Podcasts, Blogs, Websites, and Public Libraries: Non-Traditional Research Resources for Scientists and Clinicians

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This column is coordinated and edited by William D. Fraser, M.Sc. These articles are not peer-reviewed. The AsMA Science and Technology Committee provides the Watch as a forum to introduce and discuss a variety of topics involving all aspects of civil and military aerospace medicine. Please send your submissions and comments via email to: fraserwdf@gmail.com. Watch columns are available at www.asma.org through the "Read the Journal" link.

Though access to scientific journal articles online, available from traditional hardcopy publications or from journals only published in electronic format, and online electronic (e-book) versions of reference material is becoming the norm for obtaining research resources, other sources of online material, especially useful for training and educational purposes, are becoming more available. Material from sites such as Wikibooks[28] can provide background material for researchers, though one has to exercise caution in citing that material. However, other sources of material are available which can provide useful information for the design, analysis, and interpretation of experimental studies, as well as more in depth and higher quality background material not available on Wikibooks. Other sites can provide more general information about science policies, media coverage of science, government research budgets, scientific controversies such as those revolving around CAM and vaccination, and interesting discussions about research areas outside one's specialty for those with strong scientific and medical backgrounds.

Podcasts

The universal access to audio and video podcasts provides a rich resource for continuing education, as well as more general interest material. Apple provides a list of a large number of podcasts covering science and medical topics,[8] often with discussions and debates of a highly technical nature. A number of podcasts focus on more controversial issues, including pseudoscientific beliefs, and medical and other life science research papers with deficiencies in experimental design, analysis, and interpretation. "The Skeptics' Guide to the Universe" (SGU),[24] and "StarTalk"[23] are two high-quality podcasts that address 'bad science' topics that are of interest to the AsMA community. The American Association for the Advancement of Science (AAAS) provides a news podcast covering a wide range of scientific topics, including medical and life sciences.[2] A number of research institutes, such as the John Hopkins Medical Podcast,[9] provide audio downloads specifically focused on medical research. Podcasts specifically relevant to aerospace medicine and human performance are rare but there is an the excellent "Brain Science Podcast"[5] with in-depth analysis of a number of topics in neuroscience and psychology, and the NECOEM website[13] has a number of presentations and podcasts related to occupational and environmental medicine, including occupational back pain, opioid therapy for chronic musculoskeletal disorders, travel medicine, neck injuries and treatment, fitness for duty, and aerospace medical issues of unmanned air vehicles.

Designing laboratory, clinical, and epidemiological studies, and using the proper statistical tools for the analysis of data collected from these studies is often the most difficult issue to deal with, and subject of much of the criticism directed at published research. There are audio podcasts that address some of the common issues in data collection and analysis,[22] though more information is available from websites and online text books as discussed below.

Public Libraries

Not all researchers have access to a university or government library system, such as clinicians in private practice, but in some municipalities free access to a large number of scientific and technical resources can be obtained from the public library,

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usually in the form of downloadable or online e-books. Membership in the Toronto Public Library provides me with a free link to the Safari website[18] with online access to reference books in areas including statistics and data analysis, programming guides for data analysis software such as R and Python, biochemistry, biotechnology, and references for collecting and analyzing clinical trial data. In addition, online video training, courses, and conference presentations are available. A small sampling of available book titles relevant to readers of this journal that can be read online include: "Electrochemical DNA Biosensors," "Biostatistics," "Feedback Control in Systems Biology," "Applied Missing Data Analysis in the Health Sciences," "Open Source Software in Life Science Research," "Data Mining in Biomedical Imaging," "Introduction to Statistical Methods for Biosurveillance," "Analysis of Observational Health Care Data Using SAS," "Risk-Based Monitoring and Fraud Detection in Clinical Trials Using JMP and SAS," "Image Analysis and Modeling in Ophthalmology," and "Foundational and Applied Statistics for Biologists Using R." Though often available in many university libraries, a casual search indicated that the Safari resource is provided in the Seattle, Oakland, and San Francisco public libraries and some public libraries in the UK.

Through the Zinio website,[30] public libraries may also provide free access to magazines that are relevant to the AsMA community such as *Aviation Week and Space Technology*, *Flying*, *Discover*, *New Scientist*, as well as computer and astronomy magazines.

Blogs and Websites

Blogs and specialized websites are the source of a wide range of scientific research resources. For example, the Science Based Medicine site,[20] hosted by some of the same individuals involved with the SGU podcast, is "dedicated to evaluating medical treatments and products of interest to the public in a scientific light, and promoting the highest standards and traditions of science in health care." It focuses on the lack of good scientific practice in many clinical research studies – addressing both traditional and so-called alternative medical practices such as homeopathy, acupuncture, and energy medicine. It also critiques basic research studies and covers current events such as the recent measles outbreak in the United States. For keeping up with recent discoveries in all areas of scientific research, there are a number of high-quality websites that provide daily coverage of a wide range of science news topics: AAAS,[1] ScienceNews,[21] SciTechDaily,[19] and RedOrbit.[16]

As indicated earlier, experimental design and statistical analysis of research data can often be the source of some of the more difficult (and controversial) problems in scientific and clinical research. In an ideal world, one will have ready access to statistical experts, but resources are always limited. There a number of blogs and online journals that have extensive discussions and articles on experimental design methodology, data analysis techniques, and even code snippets for free download.[6,14,15,27] The Probability and Statistics blog[15] maintains a "Blogroll" which is a list of links to other blogs on the web discussing statistics and data analysis, including those dedicated to psychological statistics, the R statistical language, graphical display of data, and Bayesian statistics. One excellent website is the UCLA's Institute for Digital Research and Education website for Statistical Consulting Classes and Workshops,[26] which includes written and video seminars on using a number of statistical software packages including SAS, SPSS, and R, as well as guides for writing the experimental design and data analysis procedure sections of a research paper, preparing research proposals, improving the quality of scientific writing, survey data analysis, and power analysis. As well, there are a number of online statistical textbooks and courses available.[7,10,12,17]

For keeping up on aviation issues in general, Blast Fence International provides a list of aviation specific blogs and news sites,[4] such as the one hosted by the *Aviation Week and Space Technology* journal.[3]

For continuing education in a wide variety of scientific and technical areas, there is an increasing ability to access videos and lectures from undergraduate and graduate courses, such as the material available from Tufts University[25] and MIT.[11] The Tufts site provides relevant lectures from its medical school, including "Introduction to Clinical Pain Problems" and "Epidemiology and Biostatistics." The MIT offerings are more focused on basic science and engineering, such as "Brain Structure and Its Origins" (with lecture notes and audio recordings) and "Foundations of Computational and Systems Biology," but some are directly relevant to the clinician, e.g., "Virus-host Interactions in Infectious Diseases" and "Mechanisms of Drug Actions."

The ubiquitous YouTube website and mobile app[29] provide resource material on just about any scientific and technical topic, at almost any level of expertise. A very large number of video lectures and presentations on aviation medicine and physiology, biochemistry and genetics, biomedical engineering, programming, research methodology, experimental design, experimental data analysis, and data display are available.

CONCLUSIONS

These nontraditional information sources may have only limited applicability to maintaining specific professional accreditations, but they do provide a free and readily accessible source of information and guidance for anyone involved in laboratory experimentation and/or clinical research. Only a few of the many online resources available have been discussed, but hopefully this note will provide some useful starting points to access the increasing quantity of high-quality material available from these online sites.

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