

type of behaviour addressed, length and intensity of the intervention, and study setting. Although there were differences in the magnitude of the estimated effects of the interventions, the direction of effect was consistent. The results suggest that the mass media can have an impact on health services utilisation both as the result of planned campaigns and unplanned coverage. However, due to the limitations of primary studies and incompleteness of reporting it is not possible to draw any firm conclusions about the characteristics of successful campaigns or possible differences in the effect of planned campaigns and unplanned coverage based on these studies. For example, whilst there is a growing qualitative literature on media coverage of health-related topics and on how they convey scientific information to the general public (Entwistle 1995; Nelkin 1996; Entwistle 1996; Radford 1996), we still know little about how best to frame messages communicated through planned mass media campaigns in order to achieve the intended change in use of health services. This review provides limited information about this issue; in most of the studies the descriptions of the interventions were insufficient to allow an exploration of whether the characteristics of the message and how the message was framed modified the effectiveness of the intervention.

The results of this review should be interpreted with some caution given the methodological limitations of primary research in this area. Some of these limitations are inherent to the nature of the intervention itself, which limits the possibility of using experimental designs. Moreover, many of the observational studies we identified suffered from major flaws and were likely to provide unreliable estimates of the effect of mass media on health services utilisation. Most of the studies were either uncontrolled before-and-after evaluations or, when the evaluation was based on time series data, had too few observations (less than three before-and-after the intervention) to allow the use of proper statistical techniques (Cook 1979) to control for underlying trends.

Thus, this review has been based upon the analysis of only 20 sufficiently sound interrupted time series analyses of the impact of mass media. The majority of the included studies were descriptive and did not report a statistical analysis or simply compared mean utilisation rates before-and-after the intervention. In order to overcome, at least partially, these pitfalls in the primary research, we re-analysed the data from each study using time series regression models. This approach made it possible to provide an estimate of intervention effect, taking into account the degree of lack of independence among individual observations and the effect of the underlying time trend. The effect sizes for changes in level and for changes in slope enabled a more informative interpretation of each study's results - the change in level demonstrated the immediate effect of the intervention and the change in slope showed the sustainability of the intervention.

In our analysis the intervention was modeled assuming to have an immediate and constant effect. This is a conservative assumption, as mass media campaigns may have an impact which becomes

visible only after a sufficient time from their inception, and our analysis was more likely to fail to detect an effect which was gradual rather than abrupt. Nevertheless, calculating the change in slopes does begin to address the problem of gradual changes.

A further potential bias faced in systematic reviews is that of publication bias (Begg 1988). The extent to which this review could have been affected by publication bias cannot be easily quantified. However, the existence of negative studies of evaluations of mass media campaigns undertaken by government agencies or other organisations published in the grey literature seems likely.

Further research is needed to explore whether the impact of mass media on clinical practice is specific (resulting in more appropriate use of services by patients who can actually benefit from them), or non-specific (resulting in changes in overall rates of use, without affecting the appropriateness of how health services are utilised). Some of the findings from studies on mass media impact on rates of use of HIV blood tests seem to suggest a non-specific impact of the message conveyed by the campaigns resulting in an increase in the overall volume of tests performed across all risk groups.

It is also unclear whether mass media have an equivalent effect on consumers and health professionals. While the importance of lay media in communicating research information to health professionals has already been highlighted (Phillips 1991), it is difficult to determine the extent to which the effects observed in many of the studies included in this review are attributable to changes in the behaviour of health care providers (supply) versus consumers (demand).

The duration of the observed effects is also uncertain due to a lack of studies with adequate follow-up.

The cost-effectiveness of the use of mass media has not been addressed in the papers identified for this review. Assessment of the cost-effectiveness of using mass media-based strategies to influence use of health services should include an analysis of the costs of the interventions, as well as of effects implied by the changes induced in patterns of care.

AUTHORS' CONCLUSIONS

Implications for practice

This review supports the view that mass media campaigns may have a positive influence upon the manner in which health services are utilised. Agencies and organisations engaged in promoting a better uptake of research information in clinical practice should consider mass media as one of the tools that may encourage the use of effective services and discourage those of unproved effectiveness.

In addition, these findings support the importance of efforts to ensure that reporting of health-related issues in the lay media cor-

rectly represents the best available knowledge on the effectiveness of health care interventions.

Implications for research

Current primary research in this area has several limitations relating to methodological quality and completeness of reporting of studies.

The use of time series data is a feasible approach in evaluating the impact of mass media campaigns. However, appropriate statistical techniques should be used, preferably time series regression models.

The available literature does not address a number of key issues concerning the characteristics of successful mass media campaigns. In particular, further research in this area should focus on:

- a) identifying contextual and subject characteristics which influence the effectiveness of mass media campaigns;
- b) identifying characteristics of the message which influence the effectiveness of mass media campaigns;
- c) exploring whether the effect of mass media on the rate of use of health services is specific (leading to improvements in appropriate utilisation) or non-specific (having similar impacts on changing both appropriate and inappropriate utilisation);
- d) the cost-effectiveness of the use of mass media to promote or discourage the use of health services;
- e) and the effectiveness of new channels of mass communication (ie the Internet).

FEEDBACK

PsycLIT incorrectly spelt

Summary

The reviewers incorrectly spelt the database PsycLIT.

Author's reply

This has now been corrected.

Contributors

Lorna Duggan

POTENTIAL CONFLICT OF INTEREST

None known.

ACKNOWLEDGEMENTS

We thank Nick Freemantle, David Finer and Gianfranco Domenighetti for their contribution to the first version of the review.

SOURCES OF SUPPORT

External sources of support

- NHS Research & Development Programme UK

Internal sources of support

- Agenzia Sanitaria Regionale Emilia-Romagna, Bologna ITALY
- Health Services Research Unit, University of Aberdeen UK

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* Indicates the major publication for the study

TABLES

Characteristics of included studies

Study	Blohm 1994
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: NOT DONE Completeness of data set: NOT CLEAR Reliability of primary outcome: DONE
Participants	General public
Interventions	Media campaign conducted in Goteborg (Sweden) in 1987, aimed at reducing delay in hospital admissions for patients with suspected myocardial infarction, and launched by a team of doctors and nurses. The campaign relied on a local radio station and on local newspaper articles and advertisements. Leaflets were distributed to patients admitted at medicine departments and to all households in Goteborg. They were also made available at local district clinics, pharmacies, post offices, and banks in the city. Advertisements were placed on buses and trams. Doctors made visits to local district clinics to explain the rationale for the campaign. Duration of the campaign: 1 year.
Outcomes	Delay time of hospital admission in patients with suspected myocardial infarction, and number of hospital admissions for chest pain
Notes	ITS based upon 11 observations before and 7 after the intervention for delay time, 20 observations before and 14 after for chest pain hospital admissions; monthly data
Allocation concealment	D – Not used

Study	Bonnerandi 1992
Methods	Data analysed appropriately: NOT DONE Formal test for trend: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcomes: DONE Completeness of data set: NOT CLEAR Reliability of primary outcomes: DONE
Participants	General public, health professionals
Interventions	Educational intervention alerting the general public to early diagnosis of malignant melanoma in Provence, Alps, Cote d'Azur and Corse Regions (France) in 1989. Television spots, radio programmes and interviews, newspaper articles, posters displayed in physician's office. Physicians given information through courses, meetings, videotapes and printed educational material mailed to physicians' offices. Duration of the campaign: 2 months.
Outcomes	Number of diagnosed malignant melanomas
Notes	ITS based upon 6 observations before and 6 after the intervention; 2-monthly data
Allocation concealment	D – Not used

Study	Brasca 1987
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE

Characteristics of included studies (Continued)

	Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Educational campaign on colorectal cancer, endorsed by the Sociedades de Gastroenterología, Cancerología and Colonproctología of the city of Rosario (Argentina). TV and radio campaign. 10, 000 printed educational materials targeted at physicians in the area; 25,000 printed educational materials distributed to the general population in hospitals, pharmacies, hotels, supermarkets. International meeting on colorectal cancer organised for health professionals in general, and primary care physicians in particular. Duration of the campaign: 3 months.
Outcomes	Number of colorectal cancers diagnosed
Notes	ITS based upon 9 observations before and 7 after the intervention; monthly data
Allocation concealment	D – Not used

Study	Del Mar 1997
Methods	Data analysed appropriately: DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Two educational campaigns (delivered twice over two and a half years) aimed at increasing public awareness of the risk of melanoma. The messages were delivered mainly (but not only) through TV advertisements to coastal Queensland (Australia). Duration of the campaigns: 5 and 2 months, respectively.
Outcomes	Number of malignant or potentially malignant skin lesions excised.
Notes	ITS based upon 14 observations before and 17 after the intervention; monthly data
Allocation concealment	D – Not used

Study	Domenighetti 1988
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public
Interventions	Mass media publicity in Canton Ticino (Switzerland) of hysterectomy rates higher than in other areas. From February to October 1984, 6 local newspapers, radio and TV gave wide publicity to the issue.
Outcomes	Hysterectomy rates
Notes	ITS based upon 7 observations before and 3 after the intervention in Canton Ticino as compared to an unexposed control area; 2-monthly data
Allocation concealment	D – Not used

Characteristics of included studies (Continued)

Study	Eppler 1994
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public
Interventions	'Call fast, call 9-1-1' campaign aimed at increasing the use of 911 emergency service and reducing hospital admission delay for patients with suspected myocardial infarction, in the community of King County, Washington (USA). TV and radio advertisements were targeted to individuals aged >50 in a community of about 1.5 million. Mailing of educational materials to households with persons over the age of 50. Duration of the campaign: 6 weeks.
Outcomes	Number of emergency department chest pain visits and number of coronary care unit admissions
Notes	ITS based upon 20 observations before and 5 after the intervention; monthly data
Allocation concealment	D – Not used

Study	Harris 1979
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public
Interventions	Three week educational campaign held in Birmingham (UK) for returning medicines. One of the aims was to reduce the incidence of poisoning incidents in children. Extensive coverage provided by local press, radio and TV, plus display of posters, leaflets. Duration of the campaign: 3 weeks.
Outcomes	Number of admissions of children under 15 to Birmingham hospitals after poisoning incidents
Notes	ITS based upon 32 observations before and 4 after the intervention; monthly data
Allocation concealment	D – Not used

Study	HealSmith 1993
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: NOT CLEAR Reliability of primary outcome: DONE
Participants	General public
Interventions	Campaign on early diagnosis of malignant melanoma, promoted in Leicestershire (UK) and funded by the Cancer Research Campaign (CRC). Press releases were issued to local media (newspapers, radio, TV) in the first week of July 1987. This was repeated in the same week of 1988 and 1989. CRC posters and leaflets were distributed. Duration of the campaign: 1 week.
Outcomes	Number of patients with good prognosis melanoma (ie thickness of the lesion <1.49 mm)
Notes	ITS based upon 4 observations before and 10 after the intervention; yearly data

Characteristics of included studies (Continued)

Allocation concealment D – Not used

Study	Herd 1995
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: NOT CLEAR Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Campaign for early diagnosis of malignant melanoma, promoted in Edinburgh (UK) in 1987 and funded by the Cancer Research Campaign (CRC). This initiative overlapped a similar campaign launched in Glasgow in 1985. Seminars were held for general practitioners and educational materials were also provided. The general public was targeted with a publicity campaign, plus pamphlets, posters, articles in local newspapers and radio programmes. Duration of the campaign: about 3 months per year for a 3 year period (1987,1988,1989).
Outcomes	Proportion of patients with malignant melanoma with good prognosis (ie: thin lesion, <=1.5mm)
Notes	ITS based upon 3 observations before and 6 after the intervention; yearly data
Allocation concealment	D – Not used

Study	Joshi 1988
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: NOT CLEAR Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: NOT CLEAR Reliability of primary outcome: DONE
Participants	General public
Interventions	Nationwide mass media campaign in the UK on HIV
Outcomes	Number of HIV tests performed
Notes	ITS based upon 20 observations before and 7 after the intervention; monthly data
Allocation concealment	D – Not used

Study	Lowe 1994
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT DONE Blinded assessment of primary outcome: NOT DONE Completeness of data set: NOT DONE Reliability of primary outcome: NOT CLEAR
Participants	General public, health professionals
Interventions	1991 National Skin Cancer Awareness Week campaign, promoted by the Australian Cancer Society, aimed at increasing awareness of the need for skin examination. Intensive multimedia information on danger of skin cancer. General practitioners supported with educational materials on skin cancer diagnosis. Duration of the campaign: 1 week.
Outcomes	Number of patient initiated consultations
Notes	ITS based upon 4 observations before and 6 after the intervention; weekly data

Characteristics of included studies (Continued)

Allocation concealment D – Not used

Study	Macdonald 1985
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Four week immunisation campaign by the South Australian Health Commission aimed at increasing immunisation rates for measles and rubella. The campaign included TV and radio commercials, posters, leaflets, coverage in newspapers, radio and TV programmes. Professional journals were also involved, and seminars were organised for health care providers.
Outcomes	Number of clinic attendances for measles and rubella immunisation
Notes	ITS based upon 8 observations before and 4 after the intervention; 2-monthly data
Allocation concealment	D – Not used

Study	Maclure 1998
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Mass media coverage of the effect of calcium-channel blockers in Canada, during the period 1994-96. During the same period educational interventions targeted at physicians were carried out, aimed at favouring the use of thiazides and beta-blockers over calcium-channel blockers.
Outcomes	Proportion of patients >66 years receiving different type of drugs.
Notes	ITS based upon 11 observations before and 25 after the intervention; monthly data
Allocation concealment	D – Not used

Study	Nattinger 1998
Methods	Data analysed appropriately: DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: NOT DONE Reliability of primary outcome: DONE
Participants	Women undergoing surgery for breast cancer
Interventions	Mass media report in the U.S.A. of Nancy Reagan's mastectomy for breast cancer in 1987
Outcomes	Percentage of use of breast conserving surgery over time
Notes	ITS based upon 19 observations before and 13 after the intervention; 3-monthly data
Allocation concealment	D – Not used

Characteristics of included studies (*Continued*)

Study	Paunio 1991
Methods	Data analysed appropriately: DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Nationwide vaccination programme in Finland for measles, mumps, and rubella, launched in November 1982, and including a one week mass media campaign (started in the third year of the programme), a notification of non-vaccinated children sent to health professionals (in the third year of the programme), and a similar notification sent to parents of non-vaccinated children (in the fourth year of the programme). Duration of the campaign: 4 years.
Outcomes	Vaccination coverage rates
Notes	ITS based upon 14 observations before and 8 after the intervention; weekly data
Allocation concealment	D – Not used
Study	Pehamberger 1993
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: NOT DONE Reliability of primary outcome: NOT CLEAR
Participants	General public, health professionals
Interventions	Nationwide campaign in Austria on skin cancer prevention, run under the aegis of the Austrian Society of Dermatology and Venereology, and supported by the Austrian Society of Surgery, Austrian Cancer Society, Austrian Medical Association, and Austrian Broadcasting and TV Corporation (ORF). Printed educational materials provided to all Austrian dermatologists, surgeons, and general practitioners. Regular broadcasts and television spots, articles and interviews in newspapers, posters displayed in physicians' offices, schools, and public places. Duration of the campaign: 4 months.
Outcomes	Number of patients with good prognosis melanoma (ie thickness of the lesion <1.50 mm)
Notes	ITS based upon 3 observations before and 4 after the intervention; yearly data
Allocation concealment	D – Not used
Study	Shelley 1991
Methods	Data analysed appropriately: DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: DONE Completeness of data set: NOT DONE Reliability of primary outcome: DONE
Participants	General public, health professionals
Interventions	Mass media campaign aimed at increasing Pap smear screening, launched in New South Wales (Australia), sponsored by the Department of Health and by the State Cancer Council and launched in February 1988. The intervention was based upon a 30 second TV commercial, (screened 34 times), plus 2 radio commercials,

Characteristics of included studies (Continued)

	an advertisement in two women's magazines, 2 posters and a pamphlet distributed to GPs. Duration of the campaign: 2 months.
Outcomes	Number of Pap smears performed
Notes	ITS based upon 35 observations before and 4 after the intervention; monthly data
Allocation concealment	D – Not used
Study	Soumerai 1992
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: NOT CLEAR Blinded assessment of primary outcome: NOT DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public
Interventions	Mass media coverage in the USA of the relationship between Reye's syndrome and aspirin use in children, taking place in the framework of other activities, including those of government agencies (FDA), consumer advocacy organisations, and pharmaceutical companies.
Outcomes	Incidence of Reye's syndrome
Notes	ITS based upon 6 observations before and 8 after the intervention; yearly data
Allocation concealment	D – Not used
Study	Tesoriero 1992
Methods	Data analysed appropriately: DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: DONE Reliability of primary outcome: DONE
Participants	General public
Interventions	Mass media report in the USA of 'Magic' Johnson's HIV disclosure
Outcomes	Number of counselling hours and number of blood submissions for HIV test in New York State
Notes	ITS based upon 36 observations before and 19 after the intervention; weekly data
Allocation concealment	D – Not used
Study	Turner 1987
Methods	Data analysed appropriately: NOT DONE Data collection identical before and after the intervention: DONE Intervention unlikely to affect data collection: DONE Blinded assessment of primary outcome: DONE Completeness of data set: NOT CLEAR Reliability of primary outcome: DONE
Participants	General public
Interventions	AIDS publicity campaign and government educational programme, taking place in October, November 1986 and March 1987 in the UK.
Outcomes	Number of specimens for HIV antibody tests at Liverpool Public Health Laboratory

Notes ITS based upon 7 observations before and 3 after the first campaign; monthly data

Allocation concealment D – Not used

Characteristics of excluded studies

Study	Reason for exclusion
Bach 1996	ITS Insufficient number of observations
Bakdash 1983	Uncontrolled before-after, self-reported data only
Balraj 1986	Uncontrolled before-after
Beck 1987	ITS Insufficient number of observations
Bett 1993	Uncontrolled before-after
Bortolotti 1988	Uncontrolled before-after, self-reported data only
Brown 1996	CBA Questionable appropriateness of control
Carter 1985	ITS Insufficient number of observations
Del Beccaro 1995	ITS Insufficient number of observations before/after the intervention
Dignan 1994	CBA No objective measure of health services utilisation
Doherty 1988	ITS Insufficient number of observations
Fulton 1992	Cross-sectional study, no data on actual behaviour
Gooch 1970	ITS Insufficient number of observations before/after the intervention
Gregorio 1990	Cross-sectional study
Gresham 1988	Uncontrolled before-after, self-reported data on awareness, no information on actual behaviour
Hastings 1990	Uncontrolled before-after, self-reported data only
Hill 1993	Uncontrolled before-after
Hirst 1990	Uncontrolled before-after
Ho 1989	Uncontrolled before-after, self-reported data only
Illig 1989	Cross-sectional study
Jones 1980	ITS Self-reported data only
Kelly 1991	Uncontrolled before-after, self-reported data only
Langer 1992	Uncontrolled before-after, self-reported data only
Lee 1994	Cross-sectional study, self-reported data only
Lin 1971	Cross-sectional study, self-reported data only
Marquart 1993	ITS Insufficient number of observations before/after the intervention
Mayer 1992	Uncontrolled before-after, self-reported data only
McKinnon 1978	ITS

Characteristics of excluded studies (Continued)

	Insufficient number of observations before/after the intervention
Melia 1995	ITS Insufficient number of observations before/after the intervention
Mitic 1984	Uncontrolled before-after, self-reported data only
Mukherji 1982	Uncontrolled before-after
Murtomaa 1984	Uncontrolled before-after, self-reported data only
Odumosu 1982	Cross-sectional study, no data on actual behaviour
Olivarius 1992	Uncontrolled before-after, self-reported data only
Olsen 1987	Uncontrolled before-after
Pape 1993	Cross-sectional study
Penna 1991	ITS Insufficient number of observations
Ross 1993	ITS Insufficient number of observations
Sherr 1987	Uncontrolled before-after, self-reported data on attitudes, no information on actual behaviour
Singh 1994	Uncontrolled before-after, no data on actual behaviour
Trandel-Korechuk 19	Cross-sectional
Waters 1983	ITS Insufficient number of observations
Weller 1984	ITS Insufficient number of observations
Winchester 1988	Uncontrolled before-after, self-reported data only
Young 1990	ITS Insufficient number of observations before/after the intervention
Zimicki 1994	Uncontrolled before-after, self-reported data only

ANALYSES

Comparison 01. Mass media vs control

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Health services utilisation			Other data	No numeric data

INDEX TERMS

Medical Subject Headings (MeSH)

*Health Education; Health Services [*utilization]; Health Services Research; *Mass Media

MeSH check words

Humans

COVER SHEET

Title	Mass media interventions: effects on health services utilisation
Authors	Grilli R, Ramsay C, Minozzi S
Contribution of author(s)	Information not supplied by author

Mass media interventions: effects on health services utilisation (Review)
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Issue protocol first published	/
Review first published	1998/3
Date of most recent amendment	22 February 2006
Date of most recent SUBSTANTIVE amendment	16 November 2001
What's New	This review is currently being updated. For further information, please contact Miranda Cumpston at mcumpsto@uottawa.ca.
Date new studies sought but none found	Information not supplied by author
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	Information not supplied by author
Date authors' conclusions section amended	Information not supplied by author
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DOI	10.1002/14651858.CD000389
Cochrane Library number	CD000389
Editorial group	Cochrane Effective Practice and Organisation of Care Group
Editorial group code	HM-EPOC

Analysis 01.01. Comparison 01 Mass media vs control, Outcome 01 Health services utilisation

GRAPHS AND OTHER TABLES

Health services utilisation

Study	Results	Additional notes
Blohm 1994	Delay time (in minutes) of hospital admission in patients with suspected myocardial infarction mean before: 10.3 (SD: 2.8) mean after: 6.7 (SD: 0.9) absolute change: -3.6 Change in level: -1.24 (SE: 0.69) Change in slope: +0.05 (SE: 0.15) Number of hospital admissions for chest pain	Authors performed a before-after comparison with Pitnam's non parametric test; reported p values were statistically significant. A 9% increase in the number of patients seen for chest pain at the Emergency Department was also observed; the number of those with confirmed myocardial infarction increased by 6%.

Health services utilisation (Continued)

Study	Results	Additional notes
	<p>mean before: 10.4 (SD: 0.9) mean after 11.7 (SD: 2.9) absolute change: +1.3 Change in level: -6.09 (SE: 1.68) Change in slope: +0.48 (SE: 0.22)</p>	
Bonerandi 1992	<p>Number of malignant melanoma diagnosed mean before: 12.16 (SD: 3.06) mean after: 17.66 (SD: 6.88) absolute change: +5.50 Change in level: -3.3 (SE: 2.2) Change in slope: +0.53 (SE: 0.61)</p>	<p>Authors performed a before-after comparison; reported p value was <0.02. The proportion of good prognosis melanomas (<1 mm) increased from 46% to 54% after the campaign (reported p=0.38).</p>
Brasca 1987	<p>Number of colorectal cancers diagnosed mean before: 39.8 (SD: 7.45) mean after 33.8 (SD: 13.8) absolute change: -6.00 Change in level: -2.09 (SE: 0.98) Change in slope: +0.56 (SE: 0.22)</p>	<p>Authors performed a before-after comparison of mean with Mann Whitney test; the reported p value was 0.05. The number of diagnosed polyps was also considered, with similar results (p=0.05). The pattern of number of cancers diagnosed increased after the launch of the campaign and decreased rapidly after the end of the intervention.</p>
Del Mar 1997	<p>Number of melanocytic lesions excised mean before: 104.2 (SD: 15.9) mean after 119.5 (SD: 34.0) absolute change: +15.3 Change in level: -4.66 (SE: 1.23) Change in slope: +0.11 (SE: 0.24)</p>	<p>Authors used a Poisson regression model including time as covariate. Results were reported as statistically significant: p value <0.001</p>
Domenighetti 1988	<p>Standardised hysterectomy rates mean before: 428 (SD: 63) mean after: 364 (SD: 25) absolute change: -64 Change in level: -2.17 (SE: 0.50) Change in slope: -0.70 (SE: 0.30)</p>	<p>Authors performed a before-after comparison; reported p value was <0.001. Hysterectomy rates from a control area not exposed to the media did not change over the same time frame.</p>
Eppler 1994	<p>Number of emergency department chest pain visits mean before: 1367.75 (SD: 105.1) mean after: 1608 (SD: 100.6) absolute change: +240 Change in level: -1.14 (SE: 0.93) Change in slope: -0.04 (SE: 0.33) Number of Coronary Care Unit admissions mean before: 660 (SD: 40.3) mean after: 742.6 (SD: 30.5) absolute change: +82.6 Change in level: -3.3 (SE: 2.2) Change in slope: +0.53 (SE: 0.61)</p>	<p>Authors performed a before-after comparison with Student's t test; reported p values were <0.05. No data on delay were reported. No increase in the number of patients with confirmed myocardial infarction was seen.</p>
Harris 1979	<p>Number of admissions for poisoning accidents in children under 15</p>	<p>No statistical test performed. Authors claim that the total amount of medicines</p>

Health services utilisation (Continued)

Study	Results	Additional notes
	<p>mean before: 55.4 (SD: 9.15) mean after 49 (SD: 7.34) absolute change: -6.40 Change in level: -0.35 (SE: 0.88) Change in slope: -0.24 (SE: 0.43)</p>	<p>returned was lower than expected.</p>
HealSmith 1993	<p>Number of patients with good prognosis melanoma (ie thickness of the lesion <1.49 mm) mean before: 47.5 (SD: 12.4) mean after 66.5 (SD: 8.9) absolute change: +19.0 Change in level: 0.10 (SE: 1.15) Change in slope: +0.8 (SE: 0.47)</p>	<p>No statistical test was performed.</p>
Herd 1995	<p>Proportion of patients with malignant melanoma with good prognosis (ie thin lesion, <=1.5mm) mean before: 41.7 (SD: 3.2) mean after: 60.7 (SD: 7.9) absolute change: +19 Change in level: -2.79 (SE: 4.86) Change in slope: +0.25 (SE: 2.34)</p>	<p>Authors performed a before-after comparison; reported p value was <0.001. Survival analysis for cohorts of patients according to year of diagnosis showed increased 5 year rates for those diagnosed during and after the campaign, vs those diagnosed before (84% vs 70%; p<0.0005).</p>
Joshi 1988	<p>Number of HIV tests performed mean before: 54.2 (SD: 20.22) mean after 135.3 (SD: 44.7) absolute change: +81.1 Change in level: -5.03 (SE: 1.22) Change in slope: -0.37 (SE: 0.29)</p>	<p>No statistical test performed. No increase in the number of positive tests was observed. The proportion of heterosexuals without risk factors undergoing screening increased (from 22% to 48%).</p>
Lowe 1994	<p>Average number of patient initiated consultations mean before: 7.5 (SD: 2.59) mean after: 11.9 (SD: 2.71) absolute change: +4.40 Change in level: -1.36 (SE: 1.5) Change in slope: +2.1 (SE: 1.12)</p>	<p>Authors performed a before-after comparison; reported p value was <0.01. The analysis was based on data from 60% of local GP practices. No increase was observed in the number of doctor initiated skin consultations.</p>
Macdonald 1985	<p>Number of clinic attendances for measles immunisation mean before: 2314.8 (SD: 220.9) mean after: 4179.7 (SD: 409.7) absolute change: +1864.9 Change in level: -7.31 (SE: 1.16) Change in slope: +0.003 (SE: 0.49) Number of clinic attendances for rubella immunisation mean before: 302.8 (SD: 55.3) mean after: 560.25 absolute change: +257.45 Change in level: -4.52 (SE: 1.07) Change in slope: +0.41 (SE: 0.43)</p>	<p>No statistical test reported on original paper. The promotion of other immunisation procedures (tetanus, poliomyelitis) was among the goals of this campaign, although with less emphasis. Authors claim there was an impact also on those, but no quantitative data are reported.</p>
Maclure 1998	<p>Proportion of patients >66 years and no history of</p>	<p>Authors performed a before-after comparison. No</p>

Health services utilisation (Continued)

Study	Results	Additional notes
	cardiovascular disease receiving calcium-channel blockers mean before: 22.0 (SD: 1.7) mean after 17.5 (SD: 2.8) absolute change: -4.5 Change in level: -1.44 (SE: 0.9) Change in slope: -0.36 (SE: 0.14)	statistical test reported.
Nattinger 1998	Percentage use of breast conserving surgery among females >30 years mean before: 22.2 (SD: 4.58) mean after 27.1 (SD: 3.41) absolute change: +4.9 Change in level: -1.21 (SE: 0.35) Change in slope: -0.04 (SE: 0.06)	Authors performed a logistic regression analysis, with time as a covariate. Effect for the intervention, expressed as Odds Ratio reported as statistically significant (0.75; 95%CI: 0.66-0.85).
Paunio 1991	Vaccination coverage rates in children aged 14-28 months mean before: NA mean after: NA absolute change: NA Change in level: NA Change in slope: NA Vaccination coverage rates in children aged 6 months mean before: NA mean after: NA absolute change: NA Change in level: NA Change in slope: NA	Authors performed a regression analysis taking time trend into account. The reported p values were <0.05. Further analysis aimed at disentangling the relative effect of the different components of the intervention - mass media and direct communication to parents - showed that both had a statistically significant impact.
Pehamberger 1993	Number of patients with good prognosis melanoma (ie thickness of the lesion <1.50 mm) mean before: 52.3 (SD: 3.51) mean after: 54.2 (SD:4.34) absolute change: +1.90 Change in level: -0.37 (SE: 0.61) Change in slope: -1.90 (SE: 0.26)	Authors performed a before-after comparison; reported p value was <0.01. The outcome measure considered decreased after the end of the intervention.
Shelley 1991	% Pap smears performed in women aged 20-29 mean before: 2.6% (SD:0.3%) mean after: 3.6% (SD: 0.6%) absolute change: +1% Change in level: -4.86 (SE: 0.79) Change in slope: +1.37 (SE: 0.37) % Pap smears performed in women aged 30-39 mean before: 3.0% (SD: 0.3%) mean after: 3.9% (SD: 0.7%) absolute change: +0.9% Change in level: -5.94 (SE: 1.08) Change in slope: +1.36 (SE: 0.53) % Pap smears performed in women aged 40-49	A logistic regression with time as a covariate was performed. p values were always <0.05. The analysis was based on a 10% sample of women registered with Medicare in the area exposed to the intervention. Other unexposed geographic areas were chosen as a control, showing Pap smear rates lower than those observed in the intervention site.

Health services utilisation (Continued)

Study	Results	Additional notes
	mean before: 2.4% (SD: 0.3%) mean after: 3.2% (SD: 0.5%) absolute change: +0.8% Change in level: -4.55 (SE: 0.99) Change in slope: +0.92 (SE: 0.49) % Pap smears performed in women aged 50-69 mean before: 1.4% (SD: 0.1%) mean after: 1.6% (SD: 0.3%) absolute change: +0.2% Change in level: -7.51 (SE: 1.02) Change in slope: +1.97 (SE: 0.50)	
Soumerai 1992	Incidence of Reye's syndrome per 100.000 population aged <18 mean before: 0.61 (SD: 0.17) mean after: 0.17 (SD: 0.13) absolute change: - 0.44 Change in level: -1.66 (SE: 0.67) Change in slope: -0.32 (SE: 0.16)	No statistical test performed. Lay media action on this topic was concurrent with activities carried out by government and professional agencies/organisations. Authors separately present the correlation between the number of citations concerning the topic on lay and professional media and Reye's syndrome incidence.
Tesoriero 1992	Number of counselling hours mean before: 41.6 (SD: 4.75) mean after: 51.23 (SD: 6.30) absolute change: +9.63 Change in level: -1.82 (SE: 0.63) Change in slope: -0.10 (SE: 0.05) Number of blood submissions for HIV test mean before: 31.5 (SD: 2.36) mean after 48.8 (SD: 10.5) absolute change: +17.3 Change in level: -8.82 (SE: 2.5) Change in slope: -0.07 (SE: 0.18)	Authors performed an ARIMA analysis; reported p values of coefficients indicating intervention effect were <0.01. There was also a similar statistically significant effect on other aspects of health services utilisation (hotline calls, appointments backlog hours), while a decrease was observed in the proportion of positive HIV tests.
Turner 1987	Number of specimens for HIV antibody tests mean before: 108.4 (SD: 14.8) mean after: 437.7 (SD: 228.8) absolute change: +329.3 Change in level: -13.1 (SE: 21.5) Change in slope: -0.9 (SE: 8.2)	No statistical test performed. The observed increase in the number of tests was accompanied by a decrease in the proportion of those positive.