Information for Cancer Researchers: Evaluation of Content Values on Cancer Web Sites

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Abstract

The present study is an attempt to identify cancer institutes and associations' web sites that provide free information useful in research and scientific endeavors. Thirty seven cancer web sites have been identified by using Google search engine for the study with the site domains .org, .edu, and .ac. This ensures the organization is not a commercial body. Availability of research & review articles, clinical trials, scientific reports, conferences proceedings, and other information of scientific importance in full text form are studied by visiting respective sites. The study reveals that though there are innumerable sites on cancer and information content for cancer patients as well as their relatives, the coverage of free full text scientific information for cancer scientific community is woefully inadequate. Even though the sites are developed and hosted by professional bodies, access to full text scientific literature / information for scientists and clinicians is restricted.

Keywords: Content Analysis, Electronic Resources

1. Introduction

Researchers and Oncologists across the globe are in continuous efforts to pin down the causes of cancer in a bid to discover effective control mechanisms to prevent it. The prime objective of any scientist or clinician is to gather scientific evidence and intellectual knowledge from the world, compiling and interpreting with his own knowledge and creating new knowledge and act on this new knowledge to accomplish set goals. The basic information source for any researcher to supplement and support scientific work are research publications, clinical trials, scientific reports, proceedings of conferences, patient information, laboratory reports and so on. Apart from these, scientists are also interested in knowing ongoing research projects at various organizations, training programmes, fellowships, and funds available for research making it evident that the requirements of researchers and their allied community to be different from the normal.

The easiest accessible source for any information in the present world is 'Internet'. Most of the internet web sites maintained by cancer research organizations and associations across the globe provide fundamentals like basic causes of cancer, patient profiles, types of cancers, and preventive measures, the information being mainly general in nature and useful for patients and their relatives. The more serious scientific literature, on the other hand, is available 'at cost' in scientific journals as most of the publications are commercial ventures.

Several studies were made on identifying availability of cancer information in Internet on various types of cancers viz., breast cancer, lung cancer and melanoma (1-6). Few of them focused their studies on information seeking pattern by cancer patients and their relatives specifically on breast cancer(7-9). There is a considerable use of

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internet sites by patients and their relatives for finding information on cancer. Interestingly, there are studies about patients experiences about the cancer information resources available and accessibility in internet(10, 11). Assessing and accessing the cancer information from websites for alternative medicine is also observed. (11-13). Little empirical research has examined how the clinicians are using the Internet for finding the information.(14) There is a evidence of professionals making a survey on finding and identifying the cancer information resources available in Internet (11, 14-31).

However, the need of scientific information for cancer scientific community is not reported in depth in above studies. Cancer problems are undoubtedly more complex than other diseases and perhaps the line of treatment needs expertise in handling every case (32).

The review from available literature abundantly makes it clear the potent urgency in delivery of free cancer research information through institutes' home pages and open access initiatives. Against such a backdrop, a researcher finds it very difficult to trace the desired scientific queries on the internet unless the specific scientific communication channels – 'Journals' are subscribed in their respective institutional libraries. And as it is a known phenomena - no library can full fill the information requirement of any individual even in the smallest domain area however big, the library may be. The present study is an attempt, after a series of searches and literature reviews, to identify cancer sites that are useful to scientific and research community in the area of oncology.

2. Objectives of the Study

The exponential growth of internet sites has made it very difficult to explore all available knowledge sources over the net. There are thousands of internet sites available on cancer and cancer related topics. The study focused on selecting and identifying few sites that are of direct interest to scientists and clinicians working in the field of cancer. The review of literature reveals that most of the papers studied basically identify and brief the cancer sites and resources in general, availability of information for patients and their information seeking behavior. No study has focused on garnering information from a researcher's point of view. The purpose of present study is an attempt to identify relevant and suitable online information sources for the benefit of scientific fraternity dedicated to cancer research.

3. Methodology

A search for cancer institutes on internet was made to identify sites that are affiliated to well known and established professional bodies and associations using Google search engine. They have been listed separately with their URLs for further study and evaluation of their contents from researcher point of view. Out of 51 sites, 37 cancer web sites were identified for the study with the site domains .org, .edu, and .ac. This ensures the organization is not a commercial body. Similarly 12 research association web sites were identified to see whether the contents on these sites provide scientific information that is useful for cancer scientific community. The Directory of Open Access Repositories (OpenDOAR) <http://www.opendoar.org/> is referred to check the Institutional Repositories of studied web sites.

In this Internet age, anyone can publish & distribute any information by hosting a site & in many other

ways. The authenticity and usefulness of a site is not the criteria while hosting a site because everything is controlled and distributed in the virtual level.

There are various ways of evaluating web sources on the internet (33) to know the authenticity and reliability of information available over the sites. The Beck's, "Web Evaluation Criteria" (34) is used for identifying and listing Internet sites in cancer domain, which are as follows:

- **Authority** - The information provided on the site should be trustworthy. It should be from authoritative and reliable sources and the author should have knowledge on the subject with credibility. As a rule this information is usually found on home page or links to authorships.
- **Accuracy -** The information displayed on sites should be error free in terms of language, grammar and spelling.
- **Objectivity** – The purpose of providing information should be easily made on the site.
- **Currency** – The information available over the site should be up-to-date. Most sites follow "last updated" statement at the bottom side of home page or one can find out the frequency of updating in internet archives tools.
- **Coverage** – The site should cover a target audience from all respects. In the present study the target user is Cancer researcher / Oncologist.

Generally, institute sites are designed in a way that enables them to cover its broader vision, objectives and services. In case of majority of cancer web sites, the home page is not necessarily designed to fulfill the information requirements of cancer researcher/ oncologist. The page may, in general, contain cancer information, patient profiles, basic facilities / treatments available, number of experts on their roll and so on. The cardinal aim of the present study is to hunt out, from the existing selected sites, the best and relevant scientific information that addresses for an interested cancer researcher/ oncologist. The date of access of each site is also recorded as the dynamicity of internet changes the information in no time.

Most commonly, a cancer researcher looks up for research & review articles, clinical trials, scientific programmes and reports, conference proceedings, practice guidelines, Patents, Core facilities, consensus statements, short communications and letters to the editor in full text form in web sites, where information requirements are exclusively focused on scientific and professional issues.

4. Observations and discussion

Information about research programmes and list of publications provide an insight of kind of research activities going on in an institute. It also reflects areas of research the institute is interested in and experts available in the institute. Table 1 reveals all the websites of institutes provide information on research programmes organized in their respective institutes. 78% of the institutes have listed their institute publications under different heads or hyperlinks. 22% of institutes have not listed their publications. It is surprising to know that none of institutes has Institutional Repository developed for retrieving the full text articles or research reports. In this open access movement it is one of the most effective means of enhancing the visibility of research and increasing the impact of articles published by the institute.

Clinical trials are research studies that test how well new medical approaches work in people. Each study

Table 1 - Research Information for Scientists and Clinicians - Sites of Cancer Centres

Sl.No.	Date of Access	Name of Institution/Centre	Location	Country	RP	PL	IR	CT	TP	CS	PT	CF	PA
1	16/07/07	BC Cancer Research Centre http://www.bccrc.ca/	Vancouver	Canada	Yes	Yes	No	No	Yes	No	No	Yes	Yes
2	16/07/07	Brander Cancer Research Institute http://www.nymc.edu/bcri/	New York	U.S.A	Yes	Yes	No	No	Yes	No	No	Yes	No
3	16/07/07	Cancer Research Institute (CRI) http://www.cancerresearch.org/	New York	U.S.A	Yes	Yes	No	No	No	Yes	No	No	No
4	17/07/07	Centre for Basic Cancer Research - Kansas State Universtity http://www.k-state.edu/cancer.center/	Manhattan	U.S.A	Yes	No	No	No	Yes	No	No	No	No
5	17/07/07	Dana - Farber Cancer Institute http://www.dfci.harvard.edu/default.aspx	Boston	U.S.A	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
6	17/07/07	Duke Comprehensive Cancer Centre http://www.cancer.duke.edu/	Durham	U.S.A	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes
7	18/07/07	Fox Chase Cancer Centre http://www.fccc.edu/	Philadelphia	U.S.A	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
8	18/07/07	Ludwig Cancer Research Institute http://www.licr.org/	New York	U.S.A	Yes	Yes	No	Yes	No	Yes	No	No	No
9	18/07/07	MIT Centre for Cancer Research http://web.mit.edu/ccr/	Cambridge	U.S.A	Yes	Yes	No	No	Yes	Yes	No	Yes	No
10	19/07/07	Memorial Sloan - Kettering Cancer Centre http://www.mskcc.org/mskcc/html/44.cfm	New York	U.S.A	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
11	19/07/07	National Cancer Institute http://www.cancer.gov/	Bethesda	U.S.A	Yes	Yes	No	Yes	Yes	No	No	Yes	No
12	19/07/07	The Beatson Institute for Cancer Reserch http://www.beatson.gla.ac.uk/	Glasglow	U.K.	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes
13	20/07/07	The Cancer Research Institute at Queen's University http://qcri.queensu.ca/	Kingston	Canada	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
14	20/07/07	The Sydney Kimmel Comprehensive Cancer Centre http://www.hopkinskimmelcancercenter.org/	Baltimore	USA	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No
15	20/07/07	University of Chicago Cancer Reserch Centre http://uccrc.uchicago.edu/	Chicago	U.S.A	Yes	Yes	No	Yes	No	no	No	Yes	Yes
16	20/07/07	UCLA'S Jonnson Comprehensive Cancer Centre http://www.cancer.mednet.ucla.edu/	Los Angeles	U.S.A	Yes	No	No	Yes	No	Yes	No	Yes	No
17	20/07/07	University of Michigan Comprehensive Cancer Centre http://www.cancer.med.umich.edu/	AnnArbor	U.S.A	Yes	Yes	No	Yes	No	No	No	No	No
18	20/07/07	Vander - bilt Ingram Cancer Centre http://www.vicc.org/	Nashville	U.S.A	Yes	Yes	No	Yes	No	Yes	No	Yes	No
19	20/07/07	University of Texas - M.D Anderson Cancer Centre http://www.mdanderson.org/	Houston	U.S.A	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes
20	17/09/07	AMC Cancer Research Centre http://www.amc.org/	Denver	USA	Yes	No	No	No	No	No	No	No	No
21	17/09/07	Barbara Ann Karmanos Cancer Institute http://www.karmanos.org/	Detroit	U.S.A	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
22	17/09/07	Breakthrough Breast Cancer Research Centre http://www.breakthrough.org.uk/researchcentre/	London	UK	Yes	Yes	No	No	No	No	No	Yes	Yes
23	17/09/07	Cork Cancer Research Centre http://www.ccrc.ie/	Cork	Ireland	Yes	Yes	No	No	No	No	No	No	No
24	27/09/07	Fred Hutchinson Cancer Research http://www.fhcrc.org/	seattle	U.S.A	Yes	Yes	No	Yes	Yes	No	No	No	Yes
25	27/09/07	German Cancer Research Centre http://www.dkfz.de/index.html	Heidelberg	Germany	Yes	No	No	No	No	No	No	Yes	Yes
26	27/09/07	Rumbaugh-Goodwin Institute for Cancer Research.INC http://www.rgicr.org/	Plantation	U.S.A	Yes	No	No	No	No	No	No	No	No
27	27/09/07	Gray Cancer Institute(Gray Laboratory http://www.graylab.ac.uk/	Middlesex	UK	Yes	Yes	No	No	Yes	No	No	Yes	Yes
28	27/09/07	Gujarat Cancer Society and Gujarat Cancer Research Institute http://www.cancerindia.org/index.htm	Ahmedabad	India	Yes	No	No	No	No	No	No	No	No
29	28/09/07	The Institute of Cancer Research http://www.icr.ac.uk/	London	UK	Yes	Yes	No	No	Yes	No	No	No	Yes
30	29/09/07	Queensland Institute of Medical Research http://www.qimr.edu.au/	Queensland	Australia	Yes	Yes	No	No	Yes	No	No	Yes	Yes
31	10/10/07	Japenese Foundation for Cancer Research http://www.jfcr.or.jp/english/	Koto-ko, Tokyo	Japan	Yes	No	No	No	Yes	No	No	No	No
32	10/10/07	National Cancer Centre Research Institute http://www.ncc.go.jp/	Chuo-ku, Tokyo	Japan	Yes	Yes	No	No	Yes	No	No	No	No
33	10/10/07	National Breast Cancer Centre(NBCC) http://www.nbcc.org.au/	Camperdown	Australia	Yes	Yes	No	No	Yes	No	No	No	Yes
34	10/10/07	Childrens Cancer Institute Australia for Medical Research http://www.ccia.org.au/	Randwick	Australia	Yes	No	No	No	No	No	No	No	Yes
35	10/10/07	American Institute for Cancer Research http://www.aicr.org/site/PageServer	washington	U.S.A	yes	Yes	No	No	No	Yes	No	No	No
36	23/10/07	Advanced centre for Treatment, Research & Education in Cancer http://www.actrec.gov.in	Navi Mumbai	India	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes
37	23/10/07	Tata memorial Hospital http://tmc.gov.in/	Mumbai	India	Yes	Yes	No	No	Yes	Yes	No	No	Yes

RP - Research Programmes; PL - Publications List; IR - Institutional Respository; CT - Clinical Trials; TP - Traninng Programme; CS - Conferences & Seminars; PT-Patents. CF-Core Facilities. PA-Postions Available

answers scientific questions and tries to find better ways to prevent, screen for, diagnose or treat a disease. Clinical trials may also compare a new treatment to a treatment that is already available. Every clinical trial has a protocol, or action plan, for conducting the trial. The data derived from the study reveals that 40% of the institutes provide information on clinical trials. As the samples of cancer institute sites include both research centers and hospitals normally information on clinical trials is available in case of centers where treatment facilities are available or hospitals.

Innovative approach to accelerate fundamental biomedical discovery and translate that knowledge into effective prevention strategies and new treatments through training programmes is one more area where the researcher or oncologist is eying on to strengthen his own or his team knowledge. 62% of the institutes provide information on various training programmes they organize and 38% do not cover any such information.

Advancement of any idea or innovation is possible through organizing conferences, meetings, workshops and seminars where team of experts will assemble on a platform to express their views to evolve new ideas and new domains. From the studied sample 35% of the institutes have hosted information on conferences and seminars. This may be because they may not be having any seminars or conferences at the time of this study of sites.

Inventions or discoveries of any new processes, machine, article of manufacture, or composition of matter, or any new and useful improvement are well documented in Patents. Surprisingly none of the cancer institute has given links to any of their own patents nor given links to any other external sources of relevance.

Information on core facilities allows investigators to access the cutting edge tools and technologies which would be tested and developed on a mutual understanding. These collaborations can be established with any scientists across the world. Although these services are primarily aimed on claiming instruments and facilities available in research institute, there is a broad spectrum of research that uses these resources in their own ways and means. In the present study more than 50% of the institutes are providing the information on core facilities.

Positions available is an area where the research community is always eyeing on for developing their own skills or moving on in a better working environment where they can excel in their performance or achieve their goals in their professional life. The study of samples reveals 54% of the institutes provide links on these features. It is also possible that the links are developed only when ever vacancies are evolved in the institute (Table -1)

While accepting research papers for publication authors are advised to provide abstract, keywords and communication address. This practice is followed routinely since the authors have command over the contents of the paper that they submit for publication. Similarly, if the same trend is followed over the internet sites making it mandatory or desirable to provide keywords and details on target

audience then it might make internet searches more worthwhile and less time consuming. A cursory glance at the keywords or target audience on web site will help the visitor to dig in deep for the desired information. There are many sites that carry brief information under the subheadings - Introduction, About us, Objectives etc. For many users it is a frustrating experience to go through such lengthy write-ups. Hence, it will be easy and convenient to check up the keywords or target audience to decide on further browsing the site.

Whenever researcher is on a web page, he would love to link directly to the information of his interest with minimum clicks. These are the real value additions from online sources and many online database publishers are implementing these concepts in their services by revamping their sites. Many web sites do provide links to external information and other libraries and their sources. The study of samples reveal only few sites provides links to other libraries or external sources. It all depends on the policy of institute while providing the links to external sources.

There are few institutes viz., Fox Chase Cancer Centre, USA; University of Chicago Cancer Research Centre, USA and Japanese Foundation for Cancer Research, Japan have classified the web contents as per the desires of audience on their home pages. It helps the user to find the desired scientific information in menu driven fashion rather than searching & checking every link to know the hidden data.

Research Associations play a vital role in leveraging the ideas by creating an opportunity to experts on a common platform to share their thoughts for the benefit of society at large. They too host a web site and provide information on objectives, activities and various programmes of the associations. Similar selection criteria are used to short list 12 Associations.

Table 2 - Research Information for Scientists and Clinicians - Sites of Cancer Associations

Sl. No	Date of Access	Name of Institution/Centre	Location	Country of origin	Res. Prog.	Public ations	Sub. Rep.	Train. Prog.	Conf.s Sem.s
1	16/07/07	American Association for Cancer Research http://www.aacr.org/	Philadelphia	U.S.A	Yes	Yes	No	Yes	Yes
2	16/07/07	American Society of Clinical Oncology http://www.asco.org/portal/site/ASCO/	Alexandria	U.S.A	Yes	Yes	No	Yes	Yes
3	17/07/07	Cancer Research UK http://science.cancerresearchuk.org/	London	UK.	Yes	Yes	No	Yes	Yes
4	17/07/07	Federation of European Cancer Societies http://www.ecco-org.eu/	Brussels	Belgium	No	Yes	No	Yes	Yes
5	18/07/07	International union Again Cancer (UICC) http://www.uicc.org/index.php	Geneva	swizerland	No	Yes	No	No	Yes
6	19/07/07	National Comprenhensive Cancer Network http://www.nccn.org/	Jenkintown	U.S.A	Yes	Yes	No	Yes	yes
7	20/07/07	The Cancer Council Victoria http://www.cancervic.org.au/	Victoria	Australia	Yes	No	No	Yes	no
8	28/09/07	International Agency For Research On Cancer http://www.iarc.fr/	Lyon	France	Yes	No	No	Yes	No
9	29/09/07	Singapore Cancer Syndicate http://www.scs.a-star.edu.sg/main.html	Genome	Singapore	Yes	No	No	No	Yes
10	23/10/07	American cancer Society http://www.cancer.org/	Atlanta	U.S.A	Yes	No	No	No	Yes
11	23/10/07	Canadian Cancer Society http://www.cancer.ca	Toronto	Canada	Yes	No	No	no	No
12	23/10/07	Indian Association for cancer Research http://www.iacr.org.in/homepage.htm	Mumbai	India	Yes	No	No	No	No

Table 2 briefs, 83% of the cancer research associations organize research programmes and inform about these events through their association web sites. 50% of the associations have their own publications as Journals, News Bulletins or Letters as channels for distributing research reports of authors across the world. It is also observed that access to full text article information is available in case of News Bulletins or News Letters. Otherwise full text research paper appeared in the associations' scientific journals is available at cost. No association is maintaining even subject repository similar to institutional repository. 66% of the associations organize training programmes and conferences for their professional colleagues to strengthen and share the knowledge amongst scientific community. May be at the time of search these associations might not be having any events.

An important factor observed during the study is that even though the sites are designed and developed by professional bodies, scientific information on these web sites is far too short and limited for scientists. Most of the sites do provide comprehensive list of scientific publications but very few provide links to the full text articles. This could be due to the constraints imposed by copyright laws. In this increasing trend of open access movement, cancer research institutes and associations should take lead role in setting up of repositories, to foster their research output to the scientific community across the globe. It helps in archiving the intellectual output of an institute in virtual space with wider exposure for the overall benefit of society.

Advent of Internet has enabled researchers to publish their research results in wider areas of their choice to communicate to wider audience. Now the research results are made available at every corner of the world through Internet, where they can be used by far more readers than the conventional print journals reached earlier.

It must be noted that there are many free online resources available over the internet. A list of few free online sources useful for cancer researcher is listed [TAble - 3].

Table - 3 Free online sources for Scientists and Clinicians

Sl.No	Name of Source	URL
1	Bioline International	http://www.bioline.org
2	Biomed Central	http://www.biomedcentral.com
3	Biomedical and Clinical Journals On-line	http://www-med.stanford.edu/medworld/research-journals.html
4	BMJ Journals Online	http://www.bmjjournals.com
5	BioOne	http://www.bioone.org
6	Directory of Open Access Journals	http://www.doaj.org
7	Dynamed	http://www.dynamicmedical.com
8	FreeBooks4Doctors!	http://www.freebooks4doctors.com
9	Freemedical Journals	http://www.freemedicaljournals.com
10	Highwire Press	http://highwire.stanford.edu/lists/freeart.dtl
11	HINARI - Access Research	http://www.who.int/hinari/en
12	Indian Medlars Centre	http://medind.nic.in
13	International Network for the Availability of Scientific Publications	http://www.inasp.info/peri/free.shtml
14	Medline Plus	http://medlineplus.gov
15	Medscape	http://www.medscape.com
16	National Centre for Biotechnology Information	http://www.ncbi.nlm.nih.gov
17	National Libray of Medicine	http://www.nlm.nih.gov
18	Native Health Databases	http://hsc.unm.edu/libray/nhd
19	Open J - Gate	http://www.openj-gate.com
20	Open Med	http://openmed.nic.in
21	Pubmed Central	http://www.pubmedcentral.nih.gov
22	Pubmed	http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed
23	Public Library of Science	http://www.plos.org
24	Scientific Electronic Library Online	http://www.scielo.org
25	SciELO Public Health	http://www.scielosp.org
26	Virtual health library	http://www.bireme.br/bvs/I/ihome.htm

Effective use of electronic database resources assumes a certain level of technological proficiency, autonomy and self-directed motivation(35). Online sources have many features that are hidden. As a consequence of which, these features, though available, escape the attention of users and thus remain unutilized(36).

Willinsky (37) uses an expansive notion of open access, advocating a variety of approaches to bringing "more of the research literature [to] more people," in keeping with the "scholarly tradition that has long been concerned with extending the circulation of knowledge"

Listservs, blogs, RSS, wikis, folksonomies and various types of social networking systems also make a dramatic impact on updating professional skills and developments and act as an international platform for exchange of ideas in many ways instantly without much of a cost. A selective list of listservs in the field of cancer is mentioned in Appendix.

5. Conclusion

Surprisingly, even though cancer is the largest disease afflicting the globe, there are just a few sites isseminating free full text cancer research information for fellow scientists and researchers. They cover comprehensive information for the patients and their families. Usually, the scientific cancer information is amalgamated with that of health science or biological science databases.

As most of the scientific research reports are published in commercial journals they are not freely available because of the copyright laws. The trend of open access is fast catching up, though it is scarce and taking its own time to acquire a definite shape. Even though Open Access Initiatives and Institutional Repositories are initiated by many national and international bodies strong presence of such developments are lagging in the field of cancer. A recent bill (1) passed by the US parliament is a breakthrough in science communication to support the open online access to the entire research findings funded by NIH, a major government agency in USA.

Incorporating more and more cancer scientific information on institutional sites will enhance research activities across the globe and developing countries in particular. The target audience of the paper is Directors, Heads of Divisions, Principal Investigators, Data Managers, Administrators, Web developers, Senior officials, involved in feeding the data into web sites. The suggestions mentioned might be of use while designing, redesigning institutional sites. The paper may be of direct interest to all those involved in cancer research (Appendix -1)

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References

1. **Atkinson,** NL et al. User-centered research on breast cancer patient needs and preferences of an Internet-based clinical trial matching system. J Med Internet Res., 2007; 9 (2), p.13.
2. **Meric-bernstam** et al.. Currency of online breast cancer information. Medinfo., 2007, 12, 2, pp. 973-6.

3. **Pereira, J L.** Internet usage among women with breast cancer: an exploratory study. Clin Breast Cancer, 2000, 1 (2), pp.148-53.

4. **Rankow, V G.** Breast cancer resources on the Internet: a selective list of resources for conventional and complementary/alternative information about breast. Natl Netw., 2002, 27 (2), pp.16-8.

5. **Peterson M W And Fretz, P C**. Patient use of the internet for information in a lung. Cancer Clinic Chest, 2003, 123 (2), pp.452-7.

6. **Sabel, M S,** et al. Patterns of Internet use and impact on patients with melanoma. J Am Acad Dermatol, 2005; 52 (5), pp.779-85.

7. **Basch E M** et al. Use of information resources by patients with cancer and their companions. Cancer, 2004, 100 (11), pp.2476-83.

8. **Fogel, J et al.** Use of the Internet by women with breast cancer. J Med Internet Res., 2002, 4 (2), E9.

9. **Satterlund M J, Mccaul K D and Sandgren A** K. Information gathering over time by breast cancer patients. J Med Internet Res., 2003, 5 (3), E15.

10. **Knobf, M T And Mccorkle, R.** Cancer patients' self-reported attitudes about the Internet. J Med Internet Res., 2005, 7 (3), E22.

11. **Koyani, S.** Patients resources: cancer survivorship information resources from the US government. Cancer Pract 1999, 7(3), pp.154-6.

12. **Schmidt, K and Ernst, E.** Assessing websites on complementary and alternative medicine for cancer. Ann Onco.,l 2004, 15(5), pp.733-42.

13. **Walji, M Et Al.** Searching for cancer-related information online: unintended retrieval of complementary and alternative medicine information. Int J Med Inform., 2005, 74(7-8), pp. 685-93.

14. **Ziebland, S.** The importance of being expert: the quest for cancer information on the Internet. Soc Sci Med., 2004, 59(9), pp. 1783-93.

15. **Biermann, J** S et al. Evaluation of cancer information on the Internet. Cancer, 1999, 86(3), pp. 381-90.

16. **BULT, C J et al.** A survey of web resources for basic cancer genetics research. Genome Res., 1999, 9(5), pp. 397-408.

17. **Carden, C P, Jefford, M And Rosenthal, M A.** Information about cancer clinical trials: an analysis of Internet resources. Eur J Cancer, 2007, 43(10), pp. 1574-80.

18. **Davison, B** J et al. Preferences for sexual information resources in patients treated for early-stage prostate cancer with either radical prostatectomy or brachytherapy. BJU Int., 2004, 93(7), pp. 965-9.

19. **Delvenne, C, And Pasleau, F. Organising access to Evidence-Based Medicine resources on the Web**. Comput Methods Programs Biomed., 2003, 71(1), pp. 1-10.

20. **Eakin E G and Strycker, LA.** Awareness and barriers to use of cancer support and information resources by HMO patients with breast, prostate, or colon cancer: patient and

provider perspectives. Psychooncology, 2001,10(2), pp.103-13.

21. **Gomella, L G.** The wild, wild Web: resources for counseling patients with prostate cancer in the information age. Semin Urol Oncol, 2000, 18(3), pp.167-71.

22. **Grenier, L M.** Cancer information and resources for Hispanic populations. Cancer Prac.,t 1995, 3(5), pp.317-9.

23. **Horton, R And Gundling, K E**. Clinical cancer trial information and specimen resources. Biotechniques, 1998, 25(3), pp.396-8.

24. **Junghans, T** B et al. Cancer information resources: digital and online sources. Toxicology 2004, 198 (1-3), pp.77-93.

25. **Matthews, S** C et al. The internet for medical information about cancer: help or hindrance? Psychosomatics, 2003, 44(2), pp. 100-3.

26. **Norum, J.** Evaluation of Norwegian cancer hospitals web sites and explorative survey among cancer patients on their use of the internet. J Med Internet Res., 2001, 3 (4), E30.

27. **Rimer, B** K et al. How new subscribers use cancer-related online mailing lists. J Med Internet Res., 2005, 7 (3), E32.

28. **Robertson, J F**. The Internet: the future source of information for professionals in the field of breast cancer. Breast, 2002, 11(5), pp. 398-401.

29. **Silva, J S, Ball, M J And Douglas, J V.** The Cancer Informatics Infrastructure (CII): an architecture for translating clinical research into patient care. Medinfo., 2001, 10 (1), pp.114-7.

30. **Tan, E** L et al. Information sources used by New South Wales cancer clinicians: a qualitative study. Intern Med.J., 2006, 36 (11), pp.11-7.

31. **Trumbo, C W**. Cancer information on the World Wide Web: gross characteristics. J Natl Cancer Inst., 2004, 96(4), pp.332-3.

32. Cohen, S. Cancer research and the scientific community. Science, 1971, 172 (3989), pp.1212-1214.

33. **Auer, N.** Bibliography on evaluating web information. 2007.

34. **Beck, S E**. **Evaluation Criteria.** 2007.

35. **Lagier, J.** Measuring usage and usability of online databases at Hartnell College: An evaluation of selected electronic resources [electronic version]. PhD dissertation. Florida, USA: Graduate School of Computer and Information Sciences, Nova Southeastern University, 2002.

36. **Munnolli, S.** Harnessing the online resources: A case study of ScienceDirect in India. The International Information and Library Review, 2005, 37(4), pp. 353-363.

37. **Willinsky, L.** The access principle: the case for open access to research and scholarship. 2006.

Appendix I

Selective List Of Cancer Listservs (It's A List Only. Each One Is Not Tested)

ACOUSTIC NEUROMA
email: ana-info-request@neurosurgery.mgh.harvard.edu
message : subscribe ana-info

ALL-L (Adult Acute Lymphocytic Leukemia)
email: listserv@listserv.acor.org
message: SUBSCRIBE ALL-L

ALL_KIDS (Childhood Acute Lymphoblastic Leukemia)
email: LISTSERV@HOME.EASE.LSOFT.COM
message: SUB ALL_KIDS (your-full-name)

AML (Acute Myelogenous Leukemia)
email: listserv@listserv.acor.org
message: SUBSCRIBE AML

BLOOD CELLS, MOLECULES, AND DISEASES
email: majordomo@scripps.edu
message: subscribe bloodcell your email address

BMT-TALK
email: listserv@listserv.acor.org
message: subscribe bmt-talk

BRAIN TUMOR
email: mailto:listserv@mitvma.mit.edu
message: subscribe Brain-Tumor

BREAST CANCER
email : listserv@morgan.ucs.mun.ca
message: subscribe Breast-Cancer

CANCER-MED (Medical Questions about Cancer)
email: listserv@listserv.acor.org
message: subscribe Cancer-Med

CancerWire
email: LISTSERV@RWNEILL.COM
message: Subscribe Cancerwire

CERVICAL-CANC
email: LISTSERV@LISTSERV.NET
message: SUBSCRIBE CERVICAL-CANC

CLL (Chronic Lymphocytic Leukemia)
email: listserv@listserv.acor.org
message: subscribe CLL

COLON
email: listserv@maelstrom.stjohns.edu
message: subscribe colon

E-SARCOMA (Ewing Sarcoma)
email: listserv@listserv.acor.org
message: SUBSCRIBE E-SARCOMA

KAPOSI (Kaposi Sarcoma)
email: listserv@listserv.acor.org
message: SUBSCRIBE KAPOSI

L-M-SARCOMA (leiomyosarcoma)
email: listserv@listserv.acor.org
message: SUBSCRIBE L-M-SARCOMA

LUNG-ONC
email: listserv@acor.org
message: subscribe lung-onc

MANTLE CELL LYMPHOMA
email: listserv@ucsd.edu
message: add (your email address) mantlecell

MEL-L (Melanoma)
email: MELSUB@mwt.net
message: subscribe MEL-L

N-BLASTOMA (Neuroblastoma)
email: listserv@listserv.acor.org
message: SUBSCRIBE N-BLASTOMA

OVARIAN
email: listserv@listserv.acor.org
message: subscribe Ovarian

PANCREAS-ONC
email: listserv@listserv.acor.org
message: SUBSCRIBE PANCREAS-ONC Your firstname Yourlastname

PEDIATRIC-PAIN
email: MAILSERV@ac.dal.ca
message: subscribe PEDIATRIC-PAIN

PED-ALL (Pediatric Acute Lymphocytic Leukemia) .
email: listserv@listserv.acor.org
message: subscribe PED-ALL FirstName LastName

PED-ONC (Pediatric Cancer)
email: listserv@listserv.acor.org
message: subscribe PED-ONC FirstName LastName

R-BLASTOMA
email: LISTSERV@LISTSERV.ACOR.ORG
message: SUBSCRIBE CARCINOID

TC-NET (Testicular Cancer)
email: listserv@maelstrom.stjohns.edu
message: subscribe TC-Ne**t**

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