

Country-wide availability of paediatric medical protocols via the local hospital intranet site

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In paediatrics, a wide variety of procedures and interventions (protocols) are standardized. The entire hard-copy collection of paediatric protocols used in Malta (47 to date) was put together as a website, and is hosted on the hospital intranet. Some protocols consist of Excel spreadsheets that are used for the calculation of fluids and drugs. This archive has proved very useful for medical and paramedical staff in the Department of Paediatrics, both in the hospital and in peripheral health centres and hospitals. Changes or new protocols may be uploaded at any time, with instantaneous updating of the archive. The website was created, and is maintained and updated by the author, thanks to the ease with which modern software allows users to create hypertext markup language.

Introduction

In response to the USSR Sputnik launch, the United States Government set up the Defense Advance Research Projects Agency (DARPA). This agency originally developed the internet to connect various Defense Department computer networks. The network was eventually declassified and developed into today's world-wide-web (WWW). The WWW works by means of the transfer control protocol/internet protocol (TCP/IP) suite which is also widely used on private networks known as intranets. Intranets can be used for a variety of purposes that may be educational, commercial or recreational in nature. The advantage of having information available on a local network is that said information is readily available, and can be made factual, relevant and brief. On the other hand, information on the internet may be difficult to find, and therefore time-consuming when urgently needed, verbose, not necessarily relevant, and possibly inaccurate.¹

Malta is an island in the centre of the Mediterranean Sea, with a total population of almost 400 000, about 70 000 of which fall within the paediatric age group (≤ 14 years).² There is one regional hospital (St. Luke's), and over the past five years, the entire health department has

been networked to the Malta Government Network (formerly MAGNET, now known as GOV.MT). This includes the hospital website (*www.slh.gov.mt*). The same network is also used to host a hospital intranet, which is accessible from all Maltese Government health-related departments. Terminals used to access the network comprise of personal computers (Pentium I or faster). Useful material is published on the intranet after central vetting and is accessible to *all* health workers, whereas, to date, internet access is only available to selected individuals. To my knowledge, this is the first report of such material being made widely available over a local area network (intranet).

Paediatric protocols archive website

In paediatrics, a wide variety of procedures and interventions are standard, whereas others are tailored to local

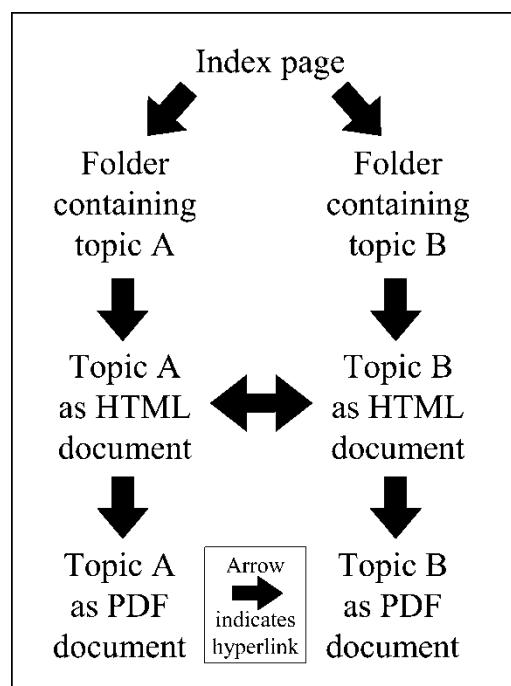


Figure 1. Paediatric protocols website structure.

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paediatric departments. These protocols are available in plastic folders in all of the St. Luke's hospital paediatric wards. However, individual protocols occasionally go missing, regularly unnoticed, until a particular protocol needs to be implemented, often with urgency. The author therefore decided to put together the entire paediatric collection of protocols as a website on the hospital intranet.

Protocols that were prepared by the author, and those of colleagues, were collected in Microsoft Word format. The protocols were then modified in order to produce a standard document format. Recent versions of Microsoft Word (Word 97 and above) allow the user to save documents in hypertext markup language (HTML) format using a WYSIWYG (What You See Is What You Get) front end. All protocols were saved in HTML format on a

PC, and an index page was used in order to link all protocols to this one page (*Figure 1*). Related protocols were cross-linked. Hypertext editing was carried out with Netscape Composer and the entire website was tested for compatibility with Microsoft Internet Explorer.

Some protocols consist of Excel spreadsheets which are used for the calculation of fluid administration and drug dosages. Hyperlinks from the main index lead directly to the desired spreadsheet. Sheets are password protected to prevent changes to any of the embedded calculations, but users are able to change patient weight and other parameters.

The protocols in Microsoft Word format were also saved in PDF (portable document format) by means of the Adobe Distiller. This software allows Microsoft Word to save as PDF, giving users the choice of a printer-friendly

Table 1. *Paediatric protocols archive index.*

Paediatrics	Neonates
Paracetamol overdose	Blood value norms for neonates
Leishmaniasis	BP norms for neonates
Malignancy	Ventilation
Burns	Blood pressure – equipment calibration
Seizures	Weight charts
BP older girls and boys	Cardiology – general for SCBU
Diabetic ketoacidosis	Cardiac drugs on SCBU
Screening and follow-up for first UTI	Bilirubin charts
Meningococcal disease	Neonates born to mothers on steroids
Advanced life support: neonates/paediatric forms	Dubowitz score
Advanced life support: neonates/paediatric spreadsheets	Apgar score
Sedation checklist & spreadsheet	Milk formulas – types and constituents
Marfan syndrome aortic root	Rapid intubation drug doses
Echocardiography – normal values for LV	Doses of drugs & fluids
Echocardiography – normal values for valves	Calculation of mean airway pressure
Kawasaki disease: criteria and follow-up	Calculation of umbilical catheter distances
Diet supplementation	Antenatal steroids for premature delivery NIH
Asthma prophylaxis	High frequency oscillation
ECG norms incl. corrected QT interval	Neonatal resuscitation checklist
Antibiotic prophylaxis. for bacterial endocarditis	Advanced life support: neonates/paediatric forms
Use of spacer in asthma (handout)	Advanced life support: neonates/paediatric spreadsheets
Perioperative anticoagulation for prosthetic valves	Extubation
Body surface area nomogram	Hepatitis B and C
Growth charts NIH	Hypoglycaemia
Coeliac disease	Enteral and parenteral nutrition
Head lice	Meconium stained liquor
Contacting social workers	
Syndromes (follow-up)	Forms
Down syndrome (male growth charts)	Paediatric echocardiogram request form
Down syndrome (female growth charts)	SCBU database form
Marfan syndrome	SCBU investigations flow chart
Turner syndrome	Neurological chart
William syndrome	Saturation monitoring chart
Genetics primer NIH	

version of any particular protocol as a print-optimized PDF file. The HTML protocol documents were also hyperlinked to the respective PDF files (Figure 1).

The entire website was uploaded to the health department intranet website and a link was created to the paediatric protocols archive from the St. Luke's Hospital website. The website also contains a site search facility courtesy of Microsoft FrontPage.

Results

Sixty-four protocols have been uploaded. They are broadly divided into the following categories: paediatric ($n=27$), neonatal ($n=26$), syndromes ($n=6$) and forms ($n=5$). The titles of the topics covered in the entire archived collection are shown in Table 1.

Eight protocols consist of spreadsheets, which perform a variety of instantaneous operations including:

1. Calculation of antibiotic dosages and fluids for neonates in ml/kg per day, in 10-ml increments, starting from 60 ml/kg per day from patient weight.
2. Calculation of anticonvulsant doses and inotrope solution preparation from patient weight. Inotropes are calculated in both low concentration infusions suitable for peripheral administration, and high concentration infusions suitable for central administration.
3. Calculation of ventilatory mean airway pressure from input ventilation parameters.
4. Calculation of neonatal umbilical catheter insertion distances by shoulder-umbilicus measurement.
5. Sedation drug dosages.
6. Neonatal and paediatric advanced life support drug and fluid dosages.

Several links lead to patient handouts, such as 'Use of spacer in asthma' and 'Cards for antibiotic prophylaxis for bacterial endocarditis'. Others lead to forms which are commonly used, which may be printed out as required. The protocol for an intradepartmental study regarding the correlation between axillary and oral/rectal temperatures has also been uploaded.³ The entire protocol archive is available on CD-ROM to medical and paramedical staff, and to students.

Discussion

Intranets have proved useful for internal publishing of important information, not only in medicine but also in

other areas, such as safety management systems,⁴ and AIDS factsheets.⁵

This archive has been found to be very useful for medical and paramedical staff in the department of paediatrics, both in the hospital and in peripheral health centres and hospitals. Naturally, any changes or new protocols may be uploaded at any time, and this results in the instantaneous updating of the entire archive due to its location on a central server. There have not been any costs in this process as new protocols are continuously produced and old protocols are updated. All this work is invariably carried out on a word processor, allowing the finished document/s to be rapidly processed for upload to the archive in HTML and PDF format. The total size of the archive to date is 17 MB, which translates to a negligible financial sum in relative server hard disk space.

The website is maintained by the author, and this is facilitated by the ease with which modern software produces and manipulates HTML. The hospital IT department are only involved in the actual upload of the website when modifications are necessary. This process is also facilitated by the internal email system which rapidly allows a zipped and compressed copy of the entire archive to be sent over the 100 MB hospital fibreoptic network.

The advent of Extensible Markup Language (XML) is expected to further facilitate data collection from such internet and intranet activities.⁶ Indeed, all components of the new version of the Microsoft Office suite (the version after Office XP) are expected to be able to 'save as XML'.

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