3 **Hansard, House of Commons Debates**. Available at http://www.parl.gc.ca/37/2/ parlbus/chambus/house/debates/031_2002- 11-25/han031_1120-E.htm (accessed 17 August 2005).

4 **Hansard, House of Commons Debates**. Available at http://www.parl.gc.ca/37/2/ parlbus/chambus/house/debates/031_2002- 11-25/han031_1145-E.htm (accessed 17 August 2005).

5 **Warda L**, Tenenbein M, Moffatt MEK. House fire injury prevention update. Part 1. A: review of risk factors for fatal and non-fatal house fire injury. *Inj Prev* 1999;**5**:145–50.

6 Health promotion: Smoking control. *Public Health Rep* 1983;suppl:107–116.

7 **Gray NJ**, Henningfield JE. A long-term view of harm reduction. *Nicotine Tob Res* 2004;**6**:759–64.

8 **Warner Ke**, Martin EG. The US tobacco control community's view of the future of tobacco harm reduction. *Tob Control* 2003;**12**:383–90.

9 **Warner KE**. Tobacco harm reduction: promise and perils. *Nicotine Tob Res* 2002;**4**(Suppl 2):S61–71.

10 **Gilpin EA**, Pierce JP. The California Tobacco Control Program and potential harm reduction through reduced cigarette consumption in continuing smokers. *Nicotine Tob Res* 2002;**4**(Suppl 2):S157–66.

11 **Spencer N**, Blackburn C, Bonas S, *et al*. Parent reported home smoking bans and toddler

(18–30 month) smoke exposure: a cross-sectional survey. *Arch Dis Child* 2005;**90**:670–4.

12 **Hatsukami DK**, Lemmonds C, Tomar SL. Smokeless tobacco use: harm reduction or induction approach? *Prev Med* 2004;**38**:309–17.

13 **Dunsby J**, Bero L. A nicotine delivery device without the nicotine? Tobacco industry development of low nicotine cigarettes. *Tob Control* 2004;**13**:362–9.

14 **Non-Smokers' Rights Association**. A brief to the Standing Committee on Health. Available at http://www.nsra-adnf.ca/news_info_PF.php? cPath = 29&news_id = 180&pf = 1 (accessed 17 August 2005).

Communication
....

Using communication theory in injury prevention campaigns

L Aldoory, S Bonzo

....

Communication research and theory can increase the impact of campaigns in the field of injury prevention

Dozens of communication campaigns have been designed and implemented on local, state, and federal levels for purposes of reducing injury related risks and rates of injuries (including both unintentional injury and intentional injury resulting from violence). However, practitioners rarely turn to communication research and theory in order to design and implement campaigns. Theory driven research and literature from the communication disciplines can provide useful insight into campaign development. After extensive and detailed review of communication research that addressed injury prevention campaigns, we developed guidelines that may improve the results of campaigns that use communication tools for purposes of reducing injury rates in the US.

Communication campaigns are designed for a relatively well defined and large audience, and they typically are limited to a given time period.[1] Campaigns include the organized use of both mass media and interpersonal sources of information to increase awareness and knowledge about injury and safety and to increase rates of safety behaviors. Mass media include television, radio, newspapers, billboards, and the Internet. Interpersonal sources can include face to face meetings, home visits, and workshops. Printed materials, such as brochures and pamphlets, may

be considered a mass medium and can also be used in interpersonal contexts.

We summarize here four theoretical perspectives that emerged from a comprehensive literature review conducted of all communication research published from 1992 to 2002: 162 journal articles, book chapters, and books were collected. The literature was examined according to: theory; methodology; audience targeted; scope of intervention—that is, individual message, interpersonal versus media tactics, or full campaign; and any cultural specificity. We conclude here with a set of guidelines developed from the theoretical perspectives and research findings.

COMMUNICATION RESEARCH ON INJURY PREVENTION CAMPAIGNS

The research literature on communication campaigns for injury prevention focused mainly on communitywide and school based efforts.[2–20] In general, communitywide campaigns are effective at increasing safety practices associated with bicycle helmet use and children's car seat use, but have had little effect on other safety practices.[8–11] Usually, campaigns increased knowledge about injury prevention when various channels of information—both mass media and interpersonal—were used. However, knowledge gain did not necessarily correlate with increases in

preventive behaviors. Research has found that mass media messages can increase awareness, knowledge, and can change some short term behaviors.[21–24] Interpersonal efforts increased motivation to comply with requested behavior changes more so than media messages.[25–27] Interpersonal communication has included: workshops where experts talk one on one with audience members; community health fairs; and home visits by healthcare professionals to address injury concerns of audiences who are less ambulatory. Other factors, such as use of opinion leaders, level of change requested, and personal relevance of the message to an audience mediated intent to change behavior.[7 9] These factors derive from theoretical perspectives and are described in more detail below. One group of studies in schools highlighted the importance of considering self identity, race, and socioeconomic status in campaign design: authors found that increased helmet use occurred only for white, female children from high income families.[16 17]

Several studies in communication and injury applied one of four theoretical traditions. The first tradition stems from psychology, and the health belief model is one theoretical model derived from this cognitive tradition. The second tradition, also from psychology, focuses on the use of fear appeals and whether there are certain factors that can make fear appeals in messages more effective for health behavior goals. The extended parallel processing model has been used to test the effects of fear appeals on injury prevention. The third tradition is developed from a sociological perspective, where flow of information and community dimensions play significant roles, and where methodology is more quasi-experimental than formally empirical. Within this tradition, the diffusion of innovations model has informed research on injury prevention communication. Finally, the fourth tradition stems from public relations

research, where the situational theory of publics has been used. This theory intersects community level effects with individual effects from campaigns.

Health belief model

According to the health belief model, preventive behaviors are influenced by five factors: (1) perceived barriers to changing behavior; (2) perceived benefits of new behavior; (3) perceived susceptibility to a risk or injury; (4) perceived severity of the outcome of that risk; and (5) cues to action, which can be internal, such as perceptions and opinions, or external, such as environmental events, media messages, or physician recommendations. Cues to action trigger the other four factors. Communication campaigns are a cue to action and, therefore, have an indirect effect on attitude change and behavioral outcomes.[14 28] Additionally, the theory explains the importance of self efficacy, the level of confidence an individual has about accomplishing the recommended behaviors. Giving individuals tools for increasing self efficacy—through media messages, interpersonal interactions, and opportunities for trial behavior—will increase intent to perform preventive behaviors. Response efficacy (belief that the behaviors recommended are effective) has also been shown to be important.

The value of the health belief model to injury prevention campaigns has already been supported through numerous studies.[29] Research has shown that messages encouraging small scale changes to prevent injury, such as turning handles of pots to backs of stoves, have been successful in increasing response efficacy, and in turn, behavior changes in audiences.[30–32] One study that used the health belief model assessed farmers' attitudes and beliefs about farm equipment accidents.[28] Findings showed that farmers believed farm equipment injuries were severe and serious, that safety measures were effective, and that they were capable of using safety measures. However, they did not believe themselves to be susceptible to serious accidents, and therefore did not personalize the safety messages targeted to them.

Extended parallel process model

The extended parallel process model applies the same concepts as the health belief model, but centers on the use of fear appeals and fear arousal.[33–39] Several factors influence the relation between fear appeal and resulting behavior change. For example, a highly threatening fear appeal will fail without an equally strong efficacy component.[38 39] Three outcomes are possible by individuals responding to a fear appeal. First, a danger control response can occur when an individual takes action or intends to take action to avert a threat. Second, a fear control response can occur when an individual is too fearful to take action. A third alternative is to ignore the message, which typically occurs if the threat is perceived as irrelevant or insignificant.[39]

The extended parallel processing model may offer a situational dimension to campaign design, where the type of injury may dictate whether a fear appeal should be used. On one hand, promoting fear may backfire because it may increase feelings of helplessness in the face of an injury considered unpredictable and unpreventable. On the other hand, fear may help increase attention of injuries related to violence on college campuses or extreme sports performed by adolescents—as long as messages are coupled with strong efficacy components.

Diffusion of innovations

Diffusion of innovations explains how and why new behaviors are adopted into communities. In terms of the behavior, called an ''innovation,'' the following characteristics enhance the probability of its adoption: (1) its compatibility with sociocultural values, economy, and current technology of the community into which it is introduced; (2) its trialability, where it may be experimented with on a limited basis; (3) relative advantage over previous practices; (4) low complexity; (5) cost efficiency or cost benefits; and (6) observability, or the degree to which the results are visible to others.[40–42] Audience members can range from innovators—who make the innovation visible to the community and who are often opinion leaders in the community—to laggards, who are the most conservative and suspicious of an innovation and may never adopt.[40]

Campaign planners have applied diffusion of innovations principles by considering the importance of opinion leaders, by using multiple forms of messages for widespread diffusion, and by relying on community and interpersonal communication networks for the basis of diffusion.[5 7 9] Strategies such as community involvement and community coalitions are used to share information about safety and practicing safety measures. As many injuries occur in the home and on the streets of local communities, opinion leaders have a large role in instigating prevention efforts. Opinion leaders are people who are influential in guiding norms and opinions within communities. One study reported on the impact of a three year Child Pedestrian Injury Prevention Project.[5] This project comprised pedestrian safety lessons in schools, home activities, and establishment of a committee of citizens who advocated for changes to speed limits near schools, traffic calming, and a programme to map and mark footprints to show children safer pedestrian routes. Significant differences were found over the three year period for pedestrian safety behaviors, such as crossing the road and playing on or near the road.

Situational theory of publics

According to the situational theory, three factors predict information seeking, attitude change, and behavior change.[24 43–46] The first factor is level of involvement, a measure of how personally relevant a problem can be for an individual. Also defined as perceived emotional connection, involvement increases the likelihood of individuals attending to and comprehending messages. The second factor is problem recognition, which is the extent to which individuals recognize a problem facing them; people do not stop to think about situations unless they perceive that something needs to be done to improve the situation. Constraint recognition is the third factor and is the extent to which individuals see their behaviors as limited by factors beyond their own control. For a campaign to move people to develop organized cognitions and perhaps change behavior, it must show them how to remove constraints to their personally doing anything about a problem.[46] A couple of studies have applied the situational theory of publics to injury prevention efforts regarding drunk driving.[24 46] These studies identified the need to differentiate publics according to level of involvement and constraint recognition. This would then be used to design different campaign messages for different publics.

GUIDELINES FOR INJURY PREVENTION CAMPAIGNS

The following guidelines were developed out of the communication research literature summarized above and the four theoretical perspectives that have informed the research in communication and injury prevention.

- *Multicomponent, multichannel campaigns*. Campaigns that incorporate interpersonal, mass media, and printed sources of information will be more effective than campaigns that put all resources into one channel. Mass media channels can help increase knowledge and awareness,

while interpersonal contact is more effective at motivating trial behavior and safety actions. For example, campaign channels could include printed brochures and billboards, news coverage of special events, public service advertisements, workshops in the community with experts, home visits, and booths at local shopping areas staffed by informed volunteers.

- *A mix of voices to spread campaign messages*. Messages should be spread through use of both authority figures and peers as spokespeople. The combination increases the likelihood of attention, credibility, and support for campaign goals.

- *Simple steps to injury prevention*. Messages focusing on simple, minor, or easy prevention techniques, such as turning pot handles to the back of the stove, are more successful than those focusing on complex prevention tactics, such as installing railings in a home or rewiring faulty electrical outlets.

- *Encouraging the confidence to make change*. Messages need to increase perceptions of susceptibility and severity of risk, but they also need to increase self efficacy. Audience members need to believe they have the capability of performing a requested action; this will reduce their perceptions that injuries are unpredictable and unpreventable. People who look similar to audience members could be used in messages to perform a preventive action and then get rewarded. Messages could include instructions or simple steps to encourage confidence.

- *Benefits emphasized over risks*. The benefits or rewards for being safe need to be clearly outlined in campaign messages and need to take precedence over risk or fear arousing messages. This addresses the need for response efficacy, which has been shown to increase audience confidence about the adequacy of a prevention tactics.

- *Success of fear appeals is dependent on amount of efficacy information*. Fear appeals or highly threatening messages will not be effective if they are presented alone. They must be paired with messages that increase self-efficacy, response efficacy, and perceived personalization or relevance.

- *Addressing and reducing constraints/barriers to action*. Messages need to address constraints and need to also be sensitive to the distinction between perceived and actual constraints. Perceived constraints, such as low self efficacy, can be addressed through messages. Some, but not all, physical and economic constraints may be addressed as well, for example, by providing resources, free materials, or transportation to workshops. However, reducing barriers such as socioeconomic constraints and literacy levels may be beyond a campaign's ability.

- *Opinion leaders as gatekeepers to attitude and behavior change*. Opinion leaders can increase the likelihood of a community accepting a campaign. These individuals should be invited to help plan, develop, and implement the campaign. Including them will gain commitment from communities and will increase audience attention and intent to change behavior. Opinion leaders integrated into campaign development will also help with understanding peer/social norms, which could feasibly be barriers to individual behavior change.

- *Consideration of mediating factors in message design*. Sex, age, ethnicity, race, education, and income all mediate the level of effect from campaigns. If audiences do not perceive themselves at risk for an injury, or if they perceive an injury to have few repercussions on their everyday life (low personal involvement), they are less likely to pay attention to messages or attempt to engage in safety behaviors.

CONCLUSION

Communication research can improve injury prevention campaigns, and we offer here guidelines for campaign development that derived from communication theory. However, these guidelines may actually create more questions than answers. Admittedly, the guidelines are not exhaustive, and they derive from a literature review rather than from empirical testing. Future research should not only work at testing the empirical validity of them but also at expanding and elaborating them for purposes of producing more effective injury prevention campaigns. For example, using methodology such as the Delphi process and other focused group discussions might develop more detailed guidelines. Other factors in campaign messages or campaign tactics could be added to the theoretical models. For example, the role of media advocacy in reducing injury rates has not been adequately addressed. In addition, the research here focused on communication only, leaving out the value or impact of engineering and enforcement, two relevant factors in increasing individual behavior change. The influence of communication on enforcement and engineering, and the relation between these three factors, should be studied as well. The guidelines proposed here begin to address necessary distinctions for developing injury prevention campaigns, and we hope they also spark greater scholarly and practical attention towards the value of communication theory and research for the injury field.

. . . .

Authors' affiliations
L Aldoory, Department of Communication, University of Maryland, MD, USA
S Bonzo, Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Atlanta, GA, USA

Correspondence to: Associate Professor L Aldoory, Department of Communication, University of Maryland, 2130 Skinner Building, College Park, MD 20742, USA; laldoory@umd.edu

REFERENCES

1 **Rice RE**, Atkin C. Principles of successful public communication campaigns. In: Bryant J, Zillman D, eds. *Media effects: advances in theory and research*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1994:365–87.
2 **Yurk R**, Juramillo L, Erwin LL, *et al*. Educating the community about violence through a gun turn-in program. *J Community Health* 2001;**26**:331–44.
3 **Walton D**, McKeown PC. Drivers' biased perceptions of speed and safety campaign messages. *Accid Anal Prev* 2001;**33**:629–40.
4 **Adler R**, Nunn R, Northam E, *et al*. Secondary prevention of childhood firesetting. *J Am Acad Child Adol Psych* 1994;**33**:1194–202.
5 **Cross D**, Stevenson M, Hall M, *et al*. Child pedestrian injury prevention project: student results. *Prev Med* 2000;**30**:179–87.
6 **Treser CD**, Trusty MN, Yang PP. Personal floatation device usage: do educational efforts have an impact? *J Public Health Policy* 1997;**18**:346–56.
7 **Schwarz DF**, Grisso JA, Miles C, *et al*. Injury prevention in an urban African American community. *Am J Public Health* 1993;**83**:675–80.
8 **Klassen TP**, MacKay JM, Moher D, *et al*. Community-based injury prevention interventions. *The Future of Children: Unintentional Injuries in Childhood* 2000;**10**:83–109.
9 **Davidson LL**, Durkin MS, Kuhn L, *et al*. The impact of the Safe Kids/Healthy Neighborhoods Injury Prevention Program in Harlem, 1988 through 1991. *Am J Public Health* 1994;**84**:580–6.
10 **Schlesinger ER**, Dickson DG, Westaby J, *et al*. A controlled study of health education in accident prevention: the Rockland County Child Injury Project. *Inj Prev* 1997;**3**:218–23.
11 **Sundelin C**, Rasmussen F, Berfanstam R, *et al*. Information through television. Does it promote child safety? *Inj Prev* 1996;**2**:36–40.
12 **Dannenberg AL**, Gielen AC, Beilenson PL, *et al*. Bicycle helmet laws and educational campaigns: an evaluation of strategies to increase children's helmet use. *Am J Public Health* 1993;**83**:667–74.
13 **Rivara FP**, Thompson DC, Thompson RS, *et al*. The Seattle children's bicycle helmet campaign—EM DASH Changes in helmet use

and head-injury admissions. *Pediatrics* 1994;**93**:567–9.

14 **Witte K**, Stokols D, Ituarte P, *et al.* Testing the health belief model in a field study to promote bicycle safety helmets. *Communic Res* 1993;**20**:564–86.

15 **Abularrage JJ**, DeLuca AJ, Abularrage CJ. Effect of education and legislation on bicycle helmet use in a multiracial population. *Arch Pediatr Adolesc Med* 1997;**151**:41–4.

16 **Parkin PC**, Hu XH, Spence LJ, *et al.* Evaluation of a subsidy program to increase bicycle helmet use by children of low-income families. *Pediatrics* 1995;**96**:283–7.

17 **Parkin PC**, Spence LJ, Hu XH, *et al.* Evaluation of a promotional strategy to increase bicycle helmet use by children. *Pediatrics* 1993;**91**:772–7.

18 **Eichel JD**, Goldman L. Safety makes sense: a program to prevent unintentional injuries in New York City public schools. *J Sch Health* 2001;**71**:180–3.

19 **Harre N**, Coveney A. School-based scalds prevention: reaching children and their families. *Health Educ Res* 2000;**15**:191–202.

20 **Spiegel IB**. A pilot study to evaluate an elementary school-based dog bite prevention program. *Anthrozoos* 2000;**13**:164–72.

21 **Hecht ML**, Corman SR, Miller-Rassulo M. An evaluation of the Drug Resistance Project: a comparison of film versus live performance media. *Health Comm* 1993;**5**:75–88.

22 **Jaffe JM**. Media interactivity and self-efficacy: an examination of hypermedia first aid instruction. *J Health Comm* 1997;**2**:235–52.

23 **Andrews AB**, McLeese DG, Curran S. The impact of a media campaign on public action to help maltreated children in addictive families. *Child Abuse Negl* 1995;**19**:921–32.

24 **Anderson RB**. Cognitive appraisal of performance capability in the prevention of drunken driving: a test of self-efficacy theory. *J Public Relations Research* 1995;**7**:205–29.

25 **Stevens M**, Holman CDJ, Bennett N, *et al.* Preventing falls in older people: outcome evaluation of a randomized controlled trial. *J Am Geriatr Soc* 2001;**49**:1448–55.

26 **Plautz B**, Beck DE, Selmar C, *et al.* Modifying the environment: a community-based injury-reduction program for elderly residents. *Am J Prev Med* 1996;**12**:33–8.

27 **Wagner EH**, LaCroix AZ, Grothaus L, *et al.* Preventing disability and falls in older adults: a population-based randomized trial. *Am J Public Health* 1994;**84**:1800–6.

28 **Peterson TR**, Witte K, Enkerlin-Hoeflich E, *et al.* Using informant directed interviews to discover risk orientation: how formative evaluations based in interpretive analysis can improve persuasive safety campaigns. *J App Commun Res* 1994;**22**:199–215.

29 **Kohler CL**, Grimley D, Reynolds K. Theoretical approaches guiding the development and implementation of health promotion programs. In: Raczynski JM, DiClemente RJ, eds. *Handbook of health promotion and disease prevention*. New York: Kluwer Academic/Plenum Publishers, 1999:23–49.

30 **Campbell NR**, Ayala GX, Litrownik AJ, *et al.* Evaluation of a first aid and home safety program for Hispanic migrant adolescents. *Am J Prev Med* 2001;**20**:258–65.

31 **Rosenstock IM**. The health belief model: explaining health behavior through expectancies. In: Glanz K, Lewis FM, Rimer BK, eds. *Health behavior and health education*. San Francisco, CA: Jossey-Bass Publishers, 1990:39–62.

32 **Rosenstock IM**, Strecher VJ, Becker MH. Social learning theory and the health belief model. *Health Ed Quart* 1988;**15**:175–83.

33 **Hale JL**, Dillard JP. Fear appeals in health promotion: too much, too little or just right? In: Maibach E, Parrott R, eds. *Designing health messages: approaches from communication theory and public health practice*. Thousand Oaks, CA: Sage, 1995:65–80.

34 **Hale JL**, Lemieux R, Mongeau PA. Cognitive processing of fear-arousing message content. *Communic Res* 1995;**22**:459–74.

35 **Witte K**, Cameron KA, McKeon JK, *et al.* Predicting risk behaviors: development and validation of a diagnostic scale. *J Health Commun* 1996;**1**:317–41.

36 **Austin EW**. Reaching young audiences: developmental considerations in designing health messages. In: Maibach E, Parrott R, eds. *Designing health messages: approaches from communication theory and public health practice*. Thousand Oaks, CA: Sage, 1995:114–44.

37 **Austin EW**, Austin EQ, Pinkleton B, *et al.* Assessing prosocial message effectiveness: effects of message quality, production quality, and persuasiveness. *J Health Commun* 1999;**4**:195–211.

38 **McMahan S**, Witte K, Meyer J. The perception of risk messages regarding electromagnetic fields: extending the extended parallel process model to an unknown risk. *Health Commun* 1998;**10**:247–59.

39 **Stephenson MT**, Witte K. Creating fear in a risky world: generating effective health risk messages. In: Rice RE, Atkin CK, eds. *Public communication campaigns*. (3rd edition) Thousand Oaks, CA: Sage, 2001:88–102.

40 **Rogers EM**. *Diffusion of innovations* (4th edition). New York: Free Press, 1995.

41 **Rogers EM**. Diffusion theory: a theoretical approach to promote community-level change. In: Peterson JL, DiClemente RJ, eds. *Handbook of HIV prevention*. New York: Kluwer Academic/Plenum Publishers, 2000:57–65.

42 **Soule SA**. The diffusion of an unsuccessful innovation. *Annals Am Acad Pol Soc Sci* 1999;**566**:120–31.

43 **Grunig JE**. *Excellence in public relations and communication management*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1992.

44 **Grunig JE**, Hunt T. *Managing public relations*. New York: Holt, Rinehart and Winston, 1984.

45 **Pavlik JV**. Audience complexity as a component of campaign planning. *Public Relations Rev* 1988;**14**:12–20.

46 **Grunig JE**, Ipes DA. The anatomy of a campaign against drunk driving. *Public Relations Rev* 1983;**9**:36–51.