

INFORMATION TECHNOLOGY

Taking pharmacy services to a new level with the intranet

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Other pharmacy departments can benefit from similar intranet initiatives to those at the Barts and the London NHS Trust described here

A local area network (LAN) was established throughout Barts and The London NHS Trust in 1996. A year later, the informa-

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tion management and technology (IM&T) department set up an intranet on the LAN. Since over 2,000 members of staff have access to the intranet, via 1,500 networked computers, an opportunity arose for departments to communicate information in a much faster and efficient way.

The pharmacy department was one of the first to take advantage of this opportunity and to look at ways of developing services

around the new capability offered by the intranet.

THE INTERNET

The use of the internet rapidly gained momentum in the mid-1990s, and even those who were sceptical about its value soon realised that the internet and associated developments were here to stay. It was

quickly realised that internet technologies could dramatically improve the way that people worked and communicated.

Following quickly on the heels of internet awareness and use, people began to realise the potential value of what was regarded as an "in-house internet", namely, the intranet. For an organisation to operate efficiently and successfully, the way information is handled and the ability of the people in the organisation to communicate reliably and speedily are essential factors. The intranet offers a means of addressing an organisation's weaknesses in these crucial areas.

Although somewhat lagging behind the use of the internet, the benefits and potential opportunities to organisations of an intranet are many, especially in the health care sector.

— PHARMACY ON THE INTRANET

Hospital pharmacists provide a wide range of professional services and in many cases the intranet can help provide these services better, faster and more comprehensively. The pharmacy department is one of the key areas where such developments should be taking place.

Panel 1 contains examples of information that can be streamlined, or in some cases, made possible by the capability of a local intranet system. In addition to these, a range of administrative information related to pharmacy, such as the staffing structure and contact details, can be published on the department's website.

There are two ways the intranet can be used, either as a platform for systems commercially available "off-the-shelf" or for "home-grown" systems designed locally to meet specific needs.

Off-the-shelf packages The provision of information on drugs and their use has been a well established activity in hospital pharmacy for more than 30 years. Drug information centres (now known as medicines information centres), were probably the first to make the shift from paper-based information retrieval systems to online access of databases (such as Medline) through to the use of stand-alone CD-ROM systems and subsequently to the handling of information on local networks. Commercial products became available on CD-ROM during the early 1990s for a range of information retrieval systems, including Medline, Excerpta Medica, Pharmline and the Micromedex products such as Drugdex. A number of well established books were then produced as CD-ROMs, including Martindale's Extra Pharmacopoeia and the British National Formulary (BNF), as well as various journals and bulletins such as the Drug and Therapeutics Bulletin and MeReC.

Panel 1: Pharmacy activities suitable for intranet display

IV policy and monographs
 Prescribing guidelines (local formulary)
 Paediatric formulary
 Pharmacy bulletins
 Trust policies on medicines
 Drug information systems
 Trust status of newly marketed drugs
 Forthcoming events
 Summaries of conferences and seminars
 Shared-care guidelines
 Use of unlicensed drugs
 Clinical trials information
 Therapeutic drug monitoring and physiological levels
 Current awareness services
 Results of audits

In terms of utilising the trust's intranet, the first major advance made by the pharmacy department was in providing access to the electronic Martindale, the web-enabled BNF (WeBNF) and Drugdex (a Micromedex database) to the different pharmacy units in the trust and to other staff at ward and clinic level. Clinical pharmacists, for the first time, had the ability to access the latest versions of these medicines information sources while on the ward. It also meant that all the pharmacy staff in the trust had ready access to these systems rather than having to go to or call the medicines information centre.

In line with these developments, the traditional role of the medicines information service changed slightly. There was a growing need to train staff in the use of systems available on the intranet and to ensure that the information retrieved was applied appropriately to the particular problem in hand. This approach has historically been associated with the medicines information pharmacist, that is, ensuring not only that the best information is used, but that the actual problem is correctly determined and the relevant information is applied appropriately to its solution.

Home-grown systems In addition to purchasing packages that are ready to load onto the local server for access via the intranet, systems can be prepared in-house. The pharmacy service has traditionally produced a

range of publications reflecting local policies and procedures that have been issued in paper format as booklets and bulletins. Obvious examples of these include the local formulary, intravenous (IV) administration guidelines, drug bulletins, policies and procedures. The intranet can revolutionise the way information is delivered to the point where it is needed, and the manner in which these systems are maintained and updated. Examples of developments undertaken by the pharmacy department are the publication of prescribing guidelines, IV monographs, pharmacy bulletins and establishing a website on pharmaceutical care.

— PRESCRIBING GUIDELINES

Local formularies and prescribing guidelines are well established tools for optimising drug therapy. These have usually taken the form of books or other hard copy formats. However, there are many advantages to using the intranet for developing these local guidelines and taking them to a new level.

Although the decision-making processes that determine what the local prescribing guidelines would be are essentially the same, the principles underpinning the design and presentation of information are rather different. Information presented in a format suitable for a book does not necessarily display well on a computer screen.

Benefits There are a number of important benefits to be derived from running a local formulary system on an intranet.

The first obvious benefit is the ease of maintenance and updating. Historically, local formularies printed in the form of a book are re-published annually at best (often much less frequently). Between successive editions, there was no easy way of communicating additions, deletions and other changes. In an earlier attempt to solve this difficulty, the trust formulary was produced in a ring binder, the intention being to facilitate the maintenance process. This was not successful for reasons that, in retrospect, are fairly obvious. It was difficult to ensure that new pages were inserted in the 600 copies issued to the various sites in the trust. On the rare occasions that the pages were inserted, they were not slotted into the right places within the existing pages, and old pages were not discarded. An attempt to solve the problem by retrieving copies of the formulary

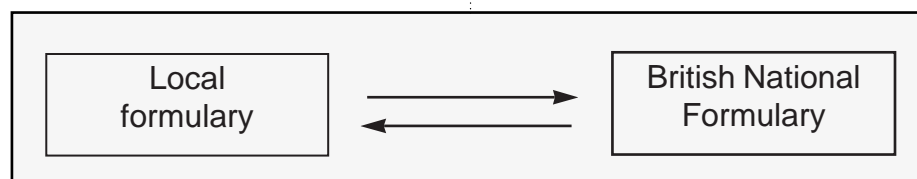


Figure 1: The intranet server. The local formulary and the WeBNF "sit" together on the server. Extensive hyperlinking allows the user to move to relevant parts of one from the other in both directions. An example is shown in Figure 2 (p160)

Figure 2: Hyperlinking. Clicking on levofloxacin (arrowed in the top page) in the local formulary allows the user to "jump" into the levofloxacin monograph in the WeBNF (bottom page)

and having them updated by pharmacy staff was more successful. However, it was an inefficient use of staff time.

Such problems do not arise with a formulary on the intranet. Once a decision is made to change, add or delete anything, the relevant pages are amended or prepared, and then uploaded directly from the author's computer in the pharmacy department onto the server. This means that the new version is immediately available to all computers on the intranet. The fact that the users are based on various sites in the trust makes no difference at all to the speed and practicality of

ensuring that "realtime" information is accessed and used.

The second benefit that is gained from the use of the intranet is the provision of hyperlinking, a facility which people have become familiar with through their use of the internet. At one level, this speeds up the process of locating the particular section of the formulary system that is required, for example, a specific therapeutic area. At another level, hyperlinks enable the user to move or "jump" to a related aspect, or to more detailed information. It is also possible to move into another system altogether and

display the appropriate information. For the user of the system, this should not take more than a second or two after clicking the relevant point on the screen. We have used the latter capability to provide supporting information on drugs to the therapeutic guidelines making up our own formulary. Clicking on a drug in one of the treatment algorithms results in the relevant part of the BNF being displayed (see Figure 1 p159 and Figure 2).

On our intranet system, this takes less than two seconds to appear. From the WeBNF page displayed, a single click of the "mouse" takes the user back to the previous screen, that is, the local treatment algorithm. In fact, it is possible to move forward and backward between the two screens as desired, simply by clicking the mouse once on each occasion. Designing the system in this way also means that the supporting information is updated on a six-monthly basis as new editions of the WeBNF are issued and loaded onto the intranet server.

It is also possible to build links into the WeBNF itself, taking users to local information such as prescribing guidelines and drug bulletins. This encourages people who access the WeBNF directly to take account of any local policies on a specific issue.

— IV MONOGRAPHS

The majority of hospitals issue monographs on drugs that are administered by the intravenous route. Often, these form the basis of a local IV policy providing guidance for nursing staff administering these drugs. In the same way that formularies have until now been produced as hard copies, local IV policies have tended to be issued in the form of A4 sheets in a ring binder. It seemed to us that the intranet would be a much better way of providing the necessary information for IV drug administration.

A system was designed with two aims: simplicity and speed (in displaying the required information). The design allows a clear print-out to be made on the ward which can be attached to the patient's prescription. Such a system encompasses all the advantages previously described in the discussion about formularies, such as the ease of updating the information. It also overcomes the common problem associated with pages being removed from the ring-binder and then not returned.

The design of the intranet version of the IV monographs is rather different from that in the formulary. An alphabetical list of drugs is permanently displayed in a panel on the left hand side of the screen. Clicking on the required drug in this panel displays the appropriate monograph to the right. The user can either scroll down the monograph to read it, or click on a range of short-cut terms displayed at the top in order to move to a particular section (eg, compatibilities

Panel 2: *Examples of pharmacy bulletin topics included on the intranet*

- “Avoid abbreviations which can result in hazards”
- “Launching the restricted antibiotic list”
- “Ceftriaxone to replace cefotaxime”
- “CFC-free salbutamol inhalers”
- “Granisetron to replace ondansetron for post-operative nausea and vomiting”
- “Prescribing fentanyl patches and hydromorphone”
- “Substitution of nifedipine preparations with long-acting form”
- “The on-call pharmacist — the service”
- “Management of corticosteroid-induced osteoporosis”
- “Using original patient packs — advice for prescribers”
- “Administration of intravenous potassium chloride”
- “Zanamivir (Relenza) — prescribing guidelines for inpatients”

and dosage). If a print-out of the monograph is required, this can easily be obtained by activating the print function. Clicking on another drug in the panel to the left of the monograph replaces the existing monograph with the new one, as shown in Figure 3.

— PHARMACY BULLETINS

For many years, the pharmacy bulletin has been an important means of communicating information on a large range of issues to do with drug use. In one sense, having a “live” formulary on the intranet negates the need for those bulletins that were previously issued to help the process of

updating prescribing policies, since these can now be implemented as the need arises on the electronic formulary. However, such bulletins may still perform a useful role in making people aware of changes that have been made. Pharmacy bulletins also cover other aspects of drug use which are not necessarily covered in the formulary.

Once pharmacy became established on the intranet, bulletins which had been issued

during the last three years were reviewed. Many had been superseded by the new formulary and considered to be out of date. However, others were still relevant. These were reformatted into a design suitable for the intranet and uploaded as shown in Panel 2 above. A comprehensive index which served to improve access to the required topics was thus created. New pharmacy bulletins will be published on the intranet as part of the ongoing current awareness service and to cover topics which do not appropriately “sit” in one of the other systems. An example of a bulletin issued on the intranet so as to ensure rapid dissemination of policy had to do with zanamivir (Figure 4, p162), during the Christmas and New

Year holiday period. In a case such as this, it is also possible to highlight the fact that there is new information available, by flagging it up on the opening pages of the intranet and encouraging users to look at the new information by providing a short-cut link directly to the required bulletin. Using the intranet in this way provides a much more efficient and effective mechanism for ensuring that hospital staff receive new information as quickly as possible.

— PHARMACEUTICAL CARE

During 2000, a website that focused on pharmaceutical care was launched. Its purpose is to help optimise the drug use process by encouraging the development of practice which is based on good quality research and evidence.

The site, called POLCA (pooled online circumspensive analysis), was launched on the trust’s intranet, as well as on the internet (www.polca.net) to gain a wider audience. The pharmacy department was eager to share ideas and gain feedback from health care colleagues of various disciplines within the trust and to help increase awareness of the pharmacist’s role, as well as paving the way for future practice developments. Since its launch on the trust’s intranet last autumn, over 550 visits to the site have been logged. (See Figure 5 p162.)

— DISCUSSION

For many years, pharmacists have sought better ways of disseminating information to the point where it is needed. The intranet provides an excellent opportunity for achieving this. Its application to a range of pharmacy activities can improve the efficiency and quality of services.

People have become familiar with using the internet over recent years and therefore feel at home when using intranet systems. A culture has now developed where people are happy to interact with a computer system, rather than simply view it in the same way as reading a book or document. The advent of e-mail has also led people to recognise the tremendous advance in communications resulting from the use of computer networks. The e-mail is now regarded as a routine and valuable communication tool. The internet (and therefore intranet) style of presentation is now familiar to so many people, that staff feel comfortable and become quickly confident and competent in using the systems that are available on the trust’s intranet. Many perceived barriers to the use of computers, which prevailed in the past have now largely disappeared.

To make full use of the capabilities of the intranet, pharmacists must review existing services, and where appropriate take advantage of the new technology available.

Figure 3: IV monograph for amoxicillin injection on the intranet. An alphabetical list of drugs is permanently displayed in the panel on the left of the screen. Clicking on the required drug in this panel displays the appropriate monograph

Figure 4: Pharmacy bulletin outlining the trust's policy on the use of zanamivir. Publishing the bulletin on the intranet ensures rapid and widespread dissemination

Once a service has been set up on the intranet, it is important that its availability is well publicised and that appropriate staff are given any necessary instruction and help in using it. Monitoring the use of intranet systems can help in further tailoring them to people's needs, and perhaps identify where further publicity is needed to increase awareness of certain aspects of the services. For example, hit-counters have been included in all of the therapeutic areas covered by the local prescribing guidelines. This will provide valuable data in the future, indicating patterns of use across the wide spectrum of topics covered in the formulary. Clearly, it is vital that information on the intranet is accurate, relevant and kept up to date, both for home-grown and commercially available systems. It is also important to constantly add value to the intranet services and continually strive to make them more user-friendly and attractive. This helps ensure that people regard the intranet as an important tool and that it becomes an essential part of day-to-day work.

At a practical level, it is important not to underestimate the need for good working relationships with both the suppliers of commercial systems and staff in the IM&T department. In this respect, experience has clearly shown the benefits of working closely with The Pharmaceutical Press in configuring the WeBNF and Micromedex systems. Assistance from the IM&T personnel is essential to ensure that the intricacies of the local computer network are fully understood and that both commercial packages and home-grown systems are adjusted as necessary to run without any hitches.

The developments that have been undertaken so far at Barts and The London NHS Trust have reinforced the pharmacy department's vision of using the intranet for many other aspects of service provision. Remote access by pharmacists while on call would be useful and this is something that is currently being considered. On-call pharmacists would welcome having ready access to electronic versions of Martindale and the Micromedex systems, as well as local resources on the intranet. Such a move would substantially reduce the need for carrying large books and files around. Perhaps in the future, these books will be replaced by a portable computer and a mobile phone.

Access of systems by local GPs and community pharmacists would also be useful. Clearly, there are security issues associated with external access to the trust's intranet, but work is currently under way to build in the necessary safeguards.

With clinical governance issues becoming increasingly recognised within the health service, it is important that high quality information and guidance is readily available to those staff making decisions about patient care. When used well, the intranet can radically improve the ways in which people work and communicate and can play an important part in helping health care professionals meet their responsibilities. Pharmacists should regard the intranet as a valuable tool that can be used in a wide range of service developments designed to optimise clinical outcome in patients.

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Figure 5: In 2000, Bart's and The London NHS Trust launched a website that focused on pharmaceutical care