

An Bord Pleanála Oral Hearing

Irish Water

Greater Dublin Drainage

Response to Human Health Questions

Dr. Martin Hogan (28th March 2019)



**GDD Oral Hearing
General Response in Relation to Human Health**

CPE Response

- 1 I accept that the emergence of antimicrobial resistant (AMR) bacteria is a significant concern. However, in my opinion, this adds greater urgency, not less, to the efficient treatment of human waste.
- 2 As CPE was raised as concern in submissions this was addressed in the response document. This referenced information readily available from the HSE including Fact sheets issues in 2018

<http://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/strategyforthecontrolofantimicrobialresistanceinirelandsari/carbapenemresistantenterobacteriaceae/factsheets/>
- 3 I would also reference the joint publication by HSE and HPSC of May 2018: Assessing Evidence of Transmission and End of Transmission of Carbapenemase Producing Enterobacterales1 (CPE) CPE Expert Group. National Guidance Document, Version 1.0
- 4 As this is the national guidance document for infection-control specialists in relation to CPE it is of particular importance. It is noteworthy therefore that it does not mention wastewater is a consideration.
- 5 The Proposed Project will not cause the formation of CPE bacteria. These bacteria exist primarily within a hospital setting and will of course enter wastewater system if a patient who is infected with these bacteria goes to the toilet. Not having an efficient and effective wastewater transport and treatment system can only lead to increased infection and greater spread outside of hospitals.
- 6 The observers seem to be referring to an article by Ludden et al. entitled; Sharing of carbapenemase-encoding plasmids between Enterobacteriaceae in UK sewage uncovered by MinION sequencing published online in the journal Microbial Genomics in July 2017. The article mainly postulates the theoretical transmission of antibiotic resistant genes within gram-negative bacteria rather than any human health risk occurring from CPE in the actual wastewater. They do postulate the theoretical risks associated with the discharge of wastewater into rivers and lakes but do not mention discharge into sea water as is the case with this project.
- 7 There is absolutely no postulation, nor could there be, that wastewater should not be adequately dealt with and treated.
- 8 This article outlined finding evidence of CPE in wastewater coming from hospitals. That is precisely what I would have expected as it was identified in the EIAR, and in the aforementioned HSE documents, that this antimicrobial resistant (AMR) bacteria is primarily a hospital problem. One of the noteworthy aspects of this article is that CPE was not found in wastewater which did not come from hospitals.
- 9 As well as not being surprising it is also important to point out that this finding is also nothing new. Indeed the Irish EPA issued a Research Report in 2014, No. 162 entitled: Hospital Effluent: Impact on microbial environment and human health.
- 10 This considered not just antibiotics in wastewater, but also AMR bacteria. A quote from the executive summary states:

"In such cases, resistance has become established in some hospitals but resistance is not yet widely established in the community (e.g. carbapenemase-producing Enterobacteriaceae) (CPE).

The measured levels of antibiotic-resistant bacteria also helped to develop a computer model to estimate levels of E. coli in water receiving discharge from a WWTP.

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The AMR E. coli level was predicted to be between 6 and 193 E. coli/100 ml seawater. There are currently no guidelines for levels of AMR E. coli in coastal waters.

However, the European Union Bathing Water Directive specifies 250 E.coli/100 ml as the upper limit for excellent-quality bathing water. Considering the volumes of water likely to be swallowed by swimmers, the model predicted low-level exposure to AMR E. coli associated with swimming in receiving waters”.

- 11 It is of note that in that report, unlike the article quoted above, seawater was actually sampled receiving discharge from a wastewater treatment plant which was treating hospital waste.

- 12 Their findings were:

“E. coli were detected in all sample sites on all sample dates; however, no AMR E. coli were detected in any of the seawater samples tested. The total E. coli present ranged from 1×10^4 to 1.75×10^5 MPN/100 ml in the seawater tested closest to the receiving point of treated effluent from the outflow point of WWTP1. The highest number (1.75×10^5 MPN/100 ml) was detected in a sample taken after a period of heavy rainfall. Although we saw the highest number of total E. coli MPN/100 ml after the rainfall event, there was no impact on the incidence of AMR E. coli in the seawater.”

- 13 While it may be pointed out that wastewater treatment will not totally eliminate AMR bacteria from effluent, this was always accepted. This is why I stated that these bacteria would not be present in effluent **to an extent posing risk** to human health. I did not state that there would be absolutely none. I stand over that statement which is entirely in accordance with the EPA report.

- 14 Again I quote the EPA research article which states:

“However, it is important to note that analytical data from this project indicate unequivocally

that the total concentration of antibiotic-resistant E. coli is greatly reduced by wastewater treatment, even if the proportion is somewhat increased”.

- 15 I reiterate a statement from the response document which stated:

“Far from increasing the risk of the spread of such conditions an efficient sewerage and treatment facility is actually hugely important in prevention”.