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Using Online Social Media and Social Networks as a Public Health Intervention

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Abstract

We performed a public reporting data-based intervention using social media and social network marketing campaigns to influence women in Los Angeles to seek public information on maternity care hospital quality. More than four million women give birth in the US every year, and more than three fourths of all American women will become mothers at some stage in their lives. Yet on key objective evidence-based metrics such as the proportion of women who received antenatal care within the first trimester, low birth weight infant deliveries, infant mortality, and maternal death rates, progress has either been away from or incompletely towards federal targets.

We used cutting edge social media and social network listening tools to understand the extent and types of communications that pregnant women engaged in online. We leveraged these understandings to design commercial marketing campaigns to drive consumer interest through targeted communications on Facebook, Twitter and Google search platforms. Our campaigns reached a little more than 140,000 consumers each day across the three platforms, with a little more than 400 click-throughs each day. Facebook and Google search had broader reach, better click-through rates, and lower costs than Twitter. Our results suggest that commercially available

online advertising platforms in wide use by other industries may play a low cost role in targeted public health interventions.

Key Words: Maternity care, public reporting, hospital quality, social media, social network, marketing campaign, micro-education

Purpose

We performed a public reporting data-based intervention which arguably offers improved chances of success. In particular, we proposed to study interventions based on active online engagement which appeals to consumer needs for social contact and reflects the new social dynamics in the internet and social media age.

We relied on three complementary, sequenced components: (1) an active listening component in which consumers independently engaging in public social media discussions involving maternity care and pregnancy are monitored, followed by (2) a playbook generation component in which the team will design and pilot an interactive playbook to actively engage with consumers in such public discussions, and (3) an active engagement component in which we conduct live field tests of a strategy to build awareness.

In the active listening phase extensive technology-enabled monitoring in English and Spanish of the entire social media of Los Angeles based twitter feeds, Facebook postings, blogs, news sites and discussion boards will be combined with a detailed ethnographic field study in a mixture of Los Angeles communities to reconstruct the key geographic and psychosocial determinants of healthcare information search and discussion.

During this component of the study we tracked in a fine-grained way the overall interest in healthcare and in particular maternity care quality which has always been reasonably high and growing in Los Angeles, as tracked by Google search analytics. Note the contrast between this general interest in the topic, and the far more limited apparent interest in specific public report websites discussed above. Importantly, web searches for hospital quality by presumably pregnant women or members of their support network have continually risen over the last half a dozen years, even while searches for physician quality have remained relatively constant over the same time-frame.

Commercial off-the-shelf monitoring technology was supplemented with USC Viterbi School of Engineering expertise in computational linguistics and natural language processing to perform text analytics on public conversation. We integrated the results of these three parallel mixed methods with existing spatial data on characteristics, consumers and quality of 80 hospitals within Los Angeles. Here are our aim was to identify geographic and cultural 'hot spots' and 'cold spots' where active information search and discussion does and does not occur, as well as identify key themes, sentiment, trends and influences present or absent in the harvested social media.

In the playbook generation phase, we exploited this unique evidence base to iteratively design and test a comprehensive new-media approach to reach, interest and activate high-priority sub-populations interested in maternity care information in a mixture of hot and cold spots within Los Angeles. Unlike standard passive information dissemination exploiting 'pull' from static sites, or 'push' and 'blast' broadcast untargeted information through emails and Facebook updates, we developed a strategy based on 'active conversation' occurring in the twitterverse, on discussion boards, in postings and comments on blogs.

Here our aim was to exploit the geography and sociology of 'buzz': we hypothesize that current not-for-profit and state public reporting lacks perceived social and cultural value. By understanding how such information is socially 'consumed' we seek to engender and further social dynamics that drive the valorization and legitimization of such information in similar manner as art and other cultural objects. We created a physician-vetted engagement playbook in English and Spanish to classify the conversations and posts we expected to encounter based on our active listening phase, and how we would engage with these in a consistent and professional manner as a thought leader and advocate but not as a provider of patient care.

We developed a test website which will serve as a research-amenable intermediary in attracting activated consumer interest and channeling this to not-for-profit, state and for-profit sources of public reports on hospital quality. We subsequently used our active engagement strategy to direct attention to our test website where we tracked usage and types of information sought.

We refined and piloted this approach and the playbook offline in ten, targeted and investigator-facilitated deliberative focus group sessions. Here our aim was to craft, fine-tune and document an immediately actionable social media active engagement strategy to drive consumer interest and information acquisition.

In live field tests, we evaluated the impact of this active engagement strategy in identified priority populations in a mixture of hot and cold spots in Los Angeles. This extensively labor-intensive approach ran live, using the test website and social media active listening awareness metrics to evaluate the effectiveness of this new strategy in the field.

We pro-actively built 'buzz' around the notion of public reporting, take part in guiding and shaping such 'buzz' using paid marketing messages delivered through Facebook, Twitter and

Google search advertisements. We documented and standardized our approach to enable other stakeholders to seamlessly adopt, replicate and adapt our strategy to other information markets.

Scope

More than four million women give birth in the US every year, and more than three fourths of all American women will become mothers at some stage in their lives. Maternity care is the second most common reason for hospitalization, the fourth most common reason for seeking ambulatory care, includes the top three procedures billed to Medicaid or private payors, and accounts for more than fourth of all Medicaid-billed hospital charges, and nearly a sixth of all private insured-billed hospital charges.

Yet on key objective evidence-based metrics such as the proportion of women who received antenatal care within the first trimester, low birth weight infant deliveries, infant mortality, and maternal death rates, progress has either been away from or incompletely towards federal targets. Subjectively, post-partum satisfaction with the birthing process, stress, and post-partum mental health problems add to the quality and patient experience shortfalls and remain persistent public health and clinical problems. Poor progress on average towards evidence-based process and outcome targets masks even greater variation between groups and regions, especially among priority populations such as minorities and lower income groups.

Among all aspects of maternity care, cesarean sections [CS] are particularly important, representing the most common major surgical procedure in the United States. The preponderance of interventions to reduce the overall CS rate by reducing unnecessary CS deliveries has focused on the development of quality indicators, on defining measures and measuring rates, on implementing quality improvement initiatives within and across hospitals, on payment reform

that removes financial incentives for unnecessary CS, and on generating of evidence and then directly promoting such evidence to the general public and directly to practitioners.

Despite many decades of consensus published in specialty obstetric journals, and similar efforts by natural childbirth advocates, current interventions do not seem to have controlled the rise of CS, let alone reduced it to rates deemed more acceptable. In the view of leading maternal care advocates, women now increasingly accept the prospect of a CS.

More generally, outside maternity care, clinical performance measures aimed at improving delivered quality have rapidly expanded in scope and detail. Starting in the late 1980s, an increasing amount of research pointed to quality shortcomings in the delivery of care and conformance to an evidence base. The National Quality Forum currently endorses 743 standards. Public report cards administered by health insurance plans are similarly available nationwide, with for example the National Committee for Quality Assurance listing 136 national plans reporting some measure of physician or hospital-specific performance.

The launch of Hospital Compare public reporting website by CMS in 2005 led to a spike in interest, but Google search tracking analytics show few ongoing searches. During recent news cycles which could be expected to influence consumer searches, consumers showed very limited and short-lived reactions in terms of incremental Google search activity. In California, the CalHospitalCompare website was launched in 2007 to a strong Google search spike, but almost immediately much of the initial interest dissipated as measured by Google. Unfortunately, interest in this site has remained relatively quiet since launch as measured by Google searches.

Public reports of hospital quality in maternity care have also held much promise but appear to have modest gains at best. For example, public reporting of provider and hospital CS rates via an interactive website in Virginia since 1996 has not controlled CS rate growth – indeed the rate of

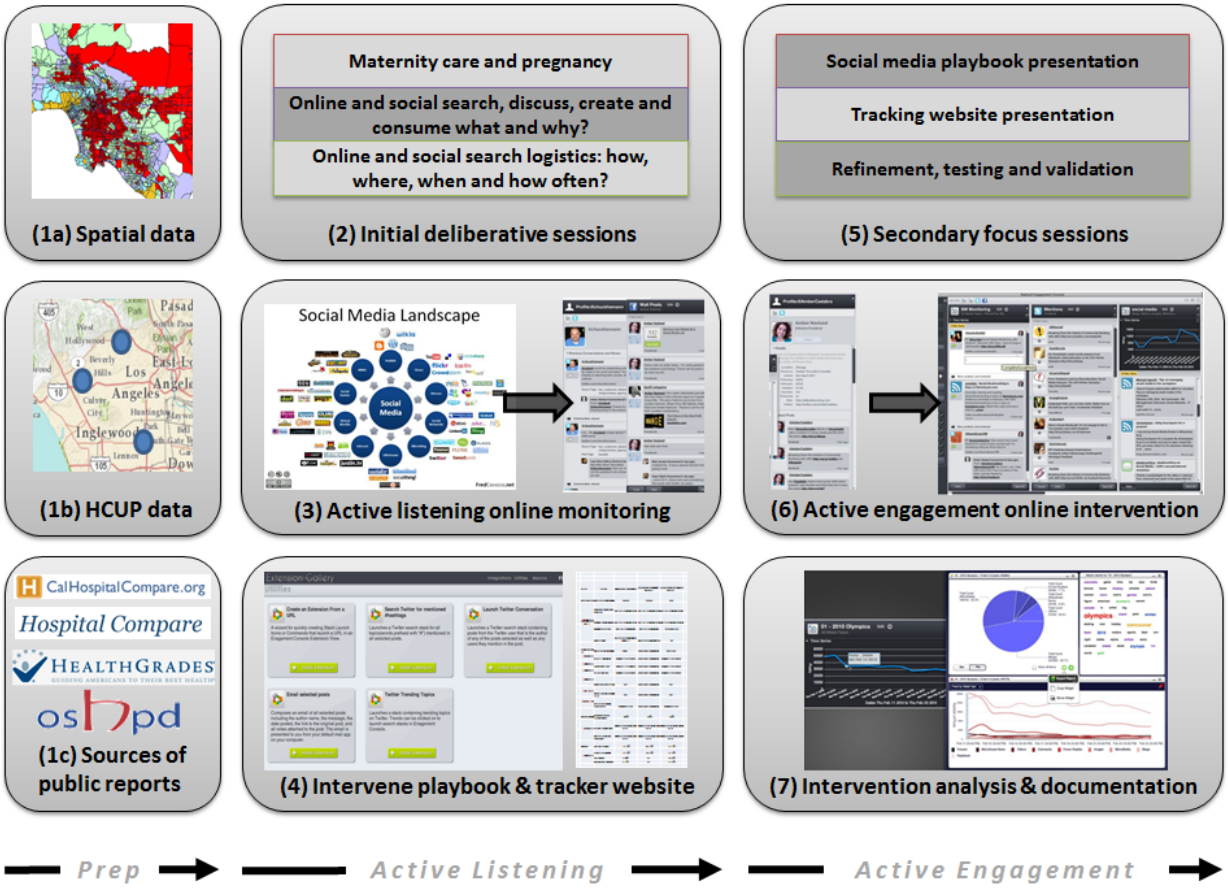
CS deliveries has risen faster in Virginia than in the United States as a whole. Some place the reason for the shortfall between the promise of public reports and their limited success on design and formatting issues.

Many argue that reports are insufficiently user friendly and have so far "been disconnected from consumer decisions about providers". Some have argued that it may therefore be "premature to embrace unilaterally the Internet as an effective asset for health promotion and disease prevention efforts that target the public." Others argue that methodological issues surrounding reporting methods may be to blame, that if these are corrected then success may increase, that some online behavioral interventions have been effective, and that approaches for reporting quality information have been slowly evolving toward strategies that help consumers process and use the information in making choices.

Methods

The overall design of this study is a two part sequential social exploratory research investigation with a predominantly online data harvesting phase and an entirely online pilot intervention phase, with overall objective to develop, pilot test, and evaluate the usability of a repeatable, scalable and immediately actionable intervention to increase consumer use of public report data.

Seven steps are detailed below:



Results

Publicly available hospital quality reports seek to inform consumers of important healthcare quality and affordability attributes, and may inform consumer decision-making. To understand how much consumers search for such information online, whether they mention such information in social media and how positively they view this information.

Google Trends and Google Adwords keyword analyses were performed for national and Californian searches between 8/1/2012 and 7/31/2013 for keywords related to 'top hospital', best hospital', and 'hospital quality', as well as for 6 specific hospital quality reports. A proprietary

social media monitoring tool was used to investigate blog, forum, social media and traditional media mentions of, and sentiment towards, major public reports of hospital quality in California in 2012.

We examined (1) Counts of searches for keywords performed on Google; (2) counts of mentions of public reports on social media; and (3) Sentiment of mentions of public reports on social media.

In our results, national Google search volume for 75 hospital quality-related terms averaged 610,700 searches per month with strong variation by keyword and by state. A commercial report (Healthgrades) was more commonly searched for nationally on Google than the federal government's Hospital Compare.

Social media references in California to quality reports were generally few, and commercially produced hospital quality reports were more widely mentioned than state (OSHPD), or non-profit (Calhospitalcompare) reports. Consumers are somewhat aware of hospital quality based on internet search activity and social media disclosures. Public stakeholders may be able to broaden their quality dissemination initiatives by advertising on Google or Twitter and using social media interactively with consumers looking for relevant information.

Subsequently, we piloted public health interventions at women potentially interested in maternity care via campaigns on social media (Twitter), social networks (Facebook) and online search engines (Google Search). Primary data from Twitter, Facebook and Google Search on users of these platforms in Los Angeles between March and July, 2014.

We performed an observational study measuring the responses of targeted users of Twitter, Facebook and Google Search exposed to our sponsored messages soliciting them to *click-*

through to a study website containing information on maternity care quality information for the Los Angeles market.

Our campaigns reached a little more than 140,000 consumers each day across the three platforms, with a little more than 400 click-throughs each day. Facebook and Google search had broader reach, better click-through rates, and lower costs than Twitter. Our results suggest that commercially available online advertising platforms in wide use by other industries may play a low cost role in targeted public health interventions.

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