



# Electronic recording of infection clinical consults: impact on hospital acquired infections and antimicrobial stewardship

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## INTRODUCTION

The global threat of antimicrobial resistance (AMR) has prompted the development of many toolkits and local initiatives to improve specialist infection team consults.

The UK five year AMR Strategy<sup>1</sup> was published in 2013 and identified a number of key areas for action in attempting to slow the spread of AMR. Robust infection prevention and control (IPC) practices and antimicrobial stewardship (AMS) are key at all levels and across all sectors, alongside ensuring a sustainable supply of suitable new diagnostics and treatments. The report defined the needs for comprehensive data collection systems, professional leadership and public awareness. In a large tertiary referral centre, local surveillance and robust communication between clinical teams and infection specialists is essential to any AMR strategy.

In 2014, we devised a new electronic method of communication (iAdvice) with clinical teams requiring clinical consults on infected patients as well as the communication of significant laboratory results. This allowed an effective blending of telephone and bedside consultations, and prevented possible transcription errors of advice in clinical notes. Electronic entries generated from these interactions form part of the patients electronic patient record which can be viewed by all healthcare professionals. We aimed to assess the impact on hospital infection rates and antimicrobial stewardship.

## METHODS

The study period was defined as one calendar year either side of the introduction of iAdvice, in November 2014. The hospital information system was interrogated to extract the following health care associated infection (HCAI) data sets:

- total numbers of hospital acquired infections, subdivided into MRSA bacteraemia and hospital acquired Clostridium difficile infections (CDI)
- compliance with the antibiotic policy
- compliance of administration of stat doses within 1 hour

We also examined the iAdvice utilisation data to look at the numbers of interactions involved, the nature of these interactions (either remote or ward based) and the clinical speciality involved. All of the data analysis was performed either within iAdvice or using Microsoft Excel 2016.

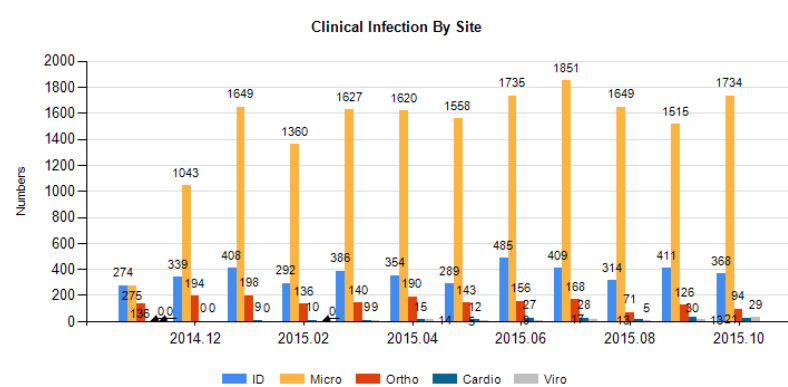


Figure 1. Workload performance of iAdvice.

## RESULTS

In the year since the introduction of iAdvice, there have been 23,871 clinical interactions with the clinical liaison service of which 74% were with the microbiology specialist team. These reviews occurred either as laboratory precipitated consults or direct clinical enquires. 21% of all of the interactions were from general medical wards, with 13% of calls from assessment units and emergency medicine. 65% of all interactions were by telephone, with 32% of the calls resulting in a bedside visit. The quality of coding and patient transfers between clinical specialities resulted in a large proportion of users defined as "blank", although these may reflect transfer of patients from emergency medicine to medical or surgical assessment units.

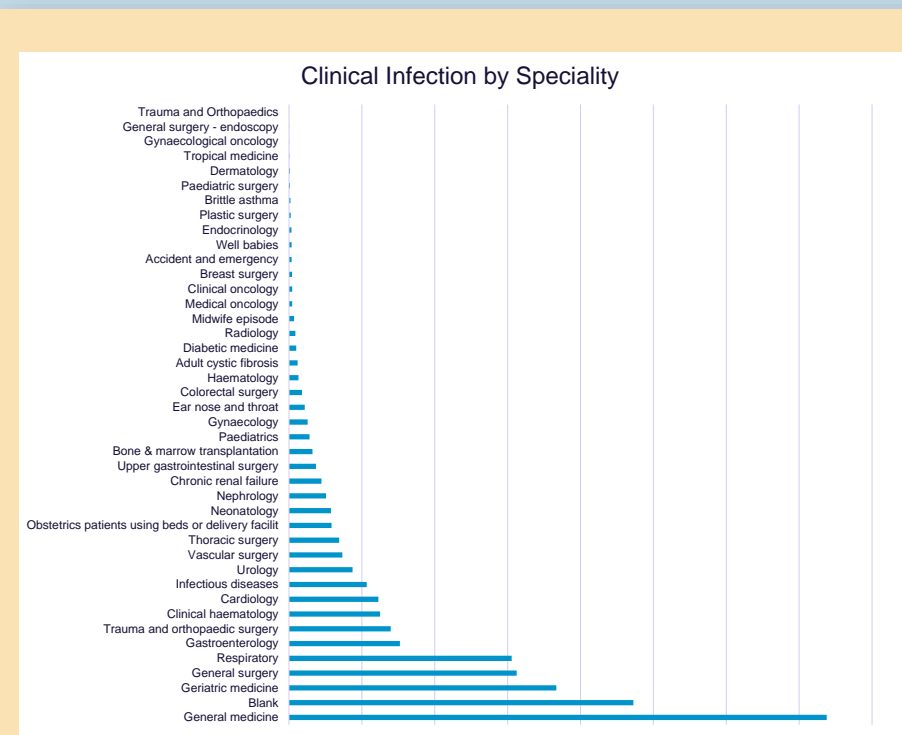


Figure 2. iAdvice interaction by referring speciality.

The iAdvice system is an integral part of the local AMS service. Bedside AMS rounds, which are co-ordinated through the restricted antibiotic lists, allowed the assessment of patients on broad spectrum antibiotics. Reviews of these patients was instrumental in reducing prescribing trends across the hospital. The impact of antibiotic reviews included a 13% reduction in the late administration of antibiotics for sepsis, defined as antibiotics given after the first hour of admission, as well as a 19% reduction of non-administrations during the study period. Snapshot audits performed in September 2013 and repeated in September 2015 revealed a 15% improvement in the overall administration of IV stat doses. There was a reduction of 33% for hospital acquired infections, although the overall trend is reducing.

- 2/3 of our consultations were via telephone. The majority of these interactions were unsolicited enquiries regarding new or ongoing infection management. This included new signs and symptoms as well as infection control advice.
- 1/3 of our consultations occurred on the ward. These were, on the whole, based on significant results from sterile sites and included clinical reviews of bacteraemic patients.
- Laboratory results were medically released as soon as possible in the hospital information system.
- A summary of the clinical interaction was recorded in the iAdvice system that forms a permanent statement in the electronic patient record (EPR), and is available for all users of the system to see. The detailed the nature of the interaction, the context (e.g. bacteraemia, sterile site sample, antimicrobial ward round, infection control).
- The section labeled "team notes" was used as a hidden section for communication between infection specialists and the diagnostic laboratory or infection control.
- The iAdvice system was embedded into local antimicrobial stewardship tools as well as local HCAI reporting.

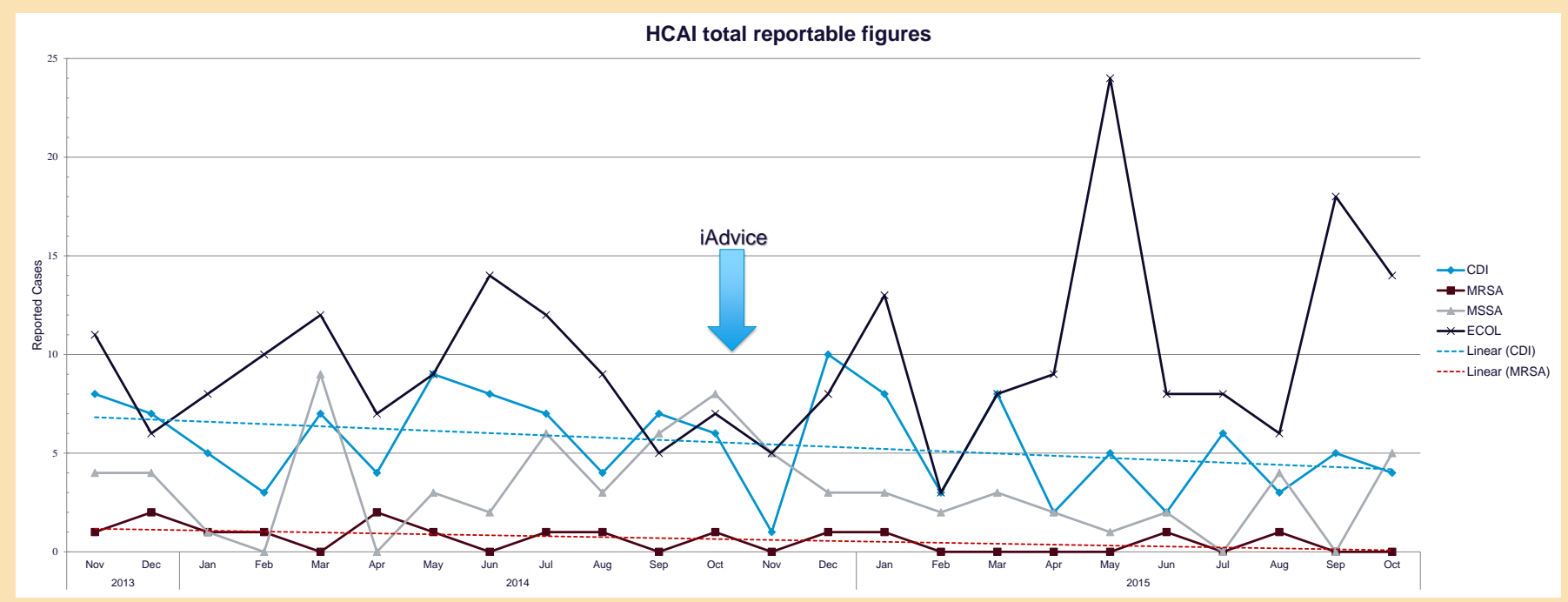


Figure 3. Total reportable figures of methicillin-resistant Staphylococcus aureus (MRSA) bacteraemia, methicillin-sensitive Staphylococcus aureus (MSSA) bacteraemia, E.coli (ECOL) bacteraemia and Clostridium difficile infection (CDI).

## DISCUSSION

Secure and timely documentation of infection advice that is visible to all clinical teams is an essential component of antimicrobial stewardship and HCAI management. The integration of iAdvice allowed the continuity of care to be maintained as well as ensuring consistent patient handover. Transcription errors of advice offered and doses of antimicrobial agents can also be minimised by such methods, as a robust audit trail of activity is maintained.

Tools such as iAdvice are essential when assessing demand for a service as well as workload<sup>2</sup>. Review of interaction data as well as time spent could form an important part of business cases for further resources.

Robust involvement of infection specialists has a significant impact in controlling hospital acquired infection rates both through infection control and antibiotic prescribing advice.

Security of systems like iAdvice should be strictly maintained through robust information governance, which allows accurate and auditable interactions to be recorded.

## CONCLUSIONS

- Integrated clinical systems that are accessible by all health care workers are essential in shaping the future of infection services.
- Robust communication within the infection teams with other clinical staff, infection control and allied health professionals can potentially reduce errors and process failures.
- All acute hospitals must monitor nosocomial infection rates. Whilst there are protocols and processes in place, the prompt communication of infection control advice allows isolation, screening and cleaning to occur in a timely fashion, minimising the risks of transmission. The effect of this can be crudely measured in local HCAI rates.
- Systems like iAdvice can be used to effect changes in prescribing such as targeting therapy, de-escalation and enforcing timely antibiotic reviews.
- Accurate recording of service utilisation is essential in workforce planning and resource deployment.
- The data provided by systems such as iAdvice provide fertile ground for data mining as well as a platform for further research opportunities.

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