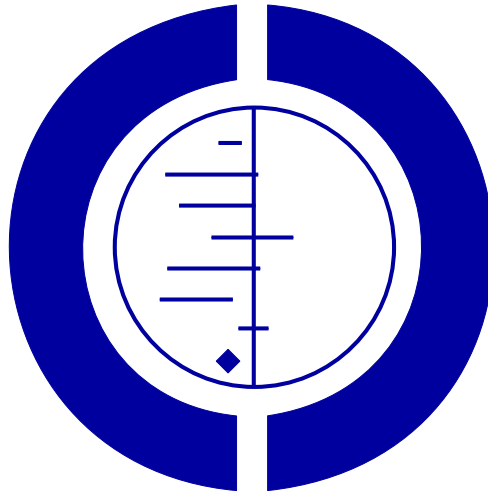


Mass media interventions: effects on health services utilisation (Review)

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ABSTRACT

Background

The mass media frequently cover health related topics, are the leading source of information about important health issues, and are targeted by those who aim to influence the behaviour of health professionals and patients.

Objectives

To assess the effects of mass media on the utilisation of health services.

Search strategy

We searched the Cochrane Effective Practice and Organisation of Care Group specialised register (1996 to 1999), MEDLINE, EMBASE, Eric, PsycLit (to 1999), and reference lists of articles. We hand searched the journals *Communication Research* (February 1987 to August 1996), *European Journal of Communication* (1986 to 1994), *Journal of Communication* (winter 1986 to summer 1996), *Communication Theory* (February 1991 to August 1996), *Critical Studies in Mass Communication* (March 1984 to March 1995) and *Journalism Quarterly* (1986 to summer 1996).

Selection criteria

Randomised trials, controlled clinical trials, controlled before-and-after studies and interrupted time series analyses of mass media interventions. The participants were health care professionals, patients and the general public.

Data collection and analysis

Two reviewers independently extracted data and assessed study quality.

Main results

Twenty studies were included. All used interrupted time series designs. Fifteen evaluated the impact of formal mass media campaigns, and five of media coverage of health-related issues. The overall methodological quality was variable. Six studies did not perform any statistical analysis, and nine used inappropriate statistical tests (ie not taking into account the effect of time trend). All of the studies apart from one concluded that mass media was effective. These positive findings were confirmed by our re-analysis in seven studies. The direction of effect was consistent across studies towards the expected change.

Authors' conclusions

Despite the limited information about key aspects of mass media interventions and the poor quality of the available primary research there is evidence that these channels of communication may have an important role in influencing the use of health care interventions. Although the findings of this review may be affected by publication bias, those engaged in promoting 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 unproven effectiveness.

SYNOPSIS

Mass media communication can encourage increased utilisation of health services

Mass media information on health-related issues may induce changes in health services utilisation, both through planned campaigns and unplanned coverage. Further research could target how best to compose media messages, and whether they have a different impact on members of the public and health professionals. More information is needed on whether mass media coverage brings about appropriate use of services in those patients who will benefit most.

BACKGROUND

The current emphasis on consumerism in the delivery of health care highlights the potentially important role of mass media in increasing the public awareness of research findings and promoting the utilisation of effective and efficient health services. The mass media frequently cover health-related topics and are targeted by those who aim to influence the behaviour of health professionals and patients (Freemantle 1994). However, while a systematic review of the impact of printed educational materials (which includes publication of research findings in scientific journals) has already been undertaken (Freemantle 1997), there has been no systematic review of the impact of mass media campaigns that examines effects upon health professional or general public behaviour.

The mass media play several important functions in society, including providing information, entertainment, articulating and creating meaning, setting agendas for individual and societal discourse, and influencing behaviour.

Population surveys show that mass media are the leading source of information about important health issues, such as weight control, HIV/AIDS, drug abuse, asthma, family planning and mammography (Chapman 1995), and have been over a 25-year period (Simpkins 1984).

Citing the 'special authority' (All For Health 1989) or 'unique responsibility' (Pfund 1981) of the media, various actors (industry, government, academia, non governmental organisations) increasingly advance utilitarian views of the mass media as an information 'distribution network' (Klaidman 1990), behaviour-modifying 'set of tools' (Brown 1990), agenda-setting 'vehicle' (Chapman 1995), or an 'opportunity of the greatest magnitude' (Wallack 1990).

Media advocacy has become an established health promotion strategy, partly due to the influence of the World Health Organisation's 1986 Ottawa Charter for Health Promotion. It has become common to seek a 'partnership' or 'shared agenda' (Atkin 1990) with the mass media in communicating health information to the public, particularly in the area of prevention, risk reduction, and drug information (Razak 1992).

Proponents of 'media advocacy' lobby for health message exposure, accuracy and media responsibility in order to set the media agenda

(framing for access), shape the media debate (framing for content), and advance healthy public policies (Wallack 1993). It should be remembered, however, that in the USA, the mass media have been a source of both hope and frustration in promoting social good for over 150 years (Paisley 1990).

Medical news reports may raise expectations (sometimes falsely), may dash hope, or may provoke alarm (sometimes unnecessarily). The mass media may also influence individual health behaviours, health care utilisation, health care practices and health policy (Nelkin 1987; Kristiansen 1984; Mazur 1981; Freimuth 1981; Cronholm 1981; Jones 1980; Domenighetti 1988). For example after extensive media reports on dietary studies relating cholesterol-rich foods with heart disease, consumption of beef, eggs and fatty milk products declined; similarly, reports on the risks of excessive sodium consumption were associated with increased use of salt-free food products; and a decline in the use of birth control pills and IUDs between 1970 and 1975 correlated closely with publicity about their possible adverse effects. However, the possible impact of the media on health behaviours is difficult to measure (Warner 1987; Sandman 1987; Flay 1987; Winsten 1985; Culbertson 1984; Pfund 1981; Church 1979; McQuail 1977).

This review aims to inform practice and further research for those attempting to help health professionals provide more effective and efficient health care.

OBJECTIVES

Mass media may influence the use of health services following campaigns by organisations/agencies aimed at promoting the rational use of specific procedures (such as cancer screening) or coverage of health-related issues outside the context of a planned intervention.

In this systematic review, we aim to assess the effect of both of these approaches, which use channels of mass communication (including radio, television, newspapers, magazines, leaflets, posters and pamphlets) on the utilisation of health services by professionals, patients, or the public.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

Randomised controlled trials (RCTs), controlled clinical trials (CCTs), controlled before-and-after studies (CBAs) and interrupted time series analyses (ITs) meeting explicit entry and quality criteria used by EPOC (see METHODS USED IN REVIEWS under GROUP DETAILS).

Types of participants

Health care providers, patients, and the general public.

Types of intervention

We considered interventions that:

- were based upon the use of mass media, including radio, television, newspapers, magazines, leaflets, posters and pamphlets (alone or in conjunction with other interventions);
- were targeted at the population level;
- and which aimed to promote or discourage the use of health care interventions/procedures, or to change public lifestyles but providing information on the subsequent changes in health services utilisation.

The following interventions were excluded:

- interventions based upon scientific media such as professional journals, leaflets, and booklets specifically targeted to health care providers;
- interventions based upon the use of media such as video, booklets and leaflets in a health care setting for individual patient information purposes.

Types of outcome measures

Objective (ie not self-reported) measures of direct impact on health services utilisation by health care providers or patients. In the context of this review, health services utilisation was defined broadly to include initiatives concerning the use of drugs, medical or surgical procedures, and diagnostic tests.

Studies that only reported the impact of mass media on health care professionals', patients' and the public's attitudes, awareness, knowledge, or opinions were excluded.

SEARCH STRATEGY FOR IDENTIFICATION OF STUDIES

See: Effective Practice and Organisation of Care Group search strategy

With the help of a professional librarian, broad electronic searches were undertaken on MEDLINE and EMBASE without language or time restriction up to 1996. The MEDLINE search was based upon the following terms: health promotion

(MeSH descriptor); and communications-media (exploded); or journalism (exploded); or advertising (exploded); or propaganda (exploded); or marketing of health services (exploded). On EMBASE the search was based upon the following terms: health promotion (EMTREE descriptor); plus audiovisual-equipment (exploded); or mass communication (exploded); or commercial-phenomena (exploded); or publication (EMTREE descriptor); or patient information (EMTREE descriptor); or visual information (EMTREE descriptor).

The EPOC specialised register was also searched for relevant studies (see SPECIALISED REGISTER under GROUP DETAILS), as well as Eric and PsycLit, where exploratory searches were undertaken using subject area terms on a limited number of years.

Hand searching was also conducted on the following journals: Communication Research (52 issues from February 1987 to August 1996); European Journal of Communication (43 issues from 1986 to 1994); Journal of Communication (37 issues from Winter 1986 to Summer 1996); Communication Theory (14 issues from February 1991 to August 1996); Critical Studies in Mass Communication (20 issues from March 1984 to March 1995); Journalism Quarterly (from 1986 to summer 1996).

The titles and abstracts of each paper identified through the electronic searches were independently screened for relevance by two assessors; disagreements were resolved by discussion and papers considered potentially relevant retrieved.

The reference lists of related systematic reviews and all articles obtained were also reviewed.

For the purpose of this updated version the process above described (except for hand searching) was repeated for the period 1996-1999.

METHODS OF THE REVIEW

Quality assessment

The quality of individual studies was assessed by two independent assessors using a standardised checklist (see ADDITIONAL INFORMATION, ASSESSMENT OF METHODOLOGICAL QUALITY under GROUP DETAILS).

Data extraction and synthesis

Data on the effect of mass media were abstracted by two independent assessors.

For time series analyses, when information on the value of individual observation over time was only reported graphically in

the original paper, data were derived by scanning the figures into a computer and electronically measuring each data point. This approach has already been used and proved to be reliable (Grilli 1993). Consistency between the data collected by this approach and those explicitly reported on papers (when this information was provided) was always good and discrepancies were never greater than 1%.

Results of time series analyses were reported variably; most studies either did not perform any statistical analysis or analysed their data by comparing means before and after the launch of the intervention. Such an approach is open to substantial bias, as it does not take into account the influence of time trend and the auto-correlation among measurements repeatedly taken over time (Cook 1979). Time series regression analysis is the most appropriate statistical approach for this type of study design, as the estimate of the treatment effect models the underlying time trend, and can account for any auto-correlation between individual observations (Draper 1981). Time series regression was preferred over ARIMA models because the studies in this review tended to have a small number of datapoints.

Therefore, in order to be able to obtain reliable quantitative information from these studies, data from the original papers were collected, standardised, and finally re-analysed. This approach (which has been always feasible, except for one study where graphics made difficult the drawing of the original data) made it possible to estimate regression coefficients corresponding to two standardised effect sizes for each study: a change in level immediately after the introduction of the intervention, and a change in slope. The change in the level was estimated by extrapolating the pre-intervention regression line to the first point post-intervention. The difference between this extrapolated point and the post-intervention regression estimate for the same point gave the change in level estimate. The change in the slopes of the regression lines was calculated as post-intervention slope minus pre-intervention slope. Both of these effect sizes were necessary for interpreting the results of each study. For example, there could have been no change in the level immediately after the intervention, but there could have been a significant change in slope. Reporting only the change in level in this case would have misled the reader.

The desired direction of change in the use of health services varied, for example the desired effect in one study was an increase in the use of preventive services whereas a decrease in hysterectomy rates was desired in another study. The direction of effect was standardised so that a negative change in level or slope always described a change in the desired direction.

Results from individual studies addressing the same aspect of care were not pooled, due to the substantial heterogeneity in both the setting and subjects between studies.

When the impact of the intervention was assessed in individual studies on more than one outcome measure, the outcome that

best reflected the targeted intervention was selected. Where there were multiple appropriate outcomes the median effect was selected. Where there were only two outcomes reported the more conservative result was selected.

DESCRIPTION OF STUDIES

Overall, 749 references were retrieved from MEDLINE searching until 1996, and their titles and abstracts were inspected. Searches on Eric, EMBASE, and PsycLit yielded 18 additional references not previously identified. One hundred and eighty-one additional papers were identified following inspection of the reference lists of individual papers. No additional papers were identified through hand searching.

Four hundred and twenty articles were examined in detail, of which 86 were editorials or reviews and 123 did not concern mass media-based interventions. Among the 211 remaining potentially relevant papers, 69 papers on the impact of mass media on aspects of health services utilisation were identified.

Seven studies (11%) were cross-sectional surveys, 23 (37%) were uncontrolled before-and-after evaluations, while 30 (48%) were time series analyses of variable length. Only two (3%) had a controlled before-and-after design.

Thirty-six studies (58%) reported objective measures of health service utilisation, whereas the other studies focused on indicators of attitudes, awareness, and self-reported behaviour or use of health services.

Updating the electronic search from 1996 to 1999 yielded 267 additional references, out of which 12 were considered potentially eligible.

Overall, 26 papers published between 1979-1999 reporting 20 time series analyses and one controlled before-and-after study met the inclusion criteria.

Most of the mass media campaigns described in the included studies were planned interventions which aimed to promote the use of specific health services (for example, cancer screening, immunisation programmes, or emergency services for patients with suspected myocardial infarction). Four studies focused on the impact of media coverage of health-related issues. These concerned the excessive use of hysterectomy, the relationship between use of aspirin in children and the incidence of Reye's syndrome, the disclosure of his HIV status by Magic Johnson (the American basketball player), and the effect of Nancy Reagan's radical mastectomy on the choice of women with breast cancer for breast conserving surgery. The length of the campaigns varied widely across the studies, ranging from one week to four years.

All the campaigns relied on the use of a variety of media, including radio, television, newspapers, posters and leaflets. Electronic media, such as the Internet, were not used in any of the studies.

In many circumstances, the campaign was integrated with initiatives specifically targeted at health professionals (usually the distribution of printed educational materials and/or by the organisation of seminars and workshops).

Most of the studies based the assessment of the impact of the campaign on some measure of health care utilisation. Others relied on patient outcome measures which were clearly related to the use of the intervention promoted (or discouraged) by the campaign.

METHODOLOGICAL QUALITY

Overall, the quality of individual studies was variable. Most studies were limited to a description of the time series data without any statistical analysis ($n=6$), or based their interpretation of results on a comparison of means before and after the intervention. Only four studies formally assessed time trend in the statistical analysis based upon an adequate number of data points (12 data points). Two studies applied different regression techniques, treating time as a covariate. Only one study used a formal ARIMA model. In 13 of the studies it was not possible from the published report to exclude the possibility that other contextual changes could have occurred concurrently with the campaign.

RESULTS

Results of individual studies (including findings presented in original papers and those obtained from our re-analysis) are summarised in the Results Table. All the studies apart from one (Harris 1979) concluded in their reports that mass media was effective. Our re-analysis, which was feasible for all the studies but one (Paunio 1991) showed that those conclusions were not always confirmed.

Two studies observed a positive effect of mass media campaigns to promote utilisation of immunisations, either by simply describing patterns of utilisation over time (Macdonald 1985), or by formal statistical analysis (Paunio 1991). A statistically significant change in level was observed in the Macdonald study (Macdonald 1985) when re-analysed using time series regression.

The effect of mass media campaigns on promoting cancer screening was less clear. While all of the studies reported statistically significant increases in utilisation based on a before-and-after comparison of means (Brasca 1987; Shelley 1991; Bonerandi 1992; Healsmith 1993; Pehamberger 1993; Herd 1995; Lowe 1994; Del Mar 1997), re-analysis using time series regression observed statistically significant changes in level in only four studies (Brasca 1987; Herd 1995; Lowe 1994; Shelley 1991) and a significant change in slope in only one study (Pehamberger 1993). Most of these studies had a positive estimate for the difference in slope (although not statistically significant). This suggested that the effect of the interventions was decreasing over time.

A mixed pattern was also observed for the two studies on HIV educational campaigns. Both studies reported that mass media had an effect based upon a description of patterns of utilisation over time (Turner 1987) or a before-and-after comparison (Joshi 1988). Both studies described an increase in volume of HIV tests performed; however, this did not appear to be the result of more tests being taken by those at high risk of HIV. However, a statistically significant change in level on the number of HIV tests was only observed in one study (Joshi 1988) when re-analysed using time series regression.

The effects of mass media interventions aimed at reducing delay in admission to hospital for patients with suspected myocardial infarction also appeared mixed. Blohm (Blohm 1994) reported that the observed reduction in delay time to admission was statistically significant based on a before-and-after comparison. However this was not confirmed on re-analysis with time series regression. Likewise, Eppler (Eppler 1994) reported a statistically significant increase in emergency department chest pain visits based on a before-and-after comparison, this remained significant when re-analysed using time series regression. While both studies found that the number of patients seen at the emergency department as a result of the campaigns increased, the proportion of patients seen with suspected myocardial infarction remained relatively stable.

All five studies evaluating the effect of media coverage of health-related topics outside the context of any planned interventions described changes in utilisation (Soumerai 1992; Nattinger 1998 1998) or observed statistically significant changes in utilisation based upon either a before-and-after comparison (Domenighetti 1988; Maclure 1998) or ARIMA analysis (Tesoriero 1992). All of the studies were found to have significant changes in level following re-analysis with time series regression, and all changes were in the expected direction.

Overall, the direction of effect was consistent across studies towards the expected change, with a change in level effect size ranging from 0.1 to -13.1. However, in four studies (Bonerandi 1992; Herd 1995; Blohm 1994; Eppler 1994) where a statistically significant effect of the intervention was reported for a before-and-after comparison of means, the results of our time series regression analyses were statistically non-significant. In contrast, the change in slope effect size was not consistent across the studies (ranging from -0.9 to 2.1), although it was only statistically significant in six studies (Pehamberger 1993; Soumerai 1992; Domenighetti 1988; Blohm 1994; Shelley 1991; Maclure 1998).

DISCUSSION

This review has examined the effects of mass media campaigns on health services utilisation. Consistent positive effects were observed following planned campaigns and unplanned coverage which differed in several characteristics, including the clinical area,

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).

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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

Characteristics of included studies (Continued)

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

Study **Bonerandi 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

Study **Brasca 1987**

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, health professionals
Interventions	Educational campaign on colorectal cancer, endorsed by the Sociudades de Gastroenterologia, Cancerologia and Colonproctologia 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

Characteristics of included studies (Continued)

Allocation concealment D

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

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

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.

Characteristics of included studies (Continued)

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

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

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
Allocation concealment	D

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

Characteristics of included studies (Continued)

	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

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

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
Allocation concealment	D

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,

Characteristics of included studies (Continued)

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

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

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

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),

Characteristics of included studies (Continued)

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

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

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, 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

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
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Characteristics of included studies (Continued)

	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

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

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

Characteristics of excluded studies

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

Characteristics of excluded studies (Continued)

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 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

Characteristics of excluded studies (Continued)

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-Korenchuk 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

GRAPHS

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

Medical 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
Issue protocol first published	/
Review first published	1998/3
Date of most recent amendment	16 November 2004
Date of most recent SUBSTANTIVE amendment	16 November 2001
What's New	Electronic search and search on the EPOC specialised register were updated up to 1999. Three new eligible studies were included in the review. Methods of statistical analysis were revised: times series regression was used instead of ARIMA model originally adopted. Results and conclusions of the review were not affected by the change of the statistical analysis.
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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COMMENTS AND CRITICISMS

PsycLIT incorrectly spelt

Summary

The reviewers incorrectly spelt the database PsycLIT.

Author's reply

This has now been corrected.

Contributors

Lorna Duggan

GRAPHS AND OTHER TABLES

Table 01. 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	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;

Table 01. Health services utilisation (Continued)

Study	Results	Additional notes
	Change in level: -1.24 (SE: 0.69) Change in slope: +0.05 (SE: 0.15) Number of hospital admissions for chest pain 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)	the number of those with confirmed myocardial infarction increased by 6%.
Bonerandi 1992	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)	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).
Brasca 1987	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)	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.
Del Mar 1997	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)	Authors used a Poisson regression model including time as covariate. Results were reported as statistically significant: p value <0.001
Domenighetti 1988	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)	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.
Eppler 1994	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)	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.

Table 01. Health services utilisation (Continued)

Study	Results	Additional notes
Harris 1979	Number of admissions for poisoning accidents in children under 15 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)	No statistical test performed. Authors claim that the total amount of medicines returned was lower than expected.
HealSmith 1993	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)	No statistical test was performed.
Herd 1995	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)	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).
Joshi 1988	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)	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%).
Lowe 1994	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)	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.
Macdonald 1985	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)	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.

Table 01. Health services utilisation (Continued)

Study	Results	Additional notes
Maclure 1998	Proportion of patients >66 years and no history of 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)	Authors performed a before-after comparison. No 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)	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.

Table 01. Health services utilisation (Continued)

Study	Results	Additional notes
	<p>% Pap smears performed in women aged 40-49 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)</p> <p>% 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)</p>	
Soumerai 1992	<p>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)</p>	<p>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.</p>
Tesoriero 1992	<p>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)</p> <p>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)</p>	<p>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.</p>
Turner 1987	<p>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)</p>	<p>No statistical test performed. The observed increase in the number of tests was accompanied by a decrease in the proportion of those positive.</p>