



HAL
open science

Prospective study of the effectiveness of electronic patient records (EPR) in rapid-cycle assessment of treatment and partner notification outcomes for patients with genital Chlamydia and gonorrhoea infection

Gary Brook, Lovemore Rusere, Lizz Coppin-Browne, Stephanie Mcdonagh,
John Mcsorley

► **To cite this version:**

Gary Brook, Lovemore Rusere, Lizz Coppin-Browne, Stephanie Mcdonagh, John Mcsorley. Prospective study of the effectiveness of electronic patient records (EPR) in rapid-cycle assessment of treatment and partner notification outcomes for patients with genital Chlamydia and gonorrhoea infection. *Sexually Transmitted Infections*, 2010, 87 (2), pp.152. 10.1136/sti.2010.042440 . hal-00584274

HAL Id: hal-00584274

<https://hal.science/hal-00584274>

Submitted on 8 Apr 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

A prospective study of the effectiveness of electronic patient records (EPR) in rapid-
cycle assessment of treatment and partner notification outcomes for patients with
genital chlamydia and gonorrhoea infection

M.Gary Brook, Lovemore Rusere, Lizz Coppin-Browne, Stephanie McDonagh , John
McSorley.

Department of Sexual Health and HIV, North West London Hospitals NHS Trust,
London, UK

Correspondence to Dr Brook

Patrick Clements Clinic, Central Middlesex Hospital, Acton Lane, London, NW10
7NS.

Tel :0208 453 2727 Fax : 0208 453 2224 gary.brook@nwlh.nhs.uk

Key Words : Chlamydia, Gonorrhoea, Electronic Patient Records, Electronic Case
Records

ABSTRACT

Objectives: To assess the effectiveness of EPR in facilitating multiple, rapid measurements of treatment and partner notification (PN) outcomes for chlamydia and gonorrhoea.

Methods: In two sexual health clinics, we measured the proportion of patients with chlamydia and gonorrhoea who had been treated within 4 weeks of diagnosis and the proportion where at least one of their partners had been treated. These outcomes were measured monthly for 6 months and changes in recording practice were instituted when necessary.

Results: It took 8 hours to capture and analyse the data for 89 patients in month 1. The health advisers subsequently entered data into searchable fields to facilitate better data capture. As a result, by month 6 it took only 1.5 hours to measure these outcomes using an electronic search. It had previously taken two days to perform the same analysis using paper records. In month 1, successful treatment was recorded in 26/27 (96%) patients with gonorrhoea and 57/61 (93%) with chlamydia and there was successful PN for gonorrhoea and chlamydia patients in 19/27 (70%) and 39/61 (64%). By month 6, the recorded outcomes were 30/31 (97%), 81/86 (94%) for successful treatment and 28/31 (90%) and 74/86 (86%) for successful PN respectively.

Conclusions

Frequent rapid clinical outcome monitoring is easily attained using EPR as long as the data is entered into searchable fields. Our treatment and PN success for chlamydia and gonorrhoea are well above national targets which may be attributable both to the use of EPR and better data capture.

INTRODUCTION

Electronic patient records (EPR) have many potential advantages, one being that clinical data can be recorded in a consistent way and therefore would be amenable to capture through an electronic search. [1-5] This sexual health service has used EPR since 2007 [6], since when step-wise changes have occurred in the system to make clinical data recording and capture progressively easier. We have recently shown that inherent system efficiencies with EPR lead to significant improvement in the time taken to recall and treat patients with untreated chlamydia [7]. In late 2009 the hospital managers requested that all clinical services provided monthly clinical outcome measures that were relevant to the service. For sexual health we chose as our outcome measures the successful treatment of chlamydia and gonorrhoea and partner notification (PN) outcomes for chlamydia. We subsequently also measured the PN outcomes for gonorrhoea. In this paper we show how we instituted measurement of these outcomes and subsequently changed the way data were recorded in EPR such that outcomes could be frequently and rapidly measured in a way that is well beyond the capacity of paper-based records.

Key messages

- Clinical outcome and partner notification measures can be rapidly and repeatedly measured using EPR.
- Data needs to be entered into searchable fields within the EPR to allow subsequent data extraction.
- EPR improves the efficiency of data recording such that the effectiveness of the services clinical outcomes are accurately reported.
- EPR allows for more effective patient recall and assessment of PN success leading to better clinical outcomes.

METHODS

Setting

The study was performed in two hospital-based sexual health clinics serving a socially deprived and ethnically diverse area of north London. The clinics see most patients as self-referred 'walk-ins' and have approximately 24,000 attendances for 18,000 individual patients per year. The service uses EPR based on the Blithe 'Lilie' system (Blithe Computer Systems Ltd, Burton-on-Trent, UK.) and the clinical templates used are of our own design.

Methods of evaluation: Patient recall and partner notification.

All patients with positive chlamydia and gonorrhoea tests were contacted by telephone, text or letter by a sexual health adviser (a nurse or other health-care graduate trained in sexual health). Once contact was made, those who had already been treated at their initial visit were asked to confirm how many partners they had who were at risk and whether their partners had already attended for treatment as a

result of PN. Untreated patients were asked to return for treatment and PN. Two weeks after treatment all patients were contacted again by phone and asked to confirm treatment adherence, questioned on any new sexual risk and again asked about number of partners informed and treated. Additional evidence of successful PN was recorded from records of identified partners attending this service or other services after the return of a contact slip. Multiple attempts were made to contact patients who failed to attend for treatment and for those in whom PN information/resolution was incomplete.

Method of evaluation: measuring the clinical outcomes

In September 2009 we identified all patients who had been diagnosed with gonorrhoea and chlamydia in that month. For each patient with chlamydia and gonorrhoea, we identified the proportion that had been successfully treated by four weeks after the end of the period; so for September this was the number treated by the beginning of November. We also measured the number of patients with recorded evidence of treatment of at least one partner. Initially, to achieve this meant a manual inspection of all EPR consultations relevant to the time of diagnosis. Having identified problems in the way data was entered, we instituted changes in the way the health adviser team recorded data when dealing with infected patients. This involved recording outcomes in specific searchable fields. Treatment successfully given (0 = 'no' 1 = 'yes'), number of partners at risk and number of partners known to have been treated were recorded in three separate numeric input fields in each patient's EPR consultation template. The three outcomes were measured again for October and November (in early-December and early-January respectively). Once it was clear that data entry was relatively complete and appropriate, an EPR database search was written using Crystal Reports (Crystal Reports XI, Business Objects Software Ltd.)

for these outcomes and a search performed for the period December 2009 to February 2010 in late-March 2010

RESULTS

The clinical and PN outcomes for each of the six months are given in table 1.

Table 1: Clinical and Partner Notification Outcomes by month

Outcome	Sept 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10
Number (%) of patients with gonorrhoea successfully treated within 4 weeks	26/27 (96%)	17/17 (100%)	14/14 (100%)	26/27 (96%)	16/16 (100%)	30/31 (97%)
Number (%) of patients with gonorrhoea with evidence that at least one partner was treated within 4 weeks	19/27 (70%)	12/17 (71%)	9/14 (64%)	22/27 (81%)	13/16 (81%)	28/31 (90%)
Number (%) of patients with chlamydia successfully treated within 4 weeks	57/61 (93%)	49/53 (92%)	88/93 (95%)	85/87 (98%)	83/86 (97%)	81/86 (94%)
Number (%) of patients with chlamydia with evidence that at least one partner was treated within 4 weeks	39/61 (64%)	36/53 (68%)	79/93 (85%)	69/87 (79%)	74/86 (86%)	74/86 (86%)

The processes and times involved in measuring the outcomes are seen in figure 1. In 2007 when we used paper case-notes, based on the experience of similar past audits, we estimate that it used to take at least 16 person-hours work to do this type of clinical outcome and PN assessment. In September 2009, using our EPR system, it took 8 hours to measure these outcomes. For that month, each of the 89 individual EPR consultations had to be inspected, as data on treatment outcomes and PN outcomes especially were not being recorded consistently in the same way in each case note. Outcomes were frequently being recorded as free text, or sometimes in new consultation templates, rather than as numeric figures in the designated outcomes recording fields. This made identification of relevant data difficult. Following this,

after discussion and re-training, the health advisers subsequently uniformly recorded the data in the searchable outcome fields. A repeat search was performed for October and November 2009, again looking at individual EPR consultations. The time required to do the search for these two months fell to 4 hours for each month's data as the data were more easily identified. Once we were satisfied that data was being recorded consistently, a search was written using Crystal Reports to extract the data from the EPR consultations. Case notes lacking any data were inspected to verify why data were missing and to see if patients with a lack of treatment or PN data were being followed up appropriately. This work took 1.5 hours for each month's data. The staff involved in these searches has also significantly changed over time. In 2007, clerical staff were significantly involved in the process, searching for the paper case-notes before the data could be extracted and analysed by health advisers and/or doctors (Fig. 1). Using EPR, the data extraction is now performed by the data manager or other person skilled in IT before the data is verified and analysed by health advisers and/or doctors as before.

DISCUSSION

Summary:

This study demonstrates that since the introduction of EPR, the time taken to perform accurate and repeatable clinical outcome and PN verification has fallen by 90%. Data extraction and analysis of a month's worth of clinical activity for the treatment and PN of 80-100 patients with gonorrhoea and chlamydia used to take the equivalent of two days when paper notes were used. It can now be done in one and a half hours using EPR. This means that such searches can be repeated regularly to identify any patient who may have been managed sub-optimally and to ensure high standards are

maintained in clinical outcome and PN. The fact that staff are aware of this continuous scrutiny serves to drive up standards of recording.

Interpretation of the results:

Initially, we found that we were not using the system to the maximum efficiency as data were not being recorded consistently in the searchable fields. Once this was rectified, searches were quick and simple and the rate of finding complete data is now very high. We have also found that by recording the data in a consistent way, the measured outcomes have improved. The rate of successful PN, as defined by verification of treatment of at least one partner per patient, rose by 22% (from 64% to 86%) for patients with chlamydia and by 20% (from 70% to 90%) for patients with gonorrhoea over the six months study period. This may reflect better performance by the health advisers or may be due to better data recording. UK national guidelines give a target of treating at least one partner in 60% of patients with chlamydia within 4 weeks and 40% if the clinic (such as ours) is in a large city (8). We are thus greatly exceeding these national PN targets. It is worth noting that in some cases the verification was based on a verbal report from the index case and not on a verified attendance of the partner. UK national guidelines are not clear on which method of PN the target is based, (8) although the Society of Sexual Health Advisers suggest that verification of actual attendance should be used. (9)

UK national outcome standards suggested that 70% of patients (50% in London) should be treated for chlamydia or gonorrhoea within 4 weeks of diagnosis. [8]

National chlamydia guidelines in the UK and US have not set time-to-treat standards [10,11] although the English National Chlamydia Screening Programme suggests that 50% and 80% of patients should be treated within 14 and 30 days respectively.[12]

The Clinical Effectiveness Group (CEG) UK gonorrhoea guidelines also give a target

of 70% of patients (50% in London) being treated within 4 weeks. [13] Our treatment outcome data exceeds these national targets in that 96-100% of patients with gonorrhoea and 93-97% of patients with chlamydia are being treated within an average of 4 weeks after attendance. This has been previously shown to be due to the efficiencies that EPR brings. [7]

The reasons why this system is so efficient for clinical outcome measurement are clear. Firstly, EPR case notes can be instantly, multiply and distantly accessed rather than staff having to spend time looking for paper case-notes. This time is re-invested in clinically important activity. Secondly, clinical information can be recorded on the EPR clinical templates in such a way that it is amenable to electronic search. [5] The latter is not always intuitive as people tend to want to record information in free text as it replicates the narrative of a consultation and the usual method of paper case note recording. It is relatively difficult to extract data through electronic searches from free-text fields. [3,4] It is relatively easy to summarise outcomes in a numerical/coded searchable form once the important outcomes have been decided. A balance needs to be struck between having searchable data fields and free text input in EPR to make such clinical systems as user-friendly as possible.

Future research needs to look at rationalising how EPR data are collected. As several different EPR systems develop in sexual health, there needs to be a consensus on which are the important data that need to be recorded in searchable fields to allow ready capture of such through electronic searches. In an ideal world, each clinic would record data in such a way that the electronic data searches would work on multiple systems and at different clinics. There is a real danger that each clinic and each software developer will develop their EPR in divergent directions meaning that routine clinical outcome searches will not be transferrable.

Relation to other evidence:

As shown in this and a previous report [7], the efficiencies inherent in the use of EPR lead to more effective patient recall, treatment and PN. Our service now consistently exceeds national standards [8] and we believe it does so by a process that has capacity to improve further.

Limitations:

The strength of this study is that it compares patient data from the same cohort over contiguous time periods, in a normal clinical situation and is therefore a reflection of our standard clinical practice. It is also the first paper to demonstrate how EPR can improve the efficiency of measuring clinical and PN outcomes within the setting of a sexual health clinic. A potential weakness is that these improvements in outcome and data recording could be due to the health adviser team being aware of the repeat assessments. Without continuing assessments there is a danger of standards falling.

Conclusions.

There is a need for new national standards to be set for the time taken to treat infected patients and the proportion with successful PN. EPR is superior to paper-based case records in enabling the efficient, frequent and repetitive assessment of clinical outcomes for STIs, such as chlamydia and gonorrhoea, as well as having several other inherent advantages. [6,7]

Appropriate use of technology greatly improves our ability to record and collect data. It also enables us to treat patients and their partners rapidly. We should therefore strive to use such technologies to their maximum efficiency for the good of our patients and the betterment of public health. Clinics still running paper-based case records should strongly consider switching to EPR.

Word count: Abstract 249, Main body 2164, excluding figure.

Acknowledgments: We would like to acknowledge the efforts of the rest of the clinic staff who were key to the success of the EPR.

Competing Interests: GB has performed training and lecturing on the use of EPR for Blithe Computer Systems Ltd. in return for educational donations to the clinic.

JM, LC, LR and SM- None.

Funding: None

Contributions of each author: GB and JM planned the study and analysed the data. LC, LR and SM performed the data collection and suggested changes in the methodology of data collection. GB wrote the first draft of the paper and JM, LC, LR and SM contributed to re-writing subsequent drafts

"The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non exclusive for government employees) on a worldwide basis to the BMJ Publishing Group Ltd to permit this article (if accepted) to be published in STI and any other BMJ PGL products and sub-licences such use and exploit all subsidiary rights, as set out in our licence

<http://group.bmj.com/products/journals/instructions-for-authors/licence-forms>.

REFERENCES

1. Centers for Disease Control and Prevention (CDC). Automated detection and reporting of notifiable diseases using electronic medical records versus passive surveillance-massachusetts, June 2006-July 2007. *MMWR* 2008;57:373-6
2. Vogt TM, Feldstein AC, Aickin M, et al. Electronic medical records and prevention quality: the prevention index. *Am J Prev Med* 2007;33:291-6
3. Seyfried L, Hanauer DA, Nease D et al. Enhanced identification of eligibility for depression research using an electronic medical record search engine. *Int J Med Inform* 2009;78:e13-8
4. Hanauer DA, Englesbe MJ, Cowan JA et al. Informatics and the American College of Surgeons National Surgical Quality Improvement Program: automated processes could replace manual record review. *J Am Coll Surg* 2009;208:37-41
5. Matsumura Y, Kuwata S, Yamamoto Y et al. Template-based data entry for general description in medical records and data transfer to data warehouse for analysis. *Stud Health Technol Inform* 2007;129:412-6
6. Brook MG, Davies J, McSorley J, et al. Implementation of Electronic Patient Records (EPR) in a Sexual Health Clinic. *Sex Transm Infect* 2008;84:155-6
7. Brook MG, Baveja T, Smondulak L, et al. The effect of electronic patient records (EPR) on the time taken to treat patients with genital Chlamydia infection. *Sex Transm Infect* doi:10.1136/sti.2010.042432
8. Low N, Welch J, Radcliffe K. Developing national outcome standards for the management of gonorrhoea and genital chlamydia in genitourinary medicine clinics. *Sex Transm Infect* 2004;80:223-229

9. Society of Sexual Health Advisers (SSHA). The manual for Sexual Health Advisers, section A, partner notification. http://www.ssha.info/wp-content/uploads/ha_manual_2004_section_a.pdf (Accessed 14th September 2010)
10. Horner PJ, Boag F, on behalf of the Clinical Effectiveness Group. 2006 UK National Guideline for the Management of Genital Tract Infection with *Chlamydia trachomatis*. <http://www.bashh.org/documents/61/61.pdf> (Accessed 8th June 2010)
11. Centers For Disease Control and Prevention. Sexually transmitted diseases treatment guidelines 2006 : Chlamydial Infections in Adolescents and Adults <http://www.cdc.gov/STD/treatment/2006/urethritis-and-cervicitis.htm#uc4> (Accessed 8th June 2010)
12. National Chlamydia Screening Programme. 2008 quality assurance report. http://www.chlamydia-screening.nhs.uk/ps/assets/pdfs/publications/quality/QA_report_2008.pdf (Accessed 8th June 2010)
13. Bignell C. on behalf of the Clinical Effectiveness Group. National Guideline on the Diagnosis and Treatment of Gonorrhoea in Adults 2005. <http://www.bashh.org/documents/116/116.pdf> (Accessed 8th June 2010)

Fig 1. Processes for measuring clinical outcomes and time taken to extract and analyse 1 month's data on 90 patients

<u>Paper Case Notes</u>	<u>EPR : Manual Inspection of Records</u>	<u>EPR: Electronic Data Extraction</u>
<p>1. Notes found by clerical staff ↓ (4 hours).</p> <p>2. Notes inspected individually and data extracted manually ↓ (10 hours)</p> <p>3. Data entered onto a spreadsheet manually and analysed (2 hours)</p> <p>Total time: 16 hours</p>	<p>1. Notes immediately available electronically (0 hours) ↓</p> <p>2. Notes inspected individually and data extracted manually ↓ (6 hours)</p> <p>3. Data entered onto a spreadsheet manually and analysed (2 hours)</p> <p>Total time: 8 hours</p>	<p>1. Electronic data extract ↓ (0.3 hours)</p> <p>2. Small number of EPR files inspected and data verified ↓ (1 hour)</p> <p>3. Data is already on a spreadsheet and is analysed (0.2 hours)</p> <p>Total time: 1.5 hours</p>