i>	5	Poland

Table 8.49 showcases the varied responsibilities of EHOs in Europe. Duties range from core food safety (nutritional properties, food contact materials) to broader public health concerns (mental health, air quality). Interestingly, some EHOs delve into animal health (farm to fork) while others offer expertise in research or policy development. This highlights the diverse skillsets and focus areas of EHOs depending on their country's specific needs and administrative structure.

4.2.3 MALTA'S EHO ROLE: A COMPARATIVE ANALYSIS

Malta's participation was characterised by consistent engagement across various themes, showing a strong pattern of agreement with "Yes" responses, with only six "No" instances. Since Malta was involved in most of the duties, it did not provide additional comments, as other excerpts did. The excerpts that included Malta explained reasons for not performing certain duties, and these were integrated into the overall findings.

Malta's Environmental Health Officers (EHOs) operate in line with European standards, particularly in legislation enforcement, disease control, and food safety. While they are critical in food safety, inspections, and regulations, there is room for improvement in areas like environmental health and occupational safety. Maltese EHOs manage all but six of the 51 duties typically assigned to officers, with specialized agencies handling the remaining tasks. While their core responsibilities in food safety are similar to those of EHOs in other EU countries, their roles diverge in other areas. For example, in environmental health, which usually includes tasks like pollution control and waste management, Maltese EHOs have limited involvement, as these responsibilities fall to separate authorities. Conversely, Maltese EHOs engage in broader public health duties, such as immunisation and vector control, which are less common for EHOs in other EU nations.

These differences may be attributed to Malta's smaller size and population, its unique organisational structure for health and environmental services, and the historical development of its public health system. Relevant excerpts provided by Maltese EHOs are noted in the collection above.

4.2.4 CONCLUSION

Across the EU, EHO duties differ greatly. While some tasks, like food safety and legislation enforcement, are common, others like noise control or radiation hygiene vary widely. This review highlights the diverse responsibilities of EHOs, influenced by their administrative bodies (Ministries, Municipalities etc.). This lack of standardisation makes it difficult to create a universal job description and can lead to confusion about EHOs roles, which may differ between countries and even regions within the same country. "No" responses in surveys might not mean a duty is absent, but rather handled by another entity.

4.3 MAPPING SOPS TO STRATEGIC GOALS

This study analysed the alignment of the Standard Operating Procedures (SOPs) for bathing water sampling and food business inspections with the vision and mission of the Maltese Environmental Health Directorate. The following Tables 10 and 11, highlight key elements of the Directorate’s strategic goals, mapping them to specific steps within each SOP to demonstrate how these procedures support the overall mission.

4.3.1 KEY ELEMENTS OF THE DIRECTORATE’S VISION AND MISSION

1. Safeguarding Public Health: Mitigating exposure to harmful environmental factors to ensure public safety.
2. Consistency and Uniformity in Procedures: Achieving high reliability in operational procedures for effective public health protection.
3. Leadership in Environmental Health: Establishing the Directorate as a leading authority in environmental health practices.
4. Responsiveness to Public Health Risks: Acting swiftly and effectively in response to emerging health threats.

Table 10

SOP: Sampling of Bathing Water

Key Vision/Mission Element	SOP Steps	Alignment with Vision/Mission
Safeguarding Public Health	Steps 1-13	The SOP ensures accurate sampling of bathing water, critical for monitoring and preventing health risks. For example, Step 4 specifies appropriate sampling depth to avoid surface contamination.
Consistency and Uniformity in Procedures	Steps 1-13	Specifies precise sampling methods, including the use of sterile sample bottles (Step 2) and temperature maintenance (Step 7), ensuring uniformity and reliable results.

Key Vision/Mission Element	SOP Steps	Alignment with Vision/Mission
Leadership in Environmental Health	Steps 1, 12, 13	Rigorous procedures and swift responses to health warnings (Step 13) reflect high standards, positioning the Directorate as a leader in environmental health.
Responsiveness to Public Health Risks	Steps 12, 13	Provisions for immediate action in response to public health threats, including issuing warnings and conducting repeat sampling (Step 13), align with the Directorate's commitment to rapid response.

Table 11

SOP: Food Business Inspections

Vision/Mission Elements	Corresponding SOP Steps	Alignment Description
Promote and Safeguard Public Health	Steps 1-8: Overall inspection process.	These steps ensure thorough and consistent inspections aligned with public health regulations, directly contributing to the mission to protect public health.
Be a Leader in Environmental Health	Step 2: Preparation for inspections.	Ensures EHOs are equipped with updated knowledge and tools, supporting the Directorate's vision of leadership in environmental health.
Responsive to Stakeholder Needs	Step 4: Introductory meeting with food business staff.	Engaging stakeholders at the start builds trust and helps EHOs understand the specific needs of each business, aligning with the goal of responsiveness.
Accountable and Responsible Workforce	Steps 6-8: Closing inspection and reporting.	These steps ensure EHOs are accountable for their findings, reinforcing transparency and responsibility in the inspection process.
Continuous Improvement in Health Protection	Step 5: Comprehensive evaluation of food safety practices.	Systematically addressing all elements of food safety encourages ongoing improvements, enhancing the overall health protection strategy of the Directorate.

4.4 INTERVIEWS AND OBSERVATIONS

4.4.1 INTRODUCTION

This section delves into the second research question that guides this study:

Research Question 2: *To what extent are the standard operating procedures within the environmental health directorate aligned with the Maltese environmental directorate's vision and mission?*

The objective is to evaluate the uniformity in implementing the standard operating procedures among environmental health officers. Part one involves interviews (Appendix H) with two participants: one Executive Environmental Health Practitioner responsible for bathing water sampling and another responsible for food inspection (Participant 1 and Participant 2). The interviews were analysed and presented into emerging themes. Part two includes observations (Appendix I) of all environmental health officers conducting food inspections and bathing water monitoring within the Maltese Environmental Health Directorate, with participation extending to the Gozo region.

4.4.2 THE ANALYSIS OF INTERVIEWS (RQ2):

The interviews involved two participants: one Executive Environmental Health Practitioner responsible for food inspections and another responsible for bathing water sampling (N=2). Conducted on separate occasions, each interview took approximately 25 minutes to complete.

The author employed thematic analysis to analyse, interpret, and report patterns within the data collected from the interviews (Goldstein and Sarwate, 2016). This rigorous process involves meticulously reading and re-reading interview transcripts to identify recurring themes relevant to the research question (Liamputtong Rice and Ezzy, 2007). These themes, not simply frequent topics, become the categories for further analysis (Fereday and Muir-

Cochrane, 2006). Thematic analysis goes beyond description, offering deeper interpretations of the identified themes (Walton, 2000). Notably, the analysis followed an inductive approach, where themes emerged directly from the interview data itself, without imposing any pre-existing frameworks (Braun and Clarke, 2015). This aligns with the interpretivist stance, emphasising understanding the participants' perspectives on SOP implementation and their experiences, rather than the author's preconceived ideas.

4.4.3 PART 1: INTERVIEWS

4.4.4 TEAM MANAGEMENT:

Participant 1 focuses on clear communication and proactive training. They ensure consistency by maintaining the same monitoring procedures and refreshing staff knowledge through pre-season training sessions that address potential issues. Additionally, they conduct regular checks to verify equipment presence.

Participant 2 emphasises control and relies heavily on Higher Environmental Health Officers (HEHOs) for task delegation. While SOPs ensure standardised inspection protocols, HEHOs handle most communication with team members, including informing them about inspections, verifying ID validity, overseeing file reviews, and coordinating appointments. Equipment needs are addressed during monthly meetings. Notably, most inspections are unannounced (see Table 12.1).

Table 12.1

Team Management

Excerpts	Participant
<i>“Throughout the training season, we address any concerns that arises”</i>	P1

Excerpts	Participant
<i>“We ensure that all equipment is properly set up.”</i>	P1
<i>“We rely on established Standard Operating Procedures (SOPs) that outline inspection protocols and guidelines..... Additionally, I arrange bi-monthly in-house training sessions.”</i>	P2
<i>“Each month, during our scheduled monthly meetings, we address ongoing work-related challenges..... If there are any additional equipment needs, the HEHPs bring them to attention.”</i>	P2

4.4.5: PERFORMANCE EVALUATION

Participant 1 takes a proactive and data-driven approach to performance evaluation. They monitor trends in sample results and use them to identify areas requiring investigation. Additionally, they foster open communication with team members and address shortcomings collaboratively. The recent internal audit and collaboration with external stakeholders further highlight their commitment to continuous improvement.

Participant 2, on the other hand, relies heavily on Higher Environmental Health Officers (HEHOs) for performance evaluation. HEHOs review inspection reports and conduct one-on-one meetings to address performance issues. Team development primarily relies on EHOs’ requests for specific training during monthly meetings.

In essence, Participant 1 prioritises data-driven evaluation, open communication, and collaboration, while Participant 2 delegates performance evaluation and development to HEHOs (see Table 12.2).

Table 12.2*Performance Evaluation*

Excerpts	Participant
<i>“Completion of the table is required throughout the bathing season... When a trend indicates unsatisfactory results, we proactively investigate the root causes behind it.”</i>	P1
<i>“Performance evaluations are clear-cut, with trends serving as highly effective indicators.”</i>	P1
<i>“I maintain a meticulous watch over the duties of my staff... typically, we don't encounter situations where staff members fail to perform their tasks adequately.”</i>	P1
<i>“Performance evaluations occur during our monthly meetings. In cases where an EHO is not fulfilling their duties adequately, we conduct one-on-one meetings to address the issue and facilitate improvement.”</i>	P2
<i>“We encourage continuous training and welcome requests for specific training during staff meetings.”</i>	P2
<i>“Most issues surface during staff meetings... We regularly review the previous meeting's agenda to ensure that the designated actions have been carried out.”</i>	P2

4.4.6: QUALITY ASSURANCE

Participant 1 prioritises proactive quality assurance for bathing water monitoring. They frequently review and update SOPs, hold regular meetings with stakeholders, and rely on trend analysis to identify and address potential issues. Discrepancies are dealt with through repeat sampling and on-site investigations.

Participant 2, on the other hand, takes a more reactive approach to quality assurance for food inspections. SOPs are reviewed annually, and adherence is primarily monitored

through report reviews during outbreak investigations and monthly meetings. Issues are addressed through one-on-one meetings and verbal warnings (see Table 12.3).

Table 12.3

Quality Assurance

Excerpts	Participant
<i>“Frequently, we find ourselves in the midst of the reviewing process... we will soon update the Standard Operating Procedure (SOI</i>	P1
<i>“We're currently in the process of reviewing... Notably, we've included a new protocol in the SOP regarding the use of a telephone set with an automatic reply feature.”</i>	P1
<i>“Every team member reports directly to me... I am actively involved and adept at handling situations smoothly.”</i>	P1
<i>“We primarily rely on tracking trends and analysing the results obtained. These results provide valuable insights.”</i>	P1
<i>“As a general practice, we review the Food inspection Standard Operating Procedures (SOPs) annually, but adjustments are made as necessary.”</i>	P2
<i>“During investigations of foodborne outbreaks, EHOs are mandated to generate a comprehensive report... I personally review report to confirm its adherence to the SOP.”</i>	P2
<i>“Yes, we hold monthly meetings for this purpose.”</i>	P2
<i>“We address such issues through one-on-one meetings... verbal warnings have been issued to the respective EHO to prevent recurrence.”</i>	P2

4.4.7: RESOURCE MANAGEMENT

Participant 1 takes a decentralised approach to resource management for bathing water monitoring. Resources are readily available to EHOs through stocked lockers and a dedicated cabinet for urgent needs. They prioritise by ensuring on-call staff can handle high-risk situations. Public complaints are documented, and communication channels are maintained with other entities for collaborative investigations.

Participant 2, in contrast, uses a centralised approach for food inspection resource allocation. Equipment and personnel are assigned by the Director upon request from HEHOs. High-risk prioritisation involves evaluating inspection types (hotels vs. bars) and staff availability within a predetermined yearly plan (see Table 12.4).

Table 12.4

Resource Management

Excerpts	Participant
<i>“Resources need to be accessible to all, so we consistently conduct routine stocktaking... Additionally, we provide stocked lockers on both floors for Environmental Health Officers.”</i>	P1
<i>“We engage direct communication with other stakeholders we also keep meeting minutes so as to ascertain continuation of certain queries. “</i>	P1
<i>“I assess the resources, including time, equipment, and staff allocation in each region... We utilise a yearly planner, outlining inspections month by month... and adjustments are made accordingly to ensure efficient resource allocation.”</i>	P2

4.4.8: LEADERSHIP STYLES AND DECISION-MAKING

Participant 1 embodies a hands-on leadership style, actively participating in monitoring activities and prioritising clear communication within the team. They make data-driven decisions, prioritising public health even in the face of challenges like closing beaches. Aligning work practices with regulations is ensured through audits and SOP implementation.

Participant 2 leans towards a democratic style, encouraging team input and fostering a culture of innovation. Prioritising public well-being was exemplified by their decision to split inspection teams. Alignment with organisational goals is achieved through collaboration with other leaders and continuous learning to adapt to a changing environment (see Table 12.5).

Table 12.5*Leadership Styles and Decision-Making*

Excerpts	Participant
<i>“I prefer a hands-on approach where I stay actively involved with the team... This way, I ensure that I am aware of what's happening in the field and can provide support where needed.”</i>	P1
<i>“Closing specific sites presents numerous challenges, including political pressure... Clear communication within the team is vital in such situations to ensure everyone understands the reasons behind these decisions.”</i>	P1
<i>“An audit was requested to review our work practices... Currently, we're in the process of transitioning all protocols to SOPs.”</i>	P1
<i>“I would describe my leadership style as democratic, where I involve all team members in decision-making processes... to serve rather than to command.”</i>	P2
<i>“Ensuring alignment with the Directorate's mission and vision guides my decision-making process... Continuous improvement through learning from past decisions and ongoing training paramount in our evolving landscape.”</i>	P2

4.5 PART 2: ONSITE OBSERVATIONS

The checklists used during the observations by the author and the accompanying observer are found in Appendix I. Additionally, tables with the results from the observations for both food inspections and sea water sampling are presented in Tables 13 and 14 below.

Table 13*Summary of Findings during observations of food inspections*

Inspection Criteria	Yes	No	Not Applicable
Inspection Preparation			
1. Are EHOs aware of the type of inspection?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
2. Do EHOs possess a valid identification card?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
3. Do EHOs have adequate working knowledge of the business involved?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
4. Has the file on the business been reviewed?	Teams: 2, 5, 6, 7, 8	Teams: 3, 4, 9	Team 1 (new premises)
5. Do EHOs have the necessary equipment?	Teams: 1, 2, 3, 4, 6, 7, 9	Teams: 5, 8	
6. Has an appointment been pre-arranged?	Team: 2 (follow-up inspection)	Teams: 1, 3, 4, 5, 6, 7, 8, 9	
Conduct of Inspection			
7. Did EHOs ask for the responsible person?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
8. Were EHOs required to introduce themselves?	Teams: 1, 3, 4, 5, 6, 7, 8, 9	Team: 2 (follow-up inspection)	
9. Were EHOs requested to show a valid ID card?	Teams: 1, 2	Teams: 3, 4, 5, 6, 7, 8, 9 (wore ID cards)	
10. Did EHOs take all relevant details of the person accompanying them?	Teams: 1, 2, 3, 4, 5, 6, 7, 9	Team: 8	
11. Did EHOs outline the scope of the inspection?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
12. Did EHOs check all necessary documents?	Teams: 1, 2, 3, 4, 5, 7, 8, 9	Team: 6	
13. Did EHOs wear protective clothing prior to entering food premises?	Teams: 2, 3, 7 (one EHO)	Teams: 1, 4, 5, 6, 7 (one EHO), 8, 9	
14. Did EHOs remove any jewellery, watch, etc.?	Team: 2	Teams: 1, 3, 4, 5, 6, 7, 8, 9	

Inspection Criteria	Yes	No	Not Applicable
15. Did EHOs wash their hands prior to entering the food production area?	Teams: 1, 2, 3, 5, 6, 7	Teams: 4, 8, 9	
16. Have EHOs observed working practices?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
17. Have EHOs inspected food handlers for cuts, boils, etc.?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		
18. If necessary, did EHOs take photos, records, temperature readings, samples?	Teams: 1, 2, 4	Teams: 3, 5, 6, 8, 9	
19. If available, did EHOs inspect delivery vehicles?			Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9
20. Did EHOs properly fill in the inspection form?	Teams: 1, 2, 4, 8	Teams: 3, 5, 6, 7, 9	
Closing of Inspection			
21. Did EHOs carry out a closing meeting with the responsible person?	Teams: 1, 2 (sealed items), 3, 4, 5, 6, 7, 9	Team: 8	
22. If further action is to be taken, did EHOs take particulars from Govt. ID card?	Team: 2		Teams: 1, 3, 4, 5, 6, 7, 8, 9
Reporting and File Update			
23. Did EHOs update the business file with relevant documents?	Teams: 1, 2, 3, 4, 5, 6, 7, 8, 9		

Legend for Table 13

- ***Yes: Teams that adhered to the observation criteria.***
- ***No: Teams that did not meet the criteria.***
- ***Teams 1, 2, 3, 4, ...: Sampling teams involved in the food inspection process.***

Table 14*Summary Table of Bathing Water Sampling Observations*

Observation Criteria	Yes	No	Remarks
Sampling Site Identification	Teams: A, B, C, D, E	-	-
Preparation and Attachment of Sample Bottle			
- Clean 250 ml sterile bottle attached to sampling rod	Teams: A, B, C, E	Team: D	Team D used non-sterile bottle
- Cap removed before submerging, retained in hand	Teams: A, B, E	Teams: C, D	-
Sample Collection Process			
- Bottle lowered mouth downwards	Teams: A, B, C, E	Team: D	-
- Rod submerged 30 cm under water in 1m deep water	Teams: A, C, D, E	Team: B	-
- Sample bottle turned upwards	Teams: A, C, E	Team: B	-
Post-Collection Procedures			
- Excess water discarded	Teams: A, B, C, E	Team: D	-
- Lid replaced securely	Teams: A, B, C, D, E	-	-
- Samples stored in cooler box at ~4°C	Teams: A, B, C, D, E	-	Team A used a data logger
Sample Labelling	Teams: A, B, C, D, E	-	-

Observation Criteria	Yes	No	Remarks
Sample Handling and Transport			
- Samples kept in the dark, $\leq 10^{\circ}\text{C}$	Teams: A, B, C, D, E	-	-
- "Temperature Control Samples" in cooling box	Teams: A, B, C, D, E	-	-
Lab Analysis Preparation			
- Samples sent for microbiological analysis only	Teams: A, B, C, D, E	-	-
- Sample forms prepared prior	Teams: A, B, C, D, E	-	-
Attention to Detail			
- Importance of sterility and correct temperatures	Teams: A, B, C, E	Team: D	-
- Awareness of risks and meticulous procedure	Teams: A, B, C, E	Team: D	-
Health Warning Response			
- Daily repeat samples collected if warning issued	-	-	Not applicable: Teams A, B, C, D, E
- Bacteriological analysis for both parameters	-	-	Not applicable: Teams A, B, C, D, E

Legend for Table 14:

- *Yes: Teams that adhered to the observation criteria.*
- *No: Teams that did not meet the criteria.*
- *Teams A, B, C, D, E: Sampling teams involved in the bathing water sampling process.*

4.5.1 OBSERVATIONS' ANALYSIS (RQ2)

The observations included all environmental health officers conducting food inspections and bathing water monitoring within the Maltese Environmental Health Directorate, with participation extending to the Gozo region. To address ethical considerations, all participants signed consent forms. For confidentiality, the environmental health officers were anonymised as "Teams." A total of nine teams were observed during food inspections, each comprising two environmental health officers, except for one team which consisted of only one environmental health officer, resulting in a total of 17 participants (N=17). Additionally, observations were made on five sampling officers during bathing water sampling (N=5).

4.5.2 EMERGING THEMES FROM FOOD INSPECTION OBSERVATIONS

1. Preparation and Awareness:

All EHOs had valid identification and were aware of the inspection type, but preparation varied. Teams 2, 5, 6, 7, and 8 reviewed business files; Teams 3, 4, and 9 did not. Only Team 2 pre-arranged an appointment, since it was a court follow up.

2. Adherence to Equipment Standards:

Most teams had necessary equipment, but Teams 5 and 8 lacked essential items.

3. Conduct During Inspection:

EHOs generally introduced themselves, asked for the responsible person and wore ID cards. Team 8 inconsistently recorded accompanying persons' details. Most teams verified documents and outlined inspection scope, except Team 6.

4. Compliance with Protective Measures:

Protective clothing and hygiene practices varied. Only Team 2 removed jewellery, and only Teams 2, 3, and one member of Team 7 wore protective clothing. Teams 4, 8, and 9 did not wash hands before entering food areas.

5. Inspection Thoroughness:

All teams observed working practices and inspected food handlers for cuts and boils. Teams 1, 2, and 4 regularly took photos, records, and samples, but others did not.

6. Closing Procedures and Reporting:

Most teams held closing meetings and updated business files, but Team 8 did not. Inspection checklists were often completed after returning to the office.

7. Additional Observations:

It was noted that Team 3 had an EHO performing part of the inspection without an accompanying person. Several teams also did not complete the inspection checklist onsite, opting to fill it out back at the office.

These themes highlight strengths in certain areas of inspection preparation and conduct, while also pointing out significant inconsistencies and areas for improvement in equipment readiness, protective measures compliance, and adherence to documentation protocols.

4.5.3 EMERGING THEMES FROM BATHING WATER SAMPLING OBSERVATIONS

Observations of five EHOs conducting bathing water sampling revealed that most followed the SOPs for site identification, sample preparation, and collection. However, some

deviations were noted, such as EHO D using non-sterile bottles and inconsistent adherence to sterility protocols. All EHOs labelled and handled samples correctly, ensuring proper storage and transport. Documentation and lab submissions were consistently prepared.

Themes Emerged:

1. Adherence to Identified Sampling Sites:
 - a. All EHOs collected samples from the designated sites.
 2. Preparation and Attachment of Sample Bottle:
 - a. Most EHOs correctly attached a clean 250 ml sterile sample bottle to the sampling rod, except EHO D, who used a non-sterile bottle.
 - b. Only EHOs A, B, and E removed the bottle cap immediately before submerging it, retaining it in hand.
 3. Sample Collection Process:
 - a. EHOs A, B, C, and E lowered the bottle correctly to avoid surface contamination, but EHO D did not follow this step.
 - b. EHOs A, C, D, and E submerged the sampling rod to the correct depth; however, EHO B did not.
 - c. The sample bottle was turned upwards correctly by EHOs A, C, and E, while EHO B did not perform this step.
 4. Post-Collection Procedures:
 - a. Excess water was discarded appropriately by EHOs A, B, C, and E, but not by EHO D.
 - b. All EHOs securely replaced the lid on the sample bottles.
 - c. Samples were stored in clean cooler boxes with cooling packs at around 4°C by all EHOs.
-

5. Sample Labelling:

- a. Every EHO labelled the sample bottles accordingly. However, it was observed that EHO D pre-labelled the sample bottle before taking the sample, which could cause the label to easily fall off when the bottle became wet during the sampling procedure.

6. Sample Handling and Transport:

- a. All samples were kept in the dark and maintained below +10°C.
- b. Each cooling box contained a "Temperature Control Samples" container during transport to the Public Health Lab.

7. Lab Analysis Preparation:

- a. All samples were sent to the Public Health Lab for microbiological analysis only.
- b. Sample forms were prepared by all officers prior to sampling.

8. Attention to Detail:

- a. EHOs A, B, C, and E maintained sterility and correct temperatures as per SOP guidelines, while EHO D did not.
- b. Most EHOs (A, B, C, E) were aware of the risks and importance of following microbiological sampling procedures meticulously.

9. Health Warning Response:

- a. No health warnings were issued during the observations, so this step was not applicable to any EHO.

4.5.4 CONCLUSION

The findings reveal that the Standard Operating Procedures (SOPs) for both bathing water sampling and food business inspections are generally well-aligned with the Maltese

Environmental Health Directorate's strategic goals. These SOPs support the mission of safeguarding public health, ensuring consistency, and maintaining leadership in environmental health practices. However, practical implementation of these procedures varies significantly among officers, reflecting differences in leadership styles, resource management, and performance evaluation.

Through interviews and onsite observations, key themes emerged that highlight both strengths and areas for improvement in the Directorate's operations. While many Environmental Health Officers (EHOs) demonstrated strong adherence to SOPs, inconsistencies were observed in areas such as pre-inspection preparation, equipment readiness, compliance with protective measures, and thoroughness in documentation during food inspections. Similarly, bathing water sampling generally adhered to SOPs, but some deviations, particularly in maintaining sterility and correct sampling techniques, were noted.

These observations highlight the need for consistent implementation of SOPs across the Directorate. While current procedures form a solid foundation, ensuring adherence is crucial to align operations with the Directorate's vision and mission. Addressing these inconsistencies through enhanced training, improved resource management, and stricter quality control measures could further strengthen the Directorate's ability to protect public health and maintain its leadership in environmental health practices.

4.6 SUMMARY OF FINDINGS

This chapter has explored the roles and responsibilities of Environmental Health Officers (EHOs) across EU member states, with a focus on the Maltese Environmental Health Directorate's Standard Operating Procedures (SOPs) for food inspections and bathing water monitoring. The study identified both common trends and country-specific variations,

highlighting areas where Malta aligns with EU practices and where improvements can be made.

Key Findings:

1. Variability in EHO Roles Across EU Member States

- The scope of EHO responsibilities differs significantly among countries, with some nations assigning duties such as pollution control, occupational health, and environmental monitoring to separate agencies.
- Malta follows a centralized model, which ensures consistency but also leads to a high workload for EHOs compared to decentralized systems.

2. Standard Operating Procedures (SOPs) Implementation in Malta

- Malta has clearly defined SOPs for food safety inspections and bathing water quality monitoring, aligning with EU directives.
- Observations indicated procedural inconsistencies, particularly in pre-inspection preparation, equipment use, and documentation accuracy.

3. Training and Resource Management Issues

- In Malta, training opportunities and resource availability influence the consistency and effectiveness of inspections.

4. Alignment of SOPs with Strategic Goals

- The Maltese Environmental Health Directorate's SOPs align with its mission, but gaps remain in quality control and evaluation. Strengthening internal reviews and audits and inter-agency collaboration is essential for adherence.
-

Table 15

Comparative Summary of Key Findings

Aspect	EU EHOs (General Trends)	Malta EHOs
Legislation and Enforcement	Varies; some countries have decentralized models, where EHOs focus on specific areas (e.g., food safety, environmental control).	Centralized under one directorate, covering a broad range of duties. EHOs manage 45 of 51 duties, including uncommon tasks like immunization and vector control.
Food Safety Inspections	Not always conducted by EHOs.	Conducted by EHOs but may transition to another agency.
Bathing Water Monitoring	Responsibilities differ by country.	Strong adherence, but some procedural inconsistencies.
SOP Compliance	Limited shared data on SOP compliance across EU countries.	Generally aligned but inconsistently implemented. Discrepancies between Executive EHOs' interviews and observed practices highlight the need for stricter audits and improved resource allocation.
Training and Resources	Training availability varies; EU programs like Better Training for Safer Food (BTSF) provide standardization.	Resource limitations affect consistency
Inter-Agency Collaboration	Collaboration with public health, environmental agencies, and food safety authorities is common.	Inter-agency collaboration exists but requires clearer role delineation to improve efficiency.
Regulatory Challenges	Differences in national regulations create variations in enforcement strategies.	SOPs are in line with EU regulations, but challenges arise in adapting them to Malta's unique environmental and economic context (e.g., high tourism density).
Governance Structure	Larger countries decentralize EHO roles.	Smaller nations like Malta use centralized systems.
One Health Approach	All countries emphasize interconnections between human, animal, and environmental health, fostering collaborative efforts.	Reflects the same priorities, but resource limitations affect implementation.
Framework Challenges	The diversity in governance and national priorities makes it difficult to establish a universal framework.	Centralization helps maintain oversight, but unique duties and limitations create challenges in standardization.

4.6.1 CONCLUSION

Overall, the findings highlight that while EHO responsibilities are generally consistent across the EU, their execution varies due to differences in governance, priorities, and resources. Malta's centralized model consolidates a wide range of duties under one directorate, ensuring strong alignment with EU regulations, especially in food safety and water quality. However, inconsistencies in SOP implementation, along with limited training and resources, point to the need for improved quality control and better resource management to enhance operational effectiveness and maintain high public health standards.

CHAPTER 5 DISCUSSION

5.1 INTRODUCTION

This chapter presents a discussion and analysis of the results derived from the thematic analysis, contextualizing these findings by comparing them with the reviewed literature and highlighting similarities and differences.

5.2 EHO ROLES AND PRACTICES

This first research question is:

How do the roles, responsibilities, and practices of Environmental Health Officers (EHOs) vary across different member states in the European Union?

EHO roles across EU member states show significant variability, shaped by national contexts, institutional frameworks, and local priorities. While core responsibilities like food safety and water quality monitoring are common across the EU, the specific practices and responsible authorities differ greatly from one country to another.

For example, in Germany and Bulgaria, food establishment inspections are not handled by EHOs but by other competent authorities, reflecting a cooperative approach that involves veterinary bodies and local health units. In Finland, these inspections are managed by municipal health authorities, while in Italy, local health units operate under the oversight of a veterinarian. This decentralisation of responsibilities complicates the development of a universal EHO role and highlights the diversity of public health governance across the EU.

Similarly, the monitoring of bathing water quality exhibits a fragmented approach across Europe. In countries like Sweden, Germany, and the Czech Republic, different institutions, including local authorities and specialised public health bodies, are responsible

for this task. These examples underscore the complexity of EHO roles and responsibilities, which are often influenced by regional and local contexts within each country.

In contrast to the decentralised model prevalent in many EU countries, Malta consolidates EHO duties within a single directorate. This centralised approach offers potential advantages in terms of coordination and resource allocation, but it also underscores the need for clear delineation of responsibilities and effective collaboration with other agencies to ensure comprehensive environmental health coverage.

Despite these variations, a commitment to One Health principles is evident across surveyed nations, reflecting an understanding of the interconnectedness between human, animal, and environmental health, which calls for collaborative efforts across sectors (European Centre for Disease Prevention and Control, 2024). However, the diverse responsibilities and collaborative arrangements across member states make it challenging to establish a standardised EHO framework. Additionally, the reliance on self-reported data in this study may not fully capture the scope of EHO duties or the regional differences within countries.

Furthermore, public health priorities, resource availability, and emerging threats, such as e-commerce food safety concerns, play crucial roles in shaping EHO responsibilities. Countries with greater resources may delegate a broader range of tasks to EHOs, while those with limited resources may restrict their roles. As a result, the lack of standardisation can lead to confusion about EHO roles, which may differ not only between countries but also within regions of the same country.

Ultimately, these findings emphasise the importance of understanding the contextual factors that shape EHO practices across the EU, reinforcing the complexity of establishing a universal job description for EHOs.

5.3 COMPARISON OF FINDINGS WITH LITERATURE

The comparison between survey results and the literature highlights both alignment and divergence in Environmental Health Officer (EHO) roles and practices across the EU. Despite harmonization efforts, significant regulatory variations remain. Borraz et al. (2022) show differing approaches to risk-based inspections in France, the Netherlands, England, and Germany, while Kettunen et al. (2018) highlights inconsistencies in Finland's local enforcement of national guidelines.

Survey data confirm these variations, especially in pollution control and vector monitoring, influenced by resource constraints and public health priorities. This aligns with Mari et al. (2013), who emphasize the importance of inspector familiarity with processes and note regional differences, with higher compliance in Northern and Western Europe than in Southern and Eastern regions. European Commission (2020) similarly calls for targeted support to standardize health standards across the EU.

National contexts also shape EHO roles, as seen in Malta, where EHOs focus on food safety over pollution control, reflecting local needs. Lijana (2021) underscores the importance of fostering positive regulator-stakeholder relationships to tailor practices effectively.

Crisis preparedness and infectious disease control vary significantly across the EU, with some countries better equipped than others, reflecting differences in health crisis experiences. European Centre for Disease Prevention and Control (2022) stresses the need for robust laboratory capacity and cross-sector collaboration to control outbreaks like Salmonella, highlighting the need for EU-wide baseline standards and support.

Food safety and hygiene remain key priorities, with high compliance rates in traditional sectors. Törmä et al. (2019) note that small-scale slaughterhouses struggle with complex systems like HACCP, suggesting simplified frameworks could improve compliance. New areas such as e-commerce and radiation hygiene show variable compliance, underscoring the need for an EU-wide framework, as recommended by Food Safety News (2019).

Ultimately, both survey and literature confirm that while core EHO functions are shared, significant differences in enforcement, resources, and crisis management persist across the EU, illustrating the challenge of harmonizing environmental health practices while respecting regional contexts.

5.4 SUMMARY OF SOP ALIGNMENT

The second research question is:

To what extent are the standard operating procedures within the environmental health directorate aligned with the Maltese environmental directorate's vision and mission?

5.4.1 ALIGNMENT OF SOPs WITH STRATEGIC GOALS.

The analysis of the Standard Operating Procedures (SOPs) for bathing water sampling and food business inspections demonstrates a strong alignment with the Maltese Environmental Health Directorate's strategic goals. The SOPs generally support the mission to safeguard public health through consistent practices, such as maintaining sterility in water sampling and enforcing strict temperature controls. However, specific gaps have been identified that could impede the full realisation of these strategic objectives.

Strengths:

1. **Structured Training and Communication:** Effective training and clear communication protocols among Environmental Health Officers (EHOs) have ensured adherence to SOPs, leading to consistent sample handling and accurate inspections.
2. **Proactive Quality Assurance:** Measures such as frequent SOP reviews, stakeholder meetings, and annual evaluations contribute to maintaining high standards of quality and compliance. This proactive approach has generally ensured that SOPs remain relevant and effective.

Weaknesses:

1. **Inconsistent Implementation:** Observations revealed variability in pre-inspection preparations and equipment standards. For example, Teams 5 and 8 lacked essential equipment like thermometers and swabs, which affected their inspection effectiveness and, consequently, public health safety.
2. **Gaps in Documentation Practices:** Inconsistent adherence to documentation protocols was noted, such as only 33% of teams consistently performing documentation and sampling tasks during food inspections. This lack of consistency undermines accountability and the overall effectiveness of health enforcement activities.

5.4.2 DETAILED ANALYSIS OF GAPS

1. **Equipment and Resource Management:** The use of non-sterile bottles, such as by EHO D during bathing water sampling, undermines inspection accuracy and poses health risks. This highlights the need for strict audits and resource management to ensure equipment readiness, safeguard public health, and maintain SOP compliance.
-

2. Protective Measures and Pre-Inspection Preparation: Inconsistent adherence to protective measures, such as hand hygiene and the use of protective clothing, poses risks. Variability in pre-inspection preparations, as observed in Teams 3, 4, and 9, could lead to incomplete inspections and missed identification of potential health risks.

5.4.3 ANALYSIS OF SOP IMPLEMENTATION AMONG ENVIRONMENTAL HEALTH OFFICERS

The implementation of SOPs among environmental health officers within the Maltese Environmental Health Directorate demonstrates strong alignment with the organisation's vision and mission. Qualitative data from interviews and direct observations reveal that structured communication and training are pivotal in maintaining adherence to SOPs. Participants emphasised the importance of clear communication and proactive training initiatives, which foster uniform implementation across different operational areas.

Quality assurance measures contribute to aligning SOPs with the Directorate's objectives. Proactive strategies, such as frequent reviews and stakeholder meetings, complement reactive approaches focused on annual SOP evaluations and outbreak investigations. This dual approach ensures immediate concerns and long-term improvements are addressed (Kallman, 2006; Amare, 2012).

Data-driven performance evaluation plays a crucial role in promoting adherence to SOPs. Participants' emphasis on trend monitoring and open communication fosters continuous improvement, while reliance on Higher Environmental Health Officers (HEHOs) for regular evaluations highlights the need for ongoing monitoring to uphold compliance standards (Akyar, 2012).

5.4.4 ONSITE OBSERVATIONS AND IMPLEMENTATION ANALYSIS

Observations provided valuable insights into SOP alignment with the Directorate's overarching vision and mission. While strengths exist, notable inconsistencies affect overall alignment. Variability in pre-inspection preparation, adherence to equipment standards, and the commitment to hygiene protocols indicates a need for standardised procedures to ensure that all EHOs operate with the same level of preparedness.

Additionally, lapses in documentation and sampling practices raise concerns about accountability and traceability, potentially impacting compliance monitoring. In bathing water sampling, deviations in using non-sterile equipment underscore the importance of strict adherence to established protocols.

Overall, while foundational alignment between SOPs and the Directorate's vision and mission exists, significant work remains to achieve uniformity in implementation. Addressing observed inconsistencies through enhanced training, standardised procedures, and strict adherence to protocols is vital for improving the effectiveness of EHOs and ensuring the Directorate's objectives are fully realised.

5.4.5 Discrepancies Between Stated Practices and Observed Implementation

A comparison of insights from interviews with Executive Environmental Health Practitioners and actual practices during inspections reveals critical gaps. While executive practitioners articulate a commitment to proactive training and equipment checks, observations indicated discrepancies in team preparedness and adherence to documentation protocols. Such gaps highlight the need for enhanced training and standardisation to achieve better alignment between stated procedures and observed practices (Bhargav et al., 2020).

5.4.6 EVALUATING INNOVATIONS AND CONSISTENCIES IN FOOD SAFETY AND BATHING WATER QUALITY MONITORING FROM LITERATURE AND MALTESE PRACTICES

The comparison between the literature review and the findings from Malta reveals several key insights and similarities in food safety and bathing water quality monitoring practices, highlighting both alignment and divergence in approaches.

In food safety, the literature emphasises the need for effective management and training to address inconsistencies in inspections and audits. Barnes (2022) stresses understanding societal perceptions of inspections, while Powell et al. (2013) criticise the limitations of audits and advocate for a robust food safety culture. These themes resonate with Malta's findings, which reveal disparities in team management practices. Specifically, Participant 1's proactive, hands-on approach contrasts with Participant 2's more hierarchical and reactive style, reflecting the literature's call for effective management to improve consistency.

Similarly, Powell et al. (2013) and Kettunen et al. (2018) highlight the need for consistency and risk-based approaches in performance evaluation and enforcement. This is mirrored in Malta's findings, where Participant 1 employs a data-driven, proactive evaluation method, while Participant 2 relies on HEHOs and a reactive approach. This divergence underscores the literature's critique of performance measures and the need for standardised, risk-based enforcement.

Quality assurance practices in Malta also show significant variation. Participant 1 adopts a proactive stance, whereas Participant 2 is more reactive. This inconsistency parallels the literature's observations on the challenges of maintaining uniform quality assurance and

the impact of procedural inconsistencies, as noted by Kettunen et al. (2018) and Törmä et al. (2019).

Resource management strategies in Malta illustrate contrasts between a decentralised approach by Participant 1 and a centralised approach by Participant 2. This distinction aligns with the literature's focus on the importance of effective resource management and stakeholder engagement, as highlighted by the European Commission (2020).

Leadership styles and decision-making processes in Malta reveal differences between Participant 1's hands-on, data-driven approach and Participant 2's democratic style. This reflects the literature's observations on varying regulatory styles and their impact on food safety practices, as discussed by Borraz et al. (2022).

Bartram and Rees (2000) and Tiwari et al. (2021) discuss comprehensive approaches to designing and implementing monitoring schemes, comparing EU and U.S. practices. Their emphasis on rigorous monitoring frameworks mirrors Malta's findings on the importance of following established protocols and improving data accuracy.

The European Environment Agency (2024) reports on the need for consistent sampling and reporting standards in bathing water monitoring. This aligns with Malta's commitment to maintaining high standards of monitoring and compliance with regulatory frameworks.

Globevnik et al. (2020) and Jozić et al. (2021) highlight long-term improvements in bathing water management and regional water quality comparisons. Their findings reflect Malta's evolving practices and the need for enhanced water quality management.

Fewtrell and Kay (2015) and Leonard et al. (2015) explore the risks associated with recreational water and antibiotic-resistant bacteria, emphasising the need for improved monitoring methods. This concern aligns with Malta's focus on addressing health risks and ensuring effective monitoring.

Overall, the findings from Malta reflect broader trends and challenges identified in the literature, including the need for advanced monitoring techniques, comprehensive frameworks, and improved management practices to enhance food safety and water quality outcomes.

5.4.7 Aligning Local Practices with EU Standards in Environmental Health

Linking these findings underscores the complexities faced by Environmental Health Officers (EHOs) within the EU context. The variability in EHO responsibilities across member states poses challenges in establishing standardised frameworks, as local contexts significantly influence practices. In Malta, while EHOs focus on food safety and demonstrate a strong alignment with the Directorate's mission, inconsistencies hinder their effectiveness. Addressing these gaps through improved training, standardisation of procedures, and better resource management could enhance compliance with SOPs and align local practices with broader environmental health governance objectives.

Ultimately, fostering a culture of accountability and continuous improvement is essential for navigating the complexities of public health challenges within the EU framework.

5.5 CONCLUSION

This chapter underscores the considerable variability in environmental health officer (EHO) roles across the EU, influenced by diverse national and local contexts. Although core functions such as food safety, water quality monitoring, and auditing are universally recognized, their implementation differs significantly, presenting a challenge in establishing a universal EHO framework.

In Malta, while Standard Operating Procedures (SOPs) generally align with the Directorate's strategic goals, there are notable gaps in equipment management, documentation, pre-inspection practices, and auditing processes. These inconsistencies highlight a critical need for enhanced training, standardisation, and comprehensive auditing.

To address these issues, it is crucial to focus on improving training programs, standardising practices, and strengthening resource management. Enhancing auditing processes will further ensure adherence to SOPs and facilitate alignment with broader EU standards. By bolstering these areas, the effectiveness of EHOs can be improved, thereby supporting the Directorate's mission to safeguard public health.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS FOR IMPROVEMENT

6.1 CONCLUSION

During this research, the role of food environmental health officers was set to change, with all food-related duties expected to transfer to a new directorate. The author conducted interviews and observations in anticipation of this transition.

Through extensive research efforts, the author has uncovered a wealth of information elucidating the diverse array of tasks undertaken by environmental health officers across various member states. It has become apparent that beyond their traditional focus on food-related duties, there exists a multitude of responsibilities that the environmental health directorate could potentially embrace to bolster public health and safety efforts. Key non-food responsibilities were identified to expand the directorate's public health role. Establishing clear protocols and risk management strategies is crucial for effective integration. This dissertation provides recommendations to support streamlined operations and maintain high standards in public health and food safety during the restructuring.

6.2 EVIDENCE-BASED RECOMMENDATIONS

Evidence-based recommendations based on the conclusions drawn from this research on Environmental Health Officers (EHOs) across the EU and specifically within the Maltese Environmental Health Directorate:

Recommendations for the EU member states:

1. Standardised Training Programs Across the EU: Develop a unified training program for EHOs to ensure consistency in SOP implementation across member states.
-

2. **Establish an EU Auditing Team:** Form an EU team to review and harmonise SOPs across member states, promoting consistency in public health practices.
 3. **Adopt Flexible, Localised Public Health Regulations:** Tailor public health regulations to address diverse needs across EU member states.
 4. **Utilisation of Technology:** Invest in and expand digital tools to improve real-time reporting, data accuracy, and compliance monitoring, while enhancing communication and data collection among EHOs.
 5. **Enhance Interagency Collaboration:** Foster collaboration between EHOs and other relevant authorities to streamline public health efforts.
 6. **Create Awareness Campaigns:** Educate the public about EHOs' roles and the importance of their work in public health.
 7. **Focus on One Health Principles:** Integrate human, animal, and environmental health initiatives to enhance public health outcomes.
 8. **Develop Context-Specific Guidelines:** Create guidelines that account for national and local variations in EHO roles and responsibilities.
 9. **Encourage a Culture of Continuous Improvement:** Promote continuous improvement through leadership and feedback mechanisms.
 10. **Strengthen Quality Assurance Measures:** Develop robust quality assurance protocols for inspections and monitoring.
 11. **Review and Revise Legislative Frameworks:** Advocate for periodic reviews of environmental health legislation to reflect current practices and challenges.
-

12. Implement Regular Performance Evaluations: Introduce performance evaluations to monitor and improve SOP adherence.

Recommendations for Malta and Specific SOPs:

1. Immediate Audits and Equipment Checks: Ensure all teams have functional equipment through comprehensive audits and regular pre-inspection checks.
2. Mandatory Pre-Inspection Checklists: Standardise pre-inspection procedures to enhance uniformity and thoroughness.
3. Enhanced Training Programs: Provide ongoing training and updates on SOP adherence, focusing on key areas such as equipment readiness.
4. Explicit Strategic Connections in SOPs: Revise SOPs to link directly to public health objectives, reinforcing their strategic importance.
5. Feedback Mechanisms and Evaluation: Implement regular feedback sessions and quarterly reviews to continually refine SOPs and training programs.
6. Independent Audit Unit for SOP Compliance: Establish an independent Audit Unit within the Environmental Health Directorate, overseen by a dedicated Executive Environmental Health Practitioner, to enhance SOP compliance and monitoring. This unit will ensure impartial enforcement of SOPs across all departments.

6.3 EVIDENCE TO SUPPORT RECOMMENDATIONS

The proposed improvements are supported by substantial evidence from literature and case studies. Research indicates that effective training programs enhance compliance with health and safety standards across EU member states (BTSF Academy, 2024). Standardised

protocols and feedback mechanisms improve operational effectiveness (Amare, 2012; Akyar, 2012; Bhargav et al., 2020; Garg, 2023). Establishing independent audit units and expanding digital tools for real-time reporting are recommended to enhance monitoring and enforcement (Otia and Bracci, 2022). Feedback mechanisms, performance evaluations, and interagency collaboration are key to promoting continuous improvement and more effective public health outcomes (Bhargav et al., 2020; Garg, 2023). Integrating One Health principles and adapting regulations to local contexts ensures comprehensive and adaptable public health initiatives (Brazeau and Ogden, 2022).

By adopting these recommendations, the Maltese Environmental Health Directorate can enhance its operational effectiveness, align more closely with EU standards, and reinforce its leadership in environmental health and food control.

6.4 RECOMMENDATIONS FOR FURTHER RESEARCH

- Conduct in-depth studies in specific countries to gain a more nuanced understanding of EHO roles and challenges.
- Analyse the impact of resource availability on EHOs' ability to fulfil their duties.
- Explore how EHO roles are adapting to address emerging public health threats.
- Conduct comparative studies to identify best practices in EHO training and deployment across the EU.

This analysis provides a springboard for further investigation into the diverse and crucial work of EHOs in safeguarding public health across the European Union.

6.5 FINAL REMARKS

This dissertation has systematically addressed the roles, responsibilities, and practices of Environmental Health Officers (EHOs) across the European Union and assessed how well the Maltese Environmental Health Directorate's Standard Operating Procedures (SOPs) align with its vision and mission. Through a detailed analysis, it is evident that although EHOs across the EU share core responsibilities, notable variations reflect the diverse public health challenges and regulatory environments.

The study highlights significant opportunities for the Maltese Environmental Health Directorate to enhance its operational practices. By adopting evidence-based recommendations, including immediate audits, standardised protocols, and enhanced training, the Directorate can not only improve its alignment with EU standards but also bolster its leadership in public health and food safety.

Despite the recent structural changes, this research underscores the importance of continuous improvement and adaptation. The proposed recommendations aim to ensure that the Directorate remains at the forefront of effective environmental health management. They are designed to strengthen consistency, improve compliance, and foster a culture of excellence across the EU.

In summary, this thesis contributes valuable insights into EHO practices and SOP effectiveness, providing a robust framework for future improvements and further research. The findings and recommendations set the stage for a more integrated and responsive approach to safeguarding public health across the European Union.

REFERENCES

- Abela, L., Pace, A., & Buttigieg, S. C. (2019). What affects length of hospital stay? A case study from Malta. *Journal of Health Organization and Management*, 33(6), 714-736. <https://doi.org/10.1108/JHOM-10-2018-0280>
- Akyar, I. (2012). *Latest research into quality control*. In InTech eBooks. <https://doi.org/10.5772/45955>
- Akhtar, N., Syakir Ishak, M. I., Bhawani, S. A., & Umar, K. (2021). Various natural and anthropogenic factors responsible for water quality degradation: A review. *Water (Basel)*, 13(19), 2660. <https://doi.org/10.3390/w13192660>
- Amare, G. (2012). *Reviewing the values of a standard operating procedure*. PubMed Central. <https://pubmed.ncbi.nlm.nih.gov/23209355>
- Amery, R. W. (2023). Federal meat and poultry inspection duties and requirements--part 4: Food defence, product sampling, rules of practice, and summary. *Journal of Environmental Health*, 86(2), 8-11. <https://search.proquest.com/docview/2853065390>
- Aromataris, E., Fernandez, R., Godfrey, C. M., Holly, C., Khalil, H., & Tungpunkom, P. (2015). Summarising systematic reviews: Methodological development, conduct and reporting of an umbrella review approach. *International Journal of Evidence-Based Healthcare*, 13(3), 132–140. <https://jbi.global/critical-appraisal-tools> (Accessed 7th January 2024)
- Barbé, B., Verdonck, K., Mukendi, D., Lejon, V., Lilo Kalo, J., Alirol, E., Gillet, P., Horié, N., Ravinetto, R., Bottieau, E., Yansouni, C., Winkler, A. S., van Loen, H.,
-

Boelaert, M., Lutumba, P., & Jacobs, J. (2016). The art of writing and implementing standard operating procedures (SOPs) for laboratories in low-resource settings: Review of guidelines and best practices. *PLoS Neglected Tropical Diseases*, *10*(11), e0005053.

<https://doi.org/10.1371/journal.pntd.0005053>

Barends, E., & Rousseau, D. M. (2018). *Evidence-based management: How to use evidence to make better organisational decisions* (Eds.). Kogan Page.

Barends, E., Rousseau, D. M., & Briner, R. B. (2014). Evidence-based management: The basic principles. *Centre for Evidence Based Management*.

<https://www.cebma.org/wp-content/uploads/Evidence-Based-Practice-The-Basic-Principles.pdf> (accessed on 13 February 2024).

Barnes, J., Whiley, H., Ross, K., & Smith, J. (2022). Defining food safety inspection. *International Journal of Environmental Research and Public Health*, *19*(2), 789.

<https://doi.org/10.3390/ijerph19020789>

Bartram, J., & Rees, G. (2000). *Monitoring bathing waters* (1st ed.). CRC Press

<https://doi.org/10.4324/9780203478264>

Bhargav, R. K., Parveen, R., Naaz, S., Anand, U., & Ansari, S. (2020). A review on standard operating procedure (SOP). *World Journal of Pharmaceutical Research*, *9*(5), 704-722. [https://wjpr.s3.ap-south-](https://wjpr.s3.ap-south-1.amazonaws.com/article_issue/1588153678.pdf)

[1.amazonaws.com/article_issue/1588153678.pdf](https://wjpr.s3.ap-south-1.amazonaws.com/article_issue/1588153678.pdf)

Bischoff, S. C., Singer, P., Koller, M., Barazzoni, R., Cederholm, T., & van Gossum, A. (2015). Standard operating procedures for ESPEN guidelines and consensus

papers. *Clinical Nutrition (Edinburgh, Scotland)*, 34(6), 1043-1051.

<https://doi.org/10.1016/j.clnu.2015.07.008>

Bonamano, S., Madonia, A., Caruso, G., Zappalà, G., & Marcelli, M. (2021). Development of a new predictive index (bathing water quality index, BWQI) based on *Escherichia Coli* physiological states for bathing waters monitoring. *Journal of Marine Science and Engineering*, 9(2), 120. <https://doi.org/10.3390/jmse9020120>

Borraz, O., Beaussier, A., Wesseling, M., Demeritt, D., Rothstein, H., Hermans, M., Huber, M., & Paul, R. (2022). Why regulators assess risk differently: Regulatory style, business organization, and the varied practice of risk-based food safety inspections across the EU. *Regulation & Governance*, 16(1), 274–292.

<https://doi.org/10.1111/rego.12320>

Braun, V., & Clarke, V. (2015). *Using thematic analysis in psychology*. In J. Smith (Ed.), *Qualitative research in psychology* (pp. III141). SAGE Publications.

Brazeau, S., & Ogden, N. (2022). *Earth observation, public health, and one health*. CABI Publishing. <https://doi.org/10.1079/9781800621183.0000>

BTSF academy Better Training for Food Safety (2024). <https://better-training-for-safer-food.ec.europa.eu/training/> (accessed on 14th August 2024)

Bujang, M. A., Omar, E. D., Foo, D. H. P., & Hon, Y. K. (2024). Sample size determination for conducting a pilot study to assess reliability of a questionnaire. *Restorative Dentistry & Endodontics*, 49(49), 3.1–3.8. <https://doi.org/10.5395/rde.2024.49.e3>

Bulmer, S., & Lequesne, C. (2020). *The member states of the European Union* (3rd ed.). Oxford University Press.

Cook, J. R., Hooijberg, E. H., & Freeman, K. P. (2021). Quality management for in-clinic laboratories: The total quality management system and quality plan. *Journal of the American Veterinary Medical Association*, 258(1), 55–61.

<https://doi.org/10.2460/javma.258.1.55>

Creswell, J. W. (2006). *Research design* (2nd ed.). Sage.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*: (4th ed., international student ed.). Sage Publications.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology*, 11, 100.

<https://doi.org/10.1186/1471-2288-11-100>

Cutcliffe, J., & McKenna, H. (2010). *Establishing the credibility of qualitative research findings: The plot thickens*. In M. G. Y. Ajjawi & T. L. G. Higgins (Eds.), *Nursing research methods* (pp. II415). SAGE Publications Ltd.

Denzin, N. K., & Lincoln, Y. S. (2018). *The Sage handbook of qualitative research* (5th ed.). SAGE Publications, Inc.

DGAL - French Directorate General for Food (2015). Food safety inspections

<https://www.franceagrimer.fr/fam/content/download/38806/document/1503-AL-Controles-ANGbdef.pdf> (accessed on 26/02/2024)

- Džal, D., Kosović, I. N., Mastelić, T., Ivanković, D., Puljak, T., & Jozić, S. (2021). Modelling bathing water quality using official monitoring data. *Water (Basel)*, 13(21), 3005. <https://doi.org/10.3390/w13213005>
- Eccles, M. (2006). The improved clinical effectiveness through behavioural research group (ICEBERG): Designing theoretically-informed implementation interventions, *Implementation Science*, vol. 1
- Eendebak, R., & World Health Organization. (2015). *World report on ageing and health*. World Health Organization. <https://www.who.int/publications/i/item/9789241565042>
- Ehuwa, O., Jaiswal, A. K., & Jaiswal, S. (2021). Salmonella, food safety and food handling practices. *Foods*, 10(5), 907. <https://www.mdpi.com/2304-8158/10/5/907>
- Eliasson, K., Wiréhn, L., Neset, T., & Linnér, B. (2022). Transformations towards sustainable food systems: Contrasting Swedish practitioner perspectives with the European commission's farm to fork strategy. *Sustainability Science*, <https://link.springer.com/article/10.1007/s11625-022-01174-3>
- Environmental Health Directorate, Malta (2013). A focus on the History of the Health Inspectorate in Malta https://healthservices.gov.mt/en/environmental/Documents/Publications-Env-Health/9focus201309_hi_history_en.pdf (accessed on 27/02/2024)
- Environmental Health Directorate. (2021). *health.gov.mt*. Government of Malta. <https://healthservices.gov.mt/en/environmental/Pages/Home-Page.aspx> (accessed on 16/01/2024)
-

Environmental Health Directorate. (2021). Health inspectorate.

<https://healthservices.gov.mt/en/environmental/Health-Inspectorate/Pages/Environmental-Health-Risk-Management.aspx> (accessed on 26/02/2024)

Envesca. (2024). What is the role of an Environmental Health Officer?

<https://www.envesca.co.uk/what-is-the-role-of-an-environmental-health-officer/> (accessed on 27/02/2024)

European Centre for Disease Prevention and Control (2024). About ECDC

<https://www.ecdc.europa.eu/en/about-ecdc> (accessed on 19/03/2024)

European Centre for disease prevention and control (2022). Salmonellosis Annual Epidemiological Report for 2022

https://www.ecdc.europa.eu/sites/default/files/documents/SALM_AER_2022_Report.pdf (accessed on 19/03/2024)

European Commission (2020). A farm to fork strategy for a fair, healthy and environmentally friendly food system.

<https://library.wur.nl/WebQuery/groenekennis/2291639> (accessed on 17/03/2024)

European Commission. (2023a). Annual Activity Report 2022 DG Health and Food Safety (SANTE). https://commission.europa.eu/document/download/363b6458-aaec-45b0-9101-01a8848f8978_en?filename=SANTE_AAR_2022_en.pdf (accessed on 20/03/2024)

European Commission (2016). Communication from the Commission - EU law: Better results through better application.

https://commission.europa.eu/publications/communication-commission-eu-law-better-results-through-better-application_en (accessed on 19/03/2024)

European Commission (2022). *The European Union. What it is and what it does.*

<https://op.europa.eu/webpub/com/eu-what-it-is/en/> (accessed on 19/03/2024)

European Commission, Directorate-General for Health and Food Safety (2023b). Report from the Commission on the overall operation of official controls carried out in Member States (2021) to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products.

Publications Office of the European Union.

<https://data.europa.eu/doi/10.2875/567136> (accessed on 10/03/2024)

European Commission (n.d). Food Safety https://food.ec.europa.eu/horizontal-topics/general-food-law_en (accessed on 10/03/2024)

European Commission (2024). Health and Food Safety https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/health-and-food-safety_en (accessed on 10/03/2024)

European Environment Agency (2024). *Bathing water quality*

<https://www.eea.europa.eu/en/topics/in-depth/bathing-water> (accessed on 23/03/2024)

European Environment Agency. (2023). *Bathing water country fact sheet: Malta.*

<https://www.eea.europa.eu/publications/european-bathing-water-quality-in-2022/malta/view> (accessed on 26th March 2024)

European Environment Agency (2023). *Bathing water quality - European Environment Agency* <https://www.eea.europa.eu/en/topics/in-depth/bathing-water> (accessed on 08/07/2024)

European Union Maps (2014). <https://www.bbc.com/news/world-middle-east-24367705> (accessed on 3/07/2024)

European Union (n.d.). Facts and figures on life in the European Union https://european-union.europa.eu/principles-countries-history/key-facts-and-figures/life-eu_en (accessed on 04/03/2024)

EU Food Safety Almanac (2021). Poland https://www.focus-on-food.eu/fileadmin/media/PDF/Presse/focus_on_food/Structure_of_Food_Safety_Surveillance_in_Poland.pdf (accessed on 26/02/2024)

EUR-Lex (n.d.) Directive – 2006/7 – EN -EUR-Lex <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0007> (accessed on 29/03/2024)

EUR-Lex (n.d.). White Paper on Food Safety <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:51999DC0719> (accessed on 20/03/2024)

EUR-Lex (2021). *Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs* <https://eur-lex.europa.eu/eli/reg/2004/852/oj> (accessed on 23/03/2024)

EUR-Lex (2019). *Regulation (EC) No 854/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption.* <https://eur-lex.europa.eu/eli/reg/2004/854/oj> (accessed on 20/03/2024)

EUR-Lex (2022). Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, *establishing the European Food Safety Authority and laying down procedures in matters of food safety* <https://eur-lex.europa.eu/eli/reg/2002/178/oj> (accessed on 20/03/2024)

EUR-lex access to European law (2022). *European Food Safety Authority (EFSA) – ensuring safe food and animal feed in the EU* <https://eur-lex.europa.eu/EN/legal-content/summary/european-food-safety-authority-efsa-ensuring-safe-food-and-animal-feed-in-the-eu.html?fromSummary=30> (accessed on 06/03/2024)

Ewen, T. (2020). Food-Borne Disease Prevention and Risk Assessment. *International Journal of Environmental Research and Public Health*, 17(14), 5129. <https://doi.org/10.3390/ijerph17145129>

Eyler, A. A. (2020). *Research methods for public health* (1st ed.). Springer Publishing Company, Incorporated.

Farrell, M. L., Joyce, A., Duane, S., Fitzhenry, K., Hooban, B., Burke, L. P., & Morris, D. (2021). Evaluating the potential for exposure to organisms of public health concern in naturally occurring bathing waters in Europe: A scoping review. *Water Research (Oxford)*, <https://www.sciencedirect.com/science/article/pii/S0043135421009052>

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80-92. <https://journals.sagepub.com/doi/10.1177/160940690600500107>

Ferrinho A.M., (2024). *Environmental public health / health inspector*

Fewtrell, L., & Kay, D. (2015). Recreational Water and Infection: A Review of Recent Findings. *Current Environmental Health Reports*, 2(1), 85–94.

<https://doi.org/10.1007/s40572-014-0036-6>

Food Safety Authority of Ireland (2024). *Information about food safety for consumers.*

<https://www.fsai.ie/about/what-we-do> (accessed on 25/02/2024)

Food Safety News - Marler Clark. (2019). FSA given recommendations to improve food safety surveillance. *Newstex Trade & Industry Blogs.*

<https://search.proquest.com/docview/2230501336>

Food Standards Agency. (2021). *How Risk Analysis Keeps Food Safe*

<https://www.food.gov.uk/business-guidance/how-risk-analysis-keeps-food-and-feed-safe> (accessed on 25/02/2024)

Gallo, M., Ferrara, L., Calogero, A., Montesano, D., & Naviglio, D. (2020). Relationships between food and diseases: What to know to ensure food safety. *Food Research International*, 137, 109414. <https://doi.org/10.1016/j.foodres.2020.109414>

Garg, A. (2023). *Policies and Standard operating procedures (SOP). Monitoring tools for setting up the hospital project* (pp. 511-613). Springer.

German, R. R., Lee, L. M., Horan, J. M., Milstein, R. L., Pertowski, C. A., & Waller, M. N. (2001). Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group. *Morbidity and Mortality Weekly Report: Recommendations and Reports*, 50(RR-13), i–35.

<https://www.jstor.org/stable/42000824>

- Globevnik, L., Snoj, L., Šubelj, G., St. John, R., & Mustafa Aydin, (2020). Bathing water management in Europe. Data.europa. <https://data.europa.eu/doi/10.2800/782802>
- Goldstein, N. D., & Sarwate, A. D. (2016). Privacy, security, and the public health researcher in the era of electronic health record research. *Online Journal of Public Health Informatics*, <https://ojphi.jmir.org/2016/3/e61921/PDF>
- Gough, J., & Hamrell, M. (2009). Standard operating procedures (SOPs): Why companies must have them, and why they need them. *Drug Information Journal*, 43(1), 69–74. <https://doi.org/10.1177/009286150904300112>
- Gough, J., & Hamrell, M. (2010). Standard operating procedures (SOPs): How to write them to be effective tools. *Drug Information Journal*, 44(4), 463–468. <https://journals.sagepub.com/doi/10.1177/009286151004400410>
- Grainger, L. A., & Burnett, L. C. (2012). Developing Evaluating and Validating Standard Operating Procedures (SOPs) - Instructor Guide. *Osti.gov*. <https://www.osti.gov/servlets/purl/1660609>
- Hald, T., Aspinall, W., Devleeschauwer, B., Cooke, R., Corrigan, T., Havelaar, A. H., Gibb, H. J., Torgerson, P. R., Kirk, M. D., Angulo, F. J., Lake, R. J., Speybroeck, N., & Hoffmann, S. (2016). World health organization estimates of the relative contributions of food to the burden of disease due to selected foodborne hazards: a structured expert elicitation. *PLOS ONE*, 11(1), e0145839. <https://doi.org/10.1371/journal.pone.0145839>
- Harris, K. J., Murphy, K. S., DiPietro, R. B., & Rivera, G. L. (2015). Food safety inspections results: A comparison of ethnic-operated restaurants to non-ethnic-operated restaurants. *International Journal of Hospitality Management*, 46, 190–199. <https://doi.org/10.1016/j.ijhm.2015.02.004>
-

Health.gov.mt. (2021). Health inspectorate history.

<https://healthservices.gov.mt/en/environmental/Health-Inspectorate/Pages/Health-Inspectorate-History.aspx> (accessed on 27/02/2024)

Hollmann, S., Frohme, M., Endrullat, C., Kremer, A., D'Elia, D., Regierer, B., &

Nechyporenko, A. (2020). Ten simple rules on how to write a standard operating procedure. *PLOS Computational Biology*, *16*(9), e1008095.

<https://doi.org/10.1371/journal.pcbi.1008095>

Holstein, J., & Gubrium, J. F. (2001). Transcription quality. In J. F. Gubrium & J. A.

Holstein (Eds.) *Handbook of interview research* (pp. 628-649). SAGE

Publications.

International Federation of Environmental Health (n.d.). Spotlight in environmental health

in Cyprus https://ifeh.org/spotslights/8_cyprus.html (accessed on 25/02/2024)

International Federation of Environmental Health (n.d.). Spotlight on environmental health

in Portugal https://ifeh.org/spotslights/9_portugal.html (accessed on

26/02/2024)

Jozić, S., Baljak, V., Cenov, A., Lušić, D., Galić, D., Glad, M., Maestro, D., Maestro, N.,

Kapetanović, D., Kraus, R., Marinac-Pupavac, S., & Vukić Lušić, D. (2021).

Inland and coastal bathing water quality in the last decade (2011–2020): Croatia vs. region vs. EU. *Water (Basel)*, *13*(17), 2440–2440.

<https://doi.org/10.3390/w13172440>

Kallman, J. (2006). Creating a standard operating procedures manual. *Risk Management*, *53*

<https://www.proquest.com/magazines/creating-standard-operating-procedures-manual/docview/227015726/se-2?accountid=27934>

- Kalu, F. A., & Bwalya, J. C. (2017). What makes qualitative research good research? An exploratory analysis of critical elements. *International Journal of Social Science Research*, 5(2), 43. <https://doi.org/10.5296/ijssr.v5i2.10711>
- Kettunen, K., Pesonen, S., Lundén, J., & Nevas, M. (2018). Consistency and risk-basis of using administrative enforcement measures in local food control. *Food Control*, 85, 199–211. <https://doi.org/10.1016/j.foodcont.2017.09.023>
- Khan, M. S., & Rahman, S. (2021). Techniques to measure food safety and quality: Microbial, chemical, and sensory (1st ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-030-68636-9>
- Knill, C., & Liefferink, D. (2013). Environmental politics in the European union (1st ed.). Manchester University Press.
- Kovács, B., Lehman, D. W., & Carroll, G. R. (2020). Grade inflation in restaurant hygiene inspections: Repeated interactions between inspectors and restaurateurs. *Food Policy*, 97, 101960. <https://doi.org/10.1016/j.foodpol.2020.101960>
- Leonard, A. F. C., Zhang, L., Balfour, A. J., Garside, R., & Gaze, W. H. (2015). Human recreational exposure to antibiotic-resistant bacteria in coastal bathing waters. *Environment International*, 82, 92–100. <https://doi.org/10.1016/j.envint.2015.02.013>
- Liamputtong Rice, P., & Ezzy, D. (2007). Qualitative research methods: A health focus. Masako ONO-KIHARA.
- Lijana, B. (2021). The regulatory inspection: A tremendous opportunity to build a relationship. *BNP Media*.
- Lockwood, C., Munn, Z., & Porritt, K. (2015). Qualitative research synthesis: Methodological guidance for systematic reviewers utilizing meta-aggregation.
-

International Journal of Evidence-Based Healthcare. <https://jbi.global/critical-appraisal-tools>

Lo-Fo-Wong, K. (2023). Acceptance of standardized construction management processes: Project managers' acceptance in a change towards Standard Operating Procedures in construction consultancy firms (Master's thesis, University of Twente).

<https://essay.utwente.nl/96389/>

Maarouf, H. (2019). Pragmatism as a supportive paradigm for the mixed research approach: Conceptualising the ontological, epistemological, and axiological stances of pragmatism. *International Business Research*, 12(9), 1–9.

<https://doi.org/10.5539/ibr.v12n9p1>

Madonia, A., Caruso, G., Piazzolla, D., Bonamano, S., Piermattei, V., Zappala, G., & Marcelli, M. (2020). Chromophoric dissolved organic matter as a tracer of fecal contamination for bathing water quality monitoring in the northern tyrrhenian sea (latium, italy). *Journal of Marine Science and Engineering*,

<https://doi.org/10.3390/jmse8060430>

Mari, N., Saija, K., & Janne, L. (2013). Significance of official food control in food safety: Food business operators' perceptions. *Food Control*, 31(1), 59-64.

<https://doi.org/10.1016/j.foodcont.2012.09.041>

Munn, Z., Moola, S., Lisy, K., Riitano, D., & Tufanaru, C. (2020). Chapter 5: Systematic reviews of prevalence and incidence. In E. Aromataris & Z. Munn (Eds.), *JBI manual for evidence synthesis*. JBI. <https://jbi.global/critical-appraisal-tools>

- Munné, A., Ginebreda, A., & Prat, N. (2016). Experiences from ground, coastal, and transitional water quality monitoring: The EU water framework directive implementation in the Catalan river basin district (Part II) (1st ed.). *Springer International Publishing*. <https://doi.org/10.1007/978-3-319-23904-0>
- Oliver, D. M., van Niekerk, M., Kay, D., Heathwaite, A. L., Porter, J., Fleming, L. E., Kinzelman, J. L., Connolly, E., Cummins, A., McPhail, C., Rahman, A., Thairs, T., de Roda Husman, A. M., Hanley, N. D., Dunhill, I., Globevnik, L., Harwood, V. J., Hodgson, C. J., Lees, D. N., Nichols, G. L., Nocker, A., Schets, C., & Quilliam, R. S. (2014). Opportunities and limitations of molecular methods for quantifying microbial compliance parameters in EU bathing waters. *Environment International*, *64*, 124–128. <https://doi.org/10.1016/j.envint.2013.12.016>
- Otia, J. E., & Bracci, E. (2022). Digital transformation and the public sector auditing: The SAI's perspective. *Financial Accountability & Management*, *38*(2), 252-280. <https://doi.org/10.1111/faam.12317>
- Pace, A., & Buttigieg, S. C. (2017). Can hospital dashboards provide visibility of information from bedside to board? A case study approach. *Journal of Health Organization and Management*, *31*(2), 142-161. <https://doi.org/10.1108/jhom-11-2016-0229>
- Parahoo, K. (2014). *Nursing research: Principles, process and issues* (3rd ed.). Palgrave Macmillan.
- Penna, P., Baldrighi, E., Betti, M., Bolognini, L., Campanelli, A., Capellacci, S., Casabianca, S., Ferrarin, C., Giuliani, G., Grilli, F., Intoccia, M., Manini, E., Moro, F., Penna, A., Ricci, F., & Marini, M. (2021). Water quality integrated system: A strategic approach to improve bathing water management. *Journal of*
-

Environmental Management, 295, 113099.

<https://doi.org/10.1016/j.jenvman.2021.113099>

Peres, S. C. (2022). Human factors guidance for writing effective laboratory standard operating procedures. *Journal of Chemical Health & Safety (Online)*,

<https://doi.org/10.1021/acs.chas.2c00056>

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Wolters Kluwer.

Powell, D. A., Erdozain, S., Dodd, C., Costa, R., Morley, K., & Chapman, B. J. (2013).

Audits and inspections are never enough: A critique to enhance food safety. *Food Control*, 30(2), 686-691 <https://doi.org/10.1016/j.foodcont.2012.07.044>

Rea, L. M., & Parker, R. A. (2014). *Designing and conducting survey research* (4. ed.). Wiley.

Renda, A., & Castro, R. (2020). Towards stronger EU governance of health threats after the COVID-19 pandemic. *European Journal of Risk Regulation*, 11(2), 273–282.

<https://doi.org/10.1017/err.2020.34>

Rizzo, A., Vandelli, V., Buhagiar, G., Micallef, A. S., & Soldati, M. (2020). Coastal vulnerability assessment along the north-eastern sector of Gozo Island (Malta, Mediterranean Sea). *Water (Basel)*, 12(5), 1405.

<https://doi.org/10.3390/w12051405>

Robert, L. (2022). Developing living policy documents that optimise risk taking. *Journal of Financial Compliance*. <https://doi.org/10.69554/nita4996>

- Rowlands, J. (2021). Interviewee transcript review as a tool to improve data quality and participant confidence in sensitive research. *International Journal of Qualitative Methods*, 20, 160940692110661. <https://doi.org/10.1177/16094069211066170>
- Sammut, I., & Agranovska, J. (2021). *The implementation and enforcement of European Union law in small member states: A case study of Malta* (1st ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-030-66115-1>
- Savona-Ventura, C. (1997). *Outlines of Maltese Medical History*. Midsea Books
- Savona-Ventura, C. (2016). *Contemporary medicine in Malta [1798-1979]*. Lulu. com.
- Schniepp, S. (2020). Writing effective SOPs. *Pharmaceutical Technology Europe*, 32(10), 50 <https://search.proquest.com/docview/2821055536>
- Speziale, H. S., & Carpenter, D. R. (2007). *Qualitative research in nursing: Advancing the humanistic imperative* (4th ed.). Lippincott Williams & Wilkins.
- Stadlmüller, L., Matt, M., Stüger, H. P., Komericki-Strimitzer, T., Jebousek, K., Luttenfeldner, M., & Fuchs, K. (2017). An operational hygiene inspection scoring system for Austrian high-risk companies producing food of animal origin. *Food Control*, 77, 121–130. <https://doi.org/10.1016/j.foodcont.2017.01.019>
- Stake, R. E. (2008). *The art of case study research*. Sage Publications.
- Steinebach, Y. (2019). Instrument choice, implementation structures, and the effectiveness of environmental policies: A cross-national analysis. *Regulation & Governance*, 16(1). <https://doi.org/10.1111/rego.12297>
-

- Steinebach, Y. (2022). Instrument choice, implementation structures, and the effectiveness of environmental policies: A cross-national analysis. *Regulation & Governance*, 16(1), 225–242. <https://doi.org/10.1111/rego.12297>
- Streubert, H., & Carpenter, R. (2011). *Qualitative research in nursing: Advancing the humanistic imperative* (5th ed.). Lippincott Williams & Wilkins.
- Tashakkori, A., & Teddlie, C. (2009). Integrating qualitative and quantitative approaches to research. In *The SAGE Handbook of Applied Social Research Methods* (pp. 283–317). <https://doi.org/10.4135/9781483348858.n9>
- The European Environment Agency (2024). *Editorial* — From policy ambition to environment and climate action in Europe <https://www.eea.europa.eu/en/newsroom/editorial/environment-and-climate-action-in-europe> (accessed on 24/03/2024)
- The European Environment Agency (n.d.). What we do <https://www.eea.europa.eu/en> (accessed on 24/03/2024)
- The Royal Army Medical Corps and the Maltese Garrison – 1904 (n.d.). *Sanitary inspectors: The Malta Garrison 1904*. maltaramc.com (accessed on 3/03/2024)
- The Royal Environmental Health Institute of Scotland. (2016–2024). What is environmental health? <https://rehis.com/what-is-environmental-health/> (accessed on 27/02/2024)
- Thomson, R. (2015). *Resolving controversy in the European Union: Legislative decision-making before and after enlargement*. Cambridge University Press.
-

- Tiwari, A., Hokajärvi, A., Santo Domingo, J. W., Kauppinen, A., Elk, M., Ryu, H., Jayaprakash, B., & Pitkänen, T. (2018). Categorical performance characteristics of method ISO 7899-2 and indicator value of intestinal enterococci for bathing water quality monitoring. *Journal of Water and Health*, 16(5), 827–841.
<https://doi.org/10.2166/wh.2018.293>
- Tiwari, A., Oliver, D. M., Bivins, A., Sherchan, S. P., & Pitkänen, T. (2021). Bathing Water Quality Monitoring Practices in Europe and the United States. *International Journal of Environmental Research and Public Health*, 18(11), 5513.
<https://doi.org/10.3390/ijerph18115513>
- Törmä, K., Fredriksson-Ahomaa, M., & Lundén, J. (2019). Compliance in own-check systems poses challenges in small-scale slaughterhouses. *Food Control*, 95, 27-33. <https://doi.org/10.1016/j.foodcont.2018.07.038>
- Vella, A. P. (1993). *Storja ta' Malta*. Klabb Kotba Maltin.
- Walton, J. (2000). *Transforming qualitative information: Thematic analysis and code development*. SAGE Publications, Inc.
- Welter, C. R., Jarpe-Ratner, E., Xu, D., Lurie, A. & R. H., Fouche, S., Naji, S., & Bisesi, M. (2020). Increasing environmental public health practitioner capacity to address population health challenges. *Journal of Environmental Health*, 82(10), 20-27.
<https://www.jstor.org/stable/26986765>
- Whiley, H., Willis, E., Smith, J., & Ross, K. (2019). Environmental health in Australia: overlooked and underrated. *Journal of Public Health (Oxford, England)*, 41(3), 470-475. <https://doi.org/10.1093/pubmed/fdy156>
-

- Willig, C. (2021). *Introducing qualitative research in psychology* (4th ed.). McGraw-Hill Education.
- Winder, C. (2017). Making effective use of standard operating procedures (SOPs). *Western dairy farmer quarterly magazine*, A.4.
<https://search.proquest.com/docview/2153851887>
- Wyatt, H. V. (2010). Sir Themistocles Zammit: His medical and scientific career.
<https://www.um.edu.mt/library/oar/handle/123456789/964>
- Yazan, B. (2015). Three approaches to case study methods in education: Yin, Merriam, and Stake. *Qualitative Report* <https://doi.org/10.46743/2160-3715/2015.2102>
- Yin, R. K. (2014). *Case study research* (5th ed.). SAGE.
- Zito, A. R., Burns, C., & Lenschow, A. (2020). *The future of European Union environmental politics and policy*. Routledge, Taylor & Francis Group.
- Zinsstag, J., Kaiser-Grolimund, A., Heitz-Tokpa, K., Sreedharan, R., Lubroth, J., Caya, F., Stone, M., Brown, H., Bonfoh, B., Dobell, E., Morgan, D., Homaira, N., Kock, R., Hattendorf, J., Crump, L., Mauti, S., del Rio Vilas, V., Saikat, S., Zumla, A., & de la Rocque, S. (2023). Advancing one human–animal–environment health for global health security: What does the evidence say? *The Lancet*, 401(10376), 591–604. [https://doi.org/10.1016/S0140-6736\(22\)01595-1](https://doi.org/10.1016/S0140-6736(22)01595-1)
- Zuber, C., & Gerada-Azzopardi, E. (1980). *Malta, an island republic* (Design and text by Eric Gerada-Azzopardi; Photography by Christian Zuber). Editions Delroisse.
-

APPENDIX A

LITERATURE REVIEW FOR FOOD INSPECTIONS

Paper	Author's	Title of article	Findings
1	Barnes, J., et al., (2022)	Defining Food Safety Inspection	Food safety inspections, crucial for public health, face criticism for inconsistency and ineffectiveness. Investigating these concerns is vital, but first, understanding societal perceptions is essential. This review analyses literature to uncover 18 meanings attributed to inspections, revealing variations among consumers, industry, and inspectors. While some see inspections as reassuring, others perceive them as unfair, often tied to resource availability and inspector training. These interpretations are juxtaposed with common criticisms, highlighting sociological influences on inspection practices.
2	Powell, D.A., et al (2013)	Audits and inspections are never enough: A critique to enhance food safety.	Food safety audits, both internal and external, evaluate food safety and quality across production and manufacturing processes. Auditors, either internal stakeholders or representatives of purchasers or auditing agencies, conduct these assessments. Some buyers perform their own audits, while others rely on third-party audits. However, third-party auditors operate independently and adhere to various standards. Audits follow proprietary standards, while inspections adhere to legal frameworks. Despite their use, outbreaks linked to audited processors raise concerns about their effectiveness. Advocates argue they ensure safety amid resource constraints, but critics note their limited scope. This paper identifies audit and inspection limitations and suggests strengthening measures through a robust food safety culture and risk-based verification.
3	Kettunen, K., et al (2018)	Consistency and risk-basis of using administrative enforcement measures in local food control	Consistency and risk-based approaches are vital for effective food safety legislation enforcement. In Finland, food retail inspections have followed new national guidelines since 2013. These guidelines dictate that authorities initiate enforcement if a food business operator receives the lowest inspection grade. This study explores the consistency of enforcement initiation among local food control units. Analysis of inspection reports, electronic surveys, and interviews reveals that while most officials find the guidelines helpful, inconsistencies exist both within and between units. Enforcement measures are primarily risk-based and gradual, often applied after repeated violations and prior warnings to food business operators. However, some food business operators show persistent non-compliance. Lowering the threshold for enforcement against repeat violators could enhance compliance. Standardizing practices, providing clear enforcement procedures, and fostering inter-unit cooperation are key for consistent enforcement implementation.

Paper	Author/s	Title of article	Findings
4.	Lijana, B. (2021)	The Regulatory Inspection: A Tremendous Opportunity to Build a Relationship	Maintaining positive relationships with regulators benefits all parties involved and should be consistently nurtured. Both the FDA and USDA carry the responsibility of safeguarding public health, a duty expected by consumers. Third-party food safety assessment schemes often use the term "audit."
5.	Eliasson, K., et al (2022)	Transformations towards sustainable food systems: contrasting Swedish practitioner perspectives with the European Commission's Farm to Fork Strategy	This study examines food system transformations towards sustainability in Sweden, aligning with global goals like the UN's 2030 Agenda and the European Green Deal's Farm to Fork Strategy. It explores transformational processes and agents of change in a high-income region, considering complex systems theories. The study highlights the importance of policy alignment with practitioners' perspectives, the diversity of transformation pathways, and the role of governance mechanisms. It emphasizes the contextual complexity of food systems and the agency of actors involved.
6.	European Commission (2020)	A farm to fork strategy for a fair, healthy, and environmentally friendly food system.	The European Green Deal offers a chance to align our food system with the planet's needs and meet Europeans' desire for healthy, fair, and eco-friendly food. It aims to set the EU as a global sustainability benchmark, requiring collaboration among various stakeholders. The Commission calls on citizens and stakeholders to engage in shaping sustainable food policies at all levels of governance. It urges support from the European Parliament and the Council and pledges to involve citizens in the transformation process. Monitoring will ensure progress towards environmental goals, with a review scheduled for mid-2023 for potential adjustments.
7.	Törmä, K., et al (2019)	Compliance in own-check systems poses challenges in small-scale slaughterhouses.	Small-scale slaughterhouses encounter challenges when it comes to complying with food safety regulations. Implementing their own safety systems is vital, but it proves to be quite difficult. The European Union places importance not only on food safety but also on supporting local food production, including small-scale slaughtering. This study investigates how well small-scale slaughterhouses adhere to their own safety systems, including the Hazard Analysis and Critical Control Points (HACCP), and explores the difficulties they face in doing so. While some areas, such as storage temperature and traceability, show good compliance, others like labelling and HACCP present challenges. Compliance tends to decrease as the complexity of the HACCP system increases. High costs, especially for microbiological sampling, hinder compliance. Interestingly, official veterinarians tend to rate compliance higher than researchers, suggesting a need for further investigation. The study recommends simplifying the HACCP system.

Paper	Author/s	Title of article	Findings
			and addressing cost issues to enhance food safety in small-scale slaughterhouses.
8.	Stadlmüller, L., et al (2017)	An operational hygiene inspection scoring system for Austrian high-risk companies producing food of animal origin.	This study examines operational hygiene factors among milk, fish, and meat producers in Austria using official control data from 2014 to 2015. Routine inspections (n = 352) conducted by state authorities included surveys and food/environmental sampling. The survey, divided into four modules, addressed specific aspects of hygiene and quality management. Operational hygiene scores improved for milk and meat but decreased for fish, suggesting enhanced hygiene management in Austrian milk and meat companies. Factor analysis identified companies with food rejections as scoring lower across survey modules, indicating poorer hygiene. The study aims to design a scoring tool for the milk, fish, and meat industries using routine data and surveys. Analysis of Listeria detection data showed significantly lower rates in high-risk companies without food rejections. This study demonstrates the practical use of official control data for assessing operational hygiene, improvement in high-risk company hygiene, and a correlation between food rejection and Listeria detection.
9.	Harris, K. J., et al (2015)	Food safety inspections results: A comparison of ethnic-operated restaurants to non-ethnic-operated restaurants	This study examined the proposition that cultural differences between ethnic-operated restaurants in high tourism areas of the United States compared to non-ethnic operated restaurants explains the differences in food safety and sanitation inspection scores in five United States cities considered popular tourism destinations. It was hypothesized that ethnic-operated restaurants, composed of people from different cultural norms than that of the indigenous United States population, would result in significantly higher rates of critical regulatory violations than non-ethnic-operated restaurants. Food safety inspection data was obtained from five cities in the west, mid-west, east and two from the south for the years 2009 and 2010. Results confirmed the hypotheses that ethnic-operated restaurants have significantly higher rates of inspection and critical violations. Implications for regulators, trainers, ethnic restaurants and organizations seeking to manage diversity are discussed.
10.	Food safety news (2019)	Food Safety News - Marler Clark: FSA given recommendations to improve food safety surveillance.	A government-commissioned study proposed eight recommendations to enhance food safety surveillance in the United Kingdom. The study, conducted by RAND Europe and commissioned by the Food Standards Agency (FSA) in February 2018, aimed to revolutionize the current approach by leveraging modern analytical techniques and diverse data sources. The recommendations include prioritizing topics, forecasting,

Paper	Author/s	Title of article	Findings
			engaging stakeholders, defining communication processes, enhancing visibility, leveraging existing data, compiling a data catalogue, and capturing skills and knowledge. The study proposed a flexible, evolutionary approach structured around five steps: plan and direct, collect and collate, analyse and produce, report and disseminate, and evaluate and review. The recommendations are being implemented by the FSA. Additionally, the National Audit Office is conducting a separate review on the effectiveness of current regulatory arrangements to ensure food safety and authenticity, building on previous work from October 2013. The audit aims to assess evidence of regulatory effectiveness, performance improvements, and the coherence of regulatory regimes between the FSA and the Department for Environment, Food and Rural Affairs (Defra).
11.	Kovács, B., et al (2020)	Grade inflation in restaurant hygiene inspections: Repeated interactions between inspectors and restaurateurs	Restaurant hygiene grading systems aim to enhance food safety but may be influenced by repeated interactions between inspectors and restaurants. These interactions often lead to higher grades but also correlate with increased customer complaints, potentially inflating grades and misleading consumers. Investigating this, we analysed data from 336,208 inspections of 27,119 restaurants in Los Angeles from 2000 to 2010. Results show that repeated interactions with inspectors lead to higher grades, but grades drop when a new inspector is assigned. Additionally, inspectors with more interactions tend to mark fewer violations, possibly avoiding penalties. Increased interactions are also linked to higher consumer complaints, highlighting the impact on public health. This study underscores how administrative features in transparency policies can shape public information and health outcomes.
12.	Amery, R. W. (2023)	Federal meat and poultry inspection duties and requirements	This report informs environmental health specialists about federal meat and poultry inspectors and their regulated companies. Part 1 discussed the general attributes of U.S. Department of Agriculture Food Safety and Inspection Service personnel and companies. Part 2 covered communication systems, inspection marks, and slaughter inspection duties. Part 3 detailed consumer safety inspectors' responsibilities, including monitoring sanitation procedures, HACCP, reinspection, labelling, and allergen controls. Part 4 will address verifying company food defences, laboratory sampling, and Rules of Practice, along with a series summary.
13.	European Centre for disease prevention and control (2022)	Salmonellosis Annual Epidemiological Report for 2022	Salmonellosis rates vary significantly among EU/EEA countries due to differences in food and animal prevalence, trade practices, and surveillance system quality. Despite this variability, eggs and egg products

Paper	Author/s	Title of article	Findings
			remain the primary sources of Salmonella outbreaks, though significant outbreaks from non-animal food sources were reported in 2022. To mitigate Salmonella prevalence, effective control measures at the primary production level and robust laboratory capacity are essential. Additionally, cross-sector collaboration is critical for identifying and controlling outbreak sources, ultimately preventing future cases.
14	Borraz, O., et al. (2022).	Why regulators assess risk differently: Regulatory style, business organization, and the varied practice of risk-based food safety inspections across the EU. <i>Regulation & Governance</i>	This study contributes to comparative regulation research by expanding beyond traditional examinations of formal law and EU comitology. Instead, it explores the degree of "practice convergence" in EU regulation implementation. Through 50 key informant interviews, a survey, and analysis of policy documents, the study compares how regulators in England, Germany, France, and the Netherlands have implemented EU mandates for "risk-based" food safety inspections. By focusing on risk-scoring methods as a clear variable, the study reveals significant disparities in how risk-based inspections are conceptualized and targeted. These differences have significant implications for which types of food businesses are prioritized to ensure safety in the ostensibly unified single market. The study attributes this variation in implementation to how EU requirements were interpreted through established regulatory approaches and food industry organizational structures in each country, which perpetuated existing inspection practices when designing new risk-based tools.
15.	Ewen, T. (2020).	Food-Borne Disease Prevention and Risk Assessment. <i>International Journal of Environmental Research and Public Health</i>	Food-borne Disease Prevention and Risk Assessment" is a Special Issue of the International Journal of Environmental Research and Public Health focusing on the persistent global threat of food-borne diseases and strategies to mitigate them. Despite extensive government and industry efforts, food-borne illnesses remain prevalent worldwide, with significant morbidity and mortality rates. Unsafe water, inadequate food production processes, poor storage, and handling practices contribute to these diseases, compounded by insufficient regulatory standards and industry compliance. Addressing these challenges requires comprehensive approaches, including improving disease investigation, hazard identification, pathogen control, behaviour understanding, education, and training. Despite these efforts, influencing human behaviour remains a complex challenge for achieving lasting change in food safety practices.
16.	Hald, T., et al. (2016)	World Health Organization Estimates of the Relative Contributions of Food to the Burden of Disease Due to Selected	The Foodborne Disease Burden Epidemiology Reference Group (FERG) was formed in 2007 under the auspices of the World Health Organization (WHO) with the aim of assessing the worldwide impact of foodborne diseases

Paper	Author/s	Title of article	Findings
		Foodborne Hazards: A Structured Expert Elicitation	(FBDs). Estimating this impact is complex since most FBD-causing hazards are not exclusively transmitted through food; rather, they have multiple potential routes of exposure, including transmission from animals, humans, and environmental sources such as water. This paper outlines an expert elicitation study conducted by the FERG Source Attribution Task Force to determine the relative contribution of food to the global burden of diseases commonly associated with food consumption.
17.	Mari, N., et al. (2013)	Significance of official food control in food safety: Food business operators' perceptions.	A survey assessed Finnish food business operators' (FBOs) perceptions of local authority food control inspections. Respondents included slaughterhouses, meat, fish, and milk plants, egg-packing plants, and food storage facilities. Of 459 responses, 78.8% believed inspections improved product safety. Inspectors' familiarity with production processes was crucial for effective control. More frequent inspector visits correlated with better understanding of noncompliance's impact on safety. Local inspectors were considered vital for new information on food safety legislation, with 89.1% of respondents benefiting from discussions. Larger FBOs showed a clearer perception of associated risks.
18.	Kaskela, J., et al., (2021).	Efficacy of disclosed food safety inspections in restaurants	Noncompliance detected in restaurant inspections pose food safety risks, with challenges reported in rectifying them. Disclosure of inspection results aims to improve compliance, but its efficacy is unclear. In a study of Finnish restaurant inspections (2017–2018), we analysed compliance stability, noncompliance correction, preannouncement impact, and inspection intervals. While some improvements were noted, crucial noncompliance's persisted, indicating the need for additional food control measures. Inspection interval showed no significant association with compliance stability. Unannounced inspections revealed higher noncompliance rates, suggesting their necessity for accurate assessments.

APPENDIX B

LITERATURE REVIEW FOR BATHING WATER MONITORING

Paper	Author/s	Title of article	Findings
1.	Džal, et al (2021)	Modelling Bathing Water Quality Using Official Monitoring Data	Predictive models aid bathing water quality monitoring, requiring appropriate selection of model types and metrics for reliability. Intensive sampling is necessary to gather adequate data. This study was performed in Kaštela Bay. It developed models for <i>Escherichia coli</i> and intestinal enterococci using five seasons' worth of data. A neural network and random forest model were chosen, reflecting bacterial persistence. Combined, they achieved satisfactory performance metrics, including an 80.6% overall accuracy.
2.	Bonamano, et al (2021)	Development of a New Predictive index (Bathing Water Quality Index, BWQI) Based on <i>Escherichia coli</i> Physiological States for Bathing Waters Monitoring	Coastal bacterial pathogens may threaten public health in bathing water. The European Bathing Water Directive focuses on culturable faecal pollution indicators like <i>Escherichia coli</i> , overlooking dormant or quiescent cells (Viable but Not Culturable, VBNC) that could resuscitate post-ingestion by bathers. Standard methods are slow, failing early warning marine monitoring needs. To address this, a new Bathing Water Quality Index (BWQI) is proposed, identifying safe coastal zones for recreation. The index combines numerical simulations of living and dormant <i>E. coli</i> with their residence times. An experiment using the fluorescent antibody method was conducted to model <i>E. coli</i> 's various physiological states. Applying BWQI to Santa Marinella highlights health risks in popular bathing areas. This predictive tool aids authorities in preventive decisions, stressing the necessity for improved environmental monitoring methods.
3.	Madonia, et al (2020)	Chromophoric dissolved organic matter as a tracer of faecal contamination for bathing water quality monitoring in the northern Tyrrhenian Sea (Latium, Italy).	In natural water, dissolved organic matter is a mix of various materials. In sewage-affected coastal areas, chromophoric dissolved organic matter (CDOM) can indicate contamination. This study links CDOM's optical properties with <i>Escherichia coli</i> levels in a Tyrrhenian Sea bathing area. It identifies three CDOM components: humic acids (C1 and C2) and tryptophan (C3), correlating with active <i>E. coli</i> near sewage sites. Comparing spectral and microbiological methods could aid bathing water quality monitoring.
4.	Bartram, J., & Rees, G. (2000).	Monitoring bathing waters	Authored by an international panel of experts, this book offers extensive advice on designing, planning, and executing assessments and monitoring schemes for recreational water bodies. It covers various hazards and underscores the significance of integrating monitoring programs effectively.

Paper	Author/s	Title of article	Findings
5.	Tiwari, A., Oliver, D. M., Bivins, A., Sherchan, S. P., & Pitkänen, T. (2021).	Bathing water quality monitoring practices in Europe and the United States	EU Member States (EUMS) and the United States (U.S.) routinely monitor bathing water microbial quality to safeguard public health. This study evaluates the EU Bathing Water Directive (BWD) and U.S. Recreational Water Quality Criteria (RWQC) as frameworks for this purpose. Differences include bathing water profiles, site classification based on pollution levels, sampling frequency, accepted illness risk, epidemiological studies, and monitoring methods. Similarities involve enumerating faecal indicator bacteria (FIB) to assess health risks. However, current methods lack consideration for contamination sources and microbial inactivation rates influenced by factors like temperature and salinity. A comprehensive approach, incorporating FIB, viral pathogen indicators, and microbial source tracking, offers potential for enhanced health protection.
6.	Tiwari, et al (2018).	Categorical performance characteristics of method ISO 7899-2 and indicator value of intestinal enterococci for bathing water quality monitoring	This study evaluates ISO 7899-2:2000 for detecting intestinal enterococci in Finnish bathing waters. Of 341 bacterial isolates, 63.6% were confirmed as enterococci. <i>Enterococcus faecium</i> and <i>Enterococcus faecalis</i> comprised 93.1% of confirmed isolates. False positive and false negative rates ranged from 0.0-18.5% and 5.6-57.1%, respectively, influenced by colony count on membranes. Multiple sample volumes are suggested for accurate results.
7.	European Environment Agency (2021)	Maltese bathing water quality in 2020	More than 22,000 bathing waters in Europe are monitored each season under the Bathing Water Directive, with data reported to the European Environment Agency by 30 reporting countries for assessment in the annual European report and detailed national reports. Each identified bathing water must establish a monitoring calendar before the season, requiring a pre-season sample, a minimum of four (or three in specific cases) samples analysed per season, and sampling intervals not exceeding one month.

Paper	Author/s	Title of article	Findings
8.	European Environment Agency (2023)	Bathing water country fact sheet (2023)	This is the bathing water quality report for the 2022 season. Approximately 22,000 bathing waters across Europe are monitored each season under the Bathing Water Directive. Data and management details from 29 reporting countries are submitted to the European Environment Agency for assessment in both the annual European report and comprehensive national reports. Coastal bathing waters, situated along sea or transitional water coastlines, follow more rigorous parameter thresholds specified in Annex I of the Directive compared to inland bathing waters.
9.	Globevnik et al (2020)	Bathing water management in Europe	Swimming, a popular outdoor activity in Europe, offers health benefits and attracts tourists. Protecting bathing water quality is crucial for policymakers and environmental managers. This report highlights 40 years of European policy improving bathing water quality. Challenges and solutions are outlined, showcasing best practices. It emphasizes the feasibility and importance of enhancing water quality not only at coastal resorts but also in urban rivers and lakes. The report underscores the significance of bathing waters in Europe and identifies future management challenges.
10.	Munné, et al (2016)	Experiences from ground, coastal and transitional water quality monitoring: The EU water framework directive implementation in the Catalan river basin district	Microbial source tracking (MST) tools aid in pinpointing sources of faecal pollution for accurate public health risk assessment and implementation of best management practices. Various viruses excreted by humans and animals are commonly found in water contaminated with faeces or urine. Due to their host specificity and environmental stability, certain viral groups serve as reliable MST indicators. The Laboratory of Virus Contaminants of Water and Food at the University of Barcelona has proposed using viral indicators and cost-effective water virus concentration methods. These procedures have been applied to assess faecal pollution levels in environmental samples and trace contamination origins.

Paper	Author/s	Title of article	Findings
11.	Jozić, et al (2021).	Inland and coastal bathing water quality in the last decade (2011–2020): Croatia vs. region vs. EU.	Europe, a top tourist destination, relies heavily on bathing water quality for vacation choices. Croatia initiated early systematic monitoring, with coastal sites prioritized over inland ones. This study assesses Croatia's water quality alongside neighbouring regions and EU territories over a decade. EU Member States saw a 10.1% and 6.6% rise in excellent water quality for inland and coastal waters, respectively (2011–2020). Germany and Cyprus lead in excellent water quality. Coastal sites consistently exceed inland ones by 7.1%. Increased efforts are needed for inland water management and monitoring.
12.	Farrell, et al (2021)	Evaluating the potential for exposure to organisms of public health concern in naturally occurring bathing waters in Europe	Europe-wide analysis reveals critical lack of surveillance for organisms of public health concern in bathing waters, necessitating integration of more inclusive parameters into current monitoring methods. Current regulations focus on faecal indicator organisms, missing specific waterborne pathogens like antimicrobial-resistant bacteria and viruses. This review examines occurrences of these pathogens in EU bathing waters over 35 years, identifying risks to human health. Out of 8,118 samples, 30% contained pathogens, with viruses most prevalent (52%), followed by bacteria (35%) and protozoa (12%). AMR bacteria were detected in 47% of assessed samples, underscoring their widespread presence. These findings emphasize the need for enhanced understanding and monitoring of health risks associated with bathing waters.
13.	Oliver, et al (2014).	Opportunities and limitations of molecular methods for quantifying microbial compliance parameters in EU bathing waters.	The discussion on using molecular biological methods versus traditional culture-based methods for enumerating regulatory microbial parameters in bathing waters is of current interest to regulators and the scientific community. While culture-based methods are slow, taking 24-48 hours for results, molecular tools like quantitative polymerase chain reaction (qPCR) offer quicker assays, approximately 2-3 hours. However, concerns over the operational utility, limitations, and uncertainties of molecular tools need critical assessment before considering a shift from culture-based approaches under the European Bathing Water Directive. A series of international workshops, chaired by a UK Working Group, explored both methods and identified key concerns regarding policy implications, regulatory barriers, stakeholder engagement, and end-user needs. These findings highlight the need for careful evaluation before potential adoption of molecular methods for bathing water regulation.

Paper	Author/s	Title of article	Findings
14.	Fewtrell, L., and Kay, D. (2015).	Recreational water and infection: a review of recent findings	This review examines recent epidemiological studies and quantitative microbial risk assessments (QMRAs) concerning infection risks associated with recreational water activities. Studies were identified via a PubMed search covering articles from January 2010 to April 2014. Epidemiological findings indicate a heightened risk of gastrointestinal illness among bathers compared to non-bathers, yet often without a clear correlation with water quality assessed by faecal indicator bacteria, particularly in areas affected by non-point source pollution. QMRAs findings also support the inconsistency in water quality associations, particularly in beaches impacted by non-point sources. The paper suggests incorporating quantified microbial source apportionment alongside microbial source tracking methods in future epidemiological surveys to aid source attribution.
15.	Leonard, et al (2015).	Human recreational exposure to antibiotic resistant bacteria in coastal bathing waters	Infections from antibiotic-resistant bacteria (ARB) are a global health concern. While much research has focused on ARB transmission to humans, the role of the natural environment remains unclear. Antibiotic-resistant bacteria, like <i>E. coli</i> , have been found in aquatic environments, potentially exposing water sports participants. We aimed to estimate the prevalence of third-generation cephalosporin (3GC)-resistant <i>E. coli</i> in coastal waters of England and Wales and assess human exposure during water sports. Around 0.12% of <i>E. coli</i> in surface waters were 3GC-resistant, leading to an estimated 6.3 million water sport sessions in 2012 where participants ingested at least one resistant bacterium. Despite low prevalence, there's a risk of exposure, varying with water sport type. Further research is needed to understand the health risks of antibiotic-resistant bacteria in water.

APPENDIX C

LITERATURE REVIEW FOR STANDARD OPERATING PROCEDURES

Paper	Author/s	Title of article	Findings
1	Barbé, B., et al., (2016)	The art of writing and implementing standard operating procedures (SOPs) for laboratories in low-resource settings: Review of guidelines and best practices. <i>PLoS Neglected Tropical Diseases</i>	In this symposium paper, they undertake three main objectives: (i) reviewing current standards and guidelines regarding the creation and implementation of laboratory Standard Operating Procedures (SOPs), (ii) discussing best practices for developing and implementing these SOPs in low-resource settings, and (iii) sharing insights gleaned from the NIDIAG study conducted in the Democratic Republic of Congo (DRC). The intended audience includes clinical investigators of Neglected Tropical Diseases (NTDs), laboratory managers engaged in routine patient care, and policymakers crafting national laboratory regulations in resource-constrained environments.
2	Winder, C. (2017)	Making effective use of standard operating procedures (SOPs).	SOPs are vital for farm staff, providing clear, step-by-step instructions to ensure tasks are done accurately, minimizing errors. For example, milking SOPs cover procedures from system prep to post-milking cleaning, ensuring consistent cow treatment. SOPs can be customized for different farm needs, with simple guides for basic tasks and flowcharts for complex procedures. Consistent adherence to SOPs is crucial across the farm. When drafting SOPs, prioritize clarity and brevity, using bullet points for readability. Though mainly focused on 'what' and 'how', staff training addresses 'why' aspects. Easy access to SOPs aids staff understanding and training needs.
3	Amare, G. (2012).	Review Reviewing the values of a standard operating procedure.	This article explores the significance of standard operating procedures (SOPs) based on literature review, highlighting their critical role in medical practice and pharmaceutical services. It discusses various perspectives on the application and importance of SOPs, emphasizing their ability to address issues such as inconsistent service quality, performance variations, procedural errors, and miscommunication. Overall, SOPs, when integrated into an effective management system, promote transparent operations, prevent errors, facilitate corrective actions, and enhance knowledge transfer and skill development.
4.	Akyar, I. (2012).	<i>Latest research into quality control</i>	In the book "Latest Research into Quality Control," the author aims to compile information on quality control across various fields. The objective is to provide useful and practical knowledge to individuals seeking to enhance their understanding of quality control. Standardization is described as a problem-solving activity recurring across different disciplines, primarily involving the establishment and implementation of standards.

Paper	Author/s	Title of article	Findings
			<p>This process, crucial within quality systems, yields documents outlining accepted practices. Quality is emphasized as vital for achieving business goals, serving as a competitive advantage and a fundamental necessity. All employees are tasked with continuous improvement. Standard Operating Procedures (SOPs) are highlighted as essential components of robust quality systems, ensuring consistent procedures and guiding efficient and safe operations. The development of SOPs encourages worker participation and intrinsic motivation, facilitating organizational progress. SOPs, alongside other quality documents, promote transparency, consistency, and reproducibility, facilitating effective communication within organizations. They are indispensable for regulatory compliance and ensuring quality performance and products. Additionally, SOPs serve as valuable training tools, boosting employee confidence and fostering a sense of accomplishment.</p>
5.	Bhargav, R. et al., (2020).	A Review on standard operating procedure (SOP). <i>World Journal of Pharmaceutical Research</i>	<p>This review aims to elucidate the concept of Standard Operating Procedures (SOPs). Many institutions in India operate under various laws and regulations, which govern their activities. When these laws change, institutions must adhere to the updated regulations. Additionally, institutions authorized by the central government for a specific region must follow regional protocols or standards. SOPs must align with these regional regulations. Apart from strategic plans, organizations utilize other planning documents like intervention plans and communication plans to guide and coordinate activities, outlining operational objectives, strategies, signals, and forecasts. SOPs rely on these plans to fulfil the institution's mission effectively.</p>
6.	Peres, S. C. (2022).	Human factors guidance for writing effective laboratory standard operating procedures	<p>The occurrence of significant incidents in academic and professional laboratories underscores the need for more effective methods to ensure safety and efficiency in protocol execution. Utilizing written standard operating procedures (SOPs) stands out as a promising approach to address this concern. However, while there are numerous guidelines on the necessary content for SOPs, there is a lack of information on their optimal writing and design. Drawing from Human Factors/Ergonomics principles and guidelines can offer valuable insights and direction in crafting SOPs that promote safe and accurate user performance. This paper provides guidance for developing procedures tailored to those routinely engaged in laboratory protocols and offers additional resources for further assistance.</p>

Paper	Author/s	Title of article	Findings
7.	Hollmann, et al., (2020).	Ten simple rules on how to write a standard operating procedure	This paper outlines a standardized workflow with detailed step-by-step instructions for drafting SOPs, offering a cornerstone for robust research documentation. In today's research environment, internet accessibility to publications and data is pivotal, potentially propelling further advancements in research, products, or services. However, accessibility alone is inadequate; data quality verification is equally crucial. To ensure reuse and reproducibility, measures must span the entire research process, from experimental design through data generation, quality control, analysis, interpretation, and result validation. High-quality records, especially those establishing a clear data lineage, serve as vital credentials for potential users, bolstering traceability, transparency, and result credibility. Efforts to standardize data acquisition, analysis, and documentation have gained momentum, propelled by grassroots initiatives like the Research Data Alliance (RDA). Nevertheless, life science academic research still lacks agreed-upon procedures for complex routine workflows. In this context, well-crafted documentation such as SOPs provides essential clarity and direction, crucial for ensuring reproducibility.
8.	Kallman, J. (2006),	Creating a standard operating procedures manual. <i>Risk Management</i>	A risk manager holds the responsibility of establishing the appropriate level of risk to align with an organization's objectives. A risk management standard operating procedures (SOP) manual comprises written instructions detailing how risks are managed within the organization, covering technical, administrative, and operational activities. SOPs aim to delineate work processes tailored to achieve the desired risk level. The primary benefits of an effective SOP include ensuring compliance, reducing workload, enhancing quality, promoting understanding, bolstering credibility, and providing legal defence. Compliance is increasingly crucial in today's regulatory environment, with SOPs aiding in documentation requirements. Additionally, SOPs streamline risk management tasks, leading to efficiency gains, while fostering consistency and quality through established procedures. Moreover, SOPs serve as valuable training tools, ensuring uniformity in operations amid personnel changes, while also offering credibility during audits by demonstrating adherence to standardized risk management practices. Ultimately, SOPs serve as a foundational tool for risk management, provided

Paper	Author/s	Title of article	Findings
			they are implemented and endorsed by senior management to achieve maximum efficacy.
9.	Lo-Fo-Wong, K. (2023).	<i>Acceptance of standardized construction management processes: Project managers' acceptance in a change towards Standard Operating Procedures in construction consultancy firms</i>	This thesis represents the culmination of the author's research journey at the University of Twente, symbolizing the final milestone in the pursuit of an MSc. degree in Construction Management and Engineering. It explores the critical role of business process standardization (BPS) in driving digital transformation and organizational enhancement. It underscores the benefits of BPS, including streamlined processes, cost efficiency, improved quality, transparency, and coordination, while cautioning against the potential dampening effect of excessive standardization on innovation. Within the context of Arcadis, a leading construction consultancy, the author investigates their efforts to standardize construction management practices through SOPs. This initiative poses challenges to project managers' established work methodologies, eliciting resistance due to concerns over time consumption, decision-making limitations, and autonomy loss. Cultural and technological factors emerge as pivotal determinants of acceptance, highlighting the significance of effective communication, decision-making empowerment, and acknowledgment of experience. By exploring project managers' experiences through the lens of the Kübler-Ross grief cycle, the study offers insights into strategies for overcoming implementation hurdles, addressing barriers, and capitalizing on drivers to foster standardized construction project management processes.
10.	SchnieppD, S. (2020).	Writing effective SOPs	To steer clear of potential pitfalls, it's crucial to avoid offering ambiguous information, limiting access to SOPs, permitting access to outdated SOPs, creating unnecessary SOPs for operations not performed, and failing to provide clear instructions for data recording, which could compromise data integrity. Crafting an effective SOP and keeping it up-to-date demands time, dedication, and collaboration with users to strike the right balance. This balance ensures the process is easily followed, delineates the correct data for recording, mirrors current operations, and evolves alongside process enhancements through continuous improvement. Tailoring the information in your SOPs to accurately reflect operations aids in averting audit findings related to SOP non-compliance or inadequacy.

Paper	Author/s	Title of article	Findings
11.	Bischoff, S. C., et al., (2015).	Standard operating procedures for ESPEN guidelines and consensus papers.	The ESPEN Guideline standard operating procedures (SOP) are established based on methodologies from reputable entities such as the AWMF, SIGN, and the Centre for Evidence-based Medicine at Oxford University. These SOPs are mandatory for ESPEN-sponsored guideline projects, aiming to consistently produce high-quality guidelines. They streamline preparation processes, ensure transparency and quality, and facilitate guideline dissemination and publication. The ESPEN Guidelines Editorial Board (GEB), led by two chairmen, oversees processes and strategically plans ESPEN guideline activities. Key components include formulating precise clinical questions using the PICO system, conducting systematic literature searches, categorizing literature according to SIGN evidence levels, and employing clear consensus procedures. Participation is limited to experts disclosing conflicts of interest and unaffiliated with the industry. Recommendations are graded using SIGN criteria and encompass novel outcome models. This approach solidifies ESPEN's leadership in developing contemporary guidelines on malnutrition and clinical nutrition.
12.	Garg, A. (2023).	Policies and Standard operating procedures (SOP)	For hospitals to deliver quality patient care, operational efficiency is essential. From admission to discharge, all components and processes must harmonize to ensure consistent and exceptional care. Achieving this goal requires well-defined policies and procedures. Staff members need clear guidelines, regulations, and responsibilities to guide their daily tasks effectively. Furthermore, adherence to governmental regulations and accreditation standards is crucial. Standard operating procedures (SOPs) based on healthcare standards are developed to outline routine actions of service providers in healthcare facilities. These SOPs serve as comprehensive guides, aiding planners and designers in formulating policies, stationery formats, operational procedures, and other essential elements for hospital management.
13.	Gough, J., & Hamrell, M. (2009).	Standard Operating Procedures (SOPs): Why Companies Must Have Them, and Why They Need Them	This article marks the beginning of a series focusing on standard operating procedures (SOPs). It elucidates the pivotal role of SOPs and their ongoing maintenance. SOPs act as the initial line of defence in diverse inspections, whether conducted by regulatory entities, partners, clients, or prospective purchasers assessing due diligence. Irrespective of nomenclature, any document outlining procedural guidelines falls within the purview of SOPs. They essentially delineate the expected operational practices within businesses adhering to quality standards.

Paper	Author/s	Title of article	Findings
14.	Gough, J., M.A., & Hamrell, M., (2010).	Standard Operating Procedures (SOPs): How Companies Can Determine Which Documents They Must Put in Place	This article is the second part of a trilogy focusing on standard operating procedures (SOPs). It examines the essential SOPs that organizations should consider implementing and outlines the process of determining which SOPs are necessary. While many companies acknowledge the importance of SOPs and already have them in place, some overlook crucial SOPs because they believe they are unnecessary. For instance, a small generic manufacturer may pride itself on its compliance standards but fail to establish a recall procedure because it deems recalls unlikely. However, anticipating such scenarios and having procedures in place is crucial. Similarly, companies may neglect SOPs that regulations do not explicitly mandate, as illustrated by a biotech company that encountered issues with disclosing proprietary information in a conference abstract. These oversights highlight the importance of proactively identifying and implementing SOPs beyond regulatory requirements to mitigate risks and ensure compliance.
15.	Gough, J., & Hamrell, M. (2010).	Standard operating procedures (SOPs): How to write them to be effective tools	This article is the third instalment in a series focusing on standard operating procedures (SOPs). It explores the importance of crafting SOPs in clear and concise language to ensure that processes and activities unfold as intended. The preceding articles discussed the necessity of SOPs and their significance to the business unit, as well as how organizations should identify and establish relevant SOPs. Whether designated as SOPs or by another name, any document outlining procedural steps plays a critical role in various contexts, including regulatory inspections, partnerships, client interactions, and due diligence processes. Essentially, SOPs outline expected practices across industries where quality standards are paramount.
16.	Evans, B. A., et al., (2013).	Involving service users in trials: Developing a standard operating procedure	The authors collaborated with experienced service users and a clinical trials unit to develop an SOP. They outlined core principles for equal participation and developed a framework for involving service users in research, recommending their involvement throughout trials. The SOP aims to guide researchers in successfully involving service users in clinical trials, advocating for early and active participation. They propose allocating budget resources and time for service user involvement, emphasizing the need for formal guidance in trials.

APPENDIX D

Table 16

Different types of triangulations (Streubert and Carpeneter, 2011)

Type of triangulation	Definition
Data triangulation	More than one source of data in a single investigation. Denzin (1989) described three types of data triangulation: <ul style="list-style-type: none"> - Time: collect data at different points in time - Space: collecting data at more than one site - Person: researchers collect data from more than one level of person, i.e. individuals, groups or collectives
Methodological triangulation	Incorporate two or more research methods into one investigation, both at the level of design and data collection.
Investigator triangulation	Two or more researcher with divergent backgrounds and expertise work together.
Theoretical triangulation	Incorporates the use of more than one lens or theory in the analysis of the same data set.

APPENDIX E**FREC ETHICS EMAIL AND REDP FORM DETAILS**

The status of your REDP form (FEMA-2024-00580) has been updated to Endorsed by supervisor  

Inbox x

form.urec@um.edu.mt Wed, 26 Jun, 14:52   

to me ▼

Dear Christine Farrugia,

Please note that the status of your REDP form (FEMA-2024-00580) has been set to *Endorsed by supervisor*.

Your form has now been received by FIREC. As you flagged no issues in your self-assessment and submitted for records, you may proceed with your research (your form will be retained for audit purposes but it will not be reviewed by the FIREC).

You can keep track of your applications by visiting: <https://www.um.edu.mt/research/ethics/redp-form/frontEnd/>.

*****This email has been automatically generated by URECA. Please do not reply. If you wish to communicate with your FIREC please use the respective email address.*****

Administration

REDP Application ID

FEMA-2024-00580

Current Status

Submitted in Records

Audit Trail

-  **15/06/2024 15:31**
Christine Farrugia
Submitted by researcher for records
-  **26/06/2024 14:52**
Sandra C Buttigieg
Form set to Endorsed by supervisor

If a submitted application needs to be amended, it can be withdrawn, edited, and resubmitted, and it will retain the same reference number. There is no need to submit a new application.

APPENDIX F

DIRECTOR'S LETTER OF AUTHORISATION, DATA PROTECTION CLEARANCE

Christine Farrugia
Roseberry Court,
Blk A, App 1, Triq il-Kacca,
Zebbug

30th October 2023

Request for permission to conduct documentation research within the Environmental Health Directorate's.

Dear Mr Hadrian Bonello (DEH),

My name is Christine Farrugia and I am a student at the University of Malta, presently reading for a Masters of Arts in Evidence Based Management and Effective Decision Making. I am presently conducting a research study for my dissertation titled 'The SOP's and Risk mitigation strategies within the Maltese Environmental Health Directorate'. This study aims to evaluate whether the Environmental Health Directorate's standard operational procedures and risk mitigation strategies are in harmony and in sync with the vision and mission of the Directorate. This project is being conducted under the supervision of Professor Sandra Buttigieg.

I am hereby seeking your permission to evaluate the Standard Operating procedures, risk mitigation measures of the Directorate and other related documents within the Directorate. My data collection methods will involve interviews, observations and questionnaires with the Executives Environmental Health Practitioners and Environmental Health Practitioners

Participation will be entirely voluntary, and participants will be free to withdraw at any point, without any repercussions. Data shall always remain anonymous; consent forms will be used to portray

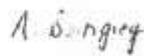
accurately what is required from the participants and specific guidelines will provide details about the proper utilization of data and its storage. Given the nature of the study and the data that will be retrieved, it is not anticipated that the information collected will not have any detrimental effect or impair the participants or the directorate in any way.

Should you require further information, please do not hesitate to contact me or my supervisor; both our contact details are provided below.

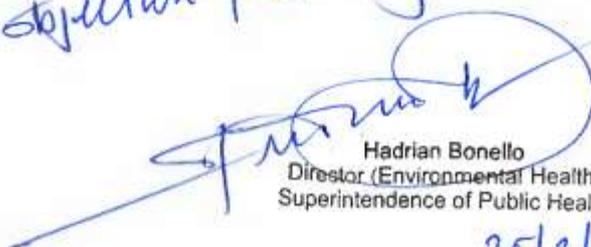
Thank you for your kind consideration of this request.

Sincerely,


Ms. Christine Farrugia
christine.a.farrugia.99@edu.mt
Contact no: 79301754


Professor Sandra Buttigieg
sandra.buttigieg@um.edu.mt
Contact no: 23401120

No objection from my end


Hadrian Bonello
Director (Environmental Health)
Superintendence of Public Health

25/3/2024

APPENDIX G

G.1: ONLINE QUESTIONNAIRE

Request for Assistance in Research Study on Environmental Health Practices

Dear Participant

I trust this message finds you well. I am writing to inform you that the undersigned is acting as an intermediary for a student pursuing a Master of Arts in Evidence-Based Management and Effective Decision Making at the University of Malta. The student is currently engaged in a research study for her dissertation, titled 'Comparative analysis of Environmental Health Officers in the European Union with A focus on the Standard Operating Procedures of Malta's Environmental Health Directorate'

As part of the literature review, the student aims to create a comparative table encompassing all 27 European Union member states to identify common practices and works performed by other authorities or private companies. To facilitate this research, a questionnaire has been attached, and we kindly request your assistance in completing it. Specifically, we are interested in gathering information on the tasks undertaken by environmental health practitioners, health inspectors, and food inspectors in your country.

Your cooperation in providing access to relevant resources would significantly contribute to the depth and scope of this study. Please be assured that any information shared will be handled with the utmost confidentiality and used solely for academic purposes.

Thank you for considering my request. Should you have any questions or require clarification, I am available for discussion. I appreciate your time and willingness to collaborate, and I look forward to the possibility of your support.

Best regards,

Name of intermediary

Contact number

Designation of work:

Name of Country:

Name of your organisation/department/entity:

	Duties of Environmental Health Officer/ Practitioner	Name of Country	Yes Explain	If you stated No, kindly explain further
1.	Does your organisation implement National Legislation?			
2.	Does your organisation implement EU legislation?			
3.	Does your organisation enforce regulations and give evidence in court?			
4.	Does your organisation investigate Public Health Issues?			
5.	Does your organisation investigate infectious disease & pandemic control?			
6.	Does your organisation investigate monitoring the wholesomeness of food products?			
7.	Does your organisation investigate food borne investigation and complaints?			
8.	Does your organisation perform sampling of food?			
9.	Does your organisation investigate nutrition and health claims, standards and labelling?			
10.	Does your organisation monitor the quality of drinking water?			
11.	Does your organisation investigate and monitor the quality of swimming pools and spas?			
12.	Monitoring the quality of bathing water?			
13.	Does your organisation investigate/ monitor the quality of other recreational water?			
14.	Does your organisation perform Legionella audits and investigations?			
15.	Is your organisation involved in monitoring and inspecting food establishments?			
16.	Does your organisation conduct inspections of institutions and hospitals?			

	Duties of Environmental Health Officer/ Practitioner	Name of Country	Yes Explain	If you stated No, kindly explain further
17.	Does your organisation perform official controls of the importation and exportation of foodstuffs?			
18.	Does your organisation administer drug control measures concerning narcotics and psychotropic substances?			
19.	Does your organisation perform monitoring of public facilities, playing areas, schools, public swimming pools, cemeteries?			
20.	Does your organisation issue Approvals to food establishments and hawkers?			
21.	Does your organisation issue Approvals to non-food establishments including barbers, hairdressers, beauticians, nail technicians, massage parlours?			
22.	Does your organisation provide consultation services to food establishments?			
23.	Does your organisation investigate complaints regarding keeping of internal parts of any property in unhygienic conditions?			
24.	Does your organisation investigate complaints regarding illegal dumping, accumulation of refuse and stagnant water?			
25.	Does your organisation investigate complaints regarding pest infestation control and complaint investigation?			
26.	Does your organisation investigate complaints regarding vector control and complaint investigation?			
27.	Does your organisation investigate complaints regarding matters related to the construction of houses and drains regulations, including water seepages?			

	Duties of Environmental Health Officer/ Practitioner	Name of Country	Yes Explain	If you stated No, kindly explain further
28.	Does your organisation perform monitoring on the manufacturing, presentation, and sale of tobacco and related products, as well as regulate smoking in public places?			
29.	Does your organisation investigate cases of malpractice; Tattoo Clinics, Beauty Parlours, Agricultural Practices?			
30.	Does your organisation investigate cases related to immunisation?			
31.	Does your organisation offer educational courses to food handlers on food hygiene?			
32.	Does your organisation take part in international exchange of information at codex level, infosan e.g. rapid alert?			
33.	Does your organisation investigate atmospheric pollution?			
34.	Does your organisation investigate noise control?			
35.	Does your organisation investigate Occupational Health and Safety?			
36.	Does your organisation investigate Pollution Control?			
37.	Does your organisation investigate, include, and control waste management practices?			
38.	Does your organisation monitor and regulate animal feed?			
39.	Does your organisation perform inspections in Slaughterhouses?			
40.	Does your organisation safeguard against food deception and fraud?			
41.	Does your organisation take part in the National and European alert system for food and feed?			
42.	Does your organisation conduct investigations and regulate radiation hygiene?			

	Duties of Environmental Health Officer/ Practitioner	Name of Country	Yes Explain	If you stated No, kindly explain further
43.	Is your organisation involved in promoting hygiene within teaching and upbringing processes?			
44.	Does your organisation perform monitoring of cosmetic products?			
45.	Does your organisation perform data collection for other departments/entities (e.g. employment agencies, water services, occupational health and safety) during onsite inspections of food premises?			
46.	Does your organisation perform the monitoring of cemeteries and burials?			
47.	Does your organisation supervise the internment repatriation of human remains?			
48.	Does your organisation investigate other public health matters? Specify what matters:			
49.	Does your organisation conduct e-commerce activities, including official controls for monitoring websites?			
50.	Does your organisation issue ship sanitation certificates?			
51.	Does your organisation conduct inspections and certification for licensing harbour vessels and pleasure boats?			

Kindly include any other work/duties that are not mentioned in the questionnaire or any other remarks:

APPENDIX H**H.1 QUESTIONS FOR INTERVIEW WITH EXECUTIVE ENVIRONMENTAL
HEALTH PRACTITIONER RESPONSIBLE FOR BATHING WATER
MONITORING****Bathing Water Monitoring Executive Environmental Health****Practitioner:**

Date: _____

Name of Executive Environmental Health Practitioner
_____**Team Management:**

1. How do you ensure that Environment Health Officers are adequately informed about the type of monitoring to be conducted beforehand? _____
2. What methods do you employ to equip your team with adequate working knowledge of the bathing water sites they monitor?

3. How do you ensure your team is equipped with the necessary equipment and resources for monitoring activities?

Performance Evaluation:

4. How do you assess the performance of your team members in conducting monitoring activities? _____
5. Can you discuss your approach to providing feedback and conducting performance evaluations for your team members? _____
6. What measures do you take to support the professional development and growth of your team members? _____
7. How do you handle any performance issues or areas needing improvement within your team? _____

Quality Assurance:

8. How often do you consult with the Bathing Water Standard Operating Procedures?

 9. How often do you review the Bathing water monitoring Standard Operating Procedures?

 10. What steps do you take to ensure consistency and adherence to standards in the monitoring process across your team?

 11. Do you conduct regular meetings or sessions to review monitoring procedures and address any updates or issues?

-

12. Can you describe your process for monitoring and evaluating the quality of monitoring conducted by your team?

13. How do you address any discrepancies or deficiencies identified during monitoring to maintain quality assurance?

Resource Management:

12. How do you allocate resources, such as equipment and personnel, to ensure efficient and effective monitoring activities? _____

13. How do you prioritise and allocate resources to address high-risk or urgent monitoring needs?

Stakeholder Engagement:

14. Can you describe your approach to handling complaints or inquiries from the public regarding bathing water quality or environmental health issues?

15. What steps do you take to address feedback or concerns raised by stakeholders, including businesses and community members?

Leadership and Decision-Making:

16. How would you describe your leadership style in guiding and motivating your team of monitoring personnel? _____

17. Can you provide examples of challenging decisions you've had to make as an executive environmental health practitioner, particularly regarding team management or monitoring priorities?

18. How do you ensure that your decisions align with organisational goals and regulatory requirements?

Name of interviewee



Christine Farrugia



Professor [Sandra C Buttigieg](#)

H.2 QUESTIONS FOR INTERVIEWS WITH FOOD EXECUTIVE

ENVIRONMENTAL HEALTH PRACTITIONER

Interview Questions for Food Executive Environmental Health Practitioner:

Date: _____

Name of Executive Environmental Health Practitioner _____

Team Management:

1. How do you ensure that the Higher Environmental Health Officers responsible for Food Safety Risk Management extract a list of food businesses due for inspections on a monthly basis, ensuring fair, equal, and random distribution among all EHOs conducting food control duties? _____
 2. How do you ensure that Environmental Health Officers are adequately informed about the type of inspection to be carried out beforehand?

 3. Can you describe the process of ensuring your officers possess valid identification cards before conducting inspections? _____
 4. What methods do you employ to equip your team with adequate working knowledge of the businesses they inspect? _____
 5. Could you explain your approach to overseeing the review of files on businesses, including compliance history and outstanding matters? _____
 6. How do you ensure your team is equipped with the necessary equipment and resources for inspections? _____
-

7. Can you elaborate on your strategy for coordinating appointments with management or other responsible persons prior to inspections?

Performance Evaluation:

8. How do you assess the performance of your team members in conducting inspections?

9. Can you discuss your approach to providing feedback and conducting performance evaluations for your inspectors? _____

10. How many regions and EHOs are under your supervision?

11. What measures do you take to support the professional development and growth of your team members?

12. How do you handle any performance issues or areas needing improvement within your team?

Quality Assurance:

13. How often do you review the Food inspection Standard Operating Procedures (SOPs)?

14. What steps do you take to ensure consistency and adherence to SOPs in the inspection process across your team?

15. Do you conduct regular meetings or sessions to review inspection procedures and address any updates or issues?

16. Can you describe your process for monitoring and evaluating the quality of inspections conducted by your team?

17. How do you address any discrepancies or deficiencies identified during inspections to maintain quality assurance?

Resource Management:

18. How do you allocate resources, such as equipment and personnel, to ensure efficient and effective inspections?

19. How do you prioritize and allocate resources to address high-risk or urgent inspection needs?

Stakeholder Engagement:

20. How do you cultivate positive relationships with businesses, stakeholders, and other relevant entities within your jurisdiction?

21. Can you describe your approach to handling complaints or inquiries from the public regarding food safety?

22. What steps do you take to address feedback or concerns raised by stakeholders, including businesses and community members?

Leadership and Decision-Making:

23. How would you describe your leadership style in guiding and motivating your team of officers?

24. Can you provide examples of challenging decisions you've had to make as an executive environmental health practitioner, particularly regarding team management or inspection priorities?

25. How do you ensure that your decisions align with organizational goals and regulatory requirements?

Name of interviewee



Christine Farrugia



Professor [Sandra C Buttigieg](#)

APPENDIX I**I.1 OBSERVATION CHECKLIST FOR FOOD ENVIRONMENTAL HEALTH OFFICERS DURING ONSITE INSPECTIONS****Observation Checklist for Accompanying Food EHOs during Onsite Inspections**

Date: _____ **Time In:** _____ **Time Out:** _____

Premises'

Name: _____

Registered/Responsible Person:

Address: _____

Inspection Preparation

1. Are the Environmental Health Officers aware of the type of inspection to be carried out?

–

2. Do the Environmental Health Officers possess a valid identification card?

–

3. Do the Environment Health Officers have adequate working knowledge of the business involved? _____

4. Has the Environment Health Officers reviewed the file on the business, including history of compliance & matters outstanding? _____

5. Do the Health Environment Health Officers have in their possession the necessary equipment? (Smartphone, tablet, official control forms, checklist, torch, blow lamp, sampling equipment, swabs, Lux metre, protective clothing, thermometer, sterile wipes, distance metre, chlorine comparator, individually numbered tamper proof seals, cooler bag)

6. Has the Environment Health Officers pre-arranged an appointment with management or another responsible person? _____

Conduct of Inspection

7. Did the Environmental Health Officers ask for the responsible person?

8. Were the Environmental Health Officers required to introduce themselves?

9. Were the Environmental Health Officers requested to show a valid identification card? _____
10. Did the Environmental Health Officers take all the relevant details of the person accompanying them? _____
11. Did the Environmental Health Officers outline the scope of the inspection?

12. Did the Environmental Health Officers check all the necessary documents?

13. Did the Environmental Health Officers wear protective clothing prior to entering food premises or production areas? _____
14. Did the Environmental Health Officers remove any jewellery, watch, etc.?

15. Did the Environmental Health Officers wash their hands prior to entering the food production area or, at least, once inside? _____
16. Have the Environment Health Officers observed working practices?

17. Have the Environment Health Officers inspected food handlers vis-à-vis cuts, boils, etc.? _____
18. If necessary, did the Environment Health Officers take any photos, records, temperature readings, and samples? _____
19. If available, did the Environment Health Officers inspect delivery vehicles?

20. Did the Environment Health Officers properly fill in the inspection form?

Closing of Inspection

21. Did the Environment Health Officers carry out a closing meeting with the responsible person in order to query any non-compliance, summarise findings, issuing of improvement notice and/or any further action? _____
-

22. If further action is to be taken, did the Environment Health Officers take all particulars of responsible persons from Govt. ID card? _____

Reporting and File Update

23. Did the Environment Health Officers update the file of the business including any relevant documents? _____

Any Remarks:

Name of accompanying observer



Christine Farrugia



Professor [Sandra C Buttigieg](#)

**I.2 OBSERVATION CHECKLIST FOR ENVIRONMENTAL HEALTH OFFICERS
DURING BATHING WATER SAMPLING PROGRAMME**

Observation Checklist for Bathing Water Sampling Procedures

Date: _____

Environment Health Officers Names: _____

Site Name/Location: _____

1. Sampling Site Identification:

- Are samples being collected from all identified sites as indicated on the sampling programme?

2. Preparation and Attachment of Sample Bottle:

- Is a clean 250 ml sterile sample bottle being attached to the sampling rod?
- Is the cap removed from the bottle immediately before submerging it, and is it retained in hand?

3. Sample Collection Process:

- Is the bottle lowered with the mouth downwards to avoid excessive contamination by the surface film?
- Is the sampling rod submerged 30 cm under the water surface and in water that is at least one metre deep?
- Is the sample bottle turned upwards and the sample taken?

4. Post-Collection Procedures:

- After retrieval, is excess water discarded if necessary to leave some air space in the closed bottle?
 - Is the lid replaced securely?
 - Are the samples stored in a clean cooler box with cooling packs at a temperature around 4°C?
-

5. Sample Labelling:

- Is each sample bottle labelled accordingly

6. Sample Handling and Transport:

- Are samples kept in the dark to avoid exposure of more than +10°C?
- Is a sample container marked "Temperature Control Samples" placed in each cooling box for temperature control during transport to the Public Health Lab?

7. Lab Analysis Preparation:

- Are samples sent to the Public Health Lab for microbiological analysis only?
- Have sample forms been prepared by the officer prior to sampling?

8. Attention to Detail:

- Is attention paid to the importance of sterility and correct temperatures, as mentioned in the SOP?
- Are inspectors aware of the risks involved in microbiological sampling and the importance of following the procedure meticulously?

9. Health Warning Response:

- If a Health Warning is issued, are daily repeat samples collected from affected sites?
- Are samples bacteriologically analysed for both parameters as required?

Additional Notes or Observations:

Name of accompanying observer



Christine Farrugia



Professor [Sandra C Buttigieg](#)

APPENDIX J

CONSENT FORMS:

J.1 CONSENT FORM OF INTERMEDIARY

Consent Form

Date: 16th April 2024

To whom it may concern,

I am writing to confirm my acceptance of the role as an intermediary in the research study carried out by Ms Christine Farrugia, under the supervision of her professor Sandra C. Buttigieg, as part of her Master of Arts in Evidence-Based Management and Effective Decision Making at the University of Malta. I am honoured to contribute to the study titled "The Standard Operating Procedures and Risk Mitigation Strategies of the Environmental Health Directorate - In a Small European Member State."

As Mr. Bernard Schembri, Assistant Director of the Environmental Health Directorate, I understand the importance of this research in exploring the standard operating procedures and risk mitigation strategies within our organisation. I am committed to facilitating communication and coordination between you, as the researcher, and potential participants to ensure the success of your study.

I acknowledge my responsibilities, which include providing information about the study to potential participants, assisting in scheduling interviews or observations as needed, and addressing any queries or concerns from potential participants.

I affirm that my participation as an intermediary in this research study is voluntary, and I am ready to fulfil my duties to the best of my abilities.

If you require any further information or assistance, please do not hesitate to contact me.

Thank you for the opportunity to be part of this important research endeavour.

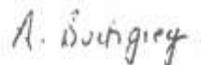
Sincerely,



Mr. Bernard Schembri
Assistant Director
Environmental Health Directorate



Christine Farrugia



Professor Sandra C Buttigieg

J.2 CONSENT FORM OBSERVER ACCOMPANYING THE AUTHOR DURING ONSITE OBSERVATIONS

Date _____

To whom it may concern,

I am writing to confirm my acceptance to participate as an observer in the study conducted by Ms Christine Farrugia, under the supervision of her professor Sandra C. Buttigieg, as part of her study for her Master of Arts in Evidence Based Management and Effective Decision Making at the University of Malta. I understand that the study, titled "Comparative analysis of Environmental Health Officers in the European Union with A focus on the Standard Operating Procedures of Malta's Environmental Health Directorate," aims to observe and analyse the processes and practices of Environmental Health Officers during routine food inspections.

I acknowledge that my role as an observer will be to accompany Environmental Health Officers during routine food inspections and document observations without influencing their behaviour or decisions. I am committed to ensuring the accuracy and objectivity of the data collected for her dissertation study.

I understand that my participation will involve accompanying Environmental Health Officers during routine food inspections for a period of March/April/May/June, I acknowledge the minimal risks associated with participating as an observer in this study and recognize the importance of my contributions in minimising bias and enhancing the validity of the research findings.

I affirm that my participation as an observer in this study is voluntary, and I retain the right to refuse or withdraw from participation at any time without penalty or consequence.

Sincerely,

Name of accompanying observer



Christine Farrugia



Professor [Sandra C Buttigieg](#)

J.3 CONSENT FORM FOR PARTICIPATION IN INTERVIEW FOR EXECUTIVE ENVIRONMENTAL HEALTH PRACTITIONERS

Participant's Name: _____

Date: _____

I, _____ hereby consent to participate in an interview conducted by Ms. Christine Farrugia, under the supervision of her professor Sandra C. Buttigieg, as part of the requirements for a Master of Arts in Evidence Based Management and Effective Decision Making at the University of Malta. This interview aims to explore the functionality, practices, and experiences of Executive Environmental Health practitioners within the Environmental Health Directorate in a European Member State. The interview will be conducted in a semi-structured format, focusing on topics related to my role, responsibilities, challenges faced, strategies employed, and insights regarding the functioning of the Environmental Health Directorate. I understand that my participation will involve engaging in a single interview session, lasting approximately 45 minutes. I acknowledge that there are minimal risks associated with participating in this interview, and any information disclosed during the interview will be kept strictly confidential. I understand that my participation is entirely voluntary, and I have the right to refuse or withdraw from participation at any time without penalty or consequence. I have read and understood the information provided above regarding participation in the interview for the dissertation study, and I voluntarily agree to participate in this interview.

Participant's Name: _____

Date: _____

Please sign and date this form if you agree to participate in the interview.

You will be provided with a copy of this consent form for your records.

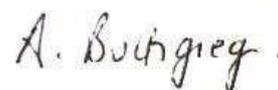
If you have any questions or concerns about this study, please do not hesitate to contact the undersigned.

Thank you for your participation.



Christine Farrugia

Email: christine.a.farrugia.99@um.edu.mt



Professor Sandra C. Buttigieg

Email: sandra.buttigieg@um.edu.mt

J.4 CONSENT FORM FOR PARTICIPATION IN OBSERVATION STUDY

Date: _____

I, _____ hereby consent to participate in an observational study conducted by Ms. Christine Farrugia, as part of the requirements for a Master of Arts in Evidence Based Management and Effective Decision Making at the University of Malta. The study, titled "Comparative analysis of Environmental Health Officers in the European Union with A focus on the Standard Operating Procedures of Malta's Environmental Health Directorate," is supervised by Professor Sandra C. Buttigieg and it aims to observe and analyse the standard operating procedures and risk mitigation strategies employed by the Environmental Health Directorate in a small European Member State during routine inspections. As a participant in this study, I understand that I will be observed while conducting routine inspections in my professional capacity as an Environmental Health Officer, with a focus on adherence to standard operating procedures and the implementation of risk mitigation strategies during the inspection process. My participation will involve allowing the researcher to accompany me during routine inspections for the entire inspection period. I acknowledge the minimal risks associated with participating in this study and the potential benefits to the broader understanding of standard operating procedures and risk mitigation strategies in the context of inspection practices. I understand that any information obtained during the observation process will be kept strictly confidential, and my name and any identifying information will not be disclosed in any reports or publications resulting from this study. I affirm that my participation in this study is entirely voluntary, and I have the right to refuse or withdraw from participation at any time without penalty or consequence. I have read and understood the information provided above regarding participation in the observation study, and I voluntarily agree to participate in this study.

Participant's Name: _____

Date: _____

Please sign and date this form if you agree to participate in the study.

Consent:

I have read and understood the information provided above regarding the observation study of Environmental Health Officers conducting routine inspections. I voluntarily agree to participate in this study.

Participant's Name: _____

Date: _____

Please sign and date this form if you agree to participate in the interview.

You will be provided with a copy of this consent form for your records.

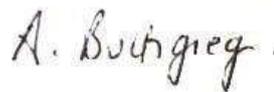
If you have any questions or concerns about this study, please do not hesitate to contact the undersigned.

Thank you for your participation.



Christine Farrugia

Email: christine.a.farrugia.99@um.edu.mt



Professor Sandra C. Buttigieg

Email: sandra.buttigieg@um.edu.mt

APPENDIX K

K.1 APPRAISAL OF QUESTIONNAIRE (MUNN ET AL., 2020)

JBI CRITICAL APPRAISAL CHECKLIST FOR STUDIES REPORTING PREVALENCE DATA

Reviewer: Prof Sandra C. Buttigieg Date: 30th June 2024

Author: Christine Farrugia Year: 2024 Record Number: 2

	Yes	No	Unclear	Not applicable
1. Was the sample frame appropriate to address the target population?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were study participants sampled in an appropriate way?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the sample size adequate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the study subjects and the setting described in detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Was the data analysis conducted with sufficient coverage of the identified sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were valid methods used for the identification of the condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Was the condition measured in a standard, reliable way for all participants?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Was there appropriate statistical analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was the response rate adequate, and if not, was the low response rate managed appropriately?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include: Exclude: Seek further info:

Comments (Including reason for exclusion)

K.2 APPRAISAL FOR QUALITATIVE STUDY (LOCKWOOD ET AL., 2015)

JBI CRITICAL APPRAISAL CHECKLIST FOR QUALITATIVE RESEARCH

Reviewer: Prof Sandra C. Buttigieg Date: 30th June 2024

Author: Christine Farrugia Year: 2024 Record Number: 1

	Yes	No	Unclear	Not applicable
1. Is there congruity between the stated philosophical perspective and the research methodology?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there congruity between the research methodology and the research question or objectives?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Is there congruity between the research methodology and the methods used to collect data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is there congruity between the research methodology and the representation and analysis of data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is there congruity between the research methodology and the interpretation of results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is there a statement locating the researcher culturally or theoretically?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the influence of the researcher on the research, and vice-versa, addressed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are participants, and their voices, adequately represented?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

Duties of Environmental Health Officers	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-
Monitoring of Institutions and Hospitals	No	Yes	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	No
	-	Yes	-	Yes	Yes	No	Yes	Yes	Yes	-	-	-	-	No	Yes	Yes	-	Yes	No	No	-	No	Yes	-	Yes	-
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	No	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	Yes	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-
Control the importation and exportation of food stuffs	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	Yes	-	No	-	Yes	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	-	-	-	No	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Issue drug control drugs with respect to narcotics and psychotropic drugs.	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	No
	-	No	-	No	No	No	No	No	No	-	-	-	-	No	Yes	No	-	No	No	Yes	-	No	No	-	No	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	-	Yes	No	-	No	-	No	-	No	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	-	-	-	No	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Monitoring of public facilities; playing areas, schools, public swimming pools, cemeteries	No	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	Yes	No	Yes	Yes	No
	-	No	-	Yes	Yes	No	No	Yes	Yes	-	-	-	-	No	Yes	No	-	Yes	No	No	-	No	Yes	-	Yes	-
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	-	No	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	Yes	-

Duties of Environmental Health Officers	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Issue Health Certificates to Food establishments and hawkers	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	Yes	-	Yes	No	No	-	Yes	Yes	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	Yes	-	-	-	Yes	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	-	No	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Issue Health Certificates to non-food establishments including barbers, hairdressers, beauticians, nail technicians, massage parlours	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No
	-	No	-	Yes	No	No	No	Yes	No	-	-	-	-	No	Yes	No	-	Yes	No	No	-	No	Yes	-	No	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	No	-	No	-	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Provide consultation services to Food establishments	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	Yes	No
	-	Yes	-	Yes	No	Yes	Yes	No	No	-	-	-	-	No	No	Yes	-	Yes	Yes	No	-	Yes	Yes	-	Yes	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	No	-	Yes	-	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	-	No	-	-	No	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Investigating complaints regarding keeping of internal parts of any	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No
	-	No	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	No	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	No	-	-	-	Yes	-

Duties of Environmental Health Officers	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
property in unhygienic conditions	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	No	-	-	No	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Illegal dumping, accumulations of refuse and stagnant water	No	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No
	-	No	-	Yes	Yes	No	No	No	Yes	-	-	-	-	No	Yes	No	-	Yes	No	No	-	No	Yes	-	Yes	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	No	-	-	No	-	Yes	-	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	No	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Pest infestation control and complaint investigation	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	Yes	-	Yes	No	No	-	Yes	No	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	Yes	No	-	-	Yes	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	No	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Vector Control and complaint investigation	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No
	-	No	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	No	-	Yes	Yes	Yes	-	Yes	No	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	No	-	-	No	-	-	Yes	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	No	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Matters related to the construction of houses and drains regulations, including water seepages.	No	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	No	Yes	No	No	No	Yes	No
	-	No	-	Yes	No	No	No	No	No	-	-	-	-	No	Yes	No	-	Yes	No	No	-	No	Yes	-	No	-
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	No	-	-	No	-	-	Yes	-

Duties of Environmental Health Officers																											
	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	No	-	-	No	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
Manufacture, Presentation and Sale of Tobacco and Related Products; including smoking in public places.	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	
	-	No	-	Yes	Yes	No	No	Yes	Yes	-	-	-	-	Yes	No	No	-	Yes	Yes	No	-	No	Yes	-	Yes	-	
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	-	No	No	-	Yes	-	No	-	Yes	-	-	Yes	-	
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	No	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
Cases of malpractice; Tattoo Clinics, Beauty Parlours, Agricultural practices	No	No	No	No	No	Yes	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	
	-	No	-	Yes	No	No	No	Yes	Yes	-	-	-	-	Yes	No	-	Yes	Yes	Yes	-	No	Yes	-	Yes	-	-	
	-	Yes	-	-	No	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	No	-	-	Yes	-	-	
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	Yes	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
Immunisation	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	
	-	No	-	Yes	No	Yes	No	Yes	No	-	-	-	-	Yes	Yes	No	-	Yes	No	Yes	-	No	Yes	-	No	-	
	-	No	-	-	No	-	-	-	-	-	-	-	-	Yes	No	-	Yes	-	Yes	-	No	-	-	Yes	-	-	
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	Yes	-	-	Yes	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
Education of food handlers on food hygiene	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	No	Yes	No	-	Yes	Yes	Yes	-	No	Yes	-	Yes	-	
	-	Yes	-	-	No	-	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	No	-	-	Yes	-	

Duties of Environmental Health Officers	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
	-	-	-	-	No	-	-	-	-	-	-	-	-	-	Yes	No	-	Yes	-	-	-	Yes	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
International Exchange of information at codex level, infosan e.g. Rapid Alert	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	-	Yes	-	Yes	Yes	Yes	Yes	Yes	No	-	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-	Yes	-
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	Yes	-	-	-	Yes	-
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	-	Yes	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Atmospheric Pollution	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No
	-	No	-	Yes	No	No	No	No	No	-	-	-	-	No	No	No	-	No	No	No	-	No	Yes	-	Yes	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	No	-	Yes	-	-	Yes	-	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	-	-	-	No	-	Yes	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Noise Control	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	No	Yes	No	No	No	No
	-	No	-	Yes	No	No	No	Yes	Yes	-	-	-	-	No	Yes	No	-	No	No	-	No	Yes	-	No	-	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	Yes	-	-	No	-	Yes	-	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	-	-	-	No	-	No	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Occupational Health and Safety	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No
	-	No	-	Yes	No	No	No	No	No	-	-	-	-	No	Yes	No	-	No	Yes	No	-	No	Yes	-	Yes	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	Yes	No	-	No	-	Yes	-	Yes	-	-	Yes	-	-

Duties of Environmental Health Officers																												
	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden		
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	-	-	-	Yes	-	-	No	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-		
Pollution Control	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No	Yes	No		
	-	No	-	Yes	No	No	No	No	-	-	-	-	-	No	Yes	No	-	No	No	Yes	-	No	No	-	Yes	-		
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	Yes	-	No	-	-	-	Yes	-		
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	Yes	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-		
Waste Management	No	No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No		
	-	No	-	Yes	No	No	No	No	-	-	-	-	-	No	Yes	No	-	No	No	Yes	-	No	No	-	Yes	-		
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	No	-	No	-	Yes	-	No	-	-	-	Yes	-		
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	No	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-		
Animal Feed	No	Yes	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No		
	-	Yes	-	Yes	No	Yes	Yes	No	No	-	-	-	-	No	Yes	Yes	-	No	Yes	Yes	-	Yes	No	-	No	-		
	-	Yes	-	-	No	-	-	-	-	-	-	-	-	Yes	Yes	-	No	-	No	-	No	-	-	-	Yes	-		
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	Yes	-	No	-	-	-	-	No	-	-	No	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-		
Slaughterhouses	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes		
	-	Yes	-	Yes	No	Yes	Yes	No	No	-	-	-	-	No	Yes	Yes	-	No	Yes	Yes	-	Yes	No	-	Yes	-		

Duties of Environmental Health Officers																											
	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	
	-	Yes	-	-	No	-	-	-	-	-	-	-	-	-	Yes	Yes	-	No	-	No	-	No	-	-	Yes	-	
	-	-	-	-	No	-	-	-	-	-	-	-	-	-	No	Yes	-	No	-	-	-	No	-	-	Yes	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
Protection against deception and fraud	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-	Yes	-	
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	No	-	-	No	-	-	Yes	-	
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	-	-	-	-	Yes	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
National and European alert systems for food and feed	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	-	Yes	-	Yes	Yes	Yes	Yes	No	Yes	-	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-	Yes	-	
	-	Yes	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	Yes	-	Yes	-	No	-	Yes	-	
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	Yes	Yes	-	Yes	-	-	-	-	-	No	-	Yes	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
Regulation of radiation hygiene	Yes	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	
	-	No	-	Yes	No	No	No	No	No	-	-	-	-	No	Yes	Yes	-	No	No	Yes	-	No	Yes	-	Yes	-	
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	No	-	Yes	-	Yes	-	-	Yes	-		
	-	-	-	-	Yes	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	-	-	-	Yes	-	-	No	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-	
Assurance of hygiene in teaching and upbringing processes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	
	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	No	Yes	Yes	-	Yes	No	Yes	-	No	Yes	-	Yes	-	

Duties of Environmental Health Officers	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Monitoring cosmetic products	Yes	No	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No
	No	No	Yes	No	No	No	No	Yes	No	-	-	-	-	Yes	Yes	No	No	Yes	No	-	No	Yes	-	No	-	-
	No	-	-	No	-	-	-	-	-	-	-	-	-	No	No	-	No	-	Yes	-	No	-	-	Yes	-	-
	-	-	-	No	-	-	-	-	-	-	-	-	-	No	No	-	No	-	-	-	-	No	-	No	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
Data collection for other departments/entities (e.g. employment agency, water services, Occupational health and safety) during onsite inspections of food premises	No	No	No	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
	-	Yes	-	Yes	Yes	No	No	No	No	-	-	-	-	No	Yes	Yes	-	Yes	No	Yes	-	No	Yes	-	Yes	-
	-	No	-	-	No	-	-	-	-	-	-	-	-	No	Yes	-	Yes	-	No	-	-	No	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	Yes	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Monitoring of Cemeteries and burials	No	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	Yes	No
	-	No	-	No	No	No	No	No	No	-	-	-	-	No	Yes	No	-	Yes	No	-	No	No	Yes	-	Yes	-
	-	No	-	-	Yes	-	-	-	-	-	-	-	-	Yes	No	-	Yes	-	No	-	-	No	-	-	Yes	-
	-	-	-	-	No	-	-	-	-	-	-	-	-	No	No	-	Yes	-	-	-	-	No	-	-	Yes	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
Supervise the interment repatriation of human remains	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	Yes	No	No
	-	No	-	Yes	Yes	No	No	No	Yes	-	-	-	-	No	Yes	-	Yes	No	No	-	No	Yes	-	Yes	-	-

