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Privacy and Security Issues in E-Health Services: a Review of HON Sites

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Abstract

E-Health involves new forms of patient-physician interaction and poses new ethical challenges and threats to patient privacy. This paper reviews HONcode accredited e-Health websites that provide online appointment services for compliance with basic principles of security and privacy. We selected the HONcode websites with online appointment service in the U.S.A to do the analysis. We found that 20 of 30 HON sites we reviewed are secure sites but only 9 of 20 secure sites state that it is secure. Most HON sites require patients to submit confidential data. 10 of 30 websites do not display privacy notice or statement of privacy policy on the web appointment request page. Even though there is a privacy notice, the reading level might be a problem for the patients who have lower education background. Regulations and guidelines do not ensure that privacy protection and data security is done appropriately or well. More attention to measures and procedures are needed to safeguard patients' privacy right.

Keywords:

health services, internet, privacy, confidentiality, computer security, ethical analysis, Health Insurance Portability and Accountability Act

Introduction

E-Health and Consumer Privacy

E-Health is "…the application of Internet and other related technologies in the healthcare industry to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by healthcare organizations, practitioners, patients, and consumers in an effort to improve the health status of patients." [1] E-Health can provide healthcare consumers with opportunities to interact with their healthcare systems online and can provide new forms of patient-physician interaction.

Despite its advantages for healthcare consumers, e-Health poses new challenges and threats to their privacy. Many healthcare consumers are not aware that their use of Healthcare resources on the Internet may be tracked. Consumers may also not be aware of the personal information gathered about them when visiting a Web site [2]. For example, consumers may not be aware that their personal information may be collected without acknowledgment by cookies, nor how it may be used when it is collected by other mechanisms such as online surveys and assessments.

The HON Code of Conduct (HONcode)

The Health On the Net Foundation (HON) was founded in 1995 to promote "…the effective and reliable use of the new technologies for telemedicine in healthcare around the world."[3] The HON Code of Conduct (HONcode) was developed …to help standardise the reliability of medical and health information available on the World-Wide Web.

The HONcode is not an award system, nor does it intend to rate the quality of the information provided by a Web site. It only defines a set of rules to:

- hold Web site developers to basic ethical standards in the presentation of information;
- help make sure readers always know the source and the purpose of the data they are reading. [4]

Currently there are more than 120,000 health-related web sites that are HONcode accredited. [5] The HONcode principle regarding privacy and confidentiality states that

Your site must describe how you treat confidential, private or semi-private information such as email addresses and the content of emails received from or sent to your visitors. You must inform your visitors whether their data will be recorded in your own database, who can access this database (others, only you, nobody), if this information is used for your own statistics (anonymous or not), or if these statistics are used by third party or other companies.

A statement or a privacy policy page regarding confidentiality of data must be clearly displayed. [6]

Purpose of the Study

Rating and accreditation standards such as HONcode are critical to the success of e-Health. This study reviews HONcode accredited websites that provide online appointment services for compliance with basic principles of security and privacy.

Methods

We searched for HONcode accredited sites using the HON search engine [7] with the query "web appointment request" on Nov 16 2006 . The search retrieved 170 HONcode accredited sites. We reviewed the 30 USA websites that actually provided online appointment services. The 30 sites are listed in **Table 1**.

We reviewed each of the 30 sites to determine:
(1) Is it a secure site?
(2) Does it include a statement regarding its status as a secure site?
(3) Does it request confidential data elements from the user making an appointment?
(4) Does it include a privacy notice or statement of privacy policy?
(5) What is the reading level of the privacy notice or statement of privacy policy?

We considered a site to be secure if it used HTTPS, which is a "…combination of a normal HTTP interaction over an encrypted Secure Sockets Layer (SSL) or Transport Layer Security (TLS) transport mechanism." [8]

We used the SMOG Calculator [9] to assess the educational level needed to fully understand the text of the privacy notice or statement of privacy policy. We coded SMOG grade <12 (high school level) as low level (l), SMOG grade 12-16 (college level) as medium level (m), SMOG grade >16 (university degree) as high level (h).

Results

Table 1 shows the results of the review.

(1) Is it a secure site?
Among the 30 HON sites, 20 sites are secure sites, 10 are not.

(2) Does it include a statement regarding its status as a secure site?

Among the 20 secure sites, only 9 of them state that they are secure.

(3) Does it request confidential data elements from the user making an appointment?

Most HON sites require patients to submit confidential data such as Social Security number, date of birth, medical record number, medical information, insurance information, etc. Almost all of them require patients to provide birth date information. 6 of them require Social Security Number (SSN) along with birthday. The secure sites require more confidential data than non-secure sites.

(4) Does it include a privacy notice or statement of privacy policy?

10 of 30 websites do not display a privacy notice or statement of privacy policy, or a link to such a statement, on the web appointment request page.

(5) What is the reading level of the privacy notice or statement of privacy policy?

Among 20 websites that have a privacy notice or statement of privacy policy on their appointment page, 19 of them need higher than high school level to fully understand the privacy statement while 6 of them need higher than college level to figure out what the privacy statement means, only one needs high school or lower level to understand.

Discussion

Persons who use the Internet for health-related reasons have the right to expect that personal data they provide will be kept confidential and also have the right to be informed that personal data may be gathered, and to choose whether they will allow their personal data to be collected and whether they will allow it to be used or shared. The study of HONcode accredited medical and health Web sites reveals the gap between ideal and reality. In our sample, 1/3 of the HONcode accredited sites that provide online appointment service are not secure.

Including a privacy notice or statement of privacy policy on a site is very important. However, even though a site adopts security procedures and displays a privacy policy, users might still not trust it or may be misled unless there is a brief and understandable statement of security and privacy displayed on the site. In our study, we regarded the websites that have "https" within their URLs as secure sites as information exchanged with any address beginning with https is encrypted using Secure Sockets Layer (SSL) before transmission, but very few lay users realize the difference between "http" and "https". It is thus necessary to show that the Web site is secure by either displaying a secured seal or a brief statement. This is especially important for the users with lower education background, particularly when the site requires users to submit confidential data such as Social Security number, date of birth, medical record number, medical information, or insurance information.

Table 1 - Review of the HONcode accredited websites for compliance with basic principles of security and privacy.

	Criteria				
On-Line Appointment Site	**1**	**2**	**3**	**4**	**5**
https://epatient.muhealth.org/UMCWeb/idxpol/pslogin.asp	y	y	n	y	m
https://forms.mayoforms.org/forms/up/mcj013201.cfm	y	n	y	y	m
https://secure.childrensmemorial.org/kids_doc/apptForm.asp	y	n	y	y	m
https://secure.mcw.edu/appt_form.htm	y	y	y	y	l
https://secure01.cqservices.com/guthrie/FindAPhysician/Physicians/ Default.asp?mode=new	y	n	y	y	h
https://transact.med.yale.edu/ynhhphysiciandata/apptrequestform.asp?inst=ynhh	y	n	y	y	h
https://www.brighamandwomens.org/forms/RequestAppointment.aspx	y	n	y	y	h
https://www.clevelandclinic.org/myappointment/form.asp	y	n	y	n	na
https://www.dfci.harvard.edu/pat/becoming/request/Default.asp	y	n	y	y	m
https://www.forsberg.com/sparrowsecure/preregister1.asp	y	n	y	n	na
https://www.geisinger.org/consumers/patients/appts/appt_form.html	y	y	y	y	h
https://www.lha.org/patientcare/requestappointment/chestxray.asp	y	n	y	y	l
https://www.marshfieldclinic.org/patients/pages/default.aspx?page=apptrequest	y	n	y	y	h
https://www.muschealth.com/patients_visitors/eservices/request_appointment/ request_appointment.htm	y	y	y	y	m
https://www.reshealth.org/findadoctor/info_appointment.cfm	y	y	y	y	h
https://www.secure.summitprimarycare.com/register.asp	y	y	y	y	l
https://www.sleh.com/sleh/SectionSecured/ index.cfm?PageName=PRForm&PageMD=PHYSI-CIAN%20REFERRALS&FormMD=On	y	y	n	y	h
https://www.ucihealth.com/secured/Appointments/aptform.html	y	n	y	y	h
https://www.ucplus.org/home/Appointment/forms/default.htmy	y	y	y	n	na
https://www.ucsfhealth.org/adult/patient_guide/request_primary_care.html	y	y	y	n	na
http://nmhphysicians.photobooks.com/Appointment.asp?disclaimer=Continue	n	na	y	y	h
http://www.calear.com/contact/appointment_form_650-494-1000.php	n	na	y	n	na
http://www.englewoodortho.com/new_pt_form.htm	n	na	y	n	na
http://www.depediatrics.com/appointment.php	n	na	n	n	na
http://www.evpeds.com/onlineappt.htm	n	na	y	y	l
http://www.ewebbmd.com/appointments.htm	n	na	y	n	na
http://www.mscenter.org/content/category/1/1/15/	n	na	y	y	m
http://www.orthopodsurgeon.com/appointment.html	n	na	n	y	l
http://www.ssdental.com/appointments/appointments_dw.asp	n	na	n	n	na
http://www.vasectomy.com/Appointment.asp?DoctorId=1967	n	na	n	n	na

Legend
n = no; y = yes; na = not applicable; l = low; m = medium; h = high

Criteria:
1: Is it a secure site?
2: Does it include a statement regarding its status as a secure site?
3: Does it request confidential data elements from the user making an appointment?
4: Does it include a privacy notice or statement of privacy policy?
5: What is the reading level of the privacy notice or statement of privacy policy? (SMOG grade)

Conclusion

Security, privacy, and confidentiality are major concerns in e-Health services. Health Insurance Portability and Accountability Act (HIPAA) regulations, eHealth Code of Ethics, HON principles, and other guidelines do not ensure that privacy protection and data security is done appropriately or well. There is a gap between ideal and reality. More attention to the spirit of existing measures and procedures are needed to safeguard patients' privacy rights.

To deal with the challenges to manage and ensure individual privacy, the following steps should be taken to maintain the Web site visitor's rights to privacy and the confidentiality of personal information:

1. Secure Web sites with user ID and password or using SSL Certificate Encryption and display the Secured Seal to let the user know that his or her transactions are secure.

2. Provide a statement or a link to the privacy policy of the Web site on the home page or the site navigational bar that is easily accessible and understandable to the user.

3. Do not collect name, birthday, phone number, e-mail address, or any other personal information unless voluntarily provided by the visitor after the visitor is informed about the potential use of such information.

4. Do not collect SSN, personal medical information (medical conditions, health-seeking behaviors and questions, and use of or requests for information about drugs, therapies, or medical devices) and other sensitive personal information without the express consent of the site visitor after explanation of the potential uses of such information.

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