

# Social media: a new source for the discussion on Global Public Health?

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## Abstract

*Global Public Health is facing a new era with the increasing usage of internet and social media. The aim of this paper is to provide an overview of how social media, and particularly Twitter and Blogs, are used to transmit Global Public Health by different organizations and actors including Global Public Health professionals. Manual and computational methodologies have been applied to determine the platforms with highest impact, frequencies of selected keywords, hashtags etc., using Global Public Health and Global Health as main keywords. We observed that these two keywords are not often well perceived or referenced even by organization dealing with Global Health. This stresses the fact that a definition of Global Public Health today is needed and that consequently, social media would make up a better platform. Different health issues are debated in the social media; those that gain most attention are the “hot” and probably more transient topics such as Ebola, in partly SDGs and Environment. Topics like HIV, Women, Children and Poverty instead remain on the scene since a long time. In general, we observed that the ongoing topics or ‘hot topics’ are more represented than abstract issues, confirming previous literature. Taken together, we demonstrated that Twitter and Blogs contribute to the ongoing discussion on Global Public Health and are part of the debate around global public health in today’s global setting. Thus a better use of social media by organizations and individuals in public health should be considered.*

**Key Words:** Global Public Health, Global Health, Twitter, Blogs, social media

## Introduction

Global Public Health in today’s global settings is currently a concept under debate (Jenkins, Lomazzi, Yeatman, & Borisch, 2016; Lomazzi, 2016). Since 2015, the World Federation of Public Health Associations (WFPHA) has embarked with the World Health Organization (WHO) on an initiative to stir a debate around the new roles of public health in today’s global setting (Jenkins et al., 2016; World Federation of Public Health Associations, 2016). The WFPHA is an international, non-governmental organization composed by multidisciplinary national public health associations. It is the only worldwide professionals’ society representing and serving the broad field of public health. Its mission is to promote and protect global public health (World Federation of Public Health Associations, 2015).

Health is embedded in a broader and deepening transnational arena concerned with the

production of global public goods (Kickbusch, 2008). Global Health in the 21<sup>st</sup> century needs to accommodate the acceleration of the exchanges of ideas, movement of people, technologies and the increase of interconnectedness. Moreover, the role of non-conventional actors such as transnational companies or pharmaceutical groups has to be added to the traditional Public Health actors in the discussions (Kickbusch, 2008).

Not only new actors, but also new communication tools characterize Global Public Health today. Internet and mobile communication have expanded the access to health information. The rising number of information’s sources on the internet allow general public to get an easy access to health-related information, promote self-diagnosis and ‘virtual’ dialogues on any health topics (McNab, 2009; Tang & Hwee Kwoon, 2006). Moreover, eHealth, and more specifically mHealth, enables the use of new

technologies such as Short Message Service (SMS) in developing countries to communicate information to many receivers at the same time without moving, allowing access also to remote areas (Blaya, Hamish, & Brian, 2010).

Global Public Health actors have to adapt to those new communication tools. Indeed, the expansion of social media and more generally the online usage quadrupled between 2005 and 2009. Within the health communication field there is the common assumption that this evolution transforms the way communication is executed (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Hence, social media speeds up the dissemination of information as well as misinformation and frames differently the communication between individuals and organizations (Moorhead et al., 2013). Social media have also increased the information's reach. In the United States, among the 69% of adults having access to internet, more than a third is active on at least one social network (Chou et al., 2009). Nevertheless, not all society strata are equally represented. The majority of the users are aged between 18 and 24 years old and the usage might differ according to the race as well (Chou et al., 2009). Always in the United States, 39% of adults are searching health information on the internet. Social media have already served to face health outbreaks; i.e. the World Health Organization tweeted during the influenza A (H1N1) pandemic to health professionals communicating information to their clinical practice and social media as well as news websites such as Google News were also intensively adopted during the recent Ebola outbreak just to cite a few (Househ, 2015; Moorhead et al., 2013).

Kaplan and Haenlein (2009) 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" (Kaplan & Haenlein, 2009). Social media have two characteristics: a media and a social aspect. Its, almost face-to-face, timing and its reduction of ambiguity and uncertainty relate to a media aspect, whereas the attempt to control on the other's perception of ourselves through interaction represents the social components of this kind of media (Moorhead et al., 2013). The most used social media at the global level are Facebook, Twitter, LinkedIn, YouTube and Google+ (Milanovic, 13th April 2015). Although the ranking may change from a region to another, these five remain important around the world (Nanji, 2015). The form of social media favorite is social networking (i.e. Facebook, Twitter), followed by blogging and lastly the uses of online support groups (Chou et al., 2009).

This study focuses on Twitter and Blogs for the following reasons. Twitter is in the top five social platforms in 2015 with LinkedIn, YouTube and Google+ (Milanovic, 13th April 2015; Nanji, 2015). Moreover, Twitter due to its open policy allows an easy access to analysis. Blogs articles dig deeper and therefore allow a more detailed analysis of a topic than other social media. Furthermore, blogs collected a higher adoption rate by public relations practitioners than traditional social networks (Eyrich, Padman, & Sweetser, 2008).

Lomazzi and colleagues (Jenkins et al., 2016;

Lomazzi, 2016) highlighted how a part of the discussion on Global Public Health today is taking place on social media. This observation, as well as the increasing impact of social media in the field of health communication, clearly highlighted the need to analyze more in depth how Global Public Health is represented on the net. The aim of this paper is to provide an overview of how social media are used to transmit Global Public Health by different actors. More specifically, this preliminary study aims at analyzing which are the topics discussed on the different platforms and how the term "Global Public Health" is depicted.

### Methods

In order to identify the main platforms debating Global Public Health online we performed a Google search between the 16<sup>th</sup> and the 18<sup>th</sup> of July 2015. The keywords used for the research were 'Global Public Health' and 'Global Health' alone and in association with 'Twitter', or 'Blog'. We focused on international platforms available in English only.

Twitter pages and Blogs have been selected when keywords were contained within the title or page description for Blogs, as '@', '#' or in the page description for Twitter. The same keywords search has been subsequently applied directly on each platform to confirm Google search.

The numbers of followers/likes/members of each media retrieved were counted to get an idea of platforms' impact. In addition, platforms and institutions with impressive repercussion at the global level have been added to this short list although non fitting with the inclusion criteria such as WHO or Post2015 (Overseas Development Institute., 2015; WHO, 2015). The short listed accounts and pages (Table 1) have been subsequently analyzed (Twitter and Blogs) for the presence of different issues in Global Public Health, both manually and with computational help.

Table 1 Selected pages' characteristics

Platform	Twitter (Number of Followers/ Tweets)	Blog	Use
<b>World Health Organisation (WHO)</b>	2.53m Followers 16128 Tweets	No	Twitter: @WHO
<b>Post2015</b>	10830 Followers 2669 Tweets	Yes	Twitter: @post2015 and blog: post2015
<b>The Bill and Melinda Gates Foundation</b>	1.5m Followers 106000 Tweets	Impatient optimists	Blog
<b>Europe Health</b>	17797 Followers 7238 Tweets	No	Twitter: @EU_Health
<b>The Lancet GH</b>	124000 Followers 865 Tweets	Yes	Blog: The Lancet Global Health
<b>PLOS Blogs Transnational Global Health</b>	Just PLOS: 824'000 Followers 9'759 Tweets	Yes	Blog: PLOS Blogs Transnational Global Health
<b>The Huffington Post</b>	6.22m Followers 430000 Tweets	Yes	Blog: The Huffington Post Global Health
<b>IlonaKickbusch</b>	4819 followers 27447 Tweets	No	Twitter: @IlonaKickbusch
<b>Martin McKee</b>	9939 followers 8727 Tweets	Yes, but not updated (last post 2013)	Twitter: @MartinMckee
<b>Johnson&amp;Johnson</b>	114000 Followers 7105 Tweets	Yes	Blog: Johnson & Johnson

Note: General overview of the platforms analyzed, including the number of tweets and followers (for Twitter) as well as the presence of a blog, is reported in the table. The blogs selected for the analysis are highlighted in column 3.

The analysis was performed on Twitter and Blogs (when available) of organizations (World Health Organization, Post2015 and The Bill and Melinda Gates Foundation (BMGF) / Impatient Optimists), governments (European account for Health), journals (The Lancet Global Health, PLOS Blogs Transnational Global Health and the Global Health section of The Huffington Post), personalities (Ilona Kickbusch and Martin McKee), and companies (Johnson&Johnson) (Bill & Melinda Gates Foundation, 2015; European account for Health, 2015; Johnson&Johnson, 2015; Kickbusch, 2015; McKee, 2015; Overseas Development Institute., 2015; PLOS Blogs, 2015; The Huffington Post, 2015; The Lancet, 2015; WHO, 2015). The frequency of selected keywords within the Twitter and Blogs accounts were counted. Over 150 Global Public Health keywords have been found by the authors and the 45 most relevant piloted on the selected Twitter pages and Blogs to determine the frequency (Table 2 and 3).

**Table 2** *Twitter accounts analysis*

	<b>@WHO</b>		<b>@Post2015</b>		<b>@llonaKickbusch</b>		<b>@EU_Health</b>		<b>@MartinMcKe</b>		<b>TOTAL</b>	
	<b>Freq.</b>	<b>Relative freq.</b>	<b>Freq.</b>	<b>Relative freq.</b>	<b>Freq.</b>	<b>Relative freq.</b>	<b>Freq.</b>	<b>Relative freq.</b>	<b>Freq.</b>	<b>Relative freq.</b>	<b>Freq.</b>	<b>Relative freq.</b>
<b>Ebola</b>	625	25%	0	0%	358	17%	173	13%	59	6%	1215	<b>13%</b>
<b>SDG</b>	8	0%	732	30%	104	5%	2	0%	6	1%	852	<b>9%</b>
<b>Development</b>	34	1%	415	17%	109	5%	18	1%	14	1%	590	<b>6%</b>
<b>Food</b>	129	5%	22	1%	44	2%	239	18%	39	4%	473	<b>5%</b>
<b>Tobacco</b>	129	5%	0	0%	47	2%	80	6%	149	16%	405	<b>4%</b>
<b>Cancer</b>	207	8%	0	0%	7	0%	145	11%	14	1%	373	<b>4%</b>
<b>Child</b>	155	6%	62	3%	53	3%	26	2%	39	4%	335	<b>4%</b>
<b>Women</b>	39	2%	74	3%	153	7%	13	1%	12	1%	291	<b>3%</b>
<b>Vaccine</b>	180	7%	0	0%	45	2%	41	3%	4	0%	270	<b>3%</b>
<b>MDG</b>	8	0%	230	9%	13	1%	5	0%	2	0%	258	<b>3%</b>
<b>Medicine</b>	59	2%	1	0%	26	1%	118	9%	37	4%	241	<b>3%</b>
<b>Research</b>	47	2%	11	0%	44	2%	49	4%	73	8%	224	<b>2%</b>
<b>G7</b>	9	0%	14	1%	178	8%	13	1%	9	1%	223	<b>2%</b>
<b>Progress</b>	35	1%	122	5%	31	1%	18	1%	14	1%	220	<b>2%</b>
<b>Crisis</b>	11	0%	2	0%	72	3%	8	1%	106	11%	199	<b>2%</b>
<b>Security</b>	15	1%	36	1%	106	5%	23	2%	9	1%	189	<b>2%</b>
<b>Sustainable</b>	15	1%	125	5%	26	1%	9	1%	7	1%	182	<b>2%</b>
<b>Poverty</b>	20	1%	120	5%	18	1%	1	0%	14	1%	173	<b>2%</b>
<b>MERS*</b>	62	3%	2	0%	60	3%	36	3%	12	1%	172	<b>2%</b>
<b>NCD</b>	58	2%	8	0%	69	3%	13	1%	15	2%	163	<b>2%</b>
<b>Global Health</b>	22	1%	5	0%	93	4%	8	1%	30	3%	158	<b>2%</b>
<b>Prevention</b>	66	3%	0	0%	16	1%	70	5%	5	1%	157	<b>2%</b>
<b>Economic</b>	14	1%	23	1%	28	1%	19	1%	72	8%	156	<b>2%</b>
<b>Climate</b>	33	1%	35	1%	65	3%	6	0%	10	1%	149	<b>2%</b>
<b>HIV</b>	74	3%	6	0%	18	1%	23	2%	13	1%	134	<b>1%</b>
<b>Education</b>	7	0%	77	3%	15	1%	7	1%	17	2%	123	<b>1%</b>
<b>Tax</b>	17	1%	15	1%	40	2%	9	1%	40	4%	121	<b>1%</b>
<b>Trade</b>	32	1%	10	0%	30	1%	12	1%	31	3%	115	<b>1%</b>
<b>Environment</b>	11	0%	19	1%	16	1%	62	5%	5	1%	113	<b>1%</b>
<b>Universal</b>	31	1%	30	1%	21	1%	5	0%	18	2%	105	<b>1%</b>
<b>Nepal</b>	77	3%	2	0%	21	1%	1	0%	0	0%	101	<b>1%</b>
<b>Nutrition</b>	40	2%	9	0%	9	0%	39	3%	3	0%	100	<b>1%</b>
<b>Conflict</b>	21	1%	26	1%	15	1%	15	1%	11	1%	88	<b>1%</b>
<b>Water</b>	37	1%	35	1%	6	0%	5	0%	3	0%	86	<b>1%</b>
<b>Peace</b>	0	0%	59	2%	18	1%	0	0%	6	1%	83	<b>1%</b>

<b>Sex</b>	37	1%	8	0%	17	1%	2	0%	12	1%	76	1%
<b>Partnership</b>	7	0%	34	1%	18	1%	8	1%	7	1%	74	1%
<b>Human right</b>	8	0%	24	1%	15	1%	2	0%	22	2%	71	1%
<b>Humanitarian</b>	17	1%	2	0%	29	1%	3	0%	6	1%	57	1%
<b>Accountability</b>	7	0%	26	1%	6	0%	0	0%	3	0%	42	0%
<b>Pollution</b>	20	1%	0	0%	15	1%	5	0%	1	0%	41	0%
<b>Sanitation</b>	23	1%	14	1%	3	0%	0	0%	0	0%	40	0%
<b>Monitoring</b>	8	0%	17	1%	4	0%	5	0%	2	0%	36	0%
<b>Donor</b>	10	0%	4	0%	9	0%	5	0%	2	0%	30	0%
<b>Refugee</b>	5	0%	2	0%	18	1%	2	0%	1	0%	28	0%
<b>TOTAL</b>	2469	100%	2458	100%	2108	100%	1343	100%	954	100%	9332	100%

\*MERS: Middle East Respiratory Syndrome

Note: The relative frequency, of the keyword out of the total keywords found, of each of the 45 keywords in the selected accounts, is reported in the table.

Table 3 Blogs accounts analysis

	PLOS Blogs Transnational Global Health		The Lancet		Johnson & Johnson		Post2015		The Impatient Optimist		The Huffpost Global Health		Total	
	Freq.	Rel. freq.	Freq.	Rel. freq.	Freq.	Rel. freq.	Freq.	Rel. freq.	Freq.	Rel. freq.	Freq.	Rel. freq.	Freq.	Rel. freq.
<b>Development</b>	42	6%	147	7%	90	9%	2158	33%	466	12%	249	3%	3152	14%
<b>Women</b>	5	1%	160	7%	62	6%	80	1%	366	9%	1740	21%	2413	10%
<b>Child</b>	16	2%	191	9%	149	15%	202	3%	685	17%	1031	12%	2274	10%
<b>Education</b>	28	4%	55	2%	32	3%	275	4%	520	13%	1018	12%	1928	8%
<b>Ebola</b>	13	2%	251	11%	36	4%	0	0%	63	2%	903	11%	1266	5%
<b>Global Health</b>	95	13%	194	9%	30	3%	30	0%	300	7%	272	3%	921	4%
<b>Research</b>	26	3%	249	11%	91	9%	184	3%	229	6%	126	1%	905	4%
<b>MDG</b>	0	0%	15	1%	8	1%	779	12%	0	0%	58	1%	860	4%
<b>Sustainable</b>	2	0%	16	1%	26	3%	564	9%	50	1%	117	1%	775	3%
<b>Water</b>	18	2%	57	3%	26	3%	81	1%	69	2%	475	6%	726	3%
<b>Progress</b>	25	3%	18	1%	16	2%	260	4%	158	4%	172	2%	649	3%
<b>Vaccine</b>	2	0%	59	3%	40	4%	4	0%	422	10%	82	1%	609	3%
<b>Poverty</b>	12	2%	28	1%	2	0%	274	4%	51	1%	222	3%	589	3%
<b>SDG</b>	0	0%	4	0%	0	0%	559	8%	4	0%	20	0%	587	3%
<b>HIV</b>	7	1%	58	3%	154	16%	15	0%	30	1%	274	3%	538	2%
<b>Food</b>	27	4%	43	2%	2	0%	39	1%	135	3%	288	3%	534	2%
<b>Medicine</b>	43	6%	75	3%	65	7%	2	0%	39	1%	80	1%	304	1%
<b>Sex</b>	0	0%	15	1%	0	0%	2	0%	13	0%	256	3%	286	1%

<b>Economic</b>	17	2%	16	1%	2	0%	159	2%	21	1%	57	1%	272	1%
<b>Partnership</b>	6	1%	8	0%	27	3%	79	1%	87	2%	57	1%	264	1%
<b>Universal</b>	8	1%	34	2%	0	0%	152	2%	20	0%	22	0%	236	1%
<b>Crisis</b>	0	0%	27	1%	10	1%	8	0%	14	0%	168	2%	227	1%
<b>Cancer</b>	88	12%	21	1%	30	3%	0	0%	0	0%	85	1%	224	1%
<b>Nutrition</b>	4	1%	49	2%	0	0%	30	0%	52	1%	89	1%	224	1%
<b>NCD</b>	85	11%	88	4%	0	0%	2	0%	0	0%	45	1%	220	1%
<b>Prevention</b>	37	5%	45	2%	44	4%	0	0%	13	0%	77	1%	216	1%
<b>Sanitation</b>	0	0%	27	1%	6	1%	10	0%	61	2%	104	1%	208	1%
<b>Conflict</b>	4	1%	27	1%	0	0%	93	1%	2	0%	80	1%	206	1%
<b>Climate</b>	27	4%	25	1%	0	0%	130	2%	2	0%	18	0%	202	1%
<b>Environment</b>	12	2%	16	1%	29	3%	85	1%	6	0%	26	0%	174	1%
<b>Human right</b>	0	0%	28	1%	2	0%	69	1%	4	0%	40	0%	143	1%
<b>Tobacco</b>	47	6%	61	3%	0	0%	0	0%	33	1%	2	0%	143	1%
<b>Tax</b>	22	3%	4	0%	0	0%	30	0%	16	0%	38	0%	110	0%
<b>Security</b>	8	1%	5	0%	0	0%	34	1%	43	1%	13	0%	103	0%
<b>Monitoring</b>	3	0%	2	0%	0	0%	88	1%	2	0%	4	0%	99	0%
<b>Donor</b>	2	0%	41	2%	0	0%	17	0%	15	0%	16	0%	91	0%
<b>Trade</b>	6	1%	25	1%	0	0%	32	0%	4	0%	19	0%	86	0%
<b>Accountability</b>	0	0%	9	0%	0	0%	51	1%	4	0%	9	0%	73	0%
<b>Humanitarian</b>	11	1%	13	1%	2	0%	4	0%	0	0%	42	0%	72	0%
<b>Nepal</b>	0	0%	0	0%	0	0%	4	0%	40	1%	20	0%	64	0%
<b>Peace</b>	0	0%	0	0%	2	0%	43	1%	0	0%	9	0%	54	0%
<b>Refugee</b>	0	0%	3	0%	7	1%	3	0%	2	0%	2	0%	17	0%
<b>Pollution</b>	0	0%	7	0%	0	0%	2	0%	0	0%	2	0%	11	0%
<b>G7</b>	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>MERS</b>	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	748	100%	2216	100%	990	100%	6633	100%	4041	100%	8427	100%	23055	100%

\*MERS: Middle East Respiratory Syndrome

Note: The relative frequency, of the keyword out of the total keywords found, of each of the 45 keywords in the selected blogs, is reported in the table.



A short list of 15 keywords has been identified for further analyses (Table 4). Word counting on the selected Global Public Health keywords has been performed 25<sup>th</sup> July to the 10<sup>th</sup> August 2015 covering for Twitter pages all tweets available within one year (20<sup>th</sup> July 2014- 20<sup>th</sup> July 2015) or with a cut off of 3,200 tweets corresponding to the maximum amount of tweets that Twitter allows to retrieve. For Blogs, a range of one year (20<sup>th</sup> July 2014- 20<sup>th</sup> July 2015) has been covered, to be consistent with the Twitter analysis. Independently of the cut-off point, most of the keywords coming up were similar.

Next, an in-depth Twitter examination using 'Twitonomy' (Twitonomy, 2015) was performed. This program allows counting the most frequent hashtags (#) used by Twitter accounts and provides the statistics of the retweets and mentioned tweets. The main function of a retweet is to spread the information to a new audience and in some cases a conversational function. It is also considered as a popularity's measure of the account (Freelon, 2014). A mention refers to a tag of an account (@accountname) within a tweet in order to engage directly a conversation (Dumbrell & Steele, 2015). Those two parameters are crowdsourced manners to determine the relevance of twitter's content (Lewis, Zamith, & Hermida, 2013). The more retweets or mentions, the more credit is attributed to the account (Ausserhofer & Maireder, 2013). Moreover, retweets define what a trendy topic is better than the number of followers or the number of tweets produced by a user (Asur, Huberman, Szabo, & Wang, 2011).

Both approaches (word counting and Twitonomy) were necessary for the Twitter analysis since with only computational analyses, the tweets without hashtags would have not been considered. Moreover, counting manually allowed the researcher to integrate content that cannot be represented under a specific hashtag (Lewis et al., 2013).

Last, a hashtag search for #GlobalPublicHealth and #GlobalHealth was performed. The hashtag symbol '#' is used to create categories tweets and to access tweets within a context. They are often used with trendy topics. If an account is public, anyone can access the tweets by searching for a specific hashtag. Therefore, it can also increase the impact of the account. Hashtags are put before a keyword that can be placed at the beginning, in the middle or at the end of a sentence (Twitter, 2014). The hashtags search has been performed on the 14<sup>th</sup> of August and retreated the last 10 days for #GlobalHealth and the last 3 days for #GlobalPublicHealth, as permitted by Twitonomy (Twitonomy, 2015).

For the blogs analysis, only the keyword frequency was done with the support of Seobook ("Seobook, keyword density analyzer," 2015) that allows counting keywords density; this analysis mainly provided a confirmation of the manual approach. This shortened analysis is due to the lack of software to conduct a deeper analysis of the blogs. The word frequency is a more traditional manner and indicates the relevance of a topic to the entity (Lewis et al., 2013). The qualitative analyses of the blogs will be the subject of a next study.

## Results

From the initial Google search with the keywords Global Public Health, plus 'Twitter', or 'Blog' between 271,000,000 and 355,000,000 results were obtained. However, in each search a maximum of dozen results were relevant. When analyzing the keywords Global Health plus 'Twitter' or 'Blog' on Google, between 149,000,000 and 389,000,000 results were retrieved. However, the actual results that can be used were between 15 and 51 (the blogs) per keywords. Nevertheless, many entities are coming up for more than one keyword.

With the same keywords applied directly on each social media, more results than the simple Google search appeared but the relevant ones corresponded to the significant pages obtained through Google in both cases.

We next analyzed the five selected Twitter pages and Blogs. When focusing on Twitter, results regarding the statistics of the organizations showed that the @WHO had 16,128 tweets from April 2008 and 2,530,926 followers. This means that WHO tweeted on average 11.39 times per day. A measure of Twitter page success can be evaluated by the favorite tweets and the retweets. For the @WHO, 94.8% of their tweets are retweeted and 95.5% of them are favorited. The three favorite hashtags of this account were #ebola, #eb136 (on the 136<sup>th</sup> WHO Executive Board) and #askwho (referring to WHO).

@Post2015 analysis revealed that since the creation of the account in April 2012, 2,669 tweets were posted and they count 10,830 followers. 43.3% of the tweets are retweeted and 35.1% of them are favorited. Post2015 posted most with the hashtags #post2015, #leavenoonebehind, #globaldev.

The European account for Health (@EU\_Health) totaled 7,238 tweets since June 2012 and has 17,797 followers. Their tweets are in average retweeted 30.6% and 28.1% favorited. #eu, #euedc (focusing on education) and #ebola represented the top 3 of the hashtags employed by the European account for Health.

Concerning personalities in Public Health, Ilona Kickbusch (@IlonaKickbusch) counted not less than 27,447 tweets in 3 years with 4,819 followers. Her tweets are retweeted 10.3% and 11.1% favorited. Her three most posted hashtags are #globalhealth, #ebola, #healthsecurity. Martin McKee (@MartinMcKee) accumulated 8,727 tweets and 9,939 followers since June 2010. His tweets are retweeted 31.9% of the time and 29.9% are favorite. #ephglasgow (EUPHA 2014 congress), #ebola and #plainpacks (on plain tobacco packaging) were the preferred hashtags of Martin McKee.

We subsequently searched for #GlobalPublicHealth and #GlobalHealth. #GlobalPublicHealth has been used three times between August the 6<sup>th</sup> and August the 11<sup>th</sup> 2015. The three accounts that employed it were @SDSNedu (Online Education Initiative of the Sustainable Development Solutions Network - SDSN), @HSRJournal (Health System Reform) and @GHP\_HarvardChan (Official account for the Department of Global Health and Population at the Harvard T.H. Chan School of Public Health). One of these tweets has been retweeted and another one

favorited. The potential reach of those three mentions that 'twitonomy' evaluated is about 625.

Regarding #GlobalHealth (analyzed on the same day), we observed a larger range since a mention was made on the 4<sup>th</sup> of August and the latest one on the 13<sup>th</sup> of August 2015. 2,386 tweets used this hashtag among which the account from the entrepreneur and philanthropist Mike Bloomberg to the United State Agency for International Development (USAID), Partners in Health and World Vision

(Bloomberg, 2015; Partners In Health, 2015; USAID, 2015; World Vision, 2015). From the most engaging users (Mike Bloomberg and Partners in Health), one tweet has been on average retweeted around 55 times and favorited around 73 times. The estimated potential reach is 11,907,692.

The frequency of the selected Global Public Health keywords was subsequently analyzed (Table 4, first three columns).

**Table 4** Fifteen keywords short-listened and used for analyses (out of the 45 piloted)\*

Twitter			Blogs		
Keywords	Tot n° mentions	%	Keywords	Tot. n° mentions	%
Ebola	1215	13%	Development	3152	14%
SDG	852	9%	Women	2413	10%
Development	590	6%	Child	2274	10%
Food	473	5%	Education	1928	8%
Tobacco	405	4%	Ebola	1266	5%
Cancer	373	4%	Global Health	921	4%
Child	335	4%	Research	905	4%
Women	291	3%	MDG	860	4%
Vaccine	270	3%	Sustainable	775	3%
MDG	258	3%	Water	726	3%
Medicine	241	3%	Progress	649	3%
Research	224	2%	Vaccine	609	3%
G7	223	2%	Poverty	589	3%
Progress	220	2%	SDG	587	3%
Crisis	199	2%	HIV	538	2%

\*The relative frequency (%) is calculated out of the total amount of keywords found considering each Twitter or Blog page.



In all Twitter pages analyzed the 15 most frequent keywords were (in descending order from the most frequent to the least frequent) Ebola, Sustainable Development Goals (SDG), Development, Food, Tobacco, Cancer, Child, Women, Vaccine, Millennium Development Goals (MDG), Medicine, Research, G7, Progress, and Crisis. The most cited were Ebola (12%), followed by SDG (9%), Development (6%) and Food (5%).

When comparing the different Twitter pages, Ebola was ranked first within the @WHO and @IlonaKickbusch accounts, in the second position for @EU\_Health but it was not among priorities in @MartinMcKee tweets and not present at all in the Post2015. Cancer appeared among the top three topics for @WHO and @EU\_Health. Moreover, @WHO attributed high importance to Vaccine while @EU\_Health to Food. In @post2015, SDG took the lead, followed by Development. Concerning @IlonaKickbusch her most frequent keyword was Ebola followed by G7 and Women, while @MartinMcKee used Tobacco the most, followed by Crisis and Research.

Afterwards a research on Blogs was conducted. The top 15 keywords were (in descending order from the most frequent to the least frequent) Development, Women, Child, Education, Ebola, Global Health, Research, MDG, Sustainable, Water, Progress, Vaccine, Poverty, SDG and HIV (Table 4, last three columns). The most cited were Development (14%), followed by Women (10%), Child (10%) and Education (8%).

The comparison between the different Blogs shows that as for the Twitter's results the overall ranking is subject to some differences. The keyword Development came up among the top three keywords in all blogs except The Lancet Global Health and The Huffpost Global Health in which it ranked 4<sup>th</sup> and 6<sup>th</sup> respectively. Both The Lancet and PLOS Blogs Transnational Global Health acknowledged high importance to Global Health, followed by Non-Communicable Diseases (NCD) and Medicine for PLOS Blogs Transnational Global Health, and by Research, Ebola and Child for The Lancet Global Health. The Huffington Post gave priority to Women, Child and Education. Post2015, after its focus on Development (33%), dealt with MDG, followed by Sustainable and SDG. Impatient Optimists, the BMGF blog, main keywords were Child, Education, Vaccine and Women. The company blog analyzed (Johnson & Johnson) dealt mainly with Child and HIV.

Lastly, a comparison between the main keywords found in Twitter pages and Blogs was performed. Platforms analyzed had nine keywords in common i.e. Ebola, SDG, Development, Child, Women, Vaccine, MDG, Research and Progress, even if ranking differently (Table 4). However, important differences raised; tweets acknowledged an unneglectable role to Food, Tobacco and Cancer, all absent in the Blogs, while Education and Global Health appeared only in the Blogs. Of note, even if Global Health did not appear in the Twitter search, the hashtag #GlobalHealth is among the 10 first hashtags used by @IlonaKickbusch, but absent in the other accounts.

Although some differences are noticed

between Twitter and the Blogs, more than half (60%) of the keywords are the same. We can speculate that similar analysis performed on other social media can lead to comparable results. Regarding the use of hashtags, it started from Twitter but are now common on other platforms such as Facebook or Google+. A dedicated study would be needed to confirm the hypothesis and evaluate the impact of # in the different platforms.

### Discussion

The present study investigated how Global Public Health is communicated by different actors on social media, what are the trends, and the differences between what is diffused on Twitter and Blogs.

### Trendy topics

Hot topics and crisis such as Ebola or the Sustainable Development Goals (and therefore the Millennium Development Goals that are evaluated this year (2015)) are quite predominant on both analyses: Twitter and Blogs. The literature showed that social media are not only another sources of news but also amplify and filter news from the traditional media (Asur et al., 2011). Our results support previous findings with hot news or topics such as the Sustainable Goals, the Development Goals or Ebola, being salient as the same period as it was within traditional media. Another 'hot topic' highlighted is Environment. Hence, this term is gaining importance during the last few years. Environment is of particular interest in 2015 with the world summit in Paris that took place in December 2015. It could be interesting to see how those results evolve; HIV might have been considered as a hot topic once, but now it is only a 'recurrent' topic, as the disease is still not eradicated. Maybe in 10 years we will not hear about HIV anymore and environment will pass to the recurrent category.

Topics like HIV, Women, Children and Poverty are subjects that cannot be qualified as 'new' and remain constantly on the Global Public Health scene as they are redundant within traditional media.

Of interest, subjects such as climate, environment, sanitation or security are not strongly present on the social media, ranked after the 15<sup>th</sup> position. As Meraz (2009) suggested, concrete issues are easier to address than abstract topics (Meraz, 2009). Therefore, Children, Women or Poverty can be easier represented than issues like Climate or Security that are more abstract. Moreover, the trendiness of an issue relies on the way the content is disseminated. More specifically, the spread of a subject is dependent of the influence of the members within the network. Furthermore, according to the types and number of followers, the message will resonate differently and gain or not popularity (Asur et al., 2011).

### Impact and Effectiveness

The impact of social media can somehow be measured through the number of followers, tweets etc. A celebrity might resonate larger toward the general population but when targeting scholars from the field a specialist might have more impact. Regarding the influence and the reach, we can imagine as well that a tweet sent out by Ilona Kickbusch (4,819 followers and 27,447 tweets) on Ebola will not have the same impact as if it was tweeted by Kim Kardashian (34,9 million of

followers and 19800 tweets). Kim Kardashian has been taken here in comparison since the it-girl is among the 100 most influential people in 2015 (TIME, 2015). However, those numbers should not be strictly considered; the UN has not twice as much influence as WHO. As Cha and colleagues (2010) mention, the number of followers does not say much on the Twitter sphere (Cha, Haddadi, Benevenuto, & Gummadi, 2010). Of course, the aim here is not to compare the new it-girl with an influential professor. Nevertheless, when it comes to communication, as in marketing, the message is important but as well as the messenger. The messenger should then be carefully chosen according to the target audience. The new star of Hollywood will not have as much authority towards scholars as their peers have for instance (Clow & Baack).

In addition, the message depends the internal agenda of the analyzed organization and its focus. Hence, non-governmental organizations (NGOs) speak about their concerns. A NGO caring about water will not necessarily tweets on HIV. A humanitarian NGO responding to crisis posts less on climate change than on Ebola for instance. This has been showed through the research with SDG and MDG overrepresented in Post2015 when compared with the newspaper Huffington Post providing a major focus on crisis and news.

#### **Use of Social Media by Global Public Health professionals**

NGOs active in Global Health are using social media to serve their purposes. Mostly, each NGO will focus on its priorities. Moreover, social media played major role in many public health emergencies (Seltzer, Jean, Kramer-Golinkoff, Asch, & Merchant, 2015). For instance, social media were used as a link between health care providers and the sources with supplies after the Haiti's earthquake in 2010. In the case of Ebola, social media, helped to develop the perception of the outbreak by the public. Social media are used to share information, to create a discussion or to raise awareness. The predominance of 'hot topics' such as Ebola confirms this fact. The epidemic of Ebola started in December 2013 and was not over at the time of this search. Therefore, this topic remained a 'hot' issue. It is the same with SDG and MDG with 2015 being a crucial year and even more with September 2015 and the adoption of the SDG coming right after.

Global Public Health institutions are present on social media but not visible. Only a few relevant results were found with the exact wording 'Global Public Health' which is not representative of all the entities active in 'Global Public Health' present on social media. Even WHO does not appear with either key-words. This reinforces the need for a more precise definition of the term and for a better referencing (Beaglehole; Jenkins et al., 2016; Kickbusch, 2008). Most entities thriving for 'Global Public Health' are using 'Global Health' or 'Public Health' more frequently (Jenkins et al., 2016; Kickbusch, 2008; Lomazzi, 2016). Last but not least, Global Public Health professionals and institutions should improve and adapt their use of social media to the global context.

#### **Limitations**

First, not all top ranking social media have been evaluated in this study rather focusing on Twitter and Blogs. The other top ranking platforms, although interesting, have not analyzed in this study due to different reasons. LinkedIn, more professionally focused, seeks mainly promotion of individuals and is not as open to the public as Twitter is. Hence, the discussion happens between health professionals and not around health in general. Google+ has not been considered because it is not yet as spread as the others are. YouTube filmed contents although very interesting would be more complex to analyze and required a different methodology than the one adopted here, and may be the subject of a next study.

Second, the research engines themselves are limited. Indeed, the Google search, as well as the research on the different social media, is quite biased. When entering the keywords on a different day the results may change since the appearance on Google depends on the popularity of the website at a determined time but also on how much companies pay to appear first in the list. Moreover, webmasters can choose which research keywords will lead to their websites. Therefore, not all the websites appear because the list of their keywords might not be exhaustive and not always the most prominent in the field pop-up due to popularity biases.

Third, social media search varies depending on the searcher profile, 'friends', 'likes' or 'connections'. Consequently, in order to overcome these biases and to be more inclusive, the pages of the main actors in Global Health were included afterwards to the results.

Moreover, measuring the followers and tweets to evaluate success is not the most suitable option because users can buy followers among other strategies to mislead the analysis. Cha and colleagues (2010) discovered that, while retweets and mentions correlated well with each other, the number of followers did not correlate well with the other two measures. Based on this, they hypothesized that the number of followers may not be a good measure of influence (Cha et al., 2010).

Fourth, the search has been conducted in English only, thus excluding any platform using another language.

Last, the methodology and the scale of the study imply some degree of arbitrary for the overall selection. Hence, some websites were excluded because they did not directly use the term Global Public Health, as we understand it.

Therefore, this study constitutes a preamble of an analysis of Global Public Health within the social media. To better understand the perception of this online interaction and to analyze in depth the content of different blogs, a qualitative study would be required. An extended comparison with different platforms including channel like YouTube and TEDx for the video part or of the imagery present on Social media is suitable. Furthermore, othermore individual communications tools, such as newswire or newsletters could be evaluated.

#### **Conclusion**

Social media are used to debate around

Global Public Health by organizations and individuals. However, the term Global Public Health and Global Health are not always appropriately perceived and used. Therefore, here too, there is a need for terminology classifications. Moreover, issues that Global Public Health embrace are discussed with different degree of importance, some are expected to evolve with the time and remain present but less prominent and other will appear following the trend in the media. In addition, ongoing topics or 'hot topics' are more represented than distant, abstract issues. Therefore, with the attribute given to social media, Twitter and Blogs contribute to the ongoing discussion on Global Public Health and needs to be integrated in the debate around the definition of Global Public Health in today's global setting.

Most organizations and individuals in the field of Global Public Health are using social media to raise awareness about their activities, priorities and to make advocacy; social media offer the opportunity to reach an important part of the population whether it is

healthcare professionals, stakeholders, NGOs, governmental institutions or others, worldwide. An effective approach requires a social media strategy in accordance with the organization's values and goals as well as the work of public health communications professionals able to set up and lead strategic communication of evidence-based health information to professional and non-professional audiences. That's why more and more organizations are investing in this area.

As highlighted in this study, even if there is an increasing use of social media applied to Global Public Health and understanding of its potential, there is still room for improvement. As only few relevant results were found when searching the exact wording 'Global Public Health', Global Public Health associations, institutions and professionals should now better acknowledge and exploit the opportunities offered by social media in information diffusion, its reach and in the debates that may rise in order to control and spread the desired information and to boost their image

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#### References

- Asur, S., Huberman, B. A., Szabo, G., & Wang, C. (2011). *Trends in Social Media: Persistence and Decay*. doi:<http://dx.doi.org/10.2139/ssrn.1755748>
- Ausserhofer, J., & Maireder, A. (2013). National Politics on Twitter. *Information, Communication & Society*, 16(3), 291-314. doi:10.1080/1369118x.2012.756050
- Beaglehole, B., Horton, Adams, McKee. Public Health in the new era: improving health through collective action. *The Lancet*, 363.
- Bill & Melinda Gates Foundation. (2015). Impatient Optimists. Retrieved on 25 July 2015, from <http://www.impatientoptimists.org/>
- Blaya, J. A., Hamish, F. S. F., & Brian, H. (2010). E-Health Technologies Show Promise In Developing Countries. *Health Affairs*, 29(2), 7. doi:10.1377/hlthaff.2009.0894
- Bloomberg, M. (2015). @MikeBloomberg. Retrieved on 29 July 2015, from <https://twitter.com/mikebloomberg>
- Benevenuto, & Gummadi. (2010). Measuring User Influence in Twitter: The Million Follower Fallacy. *Fourth International AAAI Conference on Weblogs and Social Media*.
- Chou, W. Y. S., Hunt, Y. M., Beckjord, E. B., Moser, R. P., & Hesse, B. W. (2009). Social Media Use in the United States: Implications for Health Communication. *Journal of Medical Internet Research*, 11(4). doi:PMID: 19945947
- Clow, K. E., & Baack, D. (2009). *Integrated Advertising, Promotion, and Marketing Communications*. Pearson Ed. Global Edition, Fourth edition ed. Pearson.
- Dumbrell, D., & Steele, R. (2015). #worldhealthday 2014: The Anatomy of a Global Public Health Twitter Campaign. 3094-3103. doi:10.1109/hicss.2015.373
- European account for Health. (2015). @EU\_Health Twitter. Retrieved on 5 August 2015, from [https://twitter.com/EU\\_Health?ref\\_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor](https://twitter.com/EU_Health?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor)
- Eyrich, N., Padman, M. L., & Sweetser, K. D. (2008). PR practitioners' use of social media tools and communication technology. *Public Relations Review*, 34(4), 412-414. doi:10.1016/j.pubrev.2008.09.010
- Freelon, D. (2014). On the Interpretation of Digital Trace Data in Communication and Social Computing Research. *Journal of Broadcasting & Electronic Media*, 58(1), 59-75. doi:10.1080/08838151.2013.875018
- Househ, M. (2015). Communicating Ebola through social media and electronic news media outlets: A cross-sectional study. *Health Informatic Journals*. doi:PMID: 25656678
- Jenkins, C., Lomazzi, M., Yeatman, H., & Borisch, B. (2016). Global Public Health: A Review and Discussion of the Concepts, Principles, and Roles of Global Public Health in Today's Society. *Global Policy*. doi:10.1111/1758-5899.12302
- Johnson&Johnson blog. (2015). Retrieved on 26 July 2015, Retrieved from <http://www.blogjn.com/>
- Kaplan, A. M., & Haenlein, M. (2009). Users of the world, unite! The challenges and opportunities of Social Media. *Elsevier*. doi:10.1016/j.bushor.2009.09.003
- Kickbusch, I. (2008). Identifying critical societal Public Health Needs: in search of the public health paradigm for the 21st century Retrieved on 2 August 2015 from [http://www.ilonakickbusch.com/kickbusch-wAssets/docs/Kickbusch-Rockefeller-White-paper-10\\_aug2008\\_referenceadded\\_final\\_2col\\_corrected.pdf](http://www.ilonakickbusch.com/kickbusch-wAssets/docs/Kickbusch-Rockefeller-White-paper-10_aug2008_referenceadded_final_2col_corrected.pdf)
- Kickbusch, I. (2015). @IlonaKickbusch Twitter. Retrieved on 6 August 2015 from <https://twitter.com/IlonaKickbusch>
- Lewis, S. C., Zamith, R., & Hermida, A. (2013). Content analysis in an era of big data: A hybrid approach to computational and manual methods. *Journal of Broadcasting & Electronic Media*, 57(1), 34-52. doi:10.1080/08838151.2012.761702
- Lomazzi, M., Jenkins, C., Krech, R., Borisch, B. (2016). Global Public Health Today: connecting the dots. *Global Health Action*. doi:<http://dx.doi.org/10.3402/gha.v9.28772>
- McKee, M. (2015). @MartinMcKee Twitter. Retrieved on 9 August 2015 from <https://twitter.com/martinmckee>
- McNab, C. (2009). What social media offers to health professionals and citizens. *Bull World Health Organisation* 2009, 87:566. doi:PMID: 19704998
- Meraz, S. (2009). Is There an Elite Hold? Traditional Media to Social Media Agenda Setting Influence in Blog Networks. *Journal of Computer-Mediated Communication*, 14(3), 682-707. doi:10.1111/j.1083-6101.2009.01458.x
- Milanovic, R. (13th April 2015). The World's 21 Most Important Social Media Sites and Apps in 2015. Retrieved on 10 July 2015 from <http://www.socialmediatoday.com/social-networks/2015-04-13/worlds-21-most-important-social-media-sites-and-apps-2015>
- Moorhead, S. A., Hazlett, D. E., Harrison, L., Carroll, J. K., Irwin, A., Hoving, C., & Eysenbach, G. (2013). A New Dimension of Health Care: Systematic Review of the Uses, Benefits, and Limitations of Social Media for Health Communication. *Journal of Medical Internet Research*, 15(4), 1-1. doi:PMID: 23615206
- Nanji, A. (2015). The Most Effective Social Networks for Marketing a Business in 2015. Retrieved on 27 July 2015 from

- <http://www.marketingprofs.com/charts/2015/27718/the-most-effective-social-networks-for-marketing-a-business-in-2015>  
Overseas Development Institute. (2015). post2015.org What comes after the MDGs? Retrieved on 29 July 2015 from <http://post2015.org/>
- Partners In Health. (2015). @PIH Twitter. Retrieved on 28 July 2015 from: <https://twitter.com/pih?lang=fr>
- PLOS Blogs. (2015). Plos Blogs transnational Global Health. Retrieved on 10 August 2015 from <http://blogs.plos.org/globalhealth/>
- Seltzer, E. K., Jean, N. S., Kramer-Golinkoff, E., Asch, D. A., & Merchant, R. M. (2015). The content of social media's shared images about Ebola: a retrospective study. *Public Health*. doi:PMID: 26285825
- Seobook, keyword density analyzer. (2015). Retrieved on 20 June 2015 from <http://tools.seobook.com/general/keyword-density/>
- Tang, H., & Hwee Kwoon, J. (2006). Googling for a diagnosis—use of Google as a diagnostic aid: internet based study. *British Medical Journal*, vol. 333(2 December 2006). doi:PMID: 17098763
- The Huffington Post. (2015). The Huffington Post Global Health. Retrieved on 30 July 2015 from <http://www.huffingtonpost.com/news/global-health/>
- The Lancet. (2015). The Lancet Global Health Blog. Retrieved on 29 July 2015 from <http://globalhealth.thelancet.com/>
- TIME. (2015). The 100 Most Influential People. Retrieved on 6 August 2015 from <http://time.com/collection/2015-time-100/>
- Twitonomy. (2015). Twitonomy. Retrieved on 11 June 2015 from <http://twitonomy.com/>
- Twitter. (2014). En quoi consistent les hashtags (symboles "#") ? Retrieved on 31 July 2015 from <https://support.twitter.com/articles/231414#>
- USAID. (2015). @USAID Twitter. Retrieved on 7 August 2015 from <https://twitter.com/usaid>
- WHO. (2015). @WHO Twitter. Retrieved on 25 July 2015 from <https://twitter.com/WHO>
- World Federation of Public Health Associations. (2015). Official Website. Retrieved on 26 July 2015 from <http://www.wfpha.org/projects-en/role-of-public-health-in-today-s-global-setting-en>
- World Federation of Public Health Associations. (2016). A Global Charter for the Public's Health. ? Retrieved on 9 August 2015 from <http://www.wfpha.org/projects-en/role-of-public-health-in-today-s-global-setting-en>
- World Vision. (2015). @WorldVision Twitter. ? Retrieved on 29 July 2015 from <https://twitter.com/worldvision?lang=fr>.