The need for consistency: a proposal for a standardized nationwide antibiotic awareness campaign

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A proposal for a standardized nationwide antibiotic awareness campaign

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Introduction

As medicine continues to evolve, a greater role for preventative medicine has emerged. Diet, exercise, and lifestyle changes are currently the best recommendations we have to prevent and manage diabetes, obesity, hypertension, and other chronic conditions that flourish in our society. These new advances toward preventative interventions should be applied to more acute alignments rather than just chronic health conditions. Recently, the U. S. Centers for Disease Control and Prevention (CDC) declared antibiotic resistance as one of the world’s most pressing public health problems (2012). Antibiotic resistance refers to the ability of bacteria to adapt to a threat, thereby decreasing the effectiveness of an antibiotic that once served as first line therapy. Modifiable behaviors such as poor prescriptive writing and inadequate patient education have the greatest impact on this problem. Education and resistance awareness for both patients and healthcare providers is the current solution to decrease and prevent resistance.

Proper steps have been initiated to resolve this current problem, both within the United States (US) and European nations. Nationwide antibiotic resistance campaigns in Europe, in Belgium, France, Canada, and many other countries have been created to help decrease and prevent resistance. Although surveillance of both the campaign and current resistance is difficult to measure, Belgium has shown a significant decrease in resistant Streptococcus infections since the beginning of their effort (Huttner, Goossens, Verheij, & Harbarth, 2010). Macrolide resistant Streptococcus pyogenes has decreased by 15% from 2001 to 2007 in Belgium, further illustrating the success of these campaigns (Goossens et al., 2008). The French campaign, “Keep Antibiotics Working”, has decreased overall winter antibiotics by 26.5% (Sabuncu et al., 2009).

Unable to argue the success of the European campaigns, the CDC created a national campaign for antibiotic resistance in 1995, renamed Get Smart: Know when Antibiotics Work in
2003. The Get Smart campaign is the current strategy to decrease and prevent antibiotic resistance in the United States. The main objectives focus on appropriate antibiotic prescribing practices, along with patient education, in order to decrease the inappropriate demand for antibiotics, and promote better adherence to antibiotic regimens. Unlike the nationwide European campaigns, the US campaign is maintained on the state and local level resulting in inconsistencies among resources, materials, and success. Although the European movements have shown effectiveness in decreasing antibiotic resistance, the current statewide campaigns in the US are ineffective due to these inconsistencies. Currently, twelve campaigns are actively participating in the Get Smart movement within the US (CDC, 2012). A standardized nationwide campaign is necessary to ensure proper education and awareness is provided to all states in order to efficiently decrease antibiotic resistance.

The purpose of this paper is to compare and contrast successful statewide campaigns and their unique components in order to propose and inform a nationwide program in the US. Current campaigns provide an insight into effective strategies already successful within the US. Therefore, different components from the selected campaigns will be compiled together in order to create the standardized format. Furthermore, other national campaigns, such as Belgium, France, and Canada, will provide an efficient framework for marketing and utilization of the proposed campaign in order to ensure success on the national level.

The main structure for the proposed nationwide campaign will revolve around antibiotic resistance education and awareness. Education for patients, professionals, and/or both is the one common theme found in all resistance campaigns. This educational component is a vital key for success, especially education focused on providers. The CDC has reported that more than 50% of prescribed antibiotics are futile, contributing to the continued increase of resistance (CDC,
The use of antibiotics for viral infections, most commonly acute upper respiratory infections (URI), is a major contributing factor. Antibiotics are ineffective for treating viral infections and any unnecessary treatment will allow concurrent bacteria to adapt to the antibiotic. In order to eliminate these ineffective prescribing practices, proper provider education about antibiotics is essential as the basis for the solution to antibiotic resistance. A recent study has shown a significant decrease in prescribed antibiotics after supplying healthcare provider education on appropriate antibiotic use in URIs. This information further supports the crucial need for a professional education component within these campaigns (Juzych, Banerjee, Essenmacher, & Lerner, 2005).

Education for healthcare providers is not effective by itself. Many healthcare providers may be influenced by patient demands for antibiotics. Patient education helps decrease the demand for antibiotics and in return has an additive benefit of decreasing the improper use of antibiotics by providers (Maor et al., 2011). Lack of patient compliance is another major contributor to current resistance and a focus for these campaigns. Many patients will stop their antibiotic regimen once they begin to feel better; however, the entire prescribed dosage is necessary to completely kill a bacterial infection. Any dose that is less than the prescribed amount will allow more resistant strains to survive and replicate, resulting in future resistant infections. In order to help ensure compliance, these campaigns have used unique tools to help explain this message in a more patient friendly manner. The added effect of both professional and patient education has evolved the current resistance campaigns in both Europe and the United States.

Despite all educational efforts, professional and public support is necessary for the success of these campaigns. Awareness of antibiotic resistance reinforces the educational
components, discussed above, and further emphasizes the importance of taking an active stand against resistance. Campaign messages are publicized through many different avenues, such as posters, mailings, commercials, or radio and TV ads, each having different strengths and weaknesses. Overall success of each approach is not well studied. Current research suggests, mass media strategies maintain an additive effect toward the overall success of the campaign. The effect of media advertisement alone has not yet been studied (Lambert, Masters, & Brent, 2007). These advertisement strategies are the foundation to the antibiotic resistance campaigns, further supporting and promoting the vital educational components.

In order to effectively compare and contrast each statewide campaign, both the educational and advertisement components will be broken down into further detail. This structure will help illustrate the differences among the campaigns and help create the framework for the proposed national campaign. The states of Michigan, California, and Colorado, were selected based on the overall success and available information of each campaign. Utilizing specific aspects of the listed campaigns will ensure dissemination of the most beneficial strategies for both patients and providers.
Methods

The literature review for this research was conducted using several databases. The CDC Get Smart Website, http://www.cdc.gov/getsmart/, provided a list of each statewide awareness campaign website. The websites and contact personal provided the majority of information regarding the structure and components of each statewide campaign (http://www.mi-marr.org/, http://www.aware.md/, http://www.cdc.gov/getsmart/program-planner/state-summaries.html). Inclusion criteria for statewide campaigns included an active website, current or past successful campaign activities, strategies to publicize the campaign message further than the campaign website, and quantitative and/or qualitative data supporting the campaign. PubMed, Springlink, and EBSCO databases were utilized within this search. Key phrases such as European antibiotic awareness campaigns, national antibiotic awareness campaigns, success of national antibiotic awareness campaigns, public knowledge on antibiotic resistance, public education on antibiotic resistance, and social marketing were also utilized to navigate within these databases. All articles were written in English, including the European campaign articles. Inclusion criteria for the European awareness campaigns included at least three articles discussing the national awareness campaign success and/or strategies.
Overview

The discrepancy among statewide campaigns is not limited to format strategies. Each campaign targets specific patient populations which in return shapes the overall mission of the campaign. The structure is also shaped by public support and funding, with sponsors and volunteers being vital assets. It is also important to recognize the importance of cost when proposing a nationwide campaign; however, this paper will not focus on the cost benefit of each component in depth. Rather, cost analysis will only be discussed in regards to an apparent sense of cost. In order to break down each campaign for comparison, background information is useful when determining the proper direction for the national program.

The Michigan campaign began in 1999 and was founded by the non-profit Michigan Antibiotic Resistance Reduction Coalition (MARR) in affiliation with the Michigan Public Health Institute (MPHI). It runs from November 14-20th and maintains the overall goal of “protecting our antibiotic lifeline” (Michigan Antibiotic Resistance Reduction Coalition [MARRC], n.d.). The MARR campaign particularly focuses on nursing homes and long-term care facilities. This focus is unique to Michigan, since the CDC specifies the pediatric population as the major target due to the high incidence of URIs in the pediatric population (CDC, 2012). Although Michigan does address the pediatric population; an equal emphasis on the elderly population introduced several distinct programs.

The California Alliance Working for Antibiotic Resistance Education (AWARE) campaign was initiated by the California Medical Association Foundation in 2000. The first campaign was launched a year later and has progressively become the largest campaign within the United States. The campaign runs from October 6th-10th (California Medical Association Foundation [CMA Foundation], 2008). The pediatric population is the major target and the
campaign identifies childcare providers as a significant population. Adults are also included in the campaign though individualized programs are not provided by this campaign. In order to further promote resistance education and prevention, the AWARE campaign targets specific infections, such as Community-associated Methicillin-Resistant Staphylococcus aureus (CA-MRSA) (CMA Foundation, 2008). The founders believe that stressing specific infections reinforces the importance of proper antibiotic prescribing practices and promotes further clinical research (CMA Foundation, 2008). One unique addition involves a specific subprogram directed towards multiple ethnic populations, especially the Latino culture (CMA Foundation, 2008). California has identified this population as high risk and believes they face distinct problems not highlighted in the original campaign strategy.

The Colorado Get Smart campaign recently, in 2008, ended their active role in the fight against antibiotic resistance after four years (Get Smart Colorado, n.d.). Current efforts only sustain the upkeep of the website, distribution of educational materials if supplies are available and running the online Continuing Medical Education (CME) course. During its active years the Colorado campaign identified the Latino pediatric population, and parents, specifically mothers, as important target audiences. Despite the recent discontinuation of the campaign, past successes permitted the inclusion of this campaign within the paper.

On the national level, several European countries have participated in Antibiotic Awareness campaigns. Belgium was one of the main founders of these awareness campaigns. The Belgian Antibiotic Policy Coordination Committee (BAPOCC) launched a major media campaign in 2000 consisting of several educational promotions of proper antibiotic use for both providers and patients. A unique focus was veterinary medicine as a major target for resistance since many farm raised animals such as cows, and chickens are given prophylactic antibiotics.
The France campaign, established in 2001, focused mainly on the pediatric population and outpatient prescriptions of antibiotics. Overall the UK campaign focuses largely on the pediatric population and maintains significant unique campaign strategies that target this age group.

The diversity of the United States cannot be ignored when establishing a standardized campaign. Previous statewide campaigns already illustrate the importance of these subcultures. In order to provide an all encompassing campaign for the nation, several subpopulations should be targeted. The elderly, Hispanic, pediatric and parent population are great initial targets. This paper will further highlight unique campaign strategies that were created in regards to these populations.
Educational Component

Professional education

The CDC identified proper antibiotic prescribing practices as the main solution to antibiotic resistance (2012). According to a current study, 75% of all outpatient antibiotic use in the US is for URI, which are mainly caused by viruses (Juzych et al., 2005). This prescribing practice indicates the lack of education on the proper use of antibiotics among healthcare providers. Information regarding proper antibiotic actions, use, and resistance can be found within all of the statewide campaigns, yet the approach to distribute this information differs from state to state. The influence of perceived antibiotic demand cannot be ignored in this current trend. Several campaign strategies have been created in order to eliminate patient/parent demand. These strategies will be discussed throughout both the professional and patient education sections. Compiling several campaign strategies together will ensure a standard level of knowledge and access among all healthcare providers regardless of location. Current success and practical application of each approach will shape the framework for a standardized campaign.

The emphasis on the elderly population within the Michigan campaign creates a unique subprogram. In order to eliminate resistance among the elderly population, a major focus is to prevent infection all together. Although most campaigns promote disease prevention, this program supports a 12-step prevention protocol, created by the CDC, to reduce the amount of infections present in health care facilities. A free long-term toolkit, specifically for nursing homes and long-term care facilities, is available through the website in order to decrease antibiotic resistance, (MARRC, n.d.). While beneficial, enforcing and supervising this protocol throughout the nation would be implausible. Access to this kit can be made available through
the nationwide campaign; however, the extent of its application and surveillance should be maintained by the facilities themselves.

Disease prevention is also stressed in the California campaign but, unlike Michigan, immunizations are the main recommendation. Information regarding vaccine importance, side effects, and high risk populations is available for providers to aide in their recommendations to patients for disease prevention (CMA Foundation, 2008). The information is an easy and cost free approach to promote disease prevention. The application of this strategy in the proposed campaign would be just as straightforward and; therefore, should be incorporated.

Prevention of infection is not the only focus for professional education within the statewide campaigns. Education emphasizing current guidelines on common viral diagnoses and antibiotic use is another tactic to decrease resistance. Healthcare providers have the opportunity to attend an antibiotic awareness conference within the Michigan campaign. The presentation provides information regarding the current guidelines for diagnosis and treatment of URIs along with techniques to aid in patient provider communication (MARRC, n.d.). A current study conducted by Wayne State University and the University of Michigan supports the use of these seminars as an effective mode for promoting proper antibiotic use, especially when all members of the staff attended the seminar. According to their results, physicians within the intervention group (those who attended the seminar along with their entire office staff) decreased their overall antibiotic prescriptions significantly by 24.6% (Juzych et al., 2005). In order to incorporate this type of educational tactic, an annual antibiotic resistance conference could be held to promote proper antibiotic use among primary care providers.

California does not currently provide a seminar for providers. Most of their professional education materials discussing URIs, such as guidelines and quick facts, are distributed through
the campaign website. Colorado has the similar section on the campaign website; however, significant information was also available to providers via newsletters and mailings (Get Smart Colorado). The use of brief reminders about antibiotic resistance via emails has been preferred among physicians according to a recent study conducted by the University of Massachusetts (Stille, Rifas-Shiman, Kleinman, Kotch, & Finkelstein, 2008). During the Massachusetts campaign, REACH, physicians received biweekly emails discussing antibiotic use in regards to a specific diagnosis. The majority of participating physicians found these reminders and fact sheets more effective than information on a website or a one-time mailing (Stille et al., 2008). The distribution of resistance information through emailings will help reinforce the campaign message throughout the entire year. The use of emails as the means of distribution allows for a more cost-effective approach while promoting a more efficient means of communication. The annual resistance conference could further reinforce the monthly or weekly information creating an additive effect.

In addition to URI management guidelines, a major topic for professional education material within California includes the prevention, diagnosis, and treatment of CA-MRSA. This information can be found on their website along with reference links for additional information (CMA Foundation, 2008). Specific infection education is unique to the California campaign and reinforces the need for more effective management strategies. Inclusion of community-acquired pneumonia (CAP) is currently being developed in order to expand this educational material (CMA Foundation, 2008). Due to the lack of an effective and standard management, the author believes this information should be provided in the nationwide campaign in order to standardize treatment and promote future clinical research. New information regarding these infections should be collected and distributed to all providers. The proposed nationwide campaign would
be a great tool to distribute this information via website updates or emails. This approach would standardize the access to recent findings and further decrease the discrepancy of prescriptions among the states.

The professional educational component for the California campaign is extensive and is not only addressed to healthcare providers. This campaign reaches out to childcare providers and teachers in order to assist with proper disease prevention and further dissemination of awareness among the pediatric population. These materials include educational material and activities for the children, along with handbooks and articles that promote disease prevention and healthy facilities (CMA Foundation, 2008). Once again, all of these materials are available through AWARE website which is a useful model of how to provide these materials on a national scale.

The need for antibiotic resistance awareness has recently encouraged the CDC to create CME- accredited programs in order to capture a larger professional audience. Several statewide campaigns have already created their own CME programs to advance the local professional education. Michigan created a CME-accredited webinar hosted by Wayne State University (MARRC, n.d.). It contains three one-hour presentations that focus on the proper diagnosis and treatment of URIs. This program targets physicians, physician assistants, and nurse practitioners in an attempt to increase resistance awareness while decreasing improper prescriptive practices. The California campaign also offers a CME program provided by the California Medical Association Foundation and California Medical Association (CMA Foundation, 2008). This CME credit is attained by the completion of a reading and post-test. Although this format is different from the Michigan campaign, the program promotes further resistance education in a more time-efficient manner. The Colorado CME program, created in 2008, discusses the
appropriate use of antibiotics for URIs. It contains six sections each ending in a case study. The provider is able to choose an adult or pediatric case in order to best serve their educational purposes (Get Smart Colorado, n.d.). All of the three current CME credits could be utilized in the proposed national campaign effectively and efficiently. These three unique programs include a broad base of professionals, especially the Colorado CME. The ability to personalize the patient population case study within the Colorado CME allows the provider to choose the population that best simulates their personal practice. This tactic allows for a more practical application of the provided material and reinforces the ease of application in everyday practice.

Online educational programs, which include the CME programs, are a great way to inform a large population across diverse geographical locations. The UK maintains a similar method of professional education on antibiotic resistance. The Stemming the Tide of Antibiotic Resistance (STAR) educational program was developed in 2005 in order to combat the rising rate of antibiotic resistance in family medicine (Page & Kellenberger, 2012). The program is made up of five distinct sections. The first two sections focus on educating the provider about antibiotic resistance, displaying case studies to help support current evidence and enforce the importance of taking an active stance against the resistance. The third section is a face-to-face seminar focusing on prescribing practices in an interactive manner via Skype. Videos of patient-provider interactions within the fourth category illustrate how to communicate and educate patients on antibiotic resistance. Finally, reflection on one’s own case scenarios help personalize and internalize the newly acquired information in attempts to reinforce and sustain the programs message (Bekkers et al.). Several practitioners believed that the program helped reinforce their current knowledge of resistance and “boosted their confidence” in being more parsimonious when prescribing. The online communication scenarios were also rated highly favorable by the
providers (Bekkers et al.). A recent randomized control study investigating the success of the STAR program found a significant decrease in antibiotic use in general practitioners who participated in the program. This reduction was again noted after a one year follow up (Butler et al.).

**Patient Education**

Patient education has an additive benefit to professional education in reducing futile antibiotic prescriptions. A study in 2000 evaluating the use of patient education in addition to physician education strategies during the Colorado get SMART campaign was the first to support such strategies. According to the study, the introduction of patient education significantly decreased the amount of prescribed antibiotics, especially among the adult population (Gonzales et al., 2005). Patient education includes information regarding differences between viruses and bacteria, proper antibiotic use, antibiotic resistance awareness, and preventative measures. In 2008, a European study illustrated the erroneous yet prevalent public perception regarding both the definition of antibiotic resistance and the relative risk on a community level. The majority surveyed believe that antibiotic resistance pertained to the body becoming resistant to antibiotics; therefore, personal risk of acquiring a resistant infection pertained only to personal consumption of antibiotics (Brooks, Shaw, Sharp, & Hay, 2008). This survey illustrates the importance of proper standardized education on antibiotic resistance. Indirectly, proper knowledge can further increase the public’s desire to take an active role in decreasing resistance by illustrating the true risk of resistance within the community. Once again each statewide strategy regarding patient education will be analyzed for success and practical application for the nationwide campaign. In comparison the European Awareness campaign strategies will be offered as a guideline to illustrate successful approaches to public education.
Patient awareness programs are a large part of the Michigan campaign. Antibiotic presentations are available upon request for schools, businesses, churches and other public organizations. The “Antibiotics and You” presentation focuses on general differences between bacterial and viral infections in addition to the proper use of antibiotics (MARRC, n.d.). Identifying strategies to prevent infection allow patients to maintain an active role in their health. Proper hand washing techniques, immunizations, exercise and nutrition are just a few of the prevention techniques discussed in the presentation (MARRC, n.d.). The “Antibiotics and You” program received the 2003 Award for Excellence from the CDC which propelled its use in several other statewide campaigns (CDC, 2012). Due to such success, this public presentation will be incorporated within the nationwide campaign proposal as a standardized patient education presentation.

The California campaign uses a presentation, Speaker’s Bureau, similar to Michigan in order to enhance patient education; however, this portion of the campaign only highlights proper antibiotic use in order to decrease demands for antibiotics during office visits (CMA Foundation, 2008). Current development of Podcasts within the California campaign will further provide antibiotic resistance information for patients. Analysis of this presentation style success will be necessary prior to its role in the national campaign. A separate presentation, “Wash the Germs Away” was created for California schools in order to educate and promote proper hand washing. The presentation is broken down into three sections: germs, hand washing and antibiotic use (Lin, 2006). Each section further promotes awareness and prevention of antibiotic resistance. Classroom activities and worksheets are also incorporated into this presentation in order to solidify this information. These programs are great way to target both the pediatric and parent population.
Presentations are not the only approach to promote patient education material. The Michigan campaign includes parental information guides regarding runny noses, middle ear infections and other common cold symptoms. These guides teach parents effective home remedies for common cold symptoms while illustrating the improper use of antibiotics in such situations. It is important to note: these guides do not explicitly discourage the use of antibiotics. Although antibiotics are rarely needed for URI, some complications may arise where antibiotics are warranted. These guides recommend a watch and wait approach along with home remedies for their child’s care of runny nose, middle ear infections and other common cold symptoms (MARRC, n.d.). These treatment recommendations allow parents to maintain an active role in their child’s health while limiting the demands for antibiotics during viral infections.

California also provides several pamphlets regarding home remedies, hand washing, and healthy tips in order to prevent infections. COPD patient education is unique to the California campaign. This information helps patients understand and manage their chronic condition while clearly identifying the limited role of antibiotics as a treatment option (CMA Foundation, 2008). The unwarranted demand for a prescription during office visits for URI is a large focus for patient education. A virus prescription pad, used within the California campaign, is available through the CDC website as a technique to solve this problem. The pad provides several options of home management tips for URI by utilizing symptom focused medications, none of which include antibiotics (CMA Foundation, 2008). This tool helps satisfy the demand for a prescription and further enforces knowledge about the proper application of antibiotic use. Quick links for flu shot locations is another helpful tool the California campaign provides for their patients (CMA Foundation, 2008). This user friendly tool further promotes preventative health recommendations by providing patients with all available facilities in their area. These
educational materials are a straightforward and simple means to promote patient education. A compilation of these handouts will be included in the nationwide campaign in order to appeal to the majority of the population.

Regardless of the educational approach, access to these materials is necessary for all citizens in the nationwide campaign. As stated previously, the California campaign has targeted ethnic populations as a major focal group. The AWARE campaign materials are currently available in English, Spanish, and Chinese in order to reinforce awareness in these cultures (CMA Foundation, 2008). The campaign is also taking a more active role to educate these communities. The Medical/Pharmacy Student Community Education Initiative is the current attempt in California to reach the immigrant population (CMA Foundation, 2008). The program utilizes medical and pharmacy students as the educators for predominantly ethnic communities in attempts to provide culture specific educational messages. The importance of finishing an antibiotic regimen is heavily stressed in this subprogram due to the frequent selling of leftover antibiotics within the communities (CMA Foundation, 2008). Colorado offers a similar alternative campaign, “Saludable”, for the Spanish speaking community. Posters, pamphlets and public health announcements have been created to target this underserved population (Get Smart Colorado, n.d.). Several articles analyzing the knowledge of antibiotic resistance among Hispanics further support the creation of specific culture programs. A survey analyzing the knowledge base of the Hispanic population in Colorado found less awareness about antibiotic resistance in comparison to non-Hispanics despite the current statewide resistance campaign (Corbett et al., 2005). In order to promote unified resistance awareness, specific cultural subprograms are essential. The Colorado strategy to include ethnic communities would be the most applicable technique for a nationwide campaign. The California education initiative would
be too difficult to manage nationally. Each state would have to be in charge of the subprogram resulting in inevitable discrepancies, based on disparities in state ethnic composition.

The European Antibiotic Awareness campaign chose a different avenue and target population for the majority of the public education material. The interactive website, e-Bug, was established in 2008 in order to educate adolescents on the importance and prevalence of antibiotic resistance. These programs chose a younger target audience after a British survey identified 16-24 year olds as the least educated on antibiotic resistance (McNulty et al.). This website has two distinct educational curriculums, one focusing on junior high students and another on high school students. Within the website, teaching materials, videos, and interactive online games are available for all users. These tools promote hand and food hygiene, discuss antibiotic resistance and antibiotic over use, and analyze the importance of finishing all antibiotic regimens. Resources for educators are also provided allowing these messages to spill into the classroom (McNulty et al.). Despite similarities among the junior high and high school curriculum, the “senior” level has more research-focused information, a separate lesson on sexually transmitted infections (STI), along with a deeper overall understanding on antibiotic resistance (McNulty et al.).

Since its creation in 2008, the website has been translated into ten different languages, which has lead to its dissemination among 30 European countries. In order to monitor the success of this tool, researchers at Oxford collected the number of viewers through website logs over 23 months, January 2008-2009 (de Quincey et al.). The results show 88,427 different users and a representation of 190 different countries (de Quincey et al.). Clearly, this website has been an effective means to distribute educational materials throughout Europe and would presumably have similar success throughout the US. This website incorporates the presentation approach,
found in the Michigan campaigns, and Podcasts, found in the California campaign, in one main avenue making it a convenient resource. The cost of this website would be on the lower end, with the majority of funds used for advertisement and annual updates to the educational content.

Despite the use of campaign websites as a means to distribute patient education, the European e-Bug website clearly offers a more successful use of technology. e-Bug incorporates all the European “statewide” strategies into one website while offering a more active and entertaining means to display the information. Technology is a great avenue to distribute educational materials; however, tangible handouts can still be useful in supporting the proper use of antibiotics and their limited role in viral infections. Due to the overall success of the e-Bug website, such an approach will be incorporated within the national campaign along with pamphlets and fact sheets during healthcare provider visits. Furthermore, in order to ensure proper education opportunities within the US, multiple language translations for both the website and any handouts are crucial.
Advertisement Components

Advertisement of antibiotic resistance awareness is useful in the success of all campaigns. Constant reminders of resistance emphasize the importance of this problem. The advertisement also reinforces the educational component of the campaign and sparks the desire to abide by the set guidelines for both providers and patients. These advertisement strategies can be broken down into two main categories, local and mass advertisement. For the purpose of this paper, local advertisement will be defined as the distribution of materials through personal contact. This strategy includes posters, flyers, and pamphlets distributed by healthcare providers, teachers, childcare providers and/or campaign representatives. This approach is limited by direct personal contact which minimizes the exposed population. Mass advertisement, within this paper, is defined as any avenue that promotes awareness to the majority of the state population regardless of personal contact. Billboards, newspaper, radio and television ads are the main examples of mass advertisement within this paper. Both local and mass advertisement help illustrate and reinforce the importance of antibiotic resistance awareness; however, practical application of these on a national scale will determine their use within the national proposal.

The national antibiotic resistance campaign success rides on the change of current health behaviors within our society. According to the Health Belief model for change, individuals evaluate their personal susceptibility prior to contemplating any current change. In order to propel the public to take an active stand against antibiotic resistance, the average person must feel a significant sense of risk and concern. Several studies have analyzed current public beliefs regarding personal risk and responsibility for antibiotic resistance. Overall the majority of the public knowledge about antibiotic resistance stems from the media, especially television (Hawkings, Wood, & Butler, 2007). Although this supports the importance of mass media ads
within a national campaign, the majority of these current ads depicted antibiotic resistance in relation to over prescribing antibiotics by healthcare providers. One study showed that 30% of all articles analyzed (364 total articles) discussing antibiotic resistance identified the cause of resistance as the overuse of antibiotics while only 6% discussed the public’s role in current resistance (Desilva, Muskavitch, & Roche, 2004). This disproportion helps support the current public ideology that antibiotic resistance can only be solved by healthcare organizations. According to another study, several individuals were not concerned about antibiotic resistance within the community; however, their sense of risk increased when discussing hospitalization. The majority of respondents identified hospital hygiene as the major culprit behind antibiotic resistance infections due to public portrayal of these infections as hospital acquired (Hawkings et al., 2007). The current sense of personal responsibility and influence of antibiotic resistance is a major barrier the current campaign must overcome in order to promote public support.

In order to depict the true public risk of antibiotic resistance, exact wording and type of information expressed within these ads is vital for their success. Several articles have researched different advertisement formatting used within print media and its overall effectiveness and sustainability of the depicted message. In the article, “Print Media Coverage of Antibiotic Resistance”, messaging within the “numerator/denominator” format in respect to natural frequencies is the best at illustrating the degree of risk to be public (Desilva et al., 2004). An example of this type of format can be demonstrated as “ten people out of 100 will be…” According to the authors, this style of information will personalize the risk of these infections further propelling awareness of the importance of public responsibility (Desilva et al., 2004).

Positive messaging that address the “how” and “why” of a behavior modification has also proven to be an effective strategy on a national level (Goossens et al., 2006). A positive approach to a
behavior change focuses on the benefits of the change rather than focusing on the negative consequences of maintaining current behaviors. This format approach has been successful within the European awareness campaigns, along with several other national campaigns, such as the multinational “Bob” drinking and driving campaign (Goossens et al., 2006).

One type of advertisement that depicts behavior change as a priority and establishes sustainability is social marketing. This messaging has been very useful in other health behavior campaigns, such as the US anti-smoking campaign Truth. In order to ensure success, this strategy revolves around the target audience. Preliminary research in regards to audience current knowledge, behavior beliefs, and effective communication strategies provides the outline for messaging (Edgar, Boyd, & Palame, 2009). This steers clear of the cookie cutter approach to a campaign and identifies multiple subpopulations and their unique behaviors. Simple messaging and the identification of short and long-term benefits have provided great success in this tactic. Due to the success of this type of marketing in several health behavior change campaigns, this type of marketing should be applied to the future national campaign advertisement.

**Local Advertisement**

In order to expose the public to the educational programs and tools, proper advertising for the Michigan campaign has been established primarily through posters and handouts. Posters promoting hand washing, antibiotic resistance awareness and proper antibiotic use were created for schools and primary care offices. Pamphlets and educational material are mainly distributed via a primary care provider during office visits or are available on the campaign website. These local advertisement tools can be very effective if used to reinforce the importance of avoiding unnecessary antibiotics in viral infections. One study used visual aids, such as pamphlets, to effectively explain the ineffective use of antibiotics in URIs. Patient satisfaction was not
impacted; however, the number of re-consultations for the same symptoms was not significantly different (Francis et al., 2009). Some researchers have identified inevitable integration of campaign objectives into personal practice with the use of local advertisement during office visits (Francis et al., 2009). The use of these materials forces the provider to internalize the information and incorporate it into daily practice.

Other materials such as word searches, coloring pages, and temporary tattoos are used in schools to expose both the pediatric population and their parents (MARRC, n.d.). Colorado provides similar local advertisement materials and this campaign participates in regional health fairs in order to further spread these educational materials (Get Smart Colorado, n.d.). Participation in health fairs is a great way to expose those who do not see a healthcare provider on a regular basis and/or have health insurance; therefore, this approach will be utilized within the national campaign along with the Michigan local advertisement strategies.

In addition to posters and pamphlets, the California campaign offers healthcare providers cough and cold toolkits to distribute among their patients. These kits include tissues, symptom-focused medication samples, disposable thermometers, and information packets discussing URIs and antibiotic resistance (CMA Foundation, 2008). These packets further reinforce proper antibiotic use, home remedies for URIs and eliminate the panic of leaving the office “empty handed”. Overall these kits are a great tool in reinforcing patient education; however, on the national scale the cost of these kits hinders application. Even within the AWARE campaign the quantity of these kits are limited, further indicating the use in a nationwide campaign would be challenging.
Mass Advertisement

Currently mass media advertisement, such as on radio and TV, is not used within the Michigan campaign, thereby limiting the amount of exposure. California does promote campaign messages through radio and TV public service announcements (CMA Foundation, 2008). Known public figures such as Bill Nye “the science guy” and Dick Van Dyke, each relating to a specific targeted population, discuss the importance of antibiotic resistance in a patient friendly manner. These public announcements have been used in several other state campaigns including Arizona, Utah, Idaho, and Wisconsin (CMA Foundation, 2008). Colorado also produced a mass media campaign targeting mothers of young children in 2002. This campaign included billboards, bus stop posters, and radio ads (Gonzales et al., 2008). A study was created to analyze the effectiveness of this media campaign focusing on decreasing antibiotic prescriptions and cost-benefit. The study concluded that the 2002 media campaign maintained a net-saving of 618,351 dollars in prescriptive costs after accounting for the cost of the campaign (Gonzales et al., 2008). According to the study, this overall decrease in antibiotics could be attributed to the decrease in office visits for URIs in the pediatric population (Gonzales et al., 2008). The Colorado campaign illustrates the advantage of mass media advertisement within the fight to decrease antibiotic resistance. Due to such success, public announcements, billboards, and radio ads will be utilized within the national campaign.

Several national campaigns have used mass advertisement as a means to disseminate campaign messages of antibiotic resistance among the population. Among these campaigns Belgium has found major success with this advertisement strategy. During its first two years, researchers found that 49% of the population remembered it 1-2 months after the campaign with the majority identifying the television as the most memorable avenue (Goossens et al., 2006).
The French campaign, “Keep Antibiotics Working”, utilized television and written materials as means to advertise their campaign message. Within the first four years of the campaign, a 13% reduction in total antibiotics was reported as well as an overall increase in public knowledge about antibiotics and the proper use (Goossens et al., 2006).
Conclusion

As antibiotic resistance continues to rise, the need for a standardized awareness campaign is vital. The current statewide programs are ineffective due to the many inconsistencies and small number of participating states. In order to propose a standardized and effective national format, several statewide and national campaign strategies have been analyzed within this paper. Two major components, education and advertisement, were evaluated in order to compile the most effective strategies for a standardized campaign. It is important to remember within this standardized program numerous target audiences are present, due to the great diversity within the US. In order to ensure standardization among all citizens, the components will be created to target the general public and specifically the elderly, Hispanic, pediatric and parent populations. Past success, practicality, and generalized cost of each strategy was utilized to create the final proposal.

The educational component of awareness campaigns was further categorized into professional and public strategies. Multiple strategies to increase provider education can be utilized within the standardized campaign in order to promote proper antibiotic prescriptions. Current successful statewide, such as weekly emails, CME courses, and the STAR program, offer a cost effective approach to disseminating current resistance research. An annual conference, found within the Michigan campaign, offers providers the opportunity to further enhance knowledge on the topic and could be easily reproduced on a national level. Information regarding immunizations, current research on specific infections, downloadable tool kits to prevent disease and other resources can also be accessible on the website for both healthcare and childcare providers.
As stated earlier, patient education is just as important for the success of this campaign. After analyzing several approaches to public education, the e-Bug website has proven to be most effective at educating the public on a larger scale. This website not only compiles several statewide strategies, but it also provides a more interactive and entertaining display of the information. Despite the major success of this website, the use of pamphlets, handouts, and viral prescription pads during provider visits is still useful in supporting proper use of antibiotics. These pamphlets should illustrate preventative measures and home remedies for viral infections to allow parents to maintain an active role in their child’s health, while the viral prescription pad eliminates the anxiety of leaving the provider office empty handed. The presentations for schools utilized in both the Michigan and California campaign also provided great tools to target both the pediatric and parent populations. All educational materials should be offered in several translations in order to ensure standardized knowledge base. Proper education on antibiotic resistance can further increase community desire to take an active stance against resistance and once again support professional attempts at eliminating this rising problem.

Advertisement plays a major role in the success of any behavioral modification campaign. Both local and mass advertisement strategies emphasize the importance of antibiotic resistance and encourage the active role of both professional and public communities. Local advertisement offers a limited role in expanding awareness on large scale though it may support the importance of antibiotic resistance. As stated above, local advertisement increases patient education in addition to promoting proper prescribing practices among providers actively displaying these materials. After analyzing current statewide and national campaigns it is obvious that mass advertisement plays a large role in disseminating the campaign message; however, the type of messaging is just as important as the avenue to which it is broadcast.
Overall positive messaging that further illustrates personal benefit has been most effective at promoting behavior modification on both the state and national level. In order to continue to stress the importance of the role of the public in antibiotics resistance, community behaviors that increase the risk of resistance need to be identified. Once again, multiple translations of both local and mass advertisements are crucial to ensure standardized exposure. The social marketing tactic would be very beneficial in creating campaign material, especially due to its great success in several other health behavior campaigns.

The purpose of this paper was to offer a layout for a standardized antibiotic resistance campaign; however, there are several limitations of this literature review. This is not a finalized protocol for a national campaign due to the extensive research on campaign strategies. This review is simply an outline, a suggested inception point, for a future campaign. The cost of each campaign strategy was only discussed superficially within this review. Future research is needed in order to truly divulge the cost effectiveness of this layout. This paper briefly discussed the importance of positive messaging, “numerator/denominator” frequencies, and social marketing; however, no true messaging was suggested. Proper messaging must be created professionally based on population demographics in order to create effective campaign advertisement. The articles discussing European campaigns had to be written in English or translated which limits my search when researching national campaigns.

This paper can provide a substantial outline that can one day give rise to a standardized campaign urgently needed in the US. In attempts to further propel the success of this proposed campaign statewide and nationally, future research should compare and contrast current national campaigns targeting behavior changes in order to further identify effective strategies and a more realistic sense of cost.
References


Abstract

Introduction: Antibiotic resistance has been declared one of the world’s most pressing public health problems. Nationwide campaigns in Europe have been successful in decreasing resistance. The US campaign is maintained on the state level resulting in inconsistencies. This paper offers a framework for a standardized campaign by incorporating local and national campaign strategies.

Method: A literature review was performed using PubMed, Springlink, and EBSCO databases along with several campaign websites. 27 articles and four websites were utilized in creating the framework. Components: Professional education such as CME programs, interactive websites and emails have proven successful. Patient education with the use of pamphlets, school materials, and websites has shown an additive benefit. Advertisement is vital for the success of campaigns, yet the type of messaging is just as important as the avenue of exposure.

Conclusion: In order to promote antibiotic resistance a standardized national campaign is needed in the US.