

# Promoting e-Health Resources: Lessons Learned

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**Abstract.** The increase in the number of online health resources and in particular medical digital libraries has made a wealth of information available to health professionals. Previous research has mainly concentrated on the usability and development of the resource but often, the continued promotion of the site and how to increase the levels of usage over an extended period are overlooked. In this paper we present a number of factors that have influenced the levels of usage on the National electronic Library of Infection (NeLI) family of websites. These include active promotional techniques such as attendance at conferences and eNewsletters but also passive factors such as referrals from other sites. The impact of these factors on usage levels of the sites are detailed and discussed further.

**Keywords:** Medical Digital Libraries, Weblogs, Promotion, Swine Flu.

## 1 Introduction

The number of online health resources has increased significantly since the introduction of the web [1] with websites providing accessible health related information for diverse sets of users, from a variety of fields and specialisms. A subset of e-Health resources, Medical Digital Libraries “can provide specialised information in a format that is easily updated, with speedy searching and access facilities” [2] and have been described as “life critical applications enabling professionals to stay up to date” [3]. It is therefore important for the information contained within these sites to be viewed by the largest number of target users as possible. The levels of use of these resources however have not always been as high as expected with “negative reactions to these systems often due to inappropriate system design and poor implementation” [2]. The usability of these sites has subsequently become the focus of a number of investigations [4][5][6] and along with the move to user-centred design, there has been an increased effort towards improving usability and usefulness of digital libraries.

Usability however is one factor in the success and impact of a medical digital library and the users’ ability to find, and their motivation to use the library in the first place are key considerations. As reported by Blandford et al. [7]: “build it and they’ll come is a lie. Not only may the intended users not ‘come’; even if they do, they may well leave unsatisfied.”. Improvements in usability have targeted levels of satisfaction

once users have visited the site, but there have been few reported investigations into the impact that promotional activities and external events have on levels of usage of medical digital libraries.

In this paper we describe an investigation into the factors that have influenced the levels of usage of the National electronic Library of Infection (NeLI) family of websites<sup>1</sup>, a group of online digital libraries that aggregate “the best available evidence-based, quality-tagged resources on the investigation, treatment, prevention and control of infectious disease” [8].

## 2 Evaluating Impact and Levels of Usage

A common methodology for measuring the success or impact of a website is web log analysis, also known as “web intelligence”. The server logs that are generated every time a user views a page on a website “contain a wealth of information on user preferences and the structure of user retrieval patterns” [9] as well as providing general usage patterns e.g. most commonly visited pages, search terms used, geographical distribution of users, time spent on a page etc. [3].

Zuccala et al. [1] have outlined a complementary set of research techniques which digital library managers and stakeholders can use to determine when and how their resources are being used, identify opportunities for further use and detect where online partnerships can be formed. These techniques concentrate on the analysis of external websites that link to the digital library, colinked pages (sites A and B are colinked if there is a page C that links to both [10]) and web server log file analysis/search queries.

The results described in this paper are based on analysis of the server logs of a number of websites (NeLI, NRIC and e-Bug), using similar techniques to those described by Zuccala et al., focusing on general usage statistics and referrals (external links and search engines).

## 3 Promotional Methods

The following section details some of the techniques that have been actively employed to promote the NeLI family of websites since 2002 and the impact that they have had on page views and visitors. This is followed by a description of external factors that have had an influence on usage of the same family of sites.

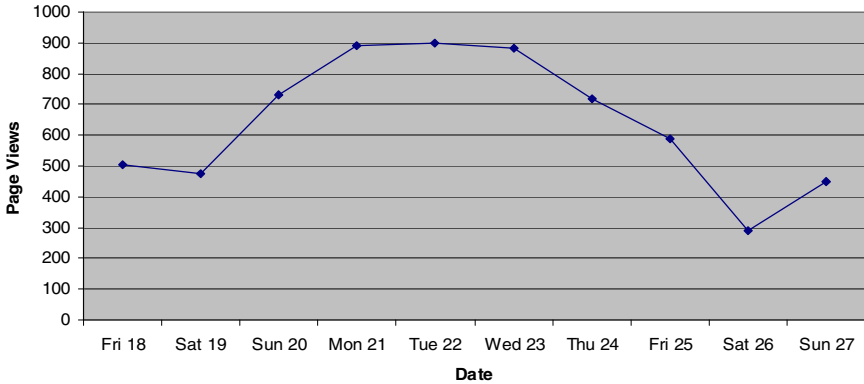
### 3.1 Conference Exhibitions

Members of the NeLI/NRIC development team attend a number of national and international infection control events to raise the profile of the project, receive invaluable face-to-face feedback, run hands-on training sessions and generally raise the awareness of the resources among all parts of the Infection Control (IC) professionals’ spectrum. This involves hiring a stand for the duration of the conference, setting up

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<sup>1</sup> NeLI <http://www.neli.org.uk>, the National Resource for Infection Control (NRIC) <http://www.nric.org.uk> and a related resource for schools, e-Bug, <http://www.e-bug.eu>

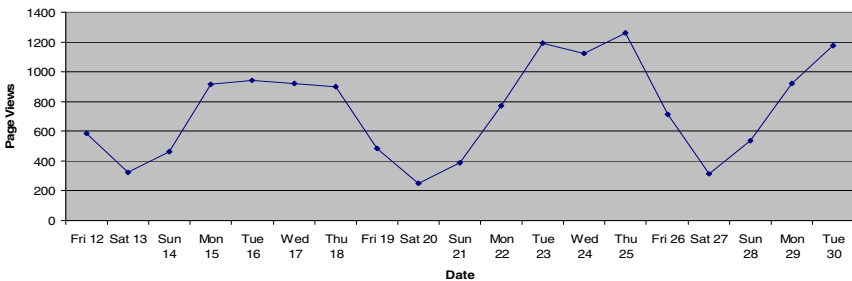
laptops that contain local copies of the site (due to unreliable or expensive internet connections at conferences), giving away various promotional materials and encouraging people to sign up to an eNewsletter via a prize draw. Attendance at these events has a marked impact on the site usage during and immediately. Figure 1 below shows the impact of attendance at the European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) during April 2008.



**Fig. 1.** Page Views on NRIC before and after ECCMID, 19<sup>th</sup>-22<sup>nd</sup> April, 2008

Before the conference, the average number of page views on NRIC during April was around four to five hundred per day. During the first day of the conference, this number increased to around nine hundred page views per day, with a higher level of usage continuing for three days after the conference.

Similar results were seen at a number of other conferences in September 2008, as shown in Figure 2 below.



**Fig. 2.** Page Views on NRIC before and after various Conferences in September 2008

The first peak coincides with the Health Protection Agency (HPA) Conference on the 15th – 17th September. The second peak coincides with the European Respiratory Society (ERS) conference on 18th – 24th September and the Infection Prevention Society (IPS/ICNA) Annual Conference on the 22nd – 24<sup>th</sup> September. There is also a third increase starting on Monday 29th after the final two conferences which could

potentially be explained by attendees of the conference viewing the site having returned to work at the start of the following week.

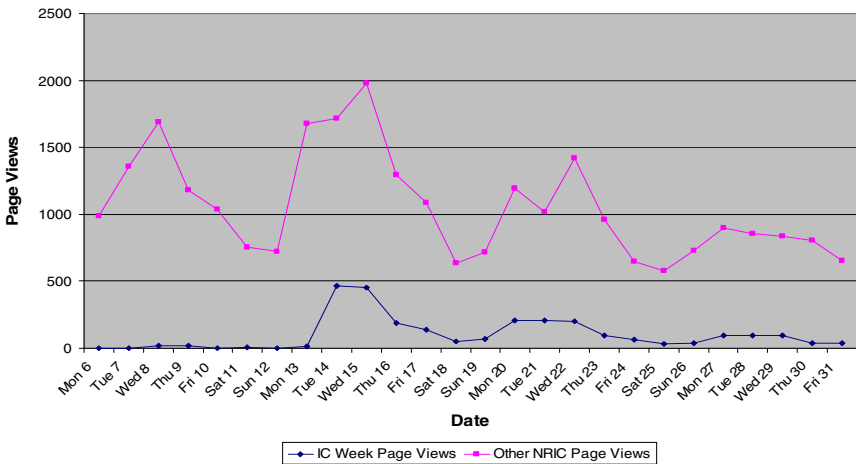
### 3.2 E-mail Newsletters

NRIC/NeLI, in collaboration with the Infection Prevention Society, hosted an Infection Control Week on the 20th to 24th of October, 2008<sup>2</sup>. As part of this week, users who had registered their contact details with the NeLI/NRIC website (primarily via exhibitions at conferences) were sent a National Infection Control Knowledge Update via email. The aim of these updates is to highlight best current knowledge and current issues for selected healthcare topics; the updates are presented as user-friendly summaries written by relevant experts, and are accompanied by links to recent, relevant peer-reviewed articles.

Figure 3 shows the impact that hosting the Infection Control Week had on traffic to the NRIC website. In that chart, ‘IC Week page views’ represents accesses to web pages that hosted content created for the IC Week, whilst ‘Other NRIC page views’ represents accesses to all the other pages on NRIC (that already existed and were not created specifically for the IC Week). There are two related peaks of traffic that coincide with the following events:

1. An email was sent to 2352 eNewsletter subscribers on the 14<sup>th</sup> of October that promoted the Knowledge Week and linked to the related material.
2. The IC week was launched on the homepage of the site on the 20<sup>th</sup> of October.

During the IC Week (20<sup>th</sup> to 24<sup>th</sup> of October), there was a substantial increase in traffic to NRIC and its resources compared to the traffic received one week before the email was sent and one week after the IC week.



**Fig. 3.** Page views on NRIC before, during and after IC Week, 20<sup>th</sup>-24<sup>th</sup> October, 2008

<sup>2</sup> <http://www.nric.org.uk/IntegratedCRD.nsf/ICWeek2008?OpenForm>

### 3.3 Links to External Websites

During the recent Swine Flu pandemic, medical digital libraries were important resources for healthcare professionals. As well as continuously updating the NRIC website with relevant articles and information, the decision was made to place a direct link on the homepage to the information provided on the European Centre of Disease Control (ECDC) website. Although from a user perspective this was of benefit as it was directing them to the most up to date and relevant information on influenza, this had a noticeable impact on the levels of usage of the rest of the NRIC website. When comparing the statistics for 2008 and 2009, it was discovered that although numbers of page views in January to March were higher in 2009, since April 2009, when the link was added, the number of pages viewed actually decreased compared to the same period in 2008. This is shown in Table 1 below.

**Table 1.** Comparison of page views on NRIC in 2009 and 2008

Month	Page Views in 2009	Page Views in 2008
January	24685	18636
February	23584	19479
March	24216	19075
April	18415	21441
May	21119	19739
June	17385	20746
July	15784	19614
August	14309	16590
September	17051	21284
October	25825	31585
November	22600	24963
December	15962	18509

Users were still accessing the site, but were no longer navigating to information contained within the site. Instead, they were immediately clicking on the link to the external page and leaving the site (and not returning). Although medical digital libraries do not necessarily see each other as competitors (their primary motivation being simply to aid users in finding the most relevant and up to date information) the drop in traffic could potentially have consequences for the future of a site.

### 3.4 Links from External Websites

An important factor in the success of any site is links from external from web pages. One reason for this is the effect that external links have on a site's position in a set of Google search results. The number of external links a site has, combined with the quality of those links is one of the factors that influence a site's rank as determined by the Google Page Rank algorithm [11]. Referrals from search engines are discussed further in section 3.5, but Table 2 below demonstrates the value of links from external sites that themselves have high levels of user traffic.

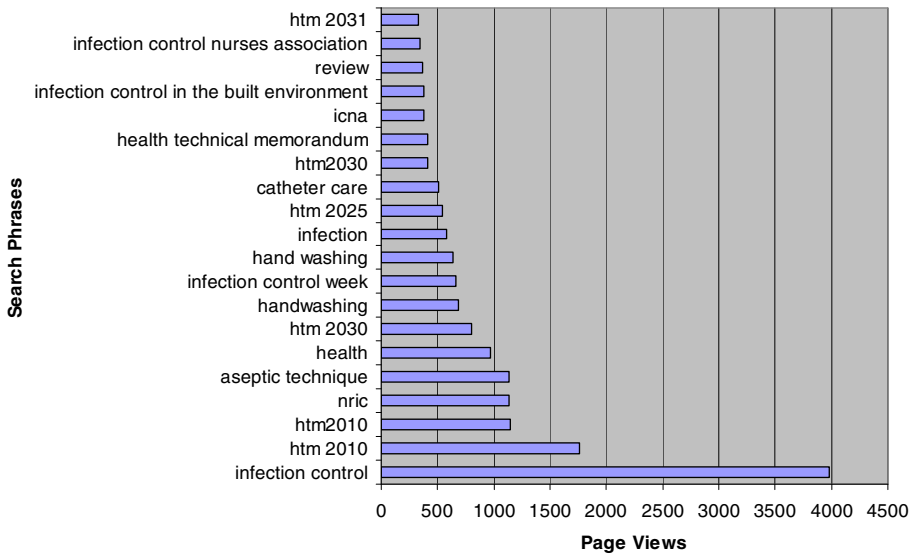
**Table 2.** Page views and visitors on e-Bug generated from referrals from external websites in 2009

Site	Number of page views	Number of Visitors
<a href="http://www.hpa.org.uk/">http://www.hpa.org.uk/</a>	8818	4688
<a href="http://www.nric.org.uk/">http://www.nric.org.uk/</a>	1008	870
<a href="http://www.healthyschools.gov.uk/">http://www.healthyschools.gov.uk/</a>	948	713
<a href="http://www.neli.org.uk/">http://www.neli.org.uk/</a>	560	487
<a href="http://www.dh.gov.uk/">http://www.dh.gov.uk/</a>	498	442

A single link from the Health Protection Agency (HPA) website to the e-Bug website generated almost 5,000 new visitors. This link was placed in May 2009 to direct visitors to the various Swine Flu resources for schools that were posted on the site. This behaviour was predominantly demonstrated in April 2009 (3,190 referrals) and May 2009 (3,443 referrals), during the initial phases of the Swine Flu pandemic. A related effect of Swine Flu was seen in the 5,452 downloads of the Swine Flu fact sheets that were posted on the site.

### 3.5 Search Referrals

Search referrals are a significant source of traffic for web sites. In 2008 NRIC received 78,286 page views via users performing searches on common search engines such as Google and Yahoo, accounting for 31% of the total page views (252,318). Figure 4 below shows the top 20 search phrases that resulted in page views on NRIC in 2008.



**Fig. 4.** Top 20 search phrases that resulted in page views on NRIC in 2008

For medical digital libraries, referrals from search engines can account for a significant amount of traffic. Following standard techniques for optimising pages for search engines [12] can increase usage levels and studying the keywords that are being used can give an indication of the types of resource that the site should provide more of. In the case of NRIC, it is clear that users are looking for general information about “infection control”, the key focus of the site, but they are also looking for specific documents (HTM 2010 is a “Health Technical Memorandum”), which has generated over 2,500 page views alone.

## 4 Conclusion

In this paper we have described a number of factors that have had an impact on the levels of usage on a family of popular medical digital libraries. The misheld belief that “if you build it, they will come” often results from the importance placed on the development process of the resource, followed by a lack of focus on the continued maintenance and promotion of the site. The key factors of offline promotion at conferences and online promotion via eNewsletters, has supported the increase in traffic seen on the NeLI family of websites since 2002. Combining these efforts with the provision of current and relevant content, particularly during events such as the Swine Flu pandemic, has increased the number of page views from external links and search engines. However, being too keen to support the users’ needs by providing prominent links to other resources can sometimes be to the detriment of the site as a whole.

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