

Hello Pathoindia members,

I wrote this piece not so much to help pathologists find online resources, as to entice them to create online content. I would invite all of my colleagues in the Indian Subcontinent to learn basic HTML and to put their ideas online. Our specialty is desperate for quality content, and the worldwide community of pathologists would greatly benefit from the collective experience of the members of Patho-India. And, I can speak from personal experience that, because of the power of the Internet, even the most isolated pathologist sitting alone in his or her office can make a difference.

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Internet Resources for Pathologists

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Introduction

The Internet is arguably the first innovation in information technology that benefits community-based pathologists more than their analogues in the academic world. Physically isolated from medical libraries, peers, and experts, general anatomic and clinical pathologists have until recently been forced to mine a corpus of knowledge possibly more massive than that of any other specialty, using only the most paleolithic of tools. Now, however, a phone line and a computer become a med-center-in-a-box for the information-hungry practitioner.

Pathologists based in academic institutions have traditionally enjoyed more convenient access to professional information, but the Internet stands to benefit them also, not only by speeding the process of information gathering, but by providing them with feedback from the consumers of the information they generate. The purpose of this document is to introduce the practicing pathologist and pathologist-in-training to the professional resources currently available on the Internet.

Mailing Lists

The online pathology community is still relatively small. At such a scale, mailing lists are currently the best method for pathology professionals to communicate among themselves. The concept is very simple: send an e-mail to the list address, and the server at that address sends a copy of that letter to every subscriber on the list. The most important thing to remember about (most) mailing lists is that they have two important addresses. 1) The **list address** is the one to which normal communications are sent for distribution. 2) The **server address** is the robot that handles administrative commands, such as subscribing, unsubscribing, and statistical requests. Two of the lists mentioned below, PATHO-L and MEDLAB-L, are run by an application called Listserv. Detailed information about Listserv is available in its online user's manual at: <http://www.lsoft.com/manuals/1.8d/user/user.html>

An exhaustive collection of information about e-mail in general can be found at Mary Houten-Kemp's Everything E-Mail Web site: <http://everythingemail.net/>

Instructions for subscribing to all the mailing lists mentioned below are collected on a single page on my Web site: http://www.neosoft.com/~uthman/mailling_lists.html

PATHO-L

PATHO-L is a mailing list that is nominally for all pathologists and pathology-related professionals. In practice, it is dominated by anatomic pathology. Clinical pathology is more in the purview of MEDLAB-L, discussed below. PATHO-L is hosted by Vijay Varma at Emory University. There are currently 605 subscribers in 39 countries.

To subscribe to PATHO-L, send e-mail to

listserv@listserv.cc.emory.edu

with the command

subscribe PATHO-L Yourfirstname Yourlastname

MEDLAB-L

MEDLAB-L is concerned with clinical laboratory medicine. Most subscribers are medical technologists, pathologists, and doctoral scientists. There are now 2280 subscribers in 46 countries. MEDLAB-L is co-hosted by Pat Letendre in Alberta, Canada, and Douglas Winship in Austin, Texas.

To subscribe to MEDLAB-L, send e-mail to

listserv@listserv.acsu.buffalo.edu

with the phrase:

subscribe MEDLAB-L Yourfirstname Yourlastname

CYTOPATHNET-L

CYTOPATHNET-L is the mailing list of the comprehensive Cytopathnet Web site. Of the three lists described here, this one is the most organized and most heavily policed. The membership consists of cytotechnologists and pathologists, some of whom are very well known in the field. CYTOPATHNET-L is hosted by Dallas cytopathologist Jana Sullinger. As of 11 Jul 2000 there were 1013 subscribers.

To subscribe to CYTOPATHNET-L, send email to:

cytoathnet-l-request@ls.cytopathnet.org

with the phrase:

subscribe Yourfirstname Yourlastname

You can also subscribe at the list's Web interface at:

<http://www.cytopathnet.org/listhelp.asp>

The Web interface can be used to search the CYTOPATHNET-L archives. You must first be a subscriber to the list to be allowed access to the archives. This list is operated by a proprietary application, Lyris, rather than the more common Listserv. Therefore, Listserv commands do not work. A short table of Lyris commands is provided at the URL given immediately above.

Finding mailing lists

Probably the best way to find a mailing list is by word of mouth from peers with similar interests. Indexing all mailing lists on the Internet is probably doomed to failure, but some attempts have been made. Arguably the most extensive mailing list catalog is Liszt at: <http://www.liszt.com/>

Even with 90,095 lists catalogued, Liszt does not show PATHO-L or CYTOPATHNET-L, both of which have operated for years (MEDLAB-L is listed). Iflanet, a resource for librarians, has other information about finding mailing lists at the following URL: <http://www.ifla.org/I/training/listserv/lists.htm>

Newsgroups

Newsgroups are bulletin boards where information can be posted. Often referred to as "Usenet" (which is actually a specific subset of newsgroups), newsgroups are intrinsically more efficient than mailing lists in disseminating information. While a mailing list sends a copy of every post to each subscriber, a newsgroup collects all posts on a server. When a user logs onto the news server, a list of all topics is displayed. The user then selects messages to read from whichever topics are of interest. There are disadvantages, however:

- The user must have access to a news server (where the messages are stored). Some Internet service providers do not have news servers, or those that do have are low-performing.
- The content of newsgroups is considerably more "public" than that of a mailing list.
- Newsgroups tend to attract users who are nuisances.

Newsgroups may be moderated or (much more commonly) unmoderated. In the former type, each message goes to a moderator, who accepts or rejects the message. In unmoderated newsgroups, anyone can post anything (including grossly offensive, irrelevant, and/or inaccurate material) to the newsgroup. This may result in what is commonly referred to as "low signal-to-noise ratio." The advantage of unmoderated groups is that messages are propagated much more quickly than would occur if they had to wait in cue for the moderator's approval.

The newest versions of Netscape Communicator and Microsoft Outlook Express have newsreader client applications built in. Much more sophisticated software is available for the serious newsgroup user who needs the ability to manage a large volume of traffic. For the PC platform, the recommended power newsreader is FortZ's FreeAgent, a shareware product that can be downloaded from the following URL:

<http://www.zdnet.com/downloads/stories/info/0,,00069X,.html>

The most powerful newsreader for the Macintosh platform is Brian Clark's YA Newswatcher, which is available free at the following URL:

<http://hotfiles.zdnet.com/cgi-bin/taxis/swlib/hotfiles/info.html?fcode=MC13945&b=mac>

Those who are new to newsgroups may find the following URL useful. This is the home page of the newsgroup news.newusers.questions newgroup, which is dedicated to helping "newbies":

<http://www.geocities.com/nnqweb/nnqlinks.html>

The newsgroups listed below are all unmoderated and therefore contain some messages that will not be useful to serious professionals. However, there are some highly qualified posters in all of these groups, and much of their information is quite useful. The challenge is to eliminate the undesirable messages, which is where the powerful filtering capabilities of Free Agent and YA Newswatcher come in.

sci.med.pathology

This is a low-volume newsgroup that is the analogue of the PATHO-L mailing list. Serious posters are pathologists and some histotechnologists. So far, the amount of irrelevant messages has been relatively low.

sci.med.laboratory

Sci.med.laboratory is the newsgroup that deals with general topics in clinical pathology and laboratory medicine. It has three to four times the volume of sci.med.pathology. Contributors are mostly medical technologists and a sprinkling of pathologists.

sci.med

The sci.med newsgroup, which deals with all medical topics, has about seven times the volume of sci.med.laboratory, and a major proportion of the messages are inaccurate, polemical, fraudulent, or otherwise of no professional value. However, there are sincere inquiries from patients and their loved ones. I urge all legitimate medical professionals to monitor sci.med as time permits and to answer questions as a public service. The amount of quackery that is promulgated over the Internet is nothing short of overwhelming, and any candles that can be lit against this great sea of darkness are always welcome.

Managing a large newsgroup like sci.med is where a powerful newsreader is useful. I use YA Newswatcher to flag certain subject headings for attention and eliminate others I do not wish to clutter the screen. I choose these text strings to best predict the topics that would benefit from a pathologist's attention. The strings I use to mark messages for reading are: breast, emia, oma, tumor, cancer, biops, autops, sarc, carcin, node, lymph. Partial words are used to retrieve all forms of the word (for instance, "biops" will flag both "biopsy" and "biopsies"). Some strings, like "oma" will pull up irrelevant topics ("glaucoma"), but powerful newsreaders can be fine tuned to filter out such hits. The strings I choose to eliminate ("kill") messages are: circ, mutil, HIV, AIDS. The first two are to kill all the messages that deal with the ethics of infant circumcision, a classic Usenet debate that threatens to extend into the next geological epoch. I kill HIV-related messages due to the extreme volume of same and the level of irrationality that tends to color discussions of this topic.

Searching newsgroups

Newsgroup messages are archived and can be searched by key words at the very useful Deja.com site:

http://www.deja.com/home_ps.shtml

If you want to post a newsgroup message that you don't want to be archived, place the following header on your outgoing message:

X-no-archive: yes

This will prevent Deja.com from archiving your message, but there is no guarantee that other archiving services will honor the header. When you post an article to a newsgroup, you must assume that it will be out in public view forever.

Messaging

The fundamentals of message composition and management apply to communications via mailing lists and newsgroups. First, consider the anatomy of a typical message, this one from the MEDLAB-L mailing list:

In reply to Connie,

```
> It sure seems like this is a
> pretty ubiquitous test and I just find it hard to believe that there
> are that many hospitalized patients with potential GI bleeds or
> carcinomas that weren't previously checked for in the physician's
> office before the patient was admitted.
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These days, most patients on the medical service are admitted from the emergency room, and the majority of those have not been to a physician's office recently. Even if they have, it may have been another physician, and the office records may not be available at the time.

Most, perhaps all, med schools teach that a fecal occult blood test is a routine part of the physical exam.

That said, laboratorians and their regulators need to realize that a false positive or false negative FOBT is not going to kill anyone. The physician has at his or her service a variety of additional tools to diagnose and rule out alimentary tract bleeding (anyone with a falling hematocrit in the hospital is going to get endoscoped irrespective of the FOBT result, for instance). Making a regulatory issue out of what is essentially a hollow item of the hallowed ancient liturgy of the physical examination serves no one. Doctors know that FOBT is a "soft" datum, and they deal with it accordingly.

Of course, if physicians were doing ABO/Rh typing at the bedside, it would be a different story. I don't want you think that my indifference to physician bedside testing is painted with a too-broad brush! :)

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< http://www.neosoft.com/~uthman >	-Seneca

Most messages are follow-ups or replies to something that has been previously posted. A given mailing list or news group usually has several subjects being discussed at the same time. To avoid confusion, it is useful to quote back a portion of the message that you are replying to. There are several ways in which the quoted material can be demarcated in a message, but the one shown above (with '>' characters preceding each quoted line) seems to be the most popular among experienced message posters in professional forums. Most e-mail client applications can format the quoted material automatically; you just select the part of the message you want to quote and choose the Reply command. To configure Microsoft Outlook Express for this type of replying, check the Use internet style replies box in the Message composition dialogue of the Preferences command.

Other features of Internet messaging are illustrated in the sample message above:

- For some reason, online colleagues tend to address each other informally, on a first name basis. Perhaps the inability to detect physical cues of seniority or veneration has resulted in a more egalitarian environment than has existed in the offline professional world.
- Only a small portion of the original message should be quoted. One of the most common peccadilloes in messages is quoting back an entire message. In extreme cases, a 100-line message everyone on the list has seen before is quoted back in toto, with the reply text being an anticlimactic "Yes, I agree."
- Messages are more likely to be read when they are broken up into short paragraphs. Many readers simply delete messages that consist of an uninterrupted sea of text. Reading screen text is harder on the eyes than reading a printed page, so for maximum readability it is necessary to make some allowances in your typography. Be sure to put two carriage returns between paragraphs by hitting the Return key twice after each paragraph.
- Messages should be in plain text ("ASCII") only. This is for maximum compatibility with other subscribers' e-mail programs. To configure Outlook Express properly, go to the Message composition dialogue in the Preferences command. In the Mail sending format area, check Plain text. Then uncheck the box for Reply to messages using the format in which they were sent. This prevents you from sending replies in non-standard, formatted text.
- While pseudonyms and screen names are *de rigueur* in personal chat rooms and other nonprofessional discussions, those who post to professional forums should use their real names. The best way to do this is have a signature line ("sig line") automatically inserted at the end of each of your messages. To configure Outlook Express to do this, use the dialogue available in the Signatures... command in the Tools menu.

- Never send attachments (binary files, such as images and application programs) to a mailing list. Violating this rule is an effective way to get soundly "flamed." If you receive an e-mail attachment from a mailing list (or from anyone, including a trusted friend, *who has not told you to expect it*) delete it immediately and *do not open it*. Otherwise, you and everyone on your contact list may fall victim to a destructive virus.

There are several other caveats that apply to messaging and Internet conduct in general:

- Consider all list traffic as public. While mailing lists distribute messages only to subscribers, anyone can subscribe to any of the lists mentioned above. Any subscriber can also access list archives, in which are stored all messages that have ever been posted to these lists. You should never discuss a potentially embarrassing case on a list. Save such correspondence for trusted confidantes only.
- Internet personae tend to be less inhibited than those we encounter in the real world. Don't be surprised if you are flamed for something you innocently posted in good faith. Perhaps the proverb, "A soft voice turneth away wrath," is even more apropos of the Internet than of human interaction in general. It is best to respond to flames with a conciliatory tone, and I believe that one will find that forgetting an online insult is more profitable than bearing a grudge.
- Mailing lists have international subscriberships. For maximum impact, messages should avoid regional slang and "shop jargon." Posters need not avoid parochial subjects, however. Some of the most interesting and informative discussions have evolved from country-specific topics. American subscribers should not shy away from discussing CAP issues, nor should British posters feel that discussions of the National Health Service are out of bounds. All can profit by seeing how our trade is plied in other systems.

Web Sites

The World Wide Web is the creation of Tim Berners-Lee, who developed the hypertext transfer protocol (hence, the "http" in URLs) in 1989, twenty years after the beginning of the Internet proper. The exponential growth of http documents beginning in the mid-1990's is the motivating force behind the popularization of the net and its subsequent ordination as an icon of world culture. Estimates of the number of Web pages available online vary widely, but I have heard numbers as high as one billion. Compiling a complete list of Web sites devoted to pathology is akin to shooting at a constantly moving target; Web sites come and go with no warning. Accordingly, familiarity with search engines is a must. For general searching of the Web, a variety of sites is available. I find Yahoo! and AltaVista to be particularly useful. The respective URLs are:

<http://www.yahoo.com/>

<http://www.altavista.digital.com/cgi-bin/query?opt=on&KL=en&text=on>

This lengthy URL for AltaVista loads a lean, text-only version of the search page, which is more responsive than the main page.

The specific sites listed below are those that I and PATHO-L subscribers have found to be particularly useful in practice.

PathMax

<http://www.pathmax.com/main.html>

PathMax is a large, highly organized compilation of pathology-related sites run by Shawn Cowper, a dermatopathology fellow in San Francisco. Navigation of the site makes extensive use of frames, which can give one a claustrophobic feeling with a small monitor, but site is very responsive, logically arranged, and fast-loading. PathMax has links not only to other Web sites but also to textbook entries in the Amazon.com catalog.

University of Rochester Pathology Resource Page

<http://www.urmc.rochester.edu/smd/pathres/Long.html>

This is a single long text-only page of mostly pathology-related Web sites. Many of the links are annotated by the editor, pediatric pathologist Leon Metlay. I find this type of linear list to be especially well-suited for browsing the range of resources that are available on a topic.

LabExplorer Lab Links

http://www.labexplorer.com/lab_links.htm

LabExplorer is an attempt to compile lists of Web resources related to laboratory medicine. The design is suspiciously "slick", and the number of links is still relatively small, but the compilation is well-organized. It will be interesting to watch as this fairly new site develops.

Pat Letendre's Medical and Laboratory Sites

<http://www.ualberta.ca/~pletendr/medical.html>

This is an eclectic, intelligent selection of sites that deal not only with lab medicine, but health care in general. The page design is simple, and the pages load rapidly.

Cytopathnet

<http://www.cytopathnet.org>

An enormous resource for pathologists and cytotechnologists, Cytopathnet is run by a small team of volunteers led by Jana Sullinger. The site is notable not only for its high quality content but also as an example of what miracles full-time practitioners can accomplish in their spare time. Cytopathnet includes tutorials, online presentations, an image database, an advocacy section, original cytology art, a new methodologies section, editorials, classified ads, an events calendar, chat room, news center, and the searchable archive of the CYTOPATHNET-L mailing list.

The only problem with Cytopathnet is that the page design is immensely complex, such that the site can be conveniently navigated only with the fastest of computers. Older machines display the pages very slowly; my 200-MHz PowerMacintosh clone required 71 seconds just to load the home page.

ImmunoQuery

<http://www.immunoquery.com/login.cfm>

ImmunoQuery is the creation of Dennis Frisman of Torrance, California. The site is best described in his words:

Currently, no easy way exists to determine the best panel of immunostains that will aid in the differential diagnosis of tumors, especially with the commercial explosion of available antibody reagents. To meet this need, I have developed an immunohistochemistry database query system that will: 1) list the antibodies that can differentiate between tumors entered by the user (e.g., lung adenocarcinoma vs. breast carcinoma), 2) rank the antibodies in terms of their ability to differentiate between the tumors, and 3) provide instant references to journal articles describing the reactivity of these antibodies. The query system provides a meta-analysis of the literature by

utilizing a database developed over several years containing 1775 peer-reviewed references and 245,640 immunostain reactivities (last updated 5/12/00). Only articles using immunoperoxidase methods on paraffin-embedded material are included.

ImmunoQuery is arguably the most useful online tool for the practicing surgical pathologist. Although user registration is required, this unique service, undoubtedly the product of hundreds to thousands of hours of professional time, is free of charge. There are currently 3881 registered users.

Neomarkers' Research Antibodies

<http://www.labvision.com/antibodyindex.html>

This is a commercial site for LabVision, a company that sells antibody reagents. It features a large selection of antibodies, including those useful in diagnostic immunohistology. For each antibody there is a detailed "data sheet" in Adobe .pdf format. The data sheet includes information on the antibody's specificity and diagnostic utility, complete with numerous references.

College of American Pathologists

<http://www.cap.org>

The CAP has steadily expanded its Web presence over the past few years, and it is now a robust resource for the practicing pathologist. With a clean, consistent, professional design, the site is highly responsive and loads speedily. An especially useful feature is the full complement of current Checklists of the Laboratory Accreditation Program. Each Checklist is available in three formats: the native Microsoft Word .doc format, the Adobe .pdf format for maximum compatibility across platforms, and the HTML format for convenient Web browsing.

The site features a membership directory and staff contact list. There are near-full-text versions of the current issue of the periodical *CAP Today*, as well as selected articles from previous issues (back to January, 1998). *Archives of Pathology and Laboratory Medicine* is also online (from January, 1999) in the form of full-text articles with high-resolution images. There is a download library, which at this time has only a few files, but they are of high quality, including such notable CAP publications as practice parameters, specimen protocols, and comparative instrument reviews.

PubMed

<http://www.ncbi.nlm.nih.gov/PubMed/>

PubMed is a well-designed interface for the National Library of Medicine's databases. I regularly perform MEDLINE searches from this site. Only abstracts are displayed; full-text articles can also be ordered here, but applicable fees can be high.

The Pathologist as Content Creator

Theodore Sturgeon, the Hugo and Nebula Award-winning science fiction writer, once observed, "Ninety percent of everything is crud." Mr. Sturgeon died in 1985, but had he lived into the Web Age, it is likely he would have revised the figure cited in Sturgeon's Law to 99%. As every personal and corporate entity feels the need to expose itself on the Web, it is appropriate to frame a few considerations for any pathologists who are contemplating the same. The bottom line, as commonly stated by the most successful Web designers, is that **content is king**. By far, the most difficult aspect of producing a Web site is creating high-quality content. Unless you have written good text, drawn good graphics, or taken good photographs using conventional media, it is unlikely that anything you post to the Web will be of value to anyone. On the other hand, if you do have the talent and initiative to create quality content, the Web will

see to it that your contribution will benefit more people over a wider geographic range than any similar effort has throughout pre-Internet history.

The mechanics of putting up a Web site are as simple or as complicated as one's time, enthusiasm, and frustration threshold permit. Creating a Web site consists of three steps:

- Composing a page using the hypertext markup language (HTML).
- Acquiring the services of a Web hosting service, which will make a password-accessible hard disk partition available to the user.
- Uploading the page to the Web server.

Composing the Web page

There are several application programs for Web page composition that have WYSIWYG ("what you see is what you get") capability. Even Microsoft Word allows you to compose HTML documents. I have a prejudice against such programs for two reasons:

- They tend to write unnecessarily "fat" code that wastes bandwidth, occupies excessive disk space, and is slow to display onscreen.
- The vast panoply of design tools available in a WYSIWYG application tempts the undisciplined neophyte to construct excessively complicated, baroque pages.

Instead, I recommend coding your own pages "by hand," that is, using a simple text editor. The beauty of HTML is that using it can be as simple or as complicated as one would like. I have found that the simpler the HTML code, the better the page. Simple designs also tend to load faster and are more compatible with programs that allow the blind and other disabled users access to the page.

An HTML document, simply put, is a plain text document that has been "marked up" with HTML-specific codes called tags. Tags are indicated by angle brackets <>. For instance, the tag <i> is used to italicize text. If an HTML document were to include the text <i>de rigueur</i> the browser would render it as *de rigueur*.

Here is an example of a simple Web page. This HTML code, when read by a browser, directs the user to my Web site using a hyperlink:

```
<html>
<head>
<title>Directions to Ed's Web site</title>
</head>
<body>
<h3>How to get to Ed's Web site</h3>
<p>To complete your survey of eccentric curmudgeon pathologists, it is
worthwhile
to visit <a href="http://www.neosoft.com/~uthman">Ed Uthman's home
page</a>.</p>
</body>
</html>
```

When a Web browser loads this document, this is what appears:

In the HTML code used for the example above, only a few tags are used, but they allow formatting of text as paragraphs <p>, headings <h3>, and hyperlinks <a>. With just those few tags, you can write a perfectly useful hypertext document, limited only by the quality of the writing itself. Add the image tag, and you can illustrate the page. There are numerous online resources for those who want to create Web documents. Two comprehensive compilations are Webreference.com and HTML Help at their respective URLs:

<http://www.webreference.com/>

<http://www.htmlhelp.com/>

If these are too overwhelming at first blush, the Bare Bones Guide to HTML gives a one-page summary of all important tags:

<http://werbach.com/barebones/barebones.html>

There are numerous books that teach HTML coding, so I would urge a trip to a local bookstore to see what is currently available. I have found the following books helpful in designing my own site. Some are dated and may have been superseded by more recent editions:

- Laura Lemay, *Teach Yourself Web Publishing with HTML 3.0 in a Week*, 2ed, Sams Net, Indianapolis, 1996
- Elizabeth Castro, *HTML 4 for the World Wide Web*, Peachpit Press, Berkeley, 1998
- Vincent Flanders and Michael Willis, *Web Pages That Suck: Learning Good Design By Looking At Bad Design*, Sybex, San Francisco, 1996.

The Flanders/Willis book is a must-read for anyone who wishes to avoid the excesses to which most amateur (and many professional) Web designers fall prey. It is also highly entertaining.

Web hosting services

Some regular consumer accounts with internet service providers include a disk partition for Web space. My account with Neosoft gives me a paltry 2 megabytes, but the plus side is that this lean accommodation has disciplined me to code my pages more efficiently. Currently my entire Web site, which includes 55 documents, over 60,000 words, and 50+ images, fits in the 2-megabyte partition with room to spare.

When I decided to start a compilation of gross photos online, I had to look for a greater allowance of Web space. Ultimately, I found free Web hosting service of Yahoo-Geocities to best meet my needs. An account comes with 15 megabytes of storage space. The only catch is that Geocities inserts pop-up or banner ads on your pages. I have found the ads to be nondistracting as well as germane to healthcare topics. So far, I have posted over 25 high-resolution images, plus other text and binary files, and have used only about 12% of the 15-megabyte allotment:

<http://www.geocities.com/euthman/>

Instructions for setting up a Geocities site are at the following URL:

<http://geocities.yahoo.com/main/about.html>

Uploading the page

Some Web hosting services, including Geocities, have user-friendly templates with which to lay out and upload your pages. They also allow you to directly upload your HTML text files using file transfer protocol (FTP). FTP can be done using the Microsoft or Netscape Web browsers, but there are dedicated freeware/shareware FTP client programs that are more versatile. For the MacOS, I would recommend Fetch; for the PC, CuteFTP has been suggested.

With FTP, you open your account with a username and password and then simply upload your HTML files to folders and subfolders you create. As soon as a page is uploaded, it is available to the world for browsing.

Tips and pitfalls in Web site design

These can be summarized in one word, **restraint**, or one acronym, **KISS** (keep it simple, stupid!) Specifically:

- **Don't use graphics when text will do.** The biggest offenders are designers who use graphics for navigation buttons. Text menus allow your site to be navigated just as thoroughly, and they load much faster than graphics.
- **Never use clip art.** Savvy users will recognize it and ridicule you.
- **Don't use original graphics unless you know something about digital imaging.** There are numerous excellent books on the subject. One that I find useful is older, but perfectly adequate:

David Blatner and Steve Roth, *Real World Scanning and Halftones*, Peachpit Press, Berkeley, 1993

- **Resist the urge to include animations and sounds.** I can't imagine why a pathologist would need either of these.
- **Show restraint in color selection.** Black text on white or neutral background is perfectly fine. If you must divert from this, make sure your background is very light, and the text is very dark. I have seen numerous pages where text blocks were so close in color to the background that they were impossible to read, or even completely invisible. This is because not every graphic card and monitor displays colors the same. Many books go on and on about the necessity of using "browser-safe colors" which limits you to only 216 specific colors. This is of benefit only in the case of users whose graphic cards cannot display more than 8-bit colors, which is only 14% of users worldwide. Those few users who do have old graphic cards will still be able to visit your site; it just won't be as pretty on their monitors.
- **Show restraint in font selection.** In most cases, two fonts will do. A serif font (like Times Roman or New York) is easier to read in long paragraphs. A sans-serif font (such as Helvetica or Arial) is good to use for headings to set them off from the body text. If you use more than two fonts, there should be some rhyme or reason for how they are used. In the original paper version of this document, for instance, I have used four fonts: Times for body text; Helvetica for headings; Courier (a monospace font) for code and URLs; and Chicago for computer commands (the Web version has slightly different fonts as displayed on Windows machines).
- **Keep layout simple.** Even some of the most popular, high-dollar sites on the Web ignore this rule and try to make their pages look like tightly laid-out magazine spreads. This may look pretty from a distance, but such design wreaks havoc with those users that have visual disabilities. A simple, linear layout allows easy access to the blind by way of text-to-speech programs, and users with lesser visual disabilities can simply increase their default font size to the point they can resolve the text.

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