

# Nephrology “e” Learning Made “e” asier

Tejas Desai\*, Cynthia Christiano, Maria Ferris and Tushar Vachharajani

East Carolina University, 2355 West Arlington Blvd, Greenville, NC 27834, USA

**Abstract:** Healthcare providers (HCPs) are increasingly turning to internet-based resources for learning and acquiring new skills and fulfilling the requirements for continuing medical education (CME) credits. Current nephrology-specific websites offer content but with varying degrees of user-friendliness. One such website, Nephrology On-Demand, has been developed to provide evidence-based content with four important user-friendly features. (<http://www.nephrologyondemand.org>). These include: 1) multimedia resources and diversity in authorship, 2) automated surfing, 3) mobile device access, and 4) open access materials.

Given the time-constraints placed on HCPs today, providers need to discern websites that will most likely provide the information for which they are searching. Websites that offer user-friendly features can help providers sort through online information quickly and effectively.

**Keywords:** Nephrology, internet, education, medical education, online learning, e-learning, web learning, website.

Healthcare providers (HCPs) are increasingly turning to internet-based resources for learning and acquiring new skills and fulfilling the requirements for continuing medical education (CME) credits [1, 2]. Internet-based learning offers a number of advantages over traditional learning environments. Information is available at all times and HCPs can learn when it is most convenient for them [3, 4]. Several sites, such as UpToDate, the American Society of Nephrology Learning Center, and Hypertension, Dialysis, and Clinical Nephrology (HDCN.com) offer nephrology HCPs online access to evidence-based medical information (Table 1). However, simply posting medical information online does not educate the largest number of HCPs. Successful teaching websites are those that incorporate technical features that make the site user-friendly [5]. Current nephrology-specific websites offer content but with varying degrees of user-friendliness. Making content accessible in the most user-friendly format is a critical step in teaching any online learner [5]. One such website, Nephrology On-Demand, has been developed to provide evidence-based content with four important user-friendly features. (<http://www.nephrologyondemand.org>).

## FEATURE 1: MULTIMEDIA RESOURCES AND DIVERSITY IN AUTHORSHIP

HCPs are a diverse group of individuals, each having unique learning preferences and learning backgrounds. Not all providers will learn in the same manner. Certain learners prefer text-based resources, while others prefer video or audio formats [3]. Moreover, HCPs differ in their levels of training. As a result, teaching material authored by one group may not resonate with learners of lower (or higher) training levels. Websites that uniformly offer content in one format (e.g., text), and/or that are authored by only one

group (e.g., fellows/residents) are less likely to educate all learners. Nephrology On-Demand balances teaching formats and authorships by providing information in text, audio, video, and slide formats from multiple author groups. As a result, HCPs are likely to find information presented in a manner that helps them learn the best. Fig. (1) shows the distribution of Nephrology On-Demand teaching resources by format and author.

## FEATURE 2: AUTOMATED SURFING

Caring for kidney patients is increasingly complex and time consuming. As a result, HCPs may not have the time to surf the web, or even a single website, for educational content. Automated surfing, through Really Simple Syndication (RSS) feeds, allows feed readers to sort and organize clinical content on behalf of the learner [6]. As an example, the Nephrology On-Demand RSS feed organizes content by time, topic, author, and read/unread status. In addition, RSS feeds of multiple websites can be combined, which can dramatically decrease the time spent searching for content. By decreasing the time needed to find content, RSS feeds allow HCPs to spend more time learning. Feed readers are free, easy to install, and easy to use [7].

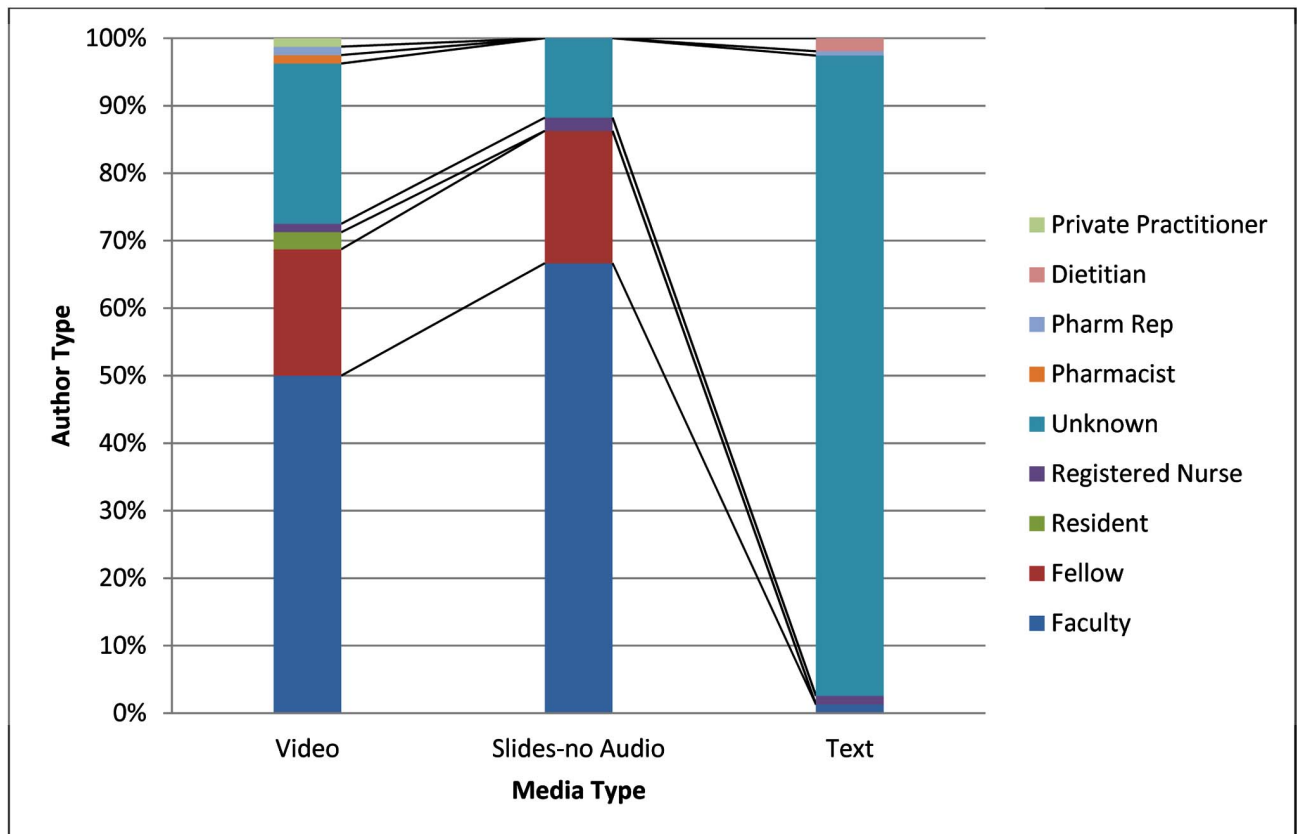
## FEATURE 3: MOBILE ACCESS

HCPs are a unique group of online learners because they are always “on-the-move”. Unlike other professionals, the responsibilities of HCPs do not center on an office, desk, or computer terminal. Rather than access medical content at fixed positions in the hospital, clinic, or dialysis unit, HCPs need medical content to follow them. Mobile websites are those that specifically offer content through mobile devices/smartphones [8]. These websites are designed to provide a similar teaching experience as traditional desktop sites, but conform to the limitations present in mobile devices [8]. One such example is Nephrology On-Demand Mobile (NOD-mobile) [9]. NOD-mobile provides complete access to content through any type of mobile device. It

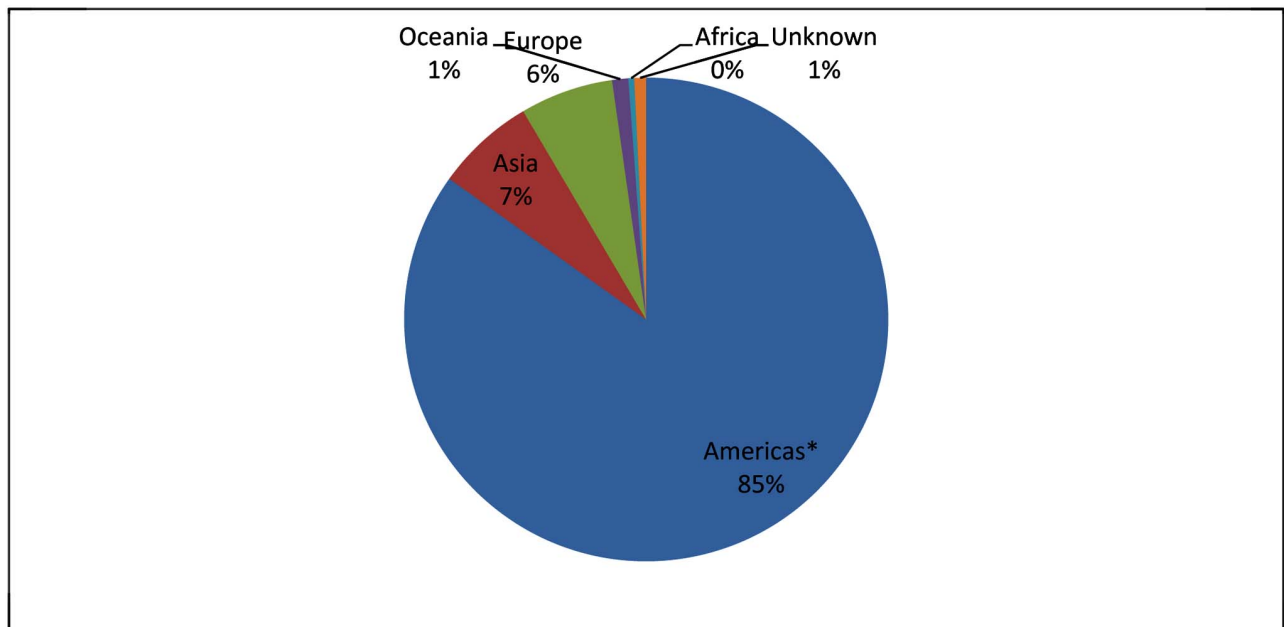
\*Address correspondence to this author at the East Carolina University, 2355 West Arlington Blvd, Greenville, NC 27834, USA; Tel: 252-744-3048; E-mail: [desait@ecu.edu](mailto:desait@ecu.edu)

**Table 1. Features of Popular Nephrology-Focused Websites**

Nephrology-Focused Websites	URL	Multimedia Resources	Authorship Diversity	Automated Surfing	Mobile Access	User Access Fees	HONcode Certification
Nephrology On-Demand	<a href="http://www.nephrologyondemand.org">http://www.nephrologyondemand.org</a>	Yes	Yes	Yes	Yes	No	Yes
ASN Learning Center	<a href="http://www.asn-online.org/education_and_meetings/distancelearning/learning-center.aspx">http://www.asn-online.org/education_and_meetings/distancelearning/learning-center.aspx</a>	Yes	No	No	No	Yes	No
Hypertension, Dialysis, Clinical Nephrology (HDCN)	<a href="http://www.hdcn.com">http://www.hdcn.com</a>	Yes	No	Yes	No	Yes	No
Renal Fellows Network	<a href="http://renal fellow.blogspot.com">http://renal fellow.blogspot.com</a>	No	No	Yes	Yes	No	Yes
UKidney	<a href="http://www.ukidney.com">http://www.ukidney.com</a>	Yes	No	Yes	No	No	No
Wikikidney	<a href="http://wikikidney.org/index.php/Main_Page">http://wikikidney.org/index.php/Main_Page</a>	No	Unclear	No	Yes	No	No
History of Nephrology	<a href="http://historyofnephrology.blogspot.com/">http://historyofnephrology.blogspot.com/</a>	No	No	No	No	No	No
Nephron Power	<a href="http://www.nephronpower.com/">http://www.nephronpower.com/</a>	No	No	Yes	No	No	No
Pediatric Nephrology	<a href="https://www.pediatric-nephrology.com/index.php">https://www.pediatric-nephrology.com/index.php</a>	Yes	No	No	No	No	No
Clinical Cases Nephrology	<a href="http://clinicalcases.org/2005/07/nephrology-cases.html">http://clinicalcases.org/2005/07/nephrology-cases.html</a>	No	No	Yes	Yes	No	No
Global Kidney Academy	<a href="http://www.gkaonlineacademy.com/">http://www.gkaonlineacademy.com/</a>	Yes	Yes	No	Yes	No	No



**Fig. (1).** Teaching content by author group and format.



**Fig. (2).** NOD-mobile visits by region. \*Of the visits to the Americas, 79% were from the USA, 4% from Canada, and the remainder from Central and South American nations.

utilizes screen size and resolution effectively, requires a conservative amount of battery power, and is compressed such that it does not exhaust storage space. Fig. (2) shows the distribution of mobile use to NOD-mobile.

#### FEATURE 4: COST

Many educational sites require a subscription fee for unrestricted access to its contents [10]. Sites that charge user fees have not been shown to provide better quality educational material than those that do not. However, such paid sites can prohibit a number of HCPs from accessing content [11]. Free websites are more accessible to learners, but are often subsidized by pharmaceutical-industry grants or advertisements. In the case of the former, users must be aware of potential conflicts-of-interest or biases that can be incorporated into teaching content. Moreover, ad-supported sites often distract learners from educational content through popup ads and elaborate eye-catching animations. In order for HCPs to focus their attention on learning and away from distracters, these obstacles need to be eliminated from websites. The Health on the Net Foundation (HON) helps learners identify websites that offer objective quality health information with limited or no distracters. In addition, the HON Foundation evaluates websites on an 8-point code ethics scale [12]. Websites that meet these ethical criteria are given the HONcode certificate, which is prominently displayed on their home page. This certificate informs HCPs that the site provides objective medical information with the least bias.

In the digital age, many providers will begin their initial searches of medical information online. The results of such searches will be a large number of websites. Given the time-constraints placed on HCPs today, providers need to discern websites that will most likely provide the information for which they are searching. Websites that offer user-friendly features can help providers sort through online information quickly and effectively. As a result, HCPs can spend less

time searching for and more time learning from online teaching resources. Further study is needed to determine specific user-friendly website features that provide the greatest yield of desired information in the least amount of time.

#### ACKNOWLEDGEMENTS

None declared.

#### CONFLICT OF INTEREST

None declared.

#### REFERENCES

- [1] Smith A. Home Broadband 2010. Pew Internet & American Life Project, August 11, 2010. Available from: <http://pewinternet.com/Reports/2010/Home-Broadband-2010.aspx> [Accessed May 5, 2011].
- [2] Horrigan J. The Internet as a Resource for News and Information about Science. November 20, 2006. Available from: <http://pewinternet.com/Reports/2006/The-Internet-as-a-Resource-for-News-and-Information-about-Science.aspx> [Accessed May 5, 2011].
- [3] He Li, Sanocki E, Gupta A, Grudin J. Comparing Presentation Summaries: Slides vs Reading vs Listening. Microsoft Research. Available from: <http://research.microsoft.com/en-us/um/people/lhe/papers/chi00.compsum.pdf> [Accessed May 5, 2011].
- [4] Kerka S. Distance Learning, the Internet, and the World Wide Web. ERIC Digest 1996. Available from: <http://eric.ed.gov/PDFS/ED395214.pdf> [Accessed May 6, 2011].
- [5] Cook DA, Dupras DM. A Practical Guide to Developing Effective Web-based Learning. *J Gen Intern Med* 2004; 19: 698-707.
- [6] Grossnickle J, Board T, Pickens B, Belmont M. RSS—Crossing into the Mainstream. Yahoo! White Paper, October 2005. Available from: [http://www.egoboss.com/pdfs/Yahoo\\_RSS\\_whitePaper.pdf](http://www.egoboss.com/pdfs/Yahoo_RSS_whitePaper.pdf) [Accessed May 6, 2011].
- [7] Nephrology On-Demand RSS Feed. Available from: <http://feeds.feedburner.com/http://nodfeedburner.com>
- [8] Diaz J, Harari I, Amadeo P, et al. WW3C Mobile Web Best Practices Evaluation of an Educational Website. Proceedings of

- 30<sup>th</sup> International Conference on Information Technology Interfaces, 2008; pp. 421-6, Cavtat, Croatia.
- [9] Nephrology On-Demand Mobile. Available from: [http://blog.ecu.edu/sites/nephro\\_logyondemand/?page\\_id=848](http://blog.ecu.edu/sites/nephro_logyondemand/?page_id=848) [Accessed May 6, 2011].
- [10] Rayport JF. The Truth about Internet Business Models. Strategy & Business 1999. Available from: [http://www.monitor.com/MENA/Portals/0/MonitorContent/imported/MonitorUnitedStates/Articles/PDFs/Monitor\\_Truth\\_About\\_Internet\\_Business\\_Models.pdf](http://www.monitor.com/MENA/Portals/0/MonitorContent/imported/MonitorUnitedStates/Articles/PDFs/Monitor_Truth_About_Internet_Business_Models.pdf) [Accessed May 6, 2011].
- [11] Jansen J. Use of the internet in higher-income households. Pew Internet and American Life Project. Available from: <http://pewinternet.org/~media/Files/Reports/2010/PIP-Better-off-households-final.pdf> [Accessed May 6, 2011].
- [12] Health On the Net Foundation. Available from: <http://www.hon.ch/HONcode/Webmasters/Visitor/visitor.html> [Accessed April 1, 2011].

---

Received: May 18, 2011

Revised: July 12, 2011

Accepted: July 15, 2011

© Desai *et al.*; Licensee *Bentham Open*.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.