2016 – 2017 Report of UK National Reference Laboratory for Food Microbiology
Activities for *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (including VTEC), *Campylobacter*, *Salmonella* and antimicrobial resistance

April 2016 to March 2017
About Public Health England

Public Health England exists to protect and improve the nation’s health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

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Executive summary

Public Health England has provided the UK’s National Reference Laboratory (NRL) for food microbiology for the Food Standards Agency (FSA), as part of the UK’s obligation to adhere to the Regulation (EU) 882/2004 for official controls. This is the annual report of the NRL’s activities between April 2016 and March 2017 and relates to activities for *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (incl. VTEC), *Campylobacter*, *Salmonella* and antimicrobial resistance (AMR).

The NRL disseminated information from the European Reference Laboratories (EURLs) and produced quarterly newsletters to 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 organised an audit to evaluate the OCLs’ capabilities and requirements; a separate report will be available in the contract year 2017 – 18, and the Food Examiner register was updated with the information collected.

Impartial advice was given to FSA, OCLs and other laboratories throughout the year, and the NRL attended all six EURL meetings. In addition, the NRL attended EURL training for detection of staphylococcal enterotoxin genes by multiplex real-time (RT) PCR and was able to refine the UK method. The NRL is now represented at the BSI AW9 microbiology committee and has participation in a CEN TAG18 expert working group for the revision of the ISO TS 13136 (PCR detection of shiga toxin-producing *Escherichia coli*).

The NRL have presence on the .gov.uk website which provides Standard Methods to OCLs. These are revised where necessary and the NRL are also drafting guidance on the use of alternative methods.

Thirteen OCLs participated in the European Food Microbiology Legislation (EFL) External Quality Assessment Scheme, under NRL support for 2016 – 17. There was an overall improvement in laboratory performance and no laboratories exhibited continued poor performance. The NRL participated in nine EURL PTs and received or indicated satisfactory performance for all. A workshop to cover aspects of Uncertainty of Measurement (UoM) was organised by the NRL and was well attended by the OCLs using Skype as the platform. The NRL also organised a two-day Campylobacter training workshop, which included laboratory-based learning and information regarding requirements for UKAS accreditation for enumeration; feedback was overall very good.

There are details of the proposed NRL activities for 2017 – 18, and a timeline to achieve these.
Introduction

Since 2011, the UK’s NRL for food microbiology has been provided by PHE for the UK’s Competent Authority, FSA. The current contract continues until March 2019, and is responsible for the following work areas as defined in Regulation (EU) 882/2004: Listeria monocytogenes, coagulase positive staphylococci, Escherichia coli (incl. VTEC), Campylobacter, Salmonella and AMR.

This report comprises NRL activities between April 2016 and March 2017, covering 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, as part of the core functions listed below and in the Annex, and detailed for this annual report in Table 1;

1. Secretariat services
2. Advice and representation within the UK/EU
3. Production of standard operating procedures, codes of practice and guidance documents
4. Compliance assessment via audits and ring trials
5. Co-ordination within the UK of EURL initiatives
6. Communication of results and data use

Table 1. PHE NRL Core Functions, April 2016 – March 2017

<table>
<thead>
<tr>
<th>Core Function</th>
<th>Description</th>
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<tbody>
<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>
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<tr>
<td>1.a</td>
<td>Produce and circulate quarterly newsletter 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>
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<tr>
<td>1.b</td>
<td>Review content of the UK Food Examiner Register</td>
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<td>1.b</td>
<td>Update and perform a survey to gather information regarding the OCL’s capabilities and requirements</td>
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<td>1.b</td>
<td>Continue liaison meetings and produce a protocol for working together with APHA for AMR, Campylobacter and Salmonella</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 2016 – 2017</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.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 VTEC EURL for ‘Bioinformatics tools for NGS data mining’ (organised by EURL, ISS, 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>
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<tr>
<td>2.f</td>
<td>Identify and inform FSA and OCLs of emerging analytical issues or developments</td>
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<tr>
<td>2.g</td>
<td>Strengthen links with 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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<tr>
<td>3.a</td>
<td>Update and expand food methods archive on NRL website</td>
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<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>
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<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 an audit on existing ISOs and UK SOPs on websites and update accordingly</td>
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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>
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<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 training workshop for Measurement of Uncertainty</td>
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<tr>
<td>4.e</td>
<td>Organise a Campylobacter enumeration and STEC detection workshop for UK OCLs</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>
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</table>
Core Function One: Secretariat services

Dissemination of information from the EURLs

The NRL regularly receive information from the six EURLs regarding new reports, outbreaks and other related topics. Information is then forwarded to the appropriate stakeholder (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 are described below by work activity; information concerning meetings, training, proficiency tests (PTs) and ISOs are described in the relevant sections of this report.

Listeria monocytogenes

In April 2016, the EURL requested the NRL’s participation in a project comparing whole genome sequencing (WGS) to pulsed-field gel electrophoresis (PFGE) for *Listeria monocytogenes*, by collection of strains or sequence data from a wide variety of sample types. The UK chose not to participate in this project, as PHE is involved in an EFSA funded WGS project with the *Listeria monocytogenes* EURL. At the time of writing, the EURL are still collecting isolates from the NRLs and preliminary analysis indicate that more discrimination is generated with WGS whilst still retaining similar clustering with epidemiologically-related strains as for PFGE.

The EURL sent a link and information of their inter-batch physico-chemical variability calculator for challenge testing in November 2016. In addition, a guidance for the competence of laboratories performing shelf-life studies was revised and circulated by the *L. monocytogenes* EURL. These were sent to colleagues in Campden BRI, who have expertise in challenge testing.

In December 2016, the EURL launched an enquiry to NRLs as to whether Member States pool samples for *Listeria* detection. The NRL circulated these questions to the OCLs and responded to the enquiry stating that the UK do not pool samples. At the EURL meeting in January 2017, it was reported that 24 of 28 NRLs do not pool samples for *Listeria* detection, and if sample pooling is performed, the EU Working Group of Microbiological Criteria referred to Article 5 of the EC Regulation 2073/2005 in that it must provide at least equivalent results to the standard method.

The EURL sent the NRLs two reports in March 2017 concerning the applicability of the recently revised EN ISO 11290-1 method for *L. monocytogenes* detection in the presence of new *Listeria* species and a study of test portion size on the measurement of uncertainty (MoU). The EURL concluded that the new *Listeria* species may not be
detected using the new ISO method and that portion size (25 g vs. 10 g) does not reduce MoU. It was recommended to take subsamples from different parts of the food, regardless of the portion size.

In March 2017, the EURL requested NRLs to collaborate with the Joint Research Centre to participate in an international comparison study for reference material for *L. monocytogenes* PFGE typing. The UK NRL chose not to participate, as GBRU does not perform PFGE for *L. monocytogenes* characterisation.

The EURL forwarded specific reports or documents from other European bodies; information concerning the EFSA molecular typing data collection; a new EU magazine, *Euroreference*, which focuses on reports dealing in reference activities in food, feed and animals; and the joint EFSA-ECDC Annual Report on Zoonoses in 2015. These were forwarded to relevant colleagues and stakeholders.

**Coagulase positive staphylococci**

In June 2016, the EURL published a report on troubleshooting and optimisation of the PFGE protocol for coagulase positive staphylococci (CPS). Although the UK NRL does not perform PFGE, the report recommended the storage of agarose plugs at 4 °C between washing and the digestion steps, and to remove RNase A and lysozyme from the first lysis buffer.

The EURL sent an enquiry to the NRLs in February 2017 regarding how staphylococcal food-borne outbreaks (SFPOs) are defined as strong or weak-evidence in all Member States. At the time that the UK NRL was gathering information and after receiving reports from many NRLs on difficulties in answering, the EURL decided to suspend the survey. At the EURL meeting in March, it was reported that of those NRLs that did respond, both microbiological and epidemiological evidence is required for both strong and weak-evidence outbreaks with varying criteria, but also that categorisation is very much on a case-by-case basis. The EURL intends to re-open the survey in the future, but focusing questions on the NRL responsibilities in generating and reporting data for SFPOs.

**Escherichia coli** (including VTEC)

In August 2016, the EURL requested information regarding the use of the EURL’s methods by the NRLs, the detection of *stx*2f in food, and use of an increased temperature (41.5 °C) on enrichment broths to minimise the background flora for the detection of VTEC in food. The UK responded with the respective answers; the UK NRL does use the EURL methods, there has been no detection of *stx*2f in food, the UK can provide data of samples enriched at 41.5 °C and would be willing to participate in an inter-laboratory study to assess the effects of this.
The EURL has forwarded specific outbreak information, meetings and reports to the NRLs;

- a joint ECDC/EFSA rapid outbreak assessment of a shiga toxin-producing *Escherichia coli* infection associated with haemolytic uraemic syndrome in Romania and Italy
- a two-day meeting entitled ‘One Health Symposium; Focus on Genomics of Pathogenic *E. coli*
- a case of enterohaemorrhagic *E.coli* O157 in a boy in Hong Kong with animal contact
- the first documented report of a VTEC outbreak in Israel
- a multiple strain outbreak in a US restaurant caused by pathogenic *E.coli* other than VTEC
- a new method for testing spent irrigation water for STEC available on the EURL website
- the revised performance parameters for ISO/TS 13136:2012, extending the food matrices data from the EURL PTs

**Salmonella**

In January 2017, the *Salmonella* EURL requested information regarding the use of Multi Locus Variable-Number Tandem Repeat Analyses (MLVA) for subtyping of *Salmonella Typhimurium* and/or *Salmonella Enteritidis*. Although England & Wales do not perform MLVA and use WGS to subtype *Salmonella*, the NRL for Food Microbiology forwarded the questions to the Scottish *Salmonella, Shigella* and *Clostridium difficile* Reference Laboratory, who do still perform MLVA for Scottish isolates. The NRL then entered the information given by Scotland to the web-based form and added that this was from Scotland only. Data collected from all Member States will inform whether the EFSA molecular typing database should be expanded to include MLVA data.

In addition, four 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 2016 edition included organisation of proficiency tests and *Salmonella*-related items from the ISO/CEN meetings in May 2016
- the October edition reported proficiency test updates
- the December edition included changes to some of the proficiency tests, and the report of the 2016 EURL *Salmonella* meeting
- the March 2017 edition covered the organisation of proficiency tests, a multi-country outbreak, the results of the MLVA questionnaire, an update of the ISO 6579-1, and the activities of the *Salmonella* EURL for 2016
The EURL newsletters can be found in the Annex.

**Antimicrobial resistance**

In October 2016, the EURL sent two methods for detecting resistance genes; a revised protocol for detecting the colistin genes (*mcr*-1 and *mcr*-2) as a multiplex PCR and a conventional PCR protocol to detect a newly discovered gene, *optrA*, which has been linked to linezolid resistance. These were forwarded to the appropriate stakeholders by the NRL.

Following the EU monitoring mandate on the monitoring and reporting of antimicrobial resistance in zoonotic and commensal bacteria, (2013/652/EU), and the inclusion of carbapenamase producing *E.coli* detection using selective plates, the EURL sent a survey to the NRLs in March 2017 to ask whether the EURL method had been modified or if any other plates were being used which the EURL could investigate further. The NRL did not complete the survey as instructions were that responses from only those involved in the EU monitoring were required. APHA responded for the UK.

The EURL has sent emails regarding their online e-learning course ‘Antimicrobials, antimicrobial resistance and antimicrobial susceptibility testing- definitions and methods’ hosted by COURSERA. This course is free after registration and has various material, videos, assignments and quizzes to access for further learning.

The NRLs received the annual EURL newsletter in December 2016 (see Annex), which contains information regarding their online course reaching 150 countries and over 9,000 registered learners. This newsletter contained information on plasmid-mediated linezolid resistance due to the *optrA* gene; plasmid-mediated colistin resistance and detection methods and a pilot study to investigate quinolone resistance in poultry isolates and the relationship of quinolone use in select EU countries.

In addition, the EURL forwarded specific documents, reports or notifications from other European bodies and were forwarded to relevant colleagues and stakeholders:

- a proposed reduction of colistin use in animals from the European Medical Agency (EMA)
- an evaluation of the EURL method to isolate MRSA from pig and dust samples
- notification of the ENGAGE meeting and workshop (Establishing Next Generation Sequencing Ability for Genomic Analysis in Europe) in October 2016 (in which PHE experts presented)
- a report of veterinary antimicrobial agent sales in the EU, 2011-14 from the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC)
- a meeting report of the CODEX working group on antimicrobial resistance
• ‘The European Union summary report on antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food in 2015’ from EFSA and ECDC
• an FSA report on the perception of human health of animal antibiotic consumption.

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

Production of NRL quarterly newsletters

The NRL has produced four newsletters primarily to inform the 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. We have had some feedback regarding the newsletter, stating that it’s very useful to have these updates and to be reminded of any upcoming NRL events. Below is a brief description of the newsletters’ content and they can be found in the Annex:

• July 2016 covered the 2016 OCL User Day, a 2015-16 European Food Microbiology Legislation (EFL) PT summary, and a note relating to the use of peptone saline diluent for Listeria monocytogenes detection and enumeration
• September 2016 contained an ISO and PHE methods update, news from the four spring EURL meetings, and the OCL audit launch
• January 2017 reported news from the two autumn EURL meetings, the uncertainty of measurement (UoM) workshop that the NRL organised, newly released ISOs and preliminary results of the OCL audit
• March 2017 included the Campylobacter workshop held for the OCLs in January 2017, the possible inclusion of Campylobacter in the Process Hygiene Criteria (EC/2073/2005), the announcement of the next OCL User Day in May 2017, and the release of several ISO methods

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

Co-ordination of the 2016 OCL User Day

The fourth Official Control Laboratories User Day was held on the 12th May 2016, at PHE, Colindale, and was attended by colleagues from eight OCLs, and other key laboratories including the PHE’s Food, Water and Environmental Microbiology Network (FWEMN) and the Gastrointestinal Bacteria Reference Unit (GBRU), the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), the Animal and Plant Health Agency (APHA), the FSA, Food Standards Scotland, and the Agri-Food and Biosciences Institute (AFBI). The agenda included news from the EURLS, an ISO update, OCL performance in the Food and Environmental Proficiency Testing Unit’s European Food Law Scheme, findings from the Campylobacter in chickens study, a national outbreak of VTEC from prepacked salad, and upcoming NRL activities (see Annex for Agenda).
The overall rating of the meeting was very good, and all respondents stated they would recommend the User Day to their colleagues. Participants were sent PDF versions of all the presentations and these were made available, at future request.

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

**Update of the Food Examiner register**

A Food Examiner register was established in 2014 as requested by FSA, to understand the OCLs’ capabilities and also as a resource for FSA if they receive enquiries concerning microbiological testing/investigation, in order to get appropriate local support from the OCLs. Data was collected as part of the OCL capabilities audit in 2016 to update this register. The results from fifteen food microbiology OCLs and two additional shellfish OCLs were collated and sent to the FSA. This register will not be published or placed on the NRL website.

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 identify any gaps in the OCL’s capability and it was an opportunity for the OCLs to request support in key areas. Consequently, training workshops for STEC detection and *Campylobacter* enumeration were organised, a number of National SOPs were made available on the website, and a seminar in UoM was performed in 2016. It was decided to update this information, and in 2016 the audit questions were reviewed and updated in the online tool SelectSurvey. OCLs were sent the SelectSurvey link over the summer and it was completed by all the OCLs, except one. Preliminary analyses have revealed the following:
Fourteen OCLs responded; 7 in England, 4 in Scotland, 2 in Wales and 1 in Northern Ireland

One laboratory no longer performs microbiological testing for Official Controls

The other 13 OCLs have between one and five food examiners

Concerning Campylobacter and the future addition to the Process Hygiene Criteria:

- 13/14 OCLs are accredited for detection of Campylobacter
- Only 4/14 are accredited for enumeration of Campylobacter
- A further two OCLs perform enumeration but are not accredited
- 10/14 are happy for the Process Hygiene Criteria to be updated with a Campylobacter criterion
- 5 OCLs will need support from the NRL to implement Campylobacter enumeration, including practical training, ISO interpretation and availability of National Methods

At least three OCLs had specific queries, including isolation of STEC after PCR using ISO 13136, how to handle processed foods with rice and cheese (composite foods), and whether separate accreditation is required for STEC detection in milk socks

The NRL will analyse the data fully in spring 2017 and will publish a report on the website in the summer. This audit report will further inform 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)

PHE and APHA are both designated as NRLs for Salmonella, Campylobacter and antimicrobial resistance (AMR) by their respective Competent Authorities, FSA and Department for Environment, Food and Rural Affairs (DEFRA). A liaison meeting took place in December 2015 to agree how to assign the EURL funded activities, since the EURLs will only financially support a single NRL per Member State at annual workshops, training events and participation in ring trials. An initial meeting established an agreement that EURL funding would be allocated on an alternating basis of APHA one year and PHE the following, unless the activities of one organisation takes precedence, eg the current statutory AMR testing in the food chain across the EU, in which case attendance and involvement in ring trials should be in proportion with the ongoing activities. An interaction document was also drafted.

In this period, April 2016 to March 2017, PHE organised two meetings with APHA, as dates and details of the EURL activities are not all available at the same time of the year. At each teleconference in May and November, PHE and APHA agreed on the EURL-funded activities, discussed UK-generated molecular typing data for EU
databases, shared annual NRL work programmes and considered joint research or surveillance proposals. This meeting was also expanded to include the Agri-Food & Biosciences Institute (AFBI), as they are the Northern Ireland Reference Laboratory for *Salmonella* and also have direct communication with some of the EURLs. An agreement and table of NRL activities 2016 – 17 were drafted.

In addition, a teleconference between PHE and APHA was arranged to discuss WGS activities. In particular, how *Salmonella* isolates from clinical, food, feed and animal samples can be characterised in a harmonised way, as PHE has established bioinformatic pipelines to analyse WGS data.

*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 (13/06/2016, 19/09/2016, 19/12/16, 27/03/17) 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, eight standard methods, a public health management guidance, and the report of the 2013 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 review, update and add to the standard methods, and to expand the NRL web presence by creating additional pages for each of the activities; *Listeria monocytogenes*, coagulase positive staphylococci, *Escherichia coli* (incl. VTEC), *Campylobacter*, *Salmonella* and antimicrobial resistance.

The web-site address is https://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

Specific requests for advice were received by the NRL between April 2016 and March 2017. These are briefly reported and categorised below:

General

- Microbiological testing advice to a Food Business Operator (FBO) in China for import of products to the UK
- Microbiological testing of pet food to export to Russia; chilli paste from a UK FBO, and ice lollies for cancer patients from a hospital
- APHA requested to be on the distribution list for the GBRU newsletter
- A request for help from a FBO to apply for a novel food to FSA
- Sampling plans for a door handle contamination project from Nigeria
- A request for PHE PCR protocols from a commercial company
- Advice concerning *Vibrio* testing in ready-to-eat (RTE) foods to the FSA
- A request for a list of food categories to ascertain recommended microbiological testing in the UK from an FBO

The NRL hosted a Thai delegation to discuss *Salmonella* testing in chicken meat which is intended for import into the UK. This involved a half day visit to Colindale and included a tour of the PHE FW&E London Laboratory in June 2016, and was attended by the FSA and representatives for the Port of London.

In March 2016, the NRL was notified of a public consultation for the inclusion of *Campylobacter* in the Process Hygiene Criteria on the FSA website ([https://www.food.gov.uk/news-updates/help-shape-our-policies/views-wanted-on-commission-regulation-campylobacter](https://www.food.gov.uk/news-updates/help-shape-our-policies/views-wanted-on-commission-regulation-campylobacter), last accessed 13/06/2017). The draft EC regulation was made available and was circulated to key members of the NRL for comment. Comments were collated, which included sampling considerations and minor edits, and sent before the deadline of 21st March.

*Listeria*

- A *Listeria* detection query from FSA following a FBO audit
- AFBI requesting further information on *Listeria monocytogenes* sequencing information, which was passed to GBRU.
Coagulase positive staphylococci

- Three requests for staphylococcal toxin detection (although samples were not submitted after NRL requested the status of food products)
- A request for the European staphylococcal toxin detection method in food from an OCL, which was provided
- A query for reference material for staphylococcal toxin detection from an OCL; details of where to procure material was given
- Providing the FSA guidelines concerning the management of CPS in food handlers to an OCL

**Escherichia coli (including VTEC)**

- The PHE STEC SOP was sent to the Republic of Ireland NRL and how testing is performed in the UK
- Requests for STEC detection from both Sweden and Malta NRLs
- An invitation to attend a teleconference regarding STEC detection in beef to adhere to FDA requirements for US export
- Provided advice, strains and support to FSS and an OCL regarding an ongoing STEC outbreak

**Campylobacter and Antimicrobial resistance**

- Advice given concerning adjusting pH in milk samples (advised not to perform) before *Campylobacter* detection to a New Zealand government scientist
- Food Standards Scotland (FSS) requested methodology for AR for EU surveillance

**Whole Genome Sequencing**

A Whole Genome Sequencing (WGS) questionnaire was jointly prepared by EFSA, the EURLs and the European Commission, and was circulated by the EURLs in September 2016 to ascertain the capability of laboratories using this technique at an EU level. This was specifically aimed at all laboratories in the EU (EURLs, NRLs, and OCLs) that work on food- and water-borne pathogens isolated from animals, food, feed and animal/ food/ feed environmental samples. The questionnaire had several parts, including laboratory background, availability and use of WGS, specific WGS methodology and bioinformatic analysis, and interest of support from the EURLs.

As the European Commission required individual laboratories to respond, and not a consolidated response, the NRL forwarded the questionnaire link to the OCLs to complete themselves. The deadline for submissions was in October 2016 and the NRL
completed the questionnaire within time. At the time of writing, the EU has not produced a report of the results submitted.

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

There has been communication from the FSA to the NRL to support FSA’s participation at the European Commission’s (EC) Microbiological Criteria Working Group in this period. The NRL provided FSA information ahead of the meeting in November 2016 on the following topics:

- Inclusion of *Campylobacter* in the Process Hygiene Criteria
- Outsourcing of PTs organised by NRLs for OCLs
- Survey on temperatures in use for *Listeria* challenge testing studies where there is a lack of data from FBOs for stages in the food chain
- The EU-wide WGS questionnaire (please see section above for more information)
- Applying UoM to Official Control samples
- Practices of pooling of samples and validation studies

The NRL was given feedback from FSA after the meeting, and received feedback from the European Committee activities at subsequent quarterly meetings. This has been valuable for planning NRL activities and providing updates for OCLs.

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

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

All six EURL meetings have been attended by at least one UK NRL representative for the time period of this report; *Listeria monocytogenes*, coagulase positive staphylococci (CPS), *Escherichia coli* (incl. VTEC), *Campylobacter*, *Salmonella* and antimicrobial resistance (see Table 2; names in red are NRL/PHE representatives). Agendas for the meetings were forwarded to the FSA as they were received (see Annex); presentations from the UK were made at the *Salmonella* and *E.coli* meetings. Individual meeting reports were submitted to FSA after attending the meeting (see Annex). In addition, UK NRL/PHE representatives attended specific Working Group (WG) meetings; Bruno Pichon at the CPS New Technologies WG meeting on the morning of the 25 May 2016 (also attended the general EURL meeting), and Frieda Jorgensen for the ISO 13136 WG on 22 – 23 June 2016.
Table 2. List of EURL meetings, April 2016 to March 2017

<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>Antimicrobial resistance</td>
<td>14/04/2016</td>
<td>15/04/2016</td>
<td>Kgs Lyngby, Denmark</td>
<td>Martin Day</td>
<td></td>
</tr>
<tr>
<td>Coagulase positive staphylococci</td>
<td>25/05/2016</td>
<td>27/05/2016</td>
<td>Paris, France</td>
<td>Bruno Pichon</td>
<td></td>
</tr>
<tr>
<td>Salmonella</td>
<td>09/06/2016</td>
<td>09/06/2016</td>
<td>St Malo, France</td>
<td>Elizabeth de Pinna</td>
<td></td>
</tr>
<tr>
<td>Campylobacter</td>
<td>03/10/2016</td>
<td>05/10/2016</td>
<td>Uppsala, Sweden</td>
<td>Amisha Vibhakar Frieda Jorgensen</td>
<td></td>
</tr>
<tr>
<td>E. coli</td>
<td>10/11/2016</td>
<td>11/11/2016</td>
<td>Rome, Italy</td>
<td>Shona Neal</td>
<td>Marie Chattaway</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>31/01/2017</td>
<td>02/02/2017</td>
<td>Paris, France</td>
<td>Shona Neal</td>
<td>Corinne Amar</td>
</tr>
</tbody>
</table>

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

Attend training workshops at the EURL

There have been various training courses offered by the EURLs, including the European Screening Method for staphylococcal toxin detection, a jointly managed EURL course for PFGE analysis using BioNumerics of *Listeria*, *E.coli* and *Salmonella*, and enumeration of *Campylobacter* in food and identification by phenotypic and PCR tests. These EURL courses are competitive as they are open to all EU MSs and associated countries. In addition, many of the courses do not apply to the UK, as they may not perform the specific technique (e.g. PFGE) or that the UK has previously attended the training.

The VTEC EURL invited applications to attend training at the EURL in Rome, Italy, ranging in direct detection of VTEC in food to ‘Bioinformatics tools for New Generation Sequencing (NGS) data mining’. The UK NRL submitted one application in March 2016 for NGS data mining training in June. Unfortunately the EURL could not fund the UK representative to attend and despite best efforts, external funding could not be secured for the UK to attend this course. However, the UK has been successful in attending the VTEC EURL courses in recent years.

The CPS EURL offered training for detection of staphylococcal enterotoxin genes by multiplex real-time (RT) PCR in July 2016 and the UK NRL registered interest via a web form by the closing date in September. The UK was successful and a representative attended the training in November (see agenda in Annex). This follows a trial PT of the same technique, in which results from the NRLs were discordant from the intended. Therefore, by attending the course, the NRL was able to gain further insights into the procedure and was able to refine the method once back in the UK.

Related to Core Function(s): 2.c, 2.e
Advise FSA on future draft of EU Regulation 882/2004

The UK NRL submitted comments regarding the new Official Control Regulations (OCR) to the FSA in January 2014. In January 2017, there was an update from the European Commission at the *Listeria monocytogenes* EURL meeting, where it was announced that the new OCRs were published in March 2017 and will be fully in force in April 2018. The new OCRs will now incorporate other Regulations for food and feed law, animal health and welfare, plant health and plant protection products. The status of mandate EU 882/2004 will not change, but is 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
- NRLs can be designated by MSs, even if no EURL exists
- NRLs must be ISO 17025 accredited and equipped with relevant biosecurity standards
- 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 CA 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)

This information and the presentation were forwarded to the FSA.

Related to Core Function(s): 2.d

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

Biannual meetings have taken place within this twelve month period (April and October) and have been attended by NRL/PHE representatives. As the EU Mandate M/381 involves a number of horizontal ISOs requiring performance parameters before the end of 2017, NRL staff has been submitting comments to draft and final draft ISOs (DIS and FDIS) to the BSI AW9 chair. Thus, the chair has invited the NRL scientist to become a member of the AW9 committee, to represent the UK NRL for food microbiology, and was invited to the next meeting in April 2017.

In addition, the UK NRL attended the CEN TAG18 expert working group for the revision of the ISO TS 13136 (PCR detection of shiga toxin-producing *Escherichia coli*) in June 2016. Further actions arose from this meeting to progress the ISO to a full standard, which included:
• EURL VTEC to send an enquiry to NRLs to see if they have data on the detection of stx2f in food, and also if they have information about the enrichment temperature of 41.5°C
• TAG 18 to ask the CEN TC275 WG6 convener to consider the inclusion of the spent irrigation water in the scope of an ISO 6887 series
• Draft the proposals for ISO 13136 part 1 and part 2 including the scope of the two parts and proposed flow diagrams

A further two NRL representatives are also EURL working group members for the use of new technologies for rapid characterisation of coagulase positive staphylococci (CPS) (attended meeting in May 2016) and outsourcing proficiency testing trials on *Listeria monocytogenes* detection/enumeration.

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**

At the time of writing there are nine Standard Methods available on the NRL website (Table 3). These methods are based on PHE in-house methods and ISOs. As most of the relevant ISOs are undergoing a major revision under Mandate M/381, the corresponding NRL methods will be updated and published as the international standards are published. Consequently, the ISO website is regularly monitored for updates.

Other relevant PHE Standard Methods have been identified that complement the NRL activities; these will also be re-formatted and 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 2017

<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>2</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>2</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>2</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

Following a request from FSA, the NRL produced a draft guidance for validation data to support the use of an alternative method in place of the reference method for the testing of the food-borne organisms in food, feed and environmental sample. An ISO for the use of alternative methods is currently under ISO/CEN revision (ISO 16140) and at the time of writing only two of the six parts have been published. However, it is the third 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 and Part 6: Protocol for the validation of alternative (proprietary) methods for microbiological confirmation and typing). The NRL will finalise the guidance in 2017 – 18, 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
Core Function Four: Compliance assessment via audits and ring trials

OCL participation in the European Food Microbiology Legislation Proficiency Testing Scheme

Since 2014, OCLs have participated in the European Food Microbiology Legislation (EFL) External Quality Assessment Scheme, under NRL support. This scheme enables the performance assessment on the identification, examination and interpretation of microbiological results of foods tested against legislative micro-criteria in EU Regulation 2073/2005 (as amended). It is provided by the PHE Food and Environmental Proficiency Testing Unit (FEPTU), comprises four distributions each year with three samples per distribution and further details can be found at this link: https://www.gov.uk/government/collections/external-quality-assessment-eqa-and-proficiency-testing-pt-for-food-water-and-environmental-microbiology#european-food-microbiology-legislation-scheme

The OCL participation to the scheme allows the NRL to directly compare performance and act independently from the scheme organisers. All results are anonymised; the NRL is not able to identify the performance of any of the laboratories. However if laboratories are experiencing difficulties, they are invited to contact the NRL and seek assistance.

Results overall for 2016-17 were satisfactory and the distribution of values produced from the enumeration examinations that the OCLs performed was again observed to be remarkably close to the participant median with the majority of values falling within the statistically acceptable limits. There was an increase in the number of labs participating this year, from 11 laboratories last year to 13 this year, and there was an overall improvement in laboratory performance; far fewer results were observed falling below 70%, a threshold FEPTU considers significant for any underlying problems. Results below this threshold were observed on only two occasions from the entire distribution, both seen within the same sample. This is compared to nine unsatisfactory results seen across 5 different samples last year. Four laboratories reported no results for one particular distribution this year; the NRL followed this up with FEPTU and most laboratories resumed reporting results for subsequent distributions. There has been a fall in the number of laboratories carrying out official control work during the course of the year, either due to permanent closure or the laboratory ceasing its official control activity. Table 4 summarises the twelve samples for 2016-17 and the performance of OCLs that carried out the examinations.
Table 4. Performance overview of the 2016 – 17 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>EFL109</td>
<td>Minced pork at end of manufacturing</td>
<td>Aerobic colony count, <em>Escherichia coli</em></td>
<td>10/11, 10/11</td>
</tr>
<tr>
<td>EFL110</td>
<td>Raw beef sausages at shelf life</td>
<td><em>Salmonella</em> spp.</td>
<td>10/11</td>
</tr>
<tr>
<td>EFL111</td>
<td>Raw beef sausages at end of manufacturing</td>
<td><em>Escherichia coli</em></td>
<td>8/11</td>
</tr>
<tr>
<td>EFL112</td>
<td>Pasteurised brie during manufacture</td>
<td><em>L. monocytogenes</em> detection, <em>Escherichia coli</em>, Coagulase positive staphylococci</td>
<td>8/9, 9/9, 8/9</td>
</tr>
<tr>
<td>EFL113</td>
<td>Whey powder at shelf life</td>
<td><em>Salmonella</em> spp., <em>L. monocytogenes</em> enumeration, Coagulase positive staphylococci</td>
<td>9/9, 7/7, 0/3</td>
</tr>
<tr>
<td>EFL114</td>
<td>Pasteurised double cream at end of manufacture</td>
<td><em>L. monocytogenes</em> detection, <em>Enterobacteriaceae</em></td>
<td>9/9, 9/9</td>
</tr>
<tr>
<td>EFL115</td>
<td>Ready to eat sprouted seeds at shelf life</td>
<td><em>L. monocytogenes</em> enumeration, <em>Salmonella</em> spp., STEC detection</td>
<td>9/9, 8/9, 4/8</td>
</tr>
<tr>
<td>EFL116</td>
<td>Dried follow-on formulae at end of manufacturing</td>
<td><em>Enterobacteriaceae</em> detection</td>
<td>7/8</td>
</tr>
<tr>
<td>EFL117</td>
<td>Vegetable and beef casserole ready meal intended for infants at shelf life</td>
<td><em>L. monocytogenes</em> detection</td>
<td>8/8</td>
</tr>
<tr>
<td>EFL118</td>
<td>Chilled raw chicken burger at shelf life</td>
<td><em>Salmonella</em> spp.</td>
<td>9/9</td>
</tr>
<tr>
<td>EFL119</td>
<td>Pasteurised liquid egg at end of manufacturing</td>
<td><em>L. monocytogenes</em> detection, <em>Enterobacteriaceae</em></td>
<td>5/6², 8/9</td>
</tr>
<tr>
<td>EFL120</td>
<td>Pre-prepared kiwi, mango and melon fruit salad at end of manufacturing; half the batch released for sale</td>
<td><em>L. monocytogenes</em> detection, <em>Salmonella</em> spp., <em>Escherichia coli</em></td>
<td>8/9, 8/8, 9/9</td>
</tr>
</tbody>
</table>

¹Number of laboratories achieving >70% over total laboratories participating in the examination. Those that did not return any data or did not examine samples were not included in this table
²Two of these laboratories named coagulase positive staphylococci for examination and identified the correct food category
³All six laboratories named the correct examination and food category

The most frequent anomalies continue to involve test selection. The requirement for coagulase positive staphylococci in a sample of whey-powder at shelf life in particular was missed by the majority of OCLs (EFL 113). The presence of *Listeria monocytogenes* was also required for pasteurised liquid egg at end of manufacturing, which three laboratories did not identify as a requirement in accordance to the legislation (EFL 119). Secondary referrals also continue to result in low scores for some tests; 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.
Data from the EFL Scheme will continue to be assessed for performance. Consolidated reports are provided by FEPTU and the NRL has more than three years’ worth of data available for comparison, trend analysis and to see if lessons are being learnt. For example, more laboratories appear to be reflecting their knowledge of the micro-criteria within the scheme’s scoring system. In a previous year’s distribution, a sample requiring STEC testing resulted in only two laboratories attempting (and achieving) to score the maximum available marks, with the majority of other labs either stating ‘not examined’ or only completing a limited number of required data fields. This year (Table 4, Sample EFL 115), four laboratories scored full (eight) marks and more laboratories attempted to score higher marks in a sample requiring an STEC test.

The NRL has invited all OCLs to register to the above scheme for the 2017 – 18 distributions (see Annex). Although it is not mandatory to join the scheme, the NRL stressed that, as well the educational benefits unique to this scheme, continued participation of all OCLs will provide overall assurance of laboratory competence, identify areas of weakness and further training and OCLs will have access to expert advice and support from FEPTU and/or the NRL. In addition, individual performance data will be helpful to support future compliance with the ISO 17025 standard and UKAS accreditation.

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

Participate as UK-NRL in EURL ring trials and other initiatives

Although the time period for this report is between April 2016 and March 2017, to follow the EURL’s activities and allow reporting of results, this report will be based on the period March 2016 to February 2017.

The NRL has received nine ring trial distributions from all six EURLs, covering various aspects of the work of OCLs and Reference Laboratories, including detection, enumeration, typing and antimicrobial resistance. Table 5 lists these activities and a summary of performance.

The NRL did not participate in the proficiency tests (PT) for antimicrobial resistance testing for Enterococci, staphylococci and E.coli in 2016-17, 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 5.
Table 5. NRL participation in EURL ring trials, March 2016 to February 2017

<table>
<thead>
<tr>
<th>Month Received</th>
<th>Organism – Test</th>
<th>Reference</th>
<th>Matrix/Pure culture</th>
<th>UK Recipient</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2016</td>
<td>Campylobacter – detection (voluntary) and enumeration</td>
<td>PT17</td>
<td>Broiler skin</td>
<td>PHE &amp; APHA</td>
<td>PHE – Satisfactory performance for enumeration (100%), detection not performed APHA – Satisfactory performance for enumeration (100%) and detection (100%)</td>
</tr>
<tr>
<td>March 2016</td>
<td>Campylobacter – detection and identification</td>
<td>PT18</td>
<td>Broiler caecum</td>
<td>APHA</td>
<td>Satisfactory performance for detection (100%) and identification (100%)</td>
</tr>
<tr>
<td>April 2016</td>
<td>VTEC – detection</td>
<td>PT17</td>
<td>Ground beef</td>
<td>PHE</td>
<td>Satisfactory performance (100%)</td>
</tr>
<tr>
<td>June 2016</td>
<td>Listeria monocytogenes – typing</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Pure cultures</td>
<td>PHE</td>
<td>Satisfactory performance (100%)</td>
</tr>
<tr>
<td>June 2016</td>
<td>Listeria monocytogenes – detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 2016</td>
<td>CPS – enumeration</td>
<td></td>
<td>Pure cultures</td>
<td>PHE</td>
<td>Eliminated from evaluation due to incorrect expression of results; however, results indicate satisfactory performance (100%) compared with intended results</td>
</tr>
<tr>
<td>June 2016</td>
<td>AMR – Enterococci, Staphylococci and E.coli</td>
<td>20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Pure cultures</td>
<td>APHA</td>
<td>Satisfactory performance per organism (E.coli 98%; Enterococci 99%; staphylococci 99%)</td>
</tr>
<tr>
<td>September 2016</td>
<td>Salmonella – detection</td>
<td>VII in Food</td>
<td>Minced chicken</td>
<td>PHE</td>
<td>Satisfactory performance (100%)</td>
</tr>
<tr>
<td>October 2016</td>
<td>AMR – Salmonella and Campylobacter</td>
<td>21&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Pure cultures</td>
<td>PHE &amp; APHA</td>
<td>PHE – not included in performance evaluation as data is not reported for EU legislation on AR monitoring; however results indicate satisfactory performance (97% for Salmonella and 98% for Campylobacter) APHA – satisfactory performance (99% for Salmonella and 98% for Campylobacter)</td>
</tr>
<tr>
<td>October 2016</td>
<td>ESBL – detection in food matrix</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Minced chicken and caecal samples</td>
<td>APHA</td>
<td>Satisfactory performance for isolation (100%). Minor discrepancies for two antibiotic MICs</td>
</tr>
<tr>
<td>November 2016</td>
<td>VTEC – typing</td>
<td>PT18</td>
<td>Pure cultures</td>
<td>PHE</td>
<td>Satisfactory performance (two discrepant results relating to stx subtyping)</td>
</tr>
<tr>
<td>November 2016</td>
<td>Salmonella – serotyping</td>
<td>21&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Pure cultures</td>
<td>PHE &amp; APHA</td>
<td>PHE – Satisfactory performance (100%) APHA – Satisfactory performance (100%)</td>
</tr>
</tbody>
</table>

1 AMR = Antimicrobial resistance testing, VTEC = Verocytotoxin-producing E. coli, CPS = Coagulase positive staphylococci, ESBL = extended spectrum beta-lactamase
2 PHE = Public Health England, APHA = Animal and Plant Health Agency
The UK NRL did not participate in the PT for detection of staphylococcal toxins from the EUURL, as the recommended method is rarely required in the UK, and ensuring competency would not be cost effective. An alternative accredited laboratory has been identified within the EU to provide this service for the UK and a draft Service Level Agreement has been produced.

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

Organise an Uncertainty of Measurement workshop for UK OCLs

As part of the 2013 OCL Audit and at other NRL events, there was interest from OCL colleagues that a training event to cover aspects of Uncertainty of Measurement (UoM) would be useful; in particular, how to use the calculations and what data should be included.

Therefore the NRL held a workshop for UoM on 21 November where the Head of the PHE Statistics, Modelling and Economics Department and a PHE Quality Manager delivered the training (see Annex for agenda). Twenty-three participants from eleven OCLs attended, and most dialled in via Skype to the event. Although there were some technological difficulties, fruitful discussions were gained surrounding the background and use of UoM, and practical examples were demonstrated using an Excel spreadsheet.

Feedback on content and usefulness was high, with requests for a similar workshop to be repeated. The UoM SOP and Excel sheet is currently in draft; both will be revised and available from the NRL website.

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

Organisation of Campylobacter training workshop for detection and enumeration for UK OCLs

In light of the pending proposal to include limits for Campylobacter within EC Regulation 2073/2005 (as amended) Microbiological Criteria, and that many OCLs are not yet UKAS-accredited for Campylobacter enumeration, a second workshop for Campylobacter detection and enumeration was held by the NRL on 25-26 January 2017. Theoretical background and practical sessions were covered for the eight OCL participants that attended.

The workshop ran over two days and started with a presentation on the background of Campylobacter. Following this, participants were able to gain practical knowledge in mostly enumeration techniques. Course contents included processing chicken neck skin, counting and differentiating colonies, a demonstration of a PCR for confirmation and requirements for UKAS accreditation for enumeration. There were tours of the PHE London Food Water and Environmental Microbiology and the Campylobacter
Reference Laboratories. Participants were also briefed on the activities surrounding enumeration work at the EU level (see Annex for agenda). Feedback was very good overall, with participants gaining knowledge and skills, in particular for *Campylobacter* enumeration.

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

### Core Function Five: Co-ordination within the UK of EUROL 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. The NRL was contacted by the FSA in October 2016 confirming that the NRL were in agreement that APHA should continue the retail component of the EU harmonised survey for the next 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

**Introduction**

- Core Functions of NRL Services

**Core Function One: Secretariat services**

<table>
<thead>
<tr>
<th>Dissemination of information from the EURLs</th>
<th>Related to Core Functions: 1.a, 1.c, 2.d, 2.e, 2.f, 4.c, 5.a</th>
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<tr>
<td>Quarterly newsletters</td>
<td>Related to Core Functions: 1.a, 2.d, 2.e, 2.f</td>
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<tr>
<td>Coordination of 2015 OCL User Day</td>
<td>Related to Core Functions: 1.a, 1.b, 1.c, 2.a, 2.d, 2.e, 2.f</td>
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</tbody>
</table>

- EURL – June 2016 Newsletter
- EURL-Salmonella Newsletter September 2016
- EURL-Salmonella Newsletter December 2016
- EURL-Salmonella Newsletter April 2017
- AR EURL 2016_12_newsletter_no10_final
- Q1 2016 NRL newsletter
- NRL newsletter autumn 2016 FINAL
- NRL newsletter winter 2017 1
- NRL newsletter Spring 2017_draft
- User day 2017 agenda_FINAL

- UK NRL Monthly Log_Apr16_FINAL_SN(2)
- UK NRL Monthly Log_MAY2016_FINAL
- UK NRL Monthly Log_JUNE2016_FINAL_SN +AV edits3
- UK NRL Monthly Log_JULY 2016_FINAL_SNEdits3
- UK NRL Monthly Log_AUG 2016_FINAL
- UK NRL Monthly Log_SEPTEMBER 2016_FINAL_KL AV SN edits1
- UK NRL Monthly Log_OCT 2016_FINAL_Aledits
- UK NRL Monthly Log_NOV2016_FINAL
- UK NRL Monthly Log_DEC 2016_FINAL
- UK NRL Monthly Log_JAN2017_FINAL_SN+Avedits
- UK NRL Monthly Log_FEB2017_FINAL_KLAVSnedits
- UK NRL Monthly Log_MAR2017_FINAL_KL_AV_Snedits
- NRL Minutes 13Jun2016_DRAFT with Sept Meeting Agenda_SNEdits_JH
- FSA minutes 19th September 1 2016 KL_SN2_CL edits
- FSA minutes 19th December_1st draft_Snedits
- FSA minutes 27 March 2017_FINAL_KL_SN_AVedits.docx

**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>Related to Core Functions: 1.a, 2.b</th>
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- Agenda workshop EURL_AR 2016_draft_v4
- DraftAgendaCPS2016
- Programme of Salmonella workshop on 09Jun2016 (draft 160502)
- EURL Campy Workshop Programme 2016
- Agenda_2016_final2
- DraftAgendaLm2017
- eurl_ar_ws2016_minutes_final
- Report 2016 workshop EURL CPS
- EURL Workshop report 2016-0045
- Individual REPORT OF VTEC EURL MEETING 2016
- EURL Lm-report WS Lm 2017
- Program_training_PCR2016 SET detection by mp rt-PCR

<table>
<thead>
<tr>
<th>Attend training workshops at the EURL</th>
<th>Related to Core Functions: 2.c, 2.e</th>
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</table>

- Workshop EURL_AR 2016 draft
- DraftAgendaCPS2016
- Programme of Salmonella workshop on 09Jun2016 (draft 160502)
- EURL Campy Workshop Programme 2016
- Agenda_2016_final2
- DraftAgendaLm2017
- eurl_ar_ws2016_minutes_final
- Report 2016 workshop EURL CPS
- EURL Workshop report 2016-0045
- Individual REPORT OF VTEC EURL MEETING 2016
- EURL Lm-report WS Lm 2017
- Program_training_PCR2016 SET detection by mp rt-PCR
### Core Function Three: Production of standard operating procedures, codes of practice and guidance documents

<table>
<thead>
<tr>
<th>Task</th>
<th>Related to Core Functions</th>
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<tbody>
<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>Related to Core Functions: 1.a, 1.e, 3.a, 4.a</td>
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<tr>
<td>Prepare an alternative method guidance for OCLs and the FSA</td>
<td>2.a, 2.d, 3.a, 4.a</td>
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### Core Function Four: Compliance assessment via audits and ring trials

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<th>Task</th>
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<tbody>
<tr>
<td>OCL participation in the European Food Microbiology Legislation Proficiency Testing Scheme</td>
<td>4.a, 4.b</td>
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<tr>
<td>Organise an Uncertainty of Measurement workshop</td>
<td>2.a, 3.a, 4.e</td>
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<tr>
<td>Organisation of <em>Campylobacter</em> training workshop</td>
<td>2.a, 4.e</td>
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<tr>
<td>• 2017-8 EFL PT Registration form BLANK</td>
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<td>• UoM Programme - 21 11 16_FINAL</td>
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<td>• Campy Workshop Programme - 25 01 17 and 26 01 17_FINAL</td>
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</tbody>
</table>
Proposed PHE NRL Activities, April 2017 – March 2018

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. Analyse and produce a report of the 2016 OCL survey

1.b. Continue liaison meetings and produce a protocol for working together with APHA for AMR, 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.d. Produce and submit annual report to the FSA on NRL activities for 2017 – 2018.

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.f. Identify and inform FSA and OCLs of emerging analytical issues or developments (eg, Intended addition of Campylobacter in the Process Hygiene Criteria).
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 approached 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.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 challenge testing training workshop for UK OCLs.

4.e. Organise a 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 harmonization of existing antimicrobial resistance testing.
## Proposed NRL activities for April 2017 to March 2018

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<tr>
<th>Activities</th>
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<td>Produce &amp; circulate quarterly newsletter to FSA, OCLs &amp; other labs</td>
<td>Disseminate information</td>
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<td>Continue liaison meetings with APHA Salmonella and AMR NRLs</td>
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<td>STEC identification and typing from food training, 16-17th</td>
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<td>E.coli 9th Workshop in Rome, 12-13th</td>
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<td>Agree the workflow and Service Level Agreement for CPS toxin testing with</td>
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<td>Produce poor performance protocol for OCL PT participation</td>
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<td>Organise challenge testing workshop for UK OCLs (30th October)</td>
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<tr>
<td>Organise PCR workshop (focus on STEC) for UK OCLs</td>
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