

# **Towards a Framework for Social Media Applications in Consumer Health**

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## **Abstract**

Social media adoption by people all over the world is increasing dramatically. With this comes a new generation of applications on the Internet that make it easier than ever before for consumers to share and collect information from one another. Based on several studies from IT and research companies, social media adoption among top corporations around the world have continually increased. This can be visibly seen at present due to their active presence on popular social media sites such as Facebook, Twitter and YouTube. The healthcare industry however, due to its strict and controlled processes to safeguard the privacy of their patients as well as ensure the stability of their systems have been slow in adopting social media. As such, this presents several opportunities and challenges for the healthcare industry including patients, physicians, healthcare institutions and public health to implement it properly in order to maximize its potential.

According to several studies cited in this research paper, the successful implementation of social media technologies can lead to a positive return on investment (ROI) for providers, because effective engagement and communication with consumers not only helps retain existing clients but also attracts potential new ones. For the healthcare industry, this translates to more satisfied patients and the possibility of increased patient revenue. Therefore, the healthcare industry must see the value of this phenomenon and try to harness its capabilities to connect with patients while also addressing security issues by establishing social media policies centered on professional healthcare standards.

As social media applications have now become a part of daily life for many individuals, there is no doubt that it is changing the way patients communicate in the modern age. This paper will try to examine the key concepts, tools, frameworks, preliminary work and trends for the future of Social Media in healthcare. Additionally, it will also analyze recent case studies related to the actual implementation of social media in healthcare and the results achieved through its use. Finally, this paper will provide a conceptual framework that integrates various forms of social media with Health 2.0 use-cases.

# 1. Social Media

Social media refers to a group of online entities that have immensely transformed the way individuals search for information, interact with each other and contribute in their communities (Kaplan et al, 2010). It incorporates a huge variety of websites, from online web journals (commonly referred to as blogs), photo and video sharing applications, social networking sites, educational, to news and information sites.

According to Gartner Research, "Social media is an on-line environment established for the purpose of mass collaboration" (Bradley, 2011). This definition is simple yet provides powerful insights. It deliberates that Social media is an environment rather than a technology. (E.g., Facebook can be referred to a social media environment developed on a social networking technology. A purpose for technology points it to be social media else it's only a technology. Although social media can be used for various interactions (e.g., group communication, one-to-one interactions), yet its usefulness is best gained from mass collaboration.

## 1.1 Social Media Characteristics

The idea behind Social Media is far from revolutionary. A confusion exists among administrators as to what exactly should or shouldn't be included in this term, and as how Social media differs from technologies like Web 2.0 and User Generated Content. To address this issue one has to look into the insight regarding the origin of Social Media and its fragments.

Tom Truscott and Jim Ellis from Duke University created the Usenet, back in 1979 which was a worldwide discussion system that endorsed users to post public messages. So far, the era of Social Media as we recognize started almost 20 years earlier, when Susan and Bruce Abelson created the "Open Diary," which was referred to as a social networking site developed for the purpose of connecting online diary writers into a single group. The term "we blog" originated at the same time and condensed as "blog" a year later. This occurred when a blogger humorously altered the noun "weblog" into the sentence "we blog." Further popularity of the concept was added by the increasing capability of high-speed internet access, ultimately leading to the creation of social networking applications/sites like MySpace(in 2003) and Facebook(in 2004). This further added up to the formation of the term "Social Media." The very recent development to this trendy grouping are so called "virtual worlds" which can be referred to as a computer based simulated environment occupied by three dimensional avatars. (e.g., Second Life by Linden Labs) (Kaplan et al, 2009).

For the purpose of defining the term social media it's necessary to draw a line between two related concepts that are frequently used in combination with it: Web 2.0 and User Generated Content. Web 2.0 was first implied in 2004 for the purpose of describing the innovative way of utilizing the World Wide Web by the developers and end users. This concept relates to the applications and content that no longer needs to be generated and published by users rather modified in an on-going manner by users in a collaborative fashion whereas applications like personal web pages, Encyclopedia Britannia Online, and the concept of web publishing relate to the concept of web 1.0, they are swapped by blogs, wikis and collaborative projects as part of web 2.0. Even though, Web 2.0 cannot be referred to as an update

of web 1.0 yet some basic set of functionalities have been added to its functionality like Adobe Flash (a standard for adding animation, audio/video streaming, interactivity), AJAX (Asynchronous Java Script, a method of retrieving data from web servers asynchronously, enabling the updating of web content without the interference of the display), and RSS (really Simple Syndication, an application of web feed formats used for publishing repeatedly updated content (Kaplan et al, 2009).

User Generated Content (UGC) can be perceived as a sum of all ways in which people use social media. According to Organizations for Economic Cooperation and Development (OECD, 2007), User Generated Content should address three basic requirements: first, it should be published on either a public accessible or social networking website available to a specific group of people; second, a certain amount of effort needs to be demonstrated; lastly, the creation should take place outside of regular practices. After the clarification of web 2.0 and UGC; Social Media can be more vastly defined as “a collection of internet-based applications developed on the ideological and technological foundations of Web 2.0 and that consent the formation and exchange of User Generated Content” (Kaplan et al, 2009)

## **1.2 Social Media & Web 2.0**

Web 2.0 was first implied in 2004 for the purpose of describing the innovative way of utilizing the World Wide Web by the developers and end users. This concept relates to the applications and content that no longer need to be generated and published by users rather modified in an on-going manner by users in a collaborative fashion whereas applications like personal web pages, Encyclopedia Britannica Online, and the concept of web publishing relate to the concept of web 1.0; they are swapped by blogs, wikis and collaborative projects as part of web 2.0. Even though, Web 2.0 cannot be referred to as an update of web 1.0 yet some basic set of functionalities have been added to its functionality like Adobe Flash (a standard for adding animation, audio/video streaming, interactivity), AJAX (Asynchronous Java Script, a method of retrieving data from web servers asynchronously, enabling the updating of web content without the interference of the display), and RSS (really Simple Syndication, an application of web feed formats used for publishing repeatedly updated content (Kaplan et al, 2009).

Web 2.0 is a standard term for progressive internet applications and technology comprising wikis, blogs, podcasting, RSS, mashups and most importantly social networks. Web 2.0 in comparison to traditional web; facilitates user-generated content through the provision of greater collaboration among various internet users. It acts as an umbrella term for an emerging core of technologies, principles and trends by altering not only the web content, yet also re-defining the working of the web. The early adoption of these new technologies by organizations perceived to achieve improvements in internal business processes, and supply chain. The key advantage of Web 2.0 in terms of organization relates to the use of technology for better collaboration with customers, suppliers and other partners, including internal users (Lai & Turban, 2008).

Web 2.0 as defined by O'Reilly (2005), *“Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and*

*services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences"*

The term Web 2.0 distinguishes the existing iteration of internet that is formed by user-generated, interactive, user-controlled applications & content, in contrast to the original, more static internet. It relates to the concept of collective intelligence where nobody knows everything, yet everybody knows something which can be distributed or shared through web 2.0 social media applications. Web 2.0 applications offer the ability to directly engage consumers in the innovative process by producing and distributing information through content sharing (e.g., text, video, and images), social networking (e.g., Facebook, Twitter), collaborative writing (e.g., wikis), social bookmarking (e.g., rating, tagging) and syndication (e.g., RSS feeds). (O'Reilly, 2005; Dawson, 2007). According to Borland (2007), the technological structure of web 2.0 is based on key components such as: messaging protocols, server-software, client applications, content syndication, and standard based browsers with plugins & extensions.

Web 2.0 technologies support the emergence of mass social media and social networking services. Social media therefore may be referred to online tools and platforms that people use for sharing experiences and opinions including images, music, videos, perceptions and insights with each other (Hinchcliffe, 2006). Social media tools can be used with little or no cost; added the ability to control the flow of information from the user's perspective.

User Generated Content (UGC) can be perceived as a sum of all ways in which people use social media. According to Organizations for Economic Cooperation and Development (OECD, 2007), User Generated Content should address three basic requirements: first, it should be published on either public accessible or social networking website available to a specific group of people; second, a certain amount of effort needs to be demonstrated; lastly, the creation should take place outside of regular practices.

Subsequently, post the clarification of web 2.0 and UGC; Social Media can be more vastly be defined as "a collection of internet-based applications developed on the ideological and technological foundations of Web 2.0 and that consent the formation and exchange of User Generated Content" (Kaplan et al, 2009).

### **1.3 Social Media Typologies**

The diversity of social media environment and its rapid growth make it challenging to develop a systematic classification based on a defined set of rules. Some of the most prominent attempts to outline the environment of Social web are as following:

#### **1.3.1 Kaplan and Haeinlein's Classification**

Kaplan & Haeinlein (2009) provide a classification of Social Media applications on the idea of (a) media research (social presence, media richness) and (b) social processes (self-prsentation, self-disclosure). The media related modules of the arrangement are illustrated as follows:

**Social Presence:** refers to the amount of acoustic, visual, and physical contact that can be attained via a specific social media channel (Short et al, 1976). Social presence is anticipated to be lower for mediated (e.g., phone conversation) than interpersonal (e.g., face-to-face discussion) and asynchronous (e.g., email) than synchronous (e.g., live chat) communications.

**Media Richness:** is narrowly associated to the theory of social presence. It's based on the perception that the goal of any communication is the resolution ambiguity and reduction of uncertainty (Daft et al, 1986). As media vary in their amount of richness - that is the information that they consent to transmit in a given time interval – it can be concluded that certain types of media are more effective to resolve ambiguity and uncertainty than others (Kaplan et al, 2009).

As per these two concepts, the authors undertake that social media may be classified according to the social presence and media richness they consent. A second classification is developed for the purpose of serving the social dimension of social media. Accordingly the social media applications are classified upon the amount self-presentation and self-disclosure they consent.

**Self-presentation:** implies that in any social interaction people desire to control the impressions other people get from them (Goffmann, 1959). This apprehension is at side driven by the objective to gain benefits while on the other side, to develop an image that is in accordance with the individual's self-perceived identity. (Kaplan et al, 2009).

**Self-disclosure:** implies to the achievement of this self-presentation. It is the conscious or unconscious revelation of personal information (e.g., feelings, thoughts, and opinions) and is considered as a vital step in the development of close relationships (Kaplan et al, 2009).

Based on the definitions discussed above, the succeeding table matches self-presentation and disclosure against social media presence and media richness. In addition, an example of a social media tool that best fits the criteria is also specified. As mentioned previously, each social media tool delivers different value to its users and further information supporting this can be seen from this table. (Kaplan et al, 2009)

**Table 1:** Self Presentation / Disclosure vs. Social Presence / Media Richness (Kaplan et al, 2009)

		Social presence/ Media richness		
		Low	Medium	High
Self-presentation/ Self-disclosure	High	Blogs	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Low	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

### **1.3.2 The Conversation Prism**

Solis and JESS3 (2010) presented a more structured and well-designed approach to the comprehensive view of social web. They termed it as a conversation prism, which is termed as one of the most prevalent classifications of social media on the web; it delivers a portrait of shifting social setting at the time of its last update in 2010. The conversation prism endeavours to envision the massive quality and diversity of social media applications beyond the dominating platforms like Facebook and Twitter. It provides a differentiation between 28 various types of social media applications. The prism is aimed at assisting organizations, alleged to be at the middle of the prism through the provision of alignment and guidance. The process of listening and observing is considered crucial for companies when it comes to engaging intelligently in online dialogue. The importance of online communications lies in the fact that it's the only opportunity to actively influence other discussions. Discussions about organizations happen, with or without the consensus of the organization in question (Kietzmann et al, 2011). The prism aims at helping companies recognize the point at which the dialogues in the social sphere are taking place, along with their magnitude and scale. This dialog can be projected into a social map exclusive to the specific brand or organization (Solis, 2010).

The theoretical and scientific foundations of the conversation prism are unfortunately rather weak as it isn't developed on the ground of some research and the categories appear to be built more or less randomly without the provision of logical rules and concepts. Moreover, the model is based on the author's personal perceptions and opinions, yet the key aspect of the conversation prism can be noted in the well-ordered and bright visual demonstration of various categories of social media applications. Overall, the conversation prism provides a comprehensive approach for companies on the construction of a social map (Kornek, 2012). Below is the illustration of the conversation prism as provided by Solis & JESS3:

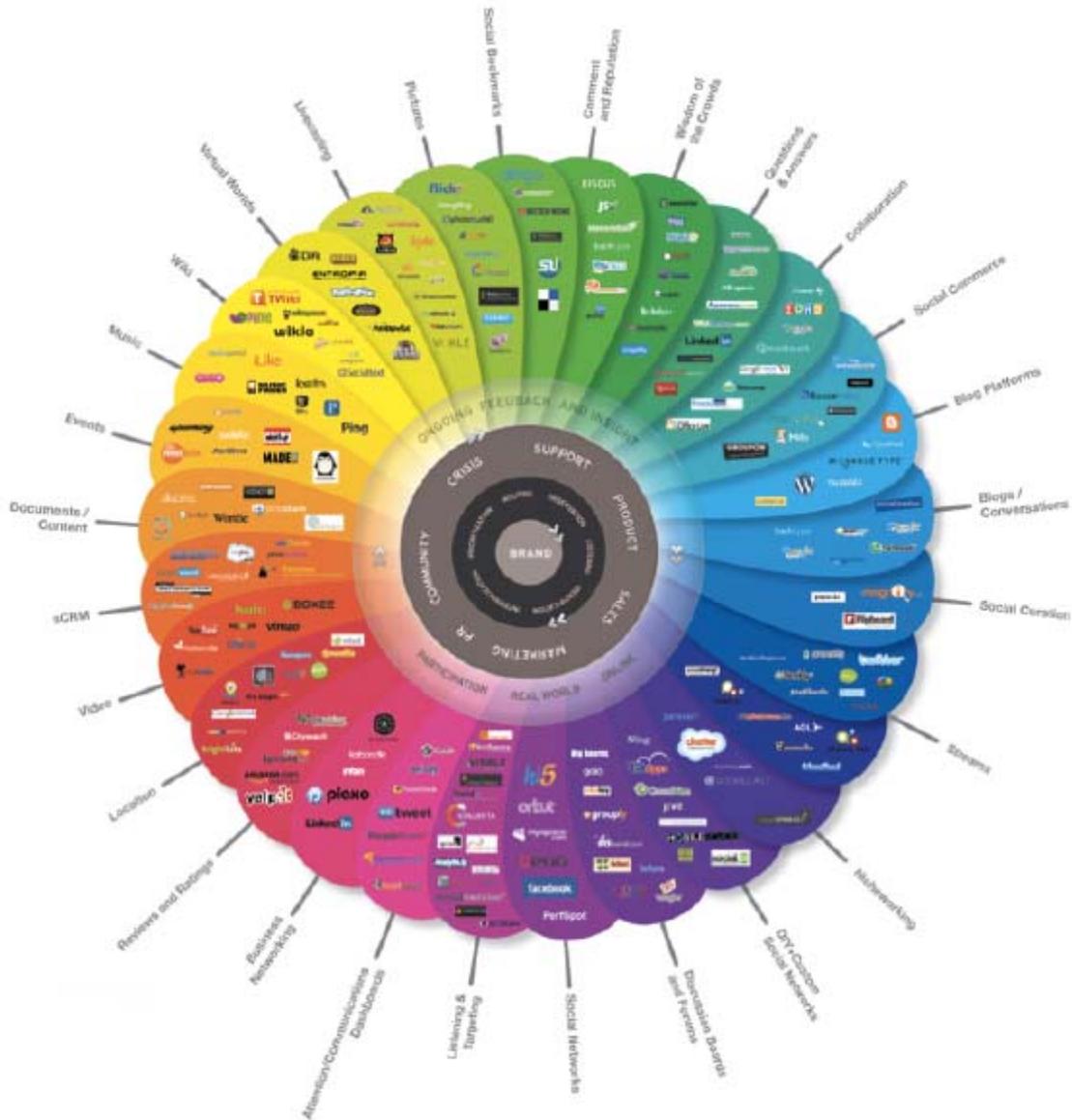


Figure 1: Conversation Prism (Solis, 2010)

### 1.3.3 The Honeycomb Framework

The Honeycomb framework has been developed to characterize social media through the acceptance and combination of various ideas from prominent bloggers. The model takes into account various functional traits of different social media activities. The framework assumes seven functional building blocks of social media; identity, conversations, sharing, presence, relationships, reputation and groups presented by (Kietzmann et al, 2011). This concept has been evolved around previous researches corresponding Social Network theory (Granovetter, 1973) and industry dynamics (McCarthy et al, 2010).

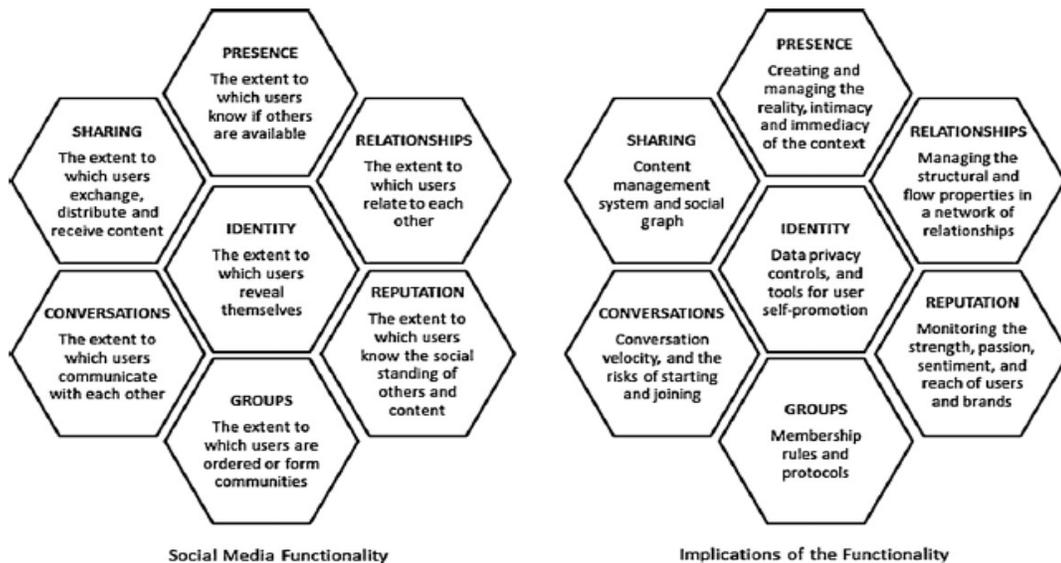
Honeycomb framework assists in explaining the implications that each block can have as to how organizations should engage with social media in three significant ways.

Firstly, the model defines various particular facets of social media user experience. Each social media platform, for example, is driven by primary, secondary and tertiary building blocks, which notify the rationale of significant social media design decisions (Kietzmann et al, 2012).

Secondly, employing the social media honeycomb as an analysis tool enables managers to conduct a focused deductive study of their organizations’ specific “community needs”, whose conclusions can enhance the design or practice of an applicable social media platform (Kietzmann et al, 2012).

Thirdly, the model can be applied on an ongoing basis, as an approach for observing how vibrantly changes of the community’s needs vis-à-vis changes of social media applications present implications for the organization (Kietzmann et al, 2012).

The seven building blocks of the framework are neither mutually exclusive nor do they all need to be included in a particular social media context (Kietzmann et al., 2011). The model facilitates researchers and managers in the understanding the functional traits and implications of various social media activities. To better understand this concept, the honeycomb framework’s functional building blocks are illustrated as below (Kietzmann et al, 2011):



**Figure 2:** Functional Building Blocks of Social Media (Kietzmann et al, 2011)

From the honeycomb framework above, it can be said that social media has seven essential building blocks that form part of its foundation. It is through these various blocks that social media is able to establish its value of being a medium for collaboration and communication. The seven building blocks are further discussed in detail below:

## **I. Identity**

Identity block signifies the level users to which users expose their identity in a social media environment. This may include information like age, sex, occupation, location and other information that reflects the user in a definite way. For example, as per Kaplan and Heanlein (2010), the presentation of a user's identity can frequently occur through the conscious or unconscious "self-disclosure" of subjective information such as feelings, thoughts, likes and dislikes. Subsequently, users and social media have diverse discourse preferences and objectives.

There exist many social media applications developed around (identity), requiring users to develop their profiles (e.g., Facebook). This has pointed to the creation of secondary services like DandyID, which enables users to store their social identities in one place. Social media users now can build profile cards similar to business cards and email signatures, using tools like Retaggr, with the aim of advertising and influencing others to follow them (Kietzmann et al, 2011).

As identity exists as a core aspect to various social media platforms, this presents some basic implications for organizations aiming to create their own social media sites. Privacy is one of the implications. Although users share their identities on social media sites like Facebook and Twitter, yet this does not mean that they don't care about their personal information. Essentially, users are very concerned about the use of their information by certain firms as a source of data mining and investigation (Kietzmann & Angell, 2010), and the level to which social media sites encourage these activities. This has also led to filing of class-action lawsuits by various users and governments related to the invasion of privacy (Kravets, 2010). Users for this purpose have also created identity strategies (e.g., real identity as opposed to virtual identity), while other users concentrate on self-branding (e.g., LinkedIn) or self-promotion (e.g., Facebook). This aspect doesn't mean that firms insist users on creating precise and complete profiles. Yet, individuals in an attempt to protect privacy, relate altered identities to the context of various social media applications in use. (e.g., LinkedIn & Facebook profiles might have different images, interests). Maintaining a vigilant balance between protecting privacy and sharing identity is essential in the process of selecting social media applications; as the incorrect mix may lessen the accountability in the virtual social environment and lead to actions like cyber-bullying (Kietzmann et al, 2011).

## **II. Conversations**

Conversations aspect of the framework illustrates the level to which the communication between various users may occur within the social media environment. Social media promotes various kinds of communication through applications like Twitter, blogs where people share their thoughts in an attempt to build self-esteem, meet like-minded people, and stay on top of new ideas. Yet, some view these applications as a way of delivering their message across large audience and have a positive impact on humanitarian causes, economic, environmental issues or political debates (Beirut, 2009). The scale and diversity of the discussions that exist in a social media environment, creates an impression that there exists a protocol for organizations to track them. (e.g., Twitter is based on the idea of sharing short messages that in majority relate to actual status updates, with an aim of creating "ambient awareness"

of various issues (Kaplan & Haenlein, 2011). These messages commonly do not obligate a reader to reply. Google Replay is an application which enables users to access past tweets, thus Twitter points to more to Conversation rather than Identity aspect of the social media environment. Blogs rather relate to less staying connected yet encourage lengthy discussions that may be traced back to the blog itself (Kietzmann et al, 2011).

According to the research on industry dynamics (McCarthy et al, 2010), Kietzmann et al, (2011) argue that the variance in content and frequency of a conversation can have key implications as to how organizations analyze the “conversation velocity”: the rate and direction of change in a conversation. The rate of change may be referred to amount of new conversations over a period of time, and direction of change is the consistency or dis-consistency of the discussion. (e.g., for the purpose of making sense of various short, speedy discussions on platforms such as Twitter, organizations require tools that facilitate in connecting the messages and turning them into overall messages, images).

### **III. Sharing**

Sharing aspect in the Honeycomb model refers to the extent to which users exchange, receive and distribute content. The term “social” frequently implies that exchanges among individuals are critical. In various cases, however, sociality relates to the objects that facilitate the links among people (Engeström, 2005); the intention behind meeting online and associating with each other. (e.g., Groupon, which distributes a 50% - 90% discount voucher for local businesses every day through email, Twitter; website and its applications for mobile platforms). Groupon and likewise other social shopping services influence the “social graph”, plotting of users’ connectivity, to distribute the news through email across their complete social network. Therefore, social media comprises individuals linked by a common object (e.g., text, sound, picture, location). Sharing itself acts as a means for individuals to interact with each other, yet the building of relationships among various individuals depends on the core objective of the social media application (Kietzmann et al, 2011).

Kietzmann et al, (2011) propose two basic associations for organizations planning to engage in social media as per the sharing part of the honeycomb framework. The first relates to recognition of objects that their users share in common. These objects provide a means for connecting people in one common group. Yet, the nature of sharing may be based according to the objective of the social media application. (e.g., YouTube started off as a social media application that facilitated users to upload and share homemade, personal objects, experiences videos with other users globally). The second aspect relates to the extent to which an object can be shared. As YouTube popularity, users gradually uploaded content without the permission of the content (video) owners which lead to various lawsuits against YouTube for not ensuring the proper compliance as per the copyright laws. Consequently, YouTube allocated resources and developed controls to further filter the content for sharing on its website. This involved to register, agree to the usage terms; the provision of a system that facilitates content owners (e.g., licencing firms) to identify and manage their content on YouTube; encouraging individuals to flag inappropriate content, and devoting people for the purpose of screening and eliminating content that does not comply with the usage terms (Kietzmann et al, 2011).

#### **IV. Presence**

Presence in context of Honeycomb framework may be referred to the level to which users can know if other users are accessible. Presence factor also includes the knowing of the location of other users, whether real or virtual, and if they are available or not. The virtual world offers the user this facility through status lines like “available” or “invisible”. As per the growing connectivity of people, this presence is linking the real and the virtual. (e.g., celebrities like Ashton Kutcher and his wife Demi Moore are present on Foursquare, and whenever they check in at a specific location, fans and other media knows where such celebrities hang around). Another example can of similar social media platforms that focus on geographical spaces rather than locations like Friends Around Me which enables users to share their status updates across networks (Facebook, Foursquare, Twitter and Gowalla) and show which friends are nearby (Kietzmann et al, 2011).

The implication of presence lies in the fact that organizations need to focus on the relative importance of user availability and location. This information sometimes is connected directly to a longing to interact synchronously, whether this is via data or voice sharing. If the users desire to participate in a real-time discussion, then social media application should provide a status indicator as well as a tool for connecting users with each other. Organizations might also find it useful to identify the user patterns; as to which places the user might declare to be visible or invisible. An important implication of presence is that it's connected to the traits of other functional blocks in the honeycomb framework, comprising conversation and relationships (Kietzmann et al, 2011). According to Kaplan and Haenlein, (2010), organizations should identify that intimacy and immediacy of relationship medium influences the social media presence and the greater the level of social presence, the more probability of influential discussions.

#### **V. Relationships**

Relationships in the honeycomb framework represent the degree to which users may be related to other users. The word “relate” here refers to the association of two or more users that points to the listing of each other as a fan or friend. Accordingly, the way users of social media application are linked often defines the content of information exchange. These relationships in some situations might be structured and regulated. LinkedIn, for example, is structured in a way that informs user as to how they are connected to other users and as to how many levels of separation they stand from a target member; which can be a future employer the user might be interested in meeting. In order to build a positive repute and authenticate information; member profiles need to be validated by others to be complete. LinkedIn also provides users the tools to a referral system where users can introduce through a chain of friends of friends; to the individual they anticipated to meet so that they can be nearer to the individuals they would like to meet (Kietzmann et al, 2011).

Although developing a network to a large scale as possible shrinks the degree of separation to these individuals. Yet, sometimes social media applications focus maintaining existing relationship rather than expanding. Skype and AOL Instant Messenger (Aim) facilitate users to connect to their friends, family or people in their contacts whom they know already. Other platforms like blogs, consent users to develop a

relationship regardless of any agreement as how much information they share. This leads to a basic rule that the communities within social media that don't value identity highly, also don't value relationships greatly. Kietzmann et al, (2011) use two properties; structure and flow, from the social network theory (Borgatti & Foster, 2003; Granovetter, 1973) in explaining the significance of various relationships traits. The structural property in terms of user relationship refers to the number of connections they possess and their standing in the relationship network. The flow aspect of individual relationships is related to the kinds of resources involved in user relationships; how these resources might be used, or exchanged.

Social media sites and organizations with an aim to engage their users must comprehend as how they can build or maintain relationships. If the relationship requires a formal and regulated approach, then a procedure should be established for validating the legitimacy of users. If users commonly anticipate upholding existing relationships, then a simple identification process is needed. (e.g., a user may send a friend request to another party yet the two can only add each other to their contact list after the approval of request). In the situation where the purpose of engagement among individuals is to enhance their networks; additional information might need to be exhibited to generate significant relationships which are in line with the users' expectation of both privacy and identity (Kietzmann et al, 2011).

## **VI. Reputation**

According to Kietzmann et al, (2011), Reputation in the honeycomb context refers to the degree, to which users can recognize the standing of others, counting themselves, in a social media environment. Reputation may infer to various meaning within a social media context yet majorly it is referred to as a matter of trust. As information technologies lack of determining a highly qualitative criteria, social media sites depend on "mechanical Turks": tools that automatically gather user developed information in order to define reliability. An example is LinkedIn, which constructs upon reputation of single individual based on a seal of approval from others. Though in the social media context, reputation may refer not primarily to the individuals but rather to their content, which is frequently assessed using content voting systems. For YouTube, the reputation of video content may be grounded on "ratings" and "view counts", yet in case of Facebook the same idea could be in the form of "likes".

Reputation as compared to other blocks of the honeycomb framework has various important implications as for how organizations effectively employ social media. A criterion must be established for the provision of information if the firms and individuals are concerned about their and other individual's reputation. Twitter accounts have limited value as people who follow don't necessarily read the tweets rather they like just because a person might be popular and it makes no reason to "unfollow". From an organization's perspective, this relates to the selection of a reputation system based on the recognition of the engagement needs of its community. Once a metric for reputation of community's social media engagements has been identified, a suitable evaluation tool is to be designated. This tool could either analyze objective data (e.g., quantity of followers) or joint intelligence of the crowd (e.g. rating system) (Kietzmann et al, 2011).

## **VII. Groups**

Groups block in honeycomb framework represents the degree to which users can create communities and sub-communities. The more social nature of a network, the more it attracts groups of friends, contacts, and followers. A popular relationship-group metric is Dunbar's Number, developed by Anthropologist Robin Dunbar (1992). According to the metric people have a cognitive limit which confines them in maintaining a stable number of social relationships with other individuals at about 150. In case of social media people usually go beyond this figure, and social media also provides the tools to manage these members. Generally two groups exist. First, individuals have the flexibility of sorting their contacts and placing friends, fans, followers into a self-defined group (e.g., Twitter's lists). Second groups can relate to the real offline world which may or may not be open(everyone), closed (by approval), secret(by invitation). Flickr and Facebook have administrators who approve, decline, manage the group) (Kietzmann et al, 2011).

The direct implications of groups is rather simple where social media applications facilitate users to manage their contacts by placing them into various groups and then assigning rights to specific groups regarding the disclosure of personal information without the other party knowing about the labels a user might associate with the these contacts. However the indirect implications of groups are more complicated. Groups relate to more than just the listing of users within the social media environment. Assuming the massive traffic on social media and the crowd it gather from day to day, the need for filtering is vital. Connecting earlier blocks of honeycomb, one can determine that groups vary in the way users allow specific details to be shared with some contacts but not others. Various fragments of an identity could be developed for every block. In the context of Presence, a user may assign rights to some users for sharing of particular information (e.g., friends) but not others (e.g., colleagues). Yet the challenge arises when a friend is also a co-worker. This creates an issue in terms of permission management. The more flexibility allowed in the system, the more difficult it is to be managed by the users. Many social media applications limit the classification of groups in order to avoid such issues (Kietzmann et al, 2011).

### **1.4 Characteristics of Social Media Channels & Platforms**

A variety of technological tools and categories support the implication of social media platform, each designed for specific objective. These social media sites either promote an environment for all kind of users or serve for people with specific interests through the creation of a private network. Social media platforms have been categorized in a two dimensional matrix that deliberates the crossing between self-presentation and self-disclosure with general social presence, each dimension is marked from high to low (Kaplan et al, 2010)

#### **1.4.1 Blogs (high self-disclosure, low overall presence)**

Blogs are online journals published to the Internet largely by distinct users and are considered as one of the earliest forms of social media. Although the initial blogs were personal in nature yet the

expansion of specialty/expert blogs headed to the approval by traditional media outlets as an accepted technique of journalism. As per blog, an author has the control to permit or dis-permit readers from commenting on the blog, or post comments through an approval process. The most interesting and informative blogs tend to gain more followers than others. The latest blog “post” appears first, laying the posts in reverse sequential order, which can be termed as an “online diary”. The blog users also have the ability to subscribe to blogs via RSS (Really Simple Syndication), which directly gets the new content into an RSS enabled browser or RSS feeder, thus updating the user about any new entries posted (O’Reilly, 2005). A user might also blog videos; sharing thoughts at various platforms like YouTube, Vimeo; this can be referred to as Video Blog.

Blogs vary from simple humour sites to professional blogs, and even have grown popular with the healthcare community, often written by physicians, trainees, e-patients as well as organizations (e.g., hospitals, health information technology firms) on various topics stretching from tips on healthy living to clinical practice. Although this aspect of healthcare blogging has made it easier for the patients to get expert opinions, yet it offers a threat to the physician-patient relationship and can also potentially create a harmful influence in terms of the public perception towards doctors or healthcare providers (Dainton, 2009).

#### **1.4.2 Collaborative projects (e.g., Wikipedia) (low self-disclosure, low overall presence)**

Collaborative projects include the shared development of content for publication on a website. Generally it can be divided into two categories – websites that allow users to fully contribute in editing the content on the website, and websites that gather information (such as comments, ratings, and opinions). Collaborative projects may include websites as broad as Wikipedia and as narrow as Delicious. Delicious, is a website that enables users to share internet bookmarks (links to various internet sites) with other users, classified on the basis of a project or topic. Wikipedia, on the other hand, is a website that facilitates the collaboration knowledge in a text-based fashion on a specific issue.

In case of health organizations, Wikis can be limited to with-in the firm, such as the enrichment of hospital employee communication and collaboration, or outside the organization (public), such as descriptions of heart failure, electronic health records, or bios of prominent individuals that appear on Wikipedia (online encyclopedia, user generated). Wiki serves as a trustworthy and updated source of information for its users due to its ability of enabling community users to ensure quality of content (Kaplan et al, 2010).

#### **1.4.3 Content communities (e.g., YouTube) (low self-disclosure, medium overall presence)**

Content communities are applications that facilitate the sharing of vast range of media types among viewers or users. (Kaplan et al, 2010). The content shared can include videos (e.g., YouTube), photos (e.g., Flickr), text (e.g., BookCrossing), PowerPoint presentations (e.g., Slideshare) etc. Content communities generally share very little company information on their profile page, the main emphasis is distribution of information through media, physicians, hospitals, other organizations and personalities can create their personal “channels”, like in YouTube which provides them the flexibility to upload all

their content at their own specific page and others may become “followers”, as to be notified whenever the user uploads any new content to the page.

Hospitals may use content communities for the purpose of educating patients; provide information on specific procedures, post interviews of physicians-patients sharing their overall experiences. Also, the patients can get an idea of the kind of services the hospital provides to its patients, along with any promotional events occurring in the near future.

#### **1.4.4 Social networking sites (e.g., Facebook) (high self-disclosure, medium overall presence)**

Social networking applications facilitate users to connect by generating personal information profiles, engaging friends, family, co-workers to join their network and share instant messages, e-mails among each other. The personal profiles may include all types of information like audio, video, photos, and blogs. Several companies are using social networking sites for sustaining the creation of brand communities (Muniz et al, 2001). The major difference between a social network and a social medium is the fact that social networks emphasize on member relations. The connections and ties among members lead to the creation of a social network. This further leads to the possibility of recognizing certain groups and subsets of members, alongside with the strength of particular relationships according to types of exchanges, intimacy of connections, and frequency of contact (Haythornthwaite, 2005). According to Wikipedia, the principal social networking sites are U.S. based; Facebook (primarily founded by a Harvard graduate Mark Zuckerberg for the purpose of staying in touch with his fellow students) with 618 million daily active users and 4619 employees as of December 31, 2012 (Facebook, 2013) and MySpace (with 250 million registered users and 1,500 employees). LinkedIn is also a prominent social networking site aimed at professionals to facilitate their work display and make contacts. Users also use the website to apply for jobs or informing others about their qualifications and capabilities. LinkedIn was the principal professional network with 200 million members in over 200 countries as of December 31st, 2012. LinkedIn was employed for the submission of hundreds of thousands of job applications and executives from all Fortune 500 companies were network members (LinkedIn, 2013).

Social networking website`s extremely personal nature and focus on human relationships, represents some of the most behaviour changing and risky online activities that physicians and patients participate in. As per the World Medical Association guidelines, physicians need to review the privacy policies relating to the platforms they use for the purpose of keeping a balance between their professional and personal lives when it comes to dealing with social media. This aspect is of particular importance in social networking, because patients have the access to directly connect with their physicians and check their personal data and online presence, while physicians may unveil more personal information based on the assumption that it`s being shared between their immediate contacts (World Medical Association, 2011).

#### **1.4.5 Virtual gaming world (e.g., World of Warcraft) (high self-disclosure, high overall presence)**

Virtual gaming worlds offer a platform that replicates a three dimensional environment in which users can take on “character” roles, taking part in various challenges and networking with other players.

In this sense, virtual worlds provide the ultimate demonstration of social media, due to their highest level of social presence, and media productivity of the various applications deliberated this far (Kaplan et al, 2010). Virtual world can be sub categorized in two forms:

Virtual game worlds necessitate the user to follow a set of rules in the context of a MMORPG (Massively Multiplayer Online role-playing Game). The examples of this environment would be of standard gaming consoles like Sony`s PlayStation, Microsoft`s Xbox which enable the function of multiplayer gaming on a vast scale globally. "World of Warcraft", a fantasy based multiplayer game is the most popular example of an MMORPG. Despite obligatory limitations on self-disclosure, studies illustrate that the character traits of these gamers are frequently reflected in their online personality (Wolfendale, 2007). Such gaming has very less to do with health care practices.

#### **1.4.6 Virtual social worlds (e.g., Second Life) (high self-disclosure, high overall presence)**

Virtual Social Worlds are similar to the virtual world for gaming; social worlds facilitate users to pick their behaviour more freely and live a "Virtual life" in parallel to their practical life, yet the fame of these social worlds is declining (Rowan, 2009). This virtual environment allows an unlimited range of self-presentation strategies, and studies show that with increasing the usage intensity and experience, gamers (users) demonstrate behaviour that more explicitly reflects their real life behaviour (Haenlein et al, 2009).

The standard example of social worlds would be of Second Life application which enables users to develop content (e.g., designing of virtual furniture or clothing) and sell this content to various other users in exchange for Linden Dollars (a virtual currency exchangeable with U.S. dollars at the Second Life Exchange) (Kaplan et al, 2009).

## 2. Social Media and Consumer Health

### 2.1 Health/Medicine 2.0

In the 90's, Web 1.0 was a one-sided healthcare information exchange whereby the user accessed information from health related websites like WebMD. The source controlled all the information posted on the website and updated it regularly. Yet, the user had limited access only to the information posted on the website. The next generation of technology, Web 2.0, provided user the access to information and discuss it on social networks. This method was bi-directional and context specific.

Web 2.0 technologies in collaboration with online health applications gave birth to a new concept called "Health 2.0" or in a broader sense "Medicine 2.0". This approach evolved around web 2.0 technologies that allowed user generated content, with social media technologies providing the platform for users to share health information and get support (Woodside, 2012). Social media includes tools that advance communication, collaboration, content creation and knowledge sharing. The user's whole experience with Health 2.0 framework lies in support of an extended network which borders beyond family and friends and also includes community member, neighbours, healthcare providers, organization, employers, and policy makers that influence behaviour change.

*"Medicine 2.0 applications, services/tools are Web-based services for health care consumers, caregivers, patients, health professionals, and biomedical researchers, that use Web 2.0 technologies and/or semantic web and virtual-reality tools, to enable and facilitate specifically social networking, participation, apomediation, collaboration, and openness within and between these user groups"* (Eysenbach, 2008).

Health 2.0 applications are educating and empowering health care stakeholders, and therefore can be defined as the use of social software and its ability to promote alliance between patients, healthcare providers, medical professionals, and others in healthcare. For example, patients with chronic health conditions share their stories for the purpose of gaining both moral support and clinical knowledge; which points towards the collective knowledge rivalling various organizations.

Health 2.0 can be referred to a field in the next generation of healthcare sector where the flow of information is directed or controlled by the user/patient. This approach has greatly changed the direction of individual and group healthcare. For example, forums and discussion groups on issues such as smoking, cancer and weight loss have already influenced the user perceptions about what is healthy, and these influences have been adopted and addressed (e.g., smoke-free areas).

There are three key concepts that attempt to define Medicine/Health2.0 which are as follows:

- 1) Technology as an enabler for care collaboration: Information gathered by an individual through research is integrated with accumulated knowledge from other patients and caregivers, generating a collective body of information which in turn is illuminated and

delivered universally. Eventually this information can assist patients to monitor their personal healthcare (Kahn, 2008).

- 2) A platform for wider system reform: The key focus in this approach is on the “commodification” of healthcare (outcomes/price) and the use of competition for improving, efficiency, safety and quality of healthcare (Shreeve, 2011).
- 3) A participatory process between the patient and clinician: The process revolves between both the patient and clinician in a collaborative manner where the patient becomes a responsible partner in his or her personal healthcare (Eytan, 2012).

## **2.2 Social Media & Patients**

The search for information and resources from the user’s perspective relies on a variety of settings. The user friendliness and simplicity of internet has made it a useful source of health information for many users. According to surveys, eight out of ten American internet users have searched for health related information online (Fox, 2005), and in this new age of Web 2.0 technologies, a large fraction of patients share their experiences and in return obtain information and support via social media.

The Pew Internet and American Life Project in 2010; documented that 66% Americans had access to broadband internet (Smith, 2010), yet compared with 5% from back in 2000. At the same time, the proportion of Americans searching for health information online had amplified from 25% to 61% (Pew Internet, 2009).

According to a US-based survey lead by Deloitte, patients generally look for information related to their diagnosis and treatment options, yet also seek out quality of care data (such as doctor reviews) and hospital comparison information (Keckley et al, 2010). As per the same study findings, it was suggested that the sharing of information of both the conventional medicine as compared to the current medical trends; patients are more likely to follow the information received from similar patients/peers rather than the conventional medical advice (Loh et al, 2012).

Social media technologies have largely influenced the way people perceive information over the internet. Through web 2.0 technologies, people can browse information, share their experiences, and provide opinions and valuable insights to a disease, diagnosis, which are used as supporting information by other users or patients in making any healthcare decisions. A study was conducted on 15 Facebook groups centered on diabetics’ management and their wall post content. Based on the study findings it was concluded that two-third of the wall post contained the strategies to counter diabetics, while others presented information related to emotional support and feedback. There was a concerning factor realized in the study that 255 of these posts were related to non-FDA approved, natural products, while 13% of the posts were limited to the request for sharing of information from Facebook participants (Greene et al, 2011). The findings of this study reveals the usefulness in terms of social media platform for information sharing plus drawbacks as to how various parties may use the interaction for the purpose of reaching some secondary gain.

A survey of asthma patients with ages between 14 and 40 years old indicated email as the most preferred tool of communication for electronic health information; a fair amount of interest was shown in Facebook and text messaging. Twitter and MySpace were termed as the minimum interest communication channels by the group (Baptist et al, 2011). Certain likely practice standards may ascend related to chronic disease and social media. Social media has nurtured the creation of online groups that share common disease or face the same conditions. These online groups along with the support of friends on a personal network facilitate the process of moral as well as social support for the patient (Loh et al, 2012).

These scheduled online support groups, moderated by a professional, can enhance the effort by addressing both the aspect of information sharing as well as a control of information by the moderator in order to avoid any harmful discussions on the group page. This experience can be further enhanced if a clinician can also communicate frequently and efficiently, offering services via email thus addressing individual patients queries online without the need to formally hold a meeting.

This aspect has led to a more healthier patient-physician relationship where the patient can come up with some extent of information related to the illness and understanding of the issue rather than the physician explaining the patient's position, yet this does not eradicate the obligation of the legal and ethical need for physicians to assess and perform as per the standards of the healthcare system.

### **2.2.1 E-Patients Role in Healthcare Change**

The role of e-patient in healthcare has received major attention in both social media and commercial forums. As (Porter et al, 2006) stress that the patient is a consumer of healthcare and, as such, has certain responsibilities including:

- 1) Active participation in managing personal health which embraces taking responsibility for healthcare, obtaining routine care and testing, complying with treatment, and vigorous participation in disease prevention and management.
- 2) Anticipate relevant information and pursue advice by gathering information on provider results and experience with medical conditions; seeking assistance and advice in interpreting information from physicians and health plan.
- 3) Making treatment and provider preferences based on outstanding results and personal values, rather than on convenience or amenities.
- 4) Pick out a health plan based on value-added and expecting the plan to work as an overall health advisor, selecting cost effective health plan structures involving deductibles along with Health Saving Accounts (HSAs) in order to save for future healthcare requirements.
- 5) Maintaining a long-term relationship with an excellent health plan, and act/accept responsibility for healthcare.

From the discussions above on Health 2.0, the table below links some of the major social media types to specific healthcare examples that apply the concepts for each social media type. (Eckler et al, 2010)

**Table 2: Social Media Types and Examples in Healthcare (Eckler et al, 2010)**

Type	Description	Examples	Examples in Health Care
Blogs	Online journals, where authors share their opinions and/or experiences on various topics. Blogs can be personal, similar to an online diary, or professional, with opinions related to an area of expertise. Entries vary in length (often 200-1000 words) and frequency (some bloggers post daily or a few times a day, whereas others post 2-3 times/week), and readers can comment on posts. Entries can include photos and audio/video files.	Blogger; <a href="http://www.blogger.com">http://www.blogger.com</a> LiveJournal; <a href="http://www.livejournal.com">http://www.livejournal.com</a> WordPress; <a href="http://www.wordpress.org">http://www.wordpress.org</a>	Sharing Mayo Clinic; <a href="http://www.sharing.mayoclinic.org">http://www.sharing.mayoclinic.org</a> American Red Cross; <a href="http://www.blog.redcross.org/">http://www.blog.redcross.org/</a> Mercy Health System; <a href="http://www.mercyblogs.org/">http://www.mercyblogs.org/</a> McLeod Health; <a href="http://blog.mcleodhealth.org/">http://blog.mcleodhealth.org/</a>
Microblogging and presence applications	A version of the blog. Posts are much shorter and more frequent. Twitter limits length to 140 characters, and many users post several times a day. Posts can be sent via cell phone or text messaging, and can include images and audio/video files.	Twitter; <a href="http://www.twitter.com">http://www.twitter.com</a> Tumblr; <a href="http://www.tumblr.com">http://www.tumblr.com</a> FourSquare; <a href="http://www.foursquare.com">www.foursquare.com</a>	St. Jude on Twitter; <a href="http://www.twitter.com/StJude/">http://www.twitter.com/StJude/</a> Aurora Health on Twitter; <a href="http://www.twitter.com/Aurora_Health">http://www.twitter.com/Aurora_Health</a>
Social networking sites	Web sites on which users build online profiles, share updates about themselves, photos, links, etc. and comment on others' updates. A key function is the linking to other profiles, which builds one's social network on a site.	Facebook; <a href="http://www.facebook.com/">http://www.facebook.com/</a> MySpace; <a href="http://www.myspace.com/">http://www.myspace.com/</a> LinkedIn; <a href="http://www.linkedin.com/">http://www.linkedin.com/</a>	Phyzforum; <a href="http://www.phyzforum.org">http://www.phyzforum.org</a> Veterans Health Administration on Facebook; <a href="http://www.facebook.com/VeteransHealth">http://www.facebook.com/VeteransHealth</a>
Photo/video/file sharing sites	Web sites on which users share photos/videos/files. Uploads are searchable and often can be downloaded and spread by linking to them in the other 3 types of social media. This linking could increase the reach of a video/photo exponentially and make it go "viral."	YouTube; <a href="http://www.youtube.com/">http://www.youtube.com/</a> Flickr; <a href="http://www.flickr.com/">http://www.flickr.com/</a> SlideShare; <a href="http://www.slideshare.net/">http://www.slideshare.net/</a>	Wellmont Health System on YouTube; <a href="http://www.youtube.com/user/WellmontHealth">http://www.youtube.com/user/WellmontHealth</a> Duke University Medical Center on YouTube; <a href="http://www.youtube.com/user/dukemedicine">http://www.youtube.com/user/dukemedicine</a>

## 2.3 Characteristics of Health/Medicine 2.0

Medicine 2.0 as defined by Hughes et al (2008) states, "Medicine2.0 is the use of a specific set of Web tools (blogs, Podcasts, tagging, search, wikis, etc) by actors in health care including doctors, patients, and scientists, using principles of open source and generation of content by users, and the power of networks in order to personalize health care, collaborate, and promote health education".

### 2.3.1 A Structuring Theme for Medicine 2.0

According to Hughes et al (2008), no pertinent differences exist between Medicine 2.0 and Health 2.0. Eysenbach (2008) agreed to the fact yet stated, "Medicine 2.0 may be referred to a broader concept and umbrella term which comprises consumer-directed 'Medicine' or 'Health 2.0'". As per the definition provided by Hughes et al (2008), the author(s) identified five salient features in support of their concept:

1. Participants: the various stakeholders in Medicine 2.0 context (doctors, patient, researchers, scientists, administrators).

2. Method/Tools: the manner by which Medicine 2.0 information is developed and owned. (e.g., it's precision from user generation, ownership or open source, and the practice of specific tools like wikis).

3. Collaboration and Practice: the practice of Medicine 2.0 as a tool to promote member's interest as a reader (updated information) or to collaborate and communicate collectively for self-practices.

4. Medical Education: the use of Medicine 2.0 as a basis for educating general public, training new professionals, or ongoing specialist education.

5. Personalized Health: Medicine 2.0 as a tool to provide customized healthcare, such as linking patients with rare conditions and to advance an individual's value from healthcare.

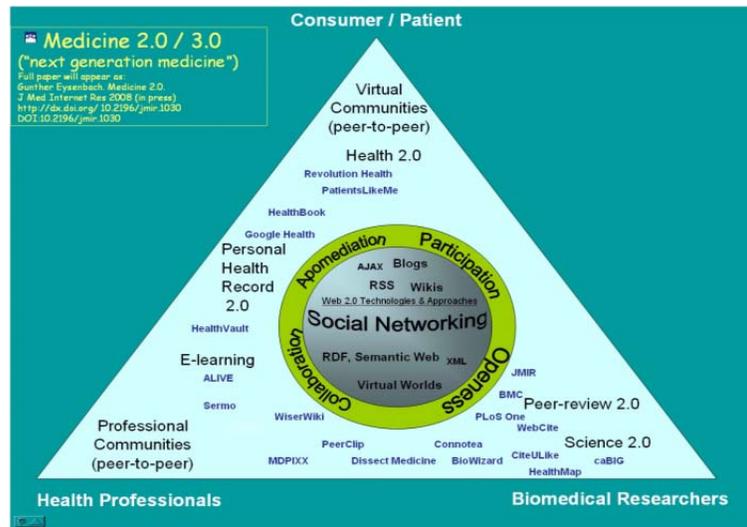
### **2.3.2 Eysenbach's Medicine 2.0 Framework**

According to the first "Medicine 2.0" conference at Toronto in 2008, five major characteristics (ideas, themes) arise from Web 2.0 in health care, medicine and science, which outlive the specific tools and services offered (Eysenbach, 2008). These developing and cyclical themes are demonstrated in the center of the framework and are as following:

- Social Networking
- Participation
- Apomediation
- Collaboration
- Openness

Below is an illustration of the Medicine 2.0 Framework as conceptualized by Eysenbach. As we can see, Medicine 2.0 acts as an umbrella concept that encompasses several Web 2.0 based healthcare technology concepts such as health 2.0, personal health record 2.0, peer-review 2.0 and science 2.0. (Eysenbach, 2008).

The framework depicts three core user groups of current Medicine 2.0 applications in the form of a triangle; consumers/patients, biomedical researchers and health professionals. Although each one of these clusters have experienced diverse level of formal training, even end users (patients, consumers) may be termed as experts as per the Web 2.0 ideology. Their shared knowledge may be tied together as according to Davidson & Pennebaker (1997) "health professional is an expert in identifying disease, while the patient is an expert in experiencing it" (Eysenbach, 2008).

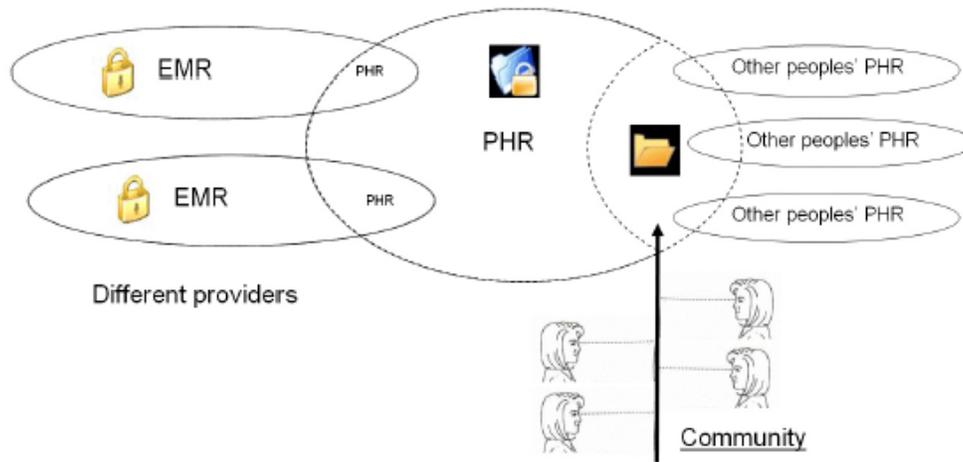


**Figure 3:** Eysenbach's Medicine 2.0 Framework (Eysenbach, 2008)

The existing Medicine 2.0 applications can exist someplace in this triangle space, typically at one of the corners of the triangle depending on their target user group. Yet, an ultimate Medicine 2.0 application would consist of integration between various user groups with the aim of enhancing collaboration and thus shifting towards the center of the triangle. The broader idea of Medicine 2.0 as presented by Eysenbach (2000) may be termed as the “second generation medicine”: which relates to the concept of health systems focusing on promoting health, providing health services to patients at their homes as opposed to hospitals; motivating patients to take responsibility of their personal health. Therefore, Medicine 2.0 relates to the new, improved healthcare system, which highlights collaboration, apomediation, participation and openness, as divergent to the traditional, categorized, closed structures in the healthcare environment.

### **I. Social networking**

Social networking is essential when it comes to dealing with Medicine and Web 2.0 applications. It includes the explicit modeling of links between individuals, creating a complex network of relations, which consequently facilitate collaboration and collaborative screening processes. Social networking applications influence users to engage, through providing “social” incentives to login, update, and manage personal information. The integration of social media technologies with developing technologies in the healthcare industry like Personal Health Records, leads to the creation of a new class of applications. i.e., PHR 2.0 which is illustrated below (Eysenbach, 2008):



**Figure 4:** PHR 2.0 Concept Framework (Eysenbach, 2008)

This conceptual model of a new generation of personal health records not only allows patients to access their Personal Health Records (PHR), yet also facilitates sharing parts of it with other individuals; which further promotes the creation of communities centered on health issues (Eysenbach, 2008).

## II. Participation

Participation is a significant theme and exhibits central value in the Medicine 2.0 framework. This feature is not only important for patients and consumers yet also extends to health researchers and professionals. PHR (Personal Health Records) specifically PHR 2.0 may be referred to as part of this development. Participation from the user's perspective has been a goal since long in the consumer healthcare industry, yet the development of web 2.0 technologies has led to more user involvement and participation in the health environment. (E.g., Wikis may be referred to as an example, as it promotes the participation theme by facilitating various user groups like health scientists and professionals to contribute scholarly content) (Eysenbach, 2008).

A significant aspect of Web 2.0 and PHR which thrills consumer and researchers is the provision of a unique opportunity (at least theoretically) that directly addresses patient's concern relating to the use of their secondary data for research purposes, and assist in gaining informed approval for participation and use of data in research studies in a decent manner (Willison et al, 2003). Personal Health Application platforms like Microsoft HealthVault and Dossia enable the user to access and control their personal health information and also provide the option to obtain permission in a different environment as compared to clinical consultation: via internet, where it's supported by appropriate educational information (Eysenbach, 2008).

According to Eysenbach (2008), the development of social networking platforms and applications like PatientsLikeMe and Facebook with the integration of Personal Health Records (PHR 2.0); facilitate individuals to share part of their personal electronic health record with other individuals; thus adding

new heights to the patient participation aspect, as well as engaging patients in their healthcare in a unique and exceptional manner.

### **III. Apomediation:**

Apomediation is a new socio-technological term which was devised for the purpose of avoiding the term “web 2.0” in the academic debate (Eysenbach, 2007). This concept describes the “third technique” for users to recognize credible/reliable services and information. The first method involves employing intermediaries (middlemen), e.g., the delivering of relevant information to the patient by health specialists. In the virtual environment, trusted web portals comprising professional assessed information may be referred to as an intermediary. The second aspect may be referred to as Disintermediation where the user bypasses the middle party entirely. E.g., patients using online social networks for getting health related information. Third approach refers to a distinct form of disintermediation in the web 2.0 context; where individuals more prefer assistance from apomediators (network collaborative filtering processes) rather than the usual specialists (Eysenbach, 2007).

Intermediary and apomediator may be differentiated on the basis of their functions. An intermediary as the name indicates exists “in between” the consumer and information. This means that Intermediary acts as a mediating agent for receiving information. Therefore, the reliability and value of intermediary defines the reliability and value of information a consumer receives. In comparison, apomediation as the name implies; involves agents (tools, people) whom stand by for the purpose of guiding consumer towards high quality services and information without implying any condition to gain that service or information in the first place, and with restricted individual control to pick the information that is being delegated. In the health environment, disintermediation refers to providing consumers with more direct access to their individual data (e.g., Electronic Health Records) and basic medical information. The basic purpose of a middleman is to guide consumers to specific and reliable information; yet the disintermediation function may create a problem as consumers without guidance may get lost in the huge information pile and end up at inferring the irrelevant information (Eysenbach, 2008).

### **IV. Collaboration:**

Collaboration refers to the concept of connecting groups of people with each other who have not, or have insufficiently interacted with each other. Looking at the researcher corner of the triangle illustrated above related to medicine 2.0/health 2.0, collaboration may be referred to the bringing together of scientists employing concepts and tools as termed by Falkman et al, (2008). Yet, it also includes reassuring collaboration among various different groups (e.g., user involvement in healthcare decisions, encouraging public engagement in research issues). According to Eysenbach, (2008), collaboration among these various groups of health professionals or public leads to enhanced potential for the translation of knowledge and the implication of research in the real world environment.

### **V. Openness**

Openness in the web 2.0 environment according to Eysenbach, (2008) refers to the two basic aspects. On the one side, it reflects the notion of web 2.0 being transparent, interoperable and open

interface/source (e.g., Microsoft’s HealthVault which offers an Application Programming Interface – API that facilitates connectivity to other applications). The “openness” aspect of web 2.0 raises expectations from the users’ perspective where the web 2.0 generation users would likely require more than just Electronic Health Records (EHR) rather Personal Health Records (PHR 2.0) which not only store their health related information but also facilitate the access to these files from user end. On the other side, Medicine 2.0 entails the transparency and openness of data that was previously out of reach of the public (e.g., open access to journals, research data). The open public access to such data may lead to further discussions and research.

Linking healthcare applications with social networking applications, the table below from Deloitte shows the participants and organizations impacted by a specific functionality of healthcare apps and how some social networking apps have provided value to support each specific functionality. (Deloitte, 2010).

**Table 3: Healthcare Application Functionality and Social Networking Apps (Deloitte, 2010)**

Health care application	Participants	Impacted organizations	Representative social networking applications
<b>Maintaining health and wellness</b>	<ul style="list-style-type: none"> <li>Consumers</li> <li>Health coaches</li> </ul>	<ul style="list-style-type: none"> <li>Physicians</li> <li>Health plans</li> <li>Wellness facilities</li> <li>Hospitals</li> <li>Alternative providers/health coaches</li> <li>Employers</li> </ul>	<ul style="list-style-type: none"> <li>WEGO Health offers health activists the chance to advise consumers about their health by reviewing and linking tools on one site.</li> <li>WebMD offers a social networking platform for both consumer- and physician/expert-moderated health conversations.</li> </ul>
<b>Disease management</b>	<ul style="list-style-type: none"> <li>Consumers</li> <li>Physicians</li> <li>Allied health professionals</li> </ul>	<ul style="list-style-type: none"> <li>Physicians</li> <li>Retail clinics</li> <li>Health plans</li> <li>Device manufacturers</li> <li>Drug companies</li> <li>Alternative care providers</li> <li>Disease management companies</li> </ul>	<ul style="list-style-type: none"> <li>PatientsLikeMe offers a 24/7 secure login for health plans to enable disease management.</li> <li>Inspire.com offers patients 24/7 access to peer communities.</li> </ul>
<b>Clinical trial recruitment</b>	<ul style="list-style-type: none"> <li>Consumers</li> <li>Clinical investigators</li> </ul>	<ul style="list-style-type: none"> <li>Academic medicine</li> <li>Drug &amp; biotech companies</li> <li>Contract Research Organizations (CROs)</li> <li>Device manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>Amyotrophic lateral sclerosis (ALS) patients organized their own clinical trial on PatientsLikeMe.</li> <li>Novartis recruited patients from PatientsLikeMe for its FTY720 multiple sclerosis trials.<sup>26</sup></li> <li>iGUARD, a wholly owned subsidiary of Quintiles, is a drug review site that leverages its network of participants to model clinical trial feasibility.</li> </ul>
<b>Personal Health Records (PHRs)</b>	<ul style="list-style-type: none"> <li>Consumers</li> <li>Health professionals</li> </ul>	<ul style="list-style-type: none"> <li>Drug &amp; device manufacturers</li> <li>CROs</li> <li>Academic medicine</li> <li>Health plans</li> </ul>	<ul style="list-style-type: none"> <li>PatientsLikeMe and MedHelp allow participants to upload detailed information about their condition and receive information from similar patients.</li> </ul>
<b>Health professional training</b>	<ul style="list-style-type: none"> <li>Physicians</li> <li>Advanced practice nurses</li> <li>Allied health professionals</li> </ul>	<ul style="list-style-type: none"> <li>Drug &amp; device manufacturers</li> <li>Licensing organizations</li> <li>Hospitals</li> <li>Schools</li> </ul>	<ul style="list-style-type: none"> <li>radRounds offers radiology professionals a community to collaborate and share cases and receive opinions.</li> <li>Sermo and Ozmosis offer physicians the opportunity to submit cases for community discussion; they fund their sites with manufacturer sponsorships and advertisements.</li> </ul>
<b>Public health announcements and campaigns</b>	<ul style="list-style-type: none"> <li>Consumers</li> <li>Regulators</li> </ul>	<ul style="list-style-type: none"> <li>Regulatory agencies</li> <li>Public health agencies</li> <li>Local/state/federal government</li> </ul>	<ul style="list-style-type: none"> <li>The CDC collaborated with DailyStrength and Sermo to inform the public and physicians about flu outbreaks.</li> <li>In addition, the CDC monitored the conversations and addressed the public on a variety of social networking sites, including Facebook, MySpace, CafeMom, etc.<sup>27</sup></li> </ul>
<b>Treatment, physician or hospital selection</b>	<ul style="list-style-type: none"> <li>Consumers</li> </ul>	<ul style="list-style-type: none"> <li>Drug &amp; device manufacturers</li> <li>Hospitals</li> <li>Health plans</li> <li>Retail clinics</li> </ul>	<ul style="list-style-type: none"> <li>DailyStrength and FacetoFace Health offer communities and a search engine so that patients can find “matches” to ask advice.</li> <li>The Mayo Clinic offers the “Sharing Mayo Clinic” blog for patients and physicians to share their stories; it also offers the “Medical Edge” for patient information podcasts and news.</li> </ul>

## 2.4 Social Media Healthcare Goals

Computer Sciences Corporation (CSC), an industry leader in IT services and outsourcing recently released a white paper evaluating the prospect of using Social Media in healthcare. In their study, they identified several healthcare goals that various healthcare institutions, depending on their type of business will need as well as how social media is able to support and improve those goals. In the summarized table below, each healthcare goal is provided with a real-life example of how social media best practices have been used by some institutions to showcase the value of social media in healthcare. (Drazen et al, 2012)

**Table 4:** Healthcare Goals and Social Media (Drazen et al, 2012)

<b>Healthcare Goals</b>	<b>Social Media Best Practice Examples</b>
<b>Marketing</b>	During July, 2011, Mayo Clinic launched its private “Online Health Community”; a site similar to Facebook, yet open to all comers. The site gained attention and within a week’s time, it attracted 1000 members and the figure crossed 7000 by September, 2011. Mayo facilitated guests to upload their images, watch stories and health videos from various patients, and participate or hear discussions on mutual health interests.
<b>Workforce Recruitment:</b>	An important aspect of social media in terms of big enterprises is the practice of “Social recruitment” approach. E.g., Sodexo (a large international organization, pioneered in the methods of using social media for talent and workforce recruitment) specializes in recruiting management level & above positions for hospitals. Social recruitment techniques employed by Sodexo facilitate in filling food services management, environmental and facilities management. Sodexo received an excellence award for the innovative use of social media in 2009; plus its social media strategies condensed yearly recruitment advertising costs by \$300,000.
<b>Brand Management</b>	Children’s Hospital Boston uses social media channels like Facebook, YouTube and Twitter for the purpose of promoting their services and maintaining reputation as the national leader in paediatric care. Social media channels depict the hospital’s focus on patients and their families in terms sharing their weekly images and stories. The hospital also maintains a blog named “Thriving”; related specifically to paediatric care where staff and clinicians post updated health news content and also address queries relevant to patient care
<b>Reputation Management</b>	Social media channels create an opportunity for organizations to respond to certain user discussions/queries in the online environment, thus addressing user issues and improving the delivery. In the healthcare context, Cigna (a global healthcare management company) monitors various social media channels for comments about the organization and in case a negative comment is found, the company directly responds to offering assistance in resolving the issue.

<p><b>Consumer, Patient Education:</b></p>	<p>Social media deliver a new platform for the sharing of knowledge among patients, consumers, and healthcare professionals. Social media is also being used for the purpose of educating these consumers and patients. E.g., a small 10-doctor obstetrics and gynaecology practice in Texas uses Facebook, Twitter and other various media channels to deliver information to their patients and as per the clinic findings, patients come more prepared and educated for their appointments</p>
<p><b>Professional Collaboration</b></p>	<p>Social media sites are also contributing to the collaboration among various healthcare professionals with specialized sites like Sermo where physicians share and converse information with colleagues near and far. Since the launch of Sermo in 2006, it has attracted more than 125,000 members. Till date it exists as the largest online community of physicians in the U.S. and is used by doctors for consulting, sharing new treatments, and discuss new research issues in the healthcare profession</p>
<p><b>Community Creation</b></p>	<p>Virtual communities like Facebook and Twitter have also created a need for the existence of health related social media applications such as PatientsLikeMe, TuDiabetes, and Inspire which enable users to form communities of same condition (patients). Users can further add their health conditions to their profiles, review others' profile, and share experience and advice related to treatment of their condition</p>
<p><b>Wellness</b></p>	<p>Enterprises have used social media as an effective means for the promotion of healthy behaviours among public and employees. Aetna (a U.S. based healthcare insurance company), in 2010 launched "Healthy Food Fight" challenge with the aim of promoting healthy cooking and nutrition. The health plan involved the use of Facebook, YouTube and Twitter to create awareness by reaching various age groups and informing them about alcohol use, sexual and physical health and smoking cessation plus provision of a health calculator which addresses user health concerns by providing tips</p>
<p><b>Clinical Trial</b></p>	<p>Novartis partnered with PatientsLikeMe back in 2008 for recruiting participants for a multiple-sclerosis drug trial. In the campaign, PatientLikeMe sent messages to 8,000 members of the sclerosis community for the purpose of creating awareness, which as a result led to the 1,500 web hits on Novartis website and also escalated the registration of participants.</p>

### **3. Representative Case Studies**

For the case study analysis of current social media use in healthcare, we will be examining two cases in which social media has been partially utilised by healthcare institutions. In order to provide an unbiased analysis, the pros and cons as well as challenges will be tackled to not only understand why social media may be useful in this industry but also to grasp possible roadblocks with implementing such a solution.

#### **3.1 Case #1: Social Media in Vascular Surgery**

Social media has been observed to be one of the most rapidly growing and evolving technology of the present era. The paper demonstrates the use of social networking sites as an effective means of creating a positive impact on vascular practice, through the evidence of this technology being implemented at Cleveland Clinic and by the Society for Vascular Surgery into their approach to patient care and physician communication. Generally, the collaboration of social networking applications with healthcare systems has existing and future potential for the promotion of healthcare issues such as patient awareness, clinical trials recruitment, and professionalism within the specialty of vascular surgery. Vascular surgery is considered to be an area within the healthcare industry that is as evolving as social media technology in terms of rapid growth.

The implication of social media in vascular surgery itself hasn't been much studied yet, many healthcare organizations have already developed a social media presence. According to the data analysis from 2011, 1229 hospitals have a presence on one or more of the social media sites, with over 4118 pages. Facebook secured the most shared with 1068 pages, followed by Twitter with 814 accounts. As per the preliminary findings, plastic surgery has been proven to be more successful in the implementation of social media practices in the healthcare sector. A study published in the *Aesthetic Surgery Journal* analyzed seven major cities and the practice of social media by plastic surgeons in the locality. The findings depicted that 30-50% of successful practices had a presence on either one or more of the social networking sites (Wong et al, 2011).

Looking specifically at Vascular surgery, the most appropriate approach applicable in terms of social media is the recruitment of patients for clinical trials. Based on recent survey conducted by the patient recruitment specialist; on a sample size of 179 adults, revealed that only 30% were aware of the clinical website trials sites like [clinicaltrials.gov](http://clinicaltrials.gov) and National Breast Cancer Foundation. After the exposure of these trials, 81% of the group recognized as "e-patients" was interested in participating in relevant clinical trials. The article also suggested that health communities can benefit from the use of various social media sites in presenting a public face to the consumer, thus developing the trust factor faster with prospective patients (Novotarski, 2011).

Social media sites provide a more effective channel for vascular surgeons to communicate, deliver resources, services or educational content to their patients. This approach helps in delivering a more personalized approach towards the patient interaction and also leads to the increase in referrals, the development of a patient base, and significantly the building of a positive image in the minds of patients. E.g., Miller Family Heart and Vascular Center (Cleveland Clinic) facilitates a personalized

patient-centered media approach through their personal Facebook page ([www.facebook.com/clevelandclinic](http://www.facebook.com/clevelandclinic)); linking it directly to their website. The interactivity of this page enables patients, hospital staff and physicians to post messages on their wall in an ongoing streaming approach. The page also provides various links to Cleveland Clinic's hospital website with detailed information related to vascular diseases. Another link directs the patient to Twitter ([www.twitter.com/ClevClinicHeart](http://www.twitter.com/ClevClinicHeart)), where hospital administrators can post "tweets" associated with vascular care. Other links direct the user to webchats ([www.clevelandclinic.org/webchat](http://www.clevelandclinic.org/webchat)) related to various topics in the vascular surgery or video content that illustrates the vascular center and procedures as part of the vascular surgery. The clinic also maintains a blog by the name of "The beating Edge", designed for updating patients about cardiovascular and thoracic diseases. Accordingly patients can post comments and feedback on the online forum.

The Society for Vascular Surgery (SVS), has also initiated its social media presence apart from its website through social networking sites like Facebook, Twitter, LinkedIn and YouTube. The society used Twitter largely for communicating with the attendees in its most recent meeting. The growth in social media applications also creates a challenge for organizations as to its effective usage. Generally healthcare companies start off with a professional website which can be used as a core to other various virtual activities, and these healthcare providers might seek support from third-party contractors that maintain a credible reputation working with the health community.

Social media is an effective communication tool; yet, there exist potential downfalls with social media deployment in the vascular surgery practice.

Firstly, the ease of communication facilitated by social media channels may lead patients to rely solely on social media as a substitute for direct communication with providers, failing to be available for phone calls and office visits. This could create harm towards patient care as the diagnosis/treatment could also be delayed due to non-communication.

Moreover, patient privacy is also a legal issue when it comes to online communications. According to the Health Insurance Portability and Accountability Act (HIPAA), health care providers are labelled as "covered entities", meaning they are liable to protect patient information from disclosure to third parties without authorization (HIPAA, 1996).

For example, a physician from Rhode Island in April, 2011 posted some medical information about one of her patients, and got a legal suit filed against her. Although the name and other personal information wasn't included in her post, yet due to specific medical information listed, the judge ruled that the information might lead to identification by patient's small community and ultimately resulted in the termination of the physician's medical license.

The use of social media in Vascular Surgery Practice as illustrated by the Cleveland Clinic and Society for Vascular Surgery (SVS) has been successful yet there exist limitations to its use. If the healthcare providers take direct control of their use and follow strict policies that comprise disclaimers about public postings, medical information and physician communications, they may protect themselves from any accountability without the losing the benefits offered by this rapidly developing technology. The growing

popularity of this new practice can potentially be used as a tool for the promotion of patient awareness, practice goals, recruitment of clinical trials, enhancement of professionalism and communication within the vascular surgery industry.

### **3.2 Case #2: Do Patients “Like” Good Care? Measuring Hospital Quality via Facebook**

The healthcare industry has been observed as a slow adopter of new communication technology regardless of its extensive availability (Hawn, 2009). Patients these days spent more time online which provides hospitals the prospect to connect to a huge group of people through internet. The growth of Facebook has lead public researchers to explore it’s implication in the healthcare industry yet there has not been much research conducted to determine the relationship between Facebook and conventional hospital quality measures. The purpose of the study is to fill in the gap observed in the use of communication technology and healthcare, and focuses on a 30-day mortality and patient recommendation rate for quantifying hospital quality and patient satisfaction; these variables were correlated with Facebook data for 40 hospitals in New York surrounding areas. Exploratory models were developed to contrast the size of Facebook communities among hospitals in New York, using 2 basic measures: HHS (US department of Health and Health Services) data on 30 day mortality rates and patient recommendations. As per the study findings, Facebook provides a unique resource for analyzing these metrics and helps in building a solid foundation for future research in terms of its use by patients, hospitals and health researchers.

The study focuses on the assumption that Facebook “Likes”, which may be termed as a method to provide positive feedback or connect with things a user cares about in the Facebook environment. The authors analyze whether “Likes” of a hospital’s Facebook page correlate to quality and satisfaction in terms of patient care and whether patients exhibit the behaviour of “Liking” Facebook page after receiving quality services. The authors use a multivariate regression model (which manages potential Facebook activity cofounders) to isolate connection between Facebook “likes” and comprehensive building of hospital quality.

Questions considered in the study are as follows:

- Which hospitals in the group model have a Facebook page?
- The size of Facebook community for each provider in terms of “Likes”?
- Is the number of “Likes” on a hospital’s Facebook page linked with traditional indicators of quality and patient satisfaction?

The authors used various exploratory models for performing a quantitative analysis of Facebook pages for a group sample of hospitals in the New York region. These relationships were verified by executing multivariate regressions and adjusting for possible confounders. The list of hospitals which comprised 82 hospitals in the New York region was gathered through the HHS Hospital compare website

by searching within a 25 miles radius. The sample size included all of these 82 hospitals and data was gathered from their respective Facebook page.

Patient recommendation has been confirmed as a degree of patient satisfaction in various studies (Monge & Contractor, 2003) and a strong link has been recognized between patient satisfaction and hospital quality. The teaching hospital and bed count statistics were collected from the Best Hospitals database (US News and world report), and the influence of these variables was measured through the hospital's Facebook account. The authors assumed that the quantity of "likes" is linked to the volume of patients, autonomous of the hospital's service quality.

Data gathered from the Facebook page of these hospitals included quantity of likes, days since the page's activation, community's post ability, quantity of posts by page administrator and community, ratio of response by administrator. Although these various variables were added, yet the key measure was "quantity of posts" with its average calculated on the basis of the launch date of the page. Some of the hospitals provided users the option to like others comments for which purpose this activity was identified as confounder because; its agenda setting nature may draw more attention in the form of "likes", regardless of hospital quality and satisfaction. For the purpose of calculating administrator response, the total number administrator responses were divided by the total number of individual community posts including multiple posts by individuals, yet multiple comments at a single community by the administrator were counted single.

Facebook users may "like" a hospital's page given the impression that the administrator responds promptly to their comments, not because they incurred a positive experience with the hospital. Facebook users may also "like" a hospital page in order to receive health or event news, and not because they like the hospital, yet it shows their interest in attaining information. The data collected for each hospital revealed following three categories of "Likes".

- Facebook "likes" – mortality rates
- Facebook "likes" – patient recommendation
- Patient recommendation on mortality rates.

According to the research findings, 40 out of 82 hospitals in the New York region were functional on their Facebook page, and these pages had a variety of activities and community sizes. The analysis revealed that a statistically substantial, negative relationship existed between Facebook "likes" and 30 day mortality while a statistically substantial, positive relationship between Facebook "likes" and patient recommendation. Patient recommendation and 30 day mortality also exhibit to show a negative and statistically substantial relationship based on the exploratory model.

The findings advocate the association of Facebook "Likes" with hospital quality as analyzed by the 30 day mortality rate. The research suggest that people are not as much of apt to "like" a hospital if it has a greater 30 day mortality rate and further prone to "like" a hospital if they recommend it. Also, the findings were surprising by the fact that Facebook "Likes" were more profound to 30 day mortality rates

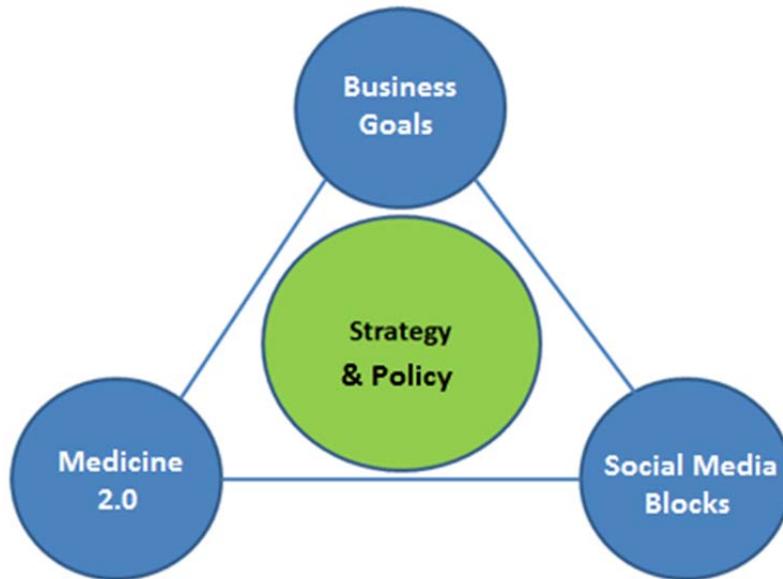
as compared to patient satisfaction yet the theoretical framework illustrated patient satisfaction to be the influencing factor in terms of hospital quality and Facebook “Likes”.

The study suggests that any hospital may develop a Facebook page, yet ones that serve higher patient satisfaction and quality are expected to score more “Likes” of their page, thus Facebook offers an opportunity in terms of revealing community perceptions of patients’ family and friends. Furthermore, social media may be used as an effective tool for hospitals to communicate with their communities, and the data generated from these sources may be used by public health researchers for the improving the level of patient satisfaction and quality.

#### **4. Towards a Framework for Social Media in Consumer Health**

In this research, we looked into several building blocks that make a strong case for the possibility of increased popularity and use of social media in healthcare in the near future. These building blocks include healthcare organisations’ business goals and the advancements of Medicine 2.0 and social media which were made possible by the introduction of various enabling Web 2.0 technologies. To summarise this research, I have come up with a simple framework below which illustrates the relationship between the factors that were reviewed in this study.

Basically, we can suggest that for healthcare organisations to successfully formulate their Social Media Strategy and Policy there are three basic building blocks that they can factor in. First, they must examine their *business’ goals*. From there, they can examine which *social media blocks* from the Honeycomb Framework do they consider essential to start a social media implementation. Lastly, using these information, they can look at available *Medicine 2.0 technologies and approaches* to come up with an initial and long-term social media adoption plan to carry out. Hence, the framework below which illustrates the three building blocks being utilized together to support overall social media strategy and policy.



**Figure 5:** Proposed Healthcare Social Media Adoption Framework

Further synthesising the information from healthcare business goals advanced by social media as identified by CSC with the Social Media Honeycomb Framework, this research will now also try to link main functional blocks of social media that are utilised by the various business goals. In addition to that, this study will also link these two aforementioned concepts with Eysenbach's Medicine 2.0 framework to determine which components best support the themes of a Medicine 2.0 environment. Below is a table that shows the relationship between healthcare business goals, social media functional blocks and Medicine 2.0:

**Table 5:** Social Media Healthcare Business Goals, Honeycomb Framework and Medicine 2.0 Themes

<b>Social Media Healthcare Business Goals</b>	<b>Functional Blocks (Honeycomb Framework)</b>	<b>Medicine 2.0 Drivers</b>
<b>Marketing</b>	Presence Conversations Relationships	Social Networking Participation
<b>Workforce Recruitment</b>	Identity Presence	Social Networking
<b>Brand Management</b>	Reputation Conversations Presence	Social Networking Participation
<b>Reputation Management</b>	Reputation Presence	Social Networking Participation
<b>Consumer Relations</b>	Relationships Conversations Reputation Presence	Social Networking Participation
<b>Consumer / Patient Education</b>	Sharing Conversations Groups	Social Networking Participation Apomediation
<b>Health Professional Education and Collaboration</b>	Sharing Conversations Groups Identity	Social Networking Participation Collaboration Openness
<b>Community Creation</b>	Groups Relationships Sharing	Social Networking Collaboration Openness Participation
<b>Wellness</b>	Sharing Conversations	Social Networking Participation
<b>Population and Patient Monitoring</b>	Sharing Relationships Reputation	Social Networking Participation Collaboration
<b>Care Management and Coordination</b>	Sharing Groups Conversations	Collaboration Openness Apomediation
<b>Clinical Trial Recruitment</b>	Groups Sharing	Participation Openness Apomediation
<b>Research Collaboration</b>	Sharing Conversations Groups	Social Networking Participation Collaboration Openness

From the table above, we can see that each of the business goals serves a purpose towards social media adoption. We can also see that Medicine 2.0 technologies have various themes that are more catered for specific goals. Depending on the healthcare organisation's line of business, they can identify the emphasis of their social media adoption strategy and the various supporting components they need to put in place for it to meet their business needs.

Lastly, it must be noted that with the use of social media, organisations must also come to terms with the need for a concrete and clear usage policy. They must factor in security and privacy issues to come up with a policy that does not inhibit information sharing and communication but at the same time is tight enough to preserve the privacy of the participants using it.

## **5. Conclusion**

Throughout the different sections of this research, we have seen how social media has impacted the way organisations do business, more specifically with regards to marketing, media relations and customer interaction. For organisations to successfully compete and remain relevant, it is imperative for them to start developing or adopting a social media strategy to avoid lagging behind the competition.

In conclusion, though social media in healthcare may not have gone mainstream yet as of the moment, but as it can be seen in a recent study by CSC, the trend of using social media in the various aspects of health care has not only begun, it also has achieved reasonable levels of success to merit consideration. As stated in their white paper, the social media revolution is rapidly overtaking information revolution and is drastically changing the way healthcare communications and goals are achieved (Drazen et al., 2012). In the literature review section of this research, we have seen how various business goals related to communications, marketing, information sharing, clinical care and coordination, research collaboration, etc. have been improved by the use of certain variations of social media implementations. However, having separate pieces of implementations is just a starting point. For a long-term implementation, organisations must eventually make use of a solution that is integrated to ensure better quality of data and a more coordinated effort to really achieve the benefits of social media. Given this, CSC has suggested that healthcare organisations need to adopt both a social media policy to protect and govern their use of social media as well as a social media strategy to anticipate the upcoming widespread use of such to help accomplish various healthcare goals (Drazen et al., 2012).

## Bibliography

- Abdul, S., Lin, C., Scholl, J., Fernandez, L., Jian, W., Hsu, M., Liou, D., Li, Yu., (2011). Facebook use leads to healthcare reform in Taiwan. *The Lancet*, 377(9783), 2083-4.
- Baptist, A.P., Thompson, M., Grossman, K.S., Mohammed, L., Sanders, G.M. (2011). Social media, text messaging, and email-preferences of asthma patients between 12 and 40 years old. *Journal of Asthma*, 8 (8), 824-30.
- Beach, C. (2011), "Using Social Media to Engage Patients". *Healthcare Executive*, pp. 66-70.
- Beirut. (2009, August 21). Why do people really tweet? The psychology behind tweeting! Retrieved January 23, 2013, from <http://blog.thoughtpick.com/2009/08/why-do-people-really-tweet-the-psychology-behind-tweeting.html>
- Bennett, E. (2012). Hospitals and social media: a survey of best practices. Retrieved January 25, 2013, from <http://ebennett.org/hsnl/>
- Borgatti, S., & Foster, P. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, 29(6), 991-1013.
- Bradley, Anthony., (2011). "Defining Social Media: Mass Collaboration is its Unique Value." Gartner Blog Network. Retrieved January 18, 2013, from [http://blogs.gartner.com/anthony\\_bradley/2011/03/08/defining-social-media-mass-collaboration-is-its-unique-value/](http://blogs.gartner.com/anthony_bradley/2011/03/08/defining-social-media-mass-collaboration-is-its-unique-value/)
- CareerBuilder, (2008). One-in-Five Employers Use Social Networking Sites to Research Job Candidates. Retrieved February 16, 2013 from <http://www.careerbuilder.com/share/aboutus/pressreleasesdetail.aspx?id=pr459&sd=9%2f10%2f2008&ed=12%2f31%2f2008&cbRecursionCnt=1&cbsid=c9bbeee8538d45329426ea1907ef736f-317581714-R8-4>
- Centers for Disease Control, (2011). Social Media at CDC. Retrieved January 17, 2013, from [http://www.cdc.gov/socialmedia/tools/guidelines/pdf/socialmediatoolkit\\_bm.pdf](http://www.cdc.gov/socialmedia/tools/guidelines/pdf/socialmediatoolkit_bm.pdf)
- Chretien, K.C., Greysen S.R., Chretien, J.P., & Kind, T. (2009). Online posting of unprofessional content by medical students. *The journal of American Medical Association (JAMA)*, 302, 1311-14.
- Clark, John. R., (2010). Social Media and Privacy. *Air Medical Journal*, 29(3). 104-107.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness, and structural design. *Management Science*, 32(5), 554-571.
- Dainton, C., (2009). Physician-writers in the age of blogging. *Canadian Medical Association Journal*, 181(5), 348.
- Davidson, K. P., & Pennebaker, J. W. (1997). Virtual narratives: Illness representations in on-line support groups. In K.J. Petrie, & J.A. Weinman (Eds.), *Perceptions of health and illness* (pp. 463-486). Amsterdam: Harwood Academic Publishers.
- Deloitte. (2010). Social Networks in Healthcare: communication, collaboration and insights. Deloitte Center for Health Solutions. Retrieved February 23, 2013, from [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US\\_CHS\\_2010SocialNetworks\\_070710.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US_CHS_2010SocialNetworks_070710.pdf)

- Dobransky, K., & Hargittai, E., (2012). Inquiring Minds Acquiring Wellness: Uses of online and offline sources for Health Information. *Health Communication*, 27(4), 331-43.
- Dolan, Brian., (2011). 13k iPhone Consumer Health Apps in 2012. *Mobihealthnews*. Retrieved February 11, 2013, from <http://mobihealthnews.com/13368/report-13k-iphone-consumer-health-apps-in-2012/>
- Drazen, E., Lorincz, C. and Dahlweid, M. (2011). Should Healthcare Organizations use Social Media? A Global update. CSC. Retrieved March 21, 2013 from [http://assets1.csc.com/health\\_services/downloads/CSC\\_Should\\_Healthcare\\_Organizations\\_Use\\_Social\\_Media\\_A\\_Global\\_Update.pdf](http://assets1.csc.com/health_services/downloads/CSC_Should_Healthcare_Organizations_Use_Social_Media_A_Global_Update.pdf)
- Dutta, S. (2012). *Social Media and Customer Service: From Listening to Engagement*. Aberdeen Group. Retrieved March 21, 2013, from <http://www.oracle.com/us/products/applications/aberdeensocial-customer-svc-1902160.pdf>
- Eckler, Petya., Worsowicz, Gregory., Rayburn, Wesley. (2010). Social Media and Health care: An overview. *Journal of Physical Medicine and Rehabilitation (PM&R)*. 2, 1046-1050.
- Engestroöm, J. (2005, April 13). Why some social network services work and others don't - Or: the case for object-centered sociality. Retrieved January 28, 2013, from <http://www.zengstrom.com/blog/2005/04/why-some-social-network-services-work-and-others-dont-or-the-case-for-object-centered-sociality.html>
- Eysenbach, Gunther. (2008). Medicine 2.0: Social Networking, Collaboration, Participation, Apomediation, and Openness. *Journal of Medical Internet Research*. 10(3).
- Eysenbach, G. (2000). Consumer health informatics. *British Medical Journal (BMJ)*. 320 (7251), 1713-1716.
- Eysenbach, G. (2007). From intermediation to disintermediation and apomediation: new models for consumers to access and assess the credibility of health information in the age of Web2.0. *Stud Health Technol Inform*. 129(1), 162-166.
- Eytan, Ted. (2012). The Health 2.0 Definition : Not just the Latest, The Greatest!. Retrieved February 8, 2013, from <http://www.tedeytan.com/2008/06/13/1089>
- Facebook., (2013). Statistics. Retrieved February 13, 2013, from <http://newsroom.fb.com/Key-Facts>
- Falkman, G., Gustafsson, M., Jontell M., Torgersson O. (2008). SOMWeb: A Semantic Web-Based System for Supporting Collaboration of Distributed Medical Communities of Practice. *Journal of Medical Internet Research*. 10(3), 25.
- Fox, S. (2005). *Health Information Online: Pew Internet & American Life Project*. Washington: DC.
- Gabbatt, Adam., (2013, February 20). How companies used social media during Hurricane Sandy. *Guardian*. Retrieved February 21, 2013, from <http://www.guardian.co.uk/world/us-news-blog/2013/feb/20/mta-conedison-hurricane-sandy-social-media-week>
- Goffman, E. (1959). *The presentation of self in everyday life*. New York: Doubleday Anchor Books.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- Greene, J.A., Choudhry, N.K., Kilabuk, E, & Shrank, W.H. (2011). Online social networking by patients with diabetes: a qualitative evaluation of communication with Facebook. *Journal of General Internal Medicine*, 26, 287-292.

- Hawn, C. (2009). Take two aspirin and tweet me in the morn-ing: How Twitter, Facebook, and other social media are reshaping health care. *Health Aff (Millwood)*, 28, 361-368.
- Haenlein, M., & Kaplan, A. M. (2009). Flagship brand stores within virtual worlds: The impact of virtual store exposure on real-life brand attitudes and purchase intent. *Recherche et Applications en Marketing*, 24(3).
- Haythornthwaite, C. (2005). Social networks and internet connectivity effects. *Information, Community & Society*, 8(2), 125–147.
- Health Insurance Portability and Accountability Act of 1996. (2012). 42 U.S.C. 1320, D- 9.
- Indes, JE., Gates, L., Mitchell, EL., & Muhs, BE. Social Media in Vascular Surgery. *Journal of Vascular Surgery*, 57(4), 1159-62.
- Jain, S., (2009). Practicing medicine in the age of Facebook. *The New England Journal of Medicine*, 361(7), 649-51.
- Kahn, J. (2008). "The Wisdom of Patients: Healthcare meets online Social Media". California Healthcare Foundation. Oakland:CA.
- Kaplan, Andreas M., & Haenlein, Michael., (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons* 53 (1), 59–68
- Kaplan, A. M., & Haenlein, M. (2009b). The fairyland of Second Life: About virtual social worlds and how to use them. *Business Horizons*, 52(6), 563-572.
- Kaplan, A., & Haenlein, M. (2011). The early bird catches the news: Nine things you should know about micro-blogging. *Business Horizons*, 54, 105-113.
- Keckley, P., & Michelle, H. (2010). Social Networks in Health Care: communication, collaboration and insights. Deloitte Centre for Health Solutions: Washington: DC. Retrieved February 16, 2013, from [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US\\_CHS\\_2010SocialNetworks\\_070710.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US_CHS_2010SocialNetworks_070710.pdf)
- Kietzmann, J. H., Hermkens, K., McCarthy, I. P., & Silvestre, B. S. (2011). Social media ? Get serious ! Understanding the functional building blocks of social media. *Business Horizons*, 54(3), 241-251.
- Kietzmann, J.H., S. Silvestre, Bruno., P. McCarthy, Ian., & F. Pitt, Leyland. (2012). Unpacking the social media phenomenon: towards a research agenda. *Journal of Public Affairs*, 12(2), 109–119.
- Kietzmann, J., & Angell, I. (2010). Panopticon revisited. *Communications of the ACM*, 53(6), 135-138.
- Kornek, F. (2012). A Balanced Scorecard Approach to Social CRM Performance Measurement. Utrecht University. Retrieved January 12, 2013, form [http://igitur-archive.library.uu.nl/student-theses/2012-0925-200735/Thesis\\_final\\_FK.pdf](http://igitur-archive.library.uu.nl/student-theses/2012-0925-200735/Thesis_final_FK.pdf)
- Kravets, D. (2010, March 17). Judge approves \$9.5 million Facebook 'beacon' accord. Retrieved February 16, 2013, from <http://www.wired.com/threatlevel/2010/03/facebook-beacon-2/>
- LinkedIn., (2013). About LinkedIn. Retrieved February 13, 2013, from <http://press.linkedin.com/about>
- Lloyd, B.A., (2009). Professional networking on the Internet. Pulp and Paper Industry Technical Conference, 2009. Retrieved February 21, 2013, from <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5185427>
- Loh, Lawrence., Bourque, Jean., Lee, Daniel., Morrison, Stewart., & Walker, Xaviour, (2012). Social Media and Medicine. Junior doctor Network: World Medical Association.

- Lustria, M., Smith, S., & Hinnant, C. (2011). Exploring digital divides: An examination of eHealth technology use in health information seeking, communication and personal health information management in the USA. *Health Informatics Journal*, 17 (3), 224-43.
- Mayo Clinic Center for Social Media, (2013). About. Retrieved January 29, 2013, from <http://network.socialmedia.mayoclinic.org/mccsm/>
- M.Boyd, Danah., & B. Ellison, Nicole, (2008). Social Network Sites:Definition, History, and Scholarship. *Journal of Computer-Mediated Communication*, 13, 210-230.
- McCarthy, I., Lawrence, T., Wixted, B., & Gordon, B. (2010). A multidimensional conceptualization of environmental velocity. *The Academy of Management Review*, 35(4), 604-626.
- Merrill, M. (2010), "Report: Social networking can improve care, lower costs" in *Healthcare IT News*.
- Merchant, R.M., Elmer, S., & Lurie, N. (2011), Integrating social media into emergency preparedness efforts. *N Eng J Med* 2011, 365(4):289-291.
- Monge PR., & Contractor, N. (2003). *Theories of communication networks*. Oxford University Press: USA.
- Muniz, A. M., & O'Guinn, T. C. (2001). Brand community. *Journal of Consumer Research*, 27(4), 412-432.
- Nasu, Y., Ashida, N., Kazaki, H., Sagawa, S., & Tsuji, M., (2012). Efficient Health Information Management Systems using wireless communications Technology to aid disaster victims. *Journal of Medical Systems*, 36(4), 2689-2695.
- Nowotarski, M. (2011). Do not steal my avatar! Challenges of social network patents. IP Watchdog. Retrieved February 24, 2013, from <http://www.ipwatchdog.com/2011/01/23/dont-steal-my-avatar-challengesof-social-networking-patents/id=14531/>.
- OECD. (2007). *Participative web and user-created content: Web 2.0, wikis, and social networking*. Organisation for Economic Co-operation and Development. Retrieved February 5, 2013, from <http://www.biac.org/members/iccp/mtg/2008-06-seoul-min/9307031E.pdf>
- O'Reilly, Tim., (2005). *What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software*. O'Reilly: Spreading the Knowledge of Innovators. Retrieved February 12, 2013, from <http://oreilly.com/pub/a/web2/archive/what-is-web-20.html?page=1>
- Pew Internet. (2009). 61% of American adults look online for health information: Pew Internet and American Life project. Retrieved February 12, 2013, from <http://www.pewinternet.org/Press-Releases/2009/The-Social-Life-of-Health-Information.aspx>
- Ponemon Institute (2011). "Global Survey of Social Media Risks: Survey of IT & IT Security Practitioners." Retrieved January 11, 2013, from <http://www.websense.com/content/ponemon-institute-research-report-2011.aspx>
- Porter, M.E., & Teisberg, E.O. (2006). *Redefining Healthcare: creating value-based competition on results*. Boston: Harvard Business School Press
- Radicati, S. (2012), Email statistics report, 2012-2016. Retrieved January 13, 2013, from <http://www.radicati.com/wp/wp-content/uploads/2012/04/Email-Statistics-Report-2012-2016-Executive-Summary.pdf>

- Rowan, D., (2009, April 2). The suits come to Second Life. Now it's dying. The Times. Retrieved January 17, 2013, from <http://www.thetimes.co.uk/tto/law/columnists/article2048658.ece>
- Safko, J, & Brake, D.K. (2009), *The social media bible*. Hoboken NJ: Wiley.
- Sajadi, K., & H. Goldman. (2011). Social Networks Lack Useful Content for Incontinence. *Urology "Gold Journal"*, 78 (4), 764-7.
- Shaer, Matthew., (2012). "Game of Life" Popular Science. Retrieved February 13, 2013, from <http://www.popsci.com/technology/article/2012-01/can-treating-your-life-game-make-you-better-person>
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Hoboken, NJ: John Wiley & Sons, Ltd.
- Shreeve, S. (2011). *The Enabling Technologies and Reform Initiatives for the Next Generation Healthcare*. Retrieved February 6, 2013, from [http://health20.org/wiki/Shreeve\\_Health\\_2.0\\_Whitepaper](http://health20.org/wiki/Shreeve_Health_2.0_Whitepaper)
- Smith, A. (2010). *Home Broadband 2010: Pew Internet and American Life Project*: Washington: DC.
- Solis, B. (2010). *Engage: The Complete Guide for Brands and Businesses to Build, Cultivate, and Measure Success in the New Web*. John Wiley & Sons, Hoboken: NJ.
- Suarez, Almazor, M., (2011). Changing health behaviors with social marketing. *Osteoporosis International*, 3, 461-3.
- Sutton, J.N. (2010), *Twittering Tennessee: distributed networks and collaboration following a technological disaster*. Proceedings of the 7th International ISCRAM Conference: May 2010; Seattle, WA. Retrieved January 11, 2013, from <http://www.iscram.org/ISCRAM2010/Papers/113-Sutton.pdf>
- Swick, H.M., Szenas, P., Danoff, D., Whitcomb, M.E. (1999). Teaching professionalism in undergraduate medical education *The journal of American Medical Association (JAMA)*, 282(9), 830-832
- Timimi, F. K. (2012), *Medicine, Morality and health care social media*. BMC Medicine. 10(83). Retrieved January 10, 2013, from <http://www.biomedcentral.com/1741-7015/10/83>
- Timian, Alex., Rupcic, Sonia., Kachnowski, Stan., & Luisi, Paloma. (2013). Do patients "Like" Good care? Measuring hospital quality via Facebook. *American Journal of Medical Quality* XX(X), 1-9.
- USA Today, (2005, September 8). Delta employee fired for blogging sues airline. Retrieved January 24, 2013 from, [http://www.usatoday.com/travel/news/2005-09-08-deltablog\\_x.htm](http://www.usatoday.com/travel/news/2005-09-08-deltablog_x.htm).
- Willison DJ, Keshavjee K, Nair K, Goldsmith C, & Holbrook AM. (2003). Patient consent preferences for research uses of information in electronic medical records: interview and survey data. *British Medical Journal*. 326(7385), 373.
- Wikipedia, (2013). Gamification. Retrieved February 11, 2013, from <http://en.wikipedia.org/wiki/Gamification>
- Woodside, J. (2012), "Health Intelligence model for Evaluation of Social Media Outcomes". Ninth International Conference on Information Technology New Generations. Las Vegas: NV, USA. (April 16-18, 2012)
- Wong, WW., Gupta, SC. (2011). Plastic surgery marketing in a generation of "tweeting." *Aesthetic Surgery Journal*. 31, 972-6.
- World Medical Association, (2011). WMA Statement on the Professional and Ethical

Use of Social Media. Retrieved January 24, 2013, from  
<http://www.wma.net/en/30publications/10policies/s11/>

World Health Organization. (2011). Mixed uptake of social media among public health specialists. Retrieved January 25, 2013, from <http://www.who.int/bulletin/volumes/89/11/11-031111/en/index.html>

Wolfendale, J., (2007). My avatar, my self: Virtual harm and attachment. *Journal of Ethics and Information Technology*, 9(2), 111-119.

Willison DJ, Keshavjee K, Nair K, Goldsmith C, & Holbrook AM. (2003). Patient consent preferences for research uses of information in electronic medical records: interview and survey data. *British Medical Journal*. 326(7385), 373.

Zheng, R. (2012). COSC7388: Advanced Distributed Computing - PowerPoint from McMaster University, Retrieved March 22, 2013 from  
[http://www.cas.mcmaster.ca/~rzheng/course/COSC7388fa12/health\\_socialmedia.pptx](http://www.cas.mcmaster.ca/~rzheng/course/COSC7388fa12/health_socialmedia.pptx)