The Integration of Current Information Technology Resources by the Design and Development of a Practice Intranet.

Where is the wisdom that we have lost in knowledge?

Where is the knowledge we have lost in information?

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Introduction and Aims.

When starting General Practice I found that there was an impossible amount of things to know or remember, I thought I could organize and reference links to important information by creation of a practice intranet.

An intranet is a network of computers that is contained within an enterprise in this case a GP Practice. It consists of interlinked computers and connections through a gateway computer to the outside Internet. The main purpose of an intranet is to share information and computing resources.

Drs and patients are predominantly positive regarding the use of computers in consultations, in some cases a computer can improve quality of care (4), computers have already proved themselves useful for organizing, auditing and storing notes. Chronic illnesses have respected treatment guidelines which are available on the internet (1) (2) (3), computers have a key role in delivering this information, fully understanding of the skills and tools that enable the sharing of information to deliver healthcare is encompassed by the term 'Medical Informatics' (13) (14).

It is known that when using a computer in a consultation that the time of consultation increases by only 48-90 seconds (5) but there is no appreciable increase in patient satisfaction (5), there is subjective evidence to show that many patients are happy their GP has a computer and is therefore thought by them to be more up to date, whilst some patients especially the elderly see the computer as an intrusion into their relationship with their Doctor.
Never the less 91 % of General practitioners have a computer in their consulting room (5) but only 19 % of these computers are used to access reference information or guidelines (5).

As said by Tony Blair 'The challenge to the NHS is to harness the information revolution and use it to benefit patients' (9) (16), it is also part of the NHS Plan to bring modern IT systems to every Hospital and GP Surgery (7).

My aims were to

- Develop and set up a practice intranet as 'A New Service' in my practice.

- Integrate current NHS IT resources such as The NHS Net, The National Electronic Library for Health (NELH), and the ABS NHS Directory.

- Make available electronically National Service Frameworks (NSFs), NICE Guidelines and Evidence based medicine (EBM) resources.

- Understand how 'Medical Informatics' could be used in General Practice to deliver healthcare.

- Use the existing computer system in the practice to develop this project and in doing so learn IT and programming skills.

- Learn where to find and how to access up to date information needed to practice more effectively.

- To assess the potential of the IT available to me in my consulting room as a consultation tool, to improve my own knowledge, and to use it as a decision making aid and improve patient care.

- Develop a way of sharing information throughout the practice thereby cutting down on my 'Desktop Clutter' of paper documents, guidelines, books and notes.

- I hoped the intranet could be run alongside consultation based software such as EMIS.

- I wanted the Practice Intranet I developed to be dynamic and easily upgraded in the future.

Method.

In my consulting room I had a computer attached to the internet, I needed to know what information I needed whilst practicing therefore I did a limited qualitative review to answer the question.

"What information is used or referred to during a consultation?"

- I made a note of every reference book I looked at and all the guidelines and protocols I followed.

- I asked other Doctors in the practice and GP registrars on my scheme to do the same for a period of two weeks.

- I went into all the consulting rooms in the practice and itemized the contents of bookshelves, notice boards

- I noted which guidelines and protocols were used on a National and Regional level.

- I asked what journals were commonly read and which journal and literature search facilities were used, I then asked the local medical library how we could access these resources on line.

- I noted internet 'bookmarks' from individual practice computers, I also asked individuals which sites they used for reference to medical information.

- I collected an up to date directory of important telephone numbers.

- I searched for reputable Evidence Based Medicine internet sites so I could create links to these sites in the future.

Although I practiced in a 'paperless practice' (12) I was sure paper documentation could be further reduced therefore

- I asked for any mail or paper documents received by the practice which contained essential information to be highlighted so I converted this into digital format.

- Hospital specialties were asked if they would email electronic versions of local guidelines and paper guidelines were scanned and using 'Text Recognition' software and converted into digital format.

I assessed what computer hardware and software was available in the practice, I contacted the IT department of the PCT and asked for their advice, they upgraded and installed all the software I needed but they were unable to help in the intranet design and development.
The software I used was called 'FrontPage' a program part of the Microsoft Office bundle available as part of the Microsoft / NHS agreement (15).

I bought a book 'FrontPage for Dummies'(10) and taught myself how to design the web pages containing the links to the information I had collected. I initially designed the 'home page' of the intranet site (Fig. 1) and used this page to link to other categorized pages putting the most important and frequent used information links on the home page

whilst allowing easy navigation to other pages, at all times however I wanted the navigation to be simple, quick and obvious, for this reason the home page was organized with both general and subject specific links.

Fig 1. 'Home Page' of the Practice Intranet as seen when opening web Browser.

Press F11 for Full Screen View	**IntraNet Home Page** A Virtual Desktop for GPs		Disease Information Guidelines.
E mail Links.	HDH Urgent Referral Guidelines	Training / Links / Virtual Logbook	Antibiotic Guide
ABS NHS Directory.	Waiting Lists HDH / Craven	Phone Directory of Local Numbers	Asthma.
Practice Email Directory.	Popular Journal Links	PCG / LMC Web Sites	BNF
	Web Site Links	NICE home / NICE Appraisals	Diabetes
	Full Academic Links	Infectious Diseases Links	Hypertension
Dr Smith.	Medical School Library	Clinical Evidence 7	Risk Chart DM
Dr Jones.	NELH / NELH (Regional)	Prodigy Guidelines	Risk Chart Non DM
Dr Bloggs.	Patient Information / Help Leaflets	Emergency Resus Protocols	Obs / Gynae
Dr Patel.			Osteoporosis
Practice Manager.	Practice Phone Directory	Google Internet Search	RCP Guidelines
Nurses.	Links to practice protocols / audits	Travel Medicine Links	Guidelines Search
Receptionists.	Nurse / Health Visitor page	Benefits / Social Services	SIGN Guidelines
	Practice Notice board	DVLA, (At a Glance)	Evidence Based On Call
Dead links.	Practice Meetings	Sick Notes	
Suggestions.			

The Practice Intranet was put onto the practice network and the home page of the intranet was set as the default home page on individual web browsers.

On the home page I used email links so that emails could be sent to other practice members quickly without having to access the default email program creating quicker emails and messaging between practice members. Email links on the home page were used as a means of direct feedback for reporting problems, dead links, and suggestions for additions or further improvement of the site.

I showed a number of the practice staff and partners how to use the software available to update the intranet before I left the practice, I also took a copy of the intranet with the idea to further develop it in the future.

Findings

An intranet is a good way for sharing and categorizing links to information, using current software available from the PCT an intranet could be developed on the present network of computers in the practice with minimum expense and disruption of the present IT network.

The intranet could be browsed with current 'Internet Explorer' software without any further instruction providing individuals had basic internet skills, therefore little in the way of education had to be given.

Using a 'Windows' based application multitasking was possible, the practice intranet could be run alongside windows based consulting software such as EMIS.

The Practice was connected to the internet via a high speed ISDN phone link which enabled quick access to the internet, the practice computers were protected by a reputable antivirus software package which was regularly updated, individual Microsoft programs were configured for automatic security updates, I suggested a further inexpensive firewall program as an additional security feature for the practice especially if internet traffic was to increase due to the development of the intranet.
It is one of the DOH targets to link all organizations to the NHS Net by high speed broadband links within the next year (16).

Results of my qualitative research and therefore what was needed on the practice intranet showed variation and depth (fig 2). There was a degree of repetition of answers therefore I felt I had reached saturation point and the numbers I had questioned were adequate, in a practice meeting I fed back this information to the practice who were in agreement as to what was needed on a Practice intranet.

In general most doctors used very similar information and electronic versions were commonly available and had the advantage of being regularly updated, most information accessed was of high quality and from repeatable sources.

Fig.2.Summary of Information sources used in GP consulting rooms.

Reference Books Used.	Clinical Guidelines Used.	Other Reference Materials found.	Medical Web Sites Commonly used.	Journals read and academic resources used.
BNF	NICE Guidelines	Nice Appraisals	NELH	BJGP
Mimms	BTS Guidelines	Joint Colleges Risk Charts	DOH	BMA
Clinical Evidence	BHS Hypertension Guidelines	PEFR Charts	DOH waiting lists	NEJM
Prodigy	Prodigy Guidelines	BMI Charts	LMC Website	Cochrane Database
	SIGN Guidelines	DVLA at a Glance	GMC Website	Bandolier
	Regional Urgent Referral Guidelines	Med 3 / 5 Advice	Travex Website	Ovid
	Endoscopy Guidelines	Emergency Resuscitation Guidelines	RCGP Website	Pub Med
	Departmental Guidelines from DH	GUM Clinic opening times	Local Deanery Website	Medline
			Medical School Library	Google Search Engine

There was also an invaluable amount of local information used such as local Cancer referral guidelines, GUM clinic opening times, local Patient Help Groups and services, this information was converted to digital format before being put on the Practice Intranet.

Other local information on the intranet included practice protocols, practice audits, minutes of practice meetings, the practice telephone directory and other local information which was available through links to the networked secretarial computers.

As the site expanded I knew I couldn't store all of the information 'locally' (on the practice computer network), this task was just too large, some information was subject to copyright, the practice server was not big enough and I didn't have the time recourses.

My Solution was to find links to the information I required on the internet, updating the links to this information was an easy process, this avoided the problems previously mentioned.

Discussion.

Investment in IT is increasing the DOH document 'Delivering IT in the NHS' (16) released in April 2002 set targets for IT implementation, the document promised increased investment in IT saying it was needed to deliver the NHS plan, it also took into consideration the Wanless Report (11) which suggested a doubling of the current expenditure on IT.
The sum of 83 million pounds has been put aside for delivering IT and to reach the targets of this document but with rapid obsolescence of IT and poor training is this spending on IT justified and who will bare the cost after this initial expenditure.

This project used hardware and software currently available, it was easily integrated into the current IT system and created no further expenditure, it utilized and brought together current IT resources, furthermore it could be used by anybody who had basic web skill and security access to the practice network.

Information was stored, shared and distributed more efficiently in the practice and paper traffic was reduced.

The information needed to practice evidence based medicine and to adhere to new guidelines, frameworks and protocols is vast and we cannot hope to remember all of it; I believe computers are under used as a means of accessing this information, organizing, retrieving and presenting this information (5).

Some Doctors in direct feedback said their practice had changed as a result of realizing what new guidance and reference was now available and what other doctors used in their practice.

During consultations I was able to access disease management information, patient advice leaflets and diagrams used for explanation which could be printed for the patient if required.

An example of the use of the Practice Intranet for the direct benefit of patients could be that of Mr.X who presented for a review of his hypertension medication, his blood pressure was measured and was found to be higher than the ideal treatment range, the practice protocol on Hypertension was compared to the British Hypertension Society guidelines (both of these being accessed from the home page of the Practice Intranet) he was subsequently started on an ACE inhibitor.
Mr. X then had his 10 yr Risk plotted on the Joint Societies Cardio Vascular Risk chart (a single mouse click away from the home page) it was found he should also be on aspirin.
Further advice was given regarding lifestyle modification and hypertension this information was then printed out in the form of a patient information leaflet also accessed from the home page.
The Trainee then made a note in his Virtual log book to clarify the use of ACE inhibitors and statins in similar patients, at a later date both the trainee and his trainer used the intranet site as an information portal to access academic links on this subject.

Some weaknesses soon became apparent, Doctors may have differing needs dependent on current knowledge interests, experience and the type of patient they see, not all Doctors are computer literate, many find change difficult especially when it involves new IT skills or changes to their practice.
Learning new skills is part of 'Life long Learning' and keeping up to date (17), our practice should continually evolve as new guidelines emerge and due to the implications of the information revolution IT skills will be an essential part of future practice (18).

Some Doctors disagree with the use of guidelines and protocols (8), either due to it blinkering their practice or by cutting down on their autonomy, information is also no substitute for experience and hands on knowledge (19).
Management guidelines hopefully benefit patients, they are evidenced based and prevent clinical indecision, referral guidelines can help provide access to essential healthcare for all patients.

Guidelines and NSFs are now part of Clinical Governance on a national level, access to this information is available through the internet and whether we agree or disagree guidelines they are here to stay. Unfortunately the adherence to guidelines can be used as audit and quality markers, in light of the new contract and quality payments this significantly effects the practice as a whole.

I think there is a limit into how much the computer can help with a consultation, and at times computer use can be off setting to both patient and doctor and derogatory to their relationship (6), looking at a computer may be a barrier between communication and non verbal clues may be missed by the Doctor.

An intranet is a perfect way for sharing information throughout a practice unfortunately websites frequently update and subsequently links to specific information needed to be regularly updated and this would have to be done after I had left the practice.

In developing this project

- I have learned IT skills.

- Learned what information is needed to practice more effectively and efficiently.

- Learned how to access this information.

- Developed a useful consultation tool.

The practice intranet took a fair amount of time to develop and took a fair amount of my own personal time and resources.

Conclusions.

- Funding is being driven into IT by the DOH.

- Information is available on the intranet can assist us in our day to day practice especially in the treatment of chronic diseases.

- Current IT resources can be utilized further; the development of a practice intranet using currently available software can help do this.

- Paper documentation can be reduced by having that information available in digital form on a practice intranet.

- Computers need to be further assessed in their use as a consultation tool and also the effect of this on patient outcomes.

- Adherence to guidelines can be used as audit and quality markers, a practice intranet can help direct and organize links to this information.

- A practice intranet can be used as a portal to quality EBM resources which can help clinical decision making.

Further Developments.

To this day the Practice Intranet is still being used by my previous training practice, personally I am very satisfied with its development.

My trainer subsequently developed the idea of a Virtual Log Book accessed from the Practice Intranet where the Trainee's needs could be documented as they became apparent, this information could be accessed and shared so that tutorials could be utilized to reflect the need of the trainee.

I have taken the basic framework of the practice intranet and put it on a CD ROM, I can now take this disk and put it in any computer that is attached to the internet.

This CD ROM has been distributed to trainers and GP Registrars for their input on further development; I am calling this CD ROM a 'Virtual Desktop for GPs'.

Word Count approximately 2980 words not including References.

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