

# E-Nephrology

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## ABSTRACT

Diagnosis of renal diseases is often delayed owing to the scarcity of trained physicians, lack of facilities, and shortage of funds limits effective management, particularly when it comes to the red zone of renal replacement therapy. The Internet is expected to open up a myriad resource of knowledge and applications for academicians, researchers and clinicians alike in all health care professions across the globe. Also, the Internet has grown rapidly over the years and will inevitably expand even more. Evolving technologies offer modern applications for information management, communications with multimedia and virtual reality. Now, these innovative technologies have opened up newer possibilities for nephrologists. As Internet is serving as a backbone for these modern technologies, it is an utmost necessity to use and refine Internet applications for future nephrologists. Increasingly easy access to Internet has dramatically reduced barriers in sharing of information among basic and clinical nephrologists. Considering the growing scope for nephrologists in the use of Internet, it is necessary to understand Internet as a source of information and backbone of modern application. This review illustrates expanding roles of the Internet for the nephrologists and provides ready to use compilation of useful academic, research, clinical resources and is expected to introduce, stimulate and guide nephrologists into the realm of the world wide web. It also investigates how Internet is supporting in growth and development of the field of nephrology and present and future scopes of Internet as a tool for professionals involved in this area as well as information about biological sciences, and it also gives information about societies in various continents working in field of nephrology and the links useful for clinicians and research scientists.

**Key words:** Nephrology, internet, web

## Introduction

The Internet is set to be in the forefront of the new age of technological revolution. With the explosive growth of the World Wide Web in recent months, health and medical websites are evolving. The Internet is a colossus body of information, which has, in recent years, witnessed an amazing expansion to such an extent that colloquially it is now termed as the "information superhighway." There has been an enormous increase in the amount of information available through the Internet over the recent years. With

an estimated 320 million web pages available,<sup>[1]</sup> it has emerged as the most powerful platform for exchange of scientific knowledge.<sup>[2]</sup>

Nowadays, Internet has become one of the most common media to explore and extract information of interest for researchers in any field, including nephrology. Its power is most strongly seen among scientists, as more and more information is made available through "the Net," whether it is gene sequences, experimental data, chromosome maps or complete journal articles.<sup>[3]</sup> Its influence is most strongly felt among basic scientists and clinicians as more and more information is coming on "the Net" in the form of e-journals, e-books, research articles, gene sequences, experimental data or chromosome maps.<sup>[4]</sup> In the past few years, many Internet and nephrology resources have been posted on the web, including medical journals, medical associations, clinical trial registries and medical guidelines. Solze *et al*<sup>[5]</sup>, have discussed in their review about online texts and web resources that are, in many respects, ahead of other areas of medicine and websites which provide free full-text access to medical journals and books in poorer countries: the Global Health Network Supercourse, which provides specially designed online lectures for the developing world, and Internet2/Abilene

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and similar research networks around the world, which provide reliable, guaranteed bandwidth for high-quality Internet videoconferencing as an alternative to face-to-face lectures and meetings for nephrologists.

## Origins of the Internet

Internet originated as a defense computer network (ARPANET) initiated by ARPA of US Defense, later known as Defense Advanced Research Projects Agency (DARPA). This ARPANET grew into different phases of development open architecture format with modified protocols and finally developed into the present day Internet, creating the WWW as a platform for exchange of information between geographically separated computers. The Internet and WWW (also called W3 and the Web) have morphed into a sort of tool for retrieval and disposal of scientific and other literature for the advancement of education. It is Internet's most exciting and popular development. As Internet matured into global treasure of ever growing knowledge, it touched all spheres of life. A list of few common websites has been recently reported by Konwar *et al* [Table 1].<sup>[6]</sup>

## Searching the Web

Internet has grown-up into a colossal mass of information, and searching Internet for information requires skills

to avoid wasting time and obtain maximum relevant biomedical information. Basically, Internet can be searched for information by using i) crawlers, ii) human-catalogued directories, iii) hybrid search engines, iv) specialized search tools, v) meta search tools and vi) tool bars. Now some specialized search engines are also coming up like Kartoos (<http://www.kartoo.com/>) which presents results in graphical ma format, while Vivisimo (<http://vivisimo.com>) presents results as clusters of related terms. Metasearch tools search through different search engines at one time and compare them to find out the best suitable results.<sup>[7]</sup> All the available search engines have their advantages and disadvantages and should be selected on the basis of specific search requirement. More about search engines can be learnt from websites dedicated to search engine (<http://searchenginewatch.com>).

## Really Simple Syndication

Really Simple Syndication (RSS) is an excellent technology that is being used by nephrologists around the world to keep track of their favorite websites. RSS flips things around a little and is a technology that provides you with a method of getting relevant and up to date information sent to you, for you to read in your own time. It not only saves time but also gets the information quickly after it is published.<sup>[8]</sup>

**Table 1: List of important website addresses related to health care information resources for kidney diseases**

Kidney diseases	Links
Kidney diseases from the U.S. NIDDK	<a href="http://www.niddk.nih.gov/health/kidney/kidney.htm">http://www.niddk.nih.gov/health/kidney/kidney.htm</a>
National Kidney Foundation from the U.S.	<a href="http://www.kidney.org/">http://www.kidney.org/</a>
American Association of Kidney Patients information, education, support	<a href="http://www.aakp.org/">http://www.aakp.org/</a>
RenalWorld kidney disease, dialysis and transplantation resources from around the world	<a href="http://renalworld.com/">http://renalworld.com/</a>
National Kidney and Transplant Institute providing health and medical services in the Philippines	<a href="http://kidney.gov.ph/">http://kidney.gov.ph/</a>
Kidney Dialysis Foundation in Singapore, helping the needy	<a href="http://www.kdf.org.sg/">http://www.kdf.org.sg/</a>
Life Options Rehabilitation Program for dialysis patients, sponsored by Amgen Inc.	<a href="http://www.lifeoptions.org/">http://www.lifeoptions.org/</a>
National Home Hemodialysis Program operated by the Lower Manhattan Dialysis Center in NYC	<a href="http://www.homehemoonline.com/">http://www.homehemoonline.com/</a>
The Kidney Stone WebSite an educational resource for those who suffer from kidney calculi	<a href="http://members.aol.com/rogerbaxtr/pages/Kidney_Stone_Page.html">http://members.aol.com/rogerbaxtr/pages/Kidney_Stone_Page.html</a>
Kidney Stones from the American Foundation for Urologic Disease	<a href="http://www.afud.org/conditions/ks.html">http://www.afud.org/conditions/ks.html</a>
IgA Nephropathy Foundation Berger's disease, the most common non-diabetic kidney disease	<a href="http://www.igan.org/">http://www.igan.org/</a>
Kidney Stones from eMedicine's consumer health collection	<a href="http://www.kidneystones.e-medicinehealth.com/">http://www.kidneystones.e-medicinehealth.com/</a>
Polycystic Kidney Disease Information Page bulletin board, chat room, links and information	<a href="http://www.geocities.com/HotSprings/Spa/3265/">http://www.geocities.com/HotSprings/Spa/3265/</a>
Adult Polycystic Kidney Disease info from the U.S. NCBI about the genetics of PKD	<a href="http://www.ncbi.nlm.nih.gov/disease/PKD.html">http://www.ncbi.nlm.nih.gov/disease/PKD.html</a>
World Kidney Fund aiding kidney sufferers in developing countries	<a href="http://www.worldkidneyfund.org/">http://www.worldkidneyfund.org/</a>
Kidney Patient Guide from the U.K., supported by the Wellcome Trust	<a href="http://www.kidneypatientguide.org.uk/">http://www.kidneypatientguide.org.uk/</a>
NephCure Foundation seeking a cure for Nephrotic Syndrome and Focal Segmental Glomerulosclerosis	<a href="http://www.nephcure.org/">http://www.nephcure.org/</a>
Kidney and Urology Foundation of America avoiding the debilitating effects of kidney/urologic diseases	<a href="http://www.kidneyurology.org/">http://www.kidneyurology.org/</a>
American Lithotripsy Society for physicians and others at lithotripsy sites in the U.S.	<a href="http://www.gamewood.net/mnet/renalpath/tutorial.htm">http://www.gamewood.net/mnet/renalpath/tutorial.htm</a>
Renal World	<a href="http://renalworld.com/regions_links/index_html">http://renalworld.com/regions_links/index_html</a>

## Web 2.0

Web 2.0 resources impede creativity, collaboration and sharing among users. Integration of Web 2.0 resources allows scientists, students, and medical professionals/nephrologists to efficiently organize and manage the information and resources that are critical in today's quickly changing biomedical research environment. The recognition of the term Web 2.0, along with the growing use of blogs, wikis and social networking technologies, has led many in academia and business to coin a outbreak of 2.0s, including Library 2.0, Social Work 2.0, Enterprise 2.0, PR 2.0, Classroom 2.0, Publishing 2.0, Medicine 2.0, Telco 2.0, Travel 2.0 and Government 2.0.

## eTOCs

The eTOC service allows anyone who registers their e-mail address to be notified via e-mail when new content goes online. You may choose to receive any or all of the following: notification that a new issue of health information on the Internet is online, complete table of contents for new issues and special announcements from nephrology journals. Virtually, all the key nephrology journals are now available electronically and offer an e-mailed table of contents (eTOC) service whereby nephrologists who register can be notified via e-mail when new content goes online.

## Nephrology and Internet

Internet has provided an interactive forum for the researchers and clinicians working in nephrology

A large and rapid growing volume of biomedical information can be accessed through the Internet. There are many databases available on Internet that may be very useful not only to the nephrologists but also to the people from other streams. At present, numerous biomedical databases of journals are accessible in Internet which include index of journal citations and abstracts of articles and even links to full text articles. Table 2 enlists few of the preferred sites for searching scientific literatures in nephrology. Some professional organizations related to nephrology are listed in Table 3 which helps not only the basic researcher but also clinical nephrologists.

An e-book is an electronic or digital version of a book. This version of book is predicted to be the future version of books as it is easier to read, requires less space and is easy to browse through and jump to relevant paragraph immediately. Internet has already become a major platform for assessing these books. Few sites allow free browsing and reading of books. While most are restricted to paid members only, some only provide CD-ROM of the book. Table 4 enlists few website of e-books related

to nephrology and medicine. Training of nephrologists in advance centers would give them great advantage to explore and learn new technologies; therefore, we have also listed different agencies providing fellowships for advance training for nephrologists [Table 5]. For Indian nephrologists and nephrology-related patients, Table 6 gives useful information on nephrology-related websites of universities, medical centers and government agencies in India.

## A. Nephrology Journals and Article Search

### PubMed

(<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed>): It is a free web-based literature database of National Library of Medicine and includes over 16 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s. It is free and the most highly accessed database.

### Scopus™

(<http://www.scopus.com>): Scopus provides broad coverage of the sciences and social sciences, indexing 15,000 journals of chemistry, biology, environmental science, mathematics, physics, engineering, health and life sciences, social sciences, psychology and economics. Scopus also provides citation analysis.

### EMBASE

([http://info.embase.com/embase\\_com/about/index.shtml](http://info.embase.com/embase_com/about/index.shtml)): The Excerpta Medica database (EMBASE) maintained by Elsevier Science, is a major biomedical and pharmaceutical database indexing over 7000 international journals in the fields of drug research, pharmacology, pharmaceuticals, toxicology, clinical and experimental human medicine, health policy and management, public health, occupational health, environmental health, drug dependence and abuse, psychiatry, forensic medicine and biomedical engineering/instrumentation.

### DARE

(<http://www.york.ac.uk/inst/crd/crddatabases.htm>): Database of Abstracts of Reviews of Effectiveness (DARE), maintained by the NHS Center for Reviews and Dissemination at the University of York, makes it available for searching via its website. DARE is a database of high-quality systematic reviews of the effectiveness of health care interventions.

### DynaMed

(<http://www.dynamicmedical.com/what.php>): DynaMed is a clinical reference tool created by a physician for physicians and other health care professionals for use primarily at the "point-of-care."

**Table 2: List of journals related to nephrology**

Advances in Chronic Kidney Disease	<a href="http://journals.elsevierhealth.com/periodicals/xackd">http://journals.elsevierhealth.com/periodicals/xackd</a>
Advances in Chronic Kidney Disease	<a href="http://www.us.elsevierhealth.com/product.jsp?isbn=15485595">http://www.us.elsevierhealth.com/product.jsp?isbn=15485595</a>
Advances in Renal Replacement Therapy	<a href="http://www.us.elsevierhealth.com/product.jsp?isbn=10734449">http://www.us.elsevierhealth.com/product.jsp?isbn=10734449</a>
American Journal of Hypertension	<a href="http://www.journals.elsevierhealth.com/periodicals/ajh">http://www.journals.elsevierhealth.com/periodicals/ajh</a>
American Journal of Kidney Diseases	<a href="http://journals.elsevierhealth.com/periodicals/yajkd">http://journals.elsevierhealth.com/periodicals/yajkd</a>
American Journal of Kidney Diseases	<a href="http://www.ajkd.org/">http://www.ajkd.org/</a>
American Journal of Physiology: Renal Physiology	<a href="http://ajprenal.physiology.org/">http://ajprenal.physiology.org/</a>
American Journal of Transplantation	<a href="http://www.medscape.com/viewpublication/1005_index">http://www.medscape.com/viewpublication/1005_index</a>
Atlas of diseases of the kidney	<a href="http://www.kidneyatlas.org/">http://www.kidneyatlas.org/</a>
BMC Nephrology	<a href="http://www.biomedcentral.com/bmcnephrol/">http://www.biomedcentral.com/bmcnephrol/</a>
Clinical and Experimental Nephrology	<a href="http://link.springer-ny.com/link/service/journals/10157/index.htm">http://link.springer-ny.com/link/service/journals/10157/index.htm</a>
Current Opinion in Nephrology & Hypertension	<a href="http://www.co-nephrohypertens.com">http://www.co-nephrohypertens.com</a>
Dialysis Centre	<a href="http://www.globaldialysis.com/centres.asp">http://www.globaldialysis.com/centres.asp</a>
Hong Kong Journal of Nephrology	<a href="http://asia.elsevierhealth.com/hkjin/">http://asia.elsevierhealth.com/hkjin/</a>
Hypertension Dialysis Clinical Nephrology Electronic Journal Hypertension	<a href="http://www.hdcn.com/">http://www.hdcn.com/</a>
Indian Journal of Nephrology	<a href="http://hyper.ahajournals.org/">http://hyper.ahajournals.org/</a>
International urology and nephrology	<a href="http://www.indianjnephrol.org">http://www.indianjnephrol.org</a>
Jornal Brasileiro de Nefrologia	<a href="http://www.springerlink.com">http://www.springerlink.com</a>
Journal of Clinical Hypertension	<a href="http://www.sbn.org.br/JBN/jbnsearch.htm">http://www.sbn.org.br/JBN/jbnsearch.htm</a>
Journal of Renal Nutrition	<a href="http://www.medscape.com/viewpublication/110_index">http://www.medscape.com/viewpublication/110_index</a>
Journal of the American Society of Nephrology	<a href="http://www.us.elsevierhealth.com/product.jsp?isbn=10512276">http://www.us.elsevierhealth.com/product.jsp?isbn=10512276</a>
Kidney & Blood Pressure Research	<a href="http://jasn.asnjournals.org/">http://jasn.asnjournals.org/</a>
Kidney International	<a href="http://content.karger.com/">http://content.karger.com/</a>
Kidney patient guide	<a href="http://www.blackwellpublishing.com/journal.asp?ref=0085-2538&amp;site=1">http://www.blackwellpublishing.com/journal.asp?ref=0085-2538&amp;site=1</a>
Medical News Nephrology	<a href="http://www.kidneypatientguide.org.uk/">http://www.kidneypatientguide.org.uk/</a>
National Kidney Foundation	<a href="http://www.medicalnews.com/nephrology">http://www.medicalnews.com/nephrology</a>
Nephrology	<a href="http://www.kidney.org">www.kidney.org</a>
Nephrology Dialysis Transplantation	<a href="http://www.blackwellpublishing.com/journal.asp?ref=1320-5358&amp;site=1">http://www.blackwellpublishing.com/journal.asp?ref=1320-5358&amp;site=1</a>
Nephrology nursing journal	<a href="http://ndt.oxfordjournals.org/">http://ndt.oxfordjournals.org/</a>
Nephron Clinical Practice	<a href="http://nephrologynursing.net/">http://nephrologynursing.net/</a>
Nephron Experimental Nephrology	<a href="http://content.karger.com">http://content.karger.com</a>
Nephron Physiology	<a href="http://content.karger.com/">http://content.karger.com/</a>
Pediatric Nephrology	<a href="http://content.karger.com/">http://content.karger.com/</a>
Peritoneal Dialysis International	<a href="http://www.springerlink.com">http://www.springerlink.com</a>
Peritoneal Dialysis Today	<a href="http://www.ispd.org/pdi_journal.html">http://www.ispd.org/pdi_journal.html</a>
Renal Failure	<a href="http://www.multi-med.com/pdtoday/">http://www.multi-med.com/pdtoday/</a>
Scandinavian Journal of Urology and Nephrology	<a href="http://ns.gamewood.net/rnet/rf/rfhome.htm">http://ns.gamewood.net/rnet/rf/rfhome.htm</a>
Seminars in Nephrology	<a href="http://www.tandf.co.uk/journals/titles/00365599.asp">http://www.tandf.co.uk/journals/titles/00365599.asp</a>
The American Journal of Physiology - Renal Physiology	<a href="http://journals.elsevierhealth.com/periodicals/ysnep">http://journals.elsevierhealth.com/periodicals/ysnep</a>
The Electronic Kidney	<a href="http://ajprenal.physiology.org/">http://ajprenal.physiology.org/</a>
The Internet Journal of Nephrology	<a href="http://www.kidney.org/eleckid.html">http://www.kidney.org/eleckid.html</a>
Transplant International	<a href="http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijne/front.xml">http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijne/front.xml</a>
	<a href="http://www.springerlink.com">http://www.springerlink.com</a>

## HSTAT

(<http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat>): The Health Services Technology/Assessment Texts (HSTAT) is a free, web-based resource of full-text documents that provide health information and support health care decision making.

There are many sites (e.g., Medical Matrix, Yahoo Health, HealthFinder) that catalog health-oriented sites on the Web which meet certain quality criteria. Another example is CliniWeb, a filtered site (<http://>

[www.ohsu.edu/clinweb/](http://www.ohsu.edu/clinweb/)), which has additional unique features based on its goals of providing access to quality-filtered, clinically oriented information.<sup>[9]</sup>

## B. Chronic Kidney Disease and Web

The WWW is now considered a key source of health information; but the quality and utility of this information has been challenged. Calderón *et al.*<sup>[10]</sup> have reported on the structural, content,

**Table 3: List of different organizations related to nephrology**

Organizations/Agencies	Web address
International Society for Hemodialysis (ISHD)	<a href="http://www.ishd.net/about.php">http://www.ishd.net/about.php</a>
American Kidney Fund	<a href="http://www.akfinc.org/">http://www.akfinc.org/</a>
American Nephrology Nurses Association	<a href="http://www.annanurse.org/cgi-bin/WebObjects/ANNANurse">http://www.annanurse.org/cgi-bin/WebObjects/ANNANurse</a>
American Society of Diagnostic and Interventional Nephrology	<a href="http://www.asdin.org/">http://www.asdin.org/</a>
American Society of Nephrology : ASN	<a href="http://www.asn-online.org/">http://www.asn-online.org/</a>
Arab Society Of Nephrology and Renal Transplantation	<a href="http://www.asnrt.org/">http://www.asnrt.org/</a>
Asian Pacific Society of Nephrology	<a href="http://www.apsneph.org/">http://www.apsneph.org/</a>
Association of Renal Technicians	<a href="http://www.artery.org.uk/">http://www.artery.org.uk/</a>
Australian and New Zealand Society of Nephrology	<a href="http://www.nephrology.edu.au/">http://www.nephrology.edu.au/</a>
Australian Kidney Foundation	<a href="http://www.kidney.org.au/">http://www.kidney.org.au/</a>
Brazilian Society of Nephrology	<a href="http://www.sbn.org.br/">http://www.sbn.org.br/</a>
Canadian Association of Nephrology Nurses and Technologists	<a href="http://www.cannt.ca/links">http://www.cannt.ca/links</a>
Canadian Society of Nephrology	<a href="http://rcpsc.medical.org/index.php?pass=1">http://rcpsc.medical.org/index.php?pass=1</a>
Danish Society of Nephrology	<a href="http://www.dns.suite.dk/">http://www.dns.suite.dk/</a>
Egyptian Society of Nephrology	<a href="http://163.121.19.91/esnnew/">http://163.121.19.91/esnnew/</a>
European Renal / Dialysis and Transplant Association	<a href="http://www.era-edta.org/erafset.htm">http://www.era-edta.org/erafset.htm</a>
European Renal Association	<a href="http://www.era-edta.org/erafset.htm">http://www.era-edta.org/erafset.htm</a>
European Renal Association	<a href="http://www.era-edta-reg.org/index.jsp">http://www.era-edta-reg.org/index.jsp</a>
European Society for Pediatric Nephrology	<a href="http://espn.uwcm.ac.uk/">http://espn.uwcm.ac.uk/</a>
Hellenic Society of Nephrology	<a href="http://www.ene.gr/">http://www.ene.gr/</a>
Hereditary Nephritis Foundation	<a href="http://www.cc.utah.edu/~cla6202/HNF.htm">http://www.cc.utah.edu/~cla6202/HNF.htm</a>
Indian Society of Nephrology	<a href="http://www.isn-india.com/">http://www.isn-india.com/</a>
International Society for Hemodialysis	<a href="http://www.ishd.net/">http://www.ishd.net/</a>
International Society of Nephrology	<a href="http://www.isn-online.org/site/cms/">http://www.isn-online.org/site/cms/</a>
Italian Society of Nephrology	<a href="http://www.sin-italia.org/">http://www.sin-italia.org/</a>
Japanese Society of Nephrology	<a href="http://www.jsn.or.jp/">http://www.jsn.or.jp/</a>
Kidney Epidemiology and Cost Centre USRDS	<a href="http://www.med.umich.edu/usrds/">http://www.med.umich.edu/usrds/</a>
Kidney Foundation of Canada	<a href="http://www.kidney.ca/index-eng.html">http://www.kidney.ca/index-eng.html</a>
Korean Society of Nephrology	<a href="http://www.ksn.or.kr/">http://www.ksn.or.kr/</a>
Libyan Society Of Nephrology	<a href="http://www.nephrolibya.org/">http://www.nephrolibya.org/</a>
Malaysian Society of Nephrology	<a href="http://www.msn.org.my/index.jsp">http://www.msn.org.my/index.jsp</a>
National Kidney Foundation	<a href="http://www.kidney.org/">http://www.kidney.org/</a>
National Kidney Foundation Singapore	<a href="http://www.nkfs.org/main.htm">http://www.nkfs.org/main.htm</a>
Nephrologists Forum	<a href="http://www.he.net/~brumley/renal/doctorboard.html">http://www.he.net/~brumley/renal/doctorboard.html</a>
Renal Pathology - Web Path, University of Utah	<a href="http://www.medlib.med.utah.edu/WebPath/RENAHTML/RENALIDX.html">http://www.medlib.med.utah.edu/WebPath/RENAHTML/RENALIDX.html</a>
South African Renal Society	<a href="http://www.sa-renalsociety.org/">http://www.sa-renalsociety.org/</a>
South African Renal Society	<a href="http://www.ssn-sa.com/">http://www.ssn-sa.com/</a>
Spanish Society of Nephrology	<a href="http://www.sin.it/defaulte.htm">www.sin.it/defaulte.htm</a>
Swiss Medical Societies	<a href="http://www.nephro.ch/Nephro/en/medecins/adresses.html">http://www.nephro.ch/Nephro/en/medecins/adresses.html</a>
The Hong Kong Society of Nephrology	<a href="http://www.hksn.org/">http://www.hksn.org/</a>
The Renal Association	<a href="http://www.renal.org/">http://www.renal.org/</a>
The Renal Physicians Association (RPA)	<a href="http://www.renalmd.org/">http://www.renalmd.org/</a>
Turkish Society of Nephrology	<a href="http://www.tsn.org.tr/default_en.asp">http://www.tsn.org.tr/default_en.asp</a>
UK Renal Association	<a href="http://www.umds.ac.uk/renal/renalassoc/">www.umds.ac.uk/renal/renalassoc/</a>
Addenbrooke's Hospital Cambridge Transplant Unit (UK)	<a href="http://cambridge-transplant.org.uk/">http://cambridge-transplant.org.uk/</a>
Bert Fish Medical Center Kidney Transplant Program	<a href="http://www.bertfish.com/kidney_transplant_program.html">http://www.bertfish.com/kidney_transplant_program.html</a>
Karnataka Nephrology & Transplant Institute	<a href="http://www.kanti.com/">http://www.kanti.com/</a>
National Kidney and Transplant Institute of the Philippines	<a href="http://members.tripod.com/nktiuro/">http://members.tripod.com/nktiuro/</a>
Sindh Institute of Urology & Transplantation (Pakistan)	<a href="http://www.siu.org/">http://www.siu.org/</a>
Washington Regional Transplant Consortium	<a href="http://www.beadonor.org/">http://www.beadonor.org/</a>

and linguistic barriers for the access of the chronic kidney disease (CKD) information and discuss the implications of limited Internet access to communicating health. Technical (number of

hyperlinks), content (number of six core CKD and risk factor information domains included) and linguistic barriers were assessed for websites offered by 12 kidney disease associations.

**Table 4: Different e-books related to nephrology**

<b>Nephrology books</b>	<b>Web address</b>
diesel-ebooks.com	<a href="http://www.diesel-ebooks.com/cgi-bin/category/MED055000/Nephrology.html">http://www.diesel-ebooks.com/cgi-bin/category/MED055000/Nephrology.html</a>
ebooks.com	<a href="http://www.ebooks.com/subjects/b/1193/1.asp">http://www.ebooks.com/subjects/b/1193/1.asp</a>
E-books about medicine	<a href="http://www.ebooksabouteverything.com/ebooks/category/MED055000/Nephrology.html">http://www.ebooksabouteverything.com/ebooks/category/MED055000/Nephrology.html</a>
Books from Stanford university	<a href="http://lane.stanford.edu/online/ebsubjectbrowse.html?m=Nephrology">http://lane.stanford.edu/online/ebsubjectbrowse.html?m=Nephrology</a>
Louis Calder Memorial Library	<a href="http://calder.med.miami.edu/catalog/subject/nephrology.html">http://calder.med.miami.edu/catalog/subject/nephrology.html</a>
FSU College of Medicine	<a href="http://med.fsu.edu/library/Ebooks/ebooks.aspx">http://med.fsu.edu/library/Ebooks/ebooks.aspx</a>
MediFocus Guidebook	<a href="http://www.renalcellcarcinoma-info.com/renal-cell-carcinoma-guidebook.php">http://www.renalcellcarcinoma-info.com/renal-cell-carcinoma-guidebook.php</a>
FreeBooks4Doctors	<a href="http://www.freebooks4doctors.com">www.freebooks4doctors.com</a>
eMedicine	<a href="http://www.emedicine.com">www.emedicine.com</a>
UpToDate	<a href="http://www.uptodate.com">www.uptodate.com</a>
Harrison's Online	<a href="http://www.harrisonsonline.com">www.harrisonsonline.com</a>
The online books page	<a href="http://onlinebooks.library.upenn.edu/">http://onlinebooks.library.upenn.edu/</a>
Bookshelf	<a href="http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books">http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books</a>

**Table 5: List of different agencies providing fellowship for advance training for nephrologists**

<b>Agency</b>	<b>Web address</b>
Henry Ford Health system	<a href="http://www.henryford.com/body.cfm?id=44841">http://www.henryford.com/body.cfm?id=44841</a>
Mayo Clinic Program	<a href="http://www.mayo.edu/msgme/nephrology-rch.html">http://www.mayo.edu/msgme/nephrology-rch.html</a>
Georgetown University Hospital	<a href="http://medicine.georgetown.edu/nephrology/fellowship_program.htm">http://medicine.georgetown.edu/nephrology/fellowship_program.htm</a>
Baystate Medical Centre	<a href="http://academics.bhs.org/Fellowships/Nephrology_Fellowship.html">http://academics.bhs.org/Fellowships/Nephrology_Fellowship.html</a>
Australia and New Zealand Society of Nephrology	<a href="http://www.nephrology.edu.au/awardsfellowshipsandgrants/fellowships.asp">http://www.nephrology.edu.au/awardsfellowshipsandgrants/fellowships.asp</a>
Kaiser Permanente Los Angeles Medical Center (LAMC)	<a href="http://residency.kp.org/scal/fellowship/nephrology/index.html">http://residency.kp.org/scal/fellowship/nephrology/index.html</a>
University of North Carolina	<a href="http://pediatrics.med.unc.edu/div/nephro/fellowship_overview.htm">http://pediatrics.med.unc.edu/div/nephro/fellowship_overview.htm</a>
Allegheny General Hospital	<a href="http://www.wpahs.org/agh/education/graduate/nephro/index.html">http://www.wpahs.org/agh/education/graduate/nephro/index.html</a>
Nephrology fellowship at VCU	<a href="http://www.intmed.vcu.edu/home/fellowships/nephrology.html">http://www.intmed.vcu.edu/home/fellowships/nephrology.html</a>
University of Alabama	<a href="http://www.nrtc.uab.edu/fellowships.htm">http://www.nrtc.uab.edu/fellowships.htm</a>
Maine Medical Center	<a href="http://www.wmhcc.org/mmc_body.cfm?id=1633">http://www.wmhcc.org/mmc_body.cfm?id=1633</a>

**Table 6: List of useful nephrology-related websites of universities, medical centers and government agencies in India**

<b>Name and address of medical colleges/medical institutions</b>	<b>Web address</b>
Osmania Medical College, Hyderabad, Andhra Pradesh	<a href="http://www.osmania.ac.in/">http://www.osmania.ac.in/</a>
All India Institute of Medical Sciences, New Delhi	<a href="http://www.aiims.edu/">http://www.aiims.edu/</a>
BJ Medical College, Ahmedabad, Gujarat	<a href="http://gujhealth.gov.in/medi_edu/ins_bj_ahm.htm">http://gujhealth.gov.in/medi_edu/ins_bj_ahm.htm</a>
Seth GS Medical College, Mumbai, Maharashtra	<a href="http://www.kem.edu/">http://www.kem.edu/</a>
Bombay Hospital Institute of Medical Sciences, Maharashtra	<a href="http://www.bombayhospital.com/index1.html">http://www.bombayhospital.com/index1.html</a>
Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab	<a href="http://pgimer.nic.in/">http://pgimer.nic.in/</a>
SMS Medical College, Jaipur, Rajasthan	<a href="http://medicaleducation.rajasthan.gov.in/jaipur/index.asp">http://medicaleducation.rajasthan.gov.in/jaipur/index.asp</a>
Christian Medical College, Bagayam, Vellore, Tamilnadu	<a href="http://www.cmch-vellore.edu/">http://www.cmch-vellore.edu/</a>
Institute of Medical Sciences, Varanasi, Uttar Pradesh	<a href="http://www.indiauniversity.me/banaras-hindu-university-varanasi-uttar-pradesh/">http://www.indiauniversity.me/banaras-hindu-university-varanasi-uttar-pradesh/</a>
Sanjay Gandhi PG Institute of Medical Sciences, Lucknow, Uttar Pradesh	<a href="http://www.sgpgi.ac.in/">http://www.sgpgi.ac.in/</a>
Sri Venkateswara Institute of Medical Sciences, Tirupati Govt.	<a href="http://tirumala.org/activities_social_svims.htm">http://tirumala.org/activities_social_svims.htm</a>
Gandhi Medical College, Hyderabad	<a href="http://www.gandhimedicalcollegehyderabad.org/">http://www.gandhimedicalcollegehyderabad.org/</a>
Kerala Medical College, Thiruvananthapuram Govt.	<a href="http://www.govtmedicalcollegevm.net/">http://www.govtmedicalcollegevm.net/</a>
Sri Ramachandra Medical College and Research Institute Trust, Tamil Nadu	<a href="http://www.sriramachandra.edu.in/">http://www.sriramachandra.edu.in/</a>

### C. Renal Transplantation and Web Resource

The last decade has seen an exponential rise in the amount and the nature of information that is available on the Internet about renal transplantation. We have described useful web links for detailed information related to kidney transplant [Table 7] and provided links of important agencies which provide financial support to

the nephrology patients, especially dialysis and kidney transplant patients [Table 8].

### D. Useful Nephrology Links

#### Nephrology@MedNet

The largest collection of direct links to online medical search engines and databases. Find the Web's free and

**Table 7: List of important website addresses related to kidney transplant**

Kidney Transplant Guide	<a href="http://www.kidneypatientguide.org.uk/site/kid_trans.php">http://www.kidneypatientguide.org.uk/site/kid_trans.php</a>
American Association of Kidney Patients	<a href="http://www.aakp.org">http://www.aakp.org</a>
American Kidney Fund	<a href="http://organdonor.gov/faq.html">http://organdonor.gov/faq.html</a>
Coalition on Donation, Donate Life	<a href="http://www.patients.unos.org">http://www.patients.unos.org</a>
National Kidney foundation	<a href="http://www.kidney.org.uk/">http://www.kidney.org.uk/</a>
iKidney.com	<a href="http://www.trioweb.org">http://www.trioweb.org</a>
Dialysis Facility Compare	<a href="http://www.ktppp.com/index.html">http://www.ktppp.com/index.html</a>
ESRD Network 5, Mid-Atlantic Renal Coalition	<a href="http://www.patients.unos.org">http://www.patients.unos.org</a>
Forum of ESRD Networks	<a href="http://www.seopf.org">http://www.seopf.org</a>
Kidney Transplant Health link	<a href="http://www.transweb.org">http://www.transweb.org</a>
Legislative Activity	<a href="http://www.niddk.nih.gov">http://www.niddk.nih.gov</a>
Living Donors Online	<a href="http://www.kidney.org">http://www.kidney.org</a>
Organ Transplant links	<a href="http://www.kidtrans.org/kidtrans2.html">http://www.kidtrans.org/kidtrans2.html</a>
National Kidney Foundation – Making Lives Better	<a href="http://www.livingdonorsonline.org">http://www.livingdonorsonline.org</a>
NIDDK Kidney Transplantation	<a href="http://www.organdonor.gov/legact.htm">http://www.organdonor.gov/legact.htm</a>
Questions About Kidney Transplantation	<a href="http://www.healthlinkusa.com/531B.asp">http://www.healthlinkusa.com/531B.asp</a>
British Colombia transplant Society	<a href="http://www.transplant.bc.ca/research_main.htm">http://www.transplant.bc.ca/research_main.htm</a>
South Eastern Organ Procurement Foundation	<a href="http://www.esrdnetworks.org">http://www.esrdnetworks.org</a>
Transplant Patient Data source Transplant Center Report	<a href="http://www.esrdnet5.org">http://www.esrdnet5.org</a>
Transplant Patient Partnering Program	<a href="http://www.medicare.gov/Dialysis/Home.asp">http://www.medicare.gov/Dialysis/Home.asp</a>
Transplant Recipients International Organization, Inc.	<a href="http://www.ikidney.com">http://www.ikidney.com</a>
United Network for Organ Sharing Transplantation Resource	<a href="http://www.shareyourlife.org">http://www.shareyourlife.org</a>
US Department of Health and Human Services	<a href="http://www.akfi.nc.org">http://www.akfi.nc.org</a>
Washington Regional Transplant Consortium	<a href="http://www.wrtc.org">http://www.wrtc.org</a>
Multi-Organ Transplant Program	<a href="http://www.lhsc.on.ca/transplant/">http://www.lhsc.on.ca/transplant/</a>
American Society of Transplant Surgeons	<a href="http://www.astso.org">http://www.astso.org</a>
HDCN Transplant	<a href="http://www.hdcn.com/ch/trans">http://www.hdcn.com/ch/trans</a>
ESRD Network 5, Mid-Atlantic Renal Coalition	<a href="http://www.esrdnet5.org">http://www.esrdnet5.org</a>
Forum of ESRD Networks	<a href="http://www.esrdnetworks.org">http://www.esrdnetworks.org</a>
Kidney Web	<a href="http://www.pw1.netcom.com/~knight10/kidneyweb.html">http://www.pw1.netcom.com/~knight10/kidneyweb.html</a>
National Academy of Sciences, Institute of Medicine	<a href="http://www4.nas.edu/iom/iomhome.nsf">http://www4.nas.edu/iom/iomhome.nsf</a>
United Network for Organ Sharing Transplantation Resource	<a href="http://www.unos.org">http://www.unos.org</a>
University Renal Research and Education	<a href="http://www.urrea.org/about.html">http://www.urrea.org/about.html</a>
Scientific Registry of Transplant Recipients	<a href="http://www.ustansplant.org">http://www.ustansplant.org</a>
United States Renal Data System	<a href="http://www.usrds.org">http://www.usrds.org</a>
US Department of Health and Human Services	<a href="http://www.os.dhhs.gov">http://www.os.dhhs.gov</a>
National Kidney Research Fund	<a href="http://www.nkrf.org.uk/">http://www.nkrf.org.uk/</a>
Transplant Information Website	<a href="http://body.orpheusweb.co.uk/lnks.html">http://body.orpheusweb.co.uk/lnks.html</a>
Renal-Net	<a href="http://www.renalnet.org/renalnet/renalnet.cfm">http://www.renalnet.org/renalnet/renalnet.cfm</a>
International Peritoneal Dialysis Society	<a href="http://www.ispd.org">http://www.ispd.org</a>
American Kidney Fund	<a href="http://www.kidneyfund.org">www.kidneyfund.org</a>
Transplant Pathology	<a href="http://tpis.upmc.edu/">http://tpis.upmc.edu/</a>

extensive medical archives, libraries, research databases, catalogs, and statistical data available at educational, governmental and corporate sites.

### CyberNephrology

E-mail discussion group for parents of children with kidney disease. cyberNephrology™ provides this website for the purpose of rendering online services, providing useful information and spreading knowledge (<http://www.cybernephrology.org/>).

### iKidney.com

Nephrology pediatric educational material but no chat room.

iKidney has been selected as a featured site in Lightspan's StudyWeb® as one of the best educational resources on the web. StudyWeb® is an educational resource site for students and teachers that select only the important informative websites (<http://www.ikidney.com/>).

### Kidney Patient Guide

For kidney patients and those who care for them (<http://www.kidneypatientguide.org.uk/site/contents.php>).

### CROWNWeb

The Centers for Medicare and Medicaid Services is developing a web-based application, Consolidated Renal

**Table 8: Different funding agencies helping nephrology patients**

Agencies that donate for dialysis and renal transplant	Web address
Universal Giving	<a href="http://www.universalgiving.org/">http://www.universalgiving.org/</a>
American Kidney Fund, Inc	<a href="http://www.kidneyfund.org">www.kidneyfund.org</a>
Saskatchewan Health	<a href="http://www.gov.sk.ca/">http://www.gov.sk.ca/</a>
BC Renal Agency	<a href="http://www.bcrenalagency.ca/KidneyCare/">http://www.bcrenalagency.ca/KidneyCare/</a>
American Association of Kidney Patients (AAKP)	<a href="http://www.aakp.org/">http://www.aakp.org/</a>
National Kidney Foundation	<a href="http://www.kidney.org/news/newsroom/fsitem.cfm?id=30">http://www.kidney.org/news/newsroom/fsitem.cfm?id=30</a>
Transplant Australia	<a href="http://www.transplant.org.au/">http://www.transplant.org.au/</a>
SouthWest Transplant Alliance	<a href="http://www.organ.org/">http://www.organ.org/</a>
The Kidney Transplant/Dialysis Association, Inc.	<a href="http://users.rcn.com/ktda1/">http://users.rcn.com/ktda1/</a>
New England Organ Bank	<a href="http://www.neob.org/">http://www.neob.org/</a>
United Network for Organ Sharing (UNOS)	<a href="http://www.unos.org/">http://www.unos.org/</a>
Organ Procurement and Transplantation Network (OPTN)	<a href="http://www.kotb.com">www.kotb.com</a>
The British Kidney Patient Association	<a href="http://www.britishkidney-pa.co.uk/">http://www.britishkidney-pa.co.uk/</a>
National Kidney Foundation of Connecticut	<a href="http://www.ctorganandtissuedonation.org/memmmber_agencies.html">http://www.ctorganandtissuedonation.org/memmmber_agencies.html</a>

Operations in a Web-Enabled Network (CROWNWeb), which is designed to facilitate data entry, updating, and retrieval for dialysis facilities nationwide. Part 1 of this three-part series outlines the history of end-stage renal disease and Medicare, and covers the rapid growth of ESRD (End stage renal disease) data management as well as other events that require progression to an online data collection and management system.<sup>[11]</sup>

### HONcode

Health on the Internet Foundation Code of Conduct (HONcode) for medical and health websites (<http://www.hon.ch/HONcode/index/html>) specifies eight principles to direct website developers in basic ethical standards and discover that consumers know the source and rationale of the data they are reading. To assist consumers use and comprehend medical terminology, the Medical Library Association (MLA) has published a brochure entitled “Deciphering Medspeak” which is offered free of charge in individual copies by sending an e-mail to [info@mlahq.org](mailto:info@mlahq.org) or visiting the MLA website at <http://www.mlanet.org> and for bulk orders the e-mail has to be sent to [mlafa@mlahq.org](mailto:mlafa@mlahq.org). The MLA has provided a “top ten” list of most useful consumer health websites.<sup>[12]</sup>

### Database of Individual Patients’ Experience

Database of Individual Patients’ Experience (DIPEX) is a new Internet-based multimedia resource that provides access to the experiences of others who have faced similar health dilemmas. On the DIPEX site, anybody can watch video clips, listen to the voices or read the accounts of people relating their experiences of illness and the impact it had on their lives. We can also find out about an illness and its available treatments, and find links to support groups and other reliable sources of medical information. DIPEX aims to promote more balanced encounters between patients and health care professionals by providing detailed

access to the patient perspective. It is, at once, a 24-h support group for anyone whose life is touched by an illness and a valuable resource for the training of doctors, nurses and other health professionals and health workers.

Home dialysis center (<http://www.homedialysis.org/resources/stories/>) is a very useful site for nephrology patients to obtain important and critical information regarding their future care.<sup>[13]</sup>

### Patient Stories and Experiences and Their Impact on Other Patients and Health Professionals

Internet (e-patients.net) is a very powerful tool for search and retrieves information from stories of other patients. With a “story topics search” facility, participants are better able to find the information they are looking for. Also, they retrieve stories that more closely covered, their information needs and they learn more from the stories retrieved.<sup>[14]</sup>

### Challenges and Limitations

Reliability, discretion and security are the major concerns for application of Internet in nephrology. Various antiviruses like Norton-Antivirus ([www.symantec.com](http://www.symantec.com)), f-prot ([www.f-prot.com](http://www.f-prot.com)), Thunder-BYTE (<http://www.thunderbyte.com/>), McAfee (<http://www.mcafee.com>) are available, which can be effectively utilized not only for repairing infected programs but also checking virus entry and enhancing cyber security. With a rise in numerous of health care websites, clinicians and patients have more information than ever to wade through, even simply the volumes of information it contains can be exhausting to search out for specific need. Unfortunately, many of these sites contain incomplete, misleading, or difficult to understand information, while others blur the distinction between advertising, medical advice and simple disclosure of fact.<sup>[15]</sup>



**Table 9: Important websites associated in relation to scientific facts and quality management of medical information**

Websites	Related information
http://www.acsh.org	separate scientific facts from nonsense
http://g.webring.com/hub?ring=antiquackerysite	Combat and debunk health-related frauds, myths, fads, and fallacies, and are more interested in real, objective, scientific proof, than in the speculative, subjective, and unproven theories and anecdotes of so-called Alternative Medicine
http://www.bmj.com/cgi/content/full/317/7171/1496#art	Quality of information on Internet
http://www.dietfraud.com	Inform public about fraudulent diet products
http://www.chirobase.org	A skeptical guide to chiropractic history, theories and current practices. Accurate information about chiropractic is not easy to get. This Website enables to deepen understanding. If you decide to seek chiropractic care, it may also help find a suitable practitioner
http://www.ftc.gov/bcp/consumer.shtm	Practical information on a variety of consumer topics
http://www.ncahf.org	NCAHF is a private nonprofit, voluntary health agency that focuses upon health misinformation, fraud and quackery as public health problems
http://www.fraud.org/	National Consumers League tracks complaints of inappropriate health care practices works in conjunction with the Federal Trade Commission, National Association of Attorneys General

At present, spurious health care websites have outnumbered the trustworthy ones, commonly that of universities, medical centers, government agencies, etc. Some patients consider online consultations as substitutes for a physician's visit, ignoring the disclaimers that the Internet information is not a substitute of medical practices. Therefore, in order to prevent the spreading of wrong information as well as making the user aware of these sites, the management of quality and reliability of medical information on Internet is extremely important. A possible solution could be labeling of medical information websites by web authors. Labeling and filtering technologies such as platform for Internet content selection (PICS) can help separate valuable health information from doubtful information. Further, doctors, medical societies and related people can critically evaluate Internet information by putting electronic evaluative and descriptive "tags" on it. Table 9 provides more insight to check the authenticity of information and focuses upon health misinformation, fraud and quackery as public health problems.

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