



CANADIAN
Stroke
BEST PRACTICE
RECOMMENDATIONS

CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

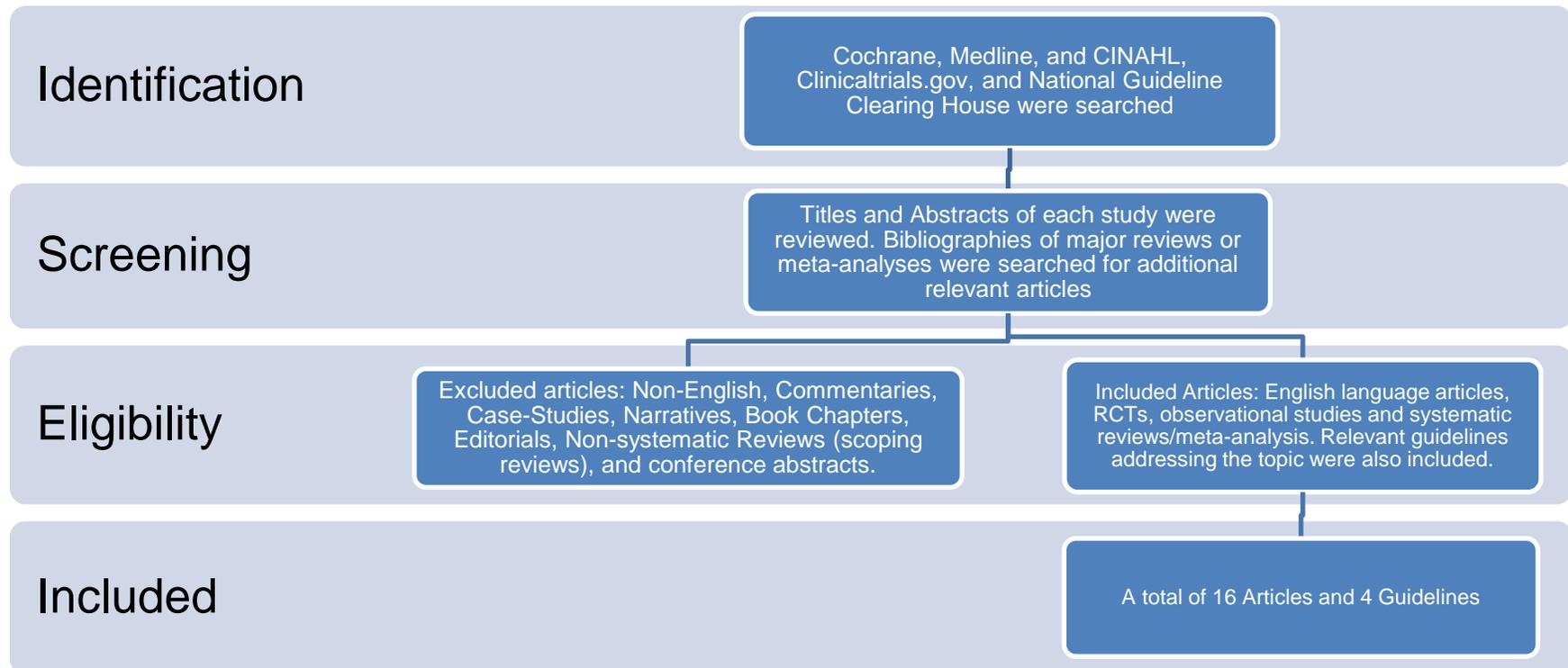
Stroke Recognition and Response Evidence Tables

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Search Strategy



Cochrane, Medline, and CINAHL, Clinicaltrials.gov, and National Guideline Clearing House were search using medical subject. Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. A total of 16 articles and 4 guidelines were included and were separated into separate categories designed to answer specific questions.

Published Guidelines

What existing clinical practice guidelines include Stroke Recognition & Response?

Guideline	Recommendations
<p>Intercollegiate Stroke Working Party. National clinical guideline for stroke, 4th edition. National Institute for Health and Clinical Excellence London: Royal College of Physicians, 2012.</p>	<p>None</p>
<p>Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke: rehabilitation, prevention and management of complications, and discharge planning. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2010 June.</p>	<p>3.1 Referral to Stroke Services</p> <p>Patients should receive information about the risk of recurrent stroke, the signs and symptoms of onset and the action they should take if stroke is suspected, for example FAST (Face, Arm, Speech, Time (to call 999) [Good practice point].</p>
<p>Clinical Guidelines for Stroke Management 2010. Melbourne (Australia): National Stroke Foundation; 2010 Sep. p. 81-82; 97-98.</p>	<p>Stroke recognition: The general public should receive ongoing education on how to recognize the symptoms of stroke and the importance of early medical assistance (Grade B).</p>
<p>Adams HP, del Zoppo G, Alberts MJ, et al. Guidelines for the early management of adults</p>	<p>I. Prehospital Management and Field Treatment</p> <ol style="list-style-type: none"> 1. Activation of the 9-1-1 system by patients or other members of the public is strongly supported because it speeds treatment of stroke (Class I, Level of Evidence B). 9-1-1 Dispatchers should make stroke a priority dispatch. 2. To increase the number of patients who can be seen and treated within the first few hours after stroke, educational

Guideline	Recommendations
with ischemic stroke: A guideline from the American Heart Association / American Stroke Association Stroke Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups. Stroke 2007;38:1655-1711.	programs to increase public awareness of stroke are recommended (Class I, Level of Evidence B).

Evidence Tables

Awareness of Stroke Signs & Symptoms among the General Public

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p>Mochari-Greenberger et al. 2014</p> <p>USA</p> <p>Cross-sectional survey</p>	NA	1205 women aged ≥25 years living in the United States, who had participated in the American Heart Association National Women's Tracking Survey.	Participants were contacted by telephone through random-digit dialing and asked standardized questions, related to stroke warning signs, actions to take in the event of stroke.	Knowledge	<p>The percentage of women who recognized the following signs of stroke:</p> <p>Sudden weakness/numbness of the face or limb of one side: 51%.</p> <p>Loss of/trouble with understanding speech:44%</p> <p>Sudden severe headache: 23%</p> <p>Unexplained dizziness: 20%</p> <p>Loss of vision in one eye: 18%</p> <p>One in 5 women could not identify one stroke warning sign.</p>
<p>Miyamatsu et al. 2013</p> <p>Japan</p> <p>Cross-sectional survey</p>	NA	5540 participants, aged 40-74 years, randomly selected from the Basic Resident Register, recruited from 3 large cities in Japan	A multiple choice, mail-in survey including items related to general knowledge of stroke, early symptoms of stroke, information sources and what to do if a stroke is suspected.	Knowledge	<p>The response rate was 49.0%. Mean age was 58 years. 53% of participants were female.</p> <p>Recognition of stroke symptoms:</p> <p>Sudden one-sided weakness: 86.6%</p> <p>Sudden confusion: 86.6%</p> <p>Sudden headache: 72.3%</p> <p>Sudden dizziness: 62.7%</p> <p>Sudden trouble seeing: 35.0%</p> <p>All 5 symptoms correctly identified: 23.0%</p> <p>81.2% of participants indicated they would call an ambulance immediately in response to a suspected stroke.</p> <p>Mass media campaigns (particularly those appearing on television) were identified as the most common source of information (estimated</p>

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					fraction: 0.32), followed by newspapers (estimated fraction: 0.28). The internet and personal communication were the least common sources of information.
Robinson et al. 2013 UK Cross-sectional survey	NA	1300 individuals (39% male) representative of the general population were sampled from public areas, places of work, and academic institutions.	Items on the survey represented the following: 1) basic familiarity with the concept of stroke, 2) awareness of warning signs of stroke, 3) awareness of risk factors for stroke, and 4) knowledge of the FAST campaign.	Awareness of stroke warning signs and risk factors and knowledge of the FAST campaign.	70% of those surveyed were aware of the FAST campaign and 80% recalled the 'burning face' image. Over 75% of participants were able to recall all three FAST stroke symptoms and >90% were able to recall at least one. Stroke warning signs not included as part of the FAST campaign were not as well recognized (e.g., Visual loss=44%, Dizziness=47%). Hypertension, smoking, alcohol, and diabetes were identified as risk factors for stroke by 90%, 74%, 54%, and 51% of participants, while 68% of participants were aware that stroke affects the brain.
Lundelin et al. 2012 Spain Cross-sectional survey	NA	11,827 non-institutionalized adults living in Spain who had participated in the Study on Nutrition & Cardiovascular Risk in Spain (ENRICA) study	Participants were identified by multistage clustered random sampling. Data was collected using a telephone interview. 55% of the participants were also examined physically and provided a blood sample.	Stroke knowledge and predictors of knowledge, based on sociodemographic indicators	65.2% of participants could correctly identify 4-6 symptoms of stroke. 19% could identify all 6 symptoms correctly, while 11.4% were unable to identify a single symptom. Higher levels of education were associated with better knowledge. 81.1% of participants indicated that they would call an ambulance if they suspected someone was having a stroke. Persons who could identify more stroke symptoms were more likely to call for an ambulance.
Hickey et al. 2009 Ireland Cross-sectional	NA	2033 community-dwelling older adults. 57% female. The survey response rate was 68%.	Participants completed a survey with items addressing knowledge of stroke warning signs and risk factors.	Percentage of participants correctly identifying stroke warning signs and risk factors.	Warning signs: Slurred speech (54%), dizziness (44%), numbness (41%), weakness (38%), headache (29%), and vision problems (20%). Risk Factors: hypertension (75%), cholesterol (40%), smoking (30%), diabetes (11%), and alcohol use (10%).

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
survey					

Increasing Awareness of the Stroke Symptoms through Public Health Campaigns

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p>Bray et al. 2015</p> <p>Australia</p> <p>Cross-sectional study</p>	NA	NA	The association between monthly volumes of ambulance dispatches for stroke and 12 National Stroke Foundation multimedia regional public awareness campaigns (2004-2014) was explored. The campaigns lasted on average for 6 weeks and were both paid and pro bono. Most of the campaigns focused on FAST symptoms and the need for quick response	Changes in ambulance calls for stroke following public awareness campaigns, controlling for paid funding, timing of campaign exposure, number of days in the month, season, population size and population growth	<p>11/12 campaigns were associated with increases in call volumes. The percentage increases by year were:</p> <p>2004: 4.8%</p> <p>2005: 7.6%</p> <p>2006: -2.2%</p> <p>2007: 1.0%</p> <p>2008: 5.2%</p> <p>2009: 4.7%</p> <p>2010: 6.9%</p> <p>2011: 5.7%</p> <p>2014: 9.9% (campaign 1); 9.3% (campaign 2)</p> <p>The effect persisted for approximately 3 months.</p> <p>In 2014, one of the campaigns was run nationally. There was an increase of 1478 calls (6.7%).</p> <p>The campaigns run in urban areas tended to be more successful than those in rural settings.</p> <p>Compared with regions that did not receive funding, those that did reported a relative increase of 10.2% in call volumes.</p>
<p>Wolters et al. 2015</p> <p>UK</p> <p>Prospective study</p>	NA	688 participants in the OXVASC study who had experienced a major stroke (NIHSS>3). Mean age was 77 years, 57% were female. Median stroke	Patient behavior for out of hospital strokes was compared before (2002-2008) and after (2009-2013) the introduction of UK-FAST (a public education	Time from stroke onset to seeking medical attention and the type of medical attention sought.	<p>There were 416 strokes pre-FAST and 252 post-FAST.</p> <p>Medical attention was sought by a by-stander in the majority of cases (553, 89.6%)</p> <p>The median time to seek first medical attention decreased significantly post-FAST (53 vs. 31 minutes, p=0.005). Median time to arrival to hospital decreased significantly post-FAST (185 vs. 119 minutes, p<0.0001).</p>

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		severity was 9.	television campaign Feb-Apr 2009)		<p>First contact with EMS or ED was made more frequently post FAST (74.8% vs. 57.2%, OR=2.20, 95% CI 1.55-3.13, p<0.0001), while first contact with non-emergency services (e.g., GP) decreased significantly (42.8% vs. 25.2%, OR=0.45, 95% CI 0.32-0.65, p<0.0001).</p> <p>The number of patients who arrived at hospital within 3 hours increased significantly post FAST (46.9% vs. 65.8%, OR=2.18, 95% CI 1.55-3.06, p<0.0001).</p>
Rasura et al. 2014 Italy Review	NA	<p>22 intervention studies and 5 web-based stroke education campaigns.</p> <p>14 studies targeted the general public using mass media campaigns, which varied in duration from 3 months to 4 years.</p> <p>6 studies targeted specific groups with the interventions lasting 3 minutes-12 hours.</p>	Narrative synthesis of included studies	Not stated <i>a priori</i>	<p>3 popular stroke signs and symptoms were included in all of the studies using mass media campaigns: FAST, SUDDEN and Give-Me-Five.</p> <p>Effectiveness of the interventions was assessed in most studies through questionnaires administered pre and post intervention. Increases of emergency room presentations t-PA administration and ambulance dispatches, and reductions in pre-hospital delays were also used.</p> <p>The authors concluded that large public health campaigns using mass media are expensive and short lived and may not be effective, although the increased costs can be mitigated through more prompt treatment with t-PA. Lower cost, smaller scale educational campaigns can be delivered successfully in the community.</p> <p>The message being delivered must direct the person to call an ambulance. The dose of the campaign appears to be as important as the message.</p> <p>Television appears to be the most effective medium. Online campaigns can also be successful but tend to attract a self-selected group (e.g. well-educated women)</p>
Dombrowski et al. 2014 UK RCT	<p>CA: <input checked="" type="checkbox"/></p> <p>Blinding: Patient <input checked="" type="checkbox"/> Assessor <input checked="" type="checkbox"/></p> <p>ITT: <input checked="" type="checkbox"/></p>	5,000 adults, sampled from the electoral register in a large urban community	Participants were randomized to receive a questionnaire + an Act FAST leaflet delivered by mail or to the	Awareness of the Act FAST campaign, and if so, what the acronym stands for.	<p>Data from 1615 respondents (32.3%) were available. Mean age was 54 years. 57% were female.</p> <p>A higher proportion of participants in the leaflet group had heard of the Act FAST campaign (75% vs. 68%, p<0.001).</p> <p>Significantly more persons in the leaflet group correctly</p>

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			questionnaire only. The Act FAST campaign was a mass media campaign designed to increase awareness of the FAST mnemonic	Stroke response and recognition were assessed using 16 vignette scenarios (12 stroke and 4 non-stroke)	named the FAST elements (66% vs. 45%, $p<0.001$). There was no difference between groups in the number or participants who indicated they would call "999" in the event of a stroke. Using the 16 vignettes, there were no significant differences between groups in the numbers of participants who were able to correctly identify stroke symptoms, not even in the 6 FAST scenarios (78.4% correct recognition in the leaflet group vs. 79.0% in the non-leaflet group, $p=0.55$). The pattern of correct response was similar (65.6% vs. 64.0%, $p=0.30$).
Mellon et al. 2014 UK Retrospective study	NA	870 patients who had presented to the emergency department (ED) of 2 large teaching hospitals with symptoms of stroke over a one-year time frame (March 2010-Feb 2011)	Multivariable analysis to determine the impact of 3 waves of 3-week mass media FAST campaigns in May, August 2010 and January 2011	Factors related to onset of symptoms to ER arrival ≤ 3.5 hours and changes in presentations to the ED with stroke symptoms.	There were 284 confirmed strokes (32.6%) and 150 TIAs (17.4%). The remaining admissions were for non-stroke neurological and medical conditions. Independent predictors of arrival to ED ≤ 3.5 hours were arrival via ambulance (OR=3.1, 95% CI 2.23-4.23, $p<0.001$) and self-referral (OR=2.67, 95% CI 1.84-3.88, $p<0.001$). Exposure to the FAST campaign was not a significant predictor (OR=0.93, 95% CI 0.60-1.45, $p=0.76$). During the first wave of the campaign, there was an increase in the number of presentations to the ED with stroke symptoms, which dropped off after the cessation of the campaign. There were no such evidence of an impact of the FAST campaign during waves 2 or 3.
Bray et al. 2013 Australia Cross-sectional survey	NA	12,439 participants, ≥ 40 years of age randomly selected from the general population using an electronic telephone directory.	Surveys were administered via telephone over a 6-year period to determine the impact of a national multimedia stroke awareness campaign on knowledge of stroke warning signs, and	Number of respondents aware of the advertising campaign, number of respondents able to recall ≥ 1 , ≥ 2 , and/or ≥ 3 stroke warning signs.	From 2004 to 2010, a significant increase was observed in the number of respondents aware of the campaign (31% vs 50%) and in the number of participants able to name ≥ 1 (69% vs 81%), ≥ 2 (43% vs 63%), and ≥ 3 (19% vs 32%) warning signs (all at $p<0.001$). Respondents who could identify ≥ 2 warning signs were significantly more likely to be aware of the campaign (OR= 1.88, 95% CI 1.74 to 2.04).

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p>Trobbiani et al. 2012</p> <p>Cross-sectional surveys (pre/post intervention)</p> <p>Australia</p>	NA	<p>English sample: 1905 adults aged 16-55 years</p> <p>Canadian sample: 2807 adults ≥18 years</p> <p>Australian sample: 1002 adults >40 years, randomly selected from Victorian households</p>	<p>awareness of the campaign.</p> <p>Comparison of 3 mass media stroke awareness campaigns conducted in England (FAST), Canada (SUDDENS) and Australia (FAST), designed to increase the public's recognition of stroke symptoms.</p> <p>The surveys were conducted by telephone interviews (Canada, Australia) or in person (England) before and after exposure to the campaigns.</p> <p>All of the campaigns used television and radio, print newspapers and digital means.</p>	<p>Changes in the ability to recognize stroke symptoms following awareness campaigns.</p> <p>Timing of data collection surveys (before/after campaign): Canada: 1 month/2 months Australia: 10 months/2 weeks England: 6 weeks/1 month</p>	<p>The cost of the campaigns was €7 million (England), €700K (Canada) and €650K (Australia).</p> <p>Head-to-head comparisons across the 3 groups was not possible.</p> <p>Prior to the campaign, a significantly greater number of English participants could identify more FAST components compared with Australian participants (F: 67% vs. 44%, A: 62% vs. 30%, S: 56% vs. 21%, T: 42% vs. 14%, all p<0.001).</p> <p>Following the campaign significantly more English participants had increased their knowledge (F: 19% vs. 3%, A: 12% vs. 6%, S: 10% vs. 6%, T: 6% vs. -1%, all p<0.01).</p> <p>Prior to the campaign, a significantly greater number of Australian participants could identify ≥2 warning signs of stroke compared with Canadian participants (59% vs. 50%, p<0.001). Following the campaign, the percent change (increase) was similar between groups (Canada 7% vs. Australia 9%).</p> <p>Higher percentages of participants in England and Australia indicated they would call emergency services in the event of a stroke, compared with those from Canada (97% and 90% vs. 67%).</p>
<p>Worthmann et al. 2013</p> <p>Germany</p> <p>Cross-sectional</p>	NA	1004 adult residents of the city of Hanover	Computer-assisted interviews were conducted before and immediately after a 6-month public awareness campaign,	Changes in the ability to recognize stroke symptoms following the awareness campaign.	There was a significant increase in the number of participants who identified paresis and weakness as signs of stroke (from 40% to 46%, p=0.007 and 24% to 31%, p<0.001, respectively). There was also a significant increase in the number of participants who identified impaired vision as a sign of stroke (8% to 11%, p<0.05).

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
surveys (pre/post intervention)			<p>designed to increase knowledge of stroke knowledge warning signs and risk factors, emergency care seeking behavior.</p> <p>The campaign included mass media (posters, flyers, public lectures, newspapers and television advertisements).</p>		<p>There were no significant increases in the number of participants who identified gait disorders, numbness, sudden headache, nausea or disorientation as a sign of stroke.</p> <p>Following the campaign, there was a significant increase in the number of participants who indicated that the first action to take after recognizing a possible stroke was to call for emergency care (from 74% to 84%, $p < 0.001$). There was a non-significant increase in the number of participants who indicated this action should be taken immediately (from 81% to 84%)</p>
Fogle et al. 2010 USA Controlled study	NA	<p>Intervention group: 400 adults randomly selected, living in a single county with a census of 85,314. Median age was 40 years.</p> <p>Control group: 401 adults randomly selected, living in a comparable county, with a census of 81,763. Median age was 33 years.</p>	<p>Participants in the intervention group were exposed to a high-intensity public education campaign, conducted during 2, 10-week periods (2007-2008). The campaign included television, radio and newspaper advertisements that focused on stroke warning signs and actions to take.</p> <p>Participants in the control group were not exposed to the campaign.</p> <p>Computer-assisted</p>	<p>Changes in the ability to recall ≥ 2 stroke warning signs before and after campaign, stroke risk factors and intentions to call '911' if a stroke was suspected</p>	<p>There was a significant increase in the number of participants in the intervention group, but not the control group, who could identify ≥ 2 warning signs before/after the campaign (from 73% to 82% and 68% to 69%, respectively).</p> <p>There was a significant increase in the number of participants in the intervention group, but not the control group, who could identify ≥ 2 risk factors for stroke before/after the campaign (from 69% to 86% and 70% to 65%, respectively).</p> <p>There was a non-significant increase in the number of participants in the intervention group who indicated that they would call '911' if they suspected they, or someone else were having a stroke (from 81% to 84%), while there was a significant decrease among participants in the control group (from 82% to 74%, $p < 0.05$).</p>

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			telephone surveys of adults ≥45 years were conducted before and after the campaign.		
Lecoutuier et al. 2010 UK Systematic Review	NA	10 studies examining the effectiveness of mass media campaigns designed to change stroke-related knowledge and/or behaviour following the onset of stroke. 4 studies targeted the public and 4 targeted both the public and healthcare professionals (HCP).	Narrative synthesis	Knowledge of stroke symptoms and the need for rapid response, access to emergency services, and early treatment with thrombolysis.	Each of the 6 studies targeting public awareness demonstrated a significant increase in knowledge of stroke symptoms; however, these interventions appeared to have little impact on emergency response behaviours. Four studies targeted both professionals and the public. In light of the dual purpose of these interventions, the authors concluded that it was difficult to “disentangle any active components that might explain any reported impact”. The interventions appeared to be more effective for HCP than the public.
Jurkowski et al. 2010 US Controlled study	NA	Intervention group: 994 adults ≥30 years, randomly selected, living in 3 counties with a total population of 603K. Mean age was 56 years. 65% female Control group: 795 adults living in one county with a total population of 376K. Mean age was 54 years. 63%	Participants in the intervention group were exposed to a 3-phase multimedia campaign, designed to increase public awareness of the FAST mnemonic. Each stage of the campaign lasted for 33 weeks Participants in the control group were	Percentage of respondents aware of the campaign, aware of the campaigns primary message, and who would call 9-1-1 in response to specific stroke symptoms identified in oneself and/or others.	The percentage of respondents who reported they would call 9-1-1 in response to specific stroke symptoms increased significantly more from pre-to post campaign for participants in the intervention group, with increases ranging from 9%-12% for specific symptoms identified in oneself and 4%-12% for specific symptoms identified in others.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		female.	not exposed to the campaign. Telephone surveys were conducted before and during phase 3 of the campaign.		
Marx et al. 2010 Germany Surveys (pre/post intervention)	NA	501 adults residing in 5 counties in western Germany. The census from the area was 400K. Mean age was 52 years. 44% male.	Computer-assisted telephone surveys were conducted before and after a 3-month mass-media educational program (billboard, flyers, radio, television, and 3 full day public events) designed to increase awareness of stroke signs and symptoms and response.	Gender differences in general stroke knowledge, knowledge of stroke warning signs and risk factors, response in the event of stroke and through what source(s) had participants gained this knowledge	<p>Prior to the intervention, significantly more women than men could correctly answer the question “where does stroke happen in the body?” (87.2% vs. 70.3%, p<0.001) and knew the stroke emergency call number (33.3% vs. 24.4%, p<0.001). Significantly more women knew to call for emergency care (87.2% vs. 70.1%, p<0.001)</p> <p>Following the intervention, an increased number of both men and women could answer the 2 questions correctly. The percentage change from pre to post intervention was significantly higher for women, (Question 1: +2.8%, p=n/s; Question 2, +5.7%, p<0.005).</p> <p>There were increases in the mean number of stroke warning signs that could be named before and after the intervention (women: 5.4 to 6.2; men: 5.1 to 5.9).</p> <p>Men and women were equally likely to recall campaign messages from television, radio and flyers. Women were more likely to remember the messages from leaflets and advertisements in pharmacies and doctor’s offices, while men were more likely to remember them from advertisements on buses and street cars.</p>
Hodgson et al. 2007 Canada Retrospective study	NA	1000 adults ≥45 years residing in the province of Ontario.	Telephone surveys were conducted before, during and following 2 paid television advertising campaigns that lasted for 8 and 9 months, conducted in 2003 and 2005,	Identification of up to 5 stroke warning signs, and the proportion of participants who could name ≥2 signs of stroke	<p>Over the 6 sampling points, there was a significant increase in the proportion of participants who could correctly identify ≥2 stroke warning signs, and the mean number of warning signs (p<0.001).</p> <p>Prior to the first campaign, 52.1% of participant could correctly identify ≥2 stroke warning signs. Following the completion of the first campaign, this percentage increased to 67.8%.</p>

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			designed to increase awareness of the warning signs of stroke.		<p>From part-way through the second campaign to 7 months following its completion, there was a significant decrease in the percentage of persons who could correctly identify ≥ 2 stroke warning signs (70.8% to 64.2%, $p < 0.001$).</p> <p>Across all polls, significantly more women than men could name ≥ 2 stroke warning signs.</p> <p>Only a small percentage of participants could identify all 5 signs of stroke (paralysis, slurred speech, headache, blurred vision and dizziness). (1.3%, prior to the first campaign, to a maximum of 3.5%, immediately following the second campaign)</p>
<p>Morgenstern et al. 2007</p> <p>USA</p> <p>(Kids Identifying and Defeating Stroke (KIDS))</p> <p>RCT</p>	<p>CA: <input checked="" type="checkbox"/></p> <p>Blinding: Patient <input checked="" type="checkbox"/> Assessor <input checked="" type="checkbox"/></p> <p>ITT: <input checked="" type="checkbox"/></p>	<p>294 students in 3 intervention schools and 279 students in 3 control schools.</p> <p>There were significantly more males in the intervention schools (55% vs. 41%, $p = 0.002$)</p>	<p>Students in the intervention group received 4, 50 minute classroom-based lessons for 3 years, starting in grades 6, designed to increase stroke awareness and response. Homework assignments were designed to include (and educate) the student's parents.</p> <p>Students in the control group received no stroke education</p>	<p>3 domains (4 questions each): stroke pathophysiology (domain 1), stroke symptom knowledge (domain 2) and behavioral intent to call 911 in the event of stroke (domain 3).</p>	<p>47% of students in the intervention group and 46% in the control group completed the pre and post tests. Only 18% and 16% of the parents completed both tests. (no analyses were conducted).</p> <p>There was a significant increase in the proportion of students answering questions correctly in domains 2 and 3 in both groups; however, the improvement was significantly greater for students in the intervention group.</p> <p>For domain 1, there was an increase in correct responses from 29% to 34% in the intervention group and a significant decrease in the control group (from 28% to 25%, $p = 0.007$).</p>

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