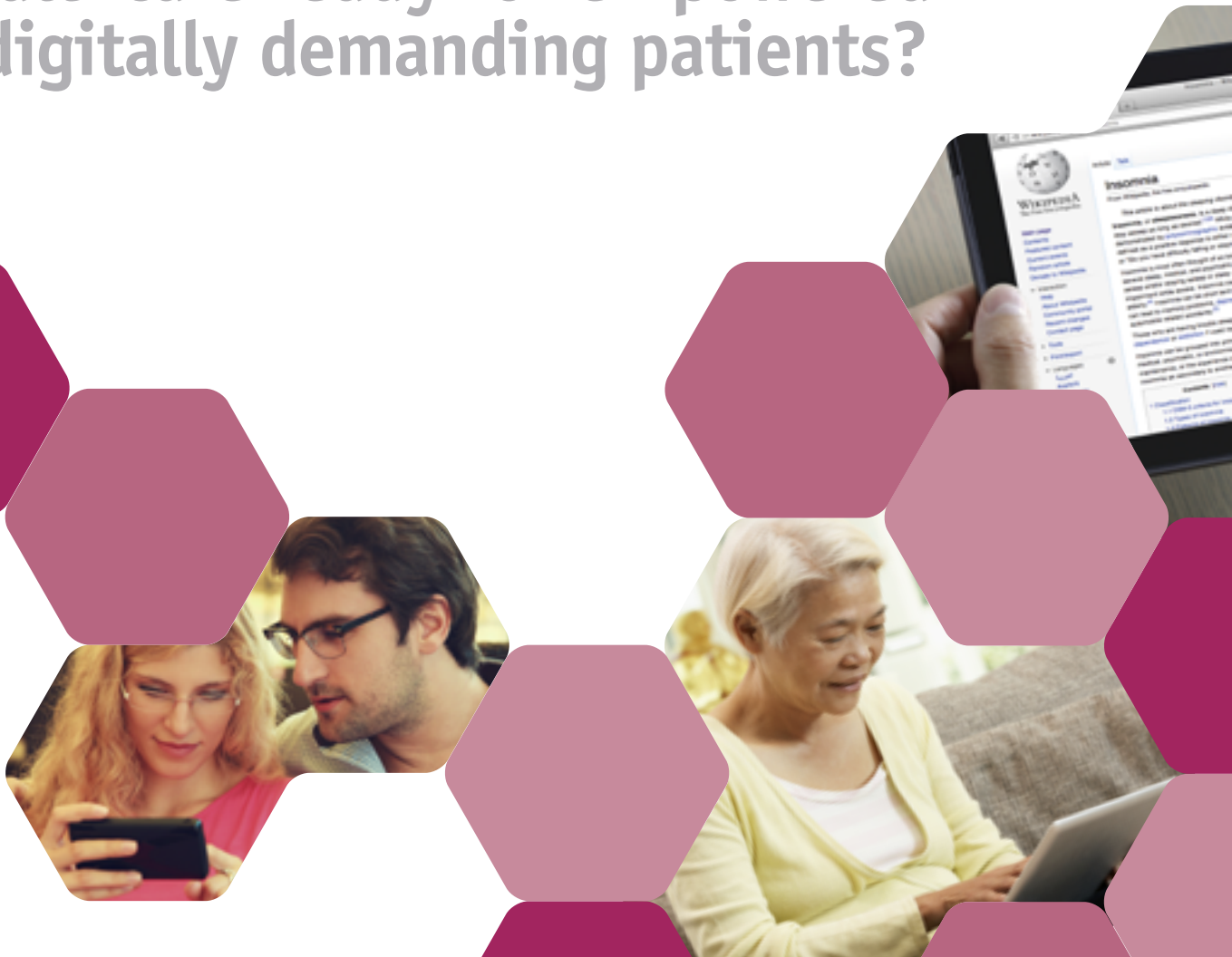


January 2014

Engaging patients through social media

Is healthcare ready for empowered
and digitally demanding patients?



Introduction

The rise of digital technologies has had a transformational impact across everyday life and business globally including healthcare. Exponential growth in use of the internet, social media, and apps as well as the uptake of personal computing, smartphones and tablets by all healthcare stakeholders – including patients, healthcare professionals and payers – is well documented. Given the speed with which the volume of activity has grown, it is easy to lose sight of what impact these technologies are having on the delivery and outcomes of healthcare interventions. Furthermore, what impact are they having on the use of pharmaceuticals and the effectiveness of existing pharmaceutical business models?

This report is intended to look specifically at the impact of social media on the use of medicines, including the role that pharmaceutical manufacturers are playing in leveraging social media platforms as part of their business model. It includes new analysis of the role of Wikipedia and its linkage to medicine use. It also assesses the current level of social media engagement undertaken by pharmaceutical manufacturers.

The role of social media in healthcare and impact on patient engagement is moving to center-stage, propelled by mobile technology, patient demand and growing influence of the digital native generation. How ready the healthcare sector is for these empowered and digitally demanding patients will be a subject of discussion and assessment for some time.

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Executive summary

The transformation of information gathering and the emergence of the engaged patient has demonstrated the increased importance of social media in the broader healthcare context. A patient's need for information gathering relating to healthcare can be observed throughout the treatment pathway – hence, ensuring that patients have access to reliable, up-to-date, and understandable information remains a significant challenge. Due to patient trust in clinicians and the broad reach of social media, healthcare professionals (HCPs) are in a prime position to drive better healthcare outcomes through social media. Currently there are few formal and many informal organized healthcare professional and patient groups that try to ensure the correctness and accessibility of healthcare information, with no clear definition of responsibilities. It will become increasingly important to ensure the monitoring and regulation of the space where patients gather their information and form their opinions.

For the healthcare industry, it is becoming increasingly important to be able to react quickly and decisively to events on social media. Additionally, companies are increasingly utilizing social media as a tool to build relationships with patients and the general public. Mid-sized, specialized and consumer care companies are leading the change from uni-directional broadcasting of information to an engaging and relationship-orientated online conversation. However, in general, the industry needs to become less risk averse to new engagements with stakeholders to remain relevant in the overall healthcare discussion. Ironically, regulators are often more effective in their own usage of social media, in part due to fewer restrictions. The increased engagement of regulators will drive further uptake of the digital channels by other stakeholders and demonstrate the importance of these channels to the overall healthcare ecosystem.

Further investigation needs to be conducted to assess the real impact of social media, not only from a return on investment perspective but also its impact on healthcare decisions by HCPs and patients alike. An index such as the IMS Health Social Media Engagement index, which attempts to quantify the success of corporate and regulator social media engagements, should be utilized to assess impact and influence of social media, driving discussions towards what these channels should be utilized for and how they fit into the overall healthcare agenda.

An introduction to the new digital healthcare landscape

The usage and presence of social media channels is rising, though still lags among the population segment that utilizes healthcare services the most: patients over 65 years of age, and those with multiple chronic conditions.

Digital activities are currently highest in areas with the least healthcare impact.

Social media channels are diverse, provide different user experiences, and are subject to rapid shifts in use.

The role of social networks in healthcare is critical throughout a patient's journey, and demand by patients for support is high, with social media expanding on the habit of discussing healthcare with family and friends.

The rising volume of digital healthcare activity is well recognized, even if the impact on healthcare is yet to be fully understood. Examples of metrics that reflect the scope and scale of the new digital landscape include:

- Use of social networking sites has grown from 8% of all adults online in 2005, to 67% in late 2012 and up to 72% of U.S. adults online in May 2013.¹
- When making clinical decisions, physicians spend twice as much time using online resources as compared to print.²
- In 2009, 70% of Canadians turned to the internet for health-related information, and 92% of those used the search engine Google, rather than a health portal to gather this information.³
- Facebook is reported as the fourth most popular source of health information in the U.K.⁴
- Physicians on average spend three hours per week watching online videos for professional purposes and cite Medscape and YouTube followed by pharmaceutical company websites as the most important sources of video.²

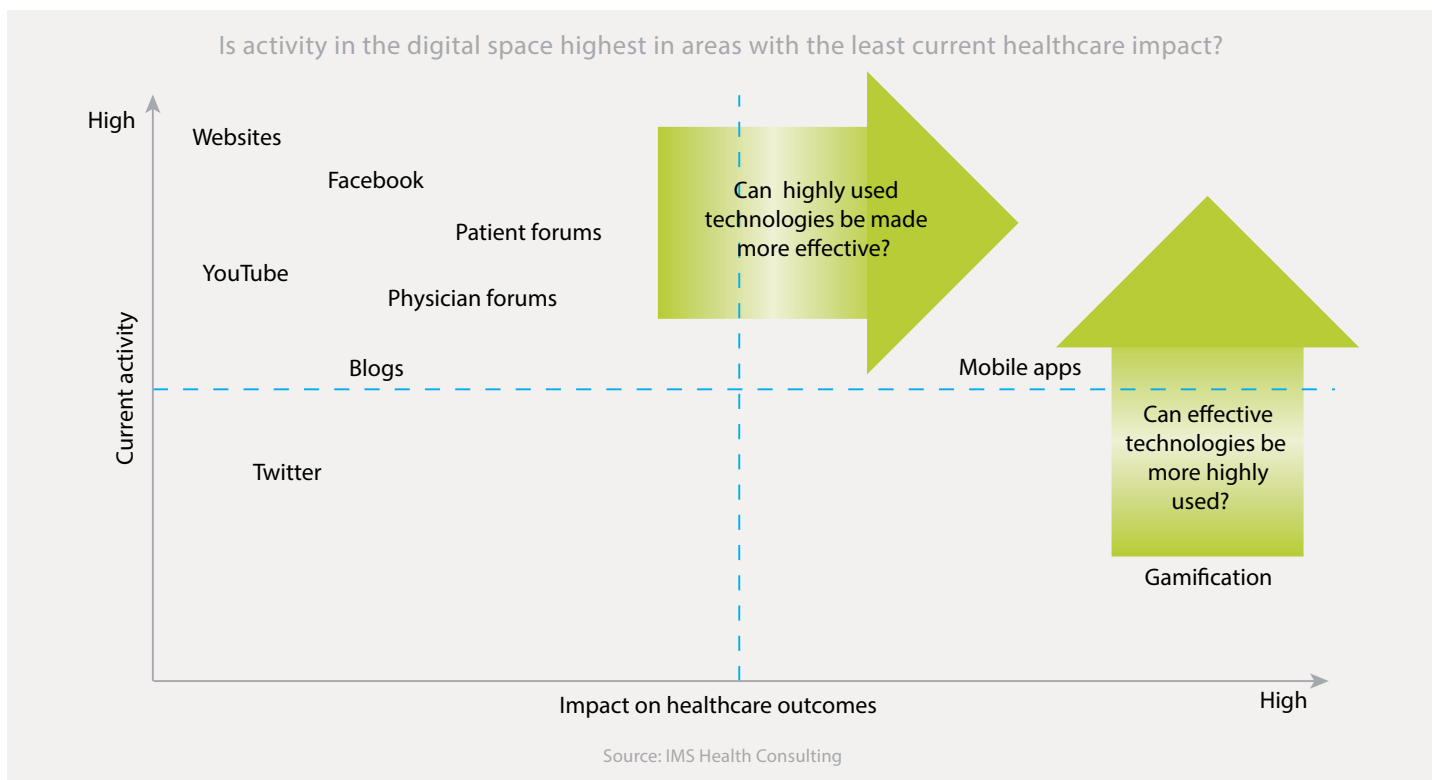
- In the U.S., interest in specific diseases receives the greatest amount of attention in social media relating to healthcare, followed by lifestyle changes, health insurance details and safety information.⁵

With the increasing use of smartphones, followed by tablets, the demand for mobile health information has increased. Smartphones enable patients to access and contribute online information, and comment anywhere. Tablets, with a bigger display and increased computing power, are being used in a more stationary state but increase patients' ease of access to information. Studies suggest that more than half of smartphone owners have looked up health information on their phone and roughly one-third of patients used tablets or mobile devices on a daily basis for research and/or to book appointments.^{6,7} This trend is likely to continue over the next several years with a further increase in smartphone penetration and tablet utilization, as well as increasing high-speed mobile coverage.

Defining social media

Andreas Kaplan and Michael Haenlein define social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content.”⁸ The term social media encompasses social networking sites, collaborative services, blogs, content hosting sites and virtual communities. Social media creates highly interactive platforms through which individuals and communities share, co-create, discuss, and modify user-generated content.⁹ It introduces substantial and pervasive changes to communication between organizations, communities, and individuals. Social media differentiates from traditional/industrial media in many aspects such as reach, frequency, usability, immediacy, permanence and quality.^{10,11} For content contributors, the benefits of participating in social media have gone beyond simply social sharing to building reputations and bringing in career opportunities and monetary income.¹²





Currently, as seen in Figure 1, the largest social media channels have different impact and activity levels.

Figure 1: Conceptual viewpoint of digital activities

Channel definitions

The key social media channels that have been considered for this report are Wikipedia, Twitter, Facebook and YouTube. All of the assessed channels have capabilities, advantages and disadvantages that need to be considered before utilization (see Table 1). While blogs, forums, physician networks and patient support websites are an important part of social media interactions, these channels have not been examined in detail.

Table 1: Assessed social media channels

Channel	Uses	Advantages	Disadvantages
Wikipedia 	Comprehensive online encyclopedia Editor-moderated content from user consensus	Trusted by patients and many physicians Comprehensive and free online information source Emphasis on self-regulation resulting in higher quality control than other social networks	Vulnerable to misinformation, though most content is to a high standard The combination of trust in Wikipedia and its vulnerability to both mistakes and author bias has caused concern within the academic and medical community ¹³
Twitter 	140 character user-generated comments or 'tweets' Following other users Sharing links Commenting on personal and corporate accounts	Effective broadcasting platform, high viral possibilities Strong for news and live events such as conferences Small message size is easily digestible	Character limit makes it difficult to have any depth Hard to generate meaningful engagement Requires regular updating Very small window for meaningful engagement No central content control
Facebook 	Add friends to create a peer network A plethora of services including groups, events, games and personal messaging Sharing links	The largest social network based on numbers of monthly active users The most diverse social network Capable of detailed and engaging interactions Enhanced word-of-mouth effect from friends' activity	Regulatory adherence is more difficult and varies according to geographic region Small window for meaningful engagement Privacy concerns Very little central content control
YouTube 	Sharing video content Commenting on videos Following content creators	Favored by physicians for highly informative, detail-orientated videos Engagement correlates to emotive patient focused content Can be linked to other social networks	Videos often require a large time investment Capability to share videos within the social network is limited Filming and editing video to a suitable standard is expensive and requires specialist skills

The importance of age and trust in healthcare

Healthcare has historically been dominated by trust in the competence and independence of information obtained by the patient from various sources, primarily HCPs. The internet is increasingly becoming the first source for general and specific health information. Current estimates are that between 70 and 75% of people online in the U.S. seek healthcare information.^{1,14} In addition, 42% of respondents to a U.S. survey said that they had used social media to find out about a healthcare issue, nearly 30% had supported a healthcare cause, 25% had discussed a health related experience, and 20% had joined a health community or forum.¹⁵

Unsurprisingly, most online health seekers (77%) begin their pursuit of information through search engines such as Google, Bing or Yahoo.⁵ Based on its search engine ranking and page view statistics, the English Wikipedia is a prominent source of online health information compared to the other online health information providers studied.¹⁶ But a survey of patients with multiple sclerosis found 28% reported that it took a lot of effort and felt frustrating to search for relevant information, 40% were concerned about the quality of information and 20% had problems understanding the information.¹⁴

Healthcare is generally utilized the most by patients over the age of 65 where chronic diseases are more common and are often accompanied by other conditions.¹⁷ However, social media is still generally utilized more by younger age cohorts, in contrast to web-based information sources and more familiar communication tools such as email. Recent surveys indicate that 89% of 18-29 year olds use social media compared to just 43% of people aged 65+.¹⁸

Age is one of the few differentiating factors for the usage of social networking sites, where usage is less dependent on gender, education, income or other forms of social advantage.⁵ The difference of utilization by age groups will diminish over the next years and decades as digital natives increase their involvement and influence professionally and privately within their networks.

The healthcare information that patients look for on social media and the internet varies. The most searched for terms relate to specific diseases, usually affecting the person in question or a relative. In fact carers and relatives have been shown to be an important group of users of social media and it is believed that around half of all digital enquiries are made on somebody else's behalf.⁵ It is important to note that the majority of people who engage with healthcare online are looking to fulfill an unmet need, be it a need for information or emotional support. Those seeking information are more likely to turn to conventional digital sources, while those in need of emotional support will be more drawn to social media platforms.

Regulators and social media in the healthcare sector

Heterogeneous market regulations and the non-existence of internet borders call for regulations that ensure consistent information and a stable environment for healthcare information contributors.




Regulators have been slow and tentative to date in providing regulatory guidance.

Regulatory oversight of social media: the challenge of precedent and guidelines

Regulators are increasingly involved in social media both reactively and prospectively, creating guidance on the way in which pharmaceutical and healthcare companies can legally interact with patients and clinicians via social channels. Currently, the key challenge is a lack of overt guidance from the leading regulatory agencies, the Food and Drug Administration (FDA) in the U.S., and the European Medicines Agency (EMA) in Europe. As of January, 2014, the U.S. FDA has published draft guidance on interactive promotional media with the aim to collect feedback and comments over the next three months. This marks a further step towards a definitive regulatory framework in the U.S.

The role of regulatory bodies and existence of key documents affecting social media from the perspective of pharmaceutical manufacturers differs around the world (see Table 2). The internet challenges geographical and linguistic borders, bringing patients closer together and allowing information to be shared across differently regulated regions. This clearly poses questions and problems for regulators and companies alike.

Table 2: Regulation differences of key regions

Country	Regulatory bodies	Key documents	Additional comments
U.S. 	U.S. FDA The Office of Prescription Drug Promotion (OPDP)	Guidance for Industry: Responding to Unsolicited Requests for Off-Label Information About Prescription Drugs and Medical Devices, Dec 2011 Update expected by July 2014 at the latest - "The development and issuance of guidance for social media is among the highest of FDA's priorities"	The existing guidance for the pharmaceutical industry mostly governs the topic of off-label usage. Other regulations must be extrapolated from precedent The "One Click Rule" is inadmissible: social media posts must always display a full product profile when naming a drug online A consumer survey's post-hoc study is not considered sufficient evidence for advertising claims Can discuss investigational uses of the drugs in an appropriate manner, but no off-label promotion
Canada 	Pharmaceutical Advertising Advisory Board (PAAB) Health Canada's Health Products and Food Branch	Health Canada's general advertising policies are intended to apply to social media PAAB Code Review 2012, "Section 6.5: Online Activities" Latest update in 2012 appears to cover much of the industry	Once a website is determined to be advertising, the site in its entirety, including any user-generated content, is subject to regulatory control
EU 	International Federation of Pharmaceutical Manufacturers and Associations (IFPMA): self-regulating	Regulatory document rejected in June 2009 UK - ABPI's Code of Practice for the Promotion of Prescription-Only Medicines (the "ABPI Code")	While little regulation exists companies are self regulating: digital marketing strategies are underway but investment is small and initiatives limited in scope Regulators fear direct-to-consumer (DTC) information and escalating pharma costs due to increased patient advocacy for drugs The European Federation of Pharmaceutical Industries and Associations (EFPIA) is attempting to push for self regulation

Pharmaceutical companies: slow to embrace social media

Pharmaceutical companies have higher hurdles to use social media in part because of regulatory requirements and constraints outside of the U.S. to reach patients directly.

Early movers are testing the waters with an educated trial and error approach.

Establishing the means to respond to online interactions and manage the large volume of social media data are essential first steps.

Assessment of social media ROI is best done in context of the overall marketing and communication strategy.

Over half of pharmaceutical executives list mastering multichannel marketing and improving digital effectiveness within their top strategic priorities.²⁰ However, the reality is that investment in this area remains low relative to other industries and the strategies that pharmaceutical companies use to engage with social media could be categorized as low risk and less innovative than those employed in other industries.

Looking across other industries, annual digital marketing operating budgets on average in the U.S. represented 2.5% of a company's revenue in 2012.²¹ Even with the recent large increases in spending on digital marketing by pharmaceutical companies, this industry is probably best described as a laggard in terms of its speed in adoption of digital technologies. Almost two-thirds of respondents in the DHC/Google Executive Landscape 2013 survey agreed that the pharma/device industry is very far behind other industries with respect to the use of social media.²²

This reluctance or slowness to adopt digital media can in part be explained by the heavily regulated environment and partly by insecurity with new technologies and direct-to-patient interaction, particularly in Europe. Aside from historic incidents, such as warning letters from regulators, there are other good reasons why companies are reluctant to leap into this area, and these broadly speaking can be split into legal, technical and internal issues. Key issues within these brackets include regulatory compliance, loss of content control, privacy concerns, lack of familiarity with social media and proving ROI for social media.^{23,24}

Regulatory issues

Looking across the regulatory organizations that govern the largest mature markets there are some clear similarities and differences in regulation. Commonalities include recognizing that pharmaceutical companies can only be held responsible for content that is posted on digital platforms that they have direct control over, and that the content of a company's digital offerings should be covered by the same regulations that govern conventional media channels.

Even with guidance, gray areas remain. These are often addressed in guidance and warning letters from the FDA or EMA. Much like legal precedent, it is important for companies to be aware of what has happened to other companies, to understand the impact of previous decisions, and to remain focused on the evolving regulatory environment, especially with respect to Adverse Drug Reaction (ADR) reporting.

ADR reporting

A major legal challenge for pharmaceutical companies to navigate is the issue of ADR reporting. Pharmaceutical companies and physicians are obligated to report all known ADRs to the regulators for the purpose of drug safety. If the company is monitoring social media channels then it may also become responsible to report ADRs that come to light in this manner. By not actually having a formal social media strategy companies are avoiding this regulatory burden. The question is what price they could pay in the long term by not accepting that this is a probable future requirement for engaging with patients and other stakeholders.

For an industry that is used to having a clear framework from regulators, this is a disconcertingly vague environment and has made social media strategies challenging for the pharmaceutical industry. There is the concern that investment taken now in the area could be wasted should the current state of affairs change, or worse, that companies may find themselves liable for damages should new legislation be applied retroactively.

Reportable adverse events are not as common relative to the number of social media posts or online conversations as company executives may fear. Estimates range from 0.2% for general posts to 7% in dedicated patient forums such as PatientsLikeMe.^{25,26} However, the absolute number may be significant, and drug manufacturers must have the capacity to provide adequate and appropriate responses to them once identified.

With an increasing ability to listen to patients, pharma companies will be able to have safer products, identify unmet needs and better understand the patients themselves. However, to get to these results they must overcome the hurdle of balancing big data and manual research. This data is of interest for regulators and healthcare payers as well.

Self regulatory approaches to social media

Companies are starting to deal with the lack of regulatory transparency by publishing their own guidelines (e.g. Roche and AstraZeneca). AstraZeneca's guideline summary revolves around a set of principles with suitably broad definitions of what social media is and what behavior they expect from employees to cover most scenarios. However, even with these safeguards in place AstraZeneca was forced to pull a Twitter campaign in August 2013 from the Associated Press' Twitter feed. This was because it was pointed out that they had included a reference to Nexium in the attached link of the tweet, which is accessed by pressing "View Summary". This product name was included without the required safety information, putting it in breach of regulations.

Ultimately this underlined the importance of being conscious of all eventualities when using social media. Furthermore, it is likely that companies will make mistakes in the application of social media, so it is also advisable to be prepared and have a protocol ready for damage control in that event and respond quickly and appropriately.

Pharmaceutical companies cannot afford to delay their entry into these ever evolving and increasingly important new channels of communication. The delayed implementation of official regulations for new channels cannot be the sole reason for companies to not utilize the new channels to their fullest benefit. Early movers will test the water with an educated trial and error approach and discover benefits for the company as a whole while moving closer to consumers and patients.

Technical considerations

Companies have to navigate a number of technical challenges to enact an effective social media strategy, including the use of the resulting "big data" generated from social interactions, integrating social media fully into the communications and marketing system, the manual demands of replying to online interactions, and whether or not to outsource the management of an online presence.

Replying to online interactions

Finding patient comments to respond to - both reportable ADRs and non-reportable events - is only half of the challenge for a pharmaceutical company as it must then have the structures in place to respond.

The nature of online interactions is that they are transient, short lived comments with even shorter attention spans, and users expect extremely rapid response times for their questions and complaints. A Facebook comment that is damaging can turn viral in a matter of days, even hours, and a conventional customer relations approach to the digital landscape is unlikely to be able to keep up. Unfortunately, wading through identifiable online issues is likely to create a labor, legal and regulatory burden. This means that to cope, pharmaceutical companies must reform their internal structures to limit exposure and maximize the benefits of direct interactions. Outsourcing and elements of automation may be required to tackle these challenges. Companies need to review protocols regularly and stay flexible to produce the best results.

The challenge of big data

The growing volume of digital interaction, both through mobile devices and social networks, is creating an ever greater stream of data for companies to access. However, analyzing this data within the right context and generating relevant business insights remains a major hurdle. A company's information technology (IT) infrastructure is key to integrating these systems and the responsibility for this rests usually with the Chief Information Officer (CIO). It should be the CIO's responsibility, and that of the IT team, to provide decision-makers with the tools to decipher this data asset, taking into account their priorities and the way they make decisions. Those tools should be usable in such a way as to deliver real-time insights, which translate into better business decisions. While some off-the-shelf tools do exist for pharmaceutical companies, large amounts of customization will be required.

For example, ADR monitoring, which until now has been viewed as a constraint by companies to actively participate in social media, can now be largely (but not entirely) automated and used to effectively engage with patients. With an improvement in natural language programming and growing computing power it becomes feasible for pharmaceutical companies to automate 90% of their adverse event reporting and vastly reduce the amount of time spent on manual tasks relating to this important issue. With an effective adverse event reporting methodology and necessary technology in place, companies can be more active about the usage and promotion of their social media channels and can further increase their presence over the next several years.

Social media complements many other types of real world evidence data metrics by adding qualitative insights to existing data, and is usually available more quickly and more frequently than many other sources of information. It will become increasingly important for manufacturers, but also for regulators and healthcare professionals, to include the qualitative nature of new channels to explain, further investigate, or obtain early information on, healthcare related topics.

Internal issues

Focussing on ROI of social media engagement

It is extremely difficult to calculate the value of a mouse click online or how internet traffic translates into actual sales. This not only relates to healthcare but also to other sectors; in a survey of marketers in other industries, 87% of respondents reported the need for help in measuring a return on investment (ROI) for their social media marketing. Conversely, in the same survey 86% agreed that social media was important to their business.²⁷ One explanation that is often proffered is that a social media ROI cannot be measured directly in terms of absolute sales or even the number of “likes” but requires a more nuanced view of the benefit of customer interaction, including the quantity and quality of followers, the number of comments, likes and shares, the reach to targeted demographics, the sentiment of comments and buzz, and ultimately the change in brand perception.

How applicable all these are to the healthcare business model is subject to some debate. Furthermore, they are not all of equal value, the value may change over time, and may differ between specific products. It would be true to say however, that it is more difficult to justify an investment without any metric for return, and companies will most likely need to select some set of measures to track the impact of their efforts and investments in social media.

Interviews with pharmaceutical companies reveal that there is increasing divergence of how companies utilize these channels. Some companies are integrating the new channels into their general communication mix and experimenting with the best and most effective usage, while others are using social media solely to broadcast what was publicized in their press releases.

Users of social media now expect to be able to have a conversation with pharmaceutical companies when they face uncertainties. If there is no conversation, or only a standardized answer, it could lead to frustration and be of little overall benefit to both involved parties. In order to make social media successful in the healthcare environment, companies must accept the differences of, and embrace the potential benefits of, social media channels. These channels must be integrated into the overall marketing and corporate communications strategy and be chosen to be part of an overall campaign if the tool fits the desired outcome.

Healthcare professionals and the use of social media

Social media can be used as a channel to provide “pastoral support” to patients efficiently.

HCPs are currently ambivalent about the import of social media, on their patients and practice.

A well-established social media presence by a provider can provide an important forum for patient engagement.

Patient trust in clinicians and the broad reach of social media puts healthcare professionals in a prime position to drive healthcare related topics on the web. HCPs are not as strictly regulated for online social engagement and have the trust of patients to deliver independent and reliable information. But much like the pharmaceutical industry, healthcare professionals are usually perceived as laggard adopters of new technologies. Increased budgetary, administrative and demographic pressures limit the amount of time that physicians have to spend with patients.²⁸ Social media is a good opportunity for clinicians to provide some of the “pastoral support” associated with the profession, and answer questions for a large number of people online. It is important to differentiate between what is possible for individual doctors - for whom time will remain a limiting factor - to contribute versus a hospital or network of HCPs.

Not all clinicians will like the idea of working with new technologies and engaging with patients through social media is not for everyone. However, there are significant benefits for the HCPs that do, such as a greater understanding of day-to-day patient issues and unmet needs, and better outcomes for patients.

While the majority of physicians recognize the important role that the internet has played in empowering patients to make informed decisions, they also warn that a little knowledge can be a mixed blessing when dealing with worried patients.²⁹ That said, positive comments on the impact of the internet on consultations outweigh negative comments by 2:1.²⁹ In a survey of physicians conducted for this report, IMS Health found similar trends, with some doctors citing informed patients as a benefit, while other warned of hypochondria, and expressed displeasure with the changing doctor/patient relationship.

Hospitals and provider organizations are an important online stakeholder, with a more structured, better resourced and commercial approach to social media. For example, the Mayo Clinic Center for Social Media is a leading contributor and advocate of social media in healthcare with a presence on YouTube, Facebook, Twitter and various blogs. In investing in these channels the group is benefiting patients while growing its brand and better understanding the needs of its clients.

Patients want to communicate and be taken seriously when they approach individual providers or organizations. One of the key areas of patient dissatisfaction is a lack of any sort of acknowledgement when they share an experience or their needs with a healthcare organization or professional. A well-established social media presence not only provides a forum for patient engagement, but also allows for crowd-sourcing ideas and feedback to stimulate debate around new approaches or changes within the organization.

The use of Wikipedia in healthcare

Wikipedia is the leading single source of healthcare information for patients and healthcare professionals.

Visits to Wikipedia pages are higher for rarer diseases than for common diseases.

Wikipedia is used throughout the entire patient journey, not just at the point of treatment initiation or change in therapy.

Correlation between Wikipedia use and medicine use can be identified for a large number of disease areas.

Younger people tend to investigate conditions and treatment options online before treatment is started whereas patients of age 50+ tend to start their treatment first and then seek information online thereafter.

Content incorporated or changed at healthcare related Wikipedia pages is subject to constant change, often overseen by informal or formal working groups.

At least half of all healthcare related changes on assessed Wikipedia disease articles are changes to patient relevant information.

Many studies have been conducted to analyze trends in accessing online healthcare information by the general public. In the year 2000, only about 25% of Americans with internet access searched online for healthcare information; in 2012 it was 72%. In the same year, among Europeans, online searching was undertaken by 83% of Spaniards, 82% of Italians, 76% of Germans, 71% of French and 56% of British people, reflecting global growth in online activity.^{5,30} During the same period, traditional healthcare information sources, such as books, newspapers or magazines, for patients have either decreased in importance or remained the same.³¹

Wikipedia utilization

Patients often use Wikipedia when diagnosed with a condition as a starting point for their online self-education. Wikipedia entries often appear highest in the results pages of various search engines and the public perception of Wikipedia being a legitimate source of information has increased dramatically in recent years.³² For healthcare in particular, patients are concerned about the validity and neutrality of the information they seek out, and Wikipedia increasingly meets this need, providing supplemental information to that which they receive from clinicians.

In addition to patients utilizing Wikipedia as a source of healthcare information, nearly 50% of U.S. physicians who go online for professional purposes use Wikipedia for information, especially on specific conditions.³³

Table 3: Top 25 Wikipedia articles viewed in the last 12 months

	Wikipedia page	Visits in millions
1	Tuberculosis	4.2
2	Crohn's Disease	4.1
3	Pneumonia	3.9
4	Multiple Sclerosis	3.8
5	Diabetes Mellitus	3.4
6	Gout	3.3
7	Meningitis	3.2
8	Down's Syndrome	3.1
9	Parkinson's Disease	3.0
10	Gastroenteritis	2.8
11	Lymphoma	2.7
12	Lyme Disease	2.7
13	Herpes Simplex	2.7
14	Fibromyalgia	2.5
15	Syphilis	2.5
16	Malaria	2.4
17	Hypertension	2.4
18	Cerebral Palsy	2.4
19	Amyotrophic Lateral Sclerosis (ALS)	2.4
20	Anemia	2.4
21	Cystic Fibrosis	2.4
22	Tinnitus	2.4
23	Psoriasis	2.4
24	Insomnia	2.3
25	Leukemia	2.2

The page visits of 5,236 English-language Wikipedia pages over the last two years have been analyzed with the aid of the IMS Health disease ontology, which is based on Medical Subject Headings from the National Institutes for Health to capture all known diseases and their development over time.³⁴ This analysis shows that rarer diseases show a higher frequency of visits than many more common diseases. Rarer diseases often have fewer available information sources and are often less well understood by the average patient and clinician than common conditions, hence the greater need for external sources of information. Also the severity of a disease must be considered when looking at Wikipedia page visits and which are visited more frequently.

The top 100 Wikipedia pages for healthcare topics were accessed, on average, 1.9 million times over the last year, ranging from 4.2 million for tuberculosis to 1.3 million for acne vulgaris. See Table 3 for the listing of the top 25 articles visited.

Since Wikipedia is being utilized so frequently by patients and healthcare professionals, the question arises whether Wikipedia page visits correlate with treatment volumes. The total activity on 50 Wikipedia pages was cross-referenced with prescriptions and unit sales of related medications based on the Anatomical Therapeutic Chemical Classification (ATC) 3 level. This was to identify if the online research of disease was directly correlated with treatment initialization.

To exclude false positives, only ATC3 classes directly related to the respective diseases were considered. In total, 389 combinations of ATC3 classes and Wikipedia pages were analyzed, correlating unit sales, total number of prescriptions and new-to-brand prescriptions over a one year period with the respective Wikipedia page visits.

Within the three analysis clusters (unit sales, total number of prescriptions, and new to brand prescriptions) a clear difference can be observed in terms of the total number of correlations and the averaged correlation value (see Figure 2). New-to-brand prescriptions represent the dynamic healthcare market where patients are treated with a medication for the first time or where patients switched from one drug to another.

Figure 2: Correlation Wikipedia / IMS Health data



If patients only searched for information at the initiation of treatment or at times of change in treatment, a higher correlation for new-to-brand prescriptions would be expected. However, the results of the analysis suggests – based on the high R^2 value of most correlated therapy areas - that online information gathering occurs not only at time-points where treatments are started or changed, but rather throughout the entire patient journey, including adherence to the medication.

This finding should encourage providers of online information, as it indicates that patients not only focus on the treatment initiation or the dynamic treatment phase within the patient journey, but require information, tools and insights that relate to the entirety of the treatment process.

Historically, patients came into contact with information about diseases and specific drugs only when either disease information programs were initiated by healthcare stakeholders or, in the U.S., with direct to consumer (DTC) marketing. DTC marketing from pharmaceutical companies usually created a push for patients to see their doctor if they encounter the conditions or symptoms mentioned in the advertisement. With the pervasive use of the internet, patients decide more often when they want to look for information. This suggests a need for pharmaceutical manufacturers and other healthcare stakeholders to ensure that information provided via the internet is not only targeting patients at the dynamic treatment decision time point, but throughout the entirety of the patient journey in order to remain relevant and provide value to patients.

Synchronization of Wikipedia page visits and medication volumes

In addition to the direct correlation between Wikipedia page visits and prescription volumes, treatment and Wikipedia activity could have an asynchronous relationship, where web visits occur either before or after treatment initiation with a delay of 1-2 months. Using the combination of Wikipedia activity data and sales data at an ATC3 level, it is possible to identify approximately when medical treatment is initiated - be it before or after a spike or trough in Wikipedia activity.

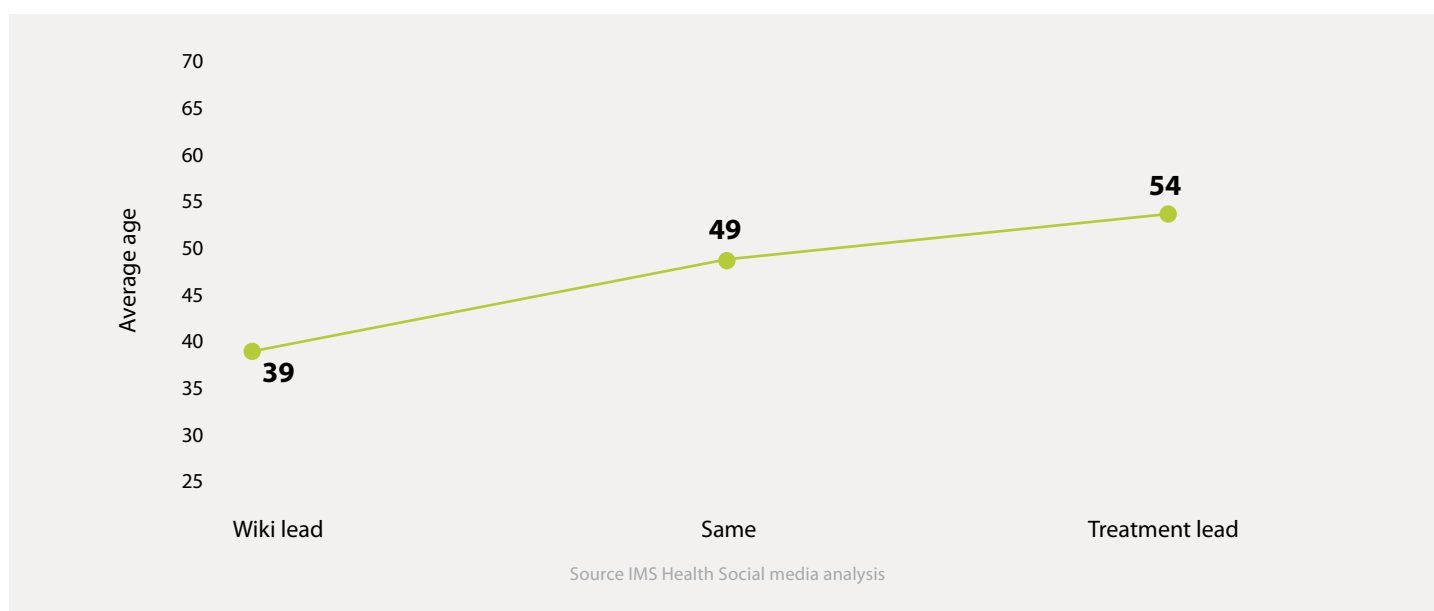
Most existing analyses of leading indicators of disease activity is focused on acute and seasonal diseases like cold and flu or rapid outbreak detection for bioterrorism.³⁵ Google flu tracker, for example, uses search terms to identify the spread of flu during the flu season and has shown repeatedly that an online search trend can be observed before an outbreak is otherwise detected.

A lag analysis performed on Wikipedia and prescription data confirms this observation, with three ATC3 classes showing a direct correlation with Wikipedia page visits for pneumonia (R^2 value of 0.88), and containing a lag of at least one month between spikes and troughs in Wikipedia page views and changes in the associated medications being sold. However, common cold page visits did not show a lag factor. Furthermore, 11 therapy areas showed a sales lead, where sales of products occurred before online information gathering occurred.

From the lag factor it is possible to infer at which stage of a patient's journey they are likely to be investigating their condition online. The existence of a lag factor for certain therapy areas dictates the influence that online education has on patient behavior and is important for all healthcare stakeholders that are actively providing information online. If the average patient searches for information before treatment initiation, the provider of this information must consider including details of symptoms, treatment options and diagnostics, and possibly a registry of specialist healthcare professionals (HCPs). For patients who access information after treatment initiation, the information needs to focus more on management of the disease and medication adherence, and less on treatment options since the initial treatment decision has already been made.

It is of course possible that the asynchronous timing of a patient seeking health information online is being caused by factors other than the pathology of their disease. For example, average age groups, based on the average age per patient at an ATC3 level over the last 12 months, showed a clear correlation between the age of a patient and the time at which Wikipedia is accessed for further information. For almost all ATC3 classes, where Wikipedia site visits occur before an increase in sales trends, the average age of the patients was younger than for ATC3 classes where sales occurred before Wikipedia visits (see Figure 3).

Figure 3: Lag factors by age



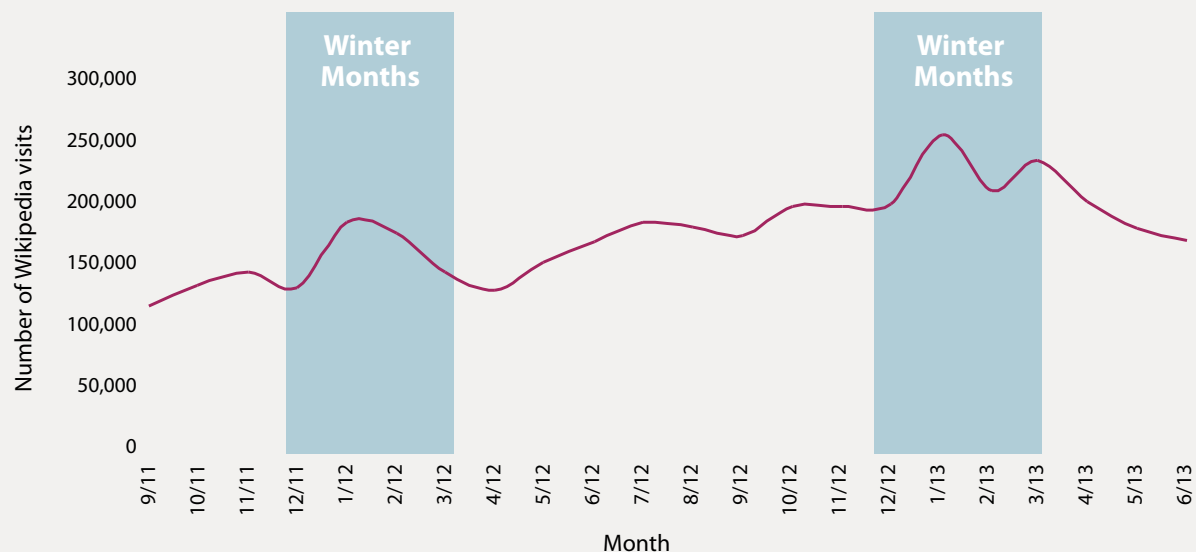
The therapy areas that saw patients waiting until after treatment initiation or change before visiting Wikipedia can be explained by age differences. Younger people tend to conduct online investigation before the start of therapy (as measured by prescriptions or sales of medication). By contrast, patients aged 50+ tend to start their treatment and start seeking information online thereafter. For older patients, family members or carers may be likely to search for information on their behalf after a diagnosis and treatment decision has already been made. This trend indicates that information sought out online is likely to influence patients of various age groups differently, since they are likely to have different sorts of illnesses, be more or less comfortable with the internet and at different stages of the treatment pathway.

CASE STUDY

Wikipedia and insomnia: sales increases relating to page visits

Insomnia had a total of 2.3 million page visits during the analyzed time period and shows a distinct increase during the colder and darker winter months (see Figure 4).

Figure 4: Insomnia Wikipedia page visits



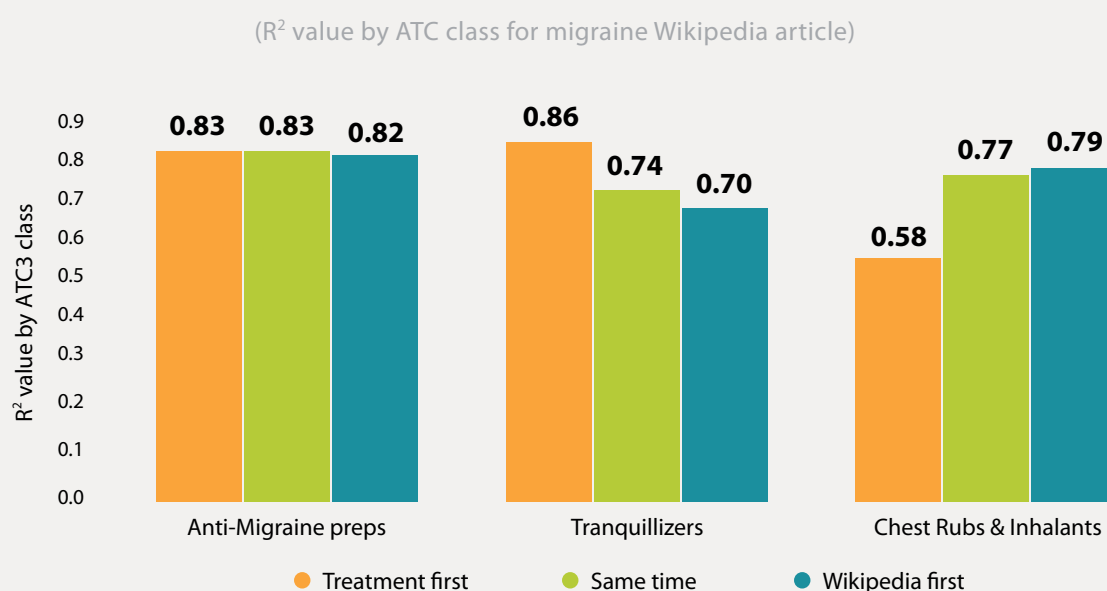
Source IMS Health Social Media Analysis

continued overleaf...

CASE STUDY *continued...*

It is observed that tranquilizers and, to some degree, anti-migraine preparations see a sales increase before Wikipedia page views (one month) as seen below. The rationale for the observed data is that when patients receive anti-migraine preparations or tranquilizers, they are at the initial stage of sleeplessness and are being treated for the underlying symptom (migraine) or an acute issue (tranquilizers) and only start their online research when the sleeplessness continues. Interestingly, anti-migraine preparations show a fairly consistent correlation rate over the three lagged categories, with the highest correlation in the “treatment first” category. The generally good correlation - independent of the lag category - for migraine treatment and information gathering shows that information gathering occurs before, during and after treatment initiation.

In addition, a correlation coefficient of 0.79 for Wikipedia insomnia page views and chest rubs and inhalants ATC3 unit sales is observed, which may reflect efforts by patients to seek other forms of relief and support for their insomnia. This supporting treatment could be “self-prescribed” or recommended by healthcare professionals.

Figure 5: Lag factor migraine

Source: IMS Health Nexxus Social Media analysis

Curation of Wikipedia pages

Given the importance of Wikipedia for healthcare topics, it is useful to understand the editorial process used in maintaining and updating Wikipedia pages. An assessment of changes to five Wikipedia articles – for diabetes, multiple sclerosis, rheumatoid arthritis, breast cancer and prostate cancer - shows that articles are in flux. The content or meaning of the information in these articles has been changed an average of between 16 and 46 times per month since their creation - almost 17,000 major changes in total. For these five articles, the last 100 changes, most of which were major changes, had all occurred within the last 5 to 12 months. For the multiple sclerosis and breast cancer entries, over 100 edits had been performed over the last 5 months, of which 78% and 74% respectively are considered major edits. This indicates that both articles are works in progress and illustrates the need for the role of editors in Wikipedia, to form a consensus from the plethora of edits submitted (see Table 4).

Table 4: Wikipedia changes to 5 therapy areas

Wikipedia article	Timeframe of last 100 edits	% Major changes	% Minor changes
Diabetes	12 Months	54%	46%
Breast Cancer	5 Months	74%	26%
Multiple Sclerosis	5 Months	78%	22%
Prostate Cancer	6 Months	70%	30%
Rheumatoid Arthritis	6 Months	68%	32%

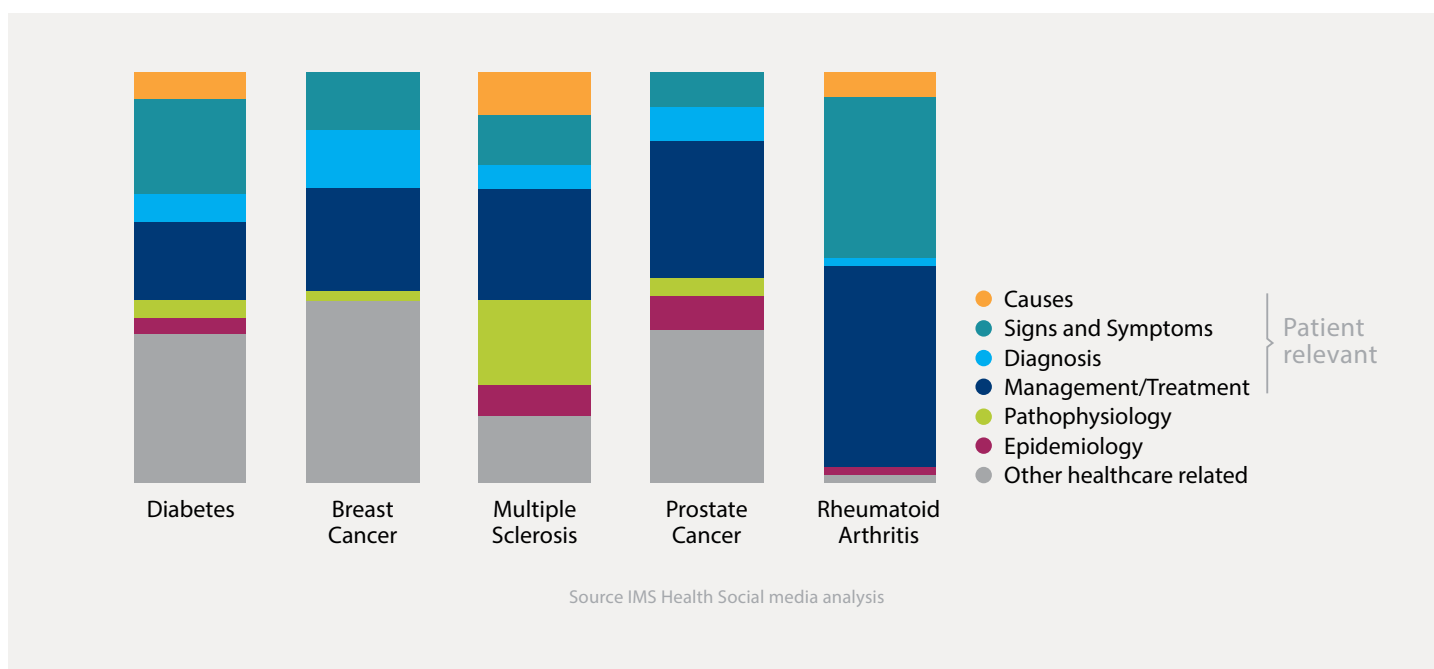
A key contributor to all 5 articles is Dr. James Heilman, an editor and English Wikipedia administrator (Jmh649). Dr. Heilman, or “Doc James”, is the founder of the Medicine Translation task force. This task force’s goal is getting 200 medical articles to a good or featured status (only 0.1% of articles on Wikipedia have this status), simplifying the English and then translating this content to as many languages as possible. The aim is to improve the quality of the most read medical articles on Wikipedia and ensure that this quality will reach non-English speakers.

Due to the ongoing efforts to increase the quality of medical information on Wikipedia, certain therapy areas like multiple sclerosis and breast cancer may seem in a state of flux. For other entries, such as for diabetes, the focus is more on annexed information and minor changes.

Because of the importance of Wikipedia as an initial source of information it is important to understand when articles change, why they change and what the options are to respond. Providing evidence to counter incorrect or biased changes should be considered by companies but the act of monitoring the platform is probably the greatest challenge given the rapid rate of change. For those disease areas or treatment options where the level of scientific consensus is low, higher levels of changes are expected, and the need for monitoring is even more critical.

The nature of changes varies between the analyzed articles but, as seen in Figure 6, at least 50% and up to 96% of all healthcare related changes are being conducted on the patient relevant disease information related to causes, signs and symptoms, diagnosis and treatment and/or management of the disease. In the case of rheumatoid arthritis, 50% of all changes are related to this patient relevant information, and in multiple sclerosis it is over one-third. The remaining changes are related to pathophysiology, epidemiology or other aspects of the disease more likely to be of relevance and interest to healthcare professionals, researchers or other types of readers. This shows that vital, patient relevant information is still in flux within these articles and undergoes constant change, expansion and clarification.

Figure 6: Nature of change for 5 therapy areas



In the current environment in which Wikipedia changes are being conducted, none of the traditional stakeholders for patient information – such as regulators and pharmaceutical companies - is actively engaged in the development of information or in ensuring its correctness. Some individual healthcare professionals, including Dr. Heilman, have acknowledged the dangers of incorrect or incomplete medical information with the influence and reach of Wikipedia, and have started to act. However, there is yet to be established a broad approach to funneling the vast resources of healthcare institutions, the pharmaceutical industry, regulators and patient groups into the information that is being used by millions of patients. Even if the healthcare stakeholders are not involved in correcting and reviewing online information on portals like Wikipedia, they must be aware of and recognize the temporal state of the resources that patients, care-givers and physicians rely on throughout their treatment journey.

Measures for social media engagement

Metrics that track social media reach, relevance and relationship can provide the basis for assessing a company's engagement with patients over time.

Among the top 50 pharmaceutical companies, half do not engage with consumers or patients through social media on healthcare-related topics.

Based on the IMS Health Social Media Relationship Index, companies with the highest levels of patient engagement are smaller companies with narrower therapeutic focus or consumer health companies.

Pharmaceutical companies have been using social media for several years, though to a lesser extent than companies in other industries, where regulatory oversight does not provide a real or perceived constraint to driving new developments and extending the boundaries of engagement with consumers.

Within the healthcare environment, there are three basic usages of social media:

- Gathering of information regarding attitudes, actions and behaviors of consumers through social media analytics.
- Broadcasting messages and content to a wide public audience via social media channels, supplementary to use of websites, news portals and other communication vehicles.
- Engaging people and organizations on healthcare related topics, leading to a public conversation that can be observed by anyone.

IMS Health Social Media Indices

In assessing the current use of Facebook, Twitter, and YouTube social media by pharmaceutical companies, three elements of social media engagement have been defined and an index developed based on the IMS Health Nexxus Social Media Solutions:

IMS Health Reach Index

Reach is a measure of the absolute number of listeners and the index is based on the number of people reached by each channel through likes, shares and re-tweets. A company can have the most interesting and engaging content but without reach they will not be heard.

IMS Health Relevance Index

Relevance measures whether people found posts or content relevant and/or useful, and the index is based on the extent to which content is being shared and forwarded across social networks. Relevance increases reach and relationship and is an indicator that a social media platform is growing.

IMS Health Relationship Index

Relationship is a measure of interaction - the back and forth of conversation - and a measure of company and consumer or patient integration. The relationship index measures the level of interaction between a company and those who post, reply or otherwise interact with the company's postings. To the extent that one of the key purposes of social media is to engage with consumers and patients, then social media relationships are a critical element.

In addition to measuring the activity of the top 50 pharmaceutical companies on Facebook, Twitter and YouTube, each interaction was also assigned a weighting related to the likely investment of either time or reputation that has been made to perform the action, in a similar fashion to Facebook's internal algorithms. On this basis, for example, posting a response or forwarding a message is given more weight than clicking on a "Like" button.

Among the top 50 pharmaceutical companies, half do not engage with consumers or patients on healthcare-related topics through social media, and only 10 companies utilized all three assessed channels. Twitter is utilized by 22 of the 50 companies studied, followed by YouTube which is used by 17 companies, and Facebook is used as a channel by 15 companies. Twitter, as the most used channel, does not provide contributors with length to create new and relevant information by itself but helps to generally build relationships and broadcast information created and stored elsewhere.

The top ranked company for each of the three indices is Johnson & Johnson, while other companies have diverse rankings among the three measured areas. Mid-sized companies appear to be utilizing social media just as well, and often even more effectively, than the ten largest pharma companies (see Table 5).

Table 5: Ranking by IMS Health Social Media Indices

	IMS Health Reach index	IMS Health Relevance Index	IMS Health Relationship Index
1	Johnson & Johnson	Johnson & Johnson	Johnson & Johnson
2	GlaxoSmithKline	GlaxoSmithKline	Novo Nordisk
3	Novartis	Novartis	Bayer
4	Pfizer	Pfizer	UCB
5	Novo Nordisk	Boehringer Ingelheim	Hospira
6	Boehringer Ingelheim	Novo Nordisk	GlaxoSmithKline
7	Merck & Co	Bayer	Boehringer Ingelheim
8	Bayer	Merck & Co	Merck & Co
9	Merck KGaA	Merck KGaA	AstraZeneca
10	Lilly	Lilly	Pfizer

Among the four top ranked companies in the Reach and Relevance Indices, only Johnson & Johnson retains a top ranking in the Relationship Index. This may reflect a focus on reach that helps drive relevance, but may not translate to relationship development. Many companies appear to use social media as a unilateral broadcasting channel to physicians and patients, with limited engagement or fostering of discussion.

IMS Health Social Media Engagement Index

The combination of all three Indices leads to the overall IMS Health Social Media Engagement Index. To reflect the different importance and usages of social media, each index was weighted by a factor of 1, 2 and 4 for the Reach, Relevance and Relationship indices respectively. The Index reflects the current overall usage of social media by pharmaceutical companies on healthcare related topics. See Table 6 for the top 10 ranked companies and each company's score. This Index can be utilized by companies and professionals as the basis for cross company comparison, as well as to identify trends and insights into the usage of social media in healthcare.

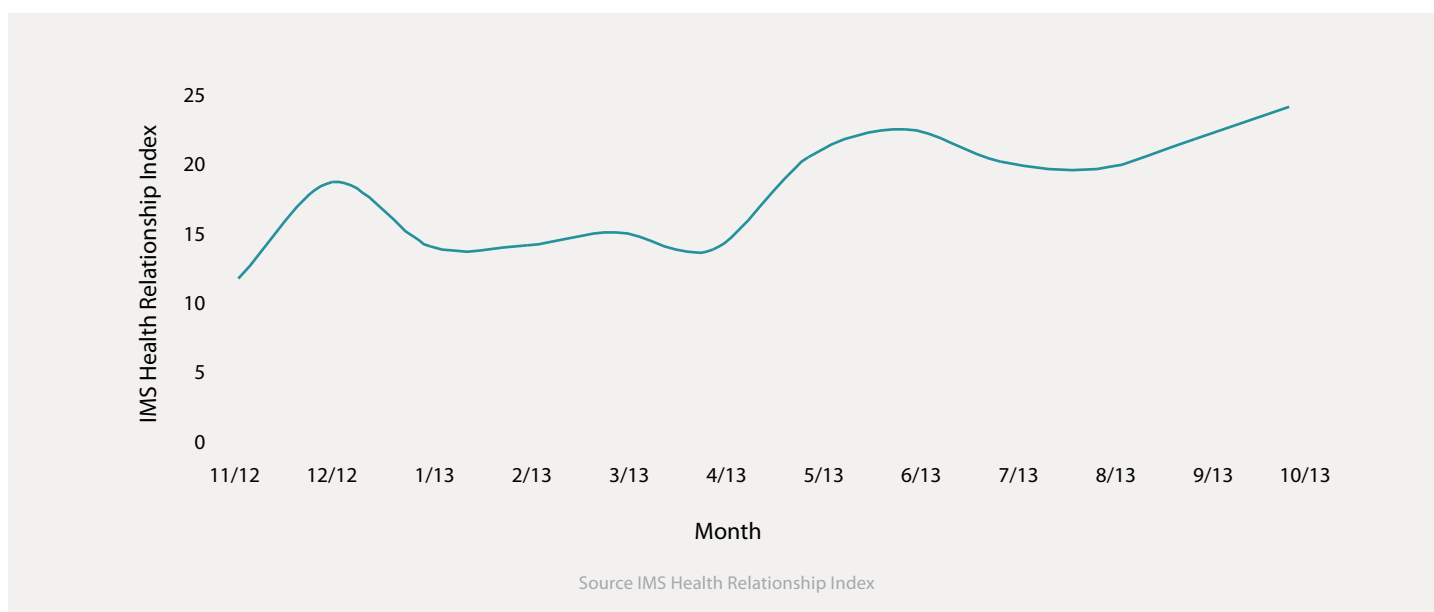
Table 6: Ranking by IMS Health Social Media Engagement Index

	IMS Health Social Media Engagement Index	Score
1	Johnson & Johnson	70
2	GlaxoSmithKline	25
3	Novo Nordisk	23
4	Pfizer	20
5	Novartis	18
6	Boehringer Ingelheim	18
7	Bayer	16
8	Merck & Co	13
9	AstraZeneca	10
10	UCB	9

The Index shows a variety of specialized, consumer health focused, and large companies within the top 10 rankings. Mid-sized companies can compete on an engagement level with large pharma and, as seen for the relationship index, often utilize more potential from social media channels due to greater flexibility and smaller target audiences. There is a large difference between Johnson & Johnson, as the top performer, and companies in the lower rankings, which may reflect the lack of maturity in social media use by companies, with only a small number having made this a key focus to date. As companies increase their awareness of the value to their brands and products resulting from effective engagement with consumers and patients, it is expected that the social media engagement scores among top performers will converge.

As seen in Figure 7, the IMS Health Relationship Index has increased steadily over the past year. A continuation of this trend is foreseen, as more companies become active with social media and, most importantly, companies realize the potential value of social media to their business model. However, risk aversion of pharmaceutical companies will need to be overcome and internal regulations and practices will need to be simplified and streamlined in order to provide the flexibility and agility to react to social media conversations quickly.

Figure 7: Monthly development of IMS Health Relationship Index



A note on regulators' use of social media

In addition to regulating and monitoring the use of social media by manufacturers, regulators also want to understand their own impact and build their own social media presence and response. In July 2013, the FDA issued a “sources sought” notice, which asked for submissions from providers of social media monitoring software to help the FDA understand the impact of FDA messages, monitoring conversations to understand the public image of the agency in general and in relation to specific initiatives.

Regulators have increasingly been utilizing social media channels to connect to a wider healthcare audience. The FDA currently operates four healthcare-related Twitter profiles, covering topics from product registration, side effects and recalls to general healthcare information like quitting smoking. Including regulators into the IMS Health Social Media Engagement Index shows the FDA especially is utilizing social media to a greater extent than most pharmaceutical companies. If included, the FDA ranks in the top 3 for all three indices and the EMA operates their Twitter channel with one of the highest Reach Index scores, second only to the FDA. Interestingly, the FDA seems to have a clear strategy using Facebook as their major engagement platform and less as a broadcast channel (holding rank 1 and rank 7 of all assessed profiles respectively) whereas Twitter shows a much higher focus on reaching stakeholders than on engagement (holding rank 9 and 15 respectively).

With increasing direct involvement of regulators into social media healthcare discussions, other stakeholders, like pharmaceutical companies, might see this as a positive sign to increasingly finding opportunities to engage with their stakeholders as well. Regulators that are utilizing social media as a means to interact and engage with healthcare professionals and patients need to ensure that other companies can utilize the vast amounts of available disease and treatment information.

Call to action

Advancing social media to center stage in healthcare and the use of medicines will require clarity from regulators, a more proactive stance by pharmaceutical manufacturers to engage with patients, and utilization of available tools to ensure patients receive value from their social media interactions.

With regulatory clarity expected in the near term, companies should no longer hide behind uncertainties. For healthcare professionals, social media is a clear differentiator, bringing them closer to patients and their real needs. Regulators are utilizing social media increasingly to tap more deeply into the healthcare discussion. Pharmaceutical company early adopters, and companies that are less risk-averse, are driving the future of healthcare's commercial context. Integrating social media into the general marketing, product branding and corporate identity process will enable companies to engage more fully in the discussion around healthcare, to show corporate responsibility, and to support patients.

Suggested near term actions by the key stakeholder groups are as follows:

Pharmaceutical companies:

- While the regulatory environment may appear chaotic, there is enough precedent to **proceed with a social media strategy, and self regulation is possible**. Companies can be less risk-averse and instead follow the patient, applying the knowledge of their medical departments to help customers and improve health outcomes.
- **Tools that enable social media content to be monitored, responded to and leveraged will need to be implemented** in order for full value to be captured from social media activity. As this technology evolves rapidly, a flexible approach is needed to ensure systems are not built on quickly outdated models. Cloud-based, outsourced tools are increasingly available and provide leading edge capabilities.
- **Internal structures must be streamlined** and employees trained to use social media. Responses to identified issues must be able to be measured in hours, not days.
- **Companies must recognize that mistakes are likely to be made** and must have a plan in advance of how to respond. Also they need to be prepared for negative comments online, whether or not a social media strategy exists. The patient is empowered and wants to be involved.
- **Social media can be leveraged to provide qualitative insights to other market measures**, provided technical support can master the use of big data. If done correctly this is a major asset, since information is unprompted, relatively inexpensive to obtain, and reflects market realities.

- **The difficulty of applying conventional quantification of ROI to social media must be recognized.** The measure of success is unlikely to be expressed in directly attributable sales. Realistic metrics are important to measure impact but a more nuanced view of success is required, anchored in measures of engagement.

Regulators:

- Expediting the release and implementation of **a regulatory framework** will reduce the uncertainty and provide pharmaceutical companies and patients with **a stronger and more effective basis** for social media activity and engagement.
- **Improvement in the quality of information available online** and help for patients looking for trustworthy sources can also be provided or supported by regulators possibly by providing some type of quality standard label to approve accurate and impartial websites.
- **Increased social media monitoring** for areas of unmet need will help regulators better understand patients, gather real world assessments of unmet need and treatment benefits, both for pharmacotherapy and other regulated healthcare services.
- Development of potential solutions that **support companies operating in markets with heterogeneous regulatory oversight** and where country borders are unenforceable is necessary.
- **Regulators also need to address many of the same technical and internal issues** that the pharmaceutical industry has to contend with, such as creating a platform to mine insights from big data and streamlining internal structures to respond promptly to queries.

Healthcare professionals:

- Effective engagement by HCPs with patients occurs where they feel most comfortable, including in social media forums. **The approach taken by HCPs to social media must therefore be developed** in order for HCPs to fulfill their professional mission.
- **The rise of the empowered patient may threaten the previous stature of the physician** as the sole decision maker, but empowered patients make the decisions which they feel are right for them. This has important implications for how HCPs view such patients and engage with them.
- **HCPs have a strong vested interest** in supporting the updating and maintenance of medical information utilized by patients online, including Wikipedia.
- **HCPs can learn from patients engaging in social media** about their conditions and the realities of living with them. They can also pass on their findings to other patients and encourage them to seek out online support communities. Groups of providers can utilize social media to improve the quality of their customer service, gain feedback on new initiatives, and crowd-source ideas for improvements. A growing segment of patients are likely to appreciate this and may demonstrate increased loyalty.

Conclusion

With the increase in availability of information, changes in the way people communicate and a general increase in personal responsibility for healthcare, new technologies are changing how healthcare is operating on a global level. In order to realize its full potential, all stakeholders need to come together to reflect the structure of social media and be willing to contribute, in order for the new system to achieve its potential. With movement in the right direction being observed already (e.g. FDA and EMA increasing their utilization of social media and the general increase in the IMS Health Social Media Relationship index), early movers will continue to receive and demonstrate the benefits while laggards will need to catch up soon.

Who will be a major contributor to the overall healthcare discussion in the future still remains to be seen, but currently more information consortia of dedicated creators are taking increasing responsibility and hence influence. With patients needing and accessing information throughout their patient journey, the relevance and quality of information needs to be ensured. Quality of information is becoming a greater concern, which also serves as a driver of positive change for online information sources and calls to action from individuals who are eager to share their information and knowledge. But the newly rising groups of healthcare professionals and patients need support to realize their full potential since they often lack resources, technical capabilities or dedicated management structures required to thrive. Companies and institutions need to find ways to support those groups and ensure they remain aware of current trends in new technologies. Regulators continue to engage through social media channels; by doing so they will further drive utilization and reach of new channels. Their major hurdles will be to define a regulatory environment for an increasingly borderless digital world, where contributions can be accessed by most patients worldwide, and which will continue to undergo changes in the structure and usage of digital information. In addition, they too have a responsibility to ensure the quality of information coming from corporations, consortia, and individuals.

The entire healthcare information infrastructure is currently in flux, and we will see further changes to the usage of computers, the internet and ways of cooperation between different stakeholders. Additional channels and usages will emerge over the next years, with platforms such as Pinterest, Instagram and Tumblr gaining importance and influence. All of these future trends will bring healthcare stakeholders closer together and need to be utilized to their fullest potential in order to ensure the best possible outcomes for patients.

Methodology

Wikipedia analysis

With the aid of IMS Health disease definition methodology, based on Medical Subject Headings (MeSH) ontology, all Wikipedia articles that matched the IMS Health disease definition were assessed by monthly page visits through direct access of IMS Health social listening dashboard to Wikipedia's application programming interface (API). Internal IMS Health expertise and desk research was conducted to identify all Anatomical Therapeutic Classification (ATC3) classes that are utilized in the treatments relating to 50 selected Wikipedia disease specific articles. Results were examined for a correlation between Wikipedia article visits and ATC3 class sales figures. ATC3 class figures were based on three IMS measures: new-to-brand prescriptions, overall prescriptions and unit sales. A total of 387 Wikipedia articles and ATC3 classes have been assessed on the basis of direct correlation but also considering a time shift of up to two months to investigate for lag factors. Correlations reaching R^2 values >0.79 have been defined as high correlations and were further investigated. For Wikipedia articles class combinations where more than one correlation throughout the lag analysis could be observed, the highest correlation was taken as the most impactful correlation and sorted into the respective groups: no lag; Wikipedia article views leading treatment trend; and Wikipedia articles views lagging treatment trend.

Change in Wikipedia content analysis

Manual research on the last 100 changes of five Wikipedia articles was conducted to identify changes within the structure and content of the articles. Changes have been classified according to the sections they occurred in and the nature of changes, major changes being changes made to content and meaning, and minor changes being changes to formatting or other non-content related changes.

IMS Health Social Media Engagement Index

To define the IMS Health Social Media Indices, manual research was conducted to identify Twitter, Facebook and YouTube profiles operated and maintained by the leading 50 pharmaceutical companies, based on global sales. These profiles were assessed, through the IMS Health Semantelli social listening dashboard and Facebook, Twitter and YouTube APIs, collecting all the measures as seen in Table 7 on a monthly basis for a total timeframe of 24 months.

To define the indices, individual attributes have been assigned to the respective indices and weighted according to the usage of social media in healthcare and IMS Health internal expertise. Results were divided by the number of overall company posts, tweets or videos posted, to reduce the impact of volume and shift the indices focus to per post measures.

Table 7: IMS social media index definitions

Channel	Measure	IMS Health Reach Index	IMS Health Relevance Index	IMS Health Relationship Index
Facebook	No. of posts	O	O	O
Facebook	No. of posts from others			
Facebook	No. of likes of posts	X	X	
Facebook	No. of shares of posts	X	X	
Facebook	No. of comments		X	X
Facebook	No. of replies			X
Twitter	No. of company tweets	O	O	O
Twitter	No. of re-tweets of companies tweets	X	X	
Twitter	No. of favorites of company tweets		X	
Twitter	No. of replies of a company to other tweets			X
YouTube	No. of videos posted	O	O	O
YouTube	No. of comments by others		X	X
YouTube	No. of comments from company			X
YouTube	No. of views	X	X	

LEGEND

O = used as denominator for per post X measurement

X = used to calculate index

Following the definition of all three indices, the combined IMS Health Social Media Engagement Index was defined by weighting Reach, Relevance and Relationship Index as 1, 2 and 4 respectively to reflect their relative importance in social media.

IMS Health Social Media Engagement Index data

Facebook					
	Comments per Post	Likes per Post	Shares per Post	Post from Others per Post	Replies per Post
AstraZeneca	0.3	55.9	1.1	0.0	0.0
Bayer	2.9	71.4	7.4	0.4	0.4
Boehringer Ingelheim	2.1	133.1	20.5	0.3	0.2
Fresenius	0.0	0.0	0.0	0.0	0.0
Gilead Sciences	0.2	0.5	0.2	0.1	0.0
GlaxoSmithKline	5.9	159.7	34.0	0.0	0.2
Johnson & Johnson	6.9	589.5	65.7	1.9	0.7
Lilly	1.2	58.6	6.3	0.0	0.1
Merck & Co	2.4	37.3	8.2	0.2	0.1
Merck KGaA	0.9	16.0	22.1	0.1	0.0
Novartis	3.0	93.0	26.7	0.0	0.0
Novo Nordisk	3.1	142.6	16.7	1.1	0.2
Pfizer	3.9	102.9	21.7	0.0	0.0
Sanofi	0.6	2.8	1.1	0.0	0.1
Teva	1.6	49.0	6.5	0.0	0.0

Twitter			
	Retweets per Tweet	Replies of Company per Tweets	Favorites per Tweet
Abbvie	3.5	0.0	0.6
Amgen	2.1	0.4	0.5
Astellas Pharma	1.7	0.2	0.1
AstraZeneca	2.1	0.5	0.3
Bayer	4.0	0.2	0.2
Boehringer Ingelheim	2.2	0.2	0.5
Bristol-Myers Squibb	4.3	0.0	0.5
Fresenius	0.2	0.0	0.0
Hospira	2.0	0.7	0.2
Johnson & Johnson	6.3	0.4	0.5
Lilly	1.8	0.2	0.2
Merck & Co	5.9	0.3	0.3
Merck KGaA	0.2	0.0	0.1
Novartis	2.7	0.1	0.5
Novo Nordisk	2.0	0.3	0.2
Pfizer	3.8	0.2	0.5
Roche	4.2	0.3	0.8
Sanofi	1.2	0.2	0.2
Shire	1.5	0.0	0.9
UCB	1.9	0.8	0.1

YouTube			
	Comments from Company per Post	Comments of Others per Post	Total View per Post
Amgen			516
Apotex			157
Astellas Pharma		2.7	103
AstraZeneca			2,156
Baxter			889
Boehringer Ingelheim		1.3	922
GlaxoSmithKline			35,979
Hospira			9,218
Johnson & Johnson	3.5	23.4	25,543
Lilly		0.1	453
Merck & Co			377
Novartis			25,804
Novo Nordisk		0.0	6,824
Pfizer			15,987
Roche	0.0	0.5	6,944
Sanofi	0.0	0.8	998
UCB			965

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Murray Aitken is executive director, IMS Institute for Healthcare Informatics, which provides policy setters and decision makers in the global health sector with objective insights into healthcare dynamics. He assumed this role in January 2011. Murray previously was senior vice president, Healthcare Insight, leading IMS Health's thought leadership initiatives worldwide. Before that, he served as senior vice president, Corporate Strategy, from 2004 to 2007. Murray joined IMS Health in 2001 with responsibility for developing the company's consulting and services businesses. Prior to IMS Health, Murray had a 14-year career with McKinsey & Company, where he was a leader in the Pharmaceutical and Medical Products practice from 1997 to 2001. Murray writes and speaks regularly on the challenges facing the healthcare industry. He is editor of HealthIQ, a publication focused on the value of information in advancing evidence-based healthcare, and also serves on the editorial advisory board of Pharmaceutical Executive. Murray holds a Master of Commerce degree from the University of Auckland in New Zealand, and received an M.B.A. degree with distinction from Harvard University.



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Daniel Rosen works as an analyst in IMS Health's European Thought Leadership team, supporting the creation of market leading perspectives on a wide range of industry relevant issues. He has three years of experience covering the pharmaceutical and healthcare industries with areas of specialty including the markets of Sub-Saharan Africa, new technologies in healthcare and the U.K. pharmaceutical environment. Daniel holds a first class degree in Functional Genomics and Stem Cell Science from the University of Sheffield.

About the Institute

The IMS Institute for Healthcare Informatics leverages collaborative relationships in the public and private sectors to strengthen the vital role of information in advancing healthcare globally. Its mission is to provide key policy setters and decision makers in the global health sector with unique and transformational insights into healthcare dynamics derived from granular analysis of information.

Fulfilling an essential need within healthcare, the Institute delivers objective, relevant insights and research that accelerate understanding and innovation critical to sound decision making and improved patient care. With access to IMS Health's extensive global data assets and analytics, the Institute works in tandem with a broad set of healthcare stakeholders, including government agencies, academic institutions, the life sciences industry and payers, to drive a research agenda dedicated to addressing today's healthcare challenges.

By collaborating on research of common interest, it builds on a long-standing and extensive tradition of using IMS Health information and expertise to support the advancement of evidence-based healthcare around the world.

Research Agenda

The research agenda for the Institute centers on five areas considered vital to the advancement of healthcare globally:

The effective use of information by healthcare stakeholders globally to improve health outcomes, reduce costs and increase access to available treatments.

Optimizing the performance of medical care through better understanding of disease causes, treatment consequences and measures to improve quality and cost of healthcare delivered to patients.

Understanding the future global role for biopharmaceuticals, the dynamics that shape the market and implications for manufacturers, public and private payers, providers, patients, pharmacists and distributors.

Researching the role of innovation in health system products, processes and delivery systems, and the business and policy systems that drive innovation.

Informing and advancing the healthcare agendas in developing nations through information and analysis.

Guiding Principles

The Institute operates from a set of Guiding Principles:

The advancement of healthcare globally is a vital, continuous process.

Timely, high-quality and relevant information is critical to sound healthcare decision making.

Insights gained from information and analysis should be made widely available to healthcare stakeholders.

Effective use of information is often complex, requiring unique knowledge and expertise.

The ongoing innovation and reform in all aspects of healthcare require a dynamic approach to understanding the entire healthcare system.

Personal health information is confidential and patient privacy must be protected.

The private sector has a valuable role to play in collaborating with the public sector related to the use of healthcare data.

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