

CONFERENCE ABSTRACT

How to manipulate friends and influence practice: using a narrative microbiology report to change clinical behaviours through the application of complexity science

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Our population had the highest rate of *Escherichia coli* (*E. coli*) bacteraemias in Wales. We introduced complexity science and behavioural change approaches to healthcare associated infections. Educational activities and narrative reporting were used to amplify good behaviour e.g. understanding and recording clinical markers of infection and suppress negative behaviours e.g. responding to dip stick results for urine infection instead of clinical assessment.

We extended our educational activities into the community, targeting nursing and residential homes for the elderly with tailored conferences, presentation to general practice cluster meetings and GP antibiotic prescribing audits. Our narrative reporting in microbiology reinforces behaviours.

Our aim was to reduce *E. coli* bacteraemias by targeting urinary management as 50% of *E. coli* bacteraemias are associated with urinary infections. Our theory is that narrative reporting, targeted at the individual patient and clinician, triggers an emotional response in the limbic brain and changes clinical behaviour.

Older people are our primary target population as they are at greater risk of admission with sepsis. Engaging our primary stakeholders, the clinical report readers and community and social care staff, we sought to reduce *E. coli* bacteraemias in our target population. The narrative microbiology report was introduced in 2014. We published our investigation of retrospective bacteraemias (<https://doi.org/10.1016/j.jhin.2018.04.009>) and urine reporting changes (<https://doi.org/10.1177/1757177419831348>) in 2019.

New reporting systems can enhance the richness of the commentary. The reader is presented with messages to consider when responding to the report. This led to a reduction in sample numbers but also quality improvements: the positive samples did not decline while the negatives declined with different interventions. Our published estimate is that every decision not to sample, releases £12.08 back to the health economy. With 12,000 less samples per annum (pa), the resource release to our healthcare system was £145,000pa. Recently, our national reporting scheme detected a 20% reduction in our *E. coli* bacteraemias over the past year. After five years, our decline in urine numbers is now

24,000pa, doubling the resource release. The reduction in urine samples was an unanticipated benefit but is an example of emergent change in a complex adaptive system. Narrative reporting takes time. However, the tools we have developed accelerate the process. We are teaching other staff the techniques and are working with an industry partner to develop Artificial Intelligence solutions to manage the simpler responses. From August 2018 we began authorizing reports for a second health economy's population with higher specimen numbers. At the end of one year, we have seen their numbers decline by 24,000pa. A new programme aims to spread the innovation across Wales. Narrative reporting is changing clinical behaviours leading to improved quality of care but with a current resource release totalling £500,000pa. Healthcare is a complex adaptive system; recognizing this as we have allows new emergent behaviours to be amplified with significant healthcare benefits. In a complex adaptive system, emergent behaviour is to be expected but the effect may not be anticipated and it is essential to always be ready to assess effects when they arise.