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Assessing the Impact of Media Consumption on Knowledge and Behaviors Related to Explosive Device Contamination in Rural Colombia

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Michigan State University
2014

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An abstract of

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of
Master of Public Health
in Epidemiology

2016

Abstract

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By Jonathan Dieter Lehnert

Colombia has been ravaged by internal conflict for the past 60 years. Use of antipersonnel explosive devices by many participants went unchecked for years, resulting in contamination that poses a serious risk to the wellbeing of the rural population. In 2012, a survey was conducted among a representative sample of the rural population to assess the knowledge, attitudes, and practices of people living in areas affected by explosive devices. Data collected included information on the media consumption habits of the population for four types of media: newspaper, radio, television, and the Internet. Logistic regression models estimated the association between individual media consumption and selected knowledge and behavior outcomes associated with mine risk education activities. Findings suggest that newspaper and Internet consumption are more likely to be associated with desired outcomes. Furthermore, consumption of a wider variety of media sources was also associated with desired outcomes. The results suggest that newspapers and the Internet may be effective mine risk education reference materials for those in contaminated areas. Additionally, the results suggest that a population that consumes a wider variety of media is likely to be more knowledgeable about explosive devices. This information may be used to improve mine risk education efforts both in Colombia and in other conflict-affected areas.

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List of Acronyms

AUC	*Autodefensas Unidas de Colombia*
BIDES	*Batallón de Ingenieros de Desminado Humanitario No. 60 'Coronel Gabino Gutiérrez'*
CDC	Centers for Disease Control and Prevention
CINAMAP	*Comisión Intersectorial Nacional para la Acción contra Minas Antipersonal*
CNC	*Centro Nacional de Consultoría*
DAICMA	*Dirección para la Acción Integral contra Minas Antipersonal*
ELN	*Ejército de Liberación Nacional*
FARC	*Fuerzas Armadas Revolucionarias de Colombia*
IDP	Internally displaced person
IED	Improvised explosive device
KAP	Knowledge, attitudes, and practices
MRE	Mine risk education
NGO	Non-governmental organization
NSAG	Non-state armed group
PAICMA	*Programa Presidencial para la Acción Integral contra Minas Antipersonal*
SAS	Statistical Analysis Software
UNICEF	United Nations Children's Fund
UNMAS	United Nations Mine Action Service
UXO	Unexploded ordnance

Introduction

The Conflict

Colombia has been in a state of internal conflict for over 60 years. Starting in 1849, the Liberal and Conservative parties dominated Colombian politics despite the allowance of third party participation (1). Differences between the parties led to widespread conflict, which culminated in a period of partisan civil war known as "*La Violencia*" that claimed an estimated 280,000 lives between 1949 and 1958 (2). In 1958 these two parties formed the National Front and banned other parties from participating in politics in an effort to end the conflict (2). Political exclusion, marginalization of the rural poor, and the increasing influence of communist and socialist ideologies in the mid-1960s led to the emergence of non-state armed groups (NSAGs) such as the Leftist National Liberation Army (*Ejército de Liberación Nacional,* ELN) and the Revolutionary Armed Forces of Colombia (*Fuerzas Armadas Revolucionarias de Colombia,* FARC) (1,2). Tensions escalated when Colombian landowners and members of the military joined together to form paramilitary groups to combat these guerilla NSAGs in the 1980s (1,2). In 1997 the paramilitary groups formed a network known as the United Self-Defense Forces of Colombia (*Autodefensas Unidas de Colombia,* AUC) (3). Though ostensibly opposed to each other, nearly all NSAGs involved in the conflict are believed to have operated as part of the illicit drug trade, isolating the country from potential sources of international conflict resolution (2). A tenuous peace may be within reach as the Colombian government and FARC leaders seem to be making progress in a series of discussions that have been hosted in Havana, Cuba since November 2012 (4).

Impact of the Colombian Conflict

A report published by the Colombian government in 2013 found that nearly 220,000 people have died due to the conflict, over 177,000 of whom are believed to have

been civilians (5). Direct and indirect conflict-related mortality, displacement, disappearances, child recruitment, sexual violence, restrictions on travel and humanitarian aid, property damage, and other conflict-related problems have severely impacted the health of the civilian population, as well as the social and economic growth of the country at large.

According to the Electronic Mine Information Network, landmines, improvised explosive devices (IEDs), booby traps, and other types of ordnance have been used in Colombia for tactical and strategic purposes since 1990 (6). Colombia became a State Party to The Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction (also known as "the Ottawa Convention" or "the Mine Ban Treaty") on 1 March 2001. The Mine Ban Treaty bans the use of antipersonnel landmines by States Parties. The treaty also requires States Parties to destroy their stockpiles of mines within four years, clear all mined areas within their territories within 10 years, conduct mine risk education (MRE) activities, provide victim assistance, and report annually on progress in treaty implementation. The National Interministerial Commission on Antipersonnel Mine Action (*Comisión Intersectorial Nacional para la Acción contra Minas Antipersonal,* CINAMAP), established in 2002, is the government party responsible for implementation of the Mine Ban Treaty in Colombia. The tasks of developing a national plan to address the burden of landmines and explosive devices, assisting in making policy decisions, and coordinating international assistance fall to this group. The Presidential Program for Comprehensive Mine Action (*Programa Presidencial para la Acción Integral contra Minas Antipersonal,* PAICMA) was the technical secretariat within CINAMAP responsible for implementation of the 2009-2019 national mine action plan until 2014, when a reorganization within CINAMAP resulted in the creation of the Directorate for Comprehensive Mine Action (*Dirección para la Acción Integral contra Minas*

Antipersonal, DAICMA) (7). DAICMA is now responsible for implementing the 2009-2019 national action plan, which was developed with the aims of minimizing the socioeconomic impacts of antipersonnel explosive devices and implementing sustainable development programs in affected communities. The Colombian government receives additional guidance and advice from the United Nations Mine Action Service (UNMAS) (7).

Despite Colombia's status as a state party to the Mine Ban Treaty since its inception, the full extent of explosive device contamination in the country is unknown. The Colombian military has stated that they laid defensive landmines surrounding bases, but they report that those minefields have all been cleared (7). In 2015, Landmine Monitor reported that 30 of 32 departments in the country remained affected by explosive device contamination (7). Devices have been found surrounding schools, water sources, pathways, and stream crossings (7). See Appendix A for a map of departments in Colombia, and Appendix B for definitions of administrative units.

While the extent of explosive device contamination may be difficult to determine, the impact of this contamination is not. Each year, Colombia consistently ranks among countries with the highest morbidity and mortality due to explosive devices. Colombia reported the highest number of unexploded device injuries in the world in 2005, 2006, and 2007 (8). Economic losses can result from injuries as well as restricted access to water sources, fields, transportation routes, and centers of trade due to explosive device contamination. Even if the use of landmines and other explosive devices has slowed or halted due to the Mine Ban Treaty, many areas contaminated before the ban was put in place remain so to this day. There is also evidence that further contamination has occurred even after the signing of the treaty.

Many of those who have been spared physical encounters with explosive devices have been affected by the conflict. According to figures from the Internal Displacement Monitoring Centre, as of December 2014 there were an estimated 6,044,200 internally displaced persons (IDPs) in Colombia (9). The majority of displacement has occurred in five departments along the Pacific coast: Valle del Cauca, Nariño, Antioquia, Cauca, and Chocó (9). Those who have fled their homes have tended to migrate to urban areas in Colombia in an effort to find safety and access to government services (10). Those who have not fled from their homes are often isolated with limited access to goods and services and at increased risk of violence. Furthermore, lasting physical and psychological trauma can be attributed to spending extended periods of time in a conflict area (11).

Mine Action – Providing Relief to Those in Conflict Areas via Humanitarian Demining

"Mine action" is a term commonly used to describe interventions that seek to reduce the impact of landmines and other explosive devices on local populations. There are five "pillars" of mine action (in no particular order): humanitarian demining, mine risk education, advocacy against explosive device use, victim assistance, and stockpile destruction (12). Humanitarian demining refers to the activities of teams, usually with military background or training, who locate and dispose of explosive devices down to a certain soil depth. Cleared land is then handed back to local populations. During demining, participating organizations have the ability to communicate and develop trust with local communities. This is necessary to ensure that cleared land is used once it is returned and to identify other population needs.

Demining an area can be a lengthy and costly endeavor. In 2010, the Colombian government requested and received a 10-year extension to the deadline for compliance

with Article 5 of the Mine Ban Treaty, which necessitates that all mined areas are cleared (13). Initial demining in Colombia was performed by the Armed Forces Humanitarian Demining Battalion (*Batallón de Ingenieros de Desminado Humanitario No. 60 'Coronel Gabino Gutiérrez',* BIDES) (14). Due to the involvement of the armed forces, only areas without any rebel activity were eligible for humanitarian demining. In September 2013, the HALO Trust became the first non-governmental organization (NGO) to conduct demining in Colombia (15). To date, the HALO Trust remains the only accredited demining NGO operating in Colombia. Current demining operations are split between three groups: BIDES, the HALO Trust, and the Colombian Marines (14). Thus far, five municipalities in four departments have been demined and land has been returned to the population (14). Demining operations are currently underway in six departments: Antioquia, Meta, Bolívar, Caldas, Santander, and Tolima.

The protracted nature of the conflict and the limited involvement of international organizations make it difficult to monitor progress and assess areas that are at highest risk. In 2013, a report from PAICMA stated that "events"—defined as "a suspected hazardous area, the location of a mine accident, or a single mine encountered and destroyed by the army"—had occurred in 28 departments (16). A military demining operation in Colombia was able to clear just 0.47 km^2 in 2013 (16), double the productivity of the preceding year. Prior to and during demining, populations in contaminated areas remain at risk of injury.

Mine Action – Preventing Accidents through Mine Risk Education

Mine risk education (MRE), another pillar of mine action, refers to activities that seek to reduce the risk of fatal and non-fatal injury from landmines and other explosive devices by raising awareness and promoting safe behaviors (17). In contaminated areas where demining and clearance are ongoing or impossible, MRE is seen as one of the best

methods of protecting people from explosive device injuries. MRE can be used to raise awareness about the existence of explosive devices in a community, support demining by fostering cooperation between local populations and demining groups to help prioritization of areas to be demined, and support victim assistance and advocacy efforts. Mine action is most effective when all pillars are engaged and interconnected, emphasizing the importance of MRE.

Simply informing the population of the presence of explosive devices is often not adequate to reduce risk. In fact, some studies have shown that residents of contaminated areas may attempt their own demining or engage in other ways with explosive devices (18,19). A 2004 study in Battambang Province, Cambodia reported that most unexploded ordnance (UXO) injuries occurred when people deliberately engaged with explosive devices (19). The authors of this study identified some common reasons for engaging with identified explosive devices, including attempts to disarm devices in order to sell them as scrap metal or use them to craft fishing lures; move the devices; or play with the devices. Factors that have been shown to enable risky behaviors such as personal demining include basic development issues such as food insecurity, increased cash needs, and lack of community input for prioritizing areas to be demined (20). In addition, a lack of legislation regarding the scrap metal trade combined with the removal of UXO and subsequent failure to provide a replacement source of income have been associated with adverse outcomes (20). A comprehensive risk education program must include both “pre-accident” information such as how to identify an explosive device and how to minimize the risk of setting it off, and “post-accident” information such as basic triage for treating injuries and protocols to report accidents and access victim assistance (20,21). Campaigns must also be designed to reach those in rural areas. In Colombia, those residing in rural villages and indigenous areas are typically viewed as being at the highest risk of explosive device injuries (7).

Little information is published regarding ongoing MRE efforts in Colombia. In 2007, the International Committee of the Red Cross (ICRC) conducted a Knowledge, Attitudes, and Practices (KAP) survey in Colombia. This survey found a "disappointing level of awareness among the civilian population" and that fewer than half of respondents could correctly identify a landmine or other explosive device or identify a mined area (8,22). Following the survey, ICRC distributed informational leaflets and posters in rural Colombia in an attempt to raise awareness of the risks posed by landmines and other explosive devices (23).

Mine Action – Creating Change through Victim Assistance and Advocacy

Victim assistance programming is the third pillar of mine action and is required of all State Parties to the Mine Ban Treaty. Since 1999 rehabilitation centers providing medical and psychosocial support to victims have opened in the departments of Caqueta, Antioquia, and Valle de Cauca (7). In 2006, ICRC began victim assistance operations, followed by the Organization of American States Mine Action Program (*Acción Integral contra las Minas Antipersonales Colombia*, AICMA-CO) in 2007 (7). Despite increased participation in victim assistance programming by international NGOs, obstacles still exist to those attempting to access services. The process of registering as a victim is lengthy and complex, and survivors struggle with multiple financial, physical, and administrative barriers (7). Furthermore, what assistance is available is generally located in population centers and is therefore difficult to access for the rural poor who are affected by the conflict (7).

In 2015, Colombia reported spending 4% of the international mine action assistance it had received for the fiscal year on advocacy in accordance with the Mine Ban Treaty and the fourth pillar of mine action (7). The Colombian military reported

complete destruction of its stockpile of antipersonnel mines on 24 October 2004 in compliance with the Mine Ban Treaty and the fifth pillar of mine action (7). There is, however, evidence of continued use of explosive devices by NSAGs through 2015 despite public calls by FARC leaders for a halt to the practice (7).

Media in Colombia

Media consumption has been shown to play a role in how people react to certain situations (24–26). Indeed, this underlying impact is why media campaigns have been utilized to promote a wide range of activities that provide health benefits from exclusive breastfeeding to tuberculosis testing (27,28).

A 2010 analysis of the media landscape in Colombia reported that television and radio had the highest penetration in the market, with 93.5% and 68.7% of audience attention (defined as watchers or listeners per day), respectively (29). Consumption of print media (such as newspapers and magazines) and the Internet was much lower (33.9% and 30.3%, respectively). Surveys to determine the penetration of various types of media have been performed in urban areas (30,31). While media penetration may be lower in rural areas, expansion is expected as the economic situation in Colombia improves (29). These four types of media (newspaper, radio, television, and internet) constitute the majority of media consumption among Colombians (31). Increased media consumption among rural Colombians may eventually increase the potential impact of MRE activities.

Knowledge, Attitudes, and Practices Survey in Colombia

In 2012, representatives of the United Nations Children's Fund (UNICEF) Colombia, PAICMA, the *Centro Nacional de Consultoría* (CNC) and the U.S. Centers for Disease Control and Prevention (CDC) implemented a KAP survey representative of explosive device-affected rural areas in Colombia. The timing of the survey is fortunate

as recent developments in the political landscape of Colombia have led to the strongest push for a resolution to the conflict in years, providing both national and international organizations increased access to isolated populations.

This analysis utilizes the data from that survey to analyze the media consumption habits of rural populations in explosive device-affected areas of Colombia in an attempt to demonstrate how mass media could be used to improve the impact of MRE activities. The hypothesis is that there will be a positive association between consumption of media and the ability to correctly identify examples of explosive devices (landmines, grenades, and explosive booby traps) as seen in photographs shown during survey interviews. Furthermore, we expect a positive association between media consumption and the probability of a person responding in a safe manner during a real or theoretical encounter with a landmine, grenade, or explosive booby trap. We also expect a positive association between regular media consumption and the probabilities of both reporting explosive device encounters and possession of adequate knowledge of victim assistance programming. The hope is that by quantifying these associations, mine action organizations can reach a larger audience with more effective MRE materials, ultimately decreasing the impact explosive devices may have on the rural population.

Methods

Conducting the KAP Survey

The 2012 KAP survey utilized a multi-stage 40 x 28 cluster design. Initially 125 municipalities met the eligibility criteria. Municipalities were declared eligible based on: 1) the rate of civilian and military accidents due to antipersonnel mines and unexploded ordnance per year per 10,000 rural population; 2) the rate of "dangers" (mined area, dangerous area, military demining operations, observed unexploded ordnance, presence of dangerous or suspected dangerous areas, suspected minefields) per year per 10,000 rural population; 3) the number of armed/combat activities (attacks on military infrastructure, roadblocks, ambushes, confrontations between non-state armed groups, "friendly fire" events, harassment, and raids); 4) the rate of population displacement per year per 10,000 rural population; 5) the number of hectares of coca, marijuana, and poppy crops; and 6) the number of hectares of coca crops cleared by manual eradication. Data for these six indicators were provided by PAICMA, UNICEF Colombia, and the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and weighted to calculate a single explosive device risk indicator. Based on their knowledge of explosive device contamination and injuries, UNICEF Colombia and PAICMA personnel then generated a list of 125 municipalities with explosive device indicator scores by choosing a numeric cutoff for the indicator.

Of the 125 eligible municipalities, 24 were eliminated due to having been declared "mine free" (n=1), containing only one landmine or UXO-affected rural area (n=2), or lacking at least three potential rural clusters (n=21). Three rural clusters were required within each municipality to conform to the substitution plan agreed upon by survey partners. First stage sampling identified 40 clusters within 39 of the 101 included municipalities based on the probability proportional to size method. One municipality,

San Andrés de Tumaco, included two clusters, due to its relatively large population. Within each rural area, 28 households were selected. A household was defined as "one or more people living under one roof and sharing food (eating from the same pot) on a permanent basis, not including domestic servants/helpers or temporary visitors." To select households, interviewers selected a sampling interval "n" based on the number of dwellings in the town center, started with a randomly selected dwelling, and selected every nth dwelling. A map showing municipalities that were visited during survey collection can be seen in Appendix C.

Within each selected household, potential participants included one randomly selected adult (aged 18 and older) and all eligible children (aged 10 to 17). Eligible adults provided consent prior to administration of the survey. In households with eligible children, permission was sought from parents or guardians before children were approached; if authorization was given, eligible children provided assent prior to administration of the survey.

An adult questionnaire was administered to participants aged 18 and above, and a child questionnaire was administered to participants aged 10 to 17. Questionnaires were written simultaneously in Spanish and English by CDC personnel and reviewed by mine action experts at UNICEF Colombia and PAICMA and survey experts at CNC to assess the topical relevance, cultural appropriateness, and language of all survey questions.

Variables Selected for Analysis

Exposure variables were based on binary responses to questions asking whether or not the respondents consumed or utilized a specific type of media at least once a week, as well as a variable which enumerated the types of media utilized on a weekly basis. Media inquired about included newspaper, radio, television, and the Internet. Outcome

variables were based upon specific survey questions. Survey respondents' knowledge regarding explosive devices was assessed based on their ability to identify an explosive device when shown a picture and to describe victim assistance programming. Participants' behavior upon encountering explosive devices was analyzed via two survey questions. First, survey participants were shown pictures of three distinct explosive devices (a landmine, grenade, or explosive booby trap) and asked if they had ever physically seen the objects in the photograph. Based on each response, they were then either asked "What did you do with this object when you saw it?" or "If you saw this object, what would you do?" Responses were categorized into "safe" and "unsafe" behaviors. The probability of reporting only "safe" behaviors was modeled against each of the exposures independently. Safe behaviors included, among other things: telling an authority or another person, leaving the area, returning to safe ground via the participant's own tracks, and not interacting with the object. Survey participants were also asked "Would you report an antipersonnel mine or unexploded ordnance accident?" The response to this question (yes/no/no response) was modeled as a separate outcome. Covariates include age, gender, highest level of education reached, location of principal occupation (adults) or principal daily activity (children), and the ability to read and write in Spanish. Previous studies have shown that age, gender, principal occupation, and level of education are major risk factors for explosive device injury (32,33).

Data Analysis

Data were analyzed using Statistical Analysis Software (SAS) v9.4 (34). The survey design required use of the complex survey procedures available in SAS. The full model for each outcome included one exposure and all covariates previously listed to control for confounding. Age was categorized into 10-year categories, with the exception of ages 10-17, which constituted the child survey population, and ages 18-25. Education

was classified as incomplete primary school, complete primary school, incomplete high school, complete high school, and technical/college/graduate school. Principal occupation or activity location groups were created based on open-ended responses to the questions “What is your principal occupation?” or “What do you do most of the time?” asked of adults and children, respectively, resulting in groups roughly categorized by industry and/or physical location. Groupings included fields, forests, and water; construction, mines, and roads; markets, shops, and restaurants; schools, offices, health centers; and homes. Race/ethnicity was not included as a covariate during logistic regression because it was only asked on the questionnaire administered to adults, while this analysis is treating the two age groups as a combined population. Over-stratification resulted in term estimates that stretched on to infinity when interaction terms were included in the model. As a result, our final models do not assess for interaction between the exposure and the covariates. This analysis was declared exempt from institutional review board approval by the Emory University Institutional Review Board.

Results

Table 1 shows the demographic breakdown of survey participants. With the exception of gender, all information represented in Table 1 was self-reported. The largest group of adults reported that their principal occupation took place in the home (n=401, 43.7%). Sample occupations that were included in the "home" category include homemaker, plumber, and locksmith. The next largest grouping of occupations included those that took place in fields, forests, or near water (n=312, 33.1%). Sample occupations included in the "fields, forests, and water" category include fisherman/fisherwoman, farmer, and collector (gatherer). The majority of children reported that they spent most of their time in school (n=438, 78.2%).

Table 1. Demographic Breakdown of Survey Respondents

Descriptor	Adults (N=928) N	Adults (N=928) % *+	Children (N=562) N	Children (N=562) % *+
Male	451	49.3%	290	51.6%
Age (years)				
10-17	-	-	562	100.0%
18-25	133	17.0%	-	-
26-35	225	23.1%	-	-
36-45	216	22.6%	-	-
46-55	160	17.8%	-	-
56-65	105	11.4%	-	-
66+	89	8.1%	-	-
Race/Ethnicity				
Mestizo, White	636	67.9%	-	-
Indigenous	123	14.2%	-	-
Black, Mulatto, Afrocolombian, Person of African Descent	121	12.9%	-	-
Does Not Know	45	5.0%	-	-
Missing	3		562	100.0%
Highest Level of Education Reached				
None	84	8.2%	0	0.0%
Incomplete Primary School	322	34.8%	216	38.8%
Complete Primary School	192	19.7%	250	44.6%
Incomplete High School	155	18.3%	92	16.1%
Complete High School	111	12.2%	1	0.2%
Technical School/College/Graduate School	64	6.8%	2	0.3%
Missing	-	-	1	-
Can Read and Write in Spanish	813	88.4%	550	97.9%
Principal Occupation / Principal Activity Location				
Homes	401	43.7%	42	7.7%
Fields, Forests, Water	312	33.1%	34	6.1%
Markets, Shops, and Restaurants	78	7.6%	6	1.0%
Schools, Offices, Health Centers	68	7.7%	438	78.2%
Construction, Mines, and Roads	42	5.3%	3	0.5%
Not Working Now/Recreation	24	2.7%	35	6.5%
Missing	3	-	4	-

* % are calculated excluding missing observations

+ % are weighted based on the number of households sampled in the cluster

When asked which types of media they consumed at least once a week, adults and children alike were most likely to report that they used television (98.1% and 99.6%, respectively, reported watching at least once a week), followed closely by radio (95.8% and 97.5%, respectively) (Table 2). Print media was less popular, with 31.2% of adults and 48.4% of children reporting weekly reading. The Internet was the least commonly utilized source of media for adults and was also the media source with the largest usage difference between the two age groups (17.1% among adults and 59.5% among children).

Table 2. Weekly Media Consumption among Respondents

	Adults (N=928)		Children (N=562)	
Type of Media	**N**	**%*+**	**N**	**%*+**
Weekly Newspaper/Magazine Reading				
Yes	290	31.2	274.0	48.4
No	633	68.8	287.0	51.6
Does Not Know / Missing	5	-	1.0	-
Weekly Radio Listening				
Yes	763	95.8	452.0	97.5
No	32	4.2	11.0	2.5
Does Not Know / Missing	133	-	99	-
Weekly Television Watching				
Yes	811	98.1	521	99.6
No	17	1.9	2	0.4
Does Not Know / Missing	100	-	39	-
Weekly Internet Use				
Yes	146	17.1	331	59.5
No	777	82.9	230	40.5
Does Not Know / Missing	5	-	1	-

* % are calculated excluding missing observations
+ % are weighted based on the number of households sampled in the cluster

Adults most frequently reported using two different types of media on a weekly basis (n=442, 47.6%) whereas children most frequently reported using three different types of media weekly (n=227, 40.4%) (Table 3).

Table 3. Number of Different Types of Media Consumed Weekly

	Adults (N=968)		Children (N=562)	
Number of Weekly Media Sources	**N**	**%*+**	**N**	**%*+**
0 – No Reported Weekly Media Consumption	20	2.2%	3	0.5%
1 – One Type of Media Reported	170	18.3%	43	7.7%
2 – Two Types of Media Reported	442	47.6%	151	26.9%
3 – Three Types of Media Reported	228	24.6%	227	40.4%
4 – Four Types of Media Reported	68	7.3%	138	24.6%

* % are calculated excluding missing observations
+ % are weighted based on the number of households sampled in the cluster

Table 4 shows the frequency of outcomes of interest within the survey population. The majority of both adults and children stated that they would report an explosive device accident. With regards to correct identification of an object in a photograph, more respondents in both age groups were able to identify grenades than landmines or explosive booby traps. A clear difference was observed in the proportion of respondents who reported safe behaviors during an actual encounter with an explosive device when compared with those who were asked about a theoretical encounter.

Table 4. Frequency of Outcomes

	Adults		Children	
Outcome	**N**	**%*+**	**N**	**%*+**
Would Report an Explosive Device Accident	854	93.5%	510	91.0%
Able to Identify a Photo of a(n) _____				
Landmine	445	47.4%	322	57.3%
Grenade	737	80.1%	481	85.5%
Explosive Booby Trap	353	37.1%	222	39.2%
Reported Only Safe Behaviors during a Real Encounter with a(n) _____				
Landmine	31	44.3%	16	57.6%
Grenade	99	23.5%	52	28.4%
Explosive Booby Trap	23	37.1%	12	21.5%
Reported Only Safe Behaviors during a Theoretical Encounter with a(n) _____				
Landmine	609	72.7%	401	75.3%
Grenade	368	75.0%	307	80.3%
Explosive Booby Trap	582	69.6%	323	64.2%

* % are calculated excluding missing observations
+ % are weighted based on the number of households sampled in the cluster

Logistic Regression

The results of the logistic regression model in Table 5 show the association between media consumption and the probability that the participant would report an explosive device accident, controlling for age, gender, highest level of education reached, primary occupation or activity location, and self-reported ability to read and write in Spanish. Participants were more likely to state that they would report an explosive device accident when they reported reading a newspaper or using the Internet on a weekly basis (Table 4). Additionally, participants who reported using a wider variety of media weekly were more likely to state that they would report an accident. This association in particular

appeared to grow stronger as the number of sources increased, mimicking a "dose-response" curve.

Table 5. Modeling the Probability of a Survey Participant Reporting an Explosive Device Accident

Media Consumed at Least Once per Week	N	%	OR	95% CI		P-value
Newspaper	534	96.0%	2.33	1.18	4.61	0.02
Radio	1122	93.4%	0.65	0.18	2.35	0.51
Television	1219	93.0%	0.37	0.04	3.27	0.37
Internet	445	95.1%	1.99	1.01	3.95	0.05
Number of Unique Media Sources						
0	15	75.0%	Ref			
1	186	89.4%	3.59	1.16	11.14	0.03
2	531	91.1%	3.95	1.34	11.69	0.01
3	428	95.1%	7.41	2.13	25.74	<0.01
4	197	97.0%	17.45	5.51	55.20	<0.001

Tables 6-8 use the same covariates as Table 5, but model the probability that a participant would be able to correctly identify the object in a photograph of a landmine (Table 5), a grenade (Table 6), and an explosive booby trap (Table 7). In a logistic regression model examining the participant's ability to correctly identify a photograph of a landmine, significant associations can be seen when the respondent reported reading a newspaper or accessing the Internet at least once per week (Table 6). Significance was also observed when the participant reported consuming three or four different types of media weekly.

Table 6. Modeling the Probability of a Survey Participant Correctly Identifying a Landmine

Media Consumed at Least Once per Week	N	%	OR	95% CI		P-value
Newspaper	329	58.9%	1.40	1.06	1.84	0.02
Radio	635	52.5%	1.76	0.93	3.33	0.08
Television	694	52.5%	0.94	0.31	2.89	0.91
Internet	299	63.9%	1.68	1.19	2.38	<0.01
Number of Unique Media Sources						
0	3	15.0%	Ref			
1	88	41.7%	2.52	0.63	10.10	0.19
2	273	46.2%	2.72	0.73	10.06	0.13
3	269	59.7%	4.15	1.06	16.17	0.04
4	129	63.6%	4.32	1.12	16.75	0.03

When modeling the participant's ability to identify a grenade a significant association can be seen when the participant reported accessing the Internet at least once a week (Table 7).

Table 7. Modeling the Probability of a Survey Participant Correctly Identifying a Grenade

Media Consumed at Least Once per Week	N	%	OR	95% CI		P-value
Newspaper	491	87.5%	1.31	0.80	2.13	0.29
Radio	995	82.3%	0.73	0.23	2.29	0.59
Television	1099	83.1%	1.81	0.77	4.27	0.18
Internet	432	91.5%	1.95	1.00	3.80	0.05
Number of Unique Media Sources						
0	11	55.0%	Ref			
1	154	73.3%	1.14	0.34	3.78	0.84
2	463	78.3%	1.28	0.42	3.91	0.66
3	395	87.6%	1.82	0.58	5.65	0.30
4	188	91.7%	2.42	0.64	9.11	0.19

No significant associations were found when modeling the participant's ability to identify an explosive booby trap based on a photograph (Table 8).

Table 8. Modeling the Probability of a Survey Participant Correctly Identifying an Explosive Booby Trap

Media Consumed at Least Once per Week	N	%	OR	95% CI		P-value
Newspaper	247	44.0%	1.27	0.95	1.69	0.10
Radio	474	39.3%	0.81	0.29	2.32	0.70
Television	519	39.3%	0.99	0.32	3.06	0.99
Internet	214	45.4%	1.40	0.98	2.00	0.06
Number of Unique Media Sources						
0	7	35.0%	Ref			
1	71	33.7%	0.78	0.27	2.26	0.65
2	202	34.4%	0.67	0.24	1.84	0.44
3	189	42.0%	0.95	0.35	2.63	0.92
4	103	50.2%	1.16	0.39	3.45	0.80

Survey participants were asked about their behaviors during encounters with specific types of explosive devices. Participants who stated that they had encountered an explosive device prior to survey administration were asked about

their actual behaviors during the encounter. Participants who stated that they had not previously encountered an explosive device were asked about how they would behave should they encounter one in the future. These are treated as separate outcomes (actual encounter vs. theoretical encounter).

Reading a newspaper at least once a week was significantly associated with safe behavior during a theoretical encounter with a landmine. Utilizing three to four different types of media weekly was also associated with reporting safe behaviors during a theoretical encounter. However, there were no significant associations observed between measures of media consumption and behavior during an actual landmine encounter.

Table 9. Modeling the Probability of a Safe Encounter with a Landmine.

	Only Safe Behaviors in a Theoretical Encounter					
Media Consumed at Least Once per Week	**N**	**%**	**OR**	**95% CI**		**P-value**
Newspaper	409	79.3%	1.54	1.14	2.07	<0.01
Radio	831	73.7%	0.73	0.28	1.89	0.52
Television	912	73.9%	1.49	0.44	5.04	0.52
Internet	343	77.4%	1.16	0.77	1.75	0.48
Number of Unique Media Sources						
0	9	47.4%	Ref			
1	129	65.8%	2.13	0.82	5.49	0.12
2	386	69.7%	2.03	0.82	5.07	0.13
3	322	77.4%	2.94	1.20	7.23	0.02
4	157	81.8%	3.44	1.16	10.16	0.03

	Only Safe Behaviors in an Actual Encounter					
Media Consumed at Least Once per Week	**N**	**%**	**OR**	**95% CI**		**P-value**
Newspaper	20	45.5%	0.49	0.17	1.43	0.19
Radio	36	43.9%	-	-	-	-
Television	45	51.1%	-	-	-	-
Internet	18	64.3%	4.42	0.78	24.88	0.09
Number of Unique Media Sources						
0	0					
1	6	40.0%	Ref			
2	18	51.4%	4.33	0.91	20.58	0.07
3	15	42.9%	1.60	0.23	10.96	0.63
4	8	61.5%	2.53	0.24	26.40	0.44

Similarly, significant associations were observed when examining media consumption habits and theoretical encounters with grenades (Table 10). Individually, reading a newspaper and watching television were significantly associated with reporting safe behaviors during a theoretical encounter with a grenade. Utilizing a variety of different types of media was also associated with reporting safe behaviors during a theoretical encounter. However, there were no

significant associations observed between media consumption habits and conducting safe behaviors during an actual encounter with a grenade.

Table 10. Modeling the Probability of a Safe Encounter with a Grenade

Media Consumed at Least Once per Week	Only Safe Behaviors in a Theoretical Encounter					
	N	%	OR	95% CI		P-value
Newspaper	278	85.0%	1.48	1.02	2.16	0.04
Radio	538	77.6%	0.66	0.16	2.66	0.55
Television	615	79.4%	6.56	1.08	39.91	0.04
Internet	225	82.7%	1.05	0.59	1.86	0.87
Number of Unique Media Sources						
0	6	40.0%	Ref			
1	92	68.7%	4.29	1.04	17.68	0.04
2	266	75.8%	4.34	1.11	16.92	0.03
3	192	79.7%	5.22	1.36	20.07	0.02
4	114	89.8%	8.06	1.89	34.34	<0.01

Media Consumed at Least Once per Week	Only Safe Behaviors in an Actual Encounter					
	N	%	OR	95% CI		P-value
Newspaper	64	27.5%	1.02	0.68	1.51	0.94
Radio	126	24.6%	0.29	0.08	1.04	0.06
Television	132	24.1%	0.43	0.10	1.96	0.28
Internet	55	27.6%	1.21	0.59	2.49	0.61
Number of Unique Media Sources						
0	2	40.0%	Ref			
1	17	22.4%	0.69	0.14	3.38	0.64
2	54	22.5%	0.60	0.13	2.85	0.52
3	56	26.9%	0.64	0.14	2.82	0.55
4	21	26.9%	0.60	0.11	3.29	0.56

No individual type of media was significantly associated with safe behaviors during any type of encounter (theoretical or actual) with an explosive booby trap (Table 11). However, using a variety of media sources weekly was significantly associated with safe behaviors during a theoretical encounter.

Table 11. Modeling the Probability of a Safe Encounter with an Explosive Booby Trap

Media Consumed at Least Once per Week	Only Safe Behaviors in a Theoretical Encounter					
	N	%	OR	95% CI		P-value
Newspaper	278	85.0%	1.29	0.98	1.71	0.07
Radio	538	77.6%	1.83	0.86	3.90	0.12
Television	615	79.4%	1.89	0.62	5.81	0.26
Internet	225	82.7%	1.15	0.76	1.74	0.51
Number of Unique Media Sources						
0	5	27.8%	Ref			
1	123	62.4%	4.23	1.44	12.46	0.01
2	356	64.3%	4.55	1.45	14.29	0.01
3	299	72.6%	6.82	2.11	22.07	<0.01
4	117	69.6%	5.89	1.75	19.83	<0.01

Media Consumed at Least Once per Week	Only Safe Behaviors in an Actual Encounter					
	N	%	OR	95% CI		P-value
Newspaper	19	28.8%	0.87	0.19	4.00	0.86
Radio	28	28.3%	3.23	0.28	37.89	0.35
Television	35	29.7%	1.68	0.31	9.14	0.55
Internet	17	27.9%	1.10	0.24	5.10	0.90
Number of Unique Media Sources						
0	0	0%				
1	2	16.7%	Ref			
2	11	31.4%	1.16	0.18	7.48	0.87
3	13	34.2%	3.68	0.54	25.03	0.18
4	9	24.3%	1.34	0.11	16.03	0.82

Discussion

Opportunities to collect data in Colombia on conflict-related topics for the benefit of those living in conflict-affected areas are relatively rare and efforts must be made to utilize their findings. This survey provides us with insight into a population living in rural areas thought to be affected by explosive devices, whether through personal encounters or hardships imposed on their way of life due to explosive device contamination.

As seen in Table 2, the vast majority of respondents reported listening to the radio or watching television on a weekly basis. MRE media campaigns based on these two distribution mechanisms would reach the widest audience of the four types of media analyzed, and would be well suited to calling attention to the problem. National television and radio stations could also be used to supplement more localized MRE campaigns (such as those run through regional media), which possess the ability to customize their messages. An added benefit of using broadcast media as a communications mechanism would be the reduced delay between the creation and distribution of a message; radio and television, for example, can operate in "real-time" while print media require more time to disseminate messages. Table 3 shows us that most of the survey population utilized multiple types of media in a given week, further suggesting that MRE media campaigns should not rely on a single distribution mechanism.

The logistic regression models allow us to examine selected outcomes that we would hope to improve utilizing MRE. Based on our results, more informed survey respondents were more likely to report an explosive device accident (Table

5). Reading the newspaper and using the Internet were significantly associated with an increased probability of reporting an explosive device accident. This may be due to the fact that information collected by a respondent via these types of media is done so actively (in other words, the respondent is choosing to read the newspaper or browse to the website) rather than passively (as is often the case with broadcast media). Another possibility is that information distributed via newspaper or the Internet can be accessed on demand whereas the consumer has less control over the availability of information distributed via radio or television. This emphasizes the impact that print media and the Internet can have as reference materials or knowledge repositories that, when utilized in conjunction with mechanisms for MRE distribution, could have a real impact on personal behavior.

The probability of reporting an explosive device accident increased consistently when a wider variety of media consumption was reported (OR = 3.59 for a single type of media, OR = 17.47 for four types of media), further emphasizing the importance of using a variety of media during an MRE campaign [Table 5]. Spreading a message across multiple types of media not only increases the size of the audience that will be reached; it also provides reinforcement in those who are exposed multiple times.

Tables 6, 7, and 8 model the probability that a respondent would be able to identify the explosive devices shown in a series of photographs. Newspaper and Internet use were significantly associated with an ability to correctly classify the object in the picture of a landmine, while Internet use only was significantly

associated with being able to correctly classify the object in the picture of a grenade. No measures of media consumption were significantly associated with being able to correctly classify the object in the picture of an explosive booby trap. The significant association between newspaper and Internet usage and the identification of explosive devices supports the notion that distributing information in a way that can be actively collected and retained by the population increases recognition. Future studies of this topic may consider using multiple pictures for each device category and/or ensuring that selected photographs are representative of the devices potentially encountered by respondents, as explosive device types vary widely by geographic area.

Actual or theoretical respondent behavior when encountering a landmine, grenade, or explosive booby trap served as the regression outcomes in Tables 9, 10, and 11 respectively. The number of respondents who reported not having encountered an explosive device, and who therefore were responding with how they would hypothetically react, was similar for all three device categories. This outcome should be interpreted as an assessment of respondents' knowledge of safe behaviors. An important caveat that must be considered is that there is no way of knowing whether those who reported safe behaviors during a theoretical encounter would actually conduct these behaviors in reality.

The numbers of respondents who reported having previous encounters with landmines or explosive booby traps were much smaller than the number who reported a previous encounter with a grenade. Potential reasons for this include the increased presence or use of grenades in the region where the survey

was conducted and higher familiarity with grenades based on exposure to film or other media. Future studies should attempt to elucidate these hypotheses. Regardless, the small population sizes meant that no statistically significant associations were found between these outcomes and the media exposure variables described previously.

A significant association between reading a newspaper once or more per week and reporting only safe behaviors when asked about a theoretical encounter with an explosive device (indicating high knowledge of safe behaviors) was observed across two of the three device categories (landmines OR: 1.5, 95% CI: 1.14, 2.07, grenades OR: 1.5, 95% CI: 1.02, 2.16). While not statistically significant at an alpha = 0.05 level, reading a newspaper was the most significant of the individual media exposures among respondents reporting safe behaviors during a theoretical encounter with an explosive booby trap. This could be interpreted as supporting evidence for the use of newspapers or other forms of mass distributed print media as MRE reference materials for those living in affected areas. On the other hand, there is presently no way of knowing whether or not reference materials could be distributed and used in such a way that would guarantee translation of safe knowledge into safe behaviors.

The variety of media sources used weekly by the respondents was significantly associated with knowledge of safe behaviors for all three device categories. However, the patterns observed in the strength of association were different. The association was only significant with utilization of at least three varieties of media when discussing landmines. Progressively increasing

significance was demonstrated when examining the association with grenade encounters. Highly significant associations were observed at all levels of the media variety variable, contradicting the non-significance of the individual media varieties (Table 11). Future research on this subject could include questions about how frequently participants have been exposed to information on explosive devices while using different types of media. Further targeted research would have to be done to confidently draw conclusions about the behavior of survey respondents.

Limitations

A number of limitations with this analysis must be addressed. First, the information we gathered in our exposure variables was not specifically related to mine action activities. Our exposure variables in this analysis simply reported weekly consumption of specific types of media within a given week. This limitation primarily impacts our ability to make predictions regarding behaviors of survey respondents, as was demonstrated by the non-significance, wide confidence intervals, and in some cases seemingly contradictory results. Furthermore, it likely impacts the "passive" media exposures (radio and television) more than the "active" media exposures (newspaper and Internet). Exposures unrelated to mine action do not necessarily affect the conclusions drawn from non-behavior outcomes, such as identification and probability of reporting an accident, as these outcomes may be influenced by other knowledge gained from consuming media. While not necessarily as effective as exposure to formal MRE materials and activities, seeing an explosive device in "pop

culture"—such as movies—could provide some sort of reference point when attempting to identify a real device. Further research would need to be done to determine the impact that "pop culture" could have on perceptions of explosive devices.

Additionally, the numbers of respondents who reported real-life encounters with explosive devices were relatively low for all three devices in the photographs shown. This may have been a reflection of the interview team's inability to access some of the most conflict-affected (and therefore likely explosive device-affected) areas of the country due to security concerns and would further impact our ability to assess the association between media consumption and behavior. As the peace process progresses and more areas achieve an acceptable level of security, it could be interesting to reassess how MRE activities can influence behavior.

Another inherent limitation is our inability to assess trends over time. In this case, it was impossible to do any sort of follow-up survey with the respondents. It would be interesting to compare changes in respondent outcomes over time and in relation to receipt of MRE messaging. Such trends could also be compared to changes in media penetration. This could be interesting considering the probable expansion of mass media in rural Colombia, and the results could be used in conjunction with those presented in this analysis to ensure that mass media is effectively utilized to achieve mine action goals.

A major limitation in our analysis was the relative lack of information on currently ongoing MRE activities in Colombia. Little published information is

available, and repeated attempts at informal information gathering via personal contacts failed. Organizations working in Colombia must coordinate with each other, the Colombian government, and the scientific community to minimize duplication of work and ensure that those in conflict-affected areas can benefit as much as possible from the work being done.

Utilizing photographs selected by the survey designers may have introduced bias into the results depending on how representative the chosen photographs were of the types of explosive devices encountered in the areas where the interviews were conducted. Landmine Monitor reports that most explosive devices encountered in Colombia are improvised rather than factory-made, and because improvised devices necessarily encompass locally available materials it may be difficult to locate photographs that would resonate with participants in multiple regions.

Finally, these results may have been affected by the various biases that accompany most surveys that take place in conflict areas. Recall bias (where memory decay influences a participant's recall of historical events) may have influenced the participants' responses to questions regarding actual behavior when they encountered explosive devices. Courtesy bias (where a participant answers the interview question in a way that he or she believes the interviewer wants to hear) may have impacted many of the questions asked. Finally, though every effort was taken to ensure that participants understood the purpose of the survey it is possible that unforeseen cultural factors may have influenced how participants responded to questions.

Conclusions

We attempted an introductory analysis of the role media consumption may have in determining respondent knowledge of and behavior related to explosive devices. While the analysis was hindered by the lack of specificity in the data collected, we are still able to report information that can be used to inform initial MRE activities. The most popular sources of media consumed in our survey population were television and radio. The Internet was used more frequently by children aged 10-17 than adults. A large proportion of the population self-reported an ability to read and write in Spanish. Most of the adults surveyed spend the majority of their time either in the home or settings with fields, forests, and water. Newspapers and the Internet may be good repositories of mine action reference information, given the logistic regression analyses conducted here and the fact that they may be more easily accessed on demand than broadcast media such as television and radio.

MRE activities should attempt to use examples that are as localized as possible when describing explosive devices to the population, as differences in the appearance of devices may have played a role in limiting the ability of respondents to identify landmines, grenades, and explosive booby traps. A repeated survey with a question set that is more specific and created with the intention of measuring the associations described in this analysis would go far in strengthening or weakening the conclusions drawn from these data. Transparency on the part of organizations presently conducting MRE in

Colombia would make it easier to monitor the effectiveness of interventions and to ensure that maximum efficiency is being attained.

References

1. British Broadcasting Corporation. Colombia Timeline. (http://news.bbc.co.uk/2/hi/americas/country_profiles/1212827.stm). (Published August 14, 2012). (Accessed January 26, 2016)

2. Lopez G. The Colombian Civil War. *Jackson Sch. J.* [electronic article]. 2011;2(1). (http://globalstudies.washington.edu/the-colombian-civil-war/). (Accessed March 10, 2016)

3. Center for Justice & Accountability. CJA: Background on Colombia. (http://www.cja.org/article.php?list=type&type=400). (Accessed April 13, 2016)

4. British Broadcasting Corporation. What is at stake in the Colombian peace process? *Br. Broadcast. Corp. News*. (http://www.bbc.com/news/world-latin-america-19875363). (Published September 24, 2015). (Accessed January 26, 2016)

5. Centro Nacional de Memoria Historica. ¡Basta ya! Colombia: Memorias de guerra y dignidad. Centro Nacional de Mormoria Historica; 2012 (Accessed January 26, 2016).(http://www.centrodememoriahistorica.gov.co/micrositios/informeGeneral/). (Accessed January 26, 2016)

6. United Nations Mine Action Service. UN Mine Action Gateway | Colombia. (http://www.mineaction.org/programmes/colombia). (Updated February 2016). (Accessed April 13, 2016)

7. Landmine & Cluster Munition Monitor. Colombia Mine Action Report. Landmine & Cluster Munition Monitor; 2015 (Accessed April 13, 2016). (http://www.the-monitor.org/en-gb/reports/2015/colombia/mine-action.aspx). (Accessed April 13, 2016)

8. Landmine & Cluster Munition Monitor. Colombia Mine Action Report. Landmine & Cluster Munition Monitor; 2007 (Accessed April 13, 2016). (http://archives.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2007&pqs_type=lm&pqs_report=colombia&pqs_section=). (Accessed April 13, 2016)

9. Internal Displacement Monitoring Centre. Internal Displacement Monitoring Centre - Colombia Profile. 2014;(http://www.internal-displacement.org/americas/colombia/). (Accessed January 26, 2016)

10. Højen L. Colombia's "Invisible Crisis": Internally Displaced Persons. Council on Hemispheric Affairs; 2015 (Accessed January 7, 2016). (http://www.coha.org/colombias-invisible-crisis-internally-displaced-persons/). (Accessed January 7, 2016)

11. UNICEF. Deadly Landmines threaten the lives and well-being of children in rural Colombia. UNICEF; 2007 (Accessed January 26, 2016). (http://www.unicef.org/infobycountry/colombia_39301.html). (Accessed January 26, 2016)

12. Moyes R, Tinning D. Formal and Informal Responses to Ordnance Contamination. United Nations Institue for Disarmament Research; (Accessed January 14, 2016). (http://www.article36.org/wp-content/uploads/2008/10/eu_bgp_08-formal-informal-responses.pdf). (Accessed January 14, 2016)

13. Dirección para la Acción Integral contra Minas Antipersonal. Address for Comprehensive Action against Antipersonnel Mines. 2016; (http://www.accioncontraminas.gov.co/Paginas/aicma.aspx). (Accessed April 13, 2016)

14. Dirección para la Acción Integral contra Minas Antipersonal. Humanitarian demining. 2016;(http://www.accioncontraminas.gov.co/accion/desminado/Paginas/Desminado-Humanitario.aspx). (Accessed April 13, 2016)

15. HALO Trust. HALO Trust Colombia Profile. (Accessed January 21, 2016). (http://www.halotrust.org/where-we-work/colombia). (Accessed January 21, 2016)

16. Programa Presidencial para la Acción Integral contra Minas Antipersonal. Anti-Personnel Landmines Convention Article 7 Report 2013. Programa Presidencial para la Acción Integral contra Minas Antipersonal; 2012 (Accessed April 13, 2016). (http://www.unog.ch/80256EDD006B8954/(httpAssets)/C38EBD17A3CC33ADC1257B64005C3D1B/$file/Colombia+2012+APLC.pdf). (Accessed April 13, 2016)

17. United Nations Mine Action Service. International Mine Action Standards 12.10 - Mine/ERW Risk Education. 2010; (http://www.mineactionstandards.org/fileadmin/MAS/documents/imas-international-standards/english/series-12/IMAS-12-10-Ed2-Am2.pdf). (Accessed April 13, 2016)

18. Bottomley R. Crossing the Divide: Landmines, Villagers and Organizations. International Peace Research Institute; 2003 (Accessed November 13, 2015).(https://www.prio.org/Publications/Publication/?x=7223). (Accessed November 13, 2015)

19. Moyes R. Tampering: Deliberate handling & use of live ordnance in Cambodia. Geneva International Centre for Humanitarian Demining; 2004 (Accessed April 13, 2016).(http://www.gichd.org/mine-action-resources/publications/detail/publication/tampering-deliberate-handling-use-of-live-ordnance-in-cambodia/). (Accessed April 13, 2016)

20. Durham J, Gillieatt S, Sisavath B. Effective mine risk education in war-zone areas - a shared responsibility. *Health Promot. Int.* [electronic article]. 2005;20(3):213–220. (http://heapro.oxfordjournals.org/content/20/3/213.long). (Accessed August 21, 2015)

21. Arnson Y, Bar-Dayan Y. Reducing Landmine Mortality Rates in Iran Using Public Medical Education and Rural Rescue Teams - What Can be Learned from Landmine Casualties, and How Can the Situation be Improved? *Preshopital Disaster Med.* [electronic article]. 2009;24(02):130–132. (http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=8255842&fulltextType=AC&fileId=S1049023X00006683). (Accessed August 21, 2015)

22. International Committee of the Red Cross. Encuesta sobre conocimientos, actitudes, y practicas (CAP), observaciones y recomendaciones, departamentos de Antiquia, Meta y Tolima. Bogota: International Committee of the Red Cross; 2007 (Accessed January 25, 2016).(http://archives.the-monitor.org/index.php/publications/display?url=lm/2008/countries/colombia.html#footnote-7757-160). (Accessed January 25, 2016)

23. Moloney A. Caring for Colombia's Landmine Survivors. *Lancet* [electronic article]. 2009;373(9680):2013–2014. (http://www.sciencedirect.com/science/article/pii/S0140673609610953#). (Accessed January 7, 2016)

24. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behavior. *Lancet* [electronic article]. 2010;376(9748):1196. (http://www.sciencedirect.com/science/article/pii/S0140673610608094). (Accessed January 19, 2016)

25. Brown JD, Witherspoon EM. The mass media and American adolescents' health. *J. Adolesc. Health*. 2002;31(6):153–170.

26. Story M, Neumark-Sztainer D, French S. Individual and Environmental Influences on Adolescent Eating Behaviors. *J. Am. Diet. Assoc.* 2002;102(3):S40–S51.

27. Gupta N, Katende C, Bessinger R. An Evaluation of Post-campaign Knowledge and Practices of Exclusive Breastfeeding in Uganda. *J. Health Popul. Nutr.* [electronic article]. 2004;22(4):429–439. (http://www.jstor.org/stable/23499161). (Accessed April 1, 2016)

28. Jaramillo E. The impact of media-based health education on tuberculosis diagnosis in Cali, Colombia. *Health Policy Plan.* [electronic article]. 2001;16(1):68–73. (http://heapol.oxfordjournals.org/content/16/1/68.long). (Accessed January 19, 2016)

29. Arango-Forero G, Arango MF, Llana L, et al. Colombian Media in the 21st Century: The Re-conquest by Foreign Investment. *Palabra Clave* [electronic article]. 2010;13(1). (http://www.scielo.org.co/scielo.php?pid=S0122-82852010000100005&script=sci_arttext). (Accessed January 7, 2016)

30. Salzman R, Aloisi R. News Media Consumption and Political Participation in Central America: Causation and Explanation. *J. Span. Lang. Media* [electronic article]. 2009;22:46–75. (http://spanishmedia.mcom.ttu.edu/pdf/vol-22009.pdf#page=48). (Accessed November 10, 2015)

31. Papathanassopoulos S, Coen S, Curran J, et al. Online Threat, But Television is Still Dominant. *Journal. Pract.* 2013;7(6):690–704.

32. Bilukha OO, Brennan M, Woodruff BA. Death and Injury From Landmines and Unexploded Ordnance in Afghanistan. *J. Am. Med. Assoc.* [electronic article]. 2003;290(5). (http://archpsyc.jamanetwork.com/data/Journals/JAMA/4890/JBR30227.pdf). (Accessed February 3, 2016)

33. Krug EG, Ikeda RM, Qualls ML, et al. Preventing Land Mine-Related Injury and Disability - A Public Health Perspective. *J. Am. Med. Assoc.* [electronic article]. 1998;280(5). (http://jama.jamanetwork.com/article.aspx?articleid=187802). (Accessed February 3, 2016)

34. Statistical Analysis Software. Cary, North Carolina: SAS Institute.

Appendix A.
Map of Colombia

Source: La Historia con Mapas. [no date]. *Mapa politico administrativo de Colombia*. Available at http://www.lahistoriaconmapas.com/atlas/colombia-maps/mapa-politico-administrativo-de-colombia.htm. Accessed 6 April 2016.

Appendix B.
A Summary of Political and Administrative Divisions in Colombia

The following text provides a brief description of terms used in the protocol and in the drawing of the sample. These descriptions are based on information from the National Administrative Department of Statistics (*Departamento Administrativo Nacional de Estadistica*, DANE) website (http://www.dane.gov.co/daneweb_V09/) and conversations with personnel from CNC and UNICEF Colombia.

Departamento (rough English equivalent: "Department")

- A departamento is a territorial entity with autonomy in planning and promotion of economic and social development. Departamentos exercise administrative functions within their territories, provide services determined by the Colombian constitution and laws and serve as intermediaries between national and municipal government representatives. There are 32 departamentos in Colombia.

Municipio (rough English equivalent: "Municipality")

- A municipio is the basic territorial political/administrative division of Colombia with political, fiscal, and administrative autonomy as stipulated by the Colombian constitution and laws. Each municipio has at least 14,000 inhabitants and comprises one cabecera municipal and many centros poblados. There are 1119 municipios in Colombia.

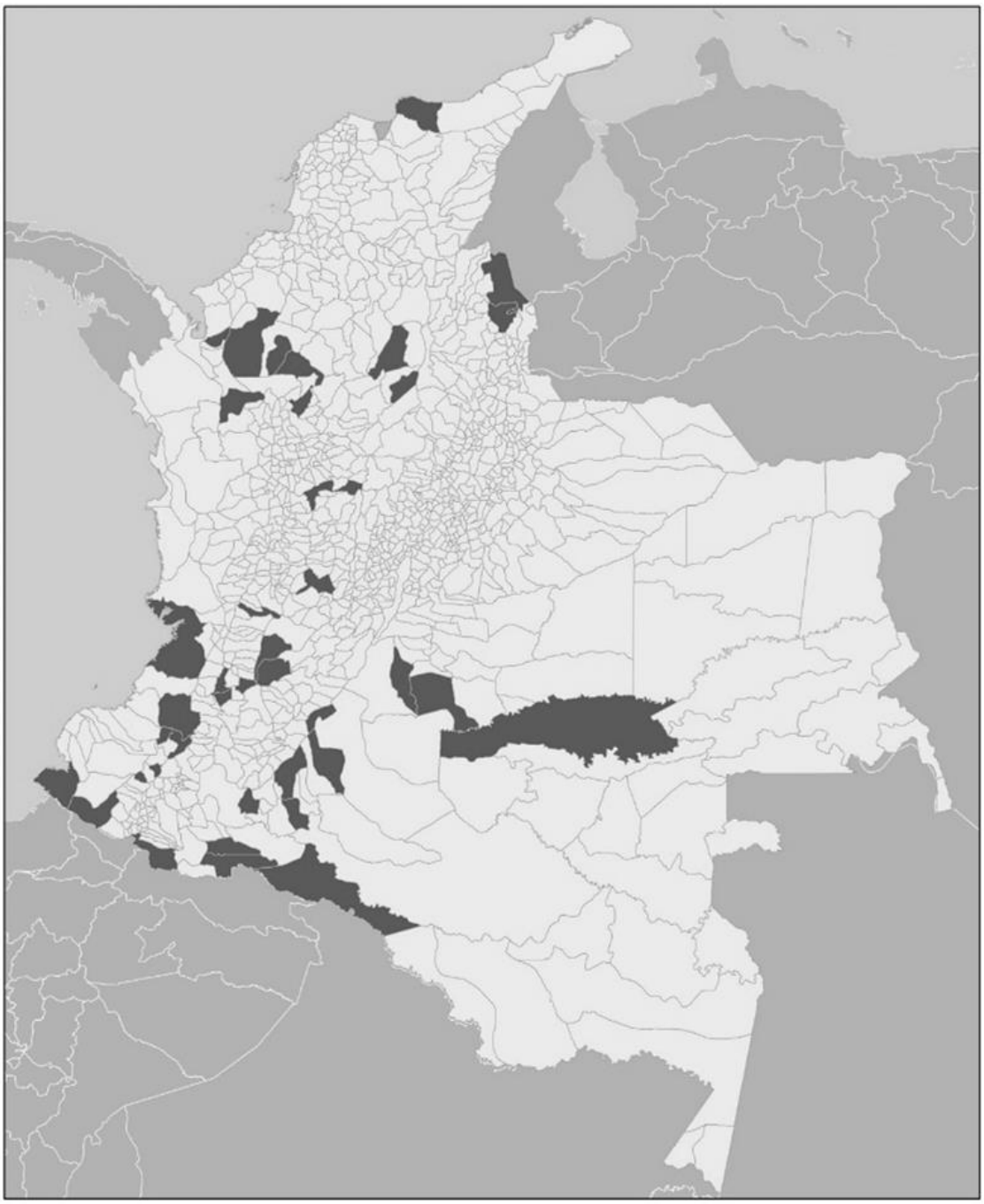
Cabecera Municipal (rough English equivalent: "Municipal Capital")

- A cabecera municipal is defined by an urban perimeter established by the municipal council, and serves as the administrative seat of the municipio.

Centro Poblado (rough English equivalent: "Town Center")

- DANE created the term "centro poblado" to identify population centers for statistical purposes. According to DANE, a centro poblado contains a minimum 20 adjoining, adjacent, or attached houses, located in a rural area of a municipio or corregimiento departamental. A centro poblado has urban characteristics such as (city) blocks and clearly defined vehicular and pedestrian paths. Centros poblados are commonly known as caseríos, inspecciones de policía and corregimientos.

Appendix C.
Municipalities Visited for Data Collection



Map created using ArcGIS 10, ESRI
(http://www.esri.com/software/arcgis/index.html)