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Annual Report of the National VTEC Reference Laboratory (VTEC NRL)

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2013 VTEC Data- PHL-DML

The incidence of VTEC in Ireland in 2013 was 15.2/100,000. This rate has consistently increased annually since 2002. Ireland now remains with the highest rate of VTEC in Europe since 2011. In 2013, 4918 stool samples or isolates were received at the PHL-Dublin for VTEC screening or confirmation and typing, this is a decrease of approx 20% from 2012. This was due to a significant change in VTEC methodology at local and regional laboratories, with the introduction of PCR based screening for VTEC. Consequently the VTEC NRL received more positive screened stools samples for VTEC confirmation rather than isolates for confirmation. Thus while the total number of samples reduced, the number of tests performed remained constant.

Of the 4918 samples or isolates received 1692(34%) were VTEC positive, representing 716 clinical VTEC cases. Of these 716 cases 108(15%) were positive for the presence of toxin genes by PCR but culture negative. VTEC was isolated from 608(85%) of samples, 227(37%) of these were VTEC O157 and 381(63%) were non-O157 VTEC. Of these 221(36%) were VTEC O26 and the remaining 162(26%) were from 33 other VTEC serogroups. When the PCR positive culture negative samples are added there were 32%, 32% and 36% VTEC O157, O26 and others respectively (tables 1-3).

The most notable change in 2013 VTEC detected is the increase in the number of ‘Ungroupable’ (confirmed after extended serotyping at PHE) culture positive VTEC cases. These rose from 3(1.5%) in 2010 to 53(9%) in 2013. The numbers of O157 and O26 VTEC remain stable since 2012; however the percentage of both is decreasing while non-O157/O26 VTEC increase (Tables 1-3, figures 1-3). HPSC will provide further enhanced data on VTEC cases for 2013 in their annual report WRT transmission, source, epidata, sporadics and outbreaks.

All isolates were typed using standardised Pulsed Field Gel electrophoresis (PFGE). Clusters or unusual PFGE patterns are notified to the relevant Depts. of Public Health, and the potential public health significance is investigated. Such molecular surveillance stimulated a national VTEC outbreak investigation involving 52 VTEC cases in 2013. VTEC PFGE data is also communicated to ECDC via the FWD network and in response to EU outbreak (EPIS) alerts. PFGE analysis, for

example by region or by serogroup is also available on request. Should you require further information on your VTEC Data, please do not hesitate to contact us.

In 2013 we screened 1037 food samples and 146 water samples for VTEC. 19 foods (unpasteurised high risk products) and 13 waters (all non-public supplies) were positive for VTEC. Non-O157 VTEC was more prevalent than O157 VTEC in these samples (tables 5 and 6).

We look forward to continuing to provide a comprehensive VTEC service in 2014. In recognition of the further expansion of the PCR VTEC screening of stools locally, we expect to receive more positive screened stools for VTEC confirmation/analysis in addition to high risk primary samples and suspect colonies. This is in accordance with the recommendations contained in the 2014 national 'Guidance for Laboratory diagnosis of human Verotoxigenic *E. coli* infection' which is post consultation and waiting sign off by HPSC. The NRL VTEC has modified internally our testing protocols to respond to this changing sample referral pattern.

To facilitate work flow efficiency, we request that urgent samples or large numbers of samples for referral are preceded by a phone call to VTEC NRL at PHL,HSE, DML and that all samples are accompanied by a completed PHL HSE, DML-VTEC request form. Each laboratory should have been sent a customised request form, if you have not received this please e mail phl.dublin@hse.ie and we will send it to you. We also request that as many of the fields as possible are completed, in particular 'External lab ID', Name, 'DOB' Outbreak code (if relevant) and clinical details (especially if HUS). In addition we require your 'Technical findings' including *vtx* PCR result and CP value for those labs screening by PCR. This enables us to streamline our testing protocol and provide you with the fastest TAT.

Table 1: PHL-HSE-DML VTEC workload 2004-2013

Year	No. Samples Analysed*	% positive cases	Number of tests
2004	599	8.5	
2005	996	12.3	
2006	1360	11.7	
2007	1468	10.8	
2008	2403	9.3	
2009	3550	6.8	
2010	3283	6.2	
2011	4943	5.5	
2012	6118	8.6	58288
2013	4918	14.6*	51376

* This is based on 1 positive result/patient, however positivity was 34% for total samples analysed.

Table 2: Summary of VTEC detected, by methodology 2013

Serogroup	Culture and PCR positive (%)	PCR positive, culture negative (%)	Total positive.
O157	227(99.6)	1(0.4)	228
O26	221(100)	0(0)	220
Other	160(60)	107(40)	267
Total	**608(85)**	**108(15)**	**716**

Table 3: Numbers and incidence of VTEC in ROI 2002-2013

Year	Numbers of VTEC cases	Incidence/100000
2002	68	1.7
2003	82	2.1
2004	51	1.4
2005	123	3.0
2006	159	3.7
2007	115	3.9
2008	223	5.3
2009	240	5.7
2010	202	4.8
2011	270	5.9
2012	540	11.8
2013	716*	15.2

*107/ 716 cases were positive by PCR only and culture negative

Table 4: Serogroups and toxin types of VTEC in ROI in 2013

Serogroup	***vtx1(%)***	**vtx2(%)**	***vtx1+ vtx2(%)***	**total**
O101	0(0)	1(100)	0(0)	1
O103	18(78)	5(22)	0(0)	23
O104	1(50)	0(0)	1(50)	2
O105c	0(0)	2(100)	0(0)	2
O108	1(100)	0(0)	0(0)	1
O111	2(29)	0(0)	5	7
O113	0(0)	3(71)	0(0)	3
O117	1(50)	1(50)	0(0)	2
O118	0(0)	1(100)	0(0)	1
O130	0(0)	2(100)	0(0)	2
O140	0(0)	0(0)	1(100)	1
O145	2(12)	14(82)	1(6)	17
O146	5(83)	0(0)	1(17)	6
O153	0(0)	3(100)	0(0)	3
O157	0(0)	190(83)*	38(17)	228
O159	0(0)	1(100)	0(0)	1
O165	0(0)	1(50)	1(50)	2
O178	0(0)	0(0)	1(100)	1
O180	0(0)	1(100)	0(0)	1
O181	1(100)	0(0)	0(0)	1
O182	3(100)	0(0)	0(0)	3
O2	0(0)	1(100)	0(0)	1
O26	101(46)	108(49)	12(5)	221
O28ab	0(0)	0(0)	1(100)	1
O5	4(100)	0(0)	0(0)	4
O55	1(17)	5(83)	0(0)	6
O73	1(100)	0(0)	0(0)	1
O74	0(0)	11(100)	0(0)	1
O75	0(0)	0(0)	1(100)	1
O76	1(33)	2(33)	0(0)	3
O78	1(100)	0(0)	0(0)	1
O8	0(0)	1(100)	0(0)	1
O84	4(100)	0(0)	0(0)	4
O91	1(17)	1(17)	4(66)	6
O98	1(100)	0(0)	0(0)	1
O Rough	2(34)	1(16)	3(50)	6
Ungroupable	23(53)	12(28)	8(19)	43
Verotoxin detected by PCR only	48(45)	33(31)	26(24)	107
Total	**222**	**203**	**291**	**716**

* One O157 VT2 was PCR positive culture negative

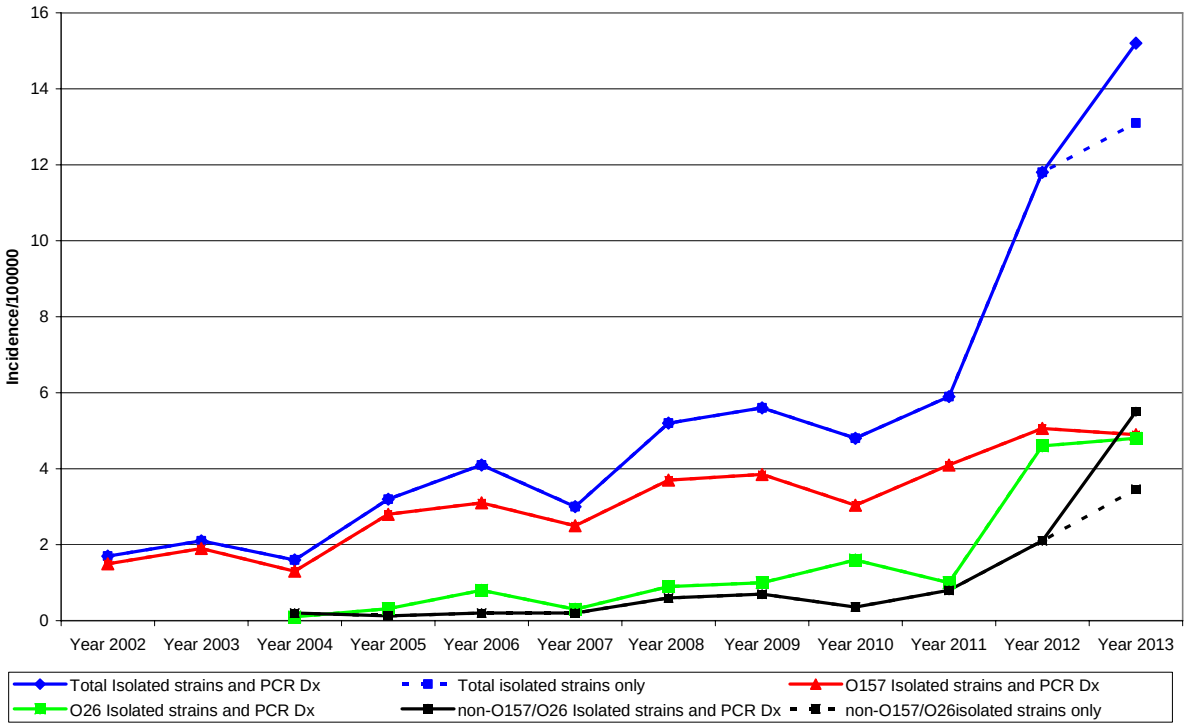

Fig 1: VTEC incidence/100000, 2002-2013

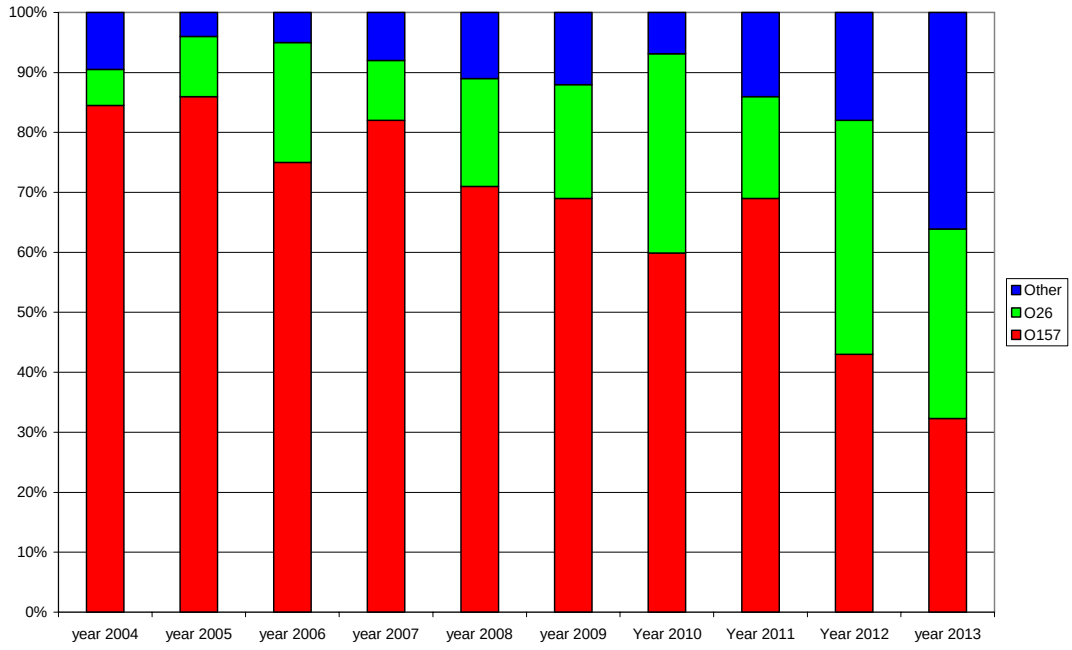

Fig 2: VTEC Serogroups % 2004-2013

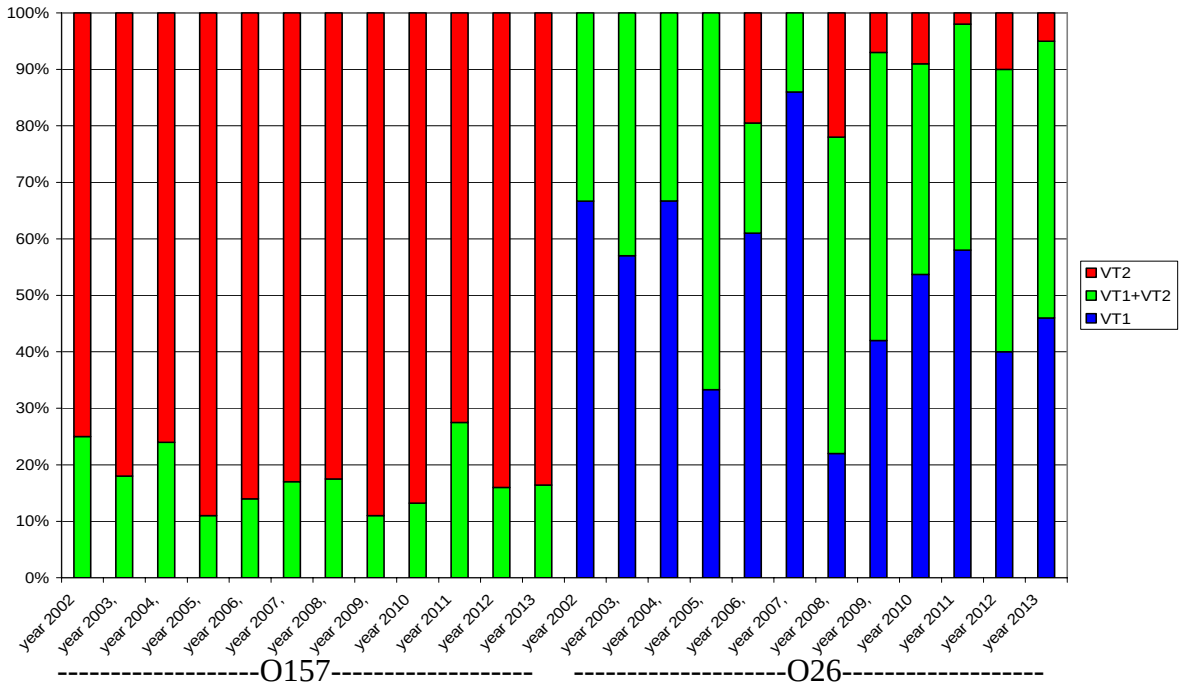

Fig3: Toxin types of *E. coli* O157 and *E. coli* O26, 2002-2013

Table 5: Summary of VTEC from Foods 2013

Serogroup	Culture and PCR positive (%)	PCR only positive (%)	Total
O157	5(100)	0(0)	5
O26	0(0)	0(0)	0
Other	13(93)	1(7)	14
Total	**18(95)**	**1(5)**	**19**

Table 6: Summary of VTEC from Waters 2013

Serogroup	Culture and PCR positive (%)	PCR only positive (%)	Total
O157	4(100)	0(0)	4
O26	1(100)	0(0)	1
Other	4(50)	4(50)	8
Total	**9(70)**	**4(30)**	**13**