

# Chapter 6

## Social Media in Health Care

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### Overview

People are increasingly using health-related online social networks (OSNs) and virtual communities to seek and provide social support and health information in collaboration with other users of these websites (Lau and Kwok 2009; Newman et al. 2011). A national survey conducted by the Pew Research Center revealed that one in four respondents had looked at someone else's personal health experience and medical issues posted online, and 16% of the respondents had looked for other Internet users with similar health conditions within the past 12 months (Fox and Duggan 2013). Additionally, 40% of the respondents indicated that they shared their health-related experiences online.

In line with this trend, health-care organizations such as hospitals, clinics, and pharmacies have also started to embark on social media strategies to directly communicate with health consumers (e.g., patients and caregivers), promote medical services and products, and enable individuals to communicate with each other and exchange social support on social media websites. Mayo Clinic, for instance, pioneered the use of social media in the USA by establishing “Mayo Clinic Center for Social Media”<sup>1</sup> and initiating an OSN<sup>2</sup> for their patients to be able to communicate with one another. They state their philosophy as:

At Mayo, we believe individuals have the right and responsibility to advocate for their own health, and it's our responsibility to help them use social networking tools to get the best information, and connect with providers as well as one another.<sup>3</sup>

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<sup>1</sup> <http://socialmedia.mayoclinic.org/>, retrieved November 2015.

<sup>2</sup> <http://connect.mayoclinic.org>, retrieved November 2014.

<sup>3</sup> <http://socialmedia.mayoclinic.org/about-mccsm-smhn>, retrieved November 2015.

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Health-care providers primarily use general-purpose OSNs such as Facebook and Twitter to enhance users' awareness about health topics (Griffis et al. 2014; Rhoads 2012; Richer et al. 2014). Health-care organizations and professionals also use these OSNs to offer useful information about health-care procedures and services they provide (Lagu et al. 2008). Moreover, there are hundreds of socially integrated health-specific websites that offer collaboration platforms for health consumers (e.g., patients and caregivers). People visit these websites, exchange social support in collaboration with other individuals, and make one-to-one social ties with them (Lasker et al. 2005). Consistent with the extant literature (e.g., Demiris 2006), these social media-enabled health-care websites are referred to as virtual health communities (VHCs) in this chapter and are defined as "online environments in which users interact with one another around a set of common interests or shared purpose related to health using a variety of tools including discussion boards, chat, virtual environments, and direct messaging" (Newman et al. 2011, p. 342).

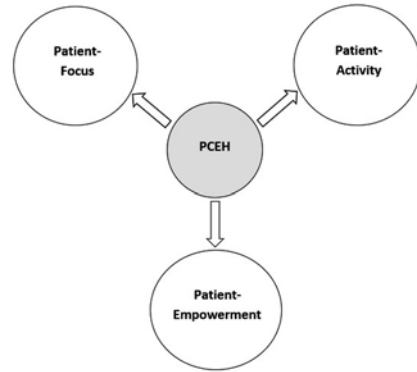
Adoption of social media technologies by health consumers will allow them to become active participants in social support and health-related information exchange activities, which are consistent with the notion of consumer health informatics (Wickramasinghe et al. 2013a). Thus, understanding various aspects of health social media will help health-care organizations, providers, and professionals utilize these systems and incorporate them into consumer health informatics practices and applications more effectively. Moreover, this understanding will allow researchers in different disciplines related to consumer health informatics direct their research efforts specifically toward health social media concepts, technologies, and applications. Therefore, in this chapter, we aim to shed light on various aspects of health social media technologies.

The remainder of the chapter is structured as follows. First, the notion of patient-centered e-health (PCEH) applications and the connection between this concept and social media in health care are discussed. Second, a distinction is made between the two major social media environments used for health-related communications. These two environments include general-purpose OSNs and VHCs. Third, a typology of social media platforms provided by VHCs and the implications of this typology are presented. Fourth, the typology is applied to analyze the types of collaboration platforms provided by a number of popular VHCs in the USA. The opportunities and future developments as well as concerns and challenges associated with the use of health social media are also discussed. The chapter is concluded with a brief recap of its contents.

### ***Patient-Centered e-Health and Social Media***

Patient-centered e-Health (PCEH) pertains to the applications that rely on the Internet technologies and revolve around patients as major actors in the health-care ecosystem (Wilson 2009). The three major characteristics of PCEH systems include patient focus, patient activity, and patient empowerment (Wilson 2009; Wilson et al.

**Fig. 6.1** Major characteristics of patient-centered e-health. (Adapted from Wilson 2009)



2014). Patient focus means that PCEH applications are primarily developed to address patients' needs and perspectives. Patient activity implies that PCEH systems are designed in such a way that patients can actively participate in providing and consuming health-related information about, or of interest to, them. Patient empowerment means that PCEH systems enable patients to control some aspects of their health care via these systems. This generation of health information systems comprises various forms of technologies from personal health records (PHRs; Greenhalgh et al. 2010) and telehealth applications to Internet-based patient communication tools and platforms (Fig. 6.1; Wilson et al. 2014).

Consistent with the definition and major characteristics of PCEH systems, health-related social technologies are considered a form of, or a structural component of, these systems. The reason is that socially enabled, health-related technologies facilitate consumer-centered health care and enable health consumers (e.g., patients and caregivers) to play an active, pivotal, and meaningful role in providing and consuming health information related to them (Kordzadeh et al. 2014; Wickramasinghe et al. 2013a). These socially enabled technologies are also referred to as consumer-centered or patient-driven health-care systems by the extant literature (Lewis et al. 2005; Swan 2009).

The use of consumer-centered social technologies for health communications provides various benefits to health consumers. The benefits include empowering patients, particularly chronic disease sufferers (Merolli et al. 2013), to manage their health care through communication with their peers (Houston et al. 2002); feeling a sense of belonging and support (Kordzadeh and Warren 2014); learning from others' health-related experiences (Demiris 2006; Kordzadeh et al. 2014; Newman et al. 2011); feeling less isolated (Houston et al. 2002; Powell et al. 2003); and coping with medical conditions more effectively (Houston et al. 2002). Moreover, these technologies may help individuals manage and shape their health-related behaviors more effectively (Wickramasinghe et al. 2013). These benefits along with the relatively low costs associated with using health social media have made these platforms an appropriate tool for health communication and social support exchange activities on the Internet.

Despite the benefits offered by health social media, these virtual environments introduce challenges and concerns. For instance, users of these websites might be concerned about the security, privacy, and confidentiality of the personal health information shared on these platforms (Antheunis et al. 2013; Kordzadeh and Warren 2014). Moreover, the accuracy and quality of information shared within these environments as well as the credibility of individuals who post medical tips, advice, and experiences through these platforms may also be a source of concern for users, providers, and administrators of these websites (Hoffman-Goetz et al. 2009). Thus, considering, investigating, and understanding the negative sides of using social media platforms for health-related communications seem necessary. The drawbacks of using health social media and the opportunities provided by them are discussed in more detail in the sections “Concerns and Challenges” and “Opportunities and Future Developments” of this chapter, respectively.

### ***Health Social Media Categories***

In general, social media websites used by health consumers and professionals can be categorized into two generic types: general-purpose OSNs and VHCs.

#### **General-Purpose OSNs**

General-purpose OSNs such as Facebook, Twitter, Instagram, and YouTube provide mass collaboration platforms to Internet users to make friendships, share thoughts, videos, audios, and pictures on any subject ranging from events in daily lives to sports, music, and education. Using OSN platforms, Internet users can also provide feedback on each other’s activities on those websites. This category of social media platforms is not specifically designed for patients and health-care organizations; however, the features and functionalities provided by such websites have made them a widely used outlet for health-related communications between individuals and health-care providers.

OSNs provide an inexpensive yet effective channel through which clinics, hospitals, pharmacies, and other health-related organizations can communicate directly with their target audience that include their actual and potential patients. Health-care organizations create profile pages on general-purpose OSNs to promote their medical services and products (Bermúdez-Tamayo et al. 2013), educate health consumers, and raise public awareness on diseases, medical conditions, and treatments (Richer et al. 2014; Griffis et al. 2014). In this way, health-care organizations can manage their relationships with health consumers and also manage their brand’s image and reputation at the community and global levels.

As of November 2014, more than 1500 hospitals in the USA had a presence on general-purpose OSNs (Bennett n.d.). For instance, 93 hospitals and clinics in Texas had a social media presence, whereas this number for the state of New York was 118. Boston Children’s Hospital and Cleveland Clinic are among the prom-

inent health-care organizations in the USA that have established a social media presence on Facebook, YouTube, or other socially enabled websites (Sharp 2012). As another example, Johns Hopkins Hospital, a world-class hospital in Baltimore, MD, has more than 225,000 users on their Facebook fan page<sup>4</sup>. Moreover, Johns Hopkins' YouTube channel<sup>5</sup> and Twitter page<sup>6</sup> have more than 11,000 subscribers and 260,000 followers, respectively, from all over the world. These statistics demonstrate that health-care organizations are more and more relying on social media websites for communications with individuals.

Health consumers including those who are suffering from particular medical conditions and those who have health-related questions or concerns join the OSN pages administered by health-care organizations. In this way, health consumers communicate directly with the organization's representatives on those pages, express their questions or concerns on their medical conditions, treatments, or procedures, and provide feedback on the services offered by that organization to health consumers. Individuals also read the articles and watch the videos related to health and wellness topics posted on those pages, and this may help them learn more about those topics and make better future decisions on their health and health care accordingly.

In addition to the communications between health providers and consumers on OSN websites, individuals can communicate with each other on those pages and share their opinions, experiences, and knowledge on medical topics (Greene et al. 2011). This consumer-to-consumer (C2C) form of collaboration will enable individuals to not only learn from health-care organizations but also learn from other individuals who have had similar health concerns or experiences related to themselves or their friends, families, or acquaintances (Greene et al. 2011; Newman et al. 2011). Providing and consuming health information in this way will empower health consumers and make them active participants in their health-care processes and education, and this is, in fact, the ultimate goal of PCEH applications and consumer health informatics.

## Virtual Health Communities

As opposed to general-purpose OSNs, VHCs are social media websites that are specifically designed for individuals to communicate on health-related topics. These websites typically provide various functionalities and collaboration platforms to facilitate health communications and discussions. DailyStrength.org, Patients-LikeMe.com, and MedHelp.org are among the most popular VHCs in the USA. For instance, MedHelp.org states that this website "empowers more than 12 million people each month to take control of their health and find answers to their medical questions."<sup>7</sup> DailyStrength.org provides more than 500 support groups ranging

<sup>4</sup> <https://www.facebook.com/Johns.Hopkins.Medicine>, retrieved November 2014.

<sup>5</sup> <https://www.youtube.com/user/JohnsHopkinsMedicine>, retrieved November 2014.

<sup>6</sup> <https://twitter.com/HopkinsMedicine>, retrieved November 2014.

<sup>7</sup> [www.Medhelp.org](http://www.Medhelp.org), retrieved October 2013.

from depression and alcoholism to pregnancy and insomnia for people to join, initiate discussions on those topics, ask related questions, and exchange informational and emotional support with other members of that website.

VHCs are different from one another in various ways. Some VHCs host users of a wide range of medical conditions. DailyStrength.org and MedHelp.org are in this group. Other VHCs host people who are somehow related to specific health-related conditions. CancerForums.net, for instance, offers collaboration platforms for individuals who are suffering from cancer or have questions or concerns related to that disease. Another difference across VHCs is the forms of collaboration platforms they provide to their users. For instance, CancerForums.net relies primarily on discussion boards and discussion threads initiated inside them, whereas MedHelp.org fosters communications between health professionals and consumers and allows individuals to ask questions and seek advice on medical issues from verified professionals on the website.

Understanding what collaboration platforms are currently provided or can potentially be offered by VHCs is important because the effectiveness, usefulness, and usability of those platforms will drive adoption and active participation of individuals on those websites, which will ultimately trigger those websites to prosper, succeed, and grow. Thus, in the next section of this chapter, a typology of collaboration platforms within VHCs will be developed, presented, and discussed. The section will start with a brief literature review on various classification schemas related to virtual communities that are proposed in the extant literature. This will be followed by explaining the method that we adapted to develop our typology. The details of the typology along with the implications of this framework will also be discussed.

## **A Typology of Collaboration Platforms Within VHCs<sup>8</sup>**

### ***Background***

Researchers in different disciplines related to online communities have developed various classification frameworks and typologies of the technologies, tools, applications, and services provided by those websites. Some frameworks aimed at classifying the platforms provided by virtual communities in a general context (e.g., Porter 2004; Stanoevska-Slabeva and Schmid 2001). Porter (2004), for instance, considered two dimensions of virtual communities, establishment and relationship orientation, as well as their subdimensions to develop a general classification of online communities. He also discussed that virtual communities can be classified based on five attributes initiated with the letter “p”: purpose, place, platform, population interaction structure, and profit model.

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<sup>8</sup> This typology was originally published and discussed in the May 2013 issue of *Health and Technology*: Kordzadeh, N., and Warren, J., (2013). “Toward a Typology of Health 2.0 Collaboration Platforms and Websites,” *Health and Technology*, 3(1), 2013, pp. 37–50.

Other researchers focused on context-specific virtual communities and provided their typology in particular for those websites. In the context of health-related online communities, researchers have made efforts to develop and present typologies and frameworks to better understand the various types of collaboration platforms as well as features and services offered by VHCs. Beijnum et al. (2009), for example, emphasized mobile virtual communities for telemedicine and discussed the different attributes and implications of this type of services. They adopted Porter's (2004) five attributes to characterize virtual communities for telemedicine. In another study, Scanfeld et al. (2010) classified and discussed various collaboration tools and platforms used for health communications through online social media. Seven types of platforms proposed in this article include blogs, microblogs, social network websites, wikis, social news and bookmarking, user reviews, and photo/video sharing. The platforms and the examples provided for each platform in this list include both health-specific websites (e.g., WebMD.com) and general-purpose OSNs (e.g., Twitter and Facebook). Scanfeld et al.'s (2010) classification, however, does not cover a set of major platforms provided by VHCs, such as physician rating, medicine rating, and ask-a-doctor. A few years later, Schein et al. (2011) added three more platforms, namely virtual worlds, news aggregators, and widgets/gadgets/badges/buttons, to the set of platforms proposed by Scanfeld et al. (2010).

Weber-Jahnke et al. (2011) adopted a three-stage typology development methodology to categorize consumer health informatics applications and services into six broad categories: (1) information aids, (2) decision aids, (3) education aids, (4) management aids, (5) health sales services, and (6) meta/rating services. They argued that various forms of health social media tools and platforms could be utilized for specific consumer health informatics applications. For example, forums, OSNs, and chat rooms can be used for management aids. A summary of the typologies discussed in this section is provided in Table 6.1.

The existing classifications in the context of health social media need an update for several reasons. First, they do not distinguish VHCs (e.g., DailyStrength.org) from general-purpose OSNs (e.g., Facebook and Twitter). Consequently, these typologies do not cover numerous state-of-the-art collaboration platforms such as physician rating and ask-a-doctor, which are provided specifically by VHCs. Second, the typologies related to health social media that are proposed by the extant literature are not built on the type of users and the forms of collaborations between them. In order to fill these gaps, we developed a specific typology of collaboration platforms within VHCs that revolves around two major types of VHC users and the interactions between them.

In order to develop the typology, a two-step method used in various typology development studies is also followed in this study. This method, known as conceptual-empirical approach (Nickerson et al. 2013), revolves around a logically supported conceptual development of a typology followed by an empirical verification. Accordingly, in the first step of the typology development process, a typology of collaboration platforms and websites within the VHC context is developed. The conceptual development is built on the prior literature on social media platforms (Scanfeld et al. 2010; Schein et al. 2011) as well as e-commerce business models

**Table 6.1** Typologies of general and health-specific social media

Citation	Content	Categories/types
Porter (2004)	Virtual communities (general)	<p>Based on the two main dimensions (establishment and relationship orientation), five major categories of virtual communities were proposed as follows:</p> <ol style="list-style-type: none"> <li>1) Social member-initiated communities</li> <li>2) Professional member-initiated communities</li> <li>3) Commercial organization-sponsored communities</li> <li>4) Nonprofit organization-sponsored communities</li> <li>5) Government organization-sponsored communities</li> </ol> <p>To further expand the typology, five attributes were also considered: purpose, place, platform, population interaction structure, and profit model</p>
Beijnum et al. (2009)	Mobile virtual communities for telemedicine	Porter's 5p attributes which include purpose, place, platform, population interaction structure, and profit model were adopted to characterize different forms of mobile virtual communities for telemedicine
Scanfeld et al. (2010)	Collaboration tools and platforms used for health communications through social media, e.g., Twitter	<p>Seven major types of collaboration platforms that can be offered by socially enabled websites were identified:</p> <ol style="list-style-type: none"> <li>1) Blogs</li> <li>2) Microblogs</li> <li>3) Social network websites</li> <li>4) Wikis</li> <li>5) Social news and bookmarking</li> <li>6) User reviews</li> <li>7) Photo/video sharing</li> </ol>
Schein et al. (2011)	Social media in health care	<p>The following three categories were added to Scanfeld et al.'s (2010) typology:</p> <ol style="list-style-type: none"> <li>1) Virtual worlds</li> <li>2) News aggregators</li> <li>3) Widgets/gadgets/badges/buttons</li> </ol>
Weber-Jahnke et al. (2011)	Consumer health informatics Services and applications	<p>Based on the purpose of using collaboration services and applications, six major types of these applications were identified:</p> <ol style="list-style-type: none"> <li>1) Information aids</li> <li>2) Decision aids</li> <li>3) Education aids</li> <li>4) Management aids</li> <li>5) Health sales services</li> <li>6) Meta/rating services</li> </ol>



(Turban et al. 2010). It is followed by an empirical verification of the proposed typology. To do so, various keywords relevant to this study, such as “virtual health communities,” “online patient communities,” “online physician communities,” “health blogs,” and “health social media,” are searched on Google.com to find relatively popular English language VHC websites and to make it possible to compare them with respect to the typology proposed in this study. The top-ranked VHC websites in terms of the number of users and page views are identified and included in a list. Then, that list is compared with the lists provided by ranking websites. Only those VHC websites that are consistently mentioned as top health-related social media websites used by either patients and caregivers or physicians and medical doctors are included in the final list. The final list includes 20 VHC websites. The names of those websites along with the collaboration platforms they provide are presented and discussed in the section “Typology in Action.”

### ***The Proposed Typology***

Within the context of VHCs, we define collaboration platform as socially enabled computer-mediated communication environment used for contribution of health-related digital content (e.g., articles, messages, emoticons, audios, and videos). As opposed to the traditional computer-mediated communication tools and technologies such as e-mail, private messaging, and chat services, VHC collaboration platforms are more comprehensive, socially oriented systems typically built upon mass collaborations on health-related topics, making social ties among individuals and creating social support exchange relationships among them.

VHC collaboration platforms derive their structures, applications, technologies, and characteristics from a wider concept of “Web 2.0 collaboration platforms”—also known as Web 2.0 applications, functionalities, or tools—such as blogs, OSNs, and user reviews (Schein et al. 2011; Constantinides and Fountain 2008). Following this naming convention, health social media and VHC websites are sometimes referred to as Health 2.0 or Medicine 2.0 websites by researchers and practitioners (Hughes et al. 2008; Wickramasinghe et al. 2013b). Among different taxonomies proposed for Web 2.0 collaboration platforms that can be applied to the context of health care, we consider the one provided by Scafield et al. (2010) a starting point for our typology (Table 6.2).

In the classification proposed by Scafield et al. (2010), seven major collaboration platforms provided by socially enabled websites are distinguished. These platforms could be used for sharing health information among users of these websites. In our study, we revised Scafield et al.’s (2010) classification because they did not focus on VHCs websites, which are dedicated to health topics (e.g., DailyStrength.com). Rather, they considered general-purpose OSNs such as Facebook and Twitter. Thus, the set of social media platforms proposed by them does not cover health-specific platforms such as health forums or ask-a-doctor, which are widely provided by VHCs. Moreover, platforms such as “microblog” and “social news and

**Table 6.2** A typology of Web 2.0 collaboration platforms. (Adapted from Scanfeld et al. 2010)

Collaboration platform	Definition
Blog (“Weblog”)	A website that contains regularly updated entries displayed in reverse chronological order
Microblog	A form of blogging that allows users to send brief text updates or micro-media to be viewed by the public or a restricted group
Social networking website	Online communities that share interests and/or activities
Wiki	A website that enables the easy creation and editing of inter-linking web pages
Social news and bookmarking	Social bookmarking enables users to save and share links to web pages organized by metadata (e.g., “tags” or keywords). Social news sites often enable users to vote on links to news, bringing the most popular stories to the top
User reviews	A website or site feature on which people can post opinions about people, businesses, products, or services
Photo/video sharing	A website that enables the publishing of a user’s digital photos or video clips online, facilitating sharing with others

bookmarking,” included in Scanfeld et al.’s (2010) classification, are not typically utilized by VHC websites. Therefore, we customized their classification to make it better fit in the context of health social media and VHCs. We also customized the definition of each type to make them meaningful in the context of our typology. Thus, the VHC collaboration platforms we focused on in this study along with their definitions are summarized in Table 6.3.

**Table 6.3** Virtual health community (VHC) collaboration platforms

Collaboration platform	Definition
Health blog	A collaboration platform that displays postings by one or more individuals on different health-related topics such that other Internet users can post their comments on each entry (Scanfeld et al. 2010)
Physician rating	A collaboration platform through which people can post their opinions about health professionals such as doctors and dentists (Scanfeld et al. 2010)
Medicine rating	A collaboration platform through which people can share knowledge and experience about different types of medicine
Online health social network	A collaboration platform on which users can create a public or semipublic profile, share their personal information such as demographics, photos, health conditions, and feelings, and make connections with other users of the website by adding them to their friends lists (Ellison 2007)
Health discussion board/forum	A collaboration platform for the open discussion of subjects relevant to health and wellness (Wang et al. 2006)
Ask-a-doctor	A collaboration platform through which health consumers can ask their questions and receive responses from health professionals hosted on a given Health 2.0 website

The collaboration platforms listed in Table 6.3 can be incorporated into various forms of VHCs and used by different types of VHC users. In general, there are two major types of individual users/actors within the context of health social media: (1) health consumers such as patients and caregivers and (2) health professionals such as physicians, medical practitioners, and dentists. Both health consumers (C) and health professionals (P) can serve as either support provider or support recipient while interacting with other users of these websites. Accordingly, the collaborations within Health 2.0 websites can be categorized into four major types: professional-to-professional (P2P), professional-to-consumer (P2C), consumer-to-consumer (C2C), and consumer-to-professional (C2P). P2C collaborations occur when health professionals provide support for health consumers, while C2P collaborations can be realized when health consumers contribute their experience and opinions to health professionals. P2P and C2C collaborations represent interactions and support exchanges among health professionals and health consumers, respectively, on VHC websites.

This perspective toward collaborations among Health 2.0 users is very similar to the way e-commerce transactions are categorized by researchers and practitioners in different fields into C2C, consumer-to-business (C2B), business-to-business (B2B), and business-to-consumer (B2C), as well as government-to-consumer (G2C) and consumer-to-government (C2G; Turban et al. 2010). For example, in the context of e-commerce, when a product or service is provided by companies for individuals over the Internet (e.g., purchasing a laptop from Dell.com), B2C transactions occur. Similarly, when individuals sell and buy items from other individuals, (e.g., trading on ebay.com or Craigslist.com), C2C transactions are realized.

The platforms proposed in Table 6.3 can enable and support specific type(s) of collaborations within the context of health social media from P2P to C2C. For instance, OSNs can be used for both C2C and P2P communications, whereas the ask-a-doctor platform is primarily used for P2C support provisions. Thus, in the following section, the proposed typology of VHC platforms is further developed and how each type of platform supports specific types of collaborations among VHC users is discussed in detail.

### **Platforms Supporting P2C Collaborations**

P2C collaborations occur when health professionals provide supports for health consumers through VHC channels. Two major platforms used by health professionals to provide direct support for patients are health blogs and ask-a-doctor. Health blogs have become an important source of online health information for Internet users (Hu and Shyam Sundar 2010). They are typically authored by health professionals and comprise health-related news, information, tips, and advice that can be beneficial for health consumers (Lagu et al. 2008). The Internet users who read the blogs can then post their comments and questions regarding the topics of those blogs. Other blog readers as well as the blog authors can afterward answer the questions posted on the blogs.

“Ask-a-doctor” is the second prominent P2C collaboration platform. Using this platform, any user can ask specific questions regarding medications, diseases, or any health-related topics from the health professionals approved by the website. These health professionals then provide the user with an answer that is specifically tailored based on the user’s question. Unlike the P2C interactions through health blogs, the interactions based on ask-a-doctor are initiated by a health consumer. An ask-a-doctor platform can be provided as a private channel such that the answers by the health professionals cannot be viewed by any user other than the one who asks the question (e.g., DailyStrength.org). Other VHC websites (e.g., MedHelp.org) provide a more socially enabled ask-a-doctor platform such that when a user posts a question and the health professionals answer that, other users can also view the question–answer thread and engage in the discussion.

### **Platforms Supporting C2C Collaborations**

Various collaboration platforms are provided by VHC websites to enable health consumers to interact, make social ties, and support each other on their health issues and concerns. The most widely used C2C collaboration platform is health discussion boards or forums. Health discussion boards are topic-oriented platforms used by health consumers to discuss specific diseases, treatments, or any other health-related topic (Tanis 2008). Health consumers initiate discussion threads on a topic, ask a question, and/or seek support from others on the website. In response to the thread initiator, others post comments to the thread and provide their thoughts, sympathy, information, and experience that specifically address the thread topic. Forums are typically categorized based on different criteria such as medical conditions (e.g., cancer and depression) or treatments.

OSNs of health consumers are another C2C platform widely used by VHC websites. Using this platform, users create profile pages, add profile photos, share personal information such as demographics and health status, and make connections with each other by adding individuals to their friends lists (Eysenbach 2008). This structure is very similar to the typical structure of general-purpose OSNs such as Facebook and MySpace (Ellison 2007).

Although online health social networks and health discussion boards have much in common, they have their differences. Online health social networks and the interactions based on them are basically user oriented (Ellison 2007). Consequently, social ties between users who interact based on these platforms are strong, emotional based, and long term, whereas the interactions that occur within discussion boards are inherently topic oriented (Stanoevska-Slabeva and Schmid 2001; Ellison 2007). Thus, the social ties formed between users who engage in discussion threads are more transaction based. It leads typically to short-term relationships between those who participate in discussion threads and support each other merely through these channels. The main advantage of discussion boards is that users can take advantage of others’ knowledge and experience, regardless of their friendship status. This leads to an extensive knowledge base available to users, compared to situa-

tions where users seek information only from their friends within the community. Additionally, discussion boards provide a more structured platform that users can initiate, follow, or contribute to the topics that are of more interest to them.

Health blogs can also be used for C2C communications. Health consumers initiate blogs on their current health issues, concerns, or questions, and others post their supportive messages on the blog. The difference between personal health blogs and discussion threads is that health discussion threads are categorized based on specific health topics, while blogs can be on any topic of interest to the user. Thus, health blogs are usually incorporated into OSNs such that users can simply initiate their personal blogs on their profile pages (e.g., DailyStrength.org).

User reviews, which is another collaboration platform used for C2C interactions, primarily emerge in two forms: medicine rating and physician rating. Medicine-rating platforms provided by VHC websites enable health consumers to share their experience and knowledge on the effectiveness, side effects, and other characteristics of medicines. Users can also rate drugs and compare the drug ratings (e.g., AskAPatient.com). Physician-rating platforms are also among the fastest growing user reviews in the context of health social media (Lagu et al. 2010; Kadry et al. 2011). Using this form of C2C platform, health consumers post their reviews on doctors, surgeons, health practitioners, and any other health professionals. Moreover, physician-rating platforms sometimes allow the users to rate clinics and hospitals in terms of the quality of health-care services they provide for their patients. The reviews posted are useful for the patients who may potentially need to visit a specific health-care organization or health professional.

### **Platforms Supporting P2P Collaborations**

Health professionals can also use VHC collaboration platforms to communicate with their colleagues. Discussion boards, for example, can be used by them to discuss on specific diseases, treatments, medications, surgery techniques, technologies, and other professional topics in their areas of expertise. This can enable health professionals to always be up-to-date on health-related sciences and technologies. Additionally, professional OSNs and health blogs can be utilized by health professionals for P2P interactions and peer-to-peer support provision. However, unlike C2C, P2C, and C2P collaboration platforms in which health consumers play a major role as support provider or recipient, P2P platforms and communications within them merely revolve around health professionals. Thus, consistent with the definition of consumer health informatics and PCEH applications, which emphasizes the active role of health consumers, P2P Health 2.0 platforms and websites are not considered part of consumer health informatics.

		Support Recipient	
		Health Professional	Health Consumer
Support Provider	Health Professional	<b>P2P (not part of consumer-centered e-health)</b> 1. Online Social Networks 2. Health Discussion Boards 3. Health Blogs	<b>P2C</b> 1. Health Blogs 2. Ask-A-Doctor
	Health Consumer	<b>C2P</b> 1. Physician-Rating	<b>C2C</b> 1. Online Social Networks 2. Health Discussion Boards 3. Health Blogs 4. Medicine-Ratings 5. Physician-Ratings

**Fig. 6.2** The proposed typology of virtual health community (VHC) collaboration platforms. *P2P* professional-to-professional, *C2P* consumer-to-professional, *P2C* professional-to-consumer, *C2C* consumer-to-consumer

### Platforms Supporting C2P Collaborations

Unlike the previous types of collaborations, C2P collaborations are not well supported by the current types of Health 2.0 collaboration platforms. However, physician-rating websites can be used by health consumers to post their reviews on health professionals for the use of these professionals and not merely for the advantage of health consumers. For example, health-care organizations can provide specific physician-rating platforms for their patients so that the organization management team can learn about the patients’ opinions about the physicians who work in the organization. This can help them improve the quality of care they provide for their patients. A summary of the types of collaboration platforms that enable and support each type of collaboration within VHC websites is presented in Fig. 6.2.

### *Typology in Action*

In order to validate the proposed typology and make it clearer, we applied our typology to a list of 20 VHC websites. Considering the different types of platforms and websites introduced in the typology, we compared these websites and the prominent platforms they provide. As mentioned earlier, to compile the list of these 20 websites, we searched various keywords relevant to health social media on Google.com

to find relatively popular health-related websites that provide collaboration platforms for their users. We compared the search results with the list of the top health-related websites provided by different blogs, ranking services, and other websites. Then, we included the names of the VHC websites that appear in different rankings and that offer socially enabled services and features. The results containing the names of the websites found throughout this search process as well as the types of collaboration platforms provided by them are summarized in Table 6.4.

Table 6.4 shows that Sermo.com and Ozmosis.org are virtual communities of health professionals and, consequently, health consumers do not get involved in the communications that occur within these online communities. Thus, these two websites are not considered as a part of consumer-centered websites or consumer health inform. The other 18 websites, however, revolve around health consumers and provide platforms for their users to communicate with health professionals and/or other health consumers who are members of these websites.

**Table 6.4** Virtual health communities (VHCs) websites and collaboration platforms

Website name	Type of Health 2.0 platform					
	P2P	P2C		C2C		C2P
	Professional discussion board	Blog/news group	Ask-a-doctor	Online health social network	Discussion board	Physician rating
DailyStrength.org	–	✓	✓	✓	✓	–
WebMD.com	–	✓	–	–	✓	–
Connect.MayoClinic.org	–	–	–	✓	✓	–
Drugs.com	–	–	–	✓	✓	–
AskaPatient.com	–	–	–	–	✓	–
HealthBoards.com	–	–	✓	✓	✓	–
PatientsLikeMe.com	–	–	–	✓	✓	–
MedHelp.org	–	✓	✓	✓	✓	–
Inspire.com	–	–	–	✓	✓	–
CancerForums.net	–	–	–	✓	✓	–
Breastcancer.org	–	✓	✓	✓	✓	–
KevinMD.com	–	✓	–	–	–	–
Sermo.com	✓	–	–	–	–	–
Ozmosis.org	✓	–	–	–	–	–
HealthGrades.com	–	–	–	–	–	✓
iWantGreatCare.org	–	–	–	–	–	✓

*P2P* professional-to-professional, *P2C* professional-to-consumer, *C2C* consumer-to-consumer, *C2P* consumer-to-professional

## ***Opportunities and Future Developments***

Despite the pervasive adoption of health social media in the health-care industry, still various opportunities exist for developers and providers of these systems as well as health-care organizations to make a better use of these technologies. Three such opportunities are synchronous collaboration platforms, social-media-enabled mobile applications, and knowledge discovery.

### **Synchronous Collaboration Platforms**

Currently, VHC websites tend to provide asynchronous collaboration platforms, while synchronous platforms such as chat rooms, video conferencing environments, and webinars can be incorporated into those websites for the users' real-time communications. Chat rooms, for example, can be used as an alternative or as a complement to health discussion boards. If chat rooms are developed within VHCs, users can join them and discuss on specific medical topics including their current health issues, concerns, and experience in a real-time manner. VHCs can also enable the users to chat with health professionals and ask their questions through this medium. In order to enrich the interactions via chat rooms, video communication functionalities can also be added to them. Video conferencing and webinars (web-based presentations, lectures, or workshops) can also be used for educational purposes, targeting health professionals or health consumers. VHCs can offer periodic webinars each on specific health/wellness topic for their users. Webinars could be even more effective than traditional health blogs for conveying health tips and advices from health professionals to health consumers.

In future studies, the potential values that each of the aforementioned synchronous collaboration platforms can provide for VHC users can be investigated. Researchers can also study how these platforms can be combined with their asynchronous counterparts to make health consumers and professionals more inclined toward adopting and using VHC websites and participating actively within these environments.

### **Mobile Applications**

Another type of collaboration platform that is not yet widely offered by VHC websites and, consequently, not researched adequately in the context of health social media is mobile applications. Recently, various communities such as WebMD.com have offered mobile applications for their users such that the members of those websites can communicate using their mobile devices. Other communities such as Epocrates.com have gone beyond that and based their business model solely on developing and providing mobile applications, mostly for health professionals. However, there is still a huge potential for other VHC websites to take advantage of the mobile-based emerging technologies and collaboration platforms. In future studies,



researchers can investigate the attitudes and perceptions of VHC users toward using mobile devices for different types of health communications from P2C to C2C. The potential capabilities of these platforms for enriching communications within VHCs can also be researched in future.

### **Knowledge Discovery**

Everyday millions of health-related posts are sent through various VHC websites. Each post may contain valuable information not only for the specific audience of that post but also for other health consumers and professionals. Health forums, for example, are becoming a rich repository of unstructured knowledge about health topics such as disease symptoms, medicine side effects, successful treatments, medical cases, and medications. The knowledge stored in this way can be discovered and organized to be used by future patients, caregivers, and, more importantly, by health professionals. Despite these opportunities, the application of knowledge management has still been overlooked by health-care information system researchers and practitioners. Future research can examine how knowledge management techniques and strategies can be utilized in Health 2.0 collaboration platforms and websites and how the knowledge discovered in this way can create value for health professionals and health consumers.

### ***Concerns and Challenges***

Adoption and use of social media technologies for health care have risks and drawbacks, such as possible violation of information privacy, lack of information quality and credibility, and free riding and lurking behaviors on those websites.

### **Information Privacy**

Personal health information is sensitive information that individuals may not be willing to share and discuss through public collaboration platforms and websites (Williams 2010). Thus, adopting VHCs and active participation within them presents information privacy risks. While interacting with other Internet users, individuals may be concerned that the personal health information they reveal on a website may be misused by the website's administrator, the members of the website, or third parties such as insurance companies. Considering these privacy risks, health professionals may not be willing or allowed to discuss their patients on publicly accessible VHC websites. Nonetheless, those websites typically provide privacy policies and controls for their users.

The importance of health information privacy within the context of health social media demonstrates that researchers should focus more on this issue. Future

research can assess perceived privacy risks and concerns of health consumers and professionals and provide practical guidelines for VHC providers to address user concerns more effectively. Website providers should also improve their privacy policies and utilize privacy-enhancing technologies to better protect their members' privacy, which will result in members being more willing to participate actively in the collaborative activities on the website.

### **Information Quality/Credibility**

A major challenge which the users of health social media platforms face is the quality, reliability, and credibility of the information provided by others on the website (Antheunis et al. 2013). For example, users may share their experience of using a specific medicine on discussion boards. However, how can one trust this information that comes from a user whose real identity is probably not disclosed on the website? To what extent do people rely on this information and take advice from other users on these websites? And, if a user claims to be a medical expert, how could his/her credibility be verified? Is it the website's responsibility to approve the reliability of the health information, tips, and advice shared through collaboration platforms, or should the users be aware of the potential risks of using and relying on such information? These are all questions that can be addressed by VHC providers and by researchers in future studies.

### **Lurking**

The success, growth, and viability of VHCs are subject to the level of user participation. The online communities within Health 2.0 websites may not survive if the vast majority of the community comprises lurkers who merely read the posts and do not actively participate in the discussions and communications (Nonnecke and Preece 2000; Panciera et al. 2010). Extant literature has addressed the reasons behind active participation and lurking within different types of online communities. However, the specific characteristics of VHC collaboration platforms and websites as well as the specific reasons for joining and participating within these websites demonstrate that researchers should particularly study the drivers and inhibitors to knowledge contribution within these environments. The results of these studies can also help online community providers to foster user participation within their websites.

## Conclusion

Social media platforms and websites are becoming a major channel through which health consumers including patients and caregivers seek and provide information and emotional aid in collaboration with other users of those websites. In this way, individuals are not merely passive consumers of health information, rather they get involved in producing, sharing, seeking, and discussing health information related, or of interest, to them. This is the ultimate goal of consumer health informatics and PCEH application.

The two major health social media categories discussed in this chapter, general-purpose OSNs and VHCs, can play a crucial role in driving individuals' engagement in their health care. Accordingly, general-purpose OSNs are primarily used by health-care organizations not only to facilitate C2C communication but also as a gateway through which those organizations educate people on health and wellness-related topics and promote the services and products that they offer to health consumers. Moreover, in order to communicate with their target audience more effectively, health-care organizations need to systematically develop a social media strategy to exactly know what their intentions of using such channels are and how they want to implement those strategies. For example, some hospitals may want to use their official Facebook pages to share organizational news on achievements, awards, new facilities, and new services provided to the community. Thus, they may need to hire social media marketing experts to better communicate organizational news and promote their quality of care through those social media websites. Other hospitals may intend to use their social media pages primarily to provide tips and advice on health and wellness topics to patients and to the broader community. Therefore, this group of hospitals will need to have physicians and medical experts develop medical articles that are easy to understand for the public audience and share those articles regularly on those social pages.

The second category of health social media, which is VHCs, can also offer various collaboration platforms for health consumers that help them communicate with other users of those websites more effectively. The primary collaboration platforms offered by VHC websites include health discussion boards, online health social networks, health blogs, ask-a-doctor, physician rating, and medicine rating. Additionally, providers of VHCs can provide users with synchronous communication environments such as chat rooms and webinar sessions. Those websites can also offer social-media-enabled mobile applications.

Hospitals and clinics all over the world can develop their own social media websites and get their own patients as well as the public audience engaged in the social interactions within those websites. In this way, health-care institutions can create support groups, encourage users to post topics and respond to others' topics through discussion boards, rate physicians, services, and products through rating platforms, and seek medical consulting services through the ask-a-doctor platform. A major advantage of organization-sponsored VHCs (e.g., Mayo Clinic's social media website) against public VHCs (e.g., CancerForums.net) is that organization-sponsored VHCs are provided, administered, and controlled by a specific (or a group of spe-

cific) health-care organization(s). As a result, physicians and other medical experts sponsored by these organizations can moderate the health-related discussions and social interactions within the community to verify the quality, accuracy, credibility, and reliability of the user-generated content on the collaboration platforms such as discussion boards.

Despite the benefits of health social media for health providers and consumers, protecting the privacy of users, particularly those who intentionally or unintentionally disclose their identifiable information within VHCs, remains a major challenge for the providers of VHC websites. Providers and administrators of these websites can develop and offer comprehensive privacy policies and statements. They can also provide users with privacy setting features to enable them to adjust their identifiability and profile visibility. Training users and raising awareness on privacy topics such as why protecting health information privacy is important and how users can protect their privacy on VHCs are among other ways of mitigating privacy risks in health social media environments. Governmental agencies such as the US Department of Health and Human Services that enforce health information privacy-related acts and regulations can also address privacy risks on socially enabled environments.

Another challenge that VHC providers face is lurking, which means many users may not be willing to actively participate in online discussions. If people tend to merely read and use the information shared by others on VHCs, the overall activity level within those communities will diminish. This is not desirable and will need to be addressed through providing incentives and making policies to encourage individuals to actively provide emotional and informational support to other users of those virtual environments.

In summary, health social media including general-purpose OSNs and VHCs offer various opportunities and challenges to health-care organizations as well as health consumers. Hospitals and clinics communicate with their audience through collaboration platforms provided by health social media. Health consumers also play an active role in their health care via adopting social media to exchange medical information and knowledge in collaboration with each other and with health-care providers. Given the current trend of using social media in health care, it is expected that in the near future, social technologies will be adopted more widely, more wisely, and more effectively in that context.

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