THE USE AND EFFECT OF SOCIAL MEDIA IN HEALTH COMMUNICATION ABOUT COMMON HEAD LICE

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November 2012

UNIVERSITY OF TWENTE.

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Abstract

Objective: Technological developments in the field of internet impacts the large group of people that uses this media source to obtain health information. Social media is such a new development and drastically changes websites from a static source to a many-to-many communication channel. To better understand these changes and use them in effective health promotion and health communication the potential of popular social media websites is investigated. With the knowledge from this research a decision can be made if these channels can be used to effectively improve public health. A case study involving the communication about head lice prevention used to better understand the use and effect of social media in health communication.

Methods: In the case study social media pages were created in collaboration with municipal health services. Channels were promoted to parents using school newsletters. The popularity and effectiveness could then be measured using quantitative and qualitative methods. To observe health behavior a questionnaire was created. The likeliness of preventive measures concerning head lice is used to illustrate health behavior. Combined with different socio-demographics and media use, indicators for this behavior could be quantified and pointed out. To illustrate media choice and preference under parents an adaptive choice based conjoint was used. In addition qualitative interviews with professionals and parents are performed to substantiate the quantitative findings.

Results: The popularity from the social media case study was very low. Passively spreading head lice information to parents' trough social media was unsuccessful. Parents indicated that they did not see social media as a source for health information. In general parents are likely to perform preventive measures concerning head lice and current information about head lice was perceived as sufficient. Only high income and higher education were indicators that reduced the odds significantly for preventive head lice measures. For general information about head lice parents indicated that they consulted schools, pharmacies and the internet. For information about head lice treatments pharmacies were used more often. The most important factor according to the ACBC for media choice was where the information could be obtained. Ideally parents received the information trough school or internet when it would be relevant in a short and practical form.

Conclusion: Social media was ineffective in spreading information to parents about head lice with the aim to change preventive behavior. Parents clearly preferred the current method of receiving information from schools. The predicted choice probability that was produced using the results from the ACBC showed that alternative solutions existed. Incorporating information from the guidelines into Wikipedia and an internet "head lice radar" application showed promise. Alternatively for head lice information municipal health services could adapt different social media strategies but "single topic health channels" on social media should be avoided.

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1. Introduction

Due to massive adoption of the internet, information in the field of health and wellness have never been more accessible to the public. In case of sickness, unknown symptoms or for diagnosis the internet is the most important source for health information (Stretcher, 2011). Fifty per cent of the Dutch population consults the internet for health information at least once in a time frame of three months (Centraal Bureau Statistiek, 2011). The municipal health services in the Netherlands, use the convenience and popularity of the internet with their passive websites to supply a wide spectrum of health information to a broad and diverse population (GGD Nederland).

The internet, or more specifically the websites on the World Wide Web, are continuously changing because of technological developments. Therefore the distribution of health information will change with it. One of these information changes is seen in the use of social media. More and more internet users now spend lots of time on social media websites (Pew Internet, 2012). Social media are online platforms on which user generated content can be shared. Facebook, and Twitter are popular and broadly used examples of these participative platforms in which users can read and post different types of content. These changes make the internet a more interactive form of media compared to static websites or other mass media. And brings its users closer together (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Many applications of social media overlap with the definition of e-health, and because of these recent changes in the provision of information it is highly relevant to e-health as a discipline to investigate the impact and potential of social media in the distribution of health information.

Many companies and organization have already successfully exploited this social media trend by engaging consumers for product marketing purposes (Schein, Wilson, & Keelan, 2011). Since they are successful in marketing because of a financial incentive it is also possible that it can be used in other marketing purposes like health promotion. Marketing, social marketing and health promotion share a common goal: changing people's attitudes, and/or modify or eliminate certain behaviours and decisions. Health promotion is an important part of health communication as it involves attempts to persuade an individual to change their behavior (Kaplan & Haenlein, 2011). Though social marketing is different from health promotion because it is generally more difficult to achieve change concerning health related topics (Delaney, Lough, Whelan, & Cameron, 2004).

The use and effect of social media in changing health behaviour is still unclear. Organizations that are involved in health communication and use it to improve public health are in the dark how they can deploy and use social media effectively and make sure that both individuals and professionals benefit from the use of social media (Kaplan & Haenlein, Users of the world, unite! The challenges and oppertunities of Social Media, 2009). To assess the use and effect of social media in health communication, head lice prevention in the Netherlands is used in this research as a study case. A social media intervention is created to observe the effect of this new communication tool on the health behaviour of parent’s.

2. Theoretical concepts

In the theoretical framework we will focus on the different aspects of health communication and how it can be effective in the context of social media. These theoretical concepts are then used illustrate a practical example using a case study. In the case study health communication about head lice prevention is used to learn more about the use and effect of social media.

2.1 Health Communication

Health communication is a very broad and multidisciplinary concept that incorporates many different work fields (Schiavo, 2007). Professionals from the field of e.g. medicine, sociology, psychology, public health and communication all work together for national and regional organizations to provide individuals with up to date and evidence based health information. According to Ratzan et al. the definition of health communication is “the art of informing, influencing, and motivating individual, institutional, and public audiences about health issues through planned learning experiences based on sound theories. The scope of this communication is to improve the disease prevention, health promotion, health care policy, and the business of healthcare as well as enhancement of the quality of life and health of individuals within the community” (Joint Committee on Terminology, 2001; Ratzan, 1994).

In practice everyone is confronted with different forms of health communication e.g. when choosing a health insurance package, reading leaflets that come with a medicine or talking face to face with a general practitioner or medical expert. Health communication is essentially the translation and distribution of health messages by experts in the medical and public health field to the people who can be helped by these messages. Individuals can consult different media channels to consume health information and acquire knowledge and skills to improve their health decisions. This is also called health education. When this information is actively advocated and promoted to the audience it is a form of health promotion that, in it’s turn, is related to social marketing. For health promotion the target is to enable people to increase control over their health and its determinants, and thereby improve their personal, and essentially public health in general (Participants at the 6th global conference on health promotion, 2005). The essential difference between health promotion and health education is that people targeted by health promotion are likely unaware of the health problem that is promoted. Because health communication is often provided by governmental or tax subsidized institutes its presence is related to public policy.

2.1.2 Effective Health Communication

The effectiveness of a health communication program or campaigns can be evaluated by measuring the impact on improving the quality of life or the reduction of adverse effects on individuals (Bennett & Glasgow, 2009). To increase effectiveness and success of health communication programs several attributes have to be considered. When launching such a program, organizations should consider how they want to inform, influence and motivate individuals. The World Health Organization (WHO) specified accuracy, availability, balance, consistency, cultural competence, repetition, timeliness and understandability as attributes to consider in a health program (Table 1).

Table 1. Attributes that influence effectiveness of health communication (United States Department of Health and Human Services, 2000).

Attribute	Description
Accuracy, Evidence Based and Reliability	The content is valid, without errors of fact, interpretation or judgment. Using relevant scientific literature that is credible and up-to-date.
Availability and reach	Delivered or placed so it is accessible for the audience and also reaches this audience.
Balance	Clear presentation of benefits and risks.
Consistency	Internally consistent over time.
Cultural Competence	Accessible to everyone and accounting for minorities (ethnicity but also education and income).
Repetition	Delivery and access is continued over time.
Timeliness	Supply information when there is a high demand.
Understandability	Language and reading is appropriate for the specific audience.

To be able to understand and interpret the scientific evidence that forms the basis of valid material, a certain professional and literacy level is needed. The professionals in the field are challenged to effectively translate this scientific knowledge and reach the individuals that are at risk, and lack sufficient knowledge on the topic of the information (Schiavo, 2007). This form of transforming and adjusting health information to an appropriate level of health literacy to reach and influence a specific audience is the essence of effective health communication (CDC, 2009). For health promotion to be effective a behavior change on the individual level must be accomplished. In a limited selection of health issues, on-line and off-line health related educative and promotional interventions have succeeded in an effective behavioral change resulting in an improved quality of life or reduction of incidence (Hutchinson & Wheeler, 2006; Bennett & Glasgow, 2009). But as these programs are preventive measures, the actual cost-effectiveness is debatable (Public Health Association of Australia, 2010).

The attributes from the WHO for effective health communication are aimed at the sending or organizational point of view to optimize a health campaign. These attributes do not incorporate the context at the receiving end or the individual. This is relevant because of the fact that individuals not only need access to health information, but also need to change their behavior by taking up, use and execute the information provided. To better understand behavioral change these additional factors and the context of the individuals need to be considered. These factors

are mentioned in the health belief model (Figure 1). This model shows that every individual has different perceptions about health conditions, and with this purpose it is adapted for health communication programs (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004). The influences on an individual from their context are further specified in this model to individual perceptions, modifying factors, likelihood of action and self-efficacy.
In case of prevention professionals want to improve the health behavior and motivate individuals to take recommended preventive health actions. Using communication and promotion to intentionally modify the behavior with use of valid facts, for example from the guidelines produced by official or appointed institutes. These perceptions can be adjusted to evidence based information ruling out ineffective measures. So by communicating evidence based information about health problems, preventive behavior of individuals and even societies can be improved (McLeroy, Simons-Morton, & Wendel, 2012).

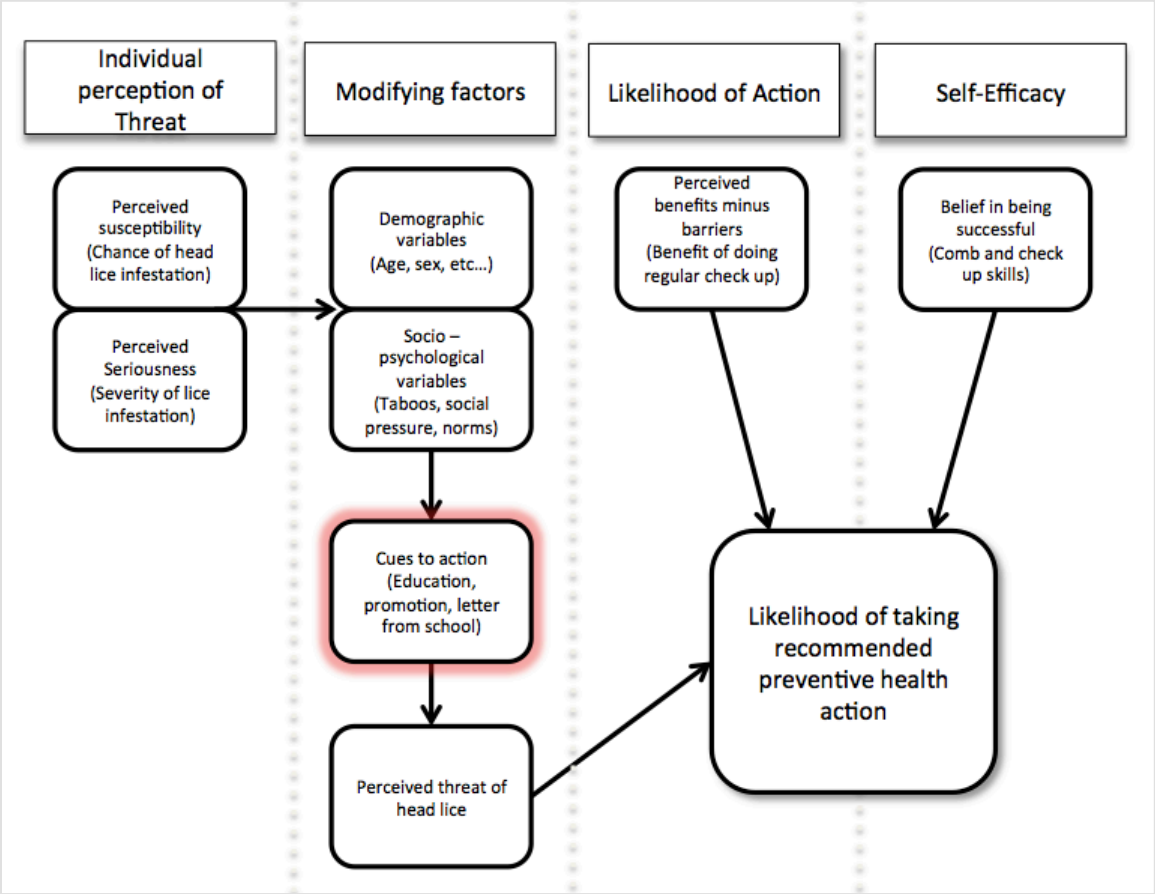

Figure 1. Health belief model (HBM) (Glanz, Rimer, & Lewis, 2002) displaying the factors that influence the likelihood of people take recommended preventive actions. With the use of education and promotion perceptions and believes can be influenced. Head lice infestations are used as an example.

To positively change health behavior concerning a certain health topic professionals, use different ways to educate and promote behavior based on evidence. Education can increase self-efficacy and our perceptions of susceptibility, seriousness, benefits and barriers affecting the likelihood of taking recommended preventive action or behavior. Important in health promotion are the cues to action. These are the incentives needed to encourage people to

execute their know-how. Some people are more sensitive to certain messages, media or information then others and to effectively reach individuals and trigger behavioral change. Therefor public health professionals should consider the medium and the form of the messages they send out in their health communication programs.

2.1.3 Media richness and media choice

When health professionals want to reach their audience with a specific message they can choose between many different tools and channels to achieve their goal. Mass media is a popular channel to reach a large audience and try to improve their health behavior by modifying and shaping behavior. To effectively reach the targeted audiences health promotion and communication activities should reflect audiences preferred formats, channels, and contexts (United States Department of Health and Human Services, 2000). This means that for effective communication the preferences of information from the audience should match to the channels in which the health information is supplied. The internet (world wide web), television and newspapers are different types of mass media and when launching a health campaign the chosen media should match the channel that is preferred by the targeted audience. Obvious channels for health related channels are doctors and other health professionals. But from a user perspective this is not the most accessible or convenient way to obtain information. And as the media choice of individuals is not always made deliberately and can be affected by an inner drive or impulse including habitual and even addictive media choices more popular forms of media are often used for health information (Hartman, 2009).

As an alternative to direct communication with doctors, health professionals can use the popularity of mass media by presenting information via these channels. Because of their popularity mass media have a large reach but with a tendency to be less effective in changing attitudes and behavior. Mass media are less effective in transferring messages to the receiving end because they lack direct interpersonal contact or higher social presence (Cassell, Jackson, & Cheuvront, 1998). The way media are capable to reproduce a message sent over it is also called media richness, and it can be measured by looking at immediacy of feedback, multiplicity of media cues, natural language and personal focus (Dennis & Kinney, 1998). Face to face communication, e.g. with a doctor, is the richest medium whereas unaddressed documents like bulk mail are the leanest media.

Because of the rapid development and diversity of web based applications the media richness of internet has dramatically increased. Interactive applications on websites like real time text based chat or even face-to-face video chat are possible, whereas a decennium ago websites only existed out of static text and pictures. Because of these developments high media richness and a large reach have never been so accessible. This combination can be very useful in case of promotion in general but also health communication were richer media can be more persuasive for people making them more likely to execute the goal of the message. This way complicated health messages that need more intensive support to induce behavior change can be spread trough mass media. Combining effectiveness with the potential to reach individuals that had otherwise not been reached (Metzler, Sanders, Rusby, & Crowley, 2012). An example of this increase in media richness in websites is seen in social media.

2.2 Internet and social media in health communication

The internet has always been a convenient and open source for educational material and information on many topics. More then half of the people in the Netherlands consult the internet to look up health information in a time frame of three months (Centraal Bureau Statistiek, 2011). In case of health information the internet is most often used for reassurance, obtain information when having a health problem or before and after a visit to the doctor (Andreassen, et al., 2007). Before this broad adoption of the internet people obtained health information from their personal or close environment. People rely on web based search engines that allow easy access to webpages from all around the world containing the topic of interest (Eysenbach, 2002). In addition to static websites, there is an on going transition to more interactive websites called social media and are also referred to as the "new media". Social media changes the internet as a static source of health information to a more dynamic form of health communication. On its turn the transition from traditional communication using new communication technologies is connected to the field of e-health (Electronic Health).

Social media are a collection of internet based applications that strive on the creation and exchange of user generated content (Kaplan & Haenlein, Users of the world, unite! The challenges and oppertunities of Social Media, 2009). User generated content (UGC) refers to different kinds of media content created and published by amateurs. The material should at least be publicized in some context, rely on the value of creative effort, and typically the creation should be without the expectation of remuneration (selfless) (Organisation for Economic Co-operation and Development , 2007). Examples of applications where UGC is created are forums, wikis (encyclopaedia), weblogs and social network sites. Some forms of social media, like the Usenet and forums, originate from the beginning of the internet and stand for the essence of internet; sharing of knowledge. Social media has become wide spread and usage is increasing dramatically, changing the internet by giving UGC a more prominent role (Kaplan & Haenlein, 2009; Pew Internet, 2012).

The field of e-health covers the combination of communication, health and social media. Eysenbach defined e-health as "an intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies. In a broader sense, the term characterises a technical development but also a state-of-mind, a way of thinking, an attitude, a commitment to improve health care locally, regionally and worldwide by using information and communication technology" (Eysenbach, What is e-health?, 2001). According to this definition the transition from static health information on websites to interacting about health related topics trough social media and networks like Facebook and Twitter are at the core of e-health.

2.3 Possibilities and limitations of social media in Health Communication

With the introduction of social media websites, online information moves from a static source to a communication channel. This upcoming form of communication will possibly affect health communication and influence the effectiveness of internet health communication. In this section we discuss the potential possibilities and limitations that are put in to motion by communicating with the use of social media. The focus lies on the change from static websites to social media.

In health communication the reliability of information is important for the reader. Readers need to know what the source of the information is and that it is based on scientific evidence. Static websites often lack references to sources of information making the interpretation of the information difficult for individuals. This leaves space for conflict of interests for companies,

organizations or persons that can easily publish information online (Risk & Dzenowagis, 2001). The lack of quality in information is even more serious when concerning topics like people's health and wellbeing (Youngh, 2011). For static websites initiatives like Health on the Net (HON-code) were launched to introduce a form of quality control (Health on the Net Foundation, 2011). Social media decentralizes the sources of information even more making the quality of the information on this websites vary (Schein, Wilson, & Keelan, 2011). These conflicts of interest and other sources of erroneous information effect health communication on social media (Youngh, 2011). Errors in information can then reach the public and can have a negative effect on the health decisions of individuals, as was seen with a case of HPV vaccination promotion (ComBat, 2010). In addition, regulations for healthcare marketing are strict compared to other markets. Unmonitored alternatives for communication are sensitive to attract companies that use these new channels for marketing and reach the public. These biased sources of information can work manipulative on the people that are not aware of the fact that some information is aimed at a financial benefit instead of a public or health benefit (iCrossing, 2008; Pew Internet, 2009). This is not a problem for everyone, typically the public is aware of this marketing bias in information and takes the source of information in consideration. In general individuals are more likely to listen to established sources like doctors or even friends and family over sources they do not know (Pew Internet, 2009). Health professionals, in any field, are affected by erroneous information in their work because their expert opinion can differ from the information an individual collected on a health topic. The health professional should respond by collaborating with the public in obtaining and analyzing the inconsistencies within the information or guide individuals to reliable websites with health information and try to increase internet health literacy (McMullan, 2006). The use of information based on valid user experiences cannot only improve the quality of information but can also improve the collaboration between professionals and the public in need of information. On its turn this can lead to the improvement of the accessibility of information; aggregation of information and induce collaboration between stakeholders (Keckley, 2010).

The availability and reach of social media is increasing, yet still limited. In the Netherlands 94 per cent of the population has access to the internet, meaning that access is already restricted to 6 per cent of the population (Centraal Bureau Statistiek, 2011). Based on numbers from Comscore Inc. in the Netherlands social media is used by 40% of the total population, but usage is significantly higher in the age category below 18 years (Oosterveer, 2012). The time spend on social media is spread over a diverse amount of websites and varies on average between half an hour per month for Twitter to 3 to 4.5 hour per month on Facebook (Pew Internet, 2009; Oosterveer, 2012). Not all internet users are interested or familiar with social media websites. The main reason or attraction for people to join social media websites is because it is a primary human need of people to belong and to present themselves (Nadkami & Hofmann, 2012). The personal uses identified for social media in health information are emotional support, motivation, accountability, and advice. But it is shown that people do not often use social media or social networking websites for these activities, reaching only small amount of all the users that are looking for health information trough social media (Newman, Lauterbach, Munson, Resnick, & Morris, "It's not that I don't have problems, I'm just not putting them on Facebook": Challenges and Opportunities in Using Online Social Networks for Health, 2011). In case of health issues that effect the general public or larger populations, sharing of information can reach a lot of people in a short time. These flows of information can even be used in guarding public health or political agenda setting (Eysenbach, 2011). Explosive spreading of specific message or material is called virality (ComBat, 2010). Because people spend more and more time on social media

and usage is getting more interwoven in everyday usage all kinds of topics are being discussed on these networks. This way social media might attract users to discuss and communicate about different health topics. Making them attractive broadcast platforms for organizations and companies (Newman, Lauterbach, Munson, Resnick, & Morris, 2011). A more practical change in accessibility for users is the ability to use social media "on the go" with a mobile device like a tablet or mobile (smart) phone. Larger social media websites like Facebook and Twitter create special applications for these devices or mobile versions of their websites allowing users more flexibility in where and when they want to use these services (CDC, 2012).

As we look at balance opinions and experiences of other individuals are very valuable for professionals and individuals looking for health information. Especially when looking for specified or personal tailored information (Pew Internet, 2009). There are even special social networks aimed at exchange of information about health experiences during disease (Patientslikeme.com, 2012). Sharing of personal experiences increases openness and transparency of information and improving the balance of information (Dawes, 2010). In open social networks this sharing of experiences can also lead to social support and better understanding of the disease by others (Keckley, 2010). Differences in these users experiences can lead to inconsistent information, but if risks and benefits are presented clearly, individuals can use these experiences for their specific health decisions.

With the use of social media the public can interact with and engage on the supplied information by asking questions, or adding information. This tailoring of information makes specific information available when and where individuals want it. Due this direct interaction the expertise of the professionals can be accessed and addressed more easily. Using open conversations these questions and their answers are also visible to the other direct stakeholders aggregating the information and creating collaboration. In one on one contact this information would not be public accessible and not be of value to other individuals or stakeholders. Using social media one-to-one communication will be replaced by one-to-many or even many-to-many (Kaplan & Haenlein, 2009). This enrichment of health communication is capable of improving the health care in general (Desphande & Jadad, 2009).

Table 2. Potential effect of social media on the provision of public health information.

Attribute	Possibilities	Limitations
Accuracy, Evidence Based and Reliability	Direct exchange of user experiences and information aggregation, openness of information (Keckley, 2010).	Individual experiences incorporate people's personal opinions, possible commercial or intentional bias and sources harder to verify (Eysenbach, Powell, Kuss, & Sa, 2002; iCrossing, 2008; Youngh, 2011).
Availability and reach	Mobile access, sharing and spreading of information (virality) (GGD Nederland, NSPOH, 2011)	Limited number of users of social media, reduced anonymity because of registration (Oosterveer, 2012; Newman, Lauterbach, Munson, Resnick, & Morris, 2011).
Balance	User experiences can increase balance in information (Keckley, 2010).	Bias in user experiences, e.g. only one group of users posts their experiences, decreases balance.

Consistency	Changes and news can be announced via a push system (CDC, 2012).	Conflicts of interest and opinion can give inconsistencies (Eysenbach, Powell, Kuss, & Sa, 2002).
Cultural Competence	Tailoring of answers to specific the level of an individual questions (leveling) (Keckley, 2010).	Social media usage is a new technology. Not everybody is interested or motivated to use these methods of communication.
Repetition	Personalizing news and information to your interests creates an attractive broadcasting platform that is consulted on regular basis (Oosterveer, 2012; Kaplan & Haenlein, 2009).	Users might not like the idea to be reminded of certain health items all the time.
Timeliness	Information in demand or that is relevant to your environment can be shared easily, highly scalable, regular updates, social support when needed (McNab, 2009; Kaplan & Haenlein, 2009).	When in actual need of information users still need to use traditional search functions. Tailoring of information via social media needs to be performed by another user; requiring human resources.
Understandability	Brand or organizations are matched to the level of an individual (CDC, 2009). Social media websites generally have good usability.	Limited publishing space for information, social media websites can be difficult for new (internet) users (CDC, 2012).

Potential down sides in effectiveness of social media over static websites are, but not limited to; quality control, conflicts of interest, limited publishing space, limited reach, anonymity and usability issues for (new) users. Potential upsides of social media are, but not limited to; improved mobile access, tailoring, push, centralization and customization of information, sharing, scalability, social support and levelling of professional brands and organizations with individuals.

2.3.1 Facebook and Twitter from a business and health communicative perspective

Because the audience of Facebook and Twitter is very large, the main focuses of the published research lies on how to use this media for commercial and marketing purposes (Kaplan & Haenlein, 2009). There are many of success stories of companies using social media strategies for marketing their brand and products (Mershon, 2011). But social media does not only have possibilities for commercial marketing but also for health communication and social marketing (Table 2). For health promotion and communication several campaigns have already been described in the literature (Schein, Wilson, & Keelan, 2011; Korda, 2011). Provisionally concluding that social media can improve the reach and promote campaign messages and activities but also improve loyalty, trust and confidence in the supply of information. The effect of health campaigns on health behavior has already been tested for promoting condom use and physical activity. In these campaigns no significant long-term effects were measured (Bull, Levine, Black, Schmiege, & Santelli, 2012; Cavallo, Tate, Ries, Brown, Devellis, & Ammerman, 2012).

Organizations involved in the public health can reach their audience by being present and broadcast information using social media as an organization. In that case professionals can supplement or overrule possible erroneous information that is spread by other users. Giving social media users an alternative to find evidence based information from recognized organizations instead of the possible erroneous information (Youngh, 2011). A credible source is often preferred when individuals look for health information online (Eysenbach, 2002; Pew Internet, 2009). In addition social media gives the opportunity to replace their website with a web service; enabling more direct interaction, connection and engagement with the public. These changes benefit individuals because there is possibility to interact with organizations on a personal level trough a single channel and receive answers to their specific questions. This form of personalization is called tailoring of health information. Using static websites the tailoring of information very hard to achieve. These possibilities of social media are not yet used extensively by public health organizations like the GGD's (Municipal health services – Gemeentelijke gezondheids dienst) (GGD Nederland, NSPOH, 2011; Thackeray, Neiger, Smith, & Wagenen, 2012). Other health related organizations including hospitals, the pharmaceutical industry, insurers and patient organizations have already succeeded using social media to interact with their stakeholders (iCrossing, 2008).

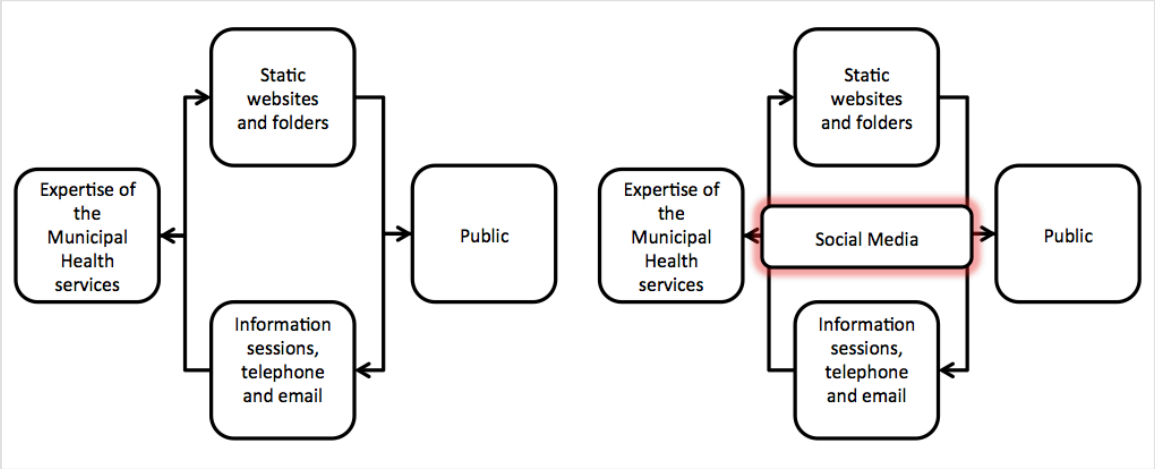

Figure 2. Schematic overview of changes in traditional communication of the left, and communication via social media on the right. Social media serves as two-way many to many platform. Social media essentially acts as a webservice instead of website (Bennett & Glasgow, 2009).

This change of the transmission factor in communication affects the way the public should be contacted and should be involved into the communication strategy. This includes the actual health topics that are addressed, its formulation and the way they are translated or encoded into a message and made ready for publication. For health messages it is important that the source is prominently displayed, as this is an important factor people use to value the information (Stroever, Mackert, McAlister, & Hoelscher, 2011). Messages can be formulated in many forms on social media. They are most effective when the health message is embedded in a lifestyle item, as a contest or purely health based facts (Jordan, 2012). Because there are many small differences in the usage of social media it is important that communication strategies include all the in and outs of these websites and how the messages are displayed to the end users.

2.3.2 Facebook

Facebook was created in 2004 as a social network for Harvard students and became a public website in 2006. Currently an age restriction of 13 years an older and a valid email address are required to sign up (Carsson, 2010). Since the website has gone public it has grown to the most popular social network online with more then 900 million people logging in monthly (Linley, 2012; Oosterveer, 2012). The main function of Facebook is to create an online social network with other users and share personal information and other content with your network. The user profile is called a “Timeline” which is a graphical presentation of the users activity in a chronological order.

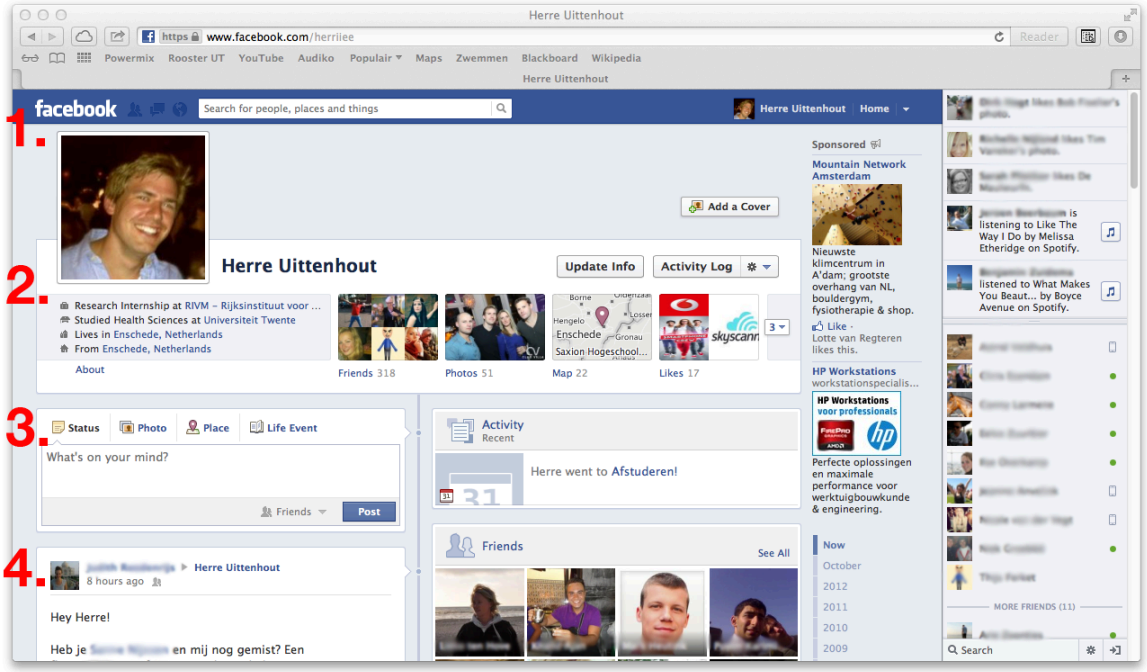

Figure 3. (1) On the top a notification bar, search field and option menu. (2) User information, personal interests (“likes”), contact information and personal information are prominently shown above the timeline. (3) In the update status field users can share their content. (4) The activity overview is a personal timeline; all content the user uploaded or is connected to the user is chronologically displayed here.

Another view is called the “News Feed”. This is a stream of all the information from other users you have access to (mostly updates from friends) in combination with other “likes” of their interest (e.g.; movies, celebrities, organizations and brands). The news feed can be seen as a personalized overview of information.

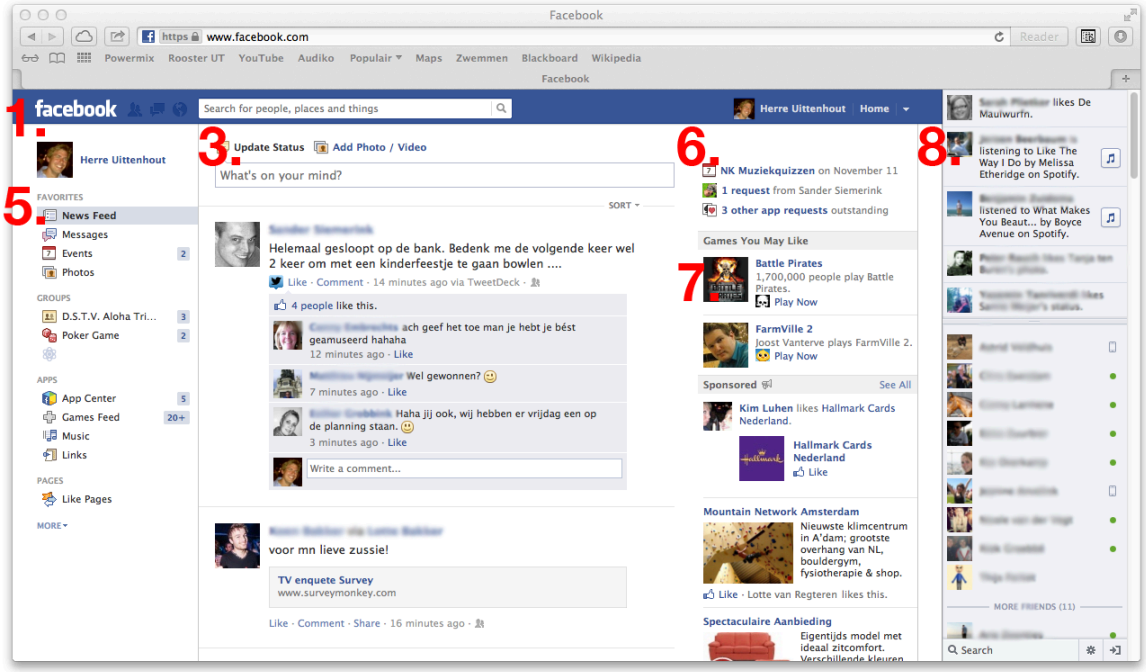

Figure 4. (1 and 3) The Facebook news feed gives an overview of the information other people share. The same top bar and status update field as in figure 3 are seen in the newsfeed. (5) The side bar shows an option to switch between newsfeed (currently active), private massages, upcoming events, groups in which you participate, automatic generated groups (friend circles) and apps you use. (6) The right side bar shows events, outstanding requests (7) and advertisements in the form of sponsored likes. (8) There is a sidebar that displays current activity and an area that shows online contacts enabling quick access to direct chat functionality.

Facebook is capable to apply an algorithm to the news feed that uses several factors, including: how many friends are commenting on a certain piece of content, who posted the content (e.g. family or close friends), and what type of content it is (e.g. photo, video, or status update) bumping interesting stories to the top of your news feed (Cohen, 2011). Interaction is possible on all content from other users trough liking, commenting, tagging or sharing. Liking content essentially means that you give content your approval and shows your interest whereas tagging means that it is linked to someone's profile. Sharing completely copies a post to your own time line. There are also more closed options to communicate like the private (video) chat or create and post in private groups. Because Facebook relies so heavily on personal information, extensive privacy options are available. Making it easier to differentiate between public, friends of friends, friends only and even specific friends only. Facebook as a company will still be able to access this information, in combination with so called "like" buttons and comment plugins on other websites Facebook possesses large amounts of personal information about its users. This information can be used to target the public for specific advertisements, which is also the main business model of Facebook (Richmond, 2011).

2.3.3 Twitter

Twitter is an online microblog with social network functions. Users of this microblog can send and read 140 character long text based messages (Tweets). It was created in 2006 as an online “short message service (SMS) replacement” and as of 2012 it has over 500 million users, of which 140 million active, generating 300 million tweets per day (Wasserman, 2012). It is the third biggest online community worldwide. Microblogs are a spin-off from weblogs that are online discussion or information websites that show new postings in chronological order. These weblogs are typically run by one person, and reflect their interests or contain stories of what they are or were doing. This formula is the same for Twitter only with limiting publishing space. People are able to subscribe and follow other blogs of interest. Twitter is then capable to suggest other users with the same interests broadening your news feed. Because of the small size of microblogs Twitter is seen as more accessible then weblogs, partly explaining its popularity.

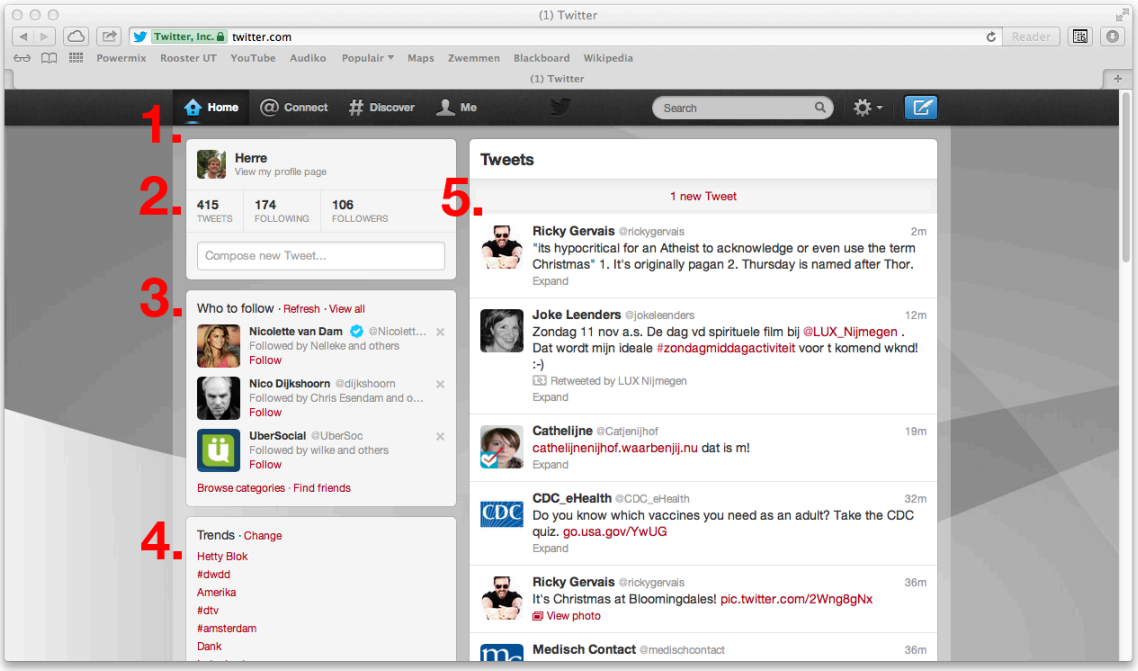

Figure 5. Overview of Twitter (Home). (1) In the status bar you can switch to a view were you can connect and discover to broaden your network, perform a search (user or topic of interest), update your profile and a tweet compose button. (2) An overview of your account is given with the amount of tweets you posted, following and followers. (3) Who to follow shows users that are followed by people that match to your network. (4) Trends show current trending topics, this are currently the most tweeted words, often users use a hash tag (#) to add a topic to a post. (5) The actual tweets of the users followed are shown in the timeline. Here you can read, retweet or favourite tweets.

Interaction trough twitter happens by mentioning someone, this is done by adding an “@” before a user name in a new tweet. You can also assign a topic to a tweet by adding an “#” before the actual topic, this is purely. The last option to interact is by sending personal messages; this can only be done when users follow each other. Privacy options are limited to locking your profile to users you accept or complete public access. Retweeting will copy a tweet and publish it, with

reference, under your name. This will extend the exposure of a tweet to more followers. The business model behind twitter are advertisements; by adding promotional tweets that stick to the top of your timeline or promoting “who to follow” companies or organization can bring their accounts and messages under the attention of twitter users.

2.4 Research aim and questions

From the literature we can conclude that social media can benefit marketing of brands and products, and that social media has the potential to improve health communication by lifting barriers present in other ways of communication and media. All tough there is evidence that social media is not effective in changing sexual and physical health behaviour it is still unclear why that is and if this is the case for other topics. Health communication about common head lice will be used as an instrumental case study. The main research question that arises is formulated as following:

- *What is the use and effect of social media in health communication about common head lice?*

2.4.1 Study Objectives

To answer and elaborate on the main question the following study objectives are added.

- *Assess the perceptions and media choice of parents about head lice prevention using an online questionnaire.*
- *Assess if there is a need under parents for additional information source supplying online feedback by logging the usage (data) of the social media case study channels.*
- *Assess the barriers and benefits in using social media for both the professionals and the parents with qualitative interviews.*

With the results an advice is given to the RIVM (Rijksinstituut voor Volksgezondheid en Milieu - The National Institute for Public Health and the Environment) and the GGD’s (Dutch municipal health services) about their social media strategy. This case study will be used to explore and illustrate the effect of social media. Common head lice is chosen as a topic because it is relevant to the RIVM and municipal health services as it falls under their jurisdiction. Both organizations are involved in the monitoring, prevention and provision of information about common head lice.

2.5 Case study: Head Lice prevention in the Netherlands

Head lice infestations regularly occur in primary schools, and seem to be a never-ending story (Feldmeier, 2012). Because head lice infestations do not cause any serious complications, there is no necessity for professional care. The burden of care and treatment is therefor transferred to individuals that mostly do not have any medical background or medical knowledge (Frankowski & Bocchini, 2010). The addition of social media in this information stream will be used to assess the need and the effect of social media.

2.5.1 Head lice

Head lice (*pediculus humanus capitis*) are parasites that colonize on the hair and on the skin of humans, particularly on the scalp and neck. Head lice feed with blood several times a day via hematophagy; this is also the main cause of the itching and irritation of a head lice infestation. Head lice reproduce by attaching their eggs (nits) to the hairs close to the scalp. No other transmission routes other then direct human hair contact have been scientifically reported as sources of transmission. Children have more physical contact, and therefore more direct hair-to-hair contact, inducing the spread of head lice infestations between children. Because of this higher incidence at low age (4 to 12 years) primary schools are often burdened with head lice infestations. There are no exact numbers on the incidence of head lice. In an unpublished study that was commissioned by the LSH (Landelijk Steunpunt hoofdluis - National Fulcrum Head lice) it is stated that schools are confronted with head lice at least once a year (KoreBusiness, 2009). The safest way to treat head lice infestations is by combing on daily basis for two weeks with a special lice comb. Daily combing for two weeks is needed to make sure newborn head lice are also removed and exclude reoccurrence. Combing of hair is a time consuming treatment that requires discipline of both infested and treating person. Combing in combination with a treatment involving dimethicon, malathion or permetrine solution are also effective. There are some known cases of head lice that show resistance to the pesticides malathion or permetrine (LCI, 2011).

2.5.2 The National Institute for Public Health and the Environment and common head lice

The RIVM (The National Institute for Public Health and the Environment) is an independent institute that is commissioned by the Dutch ministry of Health, Welfare and Sport. The RIVM performs research and collects knowledge that is generated worldwide to inform the policy makers within the ministries, that strives to improve the general public health. The supply of valid of information about head lice infestations is covered by the department of LCI (Landelijk Coordinatie Centrum Infectieziekten - National Coordination Centre for Outbreak Management). The LCI is part of Cib (Centrum for infectieziektebestrijding - Centre of Infectious Disease Control) that is responsible for the infection disease control according to Public Health Law article 1-aa (Wet publieke gezondheid). The guidelines produced by the LCI for health promotion and health education purposes are open for the public. Because these guidelines come from an independent institute that interprets and judges the existing scientific literature and knowledge it delivers bias free, accurate, evidence based background information (RIVM, 2012). By distributing this information trough the internet, or via a printed version that is updated yearly, local organizations have an up to date guideline to rely on, and spread this information further to inform the public. Thus by creating guidelines and tool kits that are based on scientific literature the LCI acts as an accessible source to the current knowledge on head lice. In this way the LCI addresses uncertainties of infection diseases matters by correcting for misinformation that is not based on scientific evidence (Figure 6).

The guideline is based on a standard format for infectious disease. The format addresses background information, the disease, diagnostics, contamination, disinfection, distribution, treatment, primary prevention, what to do when a case is reported and other activities in case of head lice infestation. The guideline is an enumeration of facts that needs to be translated to accessible material with additional practical information to make it useful for a specific targeted audience. In case of head lice the RIVM made a folder for parents (RIVM) and translated the guidelines to a main message; Lice in your hair? Comb! (Luizen in je haar? Kammen maar). In

essence this message tells people that to get rid of head lice in a safe and cost effective way they need to comb daily with a special lice and nit comb for a period of two weeks. To prevent head lice people are advised to comb and check preventively by checking for nits or head lice although there aren't any direct complaints. Preventive combing should be done in a larger scale and regular basis (e.g. after holidays in schools) or by parents on a small scale when a case of head lice has been signalled.
The LCI plays an active role in health communication when an extensive explanation is needed or when receiving signals of changes or developments concerning infections (LCI, 2011). The function of this information spread and promotion essentially should change the health-related behavior of the Dutch residents. By influencing the knowledge, motivation and skill a change in the health-related behavior can be accomplished (McLeroy, Simons-Morton, & Wendel, 2012). Actively promoting evidence-based information produced by the LCI the execution of unnecessary and ineffective health behaviour is reduced. The more effective the health behaviour of individuals is the more likely it will be that head lice infestations are treated and prevented effectively. This will reduce the nuisance of head lice infestations and generally increase public health (Feldmeier, 2012).

2.5.3 The municipal health services and common head lice

The coordination to reduce head lice nuisance on a local level is a task of the GGD's (Dutch municipal health services). The GGDs function under the national Public Health Law as the designated health services of the municipalities. Often the GGDs work for more than one municipality, and cover a complete region. In case of head lice the professional youth healthcare workers act as a distributor and coordinator of information to reduce head lice infestations. The GGDs use the public information produced by the RIVM and aims to make it widely available, reachable, cultural competent, timed and understandable (GGD Nederland). By providing different materials like personal advice, roadmaps, information and organizing thematic meetings to schools individuals are educated in the different aspects concerning head lice infestations. These measures should reduce the nuisance of head lice and result in an improvement of quality of life and public health.
The information is mainly targeted at schools and parents or caregivers. But for preventive measures everyone that comes in contact with youth on a daily basis needs to be educated, including daycares and sport clubs. In practice this implicates everyone since head lice is a matter of public health. As the GGD's provide different materials they also use different media to instruct this broad group. Complementary the standard information folders to be used in schools and pharmacies, GGDs give on location face-to-face training sessions, redirect them to other trustworthy sources of information or have online information websites (GGD Zuid Limburg, 2011; GGD Hollands Midden, 2011; GGD Hollands Noorden, 2011). To a certain level primary schools are responsible for the children's health and safety. Therefor they often work together with GGDs which leads to regular larger-scale inspections by head lice commissions, informing other parents at risk during an infestation and answering specific knowledge questions (Bos & Otter, 2003). The goal of all these different channels is that the direct stakeholders should be able to easily reach and receive valid information in a way that is convenient for the direct stakeholders to realize a health behaviour change.

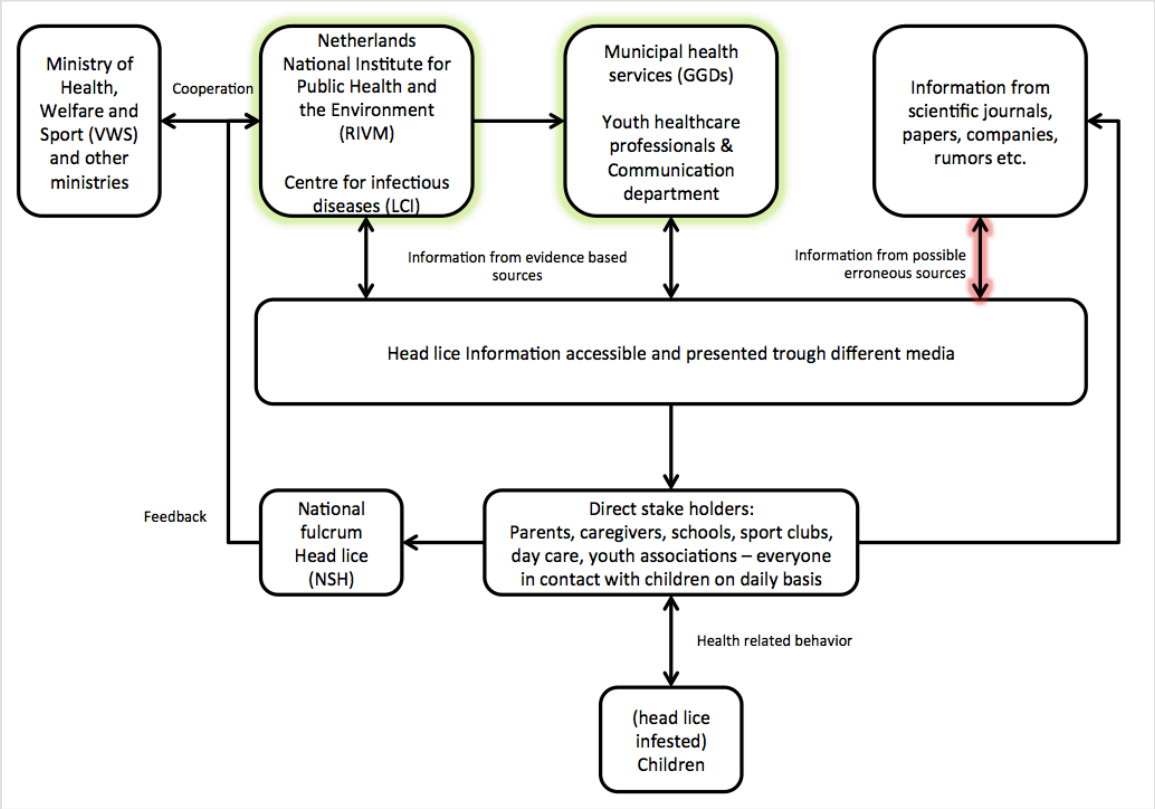

Figure 6. The chain of information between the several institutes and stakeholders. Informing the parents and youth professionals leads to execution of guidelines. The controlled flow of information trough the RIVM and GGDs can be compromised by other sources

3. Methods

In total three methods were used. The first method was a questionnaire used for the assessment of the likeliness that parents will perform measures to prevent head lice and their (social) media preferences for head lice information. This same questionnaire was used in the case study in which a social media intervention about common head lice was created with the aim to measure the impact of social media in a quasi-experimental setting (Figure 7). Data logging was used within this experiment to indicate the popularity and usage of the online intervention. Structured interviews with parents and professionals incorporate qualitative aspects and illustrate the perceptions about head lice. But also if social media can play a role in the information need. Quotes from these interviews were used to highlight barriers and benefits of social media in head lice prevention. Because the three methods use different samples and observational methods they yield different outcomes these topics are treated under different chapters. The results include a measurement of the health belief perceptions of parents about head lice and quantitative data about the preference factors in health communication. The theoretical and practical usage of social media channels about head lice and a summary of the qualitative interviews with parents and professionals.

3.1 Sampling

Parents (age 18-50 with a child in primary school) were recruited using the service of Survey Sample International (SSI). Using the rule of thumb for regular conjoint based studies an n=333 would be suggested. Due to limited resources, and the explorative aim of the study this number was reduced to 150 participants, this is the general minimum for the used form of conjoint analysis (Orne, 2010).

For the case study three municipal health services (GGD) volunteered to participate and create a "head lice" social media channel under their name. Respectively GGD Zuid-Holland Zuid (GGDZL Head lice), GGD Gelderland Midden (GGDGM Head lice) and GGD Hollands Midden (GGDHM Head lice). In this experiment the youth healthcare professionals (JGZ – Jeugd Gezondheids Zorg) that coordinate the head lice prevention contacted a random selection of schools from their region. Initial contact with the school boards was made by email, containing the information about the experiment and included an advertisement either promoting social media or other information sources of the GGD. By randomly assigning schools to promote the different media, half of the parents from the schools received a letter promoting the new social media channels, and the other half of the parents received a letter containing text promoting the regular sources of information; in this case their website. Because there is no harm in additional information over the current sources, the non-participating group was not subordinated. Leaving no ethical issues whatsoever. After two months these schools requested parents to fill in the questionnaires using the same channels as they promoted the head lice information.

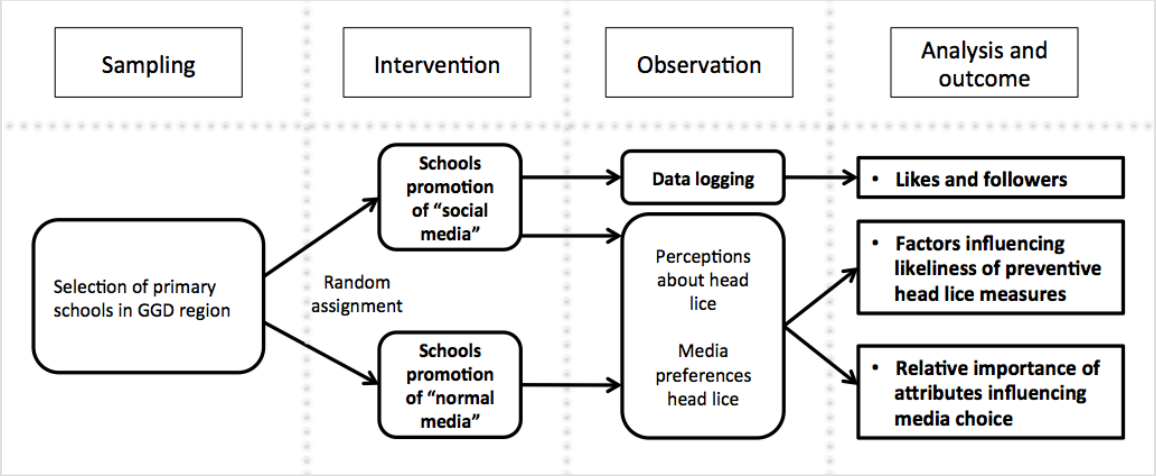

Figure 7. Graphical overview of the quasi-experimental post-test only design.

For the telephone interview a convenience sample of parents was used. People that completed the questionnaire could also opt-in to receive a telephone interview. This sample existed out of people taking care of a child at a primary school and was willing to be interviewed by telephone. In addition to the parents three youth healthcare professionals and two persons that work at the communication department of the municipal health services that participated in the experiment were asked about the use of social media for the GGD.

3.2 Intervention

For the case study a social media channel was made to reach parents and inform them about head lice. The Facebook and Twitter pages were brought under the attention of parent's trough promoting head lice in the digital school newsletters. A standardized promotional text was supplied to the schools to use in their newsletter. Linking to the social media pages and giving instructions how they could be found. Pages were public, meaning that they could also be found trough the regular search function supplied by Twitter or Facebook and via automated systems that bring pages under the attention of other users. For the three GGD's separate publically accessible channels were created (Figure 8 and 9). Static websites were already available and were unaltered. The social media channels were launched with a few general messages and all necessary information, like address and profile pictures, were completed. Updates on a three to four day basis followed and existed out of videos and links to information. All channels gave parents the option to interact with a youth health care worker and for the GGD ZL there was an additional announced office hour with the presence of a youth healthcare worker once a week that allowed direct conversations. The channels were open for comments and interaction with parents was encouraged. The strategy for GGD ZL was more active and supplied more entertainment the strategies for GGD HM and GGD GM were less active and supplied more business-like information.

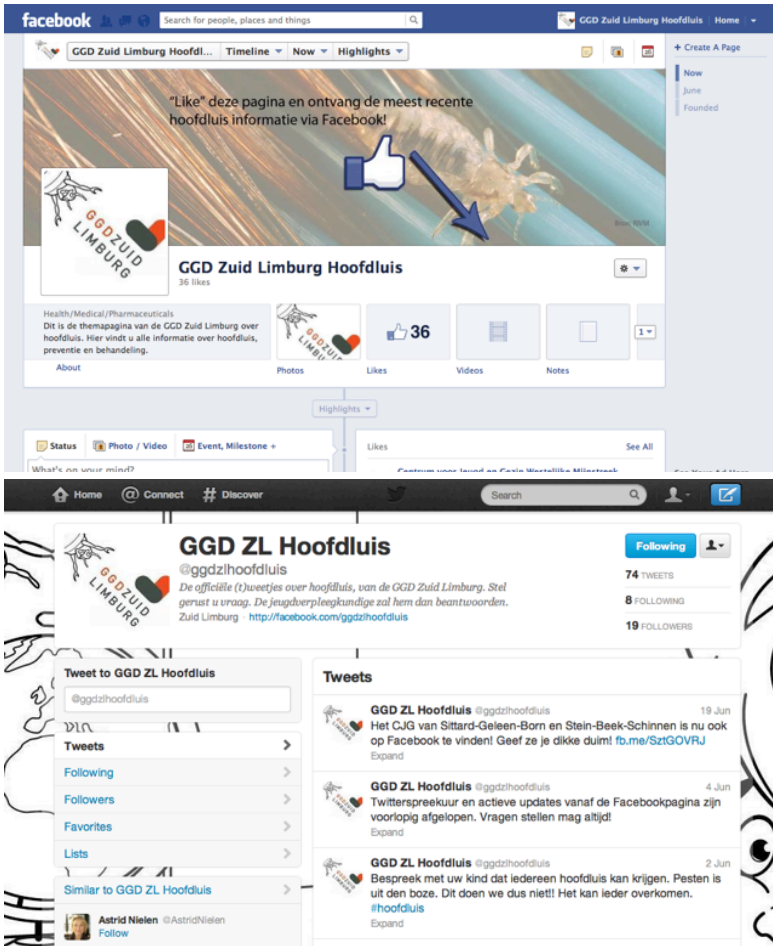

Figure 8. Overview of the GGD Zuid Limburg Hoofdluis Facebook page.

Figure 9. Overview of the GGD Gelderland Midden Hoofdluis page and GGD Hollands Midden.

3.3 Observational methods and outcome measures

3.3.1 Questionnaire and discrete choice analysis

To evaluate media preferences and perceptions about head lice a publically accessible internet questionnaire was created. The socio-demographics of interest are gender, current family situation, education, income and if active in a lice committee. Questions about head lice perceptions are based on the health belief model (HBM). The questionnaire existed out of 50-items total and was developed to assess the study objectives. It contained 16 questions based upon the HBM, and 3 questions about participants' intention to perform preventive head lice check ups. The first portion of the questionnaire existed out of 5-point Likert scaled (1 = strongly agree to 5 = strongly disagree) in the following HBM groups: perceived severity (5 items), perceived susceptibility (3 items), perceived clinical barriers (4 items), perceived accessibility barriers (4 items) and perceived clinical benefit (1 item). The statements were focused on head lice prevention. Two checklist questions assessed participant's cues to action (different media sources e.g. internet, pharmacy or friends) for general information and when having specific questions on head lice removal. A four-point Likert scale (1 = very unlikely to 4 = very likely) was

used for the two questions that directly asked participants about their intention to apply preventive measures in checking and combing of hair to prevent head lice. Also incidence of head lice, social media usage and anonymity preferences were incorporated in the questionnaire.

Descriptive statistics (mean, standard deviation, frequency) were calculated for all variables. Statistics from the CBS were added as a reference. To assess the relationship between demographic variables and health belief model domains with the participants intention to perform preventive head lice measures a regression model was used. To be able to do this logistic regression analysis and calculate the odds ratio, the variable for the intention to perform head lice preventive measures was dichotomized into a likely to perform preventive measures group (very likely and likely) or an unlikely to perform preventive measures group (very unlikely and unlikely). There was no neutral variable as we assumed that all head lice is a wide spread problem and parents had an opinion about the likeliness of their intentions concerning head lice prevention. Odds ratios and 95% confidence intervals were included. The a priori significance level was $p < 0.05$.

In the second portion of the questionnaire an adaptive choice-based conjoint (ACBC) focused on the media choice and media preferences of parents for information about head lice. Choice based conjoint is a widely accepted marketing tool that is used to measure preferences of products or services. This method has never been used in a media choice context. The choice for ACBC over a CBC was made because in addition to media preference also information about critical attributes is obtained. This specific method could also be used on a relative small sample. For the construction of the ACBC the ISPOR checklist was used as a guideline (Bridges, et al., 2011) [Appendix: Table IV]. The ACBC focuses on the preferences in information and communication about head lice between social media, static websites and information on location (folders, leaflets or letters).

The first step for the respondent was the selection of the preferred level for every attribute, called “built your own” (BYO) (Table 3). In the second step 12 choice tasks with varying levels were generated and shown to the respondent (Figure 10). Respondent’s select whether or not they interpret the combinations of the different levels as preferable or not. The combinations were analysed -on the go- to check if respondents have a must have or an unacceptable level in their choices. If in all preferred choices a specific level was present it was tagged as a must have or when in all preferred choices the level was absent it was tagged as an unacceptable. In the next step the tagged “must haves” and “unacceptable” are presented to the respondent and asked to select the two most important and least acceptable levels from the options. Respondents also receive the option to indicate that this is not a must have or unacceptable level. In the last stage two choice tasks are performed. These choice tasks are without the unacceptable and with the must haves to further analyse the preferences in the other levels and attributes. Respondents are forced to choose between two combinations and select the combination they would like the most. These forms of choice tasks that are performed in the ACBC mimic what actual individuals would chose instead of just rating or ranking the several options.

As a result a percentage indicating the importance of an attribute is obtained. Within this value conjoint utilities or part-worth’s are scaled to an arbitrary additive constant within each attribute and are interpreted as interval data. This shows information about the rating of the levels within an attribute (Sawtooth Software, 2010). The attribute and level part worth utilities are calculated with hierarchical Bayes (HB) regression using the statistical capabilities of SSI web software suite (Orme, 2000). In addition to the conjoint analysis the other exercises produce data on the

number of times a levels is selected. These numbers from the BYO configurator are given as well as the number of times a must-have or unacceptable has been selected. As for the analysis of the choice pattern of the respondents the choice count and attribute importance are calculated (Sawtooth Software, 2010).

Based on the effectiveness of health communication "when" and "where" are scaled according to how accessible and available the information are (least accessible to easy accessible). Whereas the "how" is scaled according to information richness (least rich to most rich). To verify these scales a sensitivity analysis is performed. Resembling current information methods and social media to calculate the relative preference of social media. With these questions a pattern in the specific attributes the probability of using a specific medium based on the measured attributes can be defined.

Table 3. Overview of the levels and attributes in the ACBC

Attribute	Level
Where	
	On location; pharmacy or GP's office.
	On location; schools.
	Trough the internet.
	Trough mobile internet.
When	
	Office hours accessible.
	24/7 Accessible.
	Regular updates.
	When relevant.
How	
	Practical information.
	Background information.
	Answers on questions from professionals.
	Answers on questions from parents.

The questionnaire was made using Sawtooth SSI Web System v.8.0.1. Sawtooth software is a data collection tool. This software was used to perform Hierarchical Bayes estimation and to calculate the probability of media choice scenarios. Data from the questionnaire was imported into PASW Statistics 18.0.3 for further statistical analysis.

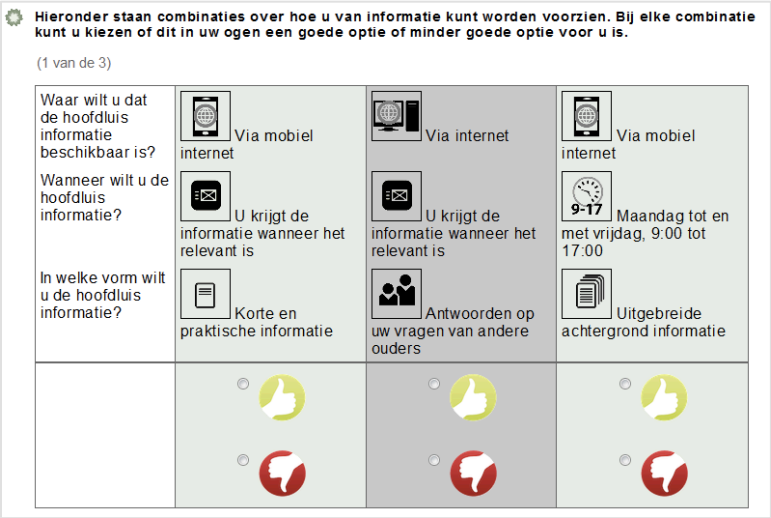

Figure 10. Design of the ACBC choice task. The attributes are shown in the left column, and the levels are generated for every choice task. Choices are illustrated with a graphical icon to make it easier to perform the choice tasks.

3.3.2 Data Logging

Data logging was performed to evaluate the online intervention made on Facebook and Twitter. To learn about the indexing and general functioning of social media, searches are performed on the key words “hoofdluis” (head lice) on Facebook and Twitter. One search was performed with a new account in private modus (not storing cookies or incorporating search histories and other preferences), and one search was performed with the accounts that were used in the experiment.

The content on the static regular website was not changed during the experiment and was saved at the beginning of the experiment as a PDF (Portable Document Format) for later reference. The pages about head lice on Facebook and Twitter, created for this experiment, were logged. On the dynamic websites of Facebook and Twitter data logging included all user-generated comments, like and posts. This data was archived in a digital document for a qualitative review. Activity was quantified for Twitter by registration of the amounts of followers, retweets, replies and personal messages. For Facebook this was the amount of likes, shares, posts and personal messages (Neiger, Thackeray, Wagenen, Hanson, West, & Barnes, 2012). Facebook supplied user statistics for pages with more than thirty likes. With the use of these statistics the average reach of all news items was calculated where possible.

3.3.3 Qualitative interviews

To explore the motives of parents and professionals for using social media qualitative telephone interviews were conducted. Telephone calls were recorded after informing the respondent. In addition to interviewing the parents the project was also evaluated with the participating GGDs using a qualitative evaluation session that focussed on the barriers and benefits of social media in their work. The structured open-ended interview can be found in the [Appendix: Table V]. A

summary of benefits and barriers of social media was made by combining the answers on how they would use social media and their background. The main reoccurring issues related to social media were extracted from this data. This extraction of topics is also known as recursive abstraction. This method was chosen to be able to ratify the discussion and conclusion. Freely translated quotes from the reviews were used to illustrate these reoccurring topics.

4. Results

4.1 Questionnaire and discrete choice analysis

A total of 213 parents, aged between 18 and 50, with a child that participates in primary education completed the online questionnaire. The group of participants obtained trough social media (n=30) and the experiment (n=16) was not seen as representative and was dropped from the study. These responses were only used for explorative purposes and not further analysed. Of the 166 participants obtained from the SSI sample, most participants were in de oldest age group of 39-49 years old (62%). Approximately 58% of participants were female and the majority indicated to be married (67.3%). The most frequent estimated annual income reported was between 25.000 and 50.000 euro (31.3%). Over half of the participants (52%) reported MBO (secondary vocational education) as their highest education level. One third (34%) of the respondents were in contact with head lice in the last three months and in the same period 7% had an actual case of head lice in the family.

In general parents are likely to perform preventive measures, but they are not likely to check themselves for head lice. As for the perceptions parents think that head lice are bad, limiting daily activities and have a chance that it spreads trough the family. When asked to rate head lice versus other types of disease they indicate that they perceive it is worse then the flu, slightly less worse then chickenpox, and less worse then a middle ear infection or pertussis (whooping cough). Parents disagree with the fact that if someone at school has head lice it will easily spread trough the family and that getting head lice is bad for your health. Parents agree with the fact that their families are susceptible for the head lice and that they have a good idea about the risk of getting head lice. Of the asked clinical barriers the only barrier seen by parents is that regular treatment with anti-head lice shampoo is bad for head and hair. Regular preventive combing is not seen as a health risk or bad for head and hair. For the accessibility barriers only the fact that shampoo is expensive is agreed upon. Checking for head lice is not seen as time consuming or perceived as difficult, the support for the fact that regular check ups will reduce the chance of head lice infestations is only slightly agreed upon. No relevant significant indicators were found in the perceptions about the parent's likeliness to perform preventive measures.

Only one significant factor was found in the demographics that relates to the likeliness of preventive measures is a higher income (OR = 3.36 [1.02 – 11.05]). The same relation is observed with people in higher educational groups (OR = 4.87 [0.89 – 26.42]). These groups are less likely to proceed with preventive measures. This phenomenon can be explained by the fact that high-income families have less time compared to low-income families. This is supported by the fact that time is seen as a clinical barrier more often for high-income respondents (OR = 1.50 [0.61 – 3.68]).

As cues to action respondents were asked what information channels they used or would have used in case of general head lice information and when they had specific questions how to get

rid of head lice. A preference was shown for obtaining information from pharmacy's, schools, internet, family, friends and professionals. For specific treatment questions we see a shift from schools to pharmacies as preferred information channel. When comparing the groups versus the rest of the respondents that do not use that specific source, the group that uses the internet are the most likely to proceed with preventive measures, whereas the group that asks their family are the least likely to do so.

Table 5. Channels for general head lice information (n=166). OR <1 is more likely to perform preventive measures.

Media	N	OR
Telephone	1	0.76
Pharmacist	59	1.12
School	109	1.11
(Mobile) internet	93	0.64
Radio	1	0.76
Paper	6	2.47
Family	9	3.3
Friend	8	1.1
Professional (youth healthcare/ doctor)	18	2.9
Insurance company	1	0.76

Table 6. Channels for questions on how to get rid of head lice (n=166). OR <1 is likely to perform preventive measures.

Media	N	OR
Telephone	4	3.26
Pharmacist	106	0.53
School	71	1.29
(Mobile) internet	79	0.67
Radio	0	-
Paper	3	6.58
Family	23	3.3
Friend	13	1.44
Professional (youth healthcare/ doctor)	21	1.70
Insurance company	1	0.76

When shifting from general information to more specific treatment information parents are aware that the health information provided by schools is limited. Still a large amount of parents see schools as an adequate source of information. Looking at cues to action the respondents looking up information on the Internet were most likely to perform preventive measures. The group that was the least likely to perform preventive measures indicated that family was their main source. Although not significant, it is supported by the relation that this group does not have a good idea about the risks of getting head lice (OR = 2.123 [0.50 – 14.97]*)*. This relation was not seen in the group that acquired information from the internet (OR = 1.01 [0.39 – 2.53]*)*. Possibly indicating that a small group of parents turn to their close environment because they are not aware of head lice and where to get information about head lice.

As for the social media usage the respondents were asked if they were registered, used and were willing to use social media for head lice information on one of three biggest social networks in the Netherlands. Facebook is the largest with about 70% of the respondents saying that they use it on regular basis. Twitter and Hyves almost have the same percentage of active users.

Table 7. Social media usage (n=166).

	% active users	% inactive
Social media		
Twitter	34.3%	3.4%
Facebook	71.8%	3.0%
Hyves	52.6%	18.1%
Willing to use social media for head lice information		% of active users
Twitter	9%	38%
Facebook	18.7%	38%
Hyves	12%	41%

As for anonymity when obtaining head lice information 39.2% preferred anonymity over 6.6% that specifically did not want anonymity. The majority (54.2%) did not mind whether the information could be obtained anonymous or not.

In the choice task of the ACBC the respondents were asked to rate different combinations of how they could obtain or receive information about head lice. More than 15% found all the 12 choice options combining the different levels on the attributes to be a possibility for them. Indicating that they did not have any levels of interest in the exercise. The minimum of acceptable combinations was two (1%). The majority marked 9 combinations as a possibility (17%). The utilities to indicate the preferences of the responses with the use of the data obtained from the choice task were calculated (Table 8.). The largest calculated average importance was for "where" *(38.4 [19.9 – 57.01])*, followed by "when" (*33.4 [19.68 – 47.15])* and "how" *(28.1 [10.86 – 45.36])*. There was no significant factor found. When we assume that the averages utilities are correct "where" was the most important attribute for parents to base their preference on. Of the different levels where information should be provided "school location" was preferred the most. For when and how head lice information should be provided the options "when relevant" and "short and practical information" were the most preferred.

Table 8. Outcome of ACBC choice task. Average and standardized utilities for average importance (n=166).

Attribute and level	Average utility	Scaled utility
Where?	38.4	
Location; school	30.5	**0.87**
Location; pharmacy	1.0	0.56
Via internet	23.0	0.79
Via mobile internet	-54.4	0.00
When?	33.4	
Relevant	50.4	**1.00**
Regular	-2.6	0.53
24/7	-12.9	0.44
Office hours	-34.9	0.25
How?	28.1	
Background	-19.9	0.41
Short	47.3	**0.91**
Response professionals	-3.6	0.53
Response parents	-23.8	0.38

After standardizing and scaling the utilities we see preference for relevantly timed, practical information on school location (Figure 11, 12 and 13).

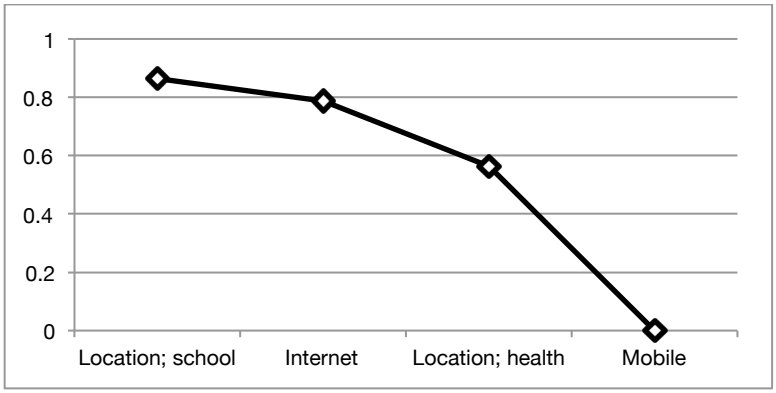

Figure 11. Scaled utilities for the levels in the attribute "where".

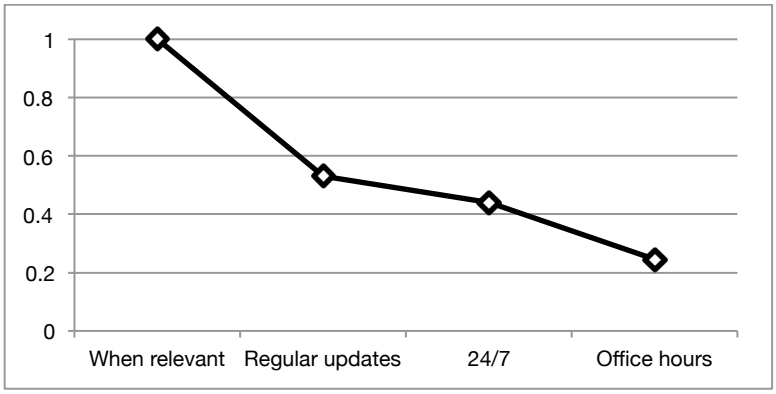

Figure 12. Scaled utilities for the levels in the attribute "when".

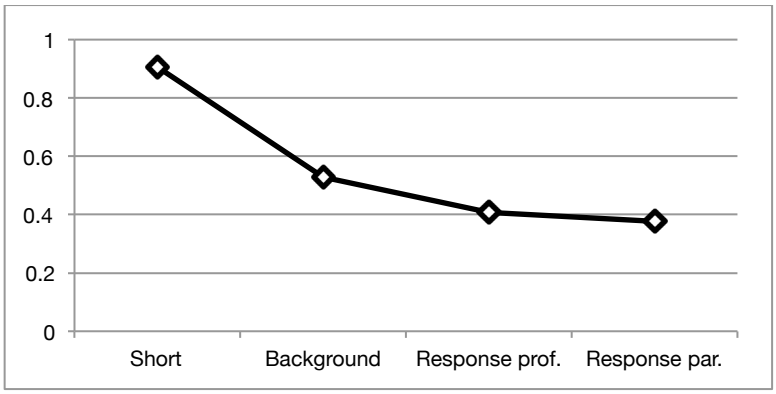

Figure 13. Scaled utilities for the levels in the attribute "how".

The predicted choice probability and share of preference confidence interval, of the different media alternatives was calculated (Figure 14). From these alternatives the newsletter (*P 0.37 [34.51 – 39.65]*) and the hypothetical lice radar website (*P 0.37 [34.51 – 39.65]*) are preferred the most and followed by websites with practical information (*P 0.16 [12.43 – 19.89]*). Social media (*P 0.06 [4.04 – 7.97]*), defined as we used it in the case study experiment, was placed above websites with background information (*P 0.02 [0.90 – 19.89]*) and information obtained at pharmacies (*P 0.01 [0.49 – 2.38]*), being the three least preferred alternatives.

	School newsletter	Website	Social Media	Pharmacies	*Website with practical information*	*Lice radar website*
Where	School	Internet	Internet	Pharmacy	Internet	Internet
When	When relevant	24/7	Regular updates	Office hours	24/7	When relevant
How	Short	Background	Response professionals	Response professionals	Short	Short

Figure 14. Compared predicted choice probability. Lice radar and website with practical information are projected scenarios.

The outcome of the CBC is reflected in the alternative exercises being the build your own (BYO), must have (MH) and winning concept in the choice tournament (WIN). The unacceptable display the least preferred levels (UN) from the ACBC (Table 9). Mobile internet, accessible during office hours and receiving answers from other parents were marked as unacceptable (UN). These levels are also least preferred in the choice task.

Table 9. Outcome of ACBC exercises. Percentage of total respondents (n=166).

Attribute and level	Build your own	Must haves	Winning concept	Unacceptable
Where?				
Location; school	44%	1%	35%	2%
Location; health	17%	0	19%	10%
Internet	36%	1%	38%	5%
Mobile	4%	0	9%	20%
When?				
Relevant	72%	4%	50%	2%
Regular	18%	0	18%	9%
24/7	9%	0	23%	9%
Office hours	1%	0	9%	20%
How?				
Background	7%	0	16%	9%
Short	82%	2%	49%	1%
Response professionals	8%	0	22%	3%
Response parents	4%	0	12%	13%

The aim of this part of the research was to assess the perceptions and media choice concerning head lice. Perceptions about head lice are in line with head lice guidelines of the RIVM. Indicating that health communicative programs should aim at an execution or improvement of preventive behaviour instead of a radical behaviour change. Cues to action are the key in motivating people to perform these preventive measures. Therefor the focus should lie on the media channels parents use and, maybe more importantly, prefer the most. Using the predicted choice probabilities the preferred method is a school newsletter. Information from a pharmacy or website with background information are not seen as preferred but is contradicted by the actual usage of these channels. Parents are actually very likely to go there for information. The stated preference differs from the actual preference. This could indicate that there is room for change or improvement in these specific channels. For social media, relevant to the case study, the probability of parents choosing this way of communication was higher then the two other used options. In addition when respondents that used social media were directly asked if they were interested in obtaining head lice information trough social media almost 20 percent of the respondents said that they would be willing to do so. This could indicate that parents would use social media if head lice information was provided trough this channel.

4.2 Data logging and case study

A total of 120 primary schools were sampled for the intervention. This number was divided over n=40 for GGD ZL, GGD GM n=30 and GGD HM n=50. GGD HM sent out 26 promotional texts, other GGDs divided this exactly to half of the sample totalling 61 schools that received a text for in their newsletter promoting social media.

The conducted experiment lasted one month of active posting. This resulted in a total of 49 page likes and 30 followers. After three months of inactivity the experiment stopped, and up to that moment the number of users was not altered.

Table 10. Overview of twitter activity after four months.

	ZHZ	GM	HM
Followers	18	5	7
Tweets	77	10	10
Mentions	0	0	0
Retweets	0	0	0

Table 11. Overview of Facebook activity after four months.

	ZHZ	GM	HM
Pages likes	36	9	4
Average reach	27	-	-
Comments	4	0	0
Shares	0	0	2

To illustrate the information already present on the social media, searches were performed (Table 12.). Facebook displayed 10 hits. As a standard the results were ordered in a way that persons are displayed first. All commercial and information pages were below the personal pages and ordered in sequence of popularity (353 likes for Prioderm to 1 for Hoofdluisherkennen.nl). For an account that had been used for a while the results were ordered differently.

Table 12. Overview of search results for "hoofdluis" on Facebook.

"Fresh" Facebook search hit *(type)*	"GGD" Facebook search hit *(type)*
Andy Hoofdluis *(person)*	**Prioderm** *(commercial)*
Hoofd Luis *(person)*	**GGD Gelderland Midden hoofdluis** *(information)*
GGD Fryslan Hoofdluis *(information)*	**GGD Fryslan Hoofdluis** *(information)*
GGD Zuid Limburg hoofdluis *(information)*	**GGD Zuid Limburg hoofdluis** *(information)*
Hoofdluisherkennen.nl *(information)*	**COATSAFE** *(Commercial)*
Coatsafe *(Commercial)*	**Millium** (Commercial)
Prioderm (*Commercial)*	**Andy Hoofdluis** *(Person)*
Millium *(Commercial)*	**Hoofdluisherkennen.nl** *(Commercial)*

Twitter displayed seven hits on the topic head lice. They were ordered by the amount of people they were followed (Luizendokter with 453 followers to Kakahoofdluis with 0 followers).

Table 13. Overview of search results for "hoofdluis" on Twitter.

"Fresh" Twitter search hit *(type)*	"GGD" Twitter search hit *(type)*
@Wegmethoofdluis *(Commercial)*	**@Wegmethoofdluis** *(Luizendokter)*
@Hoofdluis *(Information)*	**@Hoofdluis** *(information)*
@GGDZLHoofdluis *(information)*	**@GGDZLHoofdluis** *(information)*
@GGDGMHoofdluis *(information)*	**@GGDGMHoofdluis** *(information)*
@EurStpHoofdluis *(Information)*	**@EurStpHoofdluis** *(information)*
@Kakahoofdluis *(Person)*	**@Kakahoofdluis** *(Person)*

The "hoofdluis" channels could be found trough the search engines of the social media. Apart from the channels of the experiment only one other hit was offering information, all other hits were from companies and used for promotion. Search results differed between the "fresh" searches (without cookies or search history) and the searches performed with the accounts used for the experiments for Facebook. Twitter did not show this behaviour.
Despite the fact of a large public used in the promotion, and the social media channels being searchable and findable the need for head lice information on social media was limited. Possible explanations could be that the promotion was ineffective, the period of activeness was to short, the social media did not use the correct communication strategy or the fact that parents are in fact really not interested in information trough this channel.

4.3 Qualitative interviews

The interviews were conducted with 10 parents by telephone. All respondents were aware of head lice but did not consider head lice as a serious health problem. The main concern is that head lice is annoying and causes a great amount of nuisance. The attention that is given to this problem from schools is perceived as sufficient in the form of regular controls, usage of lice bags and providing information. Most of the parents see schools as the main source of infestation and as an adequate point of contact for information. All parents would possibly use an internet search engine when in need of general information or when they would have specific questions about head lice and think there is sufficient information to be found on the internet. They do not discriminate between searching for themselves and searching for other family members. Barriers for the use of social media in case of head lice information are mainly focused in a lack of interest for social media in general, lack of interest in social media because it is seen as time consuming and because people see social media as a channel to connect with friends and family.

> (Participant 1) "I have never cared and will not care for social media". "I'm too old for that (social media)".
>
> (Participant 3) "I use social media to keep track of people their personal life and updates".

(Participant 6) “I do not have time for it (Facebook), I just want to be able to consult the information when I need it”.

(Participant 10) “I did not even know you could use social media to obtain head lice information”.

Benefits of social media are mainly seen in the personalization and tailoring of information.

(Participant 2) “I like the idea that you can ask specific questions to professionals”.

(Participant 6) “I would like to read users reviews in case of homeopathic treatment options for head lice”.

Five professionals from the municipal health services, mainly from the communication and youth healthcare department, were interviewed. The barriers were mostly substantive on the use of social media. Like use of language, possible spam or only reaching a specific audience. Other barriers were hard to organize and streamline in an organization to get to a state were the channels are constantly updated and maintained.

(Youth healthcare professional 1) “(Social Media) must be maintained, and use of language must be taken into account so information can be interpreted correctly”.

(Youth healthcare professional 2) “People can post weird questions or remarks”.

(Communication professional 1) “Not all audiences are presented trough social media, combination with offline media is necessary for now”

(Communication professional 2) “(Social media is) hard to organize internally”

Benefits are increased accessibility, multimedia aspect and staying up-to-date as a municipal health service with communication tools improving their image.

(Policy officer) “Short (communication) lines, anonymity, and need to adjust to current communications patterns”.

(Youth healthcare professional 1) “Short (communication) lines, easy to refer to other (background) material on the internet”.

(Youth healthcare professional 2) “It is easy to show instruction movies”.

(Communication professional 1) “Quick and reliable way of sending information, making the municipal health services more approachable”.

(Communication professional 2) “ Possible great reach under specific targeted audience, and gives a positive image”.

There are ups and downs seen in both groups. In general parents don't know they can use or consult social media when in they want advice, tips or other health information. Professionals are positive about social media and see possibilities to make the municipal health service more approachable to the public, but are aware that this cannot be accomplished overnight.

5. Discussion

To evaluate the use and effect of social media within the framework of effective health communication we will focus at the needs of communication about head lice and the usage of social media in the case study. In the discussion section we assume the sample of respondents is representative for Dutch parents. The preferences measured in the conjoint analysis were not statistical significant because of a high standard deviation. This was not because of the number of respondents (n=166) but because of the low number of choice based exercises (12 in total). Because the alternative exercises that were inline with the CBC outcomes the calculated utilities were assumed to be representative and were used in the predicted probability experiment.
The self reported answers on the questionnaire state that the parents are already likely to comb the hair of their children the messages sent out to parents should aim at cues to action. Reminding parents to comb after holidays or sign up to volunteer for a school wide check are possibly the most effective in the reduction of head lice nuisance. There is possibly a group of parents that is not aware of head lice. This group might also be hard to reach since they look for information at friends or family and this is outside the scope of the municipal health services. For general information parents can be reached and educated about head lice at schools, pharmacies or through internet. In case of information on treatments most parents turn to pharmacies for information. As parents perceive chemical based remedies as unhealthy this might indicate that they prefer a safer treatment. If parents turn to commercial pharmacies for advice and obtain information about head lice it might lead to unbalanced information and influence the decision-making. In this case parents might by driven to choose for a less time consuming but unhealthier option instead of combing. This time aspect also plays a role in the common predictors for parents that are less likely to perform preventive measures. Indicating that parents with a high income and education are less likely to check for head lice preventively. This might be because head lice are less often found in higher income families but it should be taken into consideration when spreading information about head lice. This is contradictory to most studies where high income is associated with a better health situation (National center for Health Satistics, 2011).
The preferences of parents for head lice information are met by providing short and practical information that is relevantly timed and can be obtained at school. Since most schools already supply information this way, the preferences in information of parents are already met. It is possible that parents are used to schools providing this information and therefor prefer the information in this form, because it is familiar and perceived as sufficient. The closest alternative level for parents was obtaining information trough the internet instead of schools. From the qualitative interviews the internet was pointed out as an important source when parents had a specific questions or generally wanted to learn more about head lice. In combination with the two other popular possibilities, information being timed and short, social media might meet the preferences of parents with certain strategy changes. In the case study only a small number of parents was attracted with Facebook as well as with Twitter using different strategies for "corporate accounts" in combination with a broad promotion indicates that a different method or

strategy is needed to meet the preferences of parents with providing information online. Trying to passively promote information concerning head lice on Twitter or Facebook is not capable to effectively attract or reach a large population. Tough when the correct public is reached and engaged, studies show that health behavior can be influenced (Stroever, Mackert, McAlister, & Hoelscher, 2011). When alternative commercial forms of promotion are left out to promote the social media channels, communication strategies are limited to promote health information.

To obtain a large public there would have been different ways to notify parents about the new communication channels. In this experimental setting the channels were promoted trough newsletters from the schools to parents. Not all parents might read the promotional text and this way would not be the optimal way to obtain a large public. Alternative promotion methods for recruiting a public were limited due to the experimental setting and costs. The promotional strategy in the case study was to promote a source were people could obtain head lice information with the added service for parents to ask questions. This would be the main reason for parents to visit the social media channels. It is clear that parents rather use pre-formulated short information then obtaining it trough contact with professionals or other parents when they are in need of head lice information. This is not only a drawback in the promotion of social media, but also in the added value compared to channels that are already available. Though some respondents see the benefits of tailoring of information. The low popularity of these specific channels might also be because of the topic of head lice. Head lice infestations are not perceived as very critical and general interest in the topic might be limited to people that are confronted with head lice on a more regular basis e.g. the healthcare professionals or active “lice mothers”. It might be that these people do not have a need for information because it is already provided sufficiently. To attract and reach a broader public with social media an alternative approach could be applied that incorporates an aspect to relevantly time short and practical information. And possibly combine it with other topics of interest, for example parenting lifestyle items. Relevantly timed information for parents is when a case of head lice is observed in their environment. When the threat of head lice is high parents are more likely to be in need of information. A concept that anticipates on this need, in combination with the social media strategy, is further elaborated in the recommendation sections.

Alternatively to only following a hyperlink in the used promotional advertisement, people could use the internal search engines to find the pages from the case study. When searching for “head lice” the pages were top hits, making it possible for parents to locate the information on the specific pages. Though parents should be aware that the channels that had more likes were displayed higher. This could develop into a situation were brands, with big marketing budgets, are more influential when searching on social media websites. Facebook even displayed the search results differently from account to account. Possibly incorporating previous searches, likes of other friends and other variables used in Facebook’s algorithm. Tough parents are unlikely to search social media websites for information currently. The popular external search engines also index the information written on social media; this might also be influenced by the popularity of the information on social media websites.

6. Conclusion

The pilot study performed by GGD Frysland raised some uncertainties because of the used study sample. By launching the same experiment in two other areas most of this uncertainty was taken away. Providing sufficient prove that head lice information trough Twitter and Facebook does not appeal the public. The main barriers for parents in using social media for health communication in head lice is that they do not know these websites can be used to obtain health information. They see the benefit of tailored information but indicate that they do not prefer this above other forms of communication. The main advantage of social media for professionals are the direct lines and the better involvement, but this is not perceived as necessary at the receiving end of the information. Current information streams are perceived as sufficient by parents. When they do want information they not only turn to schools but also to non-ideal types of forms of information on websites and in pharmacies. For the area of e-health this shows promise as there is a need for online information but also definitely room for improvement compared to current information services about head lice. As social media are winning territory online, and parents look for information there, it is important to be aware of sources with a commercial benefit. The presence of active and relatively popular commercial social media channels about head lice indicate that companies are successfully using social media to reach their public. This might be due to the use of commercial incentives.

The use of social media has potential in health communication. But the main aspect social media adds to current websites, being connectivity and interaction, are not the preferred in obtaining health information about common head lice by parents. The information about head lice should be presented relevantly timed to the parents. This is already performed in pharmacies when information about treatment is needed, or at schools when there is a case of head lice by spreading a newsletter. The regular updates with the information about head lice trough social media are not capable of timing the information and impacting or attracting the targeted audience. In combination with information sources that are already seen as sufficient in general it is hard to create audience for a specific communication channel about head lice. The projected and actual popularity of a social media channel about head lice is low. Therefor communication trough social media sites like Facebook and Twitter are not capable to significantly improve behaviour of parents in case of head lice prevention.

6.1 Recommendations

This research was performed to learn if new media, in this case social media, should be used in the promotion and education health information and if it could effectively improve health behaviour for the RIVM and municipal health services. The case study shows that head lice related information trough social media is not preferred and that the creation of channels concerning specific health topics, like head lice, does not reach a large group of people.

However this does not indicate that social media is not an interesting media channel for public organizations. When asked if people were interested using social media for health information there was a definite interest in tailored information and parents were willing to receive health information, including head lice information. In this research there is evidence to support the planned or recently launched strategy of GGD's to create "lifestyle" channels based on age categories (e.g. parents, children etc.). In these channels all kind of topics of interest for that age category can be addressed. The "parenting" channels can then be used to remind parents on relevant moments, e.g. after or during holidays, that a preventive check up can reduce the

nuisance of head lice. To complete the message instructions of how to check for lice can be shared. This in combination with the information aggregation, sharing and many-to-many communication social media are an interesting platform for GGD's to engage in and make themselves more accessible.
National orientated solutions could include social media channels for health professionals to share knowledge and ideas more effectively between the RIVM and GGD's on the topic of head lice or other infection diseases. Facebook and Twitter would not be suitable for these purposes and Yammer or LinkedIn might be possible better solutions. Incorporation of the RIVM guidelines into the popular Wikipedia pages or a stand-alone application that gives internet users the ability to report cases of head lice (e.g. www.luizenradar.nl) are suitable solutions for reaching parents and possibly reducing the nuisance of head lice. These solutions would require additional research.

Conflicts of interest
None declared.

Acknowledgements
Many thanks to drs. Desirée Beaujean and dr. Lex van Velsen for their guidance, enthusiasm and for giving me the opportunity to do my thesis in a very interesting field of research. I also want to thank Dr. Lisette van Gemert-Pijnen for sharing her expertise and support in the early stages of this thesis, the proffesionals at the municipal health services, especially Dr. Rianne Reijs from GGD Zuid-Limburg, Annouk Goselink, MA from GGD Gelderland Midden and Akke Hofstee from GGD Frysland, for their help and enthusiasm, Michael Petri from Survey Sampling International for recruiting participants and to Jilles Fermont, Msc and the people working at Sawtooth Software for their technical support. On a more personal note I want to thank al the people I worked with at the RIVM and University of Twente for a fun and educative time I had during the making of this thesis.

Source of financial support. The "Rijksintituut van Volksgezondheid en Milieu" financially supported this study and a software grant was received from Sawtooth Software.

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Table I. Demographics	Experiment *n (%)*	SSI Sample *n (%)*	CBS (Statistics of 2010 for reference) *%*
Age	(total n=47)	(total n=166)	(Dutch population)
18-29 years	*9 (19.1%)*	*5 (3.1%)*	x
30-39 years	*14 (29.8%)*	*59 (35%)*	x
40-49 years	*24 (51.1%)*	*102 (62%)*	x
Gender			
Male	*10 (21.3%)*	*67 (41.1%)*	*49%*
Female	*37 (78.7%)*	*95 (58.3%)*	*51%*
Civil Status			
Married	*36 (76.7%)*	*109 (67.3%)*	*53%*
Living together	*3 (6.4%)*	*32 (19.8%)*	*13%*
Single	8 (17.0%)	*21 (13%)*	*34%*
Estimated annual family income			
< 25000 euro	*3 (6.4%)*	*33 (20.4%)*	*16%*
25000-50000 euro	*12 (25.5%)*	*90 (55.5%)*	*50%*
> 50000 euro	*15 (31.9%)*	*8 (4.9%)*	*34%*
Unknown	*6 (12.8%)*	*31 (19.1%)*	-
Highest level of education			
Primary School	*0 (0%)*	*0 (0%)*	1%
Secondary school	*1 (2.1%)*	*16 (9.9%)*	-
MBO	*6 (12.8%)*	*85 (52.2%)*	32%
HBO	*16 (34.0%)*	*51 (31.5%)*	22%
WO	*14 (29.8%)*	*10 (6.2%)*	12%
Head Lice work-group			
Yes	*11 (23.4%)*	*30 (18.5%)*	-
No	*36 (76.6%)*	*132 (81.5%)*	-
Incidence (last three months)			
Yes, self	*6 (12.8%)*	*12 (7.4%)*	-
Yes, family	*18 (38.3%)*	*44 (27.2%)*	-
No	*20 (42.6%)*	*102 (63%)*	-

Tabel II. Overview of agreement with the theorems provided.		
Items	Mean (SD)	Range
Perceived Severity (n=165)		
Having head lice is bad	2.7 (1.12)	1 - 5
Having head lice limits daily activities	2.6 (1.07)	1 - 5
If someone has head lice in the family it will easily spread in the family	2.8 (1.10)	1 - 5
If someone has head lice at school it will easily spread in the family	3.2 (1.07)	1 - 5
Head lice is bad for your health	3.7 (1.03)	1 - 5
Perceived susceptibility (n=165)		
I'm at risk of getting head lice	3.0 (1.03)	1 - 5
My family is at risk of getting head lice	2.5 (0.84)	1 - 5
I have a good idea about the risk of getting head lice	2.6 (0.86)	1 - 5
Perceived Clinical barriers (n=165)		
Regular treatment with anti-head lice shampoo is bad for head and hair	2.7 (0.96)	1 - 5
(Regular) preventive combing is bad for head and hair	3.8 (0.91)	1 - 5
Combing with a lice comb has a health risk	4.1 (0.76)	1 - 5
Treatment with head lice shampoo has a health risk	3.3 (0.95)	1 - 5
Perceived accessibility barriers (n=165)		
A Lice comb is expensive	3.6 (0.86)	1 - 5
Head lice shampoo is expensive	2.5 (0.90)	1 - 5
Checking (combing) for head lice is time consuming	3.0 (1.04)	1 - 5
Checking for head lice is difficult	3.1 (1.05)	1 - 5
Perceived clinical benefit (n=165)		
Because of preventive check ups head lice wont stand a chance	2.9 (1.15)	1 - 5
Likelihood of preventive measures (n=165)		
How likely is it that you check yourself preventively?	*2.6 (0.79)*	1 - 4
How likely is it that you check your family preventively?	*2.1 (0.80)*	1 - 4
How likely is it that you check your family regularly?	*2.1 (0.82)*	1 - 4

Table III. OR <1 is more likely to perform preventive measures. For the HBM perceptions it is agree with theorem vs. disagree.		
Item	OR [95% CI]	Chi Square p-value
Age		
< 29 years *	*1.0*	
30-39 years	*1.31 [1.37 – 1.51]*	*0.22*
> 40 years	*1.34 [1.20 – 1.50]*	*0.19*
Gender		
Male	*1.0*	
Female	*0.98 [0.48 – 2.02]*	*0.96*
Civil Status		
Married	*1.0*	
Living together	*1.36 [0.56 – 3.32]*	*0.50*
Single	1.31 [0.46 – 3.67]	*0.62*
Estimated annual family income		
< 25000 euro	*1.0*	
25000-50000 euro	*1.55 [0.51 – 4.72]*	*0.43*
> 50000 euro	*3.36 [1.02 – 11.05]*	*0.04*
Unknown	*1.87 [0.54 – 6.47]*	*0.32*
Highest level of education		
Secondary school	*1.0*	
MBO	*0.67 [0.19 – 2.33]*	*0.53*
HBO	*1.35 [0.38 – 4.83]*	*0.64*
WO	*4.87 [0.89 – 26.42]*	*0.06*
Head Lice work-group		
Yes	*1.0*	
No	*0.55 [0.20 – 1.54]*	*0.25*
Head lice incidence		
Yes, self	*1.0*	
Yes, family	*0.86 [0.19 – 3.38]*	*0.83*
No	*1.10 [0.28 – 4.29]*	*0.89*
Perceived Severity (n=166)		
Heaving head lice is bad	1.04 [0.44 – 2.52]	0.92
Heaving head lice limits daily activities	1.18 [0.51 – 2.71]	0.71
If someone has head lice in the family it will easily spread in the family	0.70 [0.32 – 1.54]	0.37
If someone has head lice at school it will easily spread in the family	0.91 [0.39 – 2.13]	0.49
Head lice is bad for your health	0.92 [0.30 – 2.77]	0.87
Perceived susceptibility (n=165)		
I'm at risk of getting head lice	1.0 [0.42 – 2.38]	1.00
My family is at risk of getting head lice	1.76 [0.60 – 5.16]	0.30

I have a good idea about the risk of getting head lice	1.51 [0.54 – 4.20]	0.43
Perceived Clinical barriers (n=165)		
Regular treatment with anti-head lice shampoo is bad for head and hair	2.2 [0.88 – 5.56]	0.09
(Regular) preventive combing is bad for head and hair	1.07 [0.277 – 4.17]	0.92
Combing with a lice comb creates a health risk *	0.10 [0.01 – 1.03]	*0.02*
Treatment with head lice shampoo has a health risk	1.29 [0.48 – 3.47]	0.61
Perceived accessibility barriers (n=165)		
A Lice comb is expensive	0.46 [0.13 – 1.66]	0.23
Head lice shampoo is expensive	1.15 [0.38 – 3.50]	0.81
Checking (combing) for head lice is time consuming	0.59 [0.25 – 1.40]	0.23
Checking for head lice is difficult	0.65 [0.28 – 1.51]	0.32
Perceived clinical benefit (n=165)		
Because of preventive check ups head lice wont stand a chance	1.06 [0.48 – 2.34]	0.89
***** Less then 5 respondents in one of the measured variables		

Table IV. ISPOR Good Research Practices for Conjoint Analysis Task Force: Checklist. *Notes added where needed.*
Was a well-defined research question stated and is conjoint analysis an appropriate method for answering it?
1.1 Were a well-defined research question and a testable hypothesis articulated? 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? 1.3 What is the rationale for using conjoint analysis to answer the research question? *Research question: What are the preferences in health communication about common head lice? Learn more about the decision making in choosing a specific type of medium (Media Choice) in the context of a decision.*
Was the choice of attributes and levels supported by evidence?
2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? 2.2 Was attribute selection justified and consistent with theory? 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? *Based on qualitative interviews indicating the main points of interest for parents and the current available information services about common head lice. Aimed at showing a preference for social media, websites or pamphlets with information.*
Was the construction of tasks appropriate?

3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? 3.2 Was the number of profiles in each conjoint task justified? 3.3 Was (should) an opt-out or a status-quo alternative (be) included? *-Explained in method section-*
Was the choice of experimental design justified and evaluated?
4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? 4.2 Were the properties of the experimental design evaluated? 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? *The number of tasks was to low, resulting in high standard deviations. Because of the use of alternative exercises data was assumed to be statistically significant.*
Were preferences elicited appropriately, given the research question?
5.1 Was there sufficient motivation and explanation of conjoint tasks? 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)?
Was the data collection instrument designed appropriately?
6.1 Was appropriate respondent information collected (such as socio-demographic, attitudinal, health history or status, and treatment experience)? 6.2 Were the attributes and levels defined, and was any contextual information provided? 6.3 Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? *Clear visual instructions were provided; all respondents were capable of finishing the conjoint analysis.*
Was the data-collection plan appropriate?
7.1 Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? 7.2 Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? 7.3 Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? *Sample assumed to be representative of the average Dutch parent.*
Were statistical analyses and model estimations appropriate?
8.1 Were respondent characteristics examined and tested? 8.2 Was the quality of the responses examined (for example, rationality, validity, reliability)? 8.3 Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately?
Were the results and conclusions valid?
9.1 Did study results reflect testable hypotheses and account for statistical uncertainty? 9.2 Were study conclusions supported by the evidence and compared with existing findings in the literature? 9.3 Were study limitations and generalizability adequately discussed?
Was the study presentation clear, concise, and complete?
10.1 Was study importance and research context adequately motivated? 10.2 Were the study data-collection instrument and methods described? 10.3 Were the study implications clearly stated and understandable to a wide audience?

Different interpretations of the data were added and display to improce readability of data.

Table V. Structured open-ended questions for telephone interview.
1. What is your family situation? And who takes the kids to the doctor when something is wrong?
2. Have you ever been confronted with head lice? Do you experiencing head lice as a serious illness? Is there enough attention from schools to the problem of head lice? Do you know what to do in case that your child or someone in your area gets head lice?
3. If you have a question or want information about head lice, where do you go to and how do you contact them?
4. Do you use the Internet as a source for health information for yourself? What do you consider important when you go looking for information? Where you will find this information then? Why do you think this is better than using the Internet? Is there any difference when you look for information for your child? Have you ever looked for information about head lice?
5. Which location would you prefer to get information about head lice?
6. When would you ideally want information about head lice?
7. Would you like to have the opportunity to ask questions about head lice?
8. How extensive should the information be?
9. How important is anonymity to you in obtaining information lice?
10. Do you have Facebook and / or Twitter? How often and what do you use it for? Would you like it to receive regular updates and the ability to ask questions about health issues? Would you consider taking an account on these social media? Does it seem useful to receive regular updates and the ability to ask questions about health issues?
11. Do you have any other comments on the information provision about head lice?