2017 – 2018 Report of UK National Reference Laboratory for Food Microbiology
Activities for *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (including STEC), *Campylobacter*, *Salmonella* and antimicrobial resistance

April 2017 to March 2018
About Public Health England

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Executive summary

As part of the UK’s compliance to the Regulation (EU) 882/2004 for official controls for food safety, Public Health England provides the UK’s National Reference Laboratory (NRL) for food microbiology for the Food Standards Agency (FSA). This is the annual report of the NRL’s activities between April 2017 and March 2018 and relates to activities for *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (incl. STEC), *Campylobacter*, *Salmonella* and antimicrobial resistance (AR).

Information from the European Reference Laboratories (EURLs) and NRL quarterly newsletters were disseminated to the FSA, the Official Control Laboratories (OCLs) and other stakeholders. An annual OCL user day was held to inform the above of any developments from the EURLs, legislation changes and methodology updates. The NRL completed and published the 2016 audit to evaluate the OCLs’ capabilities and requirements and the Food Examiner register was updated.

The NRL attended all 6 EURL meetings and impartial advice was provided to FSA, OCLs and other laboratories throughout the year. In addition, the NRL attended EURL training for ‘detection and characterisation of STEC from food by ISO/TS 13136’ and ‘dry lab’ training to use whole genome sequencing to monitor antimicrobial resistance.

The publication of the new official control regulations, (EU) 2017/625 has warranted increased conversations and clarification from the FSA, which the NRL are involved in. The NRL is a member of the CEN TAG18 expert working group for the revision of the ISO TS 13136 (PCR detection of shiga toxin-producing *Escherichia coli*) and has been active in the BSI AW9 microbiology committee.

The NRL provides Standard Methods to OCLs via the .gov.uk website. These are undergoing impact assessments after EU Mandate 381 has required all ISO Standards that are referenced in the Microbiological Criteria EU 2073/2015 to be revised.

13 OCLs participated in the European Food Microbiology Legislation (EFL) External Quality Assessment Scheme, under NRL support for 2017 – 2018. In addition, a distribution from the Standard Scheme was chosen to evaluate *Campylobacter* detection and/or enumeration testing amongst OCLs, as this was not covered in the EFL scheme.

Results were satisfactory overall and no laboratories exhibited poor performance. The NRL participated in 12 EURL PTs and received or indicated satisfactory performance for all.
The NRL organised 2 workshops. The first was a one-day challenge test and shelf-life studies in food, which 176 delegates attended from OCLs, Local Authorities and the FSA. The second workshop provided by the NRL was a Skype impact assessment workshop to assist OCLs in understanding the changes required following the revised ISO Standards. Feedback was very good for both events.

Details of the proposed NRL activities for 2018 to 2019 and a timeline to achieve these complete this report.
Abbreviation list

AFBI
Agri-Food and Biosciences Institute

APHA
Animal and Plant Health Agency

AR
Antimicrobial resistance

BSI
British Standards Institute

CEN
European Committee for Standardization

cfu/g
Colony-forming Units per Gram

CPS
Coagulase positive Staphylococci

ECDC
European Centre for Disease Prevention and Control

EFL
European Food Microbiology Legislation

EFSA
European Food Safety Authority

EHP
Environmental health practitioners

EMA
European Medicines Agency

ESBL
Extended-spectrum Beta-Lactamases

ESM
European Screening Method

EURL
European Reference Laboratory

FBO
Food Business Operator

FE
Food Examiner

FEPTU
Food and Environmental Proficiency Testing Unit

FSA
Food Standards Agency

GBRU
Gastrointestinal Bacteria Reference Unit

ISO
International Standards Organisation

MS
Member State

NRL
National Reference Laboratory

OCL
Official Control Laboratory

OCRs
Official Control Regulations

PCR
Polymerase Chain Reaction

PFGE
Pulsed-field Gel Electrophoresis

PHC
Process Hygiene Criteria

PHE
Public Health England

PT
Proficiency Test

RTE
Ready-to-Eat

SFPO
Staphylococcal food-borne outbreak

SOP
Standard Operating Procedure

ST
Sequence Type

STEC
Shiga-toxin producing *E.coli*

WG
Working group

WGS
Whole Genome Sequencing

WHO
World Health Organization
Introduction

Public Health England (PHE) has provided the service of UK’s NRL for food microbiology for the UK’s Competent Authority, FSA since 2011. The NRL is responsible for the following work areas as defined in Regulation (EU) 2017/625 (previously (EU) 882/2004) until March 2019: *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (incl. STEC), *Campylobacter*, *Salmonella* and AMR.

This report details the secretariat services, advice and representation within the UK/EU, production of documents, coordinating and participating in audits, ring trials and European Reference Laboratories (EURLs) initiatives and communication of results and data between April 2017 and March 2018. Table 1 list the NRL core functions and the activities are described in this annual report.

**Table 1. PHE NRL Core Functions, April 2017 to March 2018**

<table>
<thead>
<tr>
<th>Core Function</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Secretariat services</td>
</tr>
<tr>
<td>1.a</td>
<td>Disseminate information/advice supplied by the EURLs to FSA, OCLs and other UK laboratories in a timely and effective manner</td>
</tr>
<tr>
<td>1.a</td>
<td>Produce and circulate quarterly newsletters to FSA, OCLs and other UK laboratories</td>
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<tr>
<td>1.b</td>
<td>Co-ordinate the OCL User Day to update UK OCLs and other relevant UK laboratories to the NRL core functions</td>
</tr>
<tr>
<td>1.b</td>
<td>Review content of the UK Food Examiner Register</td>
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<tr>
<td>1.b</td>
<td>Analyse and produce a report of the 2016 OCL survey</td>
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<tr>
<td>1.b</td>
<td>Continue liaison meetings and produce a protocol for working together with APHA for AR, <em>Campylobacter</em> and <em>Salmonella</em></td>
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<tr>
<td>1.d</td>
<td>Provide regular updates to the FSA on NRL activities by producing monthly reports and meet on a quarterly basis</td>
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<tr>
<td>1.d</td>
<td>Produce and submit annual report to the FSA on NRL activities for 2017 – 2018</td>
</tr>
<tr>
<td>1.e</td>
<td>Maintain and update the NRL web content on the PHE website</td>
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<tr>
<td>2</td>
<td><strong>Advice and representation within the UK/EU</strong></td>
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<tr>
<td>2.a</td>
<td>Provide impartial expert advice to FSA, OCLs and other UK laboratories, upon request</td>
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<tr>
<td>2.b</td>
<td>Represent the UK at relevant EURL meetings; consult FSA prior to meetings and submit an internal report after attendance of meetings</td>
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<tr>
<td>2.c</td>
<td>Attend training workshop at the STEC EURL for ‘STEC identification and typing from food’ (organised by EURL, Istituto Superiore di Sanità, Rome)</td>
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<tr>
<td>2.d</td>
<td>Advise FSA on future draft proposals relating to review of Regulation (EU) 882/2004</td>
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<tr>
<td>2.e</td>
<td>Keep abreast of methodology developments and advise FSA and OCLs (eg, workflow and Service Level Agreement for CPS toxin testing)</td>
</tr>
<tr>
<td>2.f</td>
<td>Identify and inform FSA and OCLs of emerging analytical issues or developments (eg, Intended addition of <em>Campylobacter</em> in the Process Hygiene Criteria)</td>
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<tr>
<td>2.g</td>
<td>Participate in the BSI AW9 microbiology committee</td>
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<tr>
<td>2.g</td>
<td>Participate in Working Group to revise the ISO/TS 13136:2012 (PCR detection of STEC)</td>
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<table>
<thead>
<tr>
<th>3</th>
<th><strong>Production of standard operating procedures, codes of practice and guidance documents</strong></th>
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<tbody>
<tr>
<td>3.a</td>
<td>Update and expand food methods archive on NRL website</td>
</tr>
<tr>
<td>3.a</td>
<td>Prepare a guidance document for OCLs and the FSA on the use and validation of alternative methods for testing Official Controls</td>
</tr>
<tr>
<td>3.a</td>
<td>Produce a poor performance protocol for OCL participation in the EFL proficiency test scheme</td>
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<tr>
<td>3.a</td>
<td>Perform gap analyses of ISOs from the EU Mandate 381 and related UK SOPs and update accordingly</td>
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<th>4</th>
<th><strong>Compliance assessment via audits and ring trials</strong></th>
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<tr>
<td>4.a</td>
<td>Ensure consistency and quality of testing applied by UK OCLs and support where necessary</td>
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<tr>
<td>4.b</td>
<td>Liaise with FEPTU and monitor OCL’s comparative testing performance and assist OCLs in the implementation of corrective measures</td>
</tr>
<tr>
<td>4.d</td>
<td>Participate as UK-NRL in ring trials including method comparison or validation studies and other initiatives organised by the EURL (on-going) and report to FSA</td>
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<tr>
<td>4.e</td>
<td>Organise a challenge testing training workshop for UK OCLs</td>
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<tr>
<td>4.e</td>
<td>Organise a PCR workshop (with STEC detection focus) for UK OCLs</td>
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</tr>
<tr>
<td>5</td>
<td><strong>Co-ordination within the UK of EURL initiatives</strong></td>
</tr>
<tr>
<td>5.a</td>
<td>Support the food aspect of the EU-wide AR monitoring (Decision 2013/652/EU), liaising with FSA, OCLs relevant Reference Laboratories and APHA. Liaise with APHA, audit and review strategy for harmonization of existing antimicrobial resistance testing</td>
</tr>
<tr>
<td>6</td>
<td><strong>Communication of results and data use</strong></td>
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Core Function One: Secretariat services

Dissemination of information from the EURLs

The 6 EURLs send information to the NRL regarding new reports, outbreaks and other related topics regularly. Information is then forwarded to the appropriate stakeholder(s) (e.g., OCLs, FSA, Scottish Reference Laboratories) with any additional information or advice on further steps to be taken. In addition, the EURLs send questionnaires and surveys to the NRLs regarding NRL and/or country-wide practices. These communications are described below by work activity; information concerning meetings, training, proficiency tests (PTs) and ISOs are described in the relevant sections of this report. Website links to the EURLs are also included and their work programmes can be found in the Annex, where published.

*Listeria monocytogenes*

Website: sites.anses.fr/en/minisite/listeria/european-union-reference-laboratory-listeria-monocytogenes-0

In April 2017, the EURL sent a link and information on the new official control regulations (EU) 2017/625, highlighting in particular the updated responsibilities for the EURLs, NRLs and OCLs, and methods of analysis. This was sent to OCLs and the FSA (see Annex).

The EURL forwarded a public consultation on *L. monocytogenes* contamination of RTE foods and related risk to human health in the EU in July 2017. This was passed to FSA and the UK NRL expert to submit comments, and resulted in an EFSA scientific opinion published in January 2018.

In November 2017, the EURL sent an urgent enquiry (originally from EFSA) to the NRLs regarding an ST6 cluster causing a multi-national outbreak and requesting any information and/or sequencing data that NRLs have observed in their country. The UK responded to state that it is already involved via ECDC and no ST6 strains have been isolated from food.

In March 2018, the EURL sent a user's guide for the EURL *L. monocytogenes* set of strains dedicated to challenge testing to the NRLs. These were sent to colleagues in Campden BRI, who have expertise in challenge testing.

The EURL forwarded 2 Epidemic Intelligence Information System (EPIS) enquiries regarding *L. monocytogenes* clusters; one ST6 cluster, possibly related to frozen
sweetcorn, and the other a ST155 cluster. Both requested molecular profiles, either
PFGE or WGS; the UK NRL responded with information.

In addition, the EURL forwards specific reports or documents from other European
bodies; the second edition of the EU magazine, *Euroreference*
euroreference.anses.fr/en; and the joint EFSA-ECDC Annual Report on Zoonoses in
2016 www.efsa.europa.eu/en/efsajournal/pub/5077. These were forwarded to relevant
colleagues and stakeholders.

**Coagulase positive staphylococci**

Website: sites.anses.fr/en/minisite/staphylococci/european-union-reference-laboratory-
staphylococci

In November 2017, the EURL sent a position paper of the differences between the
European Screening Method (ESM) for detection of staphylococcal enterotoxin to the
new ISO standard 19020:2017. The EURL conclude that as the differences between the
2 methods are minor, verification is not required if changing from the ESM to ISO 19020
(see Annex). However, this should be discussed with respective national accreditation
bodies.

**Escherichia coli (including STEC)**

Website: http://old.iss.it/vtec

In May 2017, the EURL sent a new Real-Time PCR method to detect the stx2f subtype
of *E. coli*. Further methodology correspondence from the EURL in June 2017 related to
their new analytical pipeline for the characterisation of STEC from WGS data (see
Annex). Both were sent to relevant UK NRL colleagues.

The EURL has forwarded specific outbreak information, meetings and reports to the
NRLs:

- an outbreak in Germany caused by a sorbitol-fermenting O157 strain (the UK had
detected cases of sorbitol-fermenting *E. coli*, but these were not related to this
  outbreak)
- announcement of the International Symposium of the World Association of
  Veterinary Laboratory Diagnosticians
- announcements for the 10th International Symposium on STEC 2018
- announcement of the BioMicroWorld 2017: 7th International Conference on
  Environmental, Industrial and Applied Microbiology
- Canadian cases of E.coli O121 associated with flour and subsequent recalls
- a study of *E. coli* O157 causing mild disease (mutant toxin) at an agricultural show in Queensland, Australia in 2013
- an *E. coli* O157 outbreak in Californian recreational water
- an EFSA scientific conference in September 2018 (future of scientific risk assessment in food safety)
- presentations from the INNUENDO Summer Course on ‘Genomics in foodborne pathogen surveillance’

**Campylobacter**


No additional information was received from the Campylobacter EURL for this reporting period.

**Salmonella**

Website: [www.eurlsalmonella.eu](http://www.eurlsalmonella.eu)

4 newsletters were received by email link, informing NRLs of the EURL activities, including proficiency tests and workshop preparation and a literature search of relevant *Salmonella* scientific papers. These were forwarded to the FSA, the OCLs and other relevant laboratories in the UK. In brief:

- the June 2017 edition included details of their annual workshop, the new OCRs, organisation of proficiency tests and *Salmonella*-related items from the ISO/CEN meetings in June 2017
- the October edition reported proficiency test updates and a protocol to manage underperformance of NRLs
- the December edition included proficiency test organisation, and the EURL working group for WGS
- the March 2018 edition covered the organisation of proficiency tests and the validation of the draft ISO/TS 6579-4 ‘Identification of monophasic *Salmonella* Typhimurium by PCR’

The EURL newsletters can be found in the Annex.

**Antimicrobial resistance**

Website: [www.eurl-ar.eu](http://www.eurl-ar.eu)
The EURL sent communication regarding their WGS workshop training; in May 2017 they offered a course on the introduction to WGS and analysis for microbial diagnostics, which was forwarded to relevant colleagues. The EURL then announced in August 2017 that a WGS course is available on the COURSERA platform.

In September 2017, the EURL sent an invitation to participate in a *Salmonella* Dublin genomic epidemiology project, as this strain has steadily increased and many of them have caused invasive infections in humans. The UK was interested in participating and PHE have started collaborating by sharing sequence data for analyses.

The EURL updated 3 of their protocols in November 2017 on the EURL website and these were forwarded to relevant UK NRL colleagues https://www.eurl-ar.eu/protocols.aspx:

- Isolation of ESBL, ampC and carbapenemase-producing *E. coli* from caecal samples
- Isolation of ESBL, ampC and carbapenemase-producing *E. coli* from fresh meat
- Validation of selective MacConkey agar plates supplemented with 1 mg/L cefotaxime for monitoring of ESBL and ampC-producing *E. coli* in meat and animals

In addition, the EURL sent an email alerting NRLs about a possible problem on a particular batch of Campylobacter selective broth in December 2017. Although the UK NRL does not use this particular broth, the alert was forwarded to relevant staff.

In January 2018, the EURL published a new multiplex PCR for detecting 5 *mcr* genes and the protocol is available on the EURL website.

The annual EURL newsletter was sent to all NRLs in December 2017 (see Annex), which details the EURLs’ AR reference testing, the multiplex PCR for detecting 5 *mcr* genes, a EURL-AR training course on WGS held in September 2017 and the establishment of an EURL working group on WGS.

The EURL additionally sent specific documents, reports or notifications from other European bodies and were forwarded to relevant colleagues and stakeholders:

- the WHO list of critically important antibiotics
- a Vet CAST/EUCAST meeting in September 2017
- EU audits for AR planned in 2017 (none for UK NRL for food microbiology)
- abstract on the isolation of VIM-1 producing *Salmonella* Infantis from swine and minced pork meat in Germany (spread of non-human carbapenem resistant strains)
- a report from JIACRA II (joint ECDC/EFSA/EMA report on consumption of antimicrobial agents and occurrence of antimicrobial resistance in bacteria)
- a WHO call for experts and data on Antimicrobial Resistance for the work of Codex Taskforce on Antimicrobial Resistance (TFAMR)
• the 7th report of the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC)
• a joint ECDC, EFSA and EMA Scientific Opinion of outcome indicators from surveillance of antimicrobial resistance and consumption in humans and food-producing animals
• a US Food and Drug Administration integrated report on 2015 National Antimicrobial Resistance Monitoring System (NARMS)
• an OIE (World Organisation for Animal Health) report on antimicrobial agents intended for use in animals
• The European Union summary report on antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food in 2016 from EFSA and ECDC

Related to Core Function(s): 1.a, 1.c, 2.d, 2.e, 2.f, 4.c, 5.a.

Production of NRL quarterly newsletters

Since 2016, the NRL has produced quarterly newsletters to notify OCLs of NRL activities and areas that would affect them, such as the revision of the mandated ISO methods. The newsletters have also been circulated to other stakeholders of the NRL to maintain communication and a harmonised approach of disseminating information. A brief description of the newsletters’ content are listed below and are available in the Annex:

• July 2017 included the 2017 OCL User Day, the new official control regulations (EU) 2017/625, news from the 4 spring EURL meetings, and a substantial ISO method update
• September 2017 contained news of the challenge testing workshop, the inclusion of Campylobacter in the Process Hygiene Criteria (PHC; EC/2073/2005), a methods update, and the NRL participation of EURL PTs
• January 2018 reported news from the 2 autumn EURL meetings, impact assessments and PHE methods available, the differing test portion sizes for Campylobacter detection between the PHE method and the new ISO, and a 2016-17 European Food Microbiology Legislation (EFL) PT summary
• March 2018 covered the Impact Assessment workshop held for the OCLs, a methods update, and recommended actions following CPS counts over $10^6$ cfu/g

Related to Core Function(s): 1.a, 2.d, 2.e, 2.f.
Co-ordination of the 2017 OCL User Day

The fifth Official Control Laboratories User Day was held on the 22 May 2017 at PHE Colindale and was well attended by colleagues from 10 OCLs and other key laboratories including the PHE’s Food and Environmental Proficiency Testing Unit (FEPTU), the Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit and the Gastrointestinal Bacteria Reference Unit (GBRU), the Animal and Plant Health Agency (APHA), the FSA, and the Agri-Food and Biosciences Institute (AFBI). Key topics discussed included news from the EU Reference Laboratories (EURLs), challenge testing in food, Salmonella in paan leaves, a review of Listeria outbreaks in the UK and upcoming NRL activities (see Annex).

The overall rating of the meeting was very good, and all respondents stated they would recommend the User Day to their colleagues. All the slide presentations are available upon request.

Related to Core Function(s): 1.a, 1.b, 1.c, 2.a, 2.d, 2.e, 2.f.

Review content of the UK Food Examiner register

Since 2014, the NRL has established and maintained a Food Examiner (FE) register to aid FSA contact the appropriate local support from the OCLs if they receive enquiries concerning microbiological testing/investigation. The register was reviewed in 2017 and sent to the FSA.
In addition, the FSA requested information on the numbers of trainee FE s within PHE to help assess the impact of the Sampling and Qualifications Regulation that was reviewed in 2017.

Related to Core Function(s): 1.b, 4.a.

### 2016 Audit – Official Control Laboratories’ capabilities and requirements

Results of the audit performed in 2013 enabled the NRL to evaluate the OCL’s capability and any gaps were addressed by organising training events and a number of National SOPs were made available on the website. The audit was repeated in 2016, where the questions were reviewed and updated in the online tool, SelectSurvey. Details of Food Examiner status, schedule of tests performed, preparedness of the inclusion of Campylobacter to the PHC and participation of PT schemes were included. 16 OCLs responded, although 2 of these have now ceased microbiology testing.

This audit revealed that capacity for microbiological testing in food has dropped since the last audit in 2013, both in the number of laboratories and Food Examiners. However, testing capability seemed to be similar or has increased within the OCL network since 2013. Half of the OCLs perform challenge or shelf-life testing. Therefore, the NRL organised a day workshop in this subject to address this gap of knowledge (please see Core Function Four).

Tests specified in the microbiological criteria (regulation EC 2073/2005) were not available as an accredited test in all laboratories. Those within the remit of NRL include 1.28: Salmonella typhimurium and Salmonella enteritidis in fresh poultry meat (4/14 laboratories), 1.21: detection of presence of staphylococcal enterotoxins in cheeses, milk powder and whey powder (1/14) and 1.29: detection of Shiga toxin producing E.coli (STEC) in sprouts (3/14). Reasons for the low availability of these tests include recent additions to the EC 2073/2005 Regulation (1.28 & 1.29) or a highly specialised test with low demand (1.21).

When asked about preparing for the forthcoming addition to the PHC of Campylobacter enumeration in broiler carcases, 4 OCLs are accredited for the test and a further 5 would be able to perform the test as accredited. However, some OCLs did state they would need NRL support to implement the test. Furthermore, 4 OCLs noted that in general, they experience difficulties in classifying, processing and/or interpreting results when testing certain food matrices.

In order to continually improve and match the needs of the OCLs, a series of questions were included in the survey on NRL activities. OCLs are generally aware of the National methods on the NRL web page, would like more notifications of legislation updates, but
have mixed views of the usefulness of training sessions using Skype. This audit has identified some areas to improve future NRL activities to support the OCLs.

The audit report was published on the website in February 2018 (see Annex). This audit has identified areas of improvement for the NRL to support the OCLs; eg support and training for introduction of *Campylobacter* enumeration in OCLs.

Related to Core Function(s): 1.b, 2.d, 4.a.

**Liaise with APHA regarding mutual NRL activities (Campylobacter, Salmonella and antimicrobial resistance)**

Since 2013, liaison meetings between PHE and APHA have taken place, as both Agencies are designated as NRLs for *Salmonella*, *Campylobacter* and antimicrobial resistance (AR) by their respective Competent Authorities, FSA and Department for Environment, Food and Rural Affairs (DEFRA). These meetings allow transparency between the 2 NRLs and to ensure there is co-ordination of activities. Since the EURLs will only financially support a single NRL per Member State at annual workshops, training events and participation in ring trials, PHE and APHA agreed that EURL funding would be allocated on an alternating basis between APHA and PHE. However, if activities of one organisation take precedence, eg the current statutory AR testing in the food chain across the EU, then that NRL will take priority for EURL funding.

PHE organised 2 meetings with APHA in April and December 2017, via teleconference. Both NRLs agreed on the EURL-funded activities, discussed the *Campylobacter* PHC and the new OCR 2017/625, shared annual NRL work programmes and considered joint research or surveillance proposals. The Agri-Food & Biosciences Institute (AFBI) also participated in these liaison meetings, as they are the Northern Ireland Reference Laboratory for *Salmonella* and have direct communication with some of the EURLs. An agreement and table of NRL activities 2017 – 18 were drafted.

Related to Core Function(s): 1.b, 4.c, 5.a.

**Provide regular updates to Food Standards Agency**

Monthly reports listing NRL activities have been submitted electronically to the FSA (see Annex). In addition, NRL representatives met with FSA quarterly (20/07/2017, 18/09/2017, 11/12/17, 01/03/18) to discuss progress made, difficulties met, and future or new activities (see Annex for minutes).

Related to Core Function: 1.d.
NRL Web content

The NRL web page is on the Public Health England section of the .gov.uk website. At the time of writing, the NRL annual reports since 2013, 8 standard methods, a public health management guidance, and the report of the 2016 OCL audit are available. In addition to the general information about the NRL, expert witness information, and contact details are also included. There are future plans to expand the NRL web presence by creating additional pages for each of the activities; *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (incl. STEC), *Campylobacter, Salmonella* and antimicrobial resistance, and to review, update and add to the standard methods.

The website address is: www.gov.uk/government/collections/uk-national-reference-laboratory-for-food-microbiology. For ease of access, OCLs and other stakeholders are advised to use a search engine and type ‘fwe nrl’ or ‘food NRL’, as the NRL web page is normally the top hit.

Related to Core Function(s): 1.a, 1.b, 1.e, 3.a.
Core Function Two: Advice and representation within the UK/EU

Provide impartial advice to FSA, OCLs and other UK laboratories

The NRL received specific requests for advice between April 2017 and March 2018. These are briefly reported and categorised below:

General

- query from a hospital for microbiological testing of homogenised food intended to be given via nasogastric tube
- what levels of *E. coli* and Enterobacteriaceae are safe from a member of public
- query of where scombrotoksin and ciguatera toxin testing are performed in the UK
- various enquiries from individuals wanting work experience and/or placements in food and reference laboratories; these were passed on to the PHE Training Manager
- invitation to participate in a collaborative study to assess new controls using molecular assays to detect gastrointestinal infections; however, this was not relevant to the food or typing laboratories
- a request from another Member State for UK assistance with *C. botulinum* outbreak investigation (toxin assay in foods); the NRL offered assistance
- request for microbiological testing of plant root to import from Cameroon; honey from a UK Food Business Operator (FBO; and chemical testing); bottled cider from a private producer; and bottled water from Georgia following conflicting microbiological test results from 2 different laboratories
- received a food safety survey on methodology from an EU PhD student, which was authenticated by the Member State’s NRL; completed survey
- an enquiry from a university research group regarding laboratory support to certify and market the availability of healthy processed meats; the NRL advised that other scientific bodies (the Advisory Committee on Novel Foods and Processes and the Advisory Committee on the Microbiological Safety of Food) may be appropriate to approach since this work is not within the remit of the NRL
- a request for information concerning interpreting United Kingdom Accreditation Service certificates of OCLs from the FSA
- an email from Mexico requesting for a proficiency testing assurance scheme to join for chemical analysis in food; NRL forwarded to FEPTU for information regarding international proficiency schemes
- a request from a working group for a Scottish guidance document on managing outbreaks wanting to include a list of laboratories accredited for pathogen testing that are not covered by Scottish OCLs; the NRL supplied information
There were 2 requests for site visits from Georgia and China. Both asked for a large delegate group to visit and wanted to see how a food microbiology laboratory operated, as well as other areas concerning food testing. The visits did not take place due to the additional areas of interest and that PHE are unable to host a large group of delegates.

The UK NRL hosted the Deputy Director of the *Listeria* and CPS EURLS for a half-day visit. This was an informal visit and the NRL structure, functions and in particular, how the NRL organises proficiency testing, was discussed.

*Listeria*

A *Listeria* ISO and impact assessment query from an OCL.

In July 2017, the EURL launched a survey to evaluate the incidence of *Listeria* in RTE Food of Plant Origin. The UK NRL responded, stating an overall *Listeria* presence of 5% in 313 foods. In addition, the UK NRL sent further data of foods that were analysed and were negative for *Listeria*.

The NRL hosted a bioinformatician from the *Listeria* EURL in December 2017 to learn about WGS strategies in PHE, which have been in use routinely for *Listeria* since 2015. This was a 2 day visit and included a tour of the GBRU and the Bio-Analysis and Horizon Technologies laboratories and in-depth learning of the bioinformatics pipelines and analysis that PHE employ for *Listeria* investigations. The visit has resulted in further collaborative work with the bioinformatic teams at both institutions on WGS analysis.

**Coagulase positive staphylococci**

The EURL sent an enquiry to the NRLs in May 2017 regarding how staphylococcal food-borne outbreaks (SFPOs) are defined as strong or weak-evidence in all Member States. This enquiry was postponed by the EURL due to NRLs reporting difficulties in answering the original survey. The UK NRL consulted epidemiologists and reference microbiologists and responded, defining how the weak and strong evidence outbreaks are reported for the UK. In addition, the UK experiences only 0-2 incidents of SFPOs or food with CPS >$10^5$ cfu/g each year, and this makes it difficult to retain competency of the detection of staphylococcal enterotoxins test (ESM method) with relevant staff and attaining accreditation. Therefore, the UK NRL outsources the ESM method to the Netherlands:

- a request for staphylococcal toxin detection in cheese samples; NRL arranged shipping to the Netherlands Food and Consumer Product Safety Authority, and although the sec gene was present in the strain, no enterotoxins were detected in the cheese
• a query of commercial testing for the staphylococcal toxin detection method in food from an OCL, which was provided

*Escherichia coli* (including STEC)

The EURL sent a survey in June 2017 concerning how NRLs organise PTs for their *E. coli* STEC OCL network. This is in response to the *Listeria* EURL who has produced guidance for NRLs in how to organise PTs for their own OCL networks. The UK NRL replied that PTs are already outsourced and are happy to see guidance for *E. coli* STEC, although a combined guidance from all the EURLs would be better suited, with a table of any potential differences, such as recommended frequency of PTs, to be inserted.

In July, the NRL were informed by FSA of a table-top exercise organised by the Department of Health for STEC O104, where queries arose concerning whether samples could be pooled for STEC detection if a major outbreak occurred. The NRL advised the FSA that current practice of pooling colonies for PCR detection after growth and preliminary PCR detection is acceptable (and in line with ISO/TS 13136:2013), but did not advocate pooling of enrichment broth for the preliminary detection of STEC:

• enquiry from an EU Food Institute regarding strains of pathogenic *E. coli* with inhibitory adhesion factors for a local research project
• provided advice and support to Food Standards Scotland and an OCL regarding an ongoing STEC outbreak and a clarification of the *E. coli* criteria in the Health Protection Agency’s ready-to-eat guidelines

*Campylobacter*

In May 2017, the EURL sent a survey to the NRLs regarding outsourcing PTs for *Campylobacter* analysis. The UK NRL replied that PTs are already outsourced and are happy to see guidance for *Campylobacter*, and added a similar comment as for the *E. coli* STEC outsourcing PT survey (see above):

• OCL requested *Campylobacter* testing from chicken neck skin
• advised a laboratory in Northern Ireland to contact APHA regarding participation in a *Campylobacter* identification PT
• query from an OCL regarding the differences between the new and old version of ISO 10272-1 *Campylobacter* detection and the use of modified atmosphere and portion size of 10g vs 25g; the NRL confirmed with one of the ISO convenors that verification is required to use a 10g portion
• advice given concerning storage of *Campylobacter* control strain and recovery (advised that UK uses a commercial control strain prepared by PHE FEPTU) to an EU NRL
**Salmonella**

- provided advice to FSA concerning an alternative method used by an FBO for *Salmonella* detection, whose method was on an extension of AFNOR accreditation
- an invitation from another Member State to participate in a genomic study of *Salmonella Dublin* after a rise in invasive infections; UK NRL have provided sequence data for analysis
- received an enquiry from Austrian NRL regarding detection of *Salmonella* in fresh whole eggs; NRL consulted PHE experts and responded with advice on the use of the *Salmonella* PHE method for testing eggs and the requirement for validation of this food matrix when following the ISO standard

**Whole Genome Sequencing**

In 2016, a Whole Genome Sequencing (WGS) questionnaire was jointly prepared by EFSA, the EURLs and the European Commission, and was circulated by the EURLs to ascertain the capability of all laboratories in the EU (EURLs, NRLs, and OCLs) using this technique for food- and water-borne pathogens isolated from animals, food, feed and animal/food/feed environmental samples. The NRL forwarded the questionnaire link to the OCLs to complete themselves and the NRL completed the questionnaire for all 6 areas within the deadline.

A further WGS survey was sent in March 2017 from each EURL (*Listeria*, CPS, *E. coli*, *Campylobacter*, *Salmonella* and antimicrobial resistance) that required individual responses to each EURL and was aimed at the NRL capability. Questions were focused on technical and methodology details, as well as bioinformatics pipelines used and NRL interest for proficiency tests and training for WGS. The NRL liaised with PHE experts for each of the areas and submitted individual responses before the deadlines. Data from these surveys will guide the working group for WGS, established by DG SANTE, and includes 8 EURLs, EFSA and ECDC, to promote and build capacity towards the use of WGS.

**European Commission’s Microbiological Criteria Working Group**

The NRL liaises with the FSA, when requested, to support FSA’s participation at the European Commission’s (EC) Microbiological Criteria Working Group. The NRL provided FSA information and advice on the following topics:

- guidance document to evaluate the competence of laboratories implementing challenge tests and durability studies related to *Listeria monocytogenes* in RTE food
- information and advice given to FSA regarding the ISO standards affected by the EU Mandate M/381 before a EU Micro Criteria meeting
- a proposal to amend the Microbiological Criteria EU 2073/2015, where the NRL gave comments on the draft
- inclusion of *Campylobacter* in the PHC

The NRL receives feedback from FSA at the steering group quarterly meetings. This information has been helpful to plan NRL activities and provide updates for OCLs.

**Related to Core Function(s): 2.a, 2.d.**

**Representation at relevant EURL meetings and prepare meeting reports**

At least one UK NRL representative has attended the six EURL meetings for the time period of this report; *Listeria monocytogenes*, coagulase positive staphylococci (CPS), *Escherichia coli* (incl. STEC), *Campylobacter*, *Salmonella* and antimicrobial resistance (see Table 2). Agendas for the meetings were forwarded to the FSA as they were received (see Annex); presentations from the UK were made at the antimicrobial resistance, *Campylobacter* and *E. coli* meetings. Individual meeting reports were submitted to FSA after attending the meeting (see Annex). In addition, a UK NRL/PHE representative attended a specific Working Group (WG) meeting; Frieda Jorgensen for the ISO 13136 WG on 12 to 13 December 2017.

**Table 2. List of EURL meetings, April 2017 to March 2018**

<table>
<thead>
<tr>
<th>EURL Meeting</th>
<th>Date: From</th>
<th>Date: To</th>
<th>Location</th>
<th>EURL funded</th>
<th>Other attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Listeria monocytogenes</em></td>
<td>31/01/2017*</td>
<td>02/02/2017</td>
<td>Paris, France</td>
<td>Shona Neal</td>
<td>Corinne Amar</td>
</tr>
<tr>
<td>Coagulase positive staphylococci</td>
<td>22/03/2017</td>
<td>24/03/2017</td>
<td>Paris, France</td>
<td>Amisha Vibhakar</td>
<td>Caroline Weller</td>
</tr>
<tr>
<td>Antimicrobial resistance</td>
<td>06/04/2017</td>
<td>07/04/2017</td>
<td>Kgs Lyngby, Denmark</td>
<td>Martin Day</td>
<td>Craig Swift</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>29/05/2017</td>
<td>30/05/2017</td>
<td>Zaandam, the Netherlands</td>
<td>Kathie Grant</td>
<td>Heather Aird</td>
</tr>
<tr>
<td><em>Campylobacter</em></td>
<td>14/09/2017</td>
<td>15/09/2017</td>
<td>Nantes, France</td>
<td>Shona Neal</td>
<td>Frieda Jorgensen</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>12/10/2017</td>
<td>13/10/2017</td>
<td>Rome, Italy</td>
<td>Frieda Jorgensen</td>
<td>Amisha Vibhakar</td>
</tr>
</tbody>
</table>

*This Listeria meeting was taken in January, but is for the activities delivered between April 2017 and March 2018.

**Related to Core Function(s): 1.a, 2.b.**

**Attend training workshops at the EURL**

Training courses have been offered by the EURLs, including the ISO 19020 method for staphylococcal toxin detection, the colony count technique according to ISO 7218 for
Listeria enumeration, a jointly managed EURL course for PFGE analysis using BioNumerics of Listeria, E.coli and Salmonella data, and MLST typing of Campylobacter. These courses are open to all EU Member States (MSs) and associated countries on a competitive basis. However, many of the courses do not apply to the UK, as the UK may not perform the specific technique (eg PFGE) or that training has been previously attended.

In January, the STEC EURL invited applications to attend practical training for several aspects of STEC at the EURL in Rome, Italy. The UK NRL submitted 2 applications in February 2017 for ‘Detection and characterisation of STEC from food by ISO/TS 13136’ and ‘Use of bioinformatics tools for NGS data mining’ training. The EURL offered a funded place on their ‘detection and characterisation of STEC from food by ISO/TS 13136’ and a UK representative attended this in May 2017 (see Annex for program). The PHE representative expanded his knowledge in the related methods and would recommend this EURL training to others.

The AR EURL offered ‘dry lab’ training to use WGS to monitor antimicrobial resistance in June 2017. Suitable countries to attend had to be working towards or working with WGS and it was decided with APHA that a representative from PHE should register interest, as the EURL only offered funding for one person per Member State. The UK was successful and a PHE representative attended the training in September. The most useful part of the course was learning how to use ResFinder for AR, and was useful to see other practices being used throughout the EU.

Related to Core Function(s): 2.c, 2.e.

Advise FSA on future draft of EU Regulation 882/2004

In March 2017, the new Official Control Regulations (OCRs) were published (EU) 2017/625, replacing the EU Regulation 882/2004. The new OCRs will now incorporate other Regulations for food and feed law, animal health and welfare, plant health and plant protection products. The Regulation has expanded to further prescribe the roles and responsibilities of EURLs, MSs, NRLs and OCLs. Relevant additions include:

- MSs are obliged to update and make publicly available the details of all its NRLs
- an NRL may be designated by a MS, even if no EURL exists
- NRLs should maintain lists of reference materials that is available for OCLs
- NRLs must inform the Competent Authority of PT results and follow up actions and assist in outbreaks
- OCLs must report results to the Competent Authority that are non-compliant or pose a risk to animal, human or plant health
- OCLs must also take part in proficiency tests and indicate results and methods used for official controls (upon request)
Although most of (EU) 2017/625 shall apply from 14 December 2019, Articles 92 to 101, which cover responsibilities of the EURLs and NRLs, will be fully in force in 29 April 2018. These new changes have been communicated to the FSA and OCLs through emails, meetings and the NRL quarterly newsletters.

The NRL has been seeking clarification to FSA as to what constitutes ‘a risk to human, animal or plant health’ and interpretation of ‘official laboratories shall inform immediately the competent authorities’ according to Article 38, paragraph 1. Concurrently, the European Commission has established a working group with the Member States to enhance dialogue and help implement the new OCRs. The FSA is on the working group and has requested from the NRL any queries that have arisen, which has been forwarded to FSA.

Related to Core Function(s): 2.d.

**Strengthen links with the BSI AW9 microbiology committee and other working groups**

Biannual meetings of the AW9 committee have taken place within this twelve month period (April and October) and have been attended by the NRL, as the UK NRL for food microbiology representative. This reporting year has been exceptionally busy, as the EU Mandate M/381 involves a number of horizontal ISOs requiring performance parameters before the end of 2017. Consequently, NRL staff have been submitting comments for draft and final draft ISOs (DIS and FDIS) to the BSI AW9 portal, including parts 3 to 6 of the ISO 16140 series (method validation of alternative methods), ISO 19036 (uncertainty of measurement) and ISO 19020 (detection of staphylococcal enterotoxins).

The UK NRL is a member of the CEN TAG18 expert working group for the revision of the ISO TS 13136 (PCR detection of shiga toxin-producing *Escherichia coli*) which met in December 2017. It was agreed that the Standard be split into 2 parts; part 1 covering the detection and isolation of STEC, and part 2 detailing the characterisation of STEC. Suggested changes were discussed at this meeting, which included:

- changing the enrichment broth from modified tryptic soy broth to buffered peptone water and the incubation temperature from 37 to 41.5 °C
- at least 2 solid media to be used for isolation (tryptone bile x-glucuronide agar and another) and review other agars
- in part 2, to characterise/detect the top 5 serotypes as normative
- the current STEC risk assessment of clinical presentation associated with particular virulence factors/types
- inclusion of performance criteria, as for the other horizontal ISO food Standards
The Listeria EURL has established 2 working groups associated with shelf life studies which the UK NRL has nominated a representative from Campden BRI, who have expertise in this subject. These WGs are developing training tools for Competent Authorities to evaluate if laboratories are competent in shelf-life studies and a revision of the storage temperature at different stages of the cold chain.

A further 2 NRL representatives are also EURL working group members for the use of new technologies for rapid characterisation of coagulase positive staphylococci (CPS) and outsourcing proficiency testing trials on *Listeria monocytogenes* detection/enumeration, although these WGs have been dormant for this reporting period.

Related to Core Function(s): 2.e, 2.f, 2.g.
Core Function Three: Production of standard operating procedures, codes of practice and guidance documents

Update and expand food methods archive on NRL website

9 Standard Methods and/or guidance are available on the NRL website at the time of writing (Table 3). These methods are based on PHE in-house methods and ISOs will assist OCLs to comply with the requirements of the EU Microcriteria Regulations. Most of the relevant ISOs been revised under Mandate M/381, and the corresponding NRL methods are undergoing review and updates. Other relevant PHE Standard Methods have been identified that complement the NRL activities; these are also under the re-formatting process and will be archived on the NRL website. In addition, the PHE SOPs are available to OCLs upon request.

Table 3. List of Standard Methods archived on the NRL website, March 2018

<table>
<thead>
<tr>
<th>Document No.</th>
<th>Title</th>
<th>Version No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNES8 [F12]</td>
<td>Enumeration of coagulase positive staphylococci <em>Staphylococcus aureus</em> (and other species)</td>
<td>4</td>
</tr>
<tr>
<td>FNES26 [F2]</td>
<td>Preparation of samples and dilutions, plating and sub-culture</td>
<td>1</td>
</tr>
<tr>
<td>FNES3 [F8]</td>
<td>Enumeration of β-glucuronidase positive <em>Escherichia coli</em>: Pour plate method</td>
<td>3</td>
</tr>
<tr>
<td>FNES22 [F19]</td>
<td>Detection and enumeration of <em>Listeria monocytogenes</em> and other <em>Listeria</em> species</td>
<td>2</td>
</tr>
<tr>
<td>FNES28 [F22]</td>
<td>Enumeration of β-glucuronidase positive <em>Escherichia coli</em> – most probable number technique</td>
<td>3</td>
</tr>
<tr>
<td>FNES16 [F13]</td>
<td>Detection of <em>Salmonella</em> species</td>
<td>2</td>
</tr>
<tr>
<td>FNES15 [F21]</td>
<td>Detection and enumeration of <em>Campylobacter</em> species</td>
<td>2</td>
</tr>
<tr>
<td>FNES4 [E1]</td>
<td>Detection and enumeration of bacteria in swabs and other environmental samples</td>
<td>4</td>
</tr>
<tr>
<td>FNES18 [Q4]</td>
<td>Guidance on Public Health response: involvement of PHE Food Water and Environmental Microbiology laboratory staff in the investigation of outbreaks of food or waterborne disease</td>
<td>3</td>
</tr>
</tbody>
</table>

Related to Core Function(s): 1.a, 1.e, 3.a, 4.a.

Prepare specific guidance protocols for OCLs and the FSA

The NRL have been requested by the FSA to produce draft guidance for validating alternative methods in place of the reference method for the testing of the food-borne organisms in food, feed and environmental samples. There has been a delay in the
ISO/CEN revision of the relevant Standard (ISO 16140) and at the time of writing only 2 of the 6 parts have been published. However, it is the third, fourth and sixth part that mostly influences the guidance for FSA (Part 3: Protocol for the verification of reference and validated alternative methods implemented in a single laboratory, Part 4: Protocol for single-laboratory (in-house) method validation and Part 6: Protocol for the validation of alternative (proprietary) methods for microbiological confirmation and typing). The NRL will finalise the guidance in 2018 – 2019, pending the publication of the international standard. A poor performance protocol is required if any OCLs generate repeated poor results from the European Food Microbiology Legislation (EFL) External Quality Assessment Scheme. However, there has been no consistent poor performance from the participant results (see next section).

Related to Core Function: 2.a, 2.d, 3.a, 4.a.

Gap analyses of ISO Standards related to EU Mandate 381

Once an affected ISO Standard is published, PHE performs a gap analysis, comparing the new and old ISO Standards alongside the current PHE method. By identifying differences between the 2 versions of the ISO Standard, a potential ‘gap’ or ‘impact’ can be addressed in the PHE Method. These are recorded in a table format and discussed in the PHE Food, Water and Environmental Microbiology Network Methods Group meeting. If an impact is agreed, the PHE Method is revised accordingly and further validation or verification is performed, where necessary. Table 4 lists those NRL-relevant PHE Methods that have had Impact Assessments performed and their related ISO Standards in this reporting year.

Table 4. List of PHE Methods that have had gap analysis, April 2017 to March 2018

<table>
<thead>
<tr>
<th>PHE Method No.</th>
<th>PHE Method Title</th>
<th>Superseded ISO</th>
<th>Revised ISO</th>
</tr>
</thead>
</table>

These impact assessments were made available to FSA and the OCLs, and resulted in a training workshop, which is detailed in Core Function Four.

Related to Core Function: 2.a, 3.a.
Core Function Four: Compliance assessment via audits and ring trials

OCL participation in the European Food Microbiology Legislation Proficiency Testing Scheme

2017-2018 was the fourth year the NRL has supported OCL participation in the European Food Microbiology Legislation (EFL) External Quality Assessment Scheme. Provided by the PHE Food and Environmental Proficiency Testing Unit (FEPTU), this scheme enables the performance assessment on the identification, examination and interpretation of microbiological results of foods tested against legislative criteria in EU Regulation 2073/2005 (as amended). 4 distributions of 3 samples based on food categories within the regulation are sent out each year. Further details can be found at this link: www.gov.uk/government/collections/external-quality-assessment-eqa-and-proficiency-testing-pt-for-food-water-and-environmental-microbiology#europe-food-microbiology-legislation-scheme

Clauses in (EC) Regulation 625/2017 relate directly to NRL co-ordination of Official Control Laboratories activities in respect of sample analysis and performance assessment through comparative testing by the NRL. The regulation also stipulates the requirements of OCLs to partake in interlaboratory studies for the test and analyses performed as official control laboratories, upon request by the European or National Reference Laboratory. OCL participation to the EFL scheme therefore allows the NRL to directly compare performance and also act independently from the scheme organisers. All results are anonymised by the scheme co-ordinators and the identity of each individual laboratory is not disclosed to the NRL. However, the NRL does monitor performance of each individual laboratory, and if laboratories are experiencing difficulties they are invited to contact the NRL and seek assistance.

Results overall for 2017 to 2018 were satisfactory; 13 laboratories registered to participate (the same number as last year), although it was noted that one laboratory did not perform analysis for 3 out of the 4 distributions for this year. Enumeration values from relevant examinations were overall distributed well within the statistically acceptable limits and were also close to the participant’s median.

Table 5 summarises the twelve samples for 2017-2018 and the performance of OCLs that carried out the examinations. Laboratory results falling below the 70% satisfactory threshold were rare and resulted from only 2 laboratories, of which one laboratory scored unsatisfactory on just a single examination. Knowledge of legislative requirements for STEC continued to improve with more laboratories demonstrating their
understanding in a ready-to-eat sample with sprouted seeds distributed this year than last, although capability for testing remains the same. 8 out of 11 laboratories failed to recognize the regulatory requirement to parallel test Enterobacteriaceae and Cronobacter sakazakii (unless a correlation between the 2 organisms has been established) for a sample of infant formulae. The categorisation of dairy foods for Listeria monocytogenes also caused some problems amongst OCLs, especially when deciding whether the described sample could support growth of this organism or not.

Table 5. Overview of performance of the 2017 to 2018 European Food Microbiology Legislation Scheme

<table>
<thead>
<tr>
<th>Sample code</th>
<th>Brief sample details</th>
<th>Required examination(s)</th>
<th>OCLs achieving &gt;70% of the maximum available score¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFL121</td>
<td>Ready to eat salad containing sprouted bean shoots at shelf life</td>
<td>L. monocytogenes enumeration, <em>Salmonella</em> spp., STEC detection</td>
<td>11/11, 5/10</td>
</tr>
<tr>
<td>EFL122</td>
<td>Smoked salmon before leaving the food business operator</td>
<td>L. monocytogenes detection</td>
<td>11/11</td>
</tr>
<tr>
<td>EFL123</td>
<td>Fresh smoothie of strawberries, raw milk and unpasteurised orange juice at shelf life</td>
<td>L. monocytogenes enumeration, <em>Salmonella</em> spp.</td>
<td>11/11, 11/11</td>
</tr>
<tr>
<td>EFL124</td>
<td>Dressed crab at end of manufacture</td>
<td>L. monocytogenes detection, <em>Escherichia coli</em>, Coagulase-positive staphylococci</td>
<td>8/8, 9/10, 9/10</td>
</tr>
<tr>
<td>EFL125</td>
<td>Dried infant formula intended for infants below 6 months, at end of manufacture</td>
<td>L. monocytogenes detection, <em>C. sakazakii</em>, Enterobacteriaceae (detection), Presumptive <em>B. cereus</em></td>
<td>6/6², 0/2³, 7/10, 9/10</td>
</tr>
<tr>
<td>EFL126</td>
<td>Stilton cheese from milk that has undergone heat treatment, sampled during ripening period at producers</td>
<td>L. monocytogenes detection, <em>Escherichia coli</em>, Coagulase-positive staphylococci</td>
<td>9/9, 10/10</td>
</tr>
<tr>
<td>EFL127</td>
<td>Beef tartare made with lemon juice and herbs, at shelf life</td>
<td>L. monocytogenes enumeration, <em>Salmonella</em> spp.</td>
<td>11/11, 10/11</td>
</tr>
<tr>
<td>EFL128</td>
<td>Premium raw chicken burger of minced chicken and herbs from a local butcher, taken at shelf life</td>
<td><em>Salmonella</em> spp.</td>
<td>10/11</td>
</tr>
<tr>
<td>EFL129</td>
<td>Mechanically deboned minced turkey, at end of manufacture</td>
<td>Aerobic Colony Count, <em>Escherichia coli</em></td>
<td>11/11</td>
</tr>
<tr>
<td>EFL130</td>
<td>Home-made buttermilk with shelf life of less than 5 days, at shelf life</td>
<td>L. monocytogenes enumeration</td>
<td>12/12</td>
</tr>
<tr>
<td>EFL131</td>
<td>Refrigerated liquid egg mix in a carton made following</td>
<td>L. monocytogenes detection, Enterobacteriaceae</td>
<td>7/7, 11/12</td>
</tr>
</tbody>
</table>
Data from the European Food Microbiology Legislation Scheme will continue to be assessed for performance. Consolidated reports are provided by FEPTU and the NRL now has 4 years’ worth of data available for comparison, trend analysis and to evaluate lessons learnt. For example, results from a simulated sample of pasteurised liquid egg showed an improvement in the understanding that this product as it is considered a ready-to-eat food. Sample descriptions covering the 4 food types prescribed in the scheme continue to provide opportunities to learn and challenge laboratories and to reflect the large variety of foods that a laboratory may encounter for testing.

Laboratories are reminded of the scheme design and that decisions on appropriate testing should be based on fact, not assumptions and should refer to the FEPTU guide to scoring for more information. Hypothetical secondary referrals are also available and participants are advised to use the referral of a test option from the drop down lists to more correctly reflect an OCL’s response to an examination.

The NRL has invited all OCLs to register to the above scheme for the 2018 – 2019 distributions (see Annex). The scheme is unique in its provision of education on specific legislation and in addition to new regulations making clear the obligations of laboratories that perform official control work to participate in such comparative schemes, participation of OCLs will provide overall assurance of laboratory competence, identify areas of weakness and further training as well as support compliance with laboratory quality standards and accreditation. OCLs will also continue to have access to expert advice and support from FEPTU and/or the NRL.

Related to Core Function(s): 4.a, 4.b.

**OCL evaluation for Campylobacter testing**

Whilst *Campylobacter* is one of the microbiological activities within the NRL remit of work, the European Food Microbiology Legislation (EFL) PT scheme did not support evaluation of *Campylobacter* detection or enumeration testing because a criterion did

<table>
<thead>
<tr>
<th>EFL132</th>
<th>Fresh strawberry ice-cream made from raw eggs and unpasteurised milk, at shelf life</th>
<th>L. monocytogenes enumeration Salmonella spp.</th>
<th>10/12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>12/12</td>
</tr>
</tbody>
</table>

1Number of laboratories achieving >70% compared to the total laboratories participating in the examination. Those that did not return any data or did not examine samples were not included in this table.

24 laboratories not indicating a *L. monocytogenes* test were not negatively scored, due to a lack of provision for this scenario within the annex of the micro criteria.

32 laboratories correctly identified the food category and name of examination. One laboratory also applied the correct interpretation according to the scheme design.
not occur in the EU legislation. From the 1 January 2018, limits for *Campylobacter* have been enforced through the PHC within Regulation (EC) 2073/2005 (as amended).

In liaison with PHE’s Food and Environmental Proficiency Testing Unit (FEPTU), and with permission from the FSA, STD-300 of the Standard Scheme was distributed, fee-free, to OCLs in January 2018, for both *Campylobacter* detection and enumeration. Similar to the EFL scheme, the samples were organised independently from the NRL and participant results remained confidential and not identifiable to the NRL or the FSA.

Further details of this scheme can be found at: www.gov.uk/government/collections/external-quality-assessment-eqa-and-proficiency-testing-pt-for-food-water-and-environmental-microbiology#standard-scheme

12 laboratories registered to participate, 10 of which returned results for the 2 samples (see Table 6). For Campylobacter detection, 10 laboratories correctly reported the presence in sample S0637 and the absence of Campylobacter in sample S0638. The majority of the laboratories employed the reference method ISO 10272:2017, using Bolton Broth for the enrichment and modified charcoal-cefoperazone-deoxycholate agar for selective plating. One laboratory stated the use of ‘other’ method, although no further details were provided.

Table 6. Overview of performance from STD-300 of the Standard Scheme for *Campylobacter*

<table>
<thead>
<tr>
<th>Sample</th>
<th>S0637</th>
<th>S0638</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intended result</strong></td>
<td>Detection result</td>
<td>Enumeration result</td>
</tr>
<tr>
<td>Detected in 25g</td>
<td>53 – 6.3x10² cfu/g⁻¹</td>
<td>Not detected in 25g</td>
</tr>
<tr>
<td>Number of laboratories participating</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Number of laboratories reporting a result</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Number of laboratories conforming with intended result</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

6 laboratories performed *Campylobacter* enumeration, all reporting a value within the expected FEPTU range.

In Figure 1, sample S0637 demonstrates that all 6 OCLs gave results within +/- 0.5 log cfu/g difference from the OCL median value (2.13 log cfu/g); the value furthest away being -0.35 log cfu/g. This compares to all 54 laboratories that participated in STD-300
with a range of 1.08 and 3.15 log cfu/g (against an all participant median). The same 6 laboratories correctly reported less than 10 cfu/g for sample S0638.

Figure 1. OCL enumeration values for sample distribution S0637 for *Campylobacter* testing

This is the first time the NRL have been able to evaluate performance data for *Campylobacter*. The evidence from this assessment demonstrated good capability and performance for *Campylobacter* detection and enumeration amongst UK official control laboratories and the NRL are committed to continue supporting the OCL’s needs for training and advice in this area.

Related to Core Function(s): 4.a, 4.b.

**Participate as UK-NRL in EURL ring trials and other initiatives (2017 to 2018)**

The NRL has received 12 ring trial distributions from all 6 EURLs, covering various aspects of the work of OCLs and Reference Laboratories, including detection, enumeration, typing and antimicrobial resistance. Table 6 lists these activities and a summary of performance.

The *E.coli* EURL added whole genome sequencing to the typing PT this year, on the same set of samples that would be examined for PFGE. This was on a voluntary basis and the UK-NRL chose to participate and is awaiting the results of the analyses from the EURL.
The UK was invited by the EURL to participate in the proficiency test for detection of staphylococcal toxins. As the UK does not perform this method, a subcontracted laboratory within the EU provides this service and was asked to participate in this PT on behalf of the UK. The EURL sent one PT shipment to the subcontracted laboratory, which was processed and results were reported, as the subcontracted laboratory is also a designated NRL and part of the CPS EU network. The results were then sent to the UK NRL, which was then submitted to the EURL. A summary of the UK NRLs performance is in Table 7.

The NRL did not participate in the proficiency tests (PT) for antimicrobial resistance testing for Enterococci, staphylococci and E.coli in 2017-2018, as the UK NRL adopts a different method to that stipulated in EU legislation (an agar dilution method is performed for antibiotic sensitivity testing, whereas the EURL and the NRL network uses a broth dilution method). This difference may impact when comparing results and the EURL decided not to include the UK NRL for food microbiology in the analysis in previous years. In addition, the UK Food NRL is not performing the sampling and analysis required for the EU antimicrobial resistance monitoring Decision (2013/652/EU). APHA, as the UK animal and feed NRL, are performing this activity. The results of their participation in this trial, and others they are obliged to perform, are also listed in Table 7.

Related to Core Function(s): 1.a, 2.e, 4.c, 4.d.

Organisation of a microbiological challenge test and shelf-life studies in food workshop for UK OCLs

Challenge testing and shelf-life assessment are important to ensure the microbiological quality and safety of foods, including foods where contamination with Listeria monocytogenes, Clostridium botulinum and other organisms may occur. These studies inform the ‘use by’ and ‘best before’ dates given to particular batches of a food product, based on the length of time that they remain both safe to eat and of acceptable quality.

Although FBOs are responsible for defining a shelf-life, food microbiologists from OCLs and environmental health practitioners (EHPs) from local authorities are often presented with challenge testing and shelf life data that may need to be critically assessed or discussed with FBOs. Therefore, the NRL hosted a one-day workshop on these themes at the Colindale site in October 2017. The workshop was oversubscribed, with 176 delegates from OCLs, local authorities and the FSA attending.
### Table 7. NRL participation in EURL ring trials, March 2017 to February 2018

<table>
<thead>
<tr>
<th>Month received</th>
<th>Organism – Test¹</th>
<th>Reference</th>
<th>Matrix/Pure culture</th>
<th>UK Recipient²</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2017</td>
<td><em>Salmonella</em> – detection in primary production sample</td>
<td>20th</td>
<td>Chicken faeces</td>
<td>APHA</td>
<td>APHA – 100% pass</td>
</tr>
<tr>
<td>March 2017</td>
<td><em>Campylobacter</em> – detection (voluntary) and enumeration</td>
<td>PT19</td>
<td>Minced chicken meat</td>
<td>PHE &amp; APHA</td>
<td>PHE – Satisfactory performance for enumeration (100%); detection not performed APHA – Satisfactory performance for enumeration and detection (both 100%)</td>
</tr>
<tr>
<td>March 2017</td>
<td><em>Campylobacter</em> – detection and identification</td>
<td>PT20</td>
<td>Transport crate swabs</td>
<td>PHE &amp; APHA</td>
<td>PHE – Satisfactory performance for detection (100%); identification needs improvement (60%); APHA – Satisfactory performance for detection and identification (both 100%)</td>
</tr>
<tr>
<td>March 2017</td>
<td>CPS – enterotoxin detection</td>
<td>EILA / ANSES LSAL / SBCL / 2017 / 01</td>
<td>Ham and cheese</td>
<td>NRL subcontracts test to external lab</td>
<td>Excluded from performance due to interpretation of the negative sample and a different eluent was used for ham samples, but this couldn’t be recorded separately; however, results indicate satisfactory performance compared with the intended results</td>
</tr>
<tr>
<td>April 2017</td>
<td>STEC - detection in water</td>
<td>PT19</td>
<td>Spent irrigation water</td>
<td>PHE</td>
<td>Satisfactory performance. Penalty points for not identifying O-type</td>
</tr>
<tr>
<td>June 2017</td>
<td>AR – <em>E.coli</em>, Enterococci, staphylococci</td>
<td>22nd</td>
<td>Pure cultures</td>
<td>APHA</td>
<td>Satisfactory performance</td>
</tr>
<tr>
<td>June 2017</td>
<td>CPS - enumeration</td>
<td>EILA / ANSES LSAI / SBCL / 2017 / 03</td>
<td>Powdered infant formulae</td>
<td>PHE</td>
<td>Satisfactory performance</td>
</tr>
<tr>
<td>June 2017</td>
<td><em>Listeria monocytogenes</em> – enumeration</td>
<td>EILA/Anses/LSAI/SEL/2017/01</td>
<td>Smoked salmon</td>
<td>PHE</td>
<td>Excluded from evaluation as did not perform CAMP test; however, results indicate satisfactory performance compared with the intended results</td>
</tr>
<tr>
<td>June 2017</td>
<td>CPS – RT-PCR multiplex enterotoxin gene detection</td>
<td></td>
<td>Pure cultures</td>
<td>PHE</td>
<td>One false positive and one false negative (22/24 correct); this test is still in development at EURL</td>
</tr>
<tr>
<td>October 2017</td>
<td><em>Salmonella</em> – detection in environmental sample</td>
<td></td>
<td>Hygiene swabs</td>
<td>PHE &amp; APHA</td>
<td>PHE – satisfactory performance (100%); APHA – satisfactory performance (100%)</td>
</tr>
<tr>
<td>October 2017</td>
<td>AR – <em>Campylobacter</em> &amp; <em>Salmonella</em> &amp; matrix</td>
<td>23rd</td>
<td>Pure cultures</td>
<td>PHE &amp; APHA</td>
<td>PHE – satisfactory performance (100%); APHA – satisfactory performance (100%)</td>
</tr>
<tr>
<td>October 2017</td>
<td><em>Salmonella</em> – serotyping</td>
<td>22nd</td>
<td>Pure cultures</td>
<td>PHE &amp; APHA</td>
<td>PHE – good performance (100%); APHA – good performance (100%)</td>
</tr>
<tr>
<td>Date</td>
<td>Activity</td>
<td>Sample Type</td>
<td>Organ</td>
<td>Result</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------</td>
<td>--------------</td>
<td>-------</td>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>November 2017</td>
<td>STEC – (voluntary) WGS – WGS1 (PT PFGE-6)</td>
<td>Pure cultures</td>
<td>PHE</td>
<td>Results not yet available</td>
<td></td>
</tr>
<tr>
<td>November 2017</td>
<td>STEC – detection in food – PT20</td>
<td>Rocket salad</td>
<td>PHE</td>
<td>Satisfactory performance</td>
<td></td>
</tr>
<tr>
<td>February 2018</td>
<td><em>Salmonella</em> – detection in animal feed</td>
<td>Chicken feed</td>
<td>APHA</td>
<td>APHA – due to a contamination issue with the sample matrix and low sensitivity and specificity levels, the EURL did not analyse NRL performance. There was an error in reporting the positive <em>Salmonella</em> control, which was positive but reported as negative</td>
<td></td>
</tr>
</tbody>
</table>

1 AR = Antimicrobial resistance testing, STEC = Shiga toxin-producing E. coli, CPS = Coagulase positive staphylococci, ESBL = extended spectrum beta-lactamase.
In consultation with Food Standards Agency, the day was organised as an opportunity for delegates to learn and enhance their knowledge on challenge testing and shelf life studies, with the aim to equip EHPs and laboratory staff with an increased understanding of these topics. The workshop began by highlighting the issues from the perspective of the FSA and EHPs (see agenda in Annex). Domestic guidelines and EU legislation relevant to shelf-life testing was described. This was put into real-life context by presentations describing the difficulties faced by EHPs and OCLs interpreting or generating shelf-life data for FBOs.

Technical expertise was presented by scientists from Campden BRI, and included durability studies, predictive microbiological modelling, challenge testing, and process validation. It was also emphasised that a shelf-life, once specified, is not fixed: any significant change to a product’s specification – including raw ingredients, recipe, processing or packaging – will require revalidation of the shelf-life.

This workshop was complementary to the NRL’s main activities and was the largest event to date organised by the NRL, which required help from PHE Events. It was also CPD-endorsed by the Chartered Institute of Environmental Health, received extremely positive and useful feedback, and the NRL was asked to write an article for the Health Protection Report as it was such a large and successful event:


Related to Core Function(s): 2.a, 3.a, 4.e.

Organise an Impact Assessment of Mandated ISO Standards workshop for UK OCLs

Standards for food microbiology have been revised and published this year from the International Standards Organisation, due to the M/381EC Mandate instructing the inclusion of performance data to all methods referenced in the Microbiological Criteria (EC 2073/2005 as amended). In addition, supplementary guidance such as preparation of test samples for microbiological examination (ISO 6887 series) and the quality standard for general requirements for competence of testing and calibration laboratories (ISO/IEC 17025) have also undergone revisions. The NRL have been involved in carrying out gap analysis work with the PHE FW&E Laboratory Network to compare differences between the PHE national methods and the revised Standards (see Core Function 3, page 23). Impact assessments have been produced from these analyses which have been shared with FSA and OCLs.

Following expressions of interest from OCLs, the NRL organised a workshop on impact assessments in where differences from the revised ISOs on the PHE methods were
highlighted. The impact assessments were circulated to the participants before the workshop (in Annex). This event provided an opportunity for laboratories to discuss actions and receive advice from the assessors. Delegates were invited to attend in person or through Skype, and although some technical difficulties were experienced from some during the session, and others having to decline attendance due to laboratory workload, 15 delegates participated from 6 OCLs and APHA. Feedback was positive with some participants commenting that this provided a good basis from which to think about how they perform their own assessments and were grateful for the discussions and expertise from PHE.

Related to Core Function(s): 2.a, 3.a, 4.e.
Core Function Five: Co-ordination within the UK of EURL initiatives

Support food aspect of the EU-wide AR monitoring (Decision 2013/652/EU)

Since 1 January 2015, fresh meat at retail have been sampled and tested for the above EU Decision in the UK by the APHA, who commenced the slaughter monitoring in the previous year. The NRL have been available for support and advice to the APHA and FSA. There has been continuation by APHA in sampling the retail component of the EU harmonised survey for the FSA in the reporting year. Additional information regarding APHA liaison and AR work can be found previously in Core Function One; Liaise with APHA regarding mutual NRL activities.

Related to Core Function(s): 1.b, 2.a, 5.a.
## Annex – Documents produced from NRL Activities

### Core Function One: Secretariat services

<table>
<thead>
<tr>
<th>Dissemination of information from the EURLs</th>
<th>EURL Lm_2018 WP_v2</th>
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<tbody>
<tr>
<td>Related to Core Functions: 1.a, 1.c, 2.d, 2.e, 2.f, 4.c, 5.a</td>
<td>NEW EU Official Control Regs 2017_625</td>
</tr>
<tr>
<td></td>
<td>EURL CPS_2018 WP_v2</td>
</tr>
<tr>
<td></td>
<td>Differences in ESM vs ISO 19020 CPS-Cr-201716L</td>
</tr>
<tr>
<td></td>
<td>EU_RL_VTEC_Method_10_Rev_0_RT PCRdetection of stx2f subtypes</td>
</tr>
<tr>
<td></td>
<td>EURL-Salmonella Newsletter July 2017</td>
</tr>
<tr>
<td></td>
<td>EURL-Salmonella Newsletter September 2017</td>
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<td></td>
<td>EURL-Salmonella Newsletter December 2017</td>
</tr>
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<td>EURL-Salmonella Newsletter March 2018</td>
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<td></td>
<td>oc_eurl_wp_2016_antimicrobial_resistance_en</td>
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<td></td>
<td>AR EURL 394_2017-11-newsletter-no11-final</td>
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<tr>
<td>Quarterly newsletters</td>
<td>NRL newsletter Summer 2017</td>
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<tr>
<td>Related to Core Functions: 1.a, 2.d, 2.e, 2.f</td>
<td>NRL newsletter Autumn 2017</td>
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<td>NRL newsletter December 2017_FINAL</td>
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<tr>
<td></td>
<td>NRL newsletter March 2018_FINAL</td>
</tr>
<tr>
<td>Co-ordination of 2015 OCL User Day</td>
<td>User day 2017 agenda_FINAL</td>
</tr>
<tr>
<td>Related to Core Functions: 1.a, 1.b, 1.c, 2.a, 2.d, 2.e, 2.f</td>
<td>OCL Audit Report 2016 FINAL</td>
</tr>
<tr>
<td>2016 Audit – OCL’s capabilities</td>
<td>UK NRL Monthly Log_JAN2018_FINAL1</td>
</tr>
<tr>
<td>Related to Core Functions: 1.b, 2.d, 4.a</td>
<td>UK NRL Monthly Log_JAN2018_FINAL1</td>
</tr>
<tr>
<td>Provide regular updates to FSA</td>
<td>UK NRL Monthly Log_JAN2018_FINAL1</td>
</tr>
<tr>
<td>Related to Core Functions: 1.d</td>
<td>UK NRL Monthly Log_JAN2018_FINAL1</td>
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</table>

### Core Function Two: Advice and representation within the UK/EU

<table>
<thead>
<tr>
<th>Representation at relevant EURL meetings and prepare meeting reports</th>
<th>Agenda workshop 2017_final_v2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related to Core Functions: 1.a, 2.b</td>
<td>DraftAgendaCPS2017-0.4amended</td>
</tr>
<tr>
<td></td>
<td>Programme of workshop 2017 170510 (FINAL)</td>
</tr>
<tr>
<td></td>
<td>Information_workshop2017</td>
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<tr>
<td></td>
<td>Provisional Agenda_workshop2017</td>
</tr>
<tr>
<td></td>
<td>DraftAgendaLm2017</td>
</tr>
<tr>
<td>Task Description</td>
<td>Related Core Functions</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Attend training workshops at the EURL</td>
<td>2.c, 2.e</td>
</tr>
<tr>
<td>Update and expand food methods archive on NRL website</td>
<td>1.a, 1.e, 3.a, 4.a</td>
</tr>
<tr>
<td>Gap analyses of ISO Standards</td>
<td>1.a, 3.a, 4.a</td>
</tr>
<tr>
<td>OCL participation in the European Food Microbiology Legislation Proficiency Testing Scheme</td>
<td>4.a, 4.b</td>
</tr>
<tr>
<td>Organise a challenge test and shelf-life studies workshop</td>
<td>2.a, 3.a, 4.e</td>
</tr>
<tr>
<td>Organise Impact Assessment of mandated ISO Standards workshop</td>
<td>2.a, 4.e</td>
</tr>
</tbody>
</table>

**Core Function Three: Production of standard operating procedures, codes of practice and guidance documents**

- eurl-ar_ws_2017_final
- Internal report of CPS Workshop 2017_FINAL
- Indiv Report of Salmonella EU RL meeting May 2017 FINAL
- Internal Report of 12th EU RL Campylobacter Workshop 2017 FINAL
- Internal report of EU RL meeting_E.COLI 2017 FINAL
- 11th EU RL Lm Workshop Internal Report 2017 FINAL
- EU_RL_VTEC_Training_Program_ISOTS13136_Rev_2

**Core Function Four: Compliance assessment via audits and ring trials**

- ISO 6579-1 2017 Salmonella Impact Assessment
- ISO 11290-1 & 11290-2 Impact Assessment ListeriaFinal
- BSI ISO 10272 - Campylobacter - IA

- 2018-19 EFL PT Registration form BLANK
- Workshop on Challenge test agenda_FINAL
- Impact Assessment workshop programme - 26 03 18_FINAL
Proposed PHE NRL Activities, April 2018 to March 2019

1 Core Function One: Secretariat services

1.a. Disseminate information/advice supplied by the EURLs to FSA, OCLs and other UK laboratories in a timely and effective manner.

1.a. Produce and circulate quarterly newsletters to FSA, OCLs and other UK laboratories.

1.b. Co-ordinate the OCL User Day to update UK OCLs and other relevant UK laboratories of the NRL core functions.

1.b. Review content of the UK Food Examiner Register.

1.b. Continue liaison meetings and produce a protocol for working together with APHA for AR, *Campylobacter* and *Salmonella*.


1.d. Provide regular updates to the FSA on NRL activities by producing monthly reports and meet on a quarterly basis.


1.e. Maintain and update the NRL web content on the PHE website.

2 Core Function Two: Advice and representation within the UK/EU

2.a. Provide impartial expert advice to FSA, OCLs and other UK laboratories, upon request.

2.b. Represent the UK at relevant EURL meetings; consult FSA prior to meetings and submit an internal report after attendance of meetings.

2.c. Attend training workshop at the STEC EURL for ‘STEC identification and typing from food’ (organised by EURL, ISS, Rome).

2.e. Keep abreast of methodology developments and advise FSA and OCLs (eg, workflow and Service Level Agreement for CPS toxin testing).

2.g. Participate in the BSI AW9 microbiology committee.

2.g. Participate in Working Group to revise the ISO/TS 13136:2012 (PCR detection of STEC).
3 Core Function Three: Production of standard operating procedures, codes of practice and guidance documents

3.a. Update and expand food methods archive on NRL website.
3.a. Prepare a guidance document for OCLs and the FSA on the use and validation of alternative methods for testing Official Controls.
3.a. Produce a poor performance protocol for OCL participation in the EFL proficiency test scheme.
3.a. Perform gap analyses of ISOs from the EU Mandate 381 and related UK SOPs and update accordingly.

4 Core Function Four: Compliance assessment via audits and ring trials

4.a. Ensure consistency and quality of testing approaches applied by UK OCLs and support where necessary.
4.b. Liaise with FEPTU and monitor OCL’s comparative testing performance and assist OCLs in the implementation of corrective measures.
4.b. Evaluate OCL’s performance using trend analysis.
4.d. Participate as UK-NRL in ring trials including method comparison or validation studies and other initiatives organised by the EURL (ongoing) and report to FSA.
4.e. Organise a Skype/classroom-based workshop for UK OCLs.
4.e. Organise a Campylobacter enumeration/PCR workshop (with STEC detection focus) for UK OCLs.

5 Core Function Five: Coordination within the UK of EURL initiatives

5.a. Support the food aspect of the EU-wide AR monitoring (Decision 2013/652/EU), liaising with FSA, OCLs relevant Reference Laboratories and APHA. Liaise with APHA, audit and review strategy for harmonisation of existing antimicrobial resistance testing.
5.a. Provide information regarding Whole Genome Sequencing when requested from the EURLs, and participate in any related workshops, training and guidance documentation, where necessary.
# Proposed NRL activities for April 2018 to March 2019

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce &amp; circulate quarterly newsletter to FSA, OCLs &amp; other labs</td>
<td>Disseminate</td>
<td>1.a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OCL User Day meeting at NRL, 11th</td>
<td>Meeting</td>
<td>1.b</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Review content of UK Food Examiner register</td>
<td>Secretariat</td>
<td>1.b</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Continue liaison meetings with APHA Salmonella, Campylobacter and AMR NRLs</td>
<td>Secretariat</td>
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