Assessing the Quality of Health News Stories in the Australian Media Using the Media Doctor Website

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STATEMENT OF ORIGINALITY

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library**, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.
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ACKNOWLEDGEMENT OF AUTHORSHIP

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I hereby certify that this thesis is in the form of a series of published papers of which I am a joint author. I have included as part of the thesis a written statement from each co-author, endorsed by the Faculty Assistant Dean (Research Training), attesting to my contribution to the joint publications.

Amanda Wilson   (Date)

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Synopsis

This thesis by publication is composed of five peer-reviewed papers reporting on findings from data collected and analysed over a five year period. Each paper relates to the theme of the Media Doctor website as a tool for assessing and improving the quality of health reporting in the general Australian news media.

The first paper (Chapter 3) "Monitoring the quality of medical news reporting:
 Early experience with '*media doctor*'" presents early data, providing a baseline overview of health reporting using the four categories of pharmaceutical, surgical, diagnostic testing and 'other' stories. In Chapter 4, the second paper, "Media Reporting of Health Intervention: Signs of Improvement but Major Problems Persist" examines the changes in the quality of news stories in these categories. This paper also provides an analysis of how the individual items on the rating instrument differed between subject categories, outlets and over time.   I Chapter 5, the third paper, "Does it matter who writes medical news stories" looks at differences in story quality by examining different author categories and whether news stories written by certain types of journalists have significant differences. The fourth and fifth papers examine the quality of news reporting of two specific types of story: 1) Complementary and Alternative Medicines (CAM) and 2) Stories about cancer (Chapter 6). "An analysis of news media coverage of complementary and alternative medicine" identified all news stories on the website that dealt with CAM interventions and analysed these in order to assess the overall quality compared with the scores of stories about mainstream health interventions. The fifth paper of the thesis "Deconstructing Cancer: What makes a good quality news story" looks at how the reporting of a specific disease, cancer, performs across both subject categories and rating items.

This thesis also examines the state of knowledge in the existing literature via extensive literature review of interventions to improve the reporting of health news stories, and the development of a validated rating instrument.

The thesis concludes by summarising the papers' findings to give an overall assessment of the quality of health news stories in Australia. The data reveals the strongest and weakest facets of health reporting and which media outlets and writers produced the 'best' and 'worst' quality health news stories in the context of the quality scores awarded using the rating instrument. It examines the impact of these findings on public health and explores interventions to improve reporting in this area.

CHAPTER 1: HEALTH NEWS REPORTING

INTRODUCTION

In the 1800's, across America, travelling medicine shows spread the news of the best and most effective new treatments (Anderson 2000). In the 21st Century, the culture of promoting medicine continues with pharmaceutical, diagnostic, complementary and alternative therapies, industry and researchers competing with each other to capture the attention of, and inform, both the general public and health practitioner audiences of their products (Aarva and Tampere 2006). The medium of today's health news is a world away from the beating circus drum and wholesome images portrayed on elixir bottles. Instead, audience attention is obtained through advertising, promotion and the media especially the medium of news and current affairs. News is literally at the fingertips of most adults in developed countries; 24 hours a day, from every corner of the globe. It may consist of a 30 second "grab" on the television news, a 10 second radio news update, a 5 minute 'in-depth' breakthrough on a current affairs program or a two-page feature in a broadsheet newspaper. An endless variety of news can be found on the internet, including transcripts of broadcasts, online news sites, blogs, streaming, e-news and interactive news, as the cybercommunity moves into the second media age (Holmes 2005).

Accompanying the rapid growth in technological communication has been an increasing human preoccupation with health (Pribble, Goldstein et al. 2006) and most people have

a greater awareness, interest in and demand for new health interventions and products (Canadian Medical Association 2008). Individual health and the efficiency of a country's health care system depend on understanding the associated risks and benefits of new interventions and an appropriate uptake of health technologies (Moynihan and Sweet 2000; Caplan and Elliott 2004; Doran and Henry 2008). The way the media deals with health news has many important ramifications (Dentzer 2009).

HEALTH NEWS REPORTING

Sources for health news stories are derived from a wide variety of sources. These include formal press releases from commercial, research, health, and government institutions, as well as non-government organisations (NGOs). Stories come from the general public, patients and their families, health professionals and allied health workers, and unions. Many stories are also sourced from information on the internet. Most specialist health journalist actively seek stories by talking to contacts in the area rather than accepting stories from press releases. The reporting of health news covers a wide variety of topics and in order to provide some structure to the types of health news stories available, the following broad categories are used in this thesis:

1. Raising Risk Awareness

These stories involve the reporting of risk associated with a condition, medication or intervention, such as potential epidemics, adverse events or increasing prevalence of diseases. While the object of this type of story is to alert the community of potential danger, the media are often accused of contributing to wide spread fear or panic through

intense, inappropriate or misleading information (Newman 2009, Clarke 2006). This type of perceived media influence is also referred to as 'moral panic': where anxieties regarding a lifestyle or health practice (or non-practice) are presented as having threatening or negative consequences (Rowe 2008). This type of story has been shown to impact on public health behaviour, often detrimentally (e.g., SARS, AIDs, BSE, H1N1 – fear inducing acronyms that need little or no introduction due to their past capacity for headlines). For example, when the Women's Health Initiative released its findings on a possible link between hormone replacement therapy (HRT) and risk of breast cancer, there was an international response in the news media. Stories ran on front pages and led news broadcasts. Many women changed their medication regimes and stopped taking HRT without consulting their doctors (McIntosh and Blalock 2005; Rolnick, Kopher et al. 2005; Canadian Medical Association 2008; Main and Robinson 2008; Sturmberg and Pond 2009). Doctors' prescribing behaviours were also affected (Sturmberg and Pond 2009). Research findings from subsequent content analyses have revealed that news media coverage of the Women's Health Initiative results were generally balanced, consistent and accurate (Canales, Breslau et al. 2008). While it was appropriate for many women to stop HRT, especially those who had been unnecessarily prescribed it for cardiovascular prevention (Lowe 2005); this example demonstrates the power of the news media and potential for greater consequences if news media coverage is biased or inaccurate.

In another example, when the celebrity Kylie Minogue was diagnosed with breast cancer, there was intensive national and international news media coverage of her

condition. Many stories consulted health experts such as epidemiologists and breast cancer groups and cited the rising prevalence of breast cancer in younger women. News of Kylie Minogue's breast cancer generated a 100% increase in never-screened young women booking for mammograms (Chapman, McLeod et al. 2005). The trend of increased rates of breast scans in Australia peaked within a few months of Minogue's diagnosis being made public, but did not return to normal levels until almost a year later. (Kelaher, Cawson et al. 2008). This suggests that the concentrated reporting about this disease caused a change in population health behaviour. Current international public health recommendations do not include routine breast screening for asymptomatic women aged under 40 years. Although most of the news media coverage during this period stressed this recommendation and discussed other forms of breast checks, enquiries from younger women to breast screening clinics across Australia and the United Kingdom increased (Twine, Barthelmes et al. 2006; Kelaher, Cawson et al. 2008). Twine et al found a significant increase in mammograms and ultrasound in the month following Minogue's diagnosis. However, there was no increase in malignancies diagnosed compared to projected estimates. The authors of this study cautioned that the women involved in these scans may have been subjected to increased exposure to radiation, anxiety and "cancer phobia". (Twine, Barthelmes et al. 2006)

While health behaviours have been shown to change substantially with wide news media coverage of especially threatening or fear mongering stories under the guise of raising awareness, most of these changes are short lived with studies showing peaks within weeks of the stories hitting the press, and return to pre-media levels within

months. This echoes the concept of moral panic generated through the news media as naive: "(t)he simple proposition that the media, through devancy amplificiation, have a direct casual effect on the creation of folk devils through a stimulus and response mechanism, is seen as outmoded." (Rowe 2008) The way an audience perceives the messages in the media and applies them to their own lives is more complex than is sometimes assumed.

2. Human Interest and Good News Stories

Good news stories contain information usually based on individual case studies or positive outcomes in health. Today, information is gathered from around the globe and bizarre incidents or exceedingly unusual occurrences are able to be reported in detail and distributed widely within a short amount of time (Gardener 2008). This is a substantial departure from even a decade ago. A story about an Indonesian man, Dede Koswara, who had a rare and severely physically deforming disease, made international news media where he was labelled the "Tree Man" due to the extensive hyperkaratotic growths on his body. Before the advent of the internet, this story with its many explicit photographs, may not have reached the news media at all. The good news aspect of this story was that American dermatologists treated the condition, and offered ongoing care (Staff Writers 2009).

Other common examples of good news involve stories about children where health professionals restore the 'idealised subjectivity' of what childhood rights and activities are. A recent example was the story of surgical separation of conjoined twin girls. The

two girls were brought to Australia from Bangladesh as one-year-old orphans. A detailed record of their time in Australia and the surgery which successfully separated them, appeared in hundreds of multimedia news stories. Not only was their journey and outcome described as miraculous by the news media, but it was also deemed to be part of a 'real' miracle. Blessed Mary McKillop, Australia's first saint in waiting, was the reason the "world-first" operation was successful according to the Sisters of St Joseph of the Sacred Heart who prayed during the "orphaned twins' marathon surgery" (Pilcher 2009).

3. Social and HealthCare Policy and Reform

Policy and Reform stories encompass a wide range of topics that relate to the way the health care system operates and are largely bound up with political machinations of how government funded and private health care operates in Australia. Topics include health reform of existing health services, both in hospital and the community. Services available to different populations are included in these stories, such as the length of surgical waiting lists in individual area health sectors. Economic health stories include the costs associated with different types of treatments, how health tax dollars are allocated and spent, private health insurance costs, as well as the cost of medications.

4. Case Studies

Case study stories usually depict a person or family coping with a single disease or disorder. However, they can also be used to describe a 'new' or rare disease or disorder (Moynihan, Heath et al. 2002). The stories describe peoples' experiences to illustrate how a disease can progress and impact on the individual and society. A wide spectrum

of aspects is covered including origins, diagnoses, prognosis and treatments. These stories can be highly emotional and subjective and encompass components from other stories categories, such as risk awareness. Many of these stories are timed to coincide with awareness raising campaigns such as 'weeks' or 'days' associated with various diseases, e.g. stories about Sudden Infant Death Syndrome (SIDS) produced around the funding raising day of SIDS in Australian, known as "Red Nose Day".

5. Medical Research and Breakthrough Stories

This story type is based on the release of research findings which identify new treatments, technologies or contribute new information about existing interventions. Well-conducted research published in a peer-reviewed journal is a good basis for a news story. However, many news stories discuss early research, such as animal studies or early phase trials and extrapolate these findings to fit potential future treatment. There have been calls from health professionals for the news media to limit reports on early research to studies that have been published in peer-reviewed journals and are about interventions that are close to, or available for common use (Woloshin and Schwartz 2006). This would limit misrepresentation of the relevance of research findings that may sound promising but are years away (if ever) from being used in a human population (Schwartz, Woloshin et al. 2002). This type of news media coverage, often containing terms such as "new hope" or "world first" or "breakthrough" has the very real potential to raise false hope in certain populations (Barbour, Clark et al. 2008).

Research on new interventions for human use can be broadly divided into five categories: surgical, pharmaceutical, diagnostic, complementary therapies, adverse events, and 'other' including dietary, exercise and preventative measures. This thesis will focus on health news stories that fall under this category, that is, reports of outcomes of research into new surgical, pharmaceutical, diagnostic testing, complementary or other innovations.
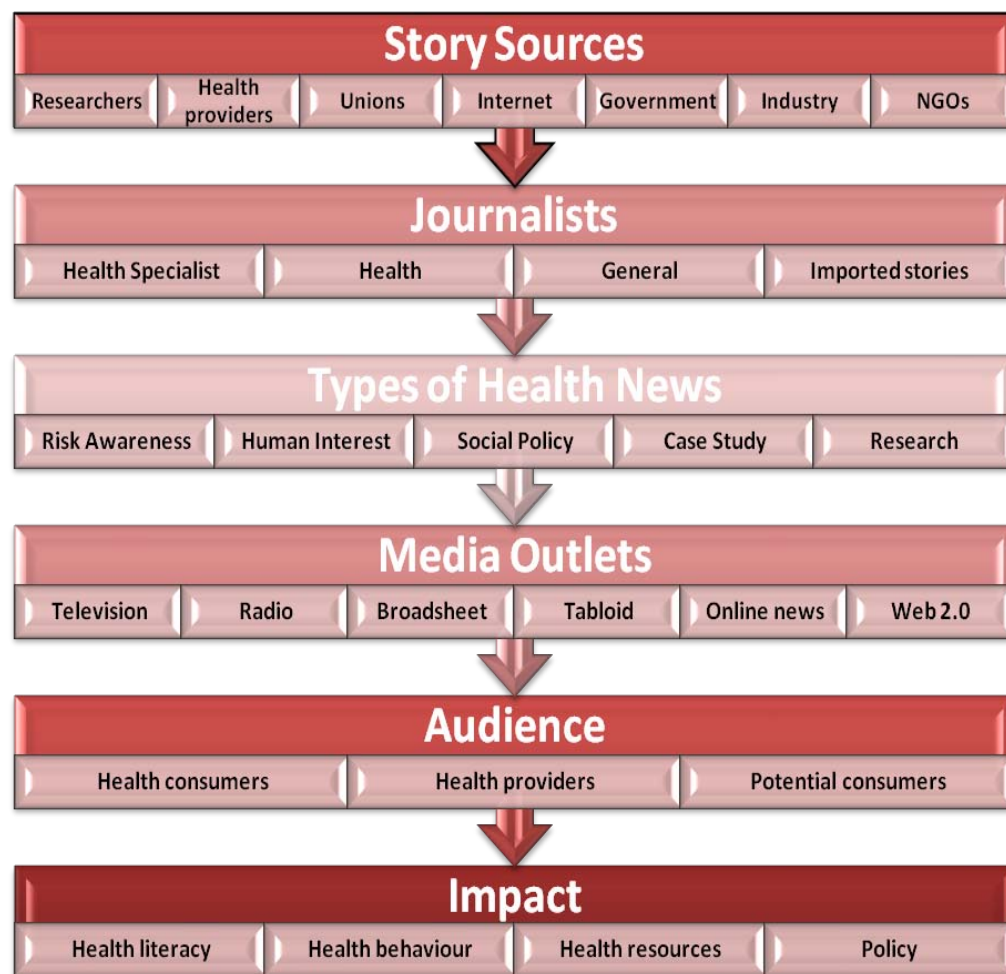
Flowchart 1.1: The Process of the Health News Story and Its Effects

THE MEDIA

It is increasingly apparent that the 20th century concept of 'the media' no longer exists.
Traditional news media incorporates empires of newspaper, television and/or radio
outlets owned by a handful of 'media moguls'. Australia has one of the most
concentrated media ownership structures of any comparable modern country. This has
been widely acknowledged and has been a subject of considerable debate, with critics
believing the concentrated media ownership contributes to a lack of diversity in
editorial opinion across the nation's various major newspapers, television and radio
news outlets (Cunningham and Turner 2006; Allan 2010). On the other hand, the
Australian media has been demonstrably free to report on many sensitive issues in
ways that media in other, less democratic regimes may find to difficult to emulate. In
basic terms, Australia has a mixture of private sector and government owned media
(Allan 2010).

Australia's government funded media assets are mostly housed within the ABC - the
Australian Broadcasting Corporation - which has operated in various forms since 1932.
Its charter requires it to broadcast programs that 'contribute to a sense of national
identity and inform and entertain, and reflect the cultural diversity of, the Australian
community'. It is also required to broadcast programs 'of an educational nature'.
Today, it operates television and radio news services across Australia, with a mixture
of region- and state-based stations, together with nationally oriented broadcasters such
as Radio National. The ABC has been an enthusiastic adopter of online news services

through the internet, and has also added to its stable of television stations with new digital outlets.

In the private sector, the famously concentrated nature of media ownership has meant that three groups of companies have effectively controlled the Australian media for decades on end. These three groups are News Limited, Publishing and Broadcasting Limited, and Fairfax Media. News Limited is controlled by Rupert Murdoch, who inherited a very much smaller media company from his father, Sir Keith Murdoch, in 1952. Over the years Murdoch has expanded, first into the United Kingdom, and later into the United States, becoming a US citizen in 1985. News Limited and its many subsidiaries now operate a truly global media empire, including numerous interests in new, online media. Fairfax Media is the oldest of three major groups, begun in 1841 when John Fairfax bought the Sydney Morning Herald. Fairfax bought other major Australian newspapers including Melbourne's The Age and has also owned television and radio stations. (Rowe 2009; Cunningham and Turner 2006)

Despite a proliferation of new online news services in recent years, most re-use or 'aggregate' news material taken from the traditional news media, and so are largely outside the field of interest of this thesis. One online news outlet that does generate its own copy is the independently owned Crikey.com.au, which employs parliamentary press gallery reporters and other specialist correspondents. It is financed both by online advertising and subscriptions that entitle the reader to otherwise unavailable 'premium'

content. Its mixture of irreverent gossip and comment, with genuine story-breaking hard news reporting has made it a closely watched news outlet.

Scientific Versus 'Lay' Media

Many publications on this subject in specialized science and medical journals refer to the 'lay' media (Anaissie, Segal et al. 2006; Rabi, Lewin et al. 2009). This term distinguishes between scientific/medical and general or mass media. The scientific media is written by academics, researchers and specialists for peers, while the lay media write for a nonprofessional, general public as an audience or the 'citizen consumer' (Allan 2010, Rowe 2005). It would seem the somewhat pejorative term of 'lay' is today used almost exclusively by the scientific profession. In the academic literature, 'mass media' is also seen as the use of the media to convey messages to the public. It implies a controlled management of media content, in the form of pamphlets, information sheets, books, blogs, advertising, opinion pieces, editorials or features to provide educational information rather than news. For the purposes of this thesis, the term 'news media' will be used to refer to mainstream mass media of newspapers, radio, television and online news. Any reference to other types of media such as specialist medical literature will be clearly defined as such throughout.

Health News Writers

Health news in the media is constructed by many types of journalists (Guillory 2009). There are dedicated health specialist journalists who are variously described as 'health editors' or 'health reporters'. (Larsson, Oxman et al. 2003) The Australian specialist health journalist works solely on health or medical related stories and produces a large

number of these stories. Most of these journalists have a substantial history working in this area and some have high levels of education in related areas of health or science (see Chapter 5 for more detail). These reporters seek out new stories in health, often using sources such as high impact peer-reviewed journals including the New England Journal of Medicine, Lancet and the Journal of the American Medical Association (Chapter 5). The concept of physician-journalists who combine knowledge of medicine with writing, do not appear to exist in Australian mainstream news media reporting. (Eggener 1998) There are medical doctors who work in the general media providing advice columns, opinion pieces or feature stories and there are a few medically trained media presenters who work full-time in presenting science and health related programs, but these are very much the exception. In the Australian general media, the candidate found no examples of doctors working as full-time health journalists.

Health news stories are also written by less specialised journalists who are commonly known as 'general reporters'. These journalists are often assigned stories that might come to the notice of an editor or producer through a media release. The Australian general reporter can range in experience from a junior employee with only one or two years experience to a well seasoned reporter, but even experienced journalists in this category, will not usually have an in-depth knowledge of health, nor have an established line of contacts or sources from whom to attain information (Guillory 2009). Many stories written by general (non-specialist) reporters are imported from foreign media or news services, or are truncated by sub-editors, with the possible loss of key information regarding treatment or interventions (Rabi, Lewin et al. 2009).

The majority of health journalists work under certain constraints. Larsson et al surveyed medical journalists in 37 countries to investigate the barriers to improving medical reports in the news media. They identified problems including lack of time and knowledge, competition for space and audience, difficulties with terminology and finding sources, as well as editorial and commercial pressures. (Larsson, Oxman et al. 2003). These findings have been supported by other research into barriers to good health news reporting. (Hodgetts, Chamberlain et al. 2008; Avery, Lariscy et al. 2009; Greene 2009). The majority of research into how health journalists perform their work is anecdotal or qualitative with journalists discussing their experiences.

Media Outlets

In Australia, as in most developed countries, there are media outlets well recognized for their high standards of reporting. These are aimed at an audience with a demographic of higher levels of education and include the broadsheet newspapers (including The Age, The Australian, The Sydney Morning Herald), the government funded Australian Broadcast Corporation (ABC) outlets, and Special Broadcasting Service (SBS). The tabloid newspapers and commercial television contain a higher content of human interest, celebrity and entertainment and sports news (The Daily Telegraph, The Herald Sun, Today Tonight, A Current Affair).

The ABC and SBS television 'current affairs' contain in-depth interviews and investigations, some of which have resulted in significant social changes in line with the concept of the 'fourth estate'. The fourth estate is the concept of the media as a fourth

bastion of societal protection, with the first three estates being the church, the
aristocracy and common people (Hampton, 2009; Schultz 1998). The media have
exposed corruption at the highest levels of society such as the 'Watergate Affair' which
brought down the government of President Nixon in the USA or the Chris Masterson
investigation "The Moonlight State" of corruption in Queensland police force in
Australia which resulted in a Royal Commission and the consequent imprisonment of
the Police Commissioner, four serving ministers (politicians) and dozens of police
officers (Turner 2005). The commercial television stations feature flagship current affair
programs designed to provide information to a viewing audience from a middle to lower
demographic (Turner 2005; Mackenzie, Chapman et al. 2008). Chapman et al described
commercial television coverage of medical issues in Australia as biased towards stories
which were bizarre, issued moral warnings, discredited well-known people, promoted
medical 'breakthroughs' or endorsed folk remedies (Chapman and Lupton 1994).

The online news websites of the ABC http://www.abc.net.au/news/ and 'ninemsn'
http://news.ninemsn.com.au/ reflect their television counterparts of the government
funded ABC, and the commercial Nine Network. The online ABC provides in-depth,
serious local, national and global news as well as specialized areas of news including
health. Ninemsn also provides specific news services but specializes in entertainment
news. The health section provides serious, and in many cases, high quality stories on
new health interventions, but sets these alongside equally seriously presented, but low
quality, stories on beauty, cosmetic enhancement and diet. This type of 'health'

reporting promoting 'cosmeceutical[1]' stories as health news has become a trend

internationally (Canadian Medical Association 2008). It reflects the concept of

tabloidization of the news or 'churnalism'. This is where news stories are churned out

using information from press agencies and media releases in the race to trump the

opposition news outlet, however this results in less time to check contents) (Rowe

2009). "This results in the coarsening and trivialization of all media and the societies

they represent ... sober organizations like major newspapers and broadcasters are

represented as 'infected' by the tabloid 'bug'." (Rowe 2009)

QUALITY of NEWS REPORTING

Code of Ethics and Guidelines for Best Practice

Media authorities and peak societies recognize the importance of good quality reporting

when dealing with health issues as illustrated by the various guidelines developed for

journalists in reporting in all areas. Among 29 European countries, 31 codes of ethics

were identified in an analysis of journalistic code of ethics (Laitila 2005). The majority

were self governed and adopted by unions or associations of journalists and most

guidelines involved an acknowledgement of certain main lines of media accountability

(see Table 1). Within these lines, the codes of ethics examined devoted the most

attention to accountability to the public (Laitila 2005).

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[1] A product which claims to combine cosmetic and pharmaceutical properties

Table 1.1: Lines of Media Accountability

1. To the public
    a. Truthfulness
    b. Clarity
    c. Defence of public rights
    d. Responsibility in creating public opinion

2. To sources and referents
    a. Gathering and presenting information
    b. Integrity of the source

3. To the state   a. Respect for state institutions
4. To the employers   a. Loyalty to the employer

5. Protection of journalistic integrity
    a. General rights
    b. Protection from public powers
    c. Protection from employers and advertisers

6. Protection of the profession
    a. Protection of the status of journalism
    b. Protection of the solidarity within the profession

Adapted from (Laitila 2005)

Internationally, other guidelines for journalists on health reporting follow these lines of
accountability and highlight the role of the media in showing accountability to the
public (Association of Health Care Journalists 2009). The Australian Press Council
Guidelines on health reporting (See Text Box 1) provide explicit warnings stating the
"dangers of exciting unreasonable fears or hopes are far too great for anything but the
most careful treatment" and there is need to treat statements on efficacy "with extreme
care" (Australian Press Council 2001). The guidelines stress the need to consult an
independent source even if the information provided comes from the "most eminent
authority". They also make clear that claims of cures and miracles should be treated
with caution and interests involved with the intervention should be made obvious.

Personal experience or anecdotal evidence should be clearly identified as such. It is also ethically necessary to keep medical news distinct from medical marketing.

Improving public access to reliable information about new interventions and treatments has obvious potential to benefit many (Viswanath, Breen et al. 2006; Bala, Strzeszynski et al. 2008; MacKenzie, Imison et al. 2008). News reports can dramatically alter consumer behaviour, cause anxiety and lead to inappropriate, expensive and sometimes detrimental use of interventions (Main and Robinson 2008; Rabi, Lewin et al. 2009). Media coverage can put pressure on politicians and pharmaceutical subsidy programs. It can affect the value of company shares, influence community support for health programs and research and impact on what is viewed as essential or worthy of continuing support, or what is marginal or unimportant (Mackenzie, Chapman et al. 2008; Raman 2009). Consequently, there are many stakeholders with different interests in news coverage of medical advances.

It therefore follows that good quality health news media stories can potentially improve public understanding and contribute to informed and appropriate use of health resources (Ma, Schaffner et al. 2006; Goodyear-Smith, Petousis-Harris et al. 2007). This means that the media deal in a moral economy in the way their content is compiled and received.

AUSTRALIAN PRESS COUNCIL

Reporting Guidelines

Health Warning

The Australian Press Council has issued the following general guideline for the print media on the ways in which newspapers and magazines should approach the reporting of medical matters, particularly reputed treatments.

The Press Council views with concern inadequately researched reports on health and medical matters appearing in the press and in the media as whole. The dangers of exciting unreasonable fears or hopes are far too great for anything but the most careful treatment.

The reporter/writer concerned may not be equipped to judge the value or otherwise of the reported treatments, from pills, potions, vaccines, and low-tech things like herbal remedies to high-tech wonders like MRI and dialysis machines.

Thus statements on efficacy should be treated with extreme care. They should always be sourced, even if made by the most eminent authority; on any lesser authority, they should be cross-checked with some other source.

Claims of cures, wonder cures, near-miracles and the like should be clearly identified as just that, claims.

The standing and the disinterest, or lack of it, of those making the claims should be made clear, be they researchers, pharmaceutical companies or just hard-selling snake-oil salesmen.

In cases where the writer is qualified to make judgment on the subject being reported, the qualification should be identified for the reader.

Personal experience or anecdotal evidence, too, should be clearly identified as such. The reader clearly has the right to ask: "Who says so?" The reports should provide the answer.

The Council recognises the undoubted public interest in health and medical matters, and the difficulties faced by the media in these areas.

The Council, of course, makes no pretence of any ability to judge for itself the value of the hundreds, if not thousands, of health-related claims made around the world each year.

Except in the case of learned journals, the media outlets that report them are generally ill-equipped to judge the soundness of reported cures.

Claims are just claims, extravagant claims are worse, and the media have a responsibility to consider the impact they may make on vulnerable, sick people.

Patients with serious illnesses understandably tend to grasp at any straw; the media should not present straws of doubtful value.

A conservative, careful approach to health and medical reports is essential.

Figure 1.1: Australian Press Council Health Guidelines (Australian Press Council 2001)

The Audience

The news media play a central role in the dissemination of information on health and medical issues (Guillaume and Bath 2008; Moriarty, Jensen et al. 2009). For most people, including health professionals, information about health issues and news of medical developments is first obtained through often intense news media coverage (Danovaro-Holliday, Wood et al. 2002; Brunt, Murray et al. 2003; Ma, Schaffner et al. 2006; Boyce, Murray et al. 2009). For the public, television, magazines newspapers, magazines, radio and internet are the most frequently cited sources of general health information (Wilkie 1996; Shuchman and Wilkes 1997; Berge 2000; Kickbusch 2004), which is often preferred over seeking such information from their doctor (Dolan, Iredale et al. 2004). The news media is consumed by a great number of Australians who read, watch or listen to news through a variety of sources and media outlets (see Table 1.2).

Health Professionals also obtain information of new research and interventions from the general media and can be influenced by news media health reports (Geller, Tambor et al. 2003; Sharma, Dowd et al. 2003; Stamm, Williams et al. 2003; Sturmberg and Pond 2009). A study of USA paediatric emergency departments showed that extensive news media coverage of a cluster of invasive streptococcal cases resulted in an a significant increase in testing for group A streptococcal disease despite no increase in children presenting with symptoms (Sharma, Dowd et al. 2003). Doctors are also approached by patients inquiring about new findings, drugs or treatments they heard about through the media (George, Hannah et al. 2009; Sturmberg and Pond 2009).

Table 1.2: Audience and Readership of Australian Media Outlets*

Media Outlet	Days	Audience per day (% population)*
Broadsheet newspapers		
The Australian	Monday – Friday Saturday	449000 (3%) 824000 (5%)
Sydney Morning Herald (SMH)	Monday – Friday Saturday	893000 (5%) 1176000 (7%)
The Age	Monday – Friday Saturday	749000 (4%) 854000 (5%)
Tabloid newspapers		
The Daily Telegraph The Sunday Telegraph	Monday – Friday Saturday Sunday	1158000 (7%) 964000 (6%) 1785000 (10%)
The Herald Sun The Sunday Herald Sun	Monday – Friday Saturday Sunday	1467000 (8%) 1404000 (8%) 1532000 (9%)
The Sun-Herald	Sunday	1365 000 (8%)
The Courier Mail	Monday – Friday Saturday	614 000 (4%) 874 000 (5%)
The Mercury	Monday – Friday Saturday	128 000 (1%) 153 000 (1%)
Commercial TV		
Today Tonight (TV Channel 7)	Monday – Friday	1224000*** (7%)
A Current Affair (TV Channel 9)	Monday - Friday	1144000*** (7%)
Online news		
ABC News	All days	2900000/week**** (17%)
Ninemsn	All days	8200000/month***** (47%)

(% population) over 15 years, n=17.3 million) (Australian Bureau of Statistics 2009)
**(Australian Press Council 2007)
***http://www.oztam.com.au/documents/2008/E_20080302.pdf accessed Mar 2008
****http://www.abc.net.au/corp/pubs/documents/ABC_Brochure_2003.pdf
*****http://mediacentre.ninemsn.com.au/aboutninemsn/default.aspx

Health Literacy

Health literacy is the ability of an individual to understand and usefully apply health

information and is widely acknowledged as necessary for maintaining and improving

public health (Zarcadoolas, Pleasant et al. 2005). There is increasing evidence that an individual's health knowledge is intrinsically linked to the complex interplay of cognitive, behavioural, economic, social and cultural elements that surround and encompass them (Zarcadoolas, Pleasant et al. 2005). Poor health literacy is associated with under-use, misuse and overuse of health resources resulting in sub-optimal individual health outcomes and unnecessary and inefficient use of health care resources (McCray 2005; Hironaka and Paasche-Orlow 2008). Lack of basic literacy and numeracy are the major contributors to poor health literacy, as is low income, disability, age, poor inter-personal skills, English as a second language, and an inability to understand information and communication technologies (Harvey, Korczak et al. 2008).

While the importance of the role of the news media in health literacy is being increasingly recognised (Hayes, Ross et al. 2007; Stryker, Emmons et al. 2007; Tian and Robinson 2008), this recognition is yet to translate into any systematic attempt to understand its role or impact on public health, or any initiatives to enhance the quality of reporting. The importance of the news media for health literacy, and the data presented in this thesis suggesting poor quality news media reporting of harms, presents a strong rationale for implementing measures to improve news media coverage of health. It follows as part of the social process of the technological revolution; there is a global movement in increasing health literacy (Hayes, Ross et al. 2007; 2008; Kountz 2009). Public demand for high quality health knowledge makes access to reliable information about health issues an important topic (Mebane 2003).

Theories of Media Communication

There are many sociological theories surrounding the media and how messages are communicated, controlled, received, retained and acted upon. There are large and complex questions surrounding the power of the media, reflexivity and reception as well as the intermediary role of journalism, especially in relation to the public, government and industries. This thesis concentrates on the principal research problems and uses an empirical focus in attempting to answer specific questions. The papers contained in this dissertation have used medical theories, methodology and arguments obtained through scientific literature, which focus primarily on quantitative methodologies and analyses. While this thesis does not incorporate a strong sociological perspective of media communication, it does acknowledge that there are many questions and aspects of this research that remain unanswered in the wider fields of analysis. The following discussion provides a brief overview of theoretical perspective of media and health.

Media Influence

The medical literature necessarily assumes an 'a priori' approach that the new media have an impact on health behaviour, as there is scant evidence involving audience reception or consumer studies to assess the relationship between news and impact. The evidence supporting this tends to be observational rather than based on experimental trials e.g. Kylie Minogue's breast cancer diagnosis and the rise in breast screening appointment as discussed earlier. While it is difficult to dispute that the media does influence health behaviour to some degree, there is little explanation as to how this occurs. There is some irony that many health researchers appear to subscribe to the

'hypodermic syringe' or 'magic bullet' theories of <u>Direct Effects</u>. (Seale 2002) These theories subscribe to the concept of the media being powerful sources of information and messages which inject message into a passive and unquestioning audience. This theory and others like it were developed in the early part of the 20th century when war propaganda provided a unique illustration of the power of media. (Greenberg and Salwen 2008) However, these theories are now considered to be outdated and naïve (Laughey 2007; Greenberg and Salwen 2008).

The <u>Limited Media Effects</u> theories differ from the direct effect theories in that while they acknowledge the power of the media as influential, this power was seen as only one factor among many that influenced audience behaviour and attitudes. These theories consider the media are not alone in causing effects, but that they are just one element of many mediating influences that shape and alter behaviour and belief (Laughey 2007).

The <u>Two-Step Flow model</u> identified opinion leaders who operated as Gatekeepers of information and stood between the media and the rest of society. While these opinion leaders could be public figures, they were more likely to be the dominant person in social circles who conveyed information they had consumed through the media to others in their group. In doing so, the messages were adapted and changed in line with the opinion leaders' own agendas. (Holmes 2005; Laughey 2007).

In <u>Uses and Gratifications theory</u> audiences were seen to use the media, in direct opposition to the Direct Effects theories. These theories postulate that audiences will

seek the best media messages to fulfill their existing needs. The audience becomes the power source in that it uses the media by taking only the information needed for gratification rather than responding to the entire media messages (Laughey 2007).

The Agenda Setting theory includes a social function of the media where it is possible to confer "…status on public issues, people, organisations and social movements. People who feature in media are elevated to a certain status among their audience" (Laughey 2007). This has been true of researchers appearing in the media who are depicted as authorities in their fields among a general audience but also in the eyes of their peers. It is a well documented phenomenon that media coverage of published research corresponds with a temporarily related increase in the citations of these research papers in the medical literature (Chapman, Nguyen et al. 2007). This is also true of issues in the health arena. Many researchers explore the potential of using the media for raising awareness of health issues such a screening (e.g. breast, prostate, skin and lung cancer) (Chapman 2004; Chapman, McLeod et al. 2005; Mackenzie, Chapman et al. 2008; MacKenzie, Imison et al. 2008; Wakefield, Durkin et al. 2008).

Media and Communication theories and models have a century long history and offer signification insight into the function and functioning of the media in society. Although in the main, the medical literature remains uninfluenced by media theory, there is great scope for a greater application of these theories in future medical research.

CONCLUSIONS

The way Australians access their health information is changing. The general news media is the main source for information on new interventions and treatments. Currently, there is movement away from more traditional forms of news media including, broadcast and print, to internet and cyberspace sources of news. The change in medium has added to the existing pressures faced by journalists and news outlets in supplying high quality information. Balancing the essentially commercial nature of the news media and ethical codes of conduct places journalists in a difficult position of producing good quality news that sells. Public health professionals have long called for the news media to be sensitive to the impact of news stories and especially to avoid the concept of giving false hope and unwarranted fear. There is differing opinion on how much impact the news media actually exerts and how much the consuming audience listen to the news media. However, there is little doubt that the news media do influence public health behaviour to some extent. Improving the quality of health stories in the news media has the potential to directly impact on public understanding of health interventions and contribute to informed and appropriate use of new treatments and technologies.

The research presented in this thesis was based on an innovative approach aimed at improving health news reporting by addressing key issues of quality in the public's major source of health information - the news media (MacDonald and Hoffman-Goetz 2002; Moriarty, Jensen et al. 2009). This research involved the application of an intervention, the Media Doctor initiative, which was developed with the aim of

enhancing journalist and media outlet understanding of health issues and thereby increasing the quality (both accuracy and reliability) of health reporting.

Despite concerns about the quality of the reporting of health news in Australia, no systematic evaluation of the quality of health stories in the general media has been undertaken and there have been only limited interventions carried out to improve quality. Studies conducted over the course of this thesis and by others in the United States of America (USA) and Canada, have documented the poor quality of the news media coverage of health issues (Smith, Wilson et al. 2005; Bonevski, Wilson et al. 2008; Cassels and Lexchin 2008; Schwitzer 2008; Wilson, Bonevski et al. 2009). Common problems in the reporting of health and medical issues include unnecessary sensationalism; not following up on stories; ignoring the public health dimensions of stories; failure to consider the quality (or lack) of the clinical evidence; inaccurate portrayal of benefit and adverse effects, not mentioning costs of medical interventions and a failure to obtain comment from experts free from conflicts of interest.

The rational for commencing this thesis was based on the observations that:

- The content of a news story on health can impact widely on public knowledge and health choices
- The quality of health reporting in the news media is poor, and
- Improving the quality of health reporting would have a positive flow-on effect to the wider community.

The thesis focuses on establishing the adequacy of reporting of new medical advances including drugs, diagnostic tests, surgery, medical devices and complementary and alternative therapies, and the impact of an intervention to improve this reporting. This research is internationally unique in the use of an evidence-based quantitative assessment of the quality of medical news stories as well as some qualitative research and interventions to improve feedback to journalists.

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CHAPTER 2: LITERATURE REVIEW

INTRODUCTION

The importance of high quality reporting of health[2] issues in the general news media is well recognised (Fonnebo and Sogaard 1990; Chen and Siu 2001; Picard 2005; Habel, Liddon et al. 2009). For most people, the news media are the primary source of information about health issues and medical developments (McIntosh and Blalock 2005; Jaffery, Jacobson et al. 2006; Weeks, Verhoef et al. 2007; Moriarty and Stryker 2008; Pribble, Trowbridge et al. 2008; Weeks and Strudsholm 2008). Media coverage can influence the perception of health issues, as well as public policy and health practice (Jones, Beniger et al. 1980; Bauman, Bellew et al. 2001; Corrigan, Watson et al. 2005; Mackenzie, Chapman et al. 2008; Boyce, Murray et al. 2009; Moriarty, Jensen et al. 2009; Sturmberg and Pond 2009). It follows that high quality news coverage of health is important especially given the substantial evidence of links between health news reports and health behaviour (Niederkrotenthaler and Sonneck 2007; Li, Chapman et al. 2008; Main and Robinson 2008).

Conversely, extensive coverage of some health issues has been known to generate negative outcomes including the generation of panic about conditions such as AIDs and Mad Cow Disease (Lupton 1992; Wilson, Code et al. 2004; McIntosh and Blalock

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[2] Health here is defined as medical or wellbeing related subjects. This encompasses all aspects of health and health news as defined in Chapter 1.

2005; Bomlitz and Brezis 2008). Inappropriate responses to perceived risk may increase exposure or hamper response and recovery operations and also overwhelm health care facilities with inappropriate use of resources (Chapman, McLeod et al. 2005; Einarson, Schachtschneider et al. 2005; Main and Robinson 2008; Rabi, Lewin et al. 2009). Widespread news media coverage of new findings of risk associated with an existing medication has resulted in people ceasing their medication either with or without medical advice (Brunt, Murray et al. 2003; Barber, Margolis et al. 2004; Smith, Ellenberg et al. 2008). For example, news media coverage of increased risk of breast cancer for women taking hormone replacement therapy was followed by decreases in its use and prescription (Barber, Margolis et al. 2004; Haas, Kaplan et al. 2004; MacLennan, Taylor et al. 2004; Majumdar, Almasi et al. 2004; Paine, Stocks et al. 2004; Heitmann, Greiser et al. 2005; Hoffmann, Hammar et al. 2005; McIntosh and Blalock 2005; Rolnick, Kopher et al. 2005; Main and Robinson 2008; Sturmberg and Pond 2009). Other examples includes coverage of research findings that short-acting calcium channel blockers (CCBs) were associated with increased risk of myocardial infarction (heart attack) causing changes in prescribing of these drugs. (Brunt, Murray et al. 2003) (See Text Box 2.1).

The good news health story, while not as likely to garner as intense or wide press coverage, is often accused of raising false hope in the most vulnerable populations (Petersen 2001; Cooper and Yukimura 2002; Daugherty 2002; Greenberg 2003; Ooi and Chapman 2003; Swan 2005; Anaissie, Segal et al. 2006; MacKenzie, Chapman et al. 2007; Barbour, Clark et al. 2008). As mentioned in Chapter 1, The Australian Press

Council has brief but explicit guidelines on dealing with health stories and categorically warns journalists against inciting "unreasonable fears or hopes" (Australian Press Council 2001). Similar guidelines exist in the United States though the Association of Health Care Journalists in America (Association of Health Care Journalists 2009). These guidelines raise issues journalists should consider when covering health and medical issues. They are not evidence based and do not include references to sources, but the information is consistent with the small amount of research findings available in this area. They refer to the journalist as being in a position of power and influence and note that

> **Textbox 2.1: CCBs – A Case Study on Impact**
>
> Brunt et al (2003) studied the media coverage of unpublished, controversial data presented at a scientific meeting describing a significant risk of myocardial infarction (MI) in people using calcium channel blockers (CCBs). High level media coverage which followed the meeting was sustained for 16 days. The authors hypothesised that prescriptions for CCBs would fall in response to the negative coverage of the report while prescriptions for first-line antihypertensives (thiazides and beta blockers) would increase. A retrospective cohort study with time series analysis of prescription claims data was conducted to assess these hypotheses.
>
> Media was analysed from using media databases and newspaper archives. A claims database was used to establish prescription use. The authors found a modest but significant drop in prescription claims of CCBs coinciding with the initial media publicity about the potential risk however all changes in prescription claims resolved within a few months. Therefore, while the impact was demonstrated, it showed only a temporary influence on health behaviour.
>
> There was no description of how news content was analysed, exact figures for new stories, or the different types of media examined. Despite stating strongly that poor reporting has important undesirable and unpredictable consequences, the study did not present any evidence of poor reporting nor were details provided as to how the quality of reporting was measured.

the impact of a story has the potential to harm. They refer to a 'special responsibility' involved with this area of reporting and while the guidelines are not binding in any way, they appeal to the professional integrity of journalists to adhere to them.

Both sets of guidelines refer to the way benefit and risk should be dealt with in order to provide a clear understanding of how efficacious or dangerous an intervention is. They caution again the use of qualitative descriptions such as "significant improvement" without statistically significant evidence, and using anecdotal stories or testimonials for dramatic benefit (Russell 1999; Moynihan, Bero et al. 2000; Schwartz, Woloshin et al. 2006; Wilson, Bonevski et al. 2009). Hyperbole or 'miracle language' is also commonly used to describe benefits (Bubela and Caulfield 2004; Schwitzer 2004). Benefits may be supported by health experts or researchers who have strong ties to the industry but these usually remain undisclosed in the story (Moynihan and Sweet 2000). News stories can also imply there is no downside to treatment by ignoring any side-effects or interactions with other treatment or by relating stories of patients who did not experience any problems. They might claim that treatment is safe and effective without mentioning the quality of evidence, such as the type or length of clinical trials or follow-up of participants in these trials (Moynihan, Heath et al. 2002; Smith, Wilson et al. 2005; Healy 2006; Heath 2006; Doran and Henry 2008; Moynihan, Doran et al. 2008).

QUALITY OF HEALTH NEWS REPORTING

Two themes recur in the vast amount of scientific literature on this subject. The first is that the general news media have a responsibility to impart accurate and high quality information to the public (Wilkes and Kravitz 1992; Shuchman and Wilkes 1997; Wilkes 1997; Ransohoff and Ransohoff 2001; Barbour, Clark et al. 2008; Lewison,

Tootell et al. 2008). The second is that the news media can and should be used to ensure health information is provided to the general public (Phillips, Kanter et al. 1991; Chapman, Nguyen et al. 2007; Donnelly, O'Hara et al. 2009). Both concepts have been explored in a large number of content analysis studies of health news media. The overwhelming conclusion of these studies is that the quality of health news reporting could be improved (Habel, Liddon et al. 2009; Harris 2009; Lai and Lane 2009; Pirkis, Dare et al. 2009; Rabi, Lewin et al. 2009; Wilson, Bonevski et al. 2009). Many also conclude that more intervention is needed from researchers and professional journals to ensure higher quality reporting (Shuchman and Wilkes 1997; Ransohoff and Ransohoff 2001; Cooper and Yukimura 2002; Smith, Wilson et al. 2005; Stefanadis 2006; Schwitzer 2008; Wilson, Bonevski et al. 2009).

The majority of the studies from the late 1990s to 2009 are based on observation and calculation of data collected from news stories. Researchers conducted searches of news databases using set search terms and extracted data from the text of the news stories identified. Research is often confined to one disease or condition, e.g. cancer, and usually confined to one type of media, e.g. newspapers – and these are often limited to those outlets with large circulation. Common areas of analysis include numbers of stories over defined time periods, sources of information, language used, and comment on the quality of the reporting. Few studies are interventional and even fewer use validated data extraction instruments. Many centred around a specific event, such as the Women's Health Initiative. The past decade has seen significant growth in the medical literature regarding how the general news media depicts health (see Table 2.1).

Table 2.1: Medical journal articles about health news reporting in the general international news media, by year

Year	Number of journal articles*
2009	74
2008	53
2007	52
2006	44
2005	54
2004	42
2003	38
2002	35
2001	28
2000	25

*containing the words media AND news AND health OR medicine in title or abstract

This review aims to examine the methodological quality of studies examining the effectiveness of interventions aimed at improving health news reporting in the general media. It also aims to assess the effectiveness of strategies at improving health news reporting.

METHODS

Literature Search

Electronic databases including Google Scholar, PubMed, CINAHL, Cochrane Library, Informit Social Sciences / Medicine and Health, JSTOR - The Scholarly Journal Archive, Oxford Journals Online, PsychINFO, ProQuest were searched for English language articles. Reference lists from relevant articles were also hand searched. The following terms were used in various combinations as search terms: health AND/OR

medicine; news AND/OR media AND/OR press AND/OR lay media AND/OR reporting AND/OR newspaper AND/OR television AND/OR journalist AND/OR journalism; quality AND/OR content AND/OR coverage AND/OR portrayal; AND/OR improve AND/OR change AND/OR impact. It was necessary to limit searches to minimise the large number of returns of clinical research articles, such as those on otitis media, this was done by blocking certain terms including: NOT otitis media OR tunica media OR contrast media OR culture media. No attempt was made to identify the grey literature.

Inclusion Criteria

Searches were restricted to research articles published in peer-reviewed journals, between 01 January 1999 and 30 December 2009. This period was considered to be large enough to incorporate a wide range of interventions but small enough to contain a homogenous group of journalists and media types – encompassing the beginnings of online news sites. However, an additional search of published research before 1999 did not reveal any studies that could have been included. All types of interventions were included. Studies were excluded if they were not published in English or if no evaluation had been conducted on the intervention.

Data Extraction

The titles and abstracts of all identified articles were reviewed by the candidate in order to identify potentially relevant papers. Those which appeared to meet the inclusion criteria were identified and the full text article was retrieved. These articles were

reviewed in detail and assessed as to their relevance against the inclusion and exclusion criteria. Those that met the full criteria were included in the subsequent full analysis.

Methodological Criteria

All studies included in the full analysis were assessed for methodological quality using an adapted version of the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies (Thomas, Ciliska et al. 2004). Each article was assessed across five domains of the assessment tool (withdrawals and dropouts were deemed to be not applicable as most studies were dealing with news stories). Each component of Section Bias, Study Design, Confounders, Blinding, and Data Collection Methods was rated as either 'Strong', 'Moderate' or 'Weak' in accordance with the tool.

RESULTS

Search Results

Over 359 potential articles were identified by ongoing search strategies conducted up to December 2009. Of these, 38 articles appeared to contain relevant content and all these full articles were retrieved. Only six (6) articles met the inclusion criteria and these were included in the following analysis. A flow chart depicts the method of article identification and retrieval (Figure 1).

Figure 1: Flow Chart of Literature Review and Article Selection

Description of Excluded Studies

- Two (2) articles featured interventions developed to improve health reporting however these interventions had not been evaluated.
- Five (5) articles were opinion pieces or editorials commenting on the need to improve journalism
- Ten (10) were anecdotal commentary on possible ways to increase the quality of health reporting but were not based on rigorous research,
- One (1) was a comprehensive set of principles for health journalists to work by,
- One (1) was an analysis of guidelines to improve news media reporting of suicide,
- One (1) involved science rather than health reporting and was not an evaluated intervention, and

- 10 were analyses of health news story content without interventions to improve quality of reporting.

Description of Included Studies

A detailed summary of included studies is provided in Table 1. Four of the six articles contained evaluated interventions which aimed to change the way suicide was reported in the news media (Michel, Frey et al. 2000; Pirkis, Blood et al. 2006; Niederkrotenthaler and Sonneck 2007; Fu and Yip 2008; Pirkis, Dare et al. 2009). One article looked at improving the depiction of mental health issues (Stuart 2003) and another described an intervention aimed at educating journalists about HIV/AIDS (Martinez-Cajas, Invernizzi et al. 2008). Three of the studies involved only newspapers, one included newspapers and magazines, one used newspaper, television and radio, and one used journalists from all media backgrounds. Four of the studies used reporting guidelines as the main intervention, one used an intensive educational intervention and the other used a combination of access to information (in the form of health experts), and increased involvement of journalists with the subject.

Quality Assessment of Included studies

Using an adapted version of the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies each article was assessed across five domains of the assessment tool: Section Bias, Study Design, Confounders, Blinding, and Data Collection. Four of the six studies were rated as having a 'moderate' methodological rating (Michel, Frey et al. 2000; Niederkrotenthaler and Sonneck 2007; Fu and Yip 2008; Pirkis, Dare et al. 2009) while two received a weak rating (Stuart 2003; Martinez-

Cajas, Invernizzi et al. 2008) (see Table 2:2). Methodological quality of the included studies is described in more detail later in this chapter.

TYPES OF INTERVENTIONS

Guidelines

Four of the studies used guidelines developed with the aim of reducing suicides that might result from hearing descriptions about someone else's suicide. This is referred to as the "Werther Effect" where a romantic notion of suicide is reinforced by reading or seeing details in the media can become a catalyst for susceptible people to copy. While this thesis has not examined the Werther Effect in any detail, the papers reviewed in this analysis cited strong evidence supporting this syndrome, as well as evidence that 'responsible' reporting of suicide coincided with a drop in the suicide rate. The guidelines used in each study were different. Three were government endorsed publications from three different countries: Australia, Austria and Switzerland, while one was a manual based on a WHO publication.

Niederkrontenthaler et al (2007) used country-wide media guidelines for reporting suicides that were introduced in 1987. No information was provided about the guideline content, how the guidelines were developed, who developed them, how they were disseminated or who they were aimed at (journalist or media organisations). A table summarising the content of current (2005) guidelines was included but there was no information on comparisons to the intervention guidelines (Niederkrotenthaler and Sonneck 2007).

Table 2:2 Ratings of the methodological quality of included studies

Authors	Selection Bias	Study Design	Confounders	Blinding	Data Collection Methods	Global Rating
Michel (2000)	Strong	Moderate	Strong	Moderate	Moderate	Moderate
Fu (2008)	Strong	Moderate	Strong	Weak	Moderate	Moderate
Neiderkrotenthaler (2007)	Strong	Moderate	Strong	Moderate	Weak	Moderate
Pirkis (2009)	Strong	Moderate	Strong	Weak	Strong	Moderate
Stuart (2003)	Weak	Moderate	Weak	Weak	Weak	Weak
Martinez-Cajas (2008)	Moderate	Weak	Weak	Weak	Weak	Weak

Michel et al (2000) distributed guidelines for responsible suicide reporting to all journalists attending a conference on suicide reporting, as well as to editors of all Swiss newspapers. These guidelines were developed with the support of the Swiss Medical Association and the Swiss Federal Office of Health. They were based on recommendations from a USA workshop on suicide contagion and reporting of suicide.

The fourth study, which used guidelines for responsible reporting of suicide, was conducted in Hong Kong. Fu et al (2008) distributed 1000 copies of guidelines, *Recommendations on Suicide Reporting for Media Professionals* to journalists and editors of Hong Kong newspapers (Center for Suicide Research and Prevention 2004). This manual incorporated recommendations for journalists covering suicide stories from the 2000 World Health Organisation publication *Preventing Suicide: A Resource for Media Professionals (World Health Organisation 2000).*

Each of the four studies showed significant increases in at least some areas of quality of reporting of suicide. Due to the different content of the guidelines and the difference in the items measured, it was impossible to perform a meta-analysis of results. Indeed, there were some conflicting results, as two studies found significant increases in the number of stories on suicide after the intervention, while one study found a significant decrease, which correlated with a decrease in the number of suicides during the same period. Areas of similarity where significant improvements were observed included:

- inappropriate language (sensational or glorifying) in the story (2 studies)

- headline content (2 studies)

- inadequate pictures or graphics (3 studies)

- location of story (2 studies).

One study also found improvements across:

- reporting of method of suicide

- focus on celebrity suicide

- inclusion of where to find help

- inclusion of mental health issues, and

- appropriate interviews with bereaved.

Individual Targeting of Reporter and Media Outlet

Stuart (2003) presented the findings of an intervention to maximise the number of stories on mental health in one of two local newspapers. The study aimed to increase both the number and length of positive stories about mental health. The intervention was performed in one newspaper using a pre and post-intervention analysis. There was an eight month baseline and post intervention period of 16 months. Details about the intervention were not provided but included:

- a senior editorial writer recruited to write a series of articles on mental illness
- Newspaper columnists invited to attend local events connected with a mental health anti-stigma project
- Local experts made available to provide comment and background information.

Table 2.3: Included Studies of Evaluated Intervention to Improve Health Reporting

AUTHORS YEAR COUNTRY	STUDY DESIGN	PARTICIPANTS (Media)	INTERVENTIONS	OUTCOMES	RESULTS
Michel, Frey, Wyss, Valach 2000 Switzerland	Design: Pre and post test	74 newspapers and magazines n= 151 stories (pre) n = 468 stories (post)	Guidelines for responsible suicide reporting widely distributed to journalists and newspaper editors Guarantee in writing from main Swiss tabloid editor to stop sensational reporting of suicide	Changes in "Imitation risk score" Length of article 'Number of Dangerous Ratings' – changes in items Compared all newspapers vs. main tabloid vs. main broadsheet	Increase in total number of articles (400%) Median Imitation Risk Score significantly lower for: • all newspapers (p<0.000) • main tabloid (p<0.005). Items showings significant differences (p<0.001) in the Number of Dangerous Ratings: • Headline on front page • Headline sensational • Headline glorifying • Article with picture • Picture inadequate • Text sensational • Text as glorifying (main tabloid only) • Shootings as method (main tabloid only)
Stuart 2003 Canada	Pre (8months) and Post (16 months)-Intervention	One of two local newspapers n= 362 stories (total study time)	Snr editorial writer recruited to write articles on mental illness Reporters invited to attend events on mental illness Mental health experts made available to reporters	Number of positive stories about mental illness Article length	Small increase in average number of positive stories (33%) Small increase in average word count of positive stories (20%) Increase in average number of negative stories (25%) Increase in average word count of negative stories (100%)

AUTHORS YEAR COUNTRY	STUDY DESIGN	PARTICIPANTS (Media)	INTERVENTIONS	OUTCOMES	RESULTS
Martinez-Cajas, Invernizzi, Ntemgwa, Schader, Wainberg 2008 Spain Thailand Australia Canada	Descriptive study	185 Journalists or communicators who had reported on HIV/AIDs and could speak English	Educational program conducted in 4 countries covering: • clinical science, • medical and therapeutic issues, • social and economic aspects of HIV /AIDS • journalism and HIV/AIDS	Journalist feedback Quality of reports on HIV/AIDs post intervention	Content of the program rated well overall Journalists generally found the program to be useful Quality of the reports were found to be high
Niederkrotenthaler, Sonnek 2007 Austria	Time series analysis 5 yrs pre and post intervention	Austrian press agency	Austrian guidelines for reporting suicide	Change in quality of reporting defined as number of headlines using either "suicide' or 'self-murder'	Significant (p<0.008) reduction in number of headlines post intervention
Fu, Yip 2008 Hong Kong	Pre (8 months) and post (19 months) intervention	Five major Hong Kong Chinese language Newspapers n= 2110 stories (pre) n=3630 stories (post)	WHO media guidelines "Preventing Suicide: A Resource for Media Professional" and an awareness campaign.	Placement in paper Appropriate messages Length Pictorial or graphical presentation	Pictorial presentation was significantly lower (p<0.05) Headlines mentioning suicide was significantly lower (p<0.000) No other significant changes
Pirkis, Dare, Blood, Rankin, Williamson, Burgess, Jolley 2009 Australia	Pre (12 months) and post (12 months) intervention,	Newspaper, television and radio reports on suicide n= 4813 stories (pre) n= 8363 stories (post)	Government Guidelines "Reporting Suicide and Mental Illness"	Number of stories Nine dimensions of quality in news stories Total quality scores	2-fold increase in number of media items. Significant improvement in individual dimensions of quality: • Inappropriate language (p=0.00) • Method of harm (p=0.000)

AUTHORS YEAR COUNTRY	STUDY DESIGN	PARTICIPANTS (Media)	INTERVENTIONS	OUTCOMES	RESULTS
					• Visual images (p=0.003) • Celebrity suicide (p=0.000) • Mental health literacy (p=0.000) • Help services (p=0.000) Total quality scores also showed significant improvement (p=0.000)

A total of 362 newspaper items were analysed over the study period. Stories were categorised as either 'antistigma' – those with positive themes about mental illness – or 'stigmatising' which used negative themes or linked mental illness to crime. Word counts for each story were calculated. Results were averaged over each month and pre- and post-intervention data were compared.

The results were unremarkable with very small increases in the number of positive stories (between 0.5 to 1.5 stories) and small percentage increase in word counts. Negative stories also increased by around the same amount and there was a greater increase in the length of these stories. The author describes the results as 'guardedly positive' but this does not seem to be supported by the data presented in this paper.

The major limitations in this research include the fact that it used only one newspaper and there is no description of the type or size of this outlet. This was a very small study with no control. Also, it appeared that all types of articles were included, not just news stories. While there was no inclusion criteria specified, the article provides examples including a "'schizophrenic' stock market or football game, or a 'psychokiller' movie or character". From these descriptions it would appear the all types of news articles, business, sporting and perhaps even film reviews, were included. This would dilute the impact of an evaluation which was designed for health news on mental health.

There is also no detail on how this intervention was chosen or on what evidence it was based. Brief reference was made a pilot program where a media project intervention was implemented and evaluated, but whether this was the basis for the Stuart's intervention was not revealed. Overall, there is too little detail provided to know what level of evidence this study provides, beyond saying the results are inconclusive.

Educational Intervention

Martinez-Cajas (2008) evaluated an educational intervention for journalists reporting on HIV/AIDS in the media. This descriptive study involved 185 journalists, who had previously reported on HIV/AIDS, attending conferences in one of four countries. Each conference presented information covering four major areas:

1) Basic and clinical sciences

2) Medical and therapeutic issues in HIV

3) Journalists and HIV/AIDS

4) Social and economical sciences

Session content varied from country to country.

The intervention was evaluated in three ways:

1) By a group of experts who assessed the content of each program in terms of accuracy and relevance,

2) By the journalists who attended the conferences at the end of each session and via an online survey conducted post intervention, and

3) By evaluation of reports written by the participating journalists.

The evaluation concluded that the program appeared to have met the aims of educating

journalists in means of translating HIV/AIDS information effectively to the general public.

Content of the programs varied in quality and comprehensiveness between countries but

overall it was assessed as satisfactory. Journalist feedback rated most sessions highly and

the post-intervention survey data showed participants felt the intervention had been very

useful and the majority had increased the quantity of their reporting in the area as a result of

the program. The evaluation of news reports found high levels of relevance and accuracy

with 84% of the reports evaluated as good or excellent.

This study had a number of limitations including a low response rate to the post-

intervention survey (26%) which the authors speculated might have been due to the

medium (e-mail) used. They argued that journalists in developing countries may not have

consistent access to this form of communication. They also acknowledged that it would

have been beneficial to have a baseline set of writing from journalists to perform a pre- and

post-analysis.

While this paper described a large and innovative intervention aiming at improving

reporting of health news, there are a number of omissions in the description of the research.

No information was provided as to how the intervention was developed or why it was

chosen. No evidence was presented to support this mode of intervention. As acknowledged

in the paper, there was no pre- and post-analysis of the quality of news reports of people

attending the program. This was despite the fact that journalists were only selected for

inclusion in the program if they submitted a report on HIV/AIDS. Although it is not made

clear, it would appear these reports were not available to the authors. There was no detail

on the methodology of evaluation of the program or the news reports. Neither was there any

detail about the design of the survey or session feedback from journalists, or the evaluation

of this. There was no discussion of following-up the journalists to see how long the quality

of their reports remained high.

This intervention may be useful in informing journalists and improving quality of reporting

in different health areas, however it is difficult to tell due to the information missing from

the paper. What was apparent was that it would be time-consuming for both the organisers

and the participants, and the costs would be large and therefore prohibitive as a widely used

intervention.

DISCUSSION

This thesis presents the first systematic review of interventions to evaluate the efficacy of

influencing journalists to improve health news reporting. It found the overall quality of

methodology used to access changes in quality of reporting across the majority of the

studies to be moderate to strong, according to the methodological rating instrument.

Selection bias was strong in those studies, which included large numbers of news outlets

and covered different types of media within their target range. Also, large numbers of

stories were gathered from many news outlets in most of the studies giving a broad

representation of media reporting. One study was rated as weak in this area as it included

only one news outlet (Stuart 2003). Design of all the studies except one, was time series

analysis, which gave them 'moderate' ratings. The Martinez-Cajas educational intervention

was mainly descriptive with no definitive study design (Martinez-Cajas, Invernizzi 2008).

In four of the studies, the samples of journalists, news outlets and media stories appeared to

be highly representative and descriptions showed there would be little in the way of

differences between groups (Michel, Frey et al. 2000; Niederkrotenthaler and Sonneck

2007; Fu and Yip 2008; Pirkis, Dare et al. 2009). In these studies, analyses were broken

down to include differences in media types such as broadsheet and tabloid newspapers, as

well as overall analyses. However, neither of the other two studies provided enough

information about the journalists and media to identify any important differences between

them (Stuart 2003; Martinez-Cajas, Invernizzi et al. 2008). In all studies, the outcome

assessors were either aware of the intervention and or the exposure of the participants, or it

was not possible to tell.

Only two studies stated that the participants were not aware of the research question

(Michel, Frey et al. 2000; Niederkrotenthaler and Sonneck 2007). Two studies discussed

validation or reliability testing of their assessments (Michel, Frey et al. 2000; Fu and Yip

2008) however only one study used instruments that had been previously tested for both

reliability[3] and validity[4] (Pirkis, Dare et al. 2009). The other studies did not describe any

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[3] **Reliability**
The stability and repeatability of measures, or the ability of a test to produce the same results under the same conditions.

[4] **Validity**
The property of being genuine, a true reflection of attitudes, behaviour, or characteristics. A measure (such as a question, series of questions, or test) is considered valid if it is thought to measure the concept or property which it claims to measure. (Oxford Dictionary of Sociology)

testing of collection or assessment tools (Stuart 2003; Niederkrotenthaler and Sonneck 2007; Martinez-Cajas, Invernizzi et al. 2008).

The methodology employed by Pirkis et al (2009) was the most rigorous and sound of all the studies. A large number (632) of media sources were used with 4813 items in the pre- and 8363 items in the post-intervention period being identified. Trained coders extracted data from a sample of the items and these were rated for quality using nine dimensions taken from an earlier mental health resource for reporting on suicide (Text Box 2). The paper described some study limitations, such as not including new media such as the internet, the possibility of stories being missed, differences in the completeness between difference media types (complete newspaper stories but only summaries for broadcast stories), potential differences between coders, restricted sample for rating content quality, and subjectivity in regard to assessing some items.

Use of guidelines to improve the quality of reporting about suicide saw significant improvement across two time periods. Pirkis et al (2009) compared individual items and also a total quality score, across the two time periods. Individual scores showed improvement or no change in all dimensions. Dimensions which showed significant improvement were: language that sensationalised or glamorised suicide (p=0.00); pictorial depiction of scene, location or method (p=0.003); detail of the method of death (p=0.000); detail and reference to wastefulness of celebrity suicide (p=0.000); discussing the reason behind suicide such as mental health issues (p=0.000); inclusion of help contacts and ways

to seek support (p=0.000). Total quality scores also showed significant improvement

(p=0.000) (Pirkis, Dare et al. 2009). There was a significant increase in the number of news

items about suicide over the two periods (Pirkis, Dare et al. 2009). The findings of

increased quality in regard to sensitivity and appropriateness, as well as the increase in the

total number of stories, are in line with other evaluations on suicide reporting pre and post

guidelines (Michel, Frey et al. 2000).

Text Box 2.2: Dimensions of Quality of Reporting Suicide
(Pirkis et al 2009) (Pirkis, Dare et al. 2009)

Dimensions of Quality of Reporting

1. Language (not using language that sensationalises or glamorised suicide)
2. Location of article (not as a lead item or on the front page)
3. Headline using 'suicide' (the use of 'suicide' in a headline can normalise and should be avoided)
4. Pictorial depiction (depiction of scene, location and method can lead to copycat deaths and should not be used)
5. Discussion of method (detail of the method of death can lead to imitation)
6. Reference to celebrity (details and especially reference to the wastefulness of the death can glamorise and normalise and result in imitation)
7. Mental health literacy (discussing the reasons behind the suicide can lead to improvement in public mental health literacy)
8. Reference to help services (inclusion of help contacts and ways to seek help for immediate support for those affected by the story)
9. Interviews with bereaved (interviews with those bereaved should be conducted with extreme sensitivity to avoid further distress to those potentially vulnerable to suicide themselves)

Some studies included in analysis items that were not news, such as letters, editorials and

'other' publications. All interventions were are aimed at reporting, which pertained to

journalists, other items published in newspapers are usually prepared and inserted by

people who are not journalists, such as artists, advertisers, sub-editors, and in the case of

letters, the general public. The majority of items appeared to be news stories; however, it

would be interesting to know if the non-news items were rated in the same way as the news stories.

This thesis expanded the methodological quality of included studies and found most studies lacked in certain methodological areas. The main deficiencies appeared to be in methods of dissemination and use of the intervention in regards to the target audience. Apart from Pirkis et al, none of the studies revealed whether any attempt had been made to establish how well the interventions had been accepted and used by the journalists. While there is some evidence that guidelines have been well received and used by journalists in reporting of suicide, there is no evidence that other guidelines, such as general guidelines for health reporting, are either widely known or used (Skehan, Greenhalgh et al. 2006). Also, there is the need to constantly inform and reinforce the guidelines as new generations of journalists rise through the ranks. One of the easiest and cost-effective ways for wide dissemination to a large audience from various media outlets of any intervention is via the internet. Journalists use the internet as an integral part in their work. A web-site with immediate assessment of news stories using rating items adapted from existing media guidelines would reinforce those guidelines.

Another way of improving the effectiveness of interventions has been to target the editor who directs journalists on what and how they should report (Larsson, Oxman et al. 2003). There is some evidence to support this, as cited in Michel et al (Michel, Frey et al. 2000) "personal contact between suicidologists and newspaper editors is probably the most

effective means of improving the quality of suicide reporting". Targeting news organisations and health editors and producers would potentially increase the effectiveness of an intervention especially if there is constant feedback about how well the media outlet was performing in contrast to rival outlets.

Although it did not fit the inclusion criteria of this literature review, the editorial by Woloshin and Schwartz *"Promoting Health Skepticism in the News: Helping Journalists Get it Right"* (Woloshin, Schwartz et al. 2009) should be noted as adding to the literature in stating that health journalists need to be more sceptical when appraising medical research claims. This claim is supported with research showing many press releases from academic medical centres contain exaggerated claims and that articles in medical journals are also prone to playing down risks and limitations. The authors also developed tip sheets for journalists. These include a "Numbers Glossary" and "Statistics Glossary" which provide an overview of ways to express effect sizes and basic statistical definitions. Other sheets include "Questions to guide your reporting" which aims to assist reporters in understanding research finding and "How to highlight study cautions" which looks at study limitations. The editorial provides a link to a website where the sheets can be downloaded. The authors have a long publication history in this area and are widely acknowledged experts in the field, however, this is not a research article and there is no information about whether the information in the tip sheets has been evaluated.

Another important benefit of feedback as a behaviour change tool is that it is efficient in

terms of resources and funding. This form of behavioural change was adapted as the basis

for the Media Doctor intervention which would relay feedback to journalists on individual

stories as well as overall feedback to media outlets on the performance in reporting health

news stories as compared to other news outlets. A web-site offers immediacy of access,

especially for a journalist at their desk, as well as potential to tailor information for

journalists and editors/producers as we receive their feedback on the web-site.

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CHAPTER 3: MEDIA DOCTOR AUSTRALIA

BACKGROUND

The aim of the research presented in this thesis was to examine in detail how health news was reported in the Australian media over a period of time (2004 – 2009) and across a variety of media outlets including broadcast (television and radio), newspaper (broadsheet and tabloid) and online news sites (commercial and government), in order to explore ways in which the health literacy of journalists and the general public could be improved. At the time this research commenced (2004), there was a fast growing bank of international medical literature regarding the content and impact of news health reporting. In Australia, a large number of medical research articles examined the content of health media stories had been published. However, there was little quantitative data rigorously assessing the quality of health reporting in the general media, and scant discussion about how to improve this reporting.

PILOT STUDY

Using the findings of the literature review (Chapter 2) to inform the process, a pilot study was conducted to establish a baseline assessment of the quality of health news reporting in the general Australian media. This involved the development of rating instruments and the creation of a website to feedback the rating information to journalists, editors and the public. Ethics approval was not sought for this part of the study as it was not being conducted on human or animal subjects.

Aim

The primary aim was to create a validated rating instrument to measure the quality of health news stories in the Australian general media. From inception, the intention was to perform a systematic sampling, assessment and reporting on news stories published or broadcast by the Australian media. Due to the large range of subjects covered under health stories (see Chapter 1), it was decided to limit the stories to those about new health interventions that made a claim regarding a health benefit; eligible interventions included pharmaceutical products, surgical procedures, diagnostic tests and 'others' (including diet, physiotherapy, and complementary therapies).

Aim 1: To develop a rating instrument for assessing the quality of health news stories

Aim 2: To evaluate the rating instrument in terms of:

- Inter-rater reliability

- Face validity and acceptability

The rating instrument had to be suitable for use in a media monitoring website (www.mediadoctor.org.au) as a means of feeding back information to journalists, editors and the public. This was an important consideration in developing the instrument.

Methodology

1. Develop the Rating Instrument

Given the small amount of evidence regarding gold standard health reporting available, a new rating instrument was developed from a literature review using a Delphi process.

Literature Review

Electronic databases including Google Scholar, PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Cochrane Library, Informit Social Sciences / Medicine and Health, JSTOR (The Scholarly Journal Archive), Oxford Journals Online, PsychINFO, ProQuest and Medline were searched for English language articles. Reference lists from relevant articles were also hand searched. The intention was to start with the Australian literature and then broaden the search to include international studies. The following were used in various combinations as search terms: Australia AND Australian AND media OR press OR news OR newspaper OR television OR journalis* (truncation search will include all words beginning with 'journalis' e.g. journalist) OR reporting OR reporter. This search involved articles published up to May 2004.

Twenty eight potential articles were identified. Abstract and titles revealed that 13 of these were not suitable for further evaluation as they were either opinion pieces or editorials, or were about the impact of health news on the population. The full text of the remaining 13 articles were retrieved and read. Of these, only two articles contained quantitative methods using a validated instrument to assess of the quality of health news stories (Pirkis, Francis et al. 2002; Bubela and Caulfield 2004).

This literature review yielded one instrument developed specifically for assessing the

quality of Australian stories around mental health issues, depression and suicide (Pirkis,

Francis et al. 2002). The other instrument was a 'coding frame' used to assess scientific

aspects of scientific news stories including costs, risks and benefits, sources and the type of

author (Bubela and Caulfield 2004). This research used Australian news stories as part of a

large group of international stories that had been analysed *en mass* but did not distinguish

the individual traits of each country. The characteristics of these two fairly comprehensive

Australian instruments are summarised in Table 3.1.

Due to the low return of Australian articles, the search was widened to news evaluation

from other countries reported in the English language. The returns for this general search

were too large, so the search was refined to include only publications that involved

instruments to rate the quality of news stories. A further two articles were identified. The

work of Oxman and colleagues (Oxman, Guyatt et al. 1993) created a Canadian rating

instrument "Index of Scientific Quality", which is well known, well validated and widely

cited. However, it concentrated solely on the scientific aspects of the reporting with no

consideration of broader issues such as conflicts of interest or the importance of the costs of

medical interventions. The other rating instrument in the international literature was that

developed by Moynihan et al to quantify the quality of coverage of risks and benefits in

health news stories regarding important medications in the USA (Moynihan, Bero et al.

2000). This covered benefits, harms and costs of interventions and the potential conflicts of

interest of informants. However, the instrument had not undergone extensive validation in the hands of the original researchers.

A summary of the items that could be adapted to cover stories of new health interventions from all the rating instruments are included in Table 3.1. The three more comprehensive instruments (Oxman 1993, Moynihan 2000 and Bubela 2004) included only two items that were common to each: quantification of benefits and coverage of adverse events.

Table 3.1: Criteria from existing instruments which could be used to rate general health news stories of new interventions

	Oxman (1993)	Moynihan (2000)	Pirkis (2002)	Bubela (2004)
Applicability	√			
Evidence – strength of findings	√			√
Inappropriate language			√	
Technical or scientific errors		√		
Quantification of benefits	√	√		√
Adverse events / risks	√	√		√
Cited expert or study / sources		√		√
Disclosed ties of sources		√		
Human or nonhuman model				√
Costs		√		√

Delphi Consensus Process

The Delphi technique has often been used in health research for developing guidelines for practice or performance measures where quantitative evidence is lacking (Fitzpatrick and Boulton 1996; Strauss and Corbin 1998; Ferri, Chisholm et al. 2004; Ferri, Prince et al. 2005). Initially, the literature review was conducted to identify the most important factors in health news analysis. The Australian Press Council Guidelines for journalists reporting on health were also consulted (Australian Press Council 2001). A draft list of items was developed based on the results of the literature search. Domains included novelty of the treatment, availability of the treatment, treatment options, evidence, quantification of benefits, harms, costs, sources of information and reliance on press release.

A modified Delphi process was used to further refine the list of items. This was a 'mini-Delphi' process with repeated small meetings of over-lapping groups of participants and re-circulation of modified forms of the rating instrument for further discussion. Participants were recruited using contacts and networks. Those with experience or interest in the media and health writing were invited to participate including medical, public health and sociological academics, media representatives including journalists, and health professionals from a wide variety of clinical areas. On each of three occasions, participants were presented with the results of the literature review and the draft list of items and asked to rate and comment on each. A relevant list of potential rating items was extracted using this process, which were compiled in a draft instrument.

The principles that underlay the choice of items were:

1) alignment with basic principles of evidence based medicine and a belief that these needed to be communicated to the public;

2) the topics that were essential to include in order to convey a balanced picture of the importance and relevance of new health technologies;

3) that the potential conflicts of interest of researchers and informants were communicated to the public;

4) that the instrument would be easy and quick to use and would be suitable for evaluating large numbers of stories and posting on the Media Doctor website.

Based on the results of Delphi process and the principles above, a rating instrument for medical interventions was developed. This is summarised in Box 3.1. Notably absent from this instrument are items such as 'sensational language' and 'assessment of headlines'. These are important but hard to quantify in a rating instrument because of subjectivity. In order to address these and other non-item issues, a free text comments area was provided. The finale rationale for inclusion of the various items is summarised in Box 3.2

Box 3.1 Criteria for reviewing media articles

Media doctor assesses articles for the extent to which they inform readers according to the following 10 criteria:

1. Whether the treatment is genuinely new
2. The availability of the treatment in Australia
3. Whether alternative treatment options are mentioned
4. Whether there is evidence of "disease mongering"*
5. Whether there is objective evidence to support the treatment
6. How the benefits of the treatment are framed (in relative or absolute terms) Whether harms of the treatment are mentioned
7. Whether costs of the treatment are mentioned
8. Whether sources of information and any known conflicts of interests of informants are disclosed
9. Whether the article relies heavily on a media release for content

* Moynihan, Heath et al. 2002; **(Moxey, O'Connell et al. 2003)

The Delphi development groups who participated in the development of the rating instrument also expressed their views on the criteria that might be used to rate each of the ten items. It was important to summarise this information in a form that could be used readily by raters and Box 3.3, which is reproduced from the Media Doctor web site summarise the brief guidance that was developed from these consultations.

Box 3.2 Rationale for assessing the rating items (numbering is the same as in Box 3.1)

1. Advocates for treatments typically present them as new, even though they may be a simple reformulation of an existing therapy. It is important for journalists to ascertain the true novelty of a new form of treatment. This can be ascertained by asking key questions of the proponent and obtaining informed independent opinion

2. It is important that full details are given about the availability of a new treatment in Australia, including whether it is subsidised by the PBS or Medicare. This will avoid building false hopes about experimental treatments that are years away from marketing

3. Frequently a new treatment may be promoted on the basis of a controlled trial where it is compared with placebo or no treatment. The comparator may be a variant of the new treatment (in which case novelty is the issue) or it may be a different but well established therapy, including a surgical procedure. In this case it is important that the reader understand that there is a choice of treatment.

4. Disease mongering – the expansion of the boundaries of treatable illness for the purpose of selling new treatments appears common. It is important that estimates of the disease burden or the prevalence of a disorder (e.g. erectile dysfunction) is not exaggerated in order to create new markets.

5. It is important that journalists try to convey something of the quality of the evidence that is used to support therapeutic claims. A single case series can seem compelling but in reality provides very weak evidence. Journalist should ask whether a randomised controlled trial of the treatment (or another high level evaluation – such as a meta-analysis of RCTs) has been performed and should convey the importance of this to readers.

6. Journalists should quantify the benefits of the treatment in their stories. The impact of information framing as relative benefits instead of individualised absolute estimates is well known. The public may be misled when treatment effects on uncommon outcomes (e.g. heart attacks, strokes) are presented only in the relative frame, as the benefits will be interpreted as being larger than they really are. Accurate framing is a crucial feature of accurate reporting

7. It is essential that readers get a balanced view of the value of a new treatment and this can only happen if they are provided with accurate information on the adverse effects and preferably this should be characterised in terms of the severity and quantified accurately.

8. Many modern treatments are very expensive. Their cost profoundly affects their availability unless they are covered by an insurance program. In order to provide a balanced summary of the place of a new treatment, costs should be included.

9. It is important that journalists report from unconflicted sources. It is well known that commercial interests can distort the true benefits and harms of new treatments in many ways. Many researchers and informants have undeclared relationships with commercial companies (medicines and equipment). It is important that the ties of these people are reported in the article.

10. Large commercial manufacturers of devices and drugs hire PR companies to prepare releases to accompany the launch of new products. There is an impression – not quantified – that sometimes media releases are pasted into articles with little modification and sometimes are published with the authority of independent reporting. It is important to identify such practices and report on them.

Box 3.3 – Rating Criteria and Guidance (from Media Doctor website)

Rating Criteria	Satisfactory	Not Satisfactory
Novelty of Treatment	Accurate information on novelty (or lack of)	Does not mention (or inaccurately represents) if treatment is genuinely new or just a re-formulation of an existing treatment, or another member of a well established class
Availability of Treatment	Accurate information on availability of treatment in Australia (both registration and PBS status)	Does not mention availability of treatment in Australia
Treatment Options	Mentions appropriate alternatives and provides comparative information	No mention of alternatives or their comparative performance
Disease Mongering	No obvious elements of disease-mongering	Frames risk factors (e.g. BMD cholesterol) as a disease, <u>or</u> No mention (or misrepresentation) of natural history of disease, <u>or</u> Exaggerates prevalence or incidence, <u>or</u> Medicalisation of normal human variation
Evidence	Where relevant, there is mention of strength of evidence and correct interpretation	No mention of the nature of clinical evidence, esp. RCTs Mention of the nature of the evidence but interpretation or discussion is inappropriate
Quantification of Benefits of Treatment	Estimate in both absolute and relative frames, or absolute frame only, or rates with and without treatment	No quantitative estimate of benefit Quantitative estimate in relative frame only
Harms of Treatment	Balanced information about harms (frequency or seriousness)	No mention of harms, or discounts potential harms
Costs of Treatment	Mentions comparative costs and comments on cost-effectiveness	No mention of costs, or downplays cost as an issue Mentions cost only, no comparative information
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Testing Validity and Reliability of the Media Doctor Rating Instrument

Face and content validity and acceptability were confirmed by sending the rating instruments to seven people who had expressed interest in the research. They included researchers, health professionals, journalists and health writers. They were asked to apply and evaluate the instrument according to its appropriateness for intended users, clarity and simplicity, adequacy of its instructions and need for subjective decisions, based on Feinstein's framework for evaluating sensibility (Feinstein 1987) using an adapted version of the *Questionnaire for Assessing the Sensibility of an Index of the Scientific Quality of Health Related News Reports* (Oxman, Guyatt et al. 1993 (Appendix 2.1). The results from this process were too small to be subject to analysis but the overall trend was moderate to high and all comments were taken into account in producing the final version of the instrument

In over five years of use, the Media Doctor rating instruments have been found to be reliable and acceptable forms of rating health news reports (see reliability data below). These are the same items that have since been adopted for use by Media Doctor Canada and Health News Review in the USA (Cassels and Lexchin 2008; Schwitzer 2008). They have empirical support, studies reporting their use and evaluation have been published (Smith, Wilson et al. 2005; Bonevski, Wilson et al. 2008; Wilson, Bonevski et al. 2009). At the time of completing this thesis, the rating instruments developed during the pilot phase had been used over a five year period. They had been adopted by other international groups and none of the items had been challenged during this period.

Construct validity was not assessed formally. Construct validity is generally taken to mean: "Are we actually measuring what we think we are measuring?" This involves generalizing from the instrument measures to the *concept* of the measures. (Research Methods Knowledge Base – http://www.socialresearchmethods.net/kb/constval.php). I acknowledge that this is an important step in the validation of a psychometric instrument. I also believe that a full evaluation based on the accumulation of correlations from numerous studies using the Media Doctor rating instrument might have yielded a shorter more focussed instrument than what was piloted and eventually implemented. However, it must be taken into consideration that the purpose of the instrument was not necessarily to provide a scientifically valid measurement of every independent construct that lies behind the attempts to assess the comprehensiveness and accuracy of media reporting of medical news stories. Rather, we were interested in producing an instrument that had face validity, was easy and quick to use, could be understood by the media and the public and which could be employed in feedback to try to improve overall reporting quality.

However, it was important to test the reliability of the instrument and this was done in two stages – an evaluation in the pilot phase and a later, quite extensive, assessment of inter-rater agreement during the operational phase. The latter can also be viewed as a quality assurance process.

Pre-testing the Rating Instrument

For pre-testing, three members of the project team were independently asked to apply the draft instruments to nine articles. These reviewers met to discuss their ratings and reviewed

each item examining agreement between reviewers. This process was repeated using a second group of five stories. Items were modified until the best method for completing the individual item scores was agreed upon.

Assessing the inter-rater reliability of the rating instrument

The inter-rater reliability of the rating scales was assessed using standard statistical methodology. Reliability represents the stability and repeatability of measures and the ability of a test to produce the same results under the same conditions. To measure the reliability of a test, it is repeated on a group on individuals and the results are analysed using statistical methods measuring agreement. For agreement analysis, we used Cohen's kappa (weighted and unweighted) and Scott's pi as measures of inter-rater agreement for each two raters' categorical assessments (StatsDirect 2004).

In the first phase, thirty different stories were reviewed using the new rating instruments. The stories were sent to seven members of the School of Medicine and Public Health at the University of Newcastle. Pairs of pilot 'raters' returned between 9 and 30 completed ratings, which were used to calculate inter-rater agreement using weighted kappa scores (StatsDirect 2004). A kappa below 0.2 is generally accepted as indicating poor agreement, while a kappa above 0.8 indicates a very high good agreement beyond chance. A kappa score of 0.6 to 0.8 is taken to denote a good level of agreement (see Table 3.2) (Landis and Koch 1977; Gordis 1996).

Table 3.2: Agreement Measures for Categorical Data*

Kappa	Level of Agreement
<0.0	Poor
0.0-0.2	Slight
0.2-0.4	Fair
0.4-0.6	Moderate
0.6-0.8	High
0.8-1.0	Very High

*Adapted from (Landis and Koch 1977)

Pilot testing of the rating instrument (30 stories and seven reviewers) produced item kappa scores between 0.09 and 0.74 (see Table 3.2). Statistical calculations of these kappa scores are provided in Appendix 2:2. The majority of scores fell into either the moderate (n=7) or high (n=4) agreement levels; however, one was rated 'slight' and another only 'fair'. Overall, the agreement levels were moderate to high. Not all rating pairs completed ratings for the 30 stories. There were only nine stories that all pairs completed and the kappa scores for these are reported in the published paper that is presented below. Additionally, these scores gave rise to discussions between raters about the most consistent approach to completing the ratings. Inevitably there is a degree of subjectivity involved in an operation like this.

Table 3.3: Kappa Scores for Assessment of New Stories

	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6
Rater 2	N= 30 K 0.571 P 0.0016			N= 20 K 0.634 P 0.002	N= 9 K 0.727 P 0.02	
Rater 4	N= 10 K 0.546 P 0.05	N= 20 K 0.634 P 0.002*			N= 29 K 0.610 P 0.02	
Rater 5	N= 9 K 0.526 P 0.07	N= 9 K 0.727 P 0.02*		N= 29 K 0.610 P 0.02*		
Rater 6			N= 10 K 0.737 P 0.016			
Rater 7	N=20 K 0.468 P 0.013	N= 10 K 0.09 P 0.013	N= 10 K 0.210 P 0.49	N= 20 K 0.467 P 0.035	N= 30 K 0.488 P 0.007	N= 10 K 0.375 P 0.236

* Repeated data

Testing of agreement during the operations of Media Doctor

As mentioned earlier, a further evaluation of the reliability of paired scores was undertaken

during the operational phase of Media Doctor. This was possible because the online rater

portal separately stored the scores completed by each pair of raters. These data were easily

downloaded and, as with the early assessment of inter-rated reliability, analysed using

StatsDirect (2004). The results of these analyses are summarised in Table 3.4

Table 3.4 – Results of inter-rater agreement obtained during the operational phase of Media Doctor

Rater	Rater	Number of articles	Kappa	95% CI for Kappa
1	2	149	0.64	0.52, 0.77
1	3	120	0.49	0.35, 0.63
1	4	80	0.70	0.53, 0.87
1	5	60	0.65	0.44, 0.86
1	6	40	0.53	0.31, 0.76
1	8	100	0.73	0.57, 0.89
1	10	20	0.30	0.02, 0.57
1	12	20	0.45	0.07, 0.83
1	13	20	0.91	0.58, 1.0
1	15	20	0.28	0.03, 0.60
2	3	60	0.36	0.18, 0.54
2	6	70	0.66	0.48, 0.84
3	4	40	0.35	0.12, 0.58
4	5	80	0.51	0.35, 0.67
4	7	20	0.29	-0.04, 0.63
4	8	30	1.0	0.73, 1.0
4	9	20	0.34	0.25, 0.66
5	8	20	0.56	0.24, 0.88
5	11	20	0.26	0.12, 0.63
5	12	20	0.41	0.06, 0.75
5	13	21	0.68	0.36, 1.0
6	9	20	0.33	0.06, 0.61
7	8	20	0.34	0.01, 0.67
8	13	20	0.51	0.22, 0.80

These data summarise the experiences of various pairwise combinations of 15 raters involved in the operations of Media Doctor over five years. The data represent a quality assessment of the rating processes. In total, the data cover pairwise ratings of all 1090 articles posted on Media Doctor at the time of this anaysis. These were the total number of articles rated at the time of analyses. Overall, 15/24 analyses yielded Kappa scores in the Moderate to Very High range. The remaining nine were in the 'fair' category of agreement. Considering these data were collected during the operational rather than the developmental phase of the program, they represent reasonable evidence of the reliability of the Media Doctor rating instrument. In addition, it should be remembered that consensus was achieved for every article through the intervention of the researcher working with the Media Doctor postings and it was very rare for significant disagreement to remain after this was done.

MEDIA DOCTOR WEB SITE

The Media Doctor Web Site was established in late 2004 and was developed with professional web designers. The Media Doctor website (http://mediadoctor.org.au) (see Figure 3.1) featured news stories headlines and the first few lines of the story with a star rating (see below). A navigation menu linked to pages including Media Doctor's aims and outcomes, a discussion page, biographical details and information about how the rating is performed (See Appendix 3:1-5).

Figure 3.1: The Media Doctor Australia home page

News Stories

The Australian Media Doctor website reviewed health news stories published in the

Australian commercial and publicly funded news media, including newspapers, online

news and transcripts of television and radio broadcasts. The media outlets assessed by

Media Doctor were representative of the whole of the Australian media at the time of

analysis and covered a large percentage of the Australian population. Details demonstrating

the media outlet and readership demographics are provided in Chapter 1. All news stories

described in this thesis have been taken from the Media Doctor database (the majority of

these were collected from the media by the candidate with others by trained researchers).

For news stories to be eligible for review, they had to fulfil each of the following inclusion

criteria:

- Be relevant to the management and prevention of disease in the source country, in

    particular they should relate to claims about new treatments, procedures, diagnostic

    tests or other types of interventions.

- Discuss an intervention intended for use on humans (animal research was excluded).

- Make explicit or implicit claims of efficacy, lack of efficacy, safety or lack of safety

- Be published or broadcast in the Australian mainstream media.

Most stories were derived from research-based interventions but this was not strictly an

inclusion criterion.

Gathering News Stories

At the beginning of this research, in early 2004, news websites in Australia were still in

their infancy and most only posted 'major' stories and these were updated infrequently, few

had story archives, and many charged for access to complete or older stories. Therefore,

different methods where employed to gather relevant health news stories. A commercial

media monitoring service (Media Monitors, http://mediamonitors.com.au) was engaged to

gather news stories for a period of three months. The result was an average of two useable

stories a week i.e., those that matched the inclusion criteria. While the media monitoring

company could locate stories from across a wide range of media (radio transcripts,

television transcripts, and all newspapers) it delivered too little return for the small research

budget to continue for longer than this period of time. The second method was hand searching of newspapers. This provided a much greater return in terms of relevant news stories than either commercial monitoring or scanning websites, however it was time consuming and did not cover radio or television stories.

By late 2004, media outlets began expanding their online presence and it was increasingly easy to access full stories and transcripts via the internet. The simplicity and low cost in locating a high number of relevant stories meant that the other forms of searching were abandoned. It took no more than an hour or two a day (and sometimes less) to search all relevant websites for news stories. In the final months of research (2009), another attempt was made to compare findings between online searching and commercial monitoring. Newspaper media outlets were changing their websites and some had announced that in the near future web users would need to subscribe to gain access to full stories and transcripts. It was becoming apparent that many health stories that appeared in print were not to be found on the website while those that did were shorter than their hardcopy equivalent. There seemed to be a trend in "soft health" news embracing cosmetic and diet stories rather than research based stories. Where previously the newspapers had dedicated health and science web pages, these had been rebadged as 'lifestyle' news and were given over mainly to lightweight stories and bloggers. At this stage, the commercial monitoring was the better source of health news stories and this outcome indicated possible changes in the quality of health news that is accessible on the internet. However, no analysis of this trend was conducted for this thesis.

The majority of news stories used for the pilot study were gathered by systematic searches of media internet sites where relevant stories or transcripts were identified and downloaded. At the time of collection, most of news websites had dedicated health pages which made it easy to identify new health stories. Sites without health pages were searched using stem keywords such as 'health', 'test', 'research', and 'study'. However, it is probable that some relevant stories were missed using these search strategies or were not available on the websites.

The stories were obtained prospectively and the same retrieval process was maintained throughout the entire study period of 2004-2009. This is in contrast to most research on media content analysis where stories are gathered retrospectively and using large media databases such as Micromedia, ProQuest, and Canadian Newsstand.

Authorship

The news stories were considered to be a product of the media outlet whose website they were taken from and were rated and analysed in that capacity. That is, if a story was written by a journalist from a press agency (wire service) but was posted on the website of a particular news outlet, it was, for the purposes of this thesis, regarded as a product of that news outlet. This was due to the fact that a conscious decision was made by the editors or producers of the news outlet to post the story and the content of stories are often changed by either cutting sections out, marrying it with another story to make a longer piece, or expanding the story using their own journalists. Most press agency stories are identified as

such, however this is not always the case and if only a journalist's name is used, readers are

unlikely to distinguish house journalists from imported journalists. Authorship was not a

criterion for assessment on the website and although this information was collected in order

to perform further analysis (see Chapter 5). Journalists' names were not publically listed on

the website. While all stories were taken from Australian media outlets, they were not

limited to local content and include stories imported from overseas news outlets.

Reviewers

Relevant stories from major Australian press and electronic news outlets and popular

current affairs shows were reviewed by a team of volunteers using standardised rating

instruments. Relevant material such as media releases or journal stories were also sent with

the story to each reviewer. Reviewers conducted their reviews using an electronic rating

instrument and ratings were entered onto the website. Any disagreements in ratings were

resolved by consensus between the two reviewers and if required, a third reviewer was

invited to review the story. A score was automatically calculated by the website using the

percentage of satisfactory items. This percentage was then automatically translated into the

1-5 star rating featured on the website. A rough guide is that each star is worth about 25%

satisfactory and half stars each around 15%. Each reviewer contributed to the comment

section, which was used to highlight the strengths of the story, or aspects that could have

been improved, including areas not covered in the rating instrument, such as sensationalist

language or inappropriate headlines. All reviews were screened by the candidate, who was

later joined by a paid researcher, who checked the scores and edited comments. The

turnaround for reviews was an average of 4.9 days (range 0-30 days) from publication of the news story to having it appear on the website.

Reviewer pairs were flexible and changed according to availability. Every reviewer participated in an hour long induction session where all aspects of the website and rating instrument were discussed and demonstrations of how to rate stories were conducted. All reviewers were provided with ongoing e-mail and telephone support as required. This support was been rarely sought and most problems that did occur were technical, such as when new reviewers found it difficult to log-on to the site for the first time, forgot their passwords or lost stories.

Media Doctor reviewers included clinicians, academics, researchers and journalists who conducted the reviews in a voluntary capacity. Biographical details of reviewers are available on the website (for privacy reasons biographical details have not been reproduced in this thesis but can be viewed at http://mediadoctor.org.au/content/people.jsp). All new reviewers were paired with an experienced reviewer for the first year or so of rating. Over 20 reviewers rated stories for Media Doctor during the 2004 - 2009 research period. Some reviewed occasionally only, on subjects relating to their expertise. A core group of eight individuals have consistently reviewed and rated since the Media Doctor's website's inception and these reviewers have been responsible for the majority (89%) of the reviews. Reviewers rated stories independently of each other using the validated rating instruments.

Scores

For each news story, the ten criteria were scored as 'satisfactory', 'not satisfactory' or 'not applicable' if a criterion is not relevant. Scores were assigned by each reviewer based on a scoring guide. Total scores (expressed as proportion of items rated 'satisfactory') were posted for stories that had seven or more items that could be rated 'satisfactory' or 'not satisfactory'. Scores were visually depicted on the website using a 1-5 'star' rating along with commentaries from the reviewers. Cumulative scores for the major media outlets were also presented, which provided ongoing feedback on their performance compared with other outlets (http://mediadoctor.org.au/content/media.jsp).

Feedback

The web site invited readers, including journalists, to add their observations and to comment on the site as a whole and many did (see Appendix 3). Links to sources of information (e.g., Cochrane Library, Informed Health Online) were provided for those wanting more information on treatments featured in the news stories (see Appendix 3). Media doctor did not provide medical advice and or assess the quality of the evidence on which the reviewed stories were based; instead it concentrated on the content of the stories themselves.

CONCLUSION

The pilot study to determine feasibility was completed over a 12 month period. The data were analysed and the results written up in a paper that was published in the Medical

Journal of Australia (Smith, Wilson et al. 2005). This paper provided details on the

methodology, the participants and the results of the analysis of the pilot study. As second

author, the candidate helped conduct the study, contributed to analysis of the data, co-wrote

the first draft of the paper and contributed substantially to all following drafts. A PDF

version of the paper and a statement of contribution signed by all co-authors are included in

Appendix 1.1).

PAPER 1

Monitoring the quality of medical news reporting:

Early experience with '*media doctor*'

(Smith, Wilson et al. 2005)

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Abstract

Objective Media doctor is a medical news-story monitoring site. Our objective was to provide an analysis of the reviews of articles posted on the *media doctor* web site between February 1 and September 1, 2004.

Design and Setting A descriptive summary of seven months experience of operating the *media doctor* website.

Main Outcome Measures Consensus scores for ten assessment criteria: novelty of medical intervention being described in the article; availability; treatment options; evidence; quantification of benefits; coverage of harms and costs; independent opinion; presence of disease-mongering; and excessive reliance on press release. We calculated cumulative article rating scores for major media outlets.

Results 104 news articles were featured on the *media doctor* web site between February and September 2004. Both online and print media scored poorly, although the print media were superior: average total scores 56.1% satisfactory for print and 40.1% for online; difference 15.9% (95% CI 8.3, 23.6). The greatest differences were seen for the use of independent information sources, quantification of the benefits in the article and the coverage of potential harms of new treatments.

Conclusion Lay news coverage of medical advances in Australia is poor, particularly by the online news services. The poor coverage might improve if journals and researchers became more active in communicating with the press and public.

The public gains much of its health and medical knowledge from newspapers, radio and television. (Phillips, Kanter et al. 1991; Chapman and Lupton 1994; Entwistle 1995) Even doctors may find out about new medical developments through the lay press. Medical news reports can have dramatic effects: they can alter consumer behaviour, like the recent wholesale abandonment of hormone replacement therapy after adverse publicity; they can put pressure on politicians and drug subsidy programs; and affect company shares. (Lawton, Rose et al. 2003)

Medical news reports obviously need to be balanced and accurate. One study of television coverage of medical issues in Australia has shown a bias towards bizarre stories, and those that issue moral warnings, discredit well known people, spruik medical "breakthroughs", or affirm folk remedies. (Chapman and Lupton 1994)

Another concern is honesty in the attribution of media reports. For example, media releases about new pharmaceutical products may be prepared by public relations companies and used as the basis of news stories directly and without attribution. A study in the United States found that most articles about pharmaceutical products failed to include complete information about benefits, harms and costs of treatment and did not report financial ties between study groups or experts and pharmaceutical manufacturers. (Moynihan, Bero et al. 2000) Similar findings came from a recent survey of the media in Canada, and there have been calls for more direct and honest reporting of the results of research into the effects of medicinal drugs. (Cassels, Hughes et al. 2003; Schwartz and Woloshin 2004)

There are many reasons why journalists may find it difficult to write accurate and balanced articles about new medical advances, including lack of time or space, pressure from editors, and difficulty in accessing independent expert opinion. (Larsson, Oxman et al. 2003) Some of these factors may be hard to change, but there is evidence in other professional areas that timely feedback on performance can improve practice standards. (Axt-Adam, van der Wouden et al. 1993; Sbarbaro 2001; Gray 2006; Jamtvedt, Young et al. 2006; Jamtvedt, Young et al. 2006; Siriwardena, Middlemass et al. 2008). A Cochrane review (Jamtvedt, Young et al. 2006) of the effects of audit and feedback on doctors' performance defined it as "any summary of clinical performance of health care over a specified period of time" provided in a written, electronic or verbal format. The premise behind feedback as a behaviour change tool is that professionals would be motivated to modify their practice if given feedback that their practice was not consistent with that of their peers or accepted standards. It showed the provider of the feedback, the addressee, the timeliness and the vehicle were all important factors (Axt-Adam, van der Wouden et al. 1993; Bennett and Glasziou 2003). We believe that web-based audits of medical news reports have the potential to improve the quality of media articles.

We report here the early experience of operating a website *media doctor*, which publishes quality assessments and critiques of Australian lay press news articles about medical treatments, including drugs, procedures and diagnostic tests. The primary aim of the critiques is to encourage journalists to report all important information about new treatments, including novelty, availability, benefits, harms, costs, adverse effects and,

where possible, the opinions of experts who are free of obvious conflicts of interest. *Media doctor* does not provide medical advice and does not assess the quality of the evidence on which the reviewed articles are based; instead it concentrates on the articles themselves. In this respect it differs from the "Hitting the headlines" project in the United Kingdom. (National Health Service)

Methods

Articles reviewed

Current news articles about medical treatments are identified by daily website searches. During the study period, we concentrated on five websites — *The Age* (Melbourne), *The Australian*, *The Sydney Morning Herald*, "ABC news online" and "ninemsn" — which form the basis of this report. Subsequently, a further eight print and media outlets have been added to the search list. Articles were eligible for inclusion if they were relevant to the management and prevention of disease in Australia, and particularly if they were related to claims about new treatments, procedures and diagnostic tests. Interventions must have been the subject of clinical research (or a claim to that effect made).

Rating criteria

Our rating instrument (http://www.mediadoctor.org.au/content/ratinginformation.jsp) (Box 1) is an extension of one previously used to assess the quality of medical news reporting in the US. (Moynihan, Bero et al. 2000) We added criteria covering novelty of the treatment, availability, treatment options, presence of elements of "disease mongering", (Moynihan,

Heath et al. 2002) and the reporting of evidence (study methodology). These criteria are consistent with those used in other media surveys and with advice provided by the Australian Press Council. (Schwitzer; Australian Press Council 2001; Cassels, Hughes et al. 2003)

Reviewers

Two reviewers assess each article. Reviewer pairs are flexible and change according to availability. Consensus scores are agreed on by the reviewers, who write a short commentary based on the criteria listed in the rating instrument. Most reviewers (7/10) were involved in piloting the original assessment tool and review process, and new reviewers receive training and supervision of their initial reviews. All reviews go through one of two "gatekeepers" before they are posted on the website. This allows reviews to be checked and edited to ensure consistency and quality.

We attempt to locate any relevant media releases, journal articles or other supporting literature that might assist the reviewers in making their assessments. Reviewers try to determine the extent to which the article relies on a media release from a company or organisation that has a vested interest in the publication of the article. It has proved difficult to locate media releases. Of the 104 news articles described in this paper, only six relevant media releases relating to six articles were located.

Box 1 Criteria for reviewing media articles

Media doctor assesses articles for the extent to which they inform readers according to the following 10 criteria:
- Whether the treatment is genuinely new
- The availability of the treatment in Australia
- Whether alternative treatment options are mentioned
- Whether there is evidence of "disease mongering" (Moynihan, Heath et al. 2002)
- Whether there is objective evidence to support the treatment
- How the benefits of the treatment are framed (in relative or absolute terms) (Moxey, O'Connell et al. 2003)
- Whether harms of the treatment are mentioned
- Whether costs of the treatment are mentioned
- Whether sources of information and any known conflicts of interests of informants are disclosed
- Whether the article relies heavily on a media release for content

Scoring system

For each news article, the 10 criteria are scored as "satisfactory", "not satisfactory" or "not applicable". Total scores are posted for articles that have two or fewer "not applicable" ratings, and are expressed as proportions. For the purposes of display, the total scores are translated into a star rating (0–25% = 0 stars; 26%–50% = 1 star; 51%–75% = 2 stars; 76%–100% = 3 stars). Star ratings and commentaries are published on the website (www.mediadoctor.org.au), which also presents cumulative scores for major media outlets.

Reviews and feedback

Reviews are posted on the *media doctor* website as soon as possible after the news article is published. The process of locating and reviewing articles usually takes between 1 and 7 days after the article is published. Most reviews are posted within 2 weeks of their

publication, and many within 1 week. The website invites readers to add their observations and to comment on the site as a whole. Links to reliable sources of information (e.g., *Cochrane Library*, *Informed Health Online*, *Bandolier*) are provided for those wanting more information on treatments featured in the news articles.

Statistical analyses

Pilot testing of the rating instrument (nine articles and seven reviewers) produced criterion κ scores between 0.49 and 0.74 (a κ score of 0.6 to 0.7 or greater is generally taken to denote a high level of agreement). Cumulative total scores for the five media outlets were calculated. Inspection of the data showed they were normally distributed, and unweighted cumulative scores were compared between media outlets using analysis of variance. Criterion and total scores for online and print media were also compared. In the case of individual criteria, we calculated the differences in proportions of satisfactory scores with their 95% confidence intervals; *P* values were two sided and calculated by an exact method. All statistical calculations were made using Stats Direct Statistical software (version 2.3.5, StatsDirect Ltd, Sale, Cheshire, UK).

Results

Between 1 February and 1 September 2004, we identified 199 potential articles, but only 104 of these were reviewed. Reasons for non-inclusion were: articles not satisfying the eligibility criteria; the same article appearing in different media outlets; a glut of articles on

the same topic (up to four of the first published articles were then included); and no reviewers available to complete the review within an acceptable time period.

Total scores for proportions of items satisfactorily reported were low overall, with statistically significant differences among the five media outlets ($F_{4,103} = 4.16$, $P = 0.004$). This appears to be almost entirely due to the much lower scores for the 53 online articles, which averaged 40.1% satisfactory compared with 56.1% for the 51 print articles, a difference of 15.9 (95% CI, 8.3–23.6) percentage points (Box 2).

The proportions of individual criterion scores that rated as satisfactory ranged from 23% to 94% for print media, and 14% to 89% for online media (Box 3). Seven of the 10 criteria had an average score of less than 50% in the online media, with the lowest scores being for "quantification of benefits" and coverage of harms and costs of treatment. The item scores were higher for print than online media, with the greatest differences seen for the use of independent information sources, quantification of the benefits and the coverage of "harms of treatment". These were also the items with the poorest scores, apart from "costs of treatment", for which both media types scored poorly.

Box 2 Analysis of mean scores for proportion of items satisfactorily reported, by media outlet and type (104 articles)

	No. of articles	Mean score	SD
The Australian	18	56.6%	18.8
The Sydney Morning Herald	16	56.0%	17.9
The Age (Melbourne)	17	55.6%	24.1
Ninemsn	21	41.3%	20.3
ABC online	32	39.4%	18.9
Print	**51**	**56.1%**	**20.1**
Online	**53**	**40.1%**	**19.3**

Comparison of mean total scores for all five outlets: $F_{4,103} = 4.16$; $P = 0.004$. Difference between mean scores for print and online 15.9 (95% CI, 8.3–23.6) percentage points ($F_{1,103} = 17.0$; $P < 0.0001$).

Twenty articles scored no stars (overall scores 25% or less) compared with 11 that scored three stars (scores 76% or above). Examples of high and low scoring articles are given in Box 4. These illustrate the fact that news articles can be informative even when brief: the average length of print articles reviewed was 370 words, and 325 for online articles.

The short period of observation and the modest number of articles rated means it was not possible to draw any conclusions about changes in overall scores over time.

Box 3: Comparison of individual criterion scores for percentage satisfactory — online v print media

Percentage satisfactory*	Online	Print media	Percentage points difference (95% CI)	Exact *P* (two sided)
	% (no.)	% (no.)		
Disease mongering	88.7% (53)	94.1% (51)	5.4 (− 6.3, 17.7)	0.33
Novelty of treatment	75.0% (52)	91.8% (49)	16.8 (2.3, 31.5)	0.02
Reliance on press release	74.2% (31)	93.5% (31)	19.4 (1.0, 38.2)	0.05
Availability of treatment	43.4% (53)	57.1% (49)	13.7 (− 0.57, 32.2)	0.17
Treatment options	34.0% (53)	37.5% (48)	3.5 (− 15.0, 22.1)	0.68
Objective evidence	24.5% (53)	43.1% (51)	18.6 (0.36, 35.9)	0.04
Independent sources of information	20.8% (53)	43.1% (51)	22.4 (4.5, 39.2)	0.01
Quantification of benefits of treatment	18.4% (49)	40.0% (50)	21.6 (3.7, 38.5)	0.02
Costs of treatment	15.2% (46)	23.1% (39)	7.9 (− 9.1%, 25.5)	0.29
Harms of treatment	14.0% (50)	44.0% (50)	30.0 (12.5, 46.1)	0.002

* Percentage satisfactory is calculated as the number rated as satisfactory divided by the total for that criterion; the denominators vary as it was not always possible to rate each criterion with the information provided in an article; denominators are given in parenthesis.

4 Examples of articles covered on the *media doctor* website

"US researchers develop new breast cancer treatment": ABC Online, 25 Jul 2004. Rating: 1 of 9
This article was so brief it was difficult to tell exactly what treatment it was describing. A web search revealed a similar US article about a technique in which a probe, inserted into a breast tumour using magnetic resonance imaging, was heated, so destroying the tumour. The US article stressed the need for controlled trials of this technology and revealed that the doctor in the article worked for the company that manufactures the device. The ABC article lacked any useful information yet portrayed the technique as "hope on the horizon".

"Managing cholesterol: a new approach": ninemsn, 28 Jul 2004. Rating: 2 of 10
This article concerned the launch of a new cholesterol-lowering drug, ezetimibe. The article very closely paralleled a press release written by a public relations company on behalf of the drug manufacturer. The article's language was promotional and sources cited were limited to those provided by the PR company. There was no mention of research studies, adverse effects or costs of treatment. The drug's trade name always appeared in upper case as though in an advertisement. The Pharmaceutical Benefits Scheme listing restrictions were not provided even though this information was in the press release.

"World's first skin cancer cream launched": ninemsn, 02 Sep 2004. Rating: 9 of 10
This was the best of several stories on an imiquimod-containing cream used to treat basal cell carcinomas. The article described the type of research used to test efficacy, quantified the benefits and provided accurate information on availability in Australia. It also provided links to detailed information about the drug and prevention of basal cell carcinomas. However, there was no information about the cost of treatment.

"Drug prevents AIDS spread": *The Sydney Morning Herald*, 11 Jul 2004. Rating: 9 of 10
This described a study showing that a single dose of a generic form of an antiretroviral agent, nevirapine, when taken in combination with another established drug, zidovudine, by pregnant women, reduced transmission of the AIDS virus to the fetus. The article described the form of research used and the size of the treatment benefit in an appropriate and accurate way. The importance of the low cost of the generic drug was discussed and independent comments from experts were provided. However, there was no mention of the adverse effects of treatment.

Discussion

These data show that the Australian media outlets we reviewed often do a poor job in

conveying important information on new medical treatments to the public. While the print

media's overall mean score was around 55% that of the online news services was

substantially lower, rating just over 40% satisfactory. Analysis of criterion scores showed that the main areas of weakness were inadequate presentation of evidence on benefits and harms of the interventions, failure to mention the costs of treatments (when relevant) or to obtain independent expert commentary.

It is unclear why journalistic standards should be lower for online news. There is no shortage of space that would justify very brief reports. We suspect the sense of "immediacy" that goes with online news reporting may be compromising standards. We have not presented an analysis of the by-lines of articles (i.e., who they were written by) we reviewed in *media doctor*. Many articles were short and a number were reproduced from overseas outlets without any consideration of local factors (for instance whether a drug or diagnostic test was available in Australia or subsidised under the Pharmaceutical Benefits Scheme/Medical Benefits Scheme). We do not doubt the articles would have rated more highly if written by dedicated health journalists.

Our main findings are in line with those published elsewhere. (Moynihan, Bero et al. 2000; Cassels, Hughes et al. 2003; Schwartz and Woloshin 2004) For instance, Moynihan et al found that, of 207 news stories covering new drugs in the US, only 30%–47% adequately covered costs and harms. (Moynihan, Bero et al. 2000) Our estimates for the Australian media are close to these values. Similar observations were made by Cassels et al in regard to the Canadian media. (Cassels, Hughes et al. 2003) The main advantages of our work are that it is ongoing, the results are accessible (there are now more than 400 articles reviewed

on the website) and a regularly updated series of reviews is available for journalists and the public to read. Our data provide a continuously updated measure of the performance of the main Australian media outlets.

The main weaknesses of our study are that (1) it covers only five major media outlets (which, because of limited resources, were all we were able to cover during the study period), so the results cannot be considered representative of all Australian media; and (2) we concentrate on the evidentiary aspect of news reporting. This has led to criticisms from journalists.

Initial press coverage of the activities of *media doctor* attracted critical feedback, which is summarised on the *media doctor* website (http://www.mediadoctor.org.au/content/feedback.jsp) and in a medical journal news article. (Sweet 2004) Supportive feedback included, ". . . your website is a great new tool, collecting current treatment information together in the same spot and offering another perspective on the contents". Criticisms from journalists included statements that "They're trying to turn the media into a medical journal" and "I do get a bit cynical about non-journalists critiquing journalism". We accept that the skills involved in writing medical news articles and medical journal articles are different. However, we consulted with journalists in establishing *media doctor,* and there are three experienced ex-journalists/medical writers in the *media doctor* review team. We make suggestions about what we think should be included in an article about a new medical treatment. We are not

trying to advise journalists about how to write the articles. Our concerns about the quality of health reporting seem to be in line with a warning to journalists from the Australian Press Council. (Australian Press Council 2001) The "cultural divide" between medical journalism and medical practice may not be that wide. The "detective skills" and capacity for critical analysis required of journalists and doctors are similar.

We recognise that providing simple feedback to media outlets is unlikely to have a major impact on the quality of medical news reporting. Accordingly, we intend to augment the service in a number of ways. In future we will provide an automatic "alert" to media outlets when one of their articles features on the site. We also intend to send an annual "report card" to editors and producers, which summarises the performance of their company and their competitors, and to extend our coverage to other media outlets.

It is important that the responsibility for poor medical news reporting is not borne solely by journalists and editors. In a number of the articles we reviewed, it was apparent that the high quality was due, in part, to the involvement of researchers in disseminating information to the press. We do not have direct evidence but it is likely that many poor articles could have been improved if investigators had taken the trouble to communicate effectively with journalists. A survey of media releases from medical journals showed that "press releases do not routinely highlight study limitations or the role of industry funding". (Woloshin and Schwartz 2002) If medical journals do not highlight these issues it is

difficult for journalists to do their job properly. In our view both editorial staff and authors should take responsibility for improving this situation.

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CHAPTER 4: CHANGES OVER TIME

BACKGROUND

Media Doctor was a web-based initiative that monitored the Australian general press and published quality assessments and critiques of news articles about medical treatments, including drugs, procedures and diagnostic tests. The preceding chapter (Chapter 3) presents the results from the analysis of the Media Doctor website as a tool for assessing and improving the quality of health reporting in the general Australian media. Relevant articles from major Australian press and electronic news outlets and popular current affairs shows were reviewed by a team of volunteers using standardized rating instruments. The first paper provided early data which pointed to the highly variable quality of media coverage of health and medical issues with problem areas including:

- failure to consider the quality of evidence;

- inaccurate portrayal of benefits;

- lack of consideration of adverse effects and costs;

- failure to obtain comments from sources free from conflicts of interest.

Since this study, Media Doctor had reviewed over 1000 articles and had been viewed by over 50,000 visitors, many of whom visited the site regularly (weekly). In 2005, the candidate and Professor David Henry were awarded the Australian Skeptics Eureka Prize for critical thinking for their work with Media Doctor. During this time, sister sites had also

been set up in Canada (www.mediadoctor.ca) and the USA (www.healthnewsreview.org). (Cassels and Lexchin 2008; Schwitzer 2008).

The first analysis of data collected on the Media Doctor website had provided provisional data on the quality of health news reporting in the Australian media. However, the small numbers of stories meant that it was not possible to draw significant conclusions from the data. There was a need to examine a large set of data to see if scoring trends continued and also to perform comparative analyses between news outlets, story categories and rating items. In an effort to improve the number of stories collected for rating, improvements in research methodology were instituted as follows.

Improvements in Study Methodology

i) Increased number of raters

During the period 2005-2008, more raters were recruited, while some of the original raters stopped rating. New raters were given intensive personal training on how to use the rating instruments and how to submit their ratings (see Chapter 3).

ii) Improvements in communication from raters

Whereas originally raters had submitted their ratings by e-mail or even hard copy, an interactive component of the website was added in 2008 so raters could directly submit their ratings online onto the website. This assisted in speeding up the process of rating and potentially decreased the number of errors associated with repeated data entry.

iii) Increased feedback from the public

Over the years, the website had received a substantial amount of feedback from the general public. The majority of these were from people researching particular illnesses or interventions. A few news stories, and the Media Doctor ratings of them, had elicited significantly higher responses than the other stories. These concerned unorthodox and controversial ways of treating cancer or children with learning difficulties. It was apparent that low scores, poor quality and lack of evidence was inherent in the majority of new stories Media Doctor was rating, from the current affairs or human interest programs on commercial television (Today Tonight and A Current Affair).

iv) Increased number of news outlets

Over the four years since Media Doctor had been established, news outlets had expanded their domains, and it was easy to access a wider selection of health news stories. Although the number of outlets was searched regularly, for the purposes of this study (Paper 2), the comparative data was only taken from those outlets studies in the previous study (Paper 1).

HYPOTHESES

Aim

This second paper evaluates changes in the quality of health reporting over the three years since the first analysis. Ratings were analysed using overall story scores and the percentage

of individual items rated as 'satisfactory". There was also analysis of how the different

rating items were rated between subject categories, media outlets and over time.

Methodology

Once more than 1000 articles had been reviewed and published on the website, the dataset

was downloaded, collated and analysed. Differences between the individual media outlets

were examined, as well as between types of media (broadsheet and tabloid newspaper,

television, online and radio). Comparison between the first (Paper 1) and second set of

analyses was also conducted and a mid-point in time was chosen to conduct the time series

analyses.

Unweighted cumulative scores were compared between media outlets using analysis of

variance (ANOVA) (StatsDirect Ltd 1990-2007). Linear unweighted regression analysis

was performed to compare the trend in scores over time with time of publication on the

horizontal axis and percentage overall satisfactory scores for each article on the vertical

axis. Separate regression analyses were performed for online and print media as sources. To

compare the proportions that were satisfactory for specific items across the media outlets,

Fisher's exact test was conducted (StatsDirect Ltd 1990-2007). Regression analysis of the

trends in scores over time was conducted for all media outlets.

Results

Overall scores of quality were low. There was a small but non-significant increase in scores

for all outlets, and a significant increase for online news media. Broadsheet newspapers had

the highest scores: 58% (95% CI 56-60%), while tabloid newspapers and online news outlets scored similarly with 48% (95% CI 44-52) and 48% (95% CI 46-50) respectively. The current affairs television programs scored the worst with an average score 33% (95% CI 28-38).

An equi-point in data collection of December 2005 was selected to provide two time periods of monitoring with a similar number of articles over each. Overall average scores were 50.7% for the first time period, rising to 52.7% in the second time period (95% CI for the difference -0.41, 4.43; p 0.10). Analysis was confined to media outlets that had been monitored consistently during the project and most of the apparent improvement in scores occurred with the online news sources (Figure 1). The change in mean scores for online outlets between period 1 and period 2 was 5.1 percentage points (95%CI 1.32, 8.97; P = 0.009)

Figure 4.1: Changes in overall scores for print versus online over time
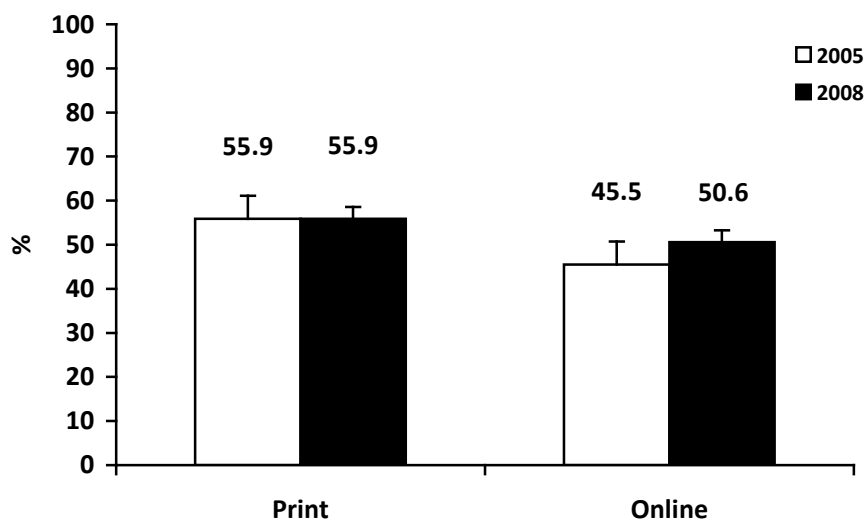
Discussion

The analysis of four years of health media stories showed that the overall quality of health reporting in the general media remained low. However, there were some improvements in certain areas including harm, benefits and availability of interventions. A disturbing finding was the poor coverage of health news by commercial current affairs television programs. The media perform in this highly competitive arena with aim of making a financial bottom line, so there is intense competition for audiences. But even taking this into account, populist human interest media still performed significantly poorly compared to other news outlets. Occasionally Media Doctor rated articles from these outlets highly, demonstrating that they are capable of producing stories of a high calibre, but they failed to do so in a consistent manner. There was an ongoing need to identify ways of reducing variability from these outlets to ensure the Australian public receives health information that is consistently reliable and useful. One approach would be to acknowledge the importance of the media in communicating between researchers and the public (Noar 2006). Another approach was to highlight the detrimental nature of this type of reporting. There were many publications on the negative impact of media stories related to disease mongering and fear campaigns (Daniels 2003; Heath 2006; Mintzes 2006); however there was little substantial research on the impact of substandard interventions being sold to the public in the guise of treatment. All of the media outlets studied during this thesis produced some articles that rated poorly, contained misleading content or were thinly veiled

promotions for particular products. Only the current affairs television programs were consistent in producing health stories with persistently low ratings.

This analysis was set against a backdrop of change in the media as the concept of traditional media was being tested and threatened by the increasing power of the internet. On August 28 2008, one of the most powerful media organizations in Australia, Fairfax Media Group, announced a reduction of 550 staff, and journalists responded with a three-day strike against what they perceived as an inevitable lowering of the standards of reporting (Roy 2008). This theme is covered in more detail in Chapter 5.

Paper 2, *Media reporting of health interventions: signs of improvement, but major problems persist*, was published in PLoS One, 2009 (Wilson, Bonevski et al. 2009) and describes the results of analysis of 1230 news stories rated on the Media Doctor Australia website and compares scores to the earlier data recorded in Paper 1 (Smith, Wilson et al. 2005). A PDF version of the paper and a statement of contribution signed by all co-authors are included in Appendix 1.2.

PAPER 2

Media Reporting of Health Interventions: Signs of Improvement, but Major Problems Persist

(Wilson, Bonevski et al. 2009)

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ABSTRACT

Background: Studies have persistently shown deficiencies in medical reporting by the mainstream media. We have been monitoring the accuracy and comprehensiveness of medical news reporting in Australia since mid 2004. This analysis of more than 1200 stories in the Australian media compares different types of media outlets and examines reporting trends over time.

Methods and Findings: Between March 2004 and June 2008, 1230 news stories were rated on a national medical news monitoring web site, Media Doctor Australia. These covered a variety of health interventions ranging from drugs, diagnostic tests and surgery to dietary and complementary therapies. Each story was independently assessed by two reviewers using ten criteria. Scores were expressed as percentages of total assessable items deemed satisfactory according to a coding guide. Analysis of variance was used to compare mean scores and Fishers exact test to compare proportions. Trends over time were analysed using un-weighted linear regression analysis. Broadsheet newspapers had the highest average satisfactory scores: 58% (95% CI 56-60%), compared with tabloid newspapers and online news outlets, 48% (95% CI 44-52) and 48% (95% CI 46-50) respectively. The lowest scores were assigned to stories broadcast by human interest/current affairs television programmes (average score 33% (95% CI 28-38)). While there was a non- significant increase in average scores for all outlets, a significant improvement was seen in the online news media: a rise of 5.1% (95%CI 1.32, 8.97; P 0.009). Statistically significant improvements were seen in coverage of the potential harms of interventions, the availability of treatment or diagnostic options, and accurate quantification of benefits.

Conclusion Although the overall quality of medical reporting in the general media remains

poor, this study showed modest improvements in some areas. However, the most striking

finding was the continuing very poor coverage of health news by commercial current

affairs television programs.

INTRODUCTION

The mainstream media are often the first source from which the public, including health professionals, learn about medical advances (Geller, Tambor et al. 2003; Larsson, Oxman et al. 2003; Dolan, Iredale et al. 2004; Miranda, Vercellesi et al. 2004). It is crucial when dealing with health issues to avoid creating false hope to those most vulnerable, or generating unwarranted pressure on limited healthcare funding for interventions (Cooper and Yukimura 2002; Passalacqua, Caminiti et al. 2004). There is a general expectation that the media will provide accurate, unbiased and complete information. Journalists endeavour to fulfil these expectations. The ethical obligations of media outlets are reflected in advice from the Australian Press Council, which advocates "a conservative, careful approach to health and medical reports" (Council 2001). However, few attempts have been made to examine whether health news reporting follows these recommendations (Schwitzer 2008).

There is growing realization of the potential of the media to influence health behaviours. (Chapman, McLeod et al. 2005) Public health advocates and researchers see a role for the media in conveying important health messages and awareness campaigns including preventative screening, suicide prevention and smoking cessation (Durrant, Wakefield et al. 2003; Corrigan, Watson et al. 2005; Pirkis, Burgess et al. 2006; Smith, Bauman et al. 2006; Li, Chapman et al. 2007; Niederkrotenthaler and Sonneck 2007). As a result media outlets are inundated with sometimes conflicting health information from companies, researchers, institutions, the government and consumers. Yet, there is little or no specialised training

available for Australian journalists who are expected to interpret often impenetrable statistics and health jargon.

Until recently, researchers, medical journals and other independent groups have done little to assist journalists interpret scientific developments for the public. To a degree this situation is changing, with the creation of science media centres in the United Kingdom and Australia (www.aussmc.org/index.php; www.sciencemediacentre.org/index.html). Some medical journals provide media releases to accompany the publication of important studies; but doubts have been expressed regarding the quality of these (Woloshin and Schwartz 2002). Pharmaceutical companies and their public relations consultants have active media strategies but these are designed to promote specific products rather than inform the public about health. As a result of these and other factors, health news stories tend to present incomplete information, which is often skewed towards either extreme of the disease process (underemphasised or exaggerated) or commercial product promotion, while complex research data are often misinterpreted or ignored (Schwartz, Woloshin et al. 2002; Machill, Beiler et al. 2006; MacKenzie, Chapman et al. 2007; Schwitzer 2008).

The Media Doctor web site (mediadoctor.org.au) was launched in 2004 with the aim of providing an objective analysis of the strengths and weaknesses of the health stories appearing in the Australian mainstream media. A secondary aim was to increase the completeness of health stories and, subsequently, health literacy among journalists and media consumers. Media Doctor Australia was initially described in 2005 when the

characteristics of the first 100 news stories reviewed were reported (Smith, Wilson et al. 2005). To date, Media Doctor has reviewed over 1200 stories and similar sites have been launched in Canada (www.mediadoctor.ca) and in the USA (www.healthnewsreview.org). (Cassels and Lexchin 2008; Schwitzer 2008)

This paper describes a critical review of 1230 stories reviewed by Media Doctor between 2004 and 2008. Differences between health stories have been analysed according to news outlets, media type (online versus print), and over time. Since the first Media Doctor paper (Smith, Wilson et al. 2005), health news stories from popular human-interest, current affair-style television programs have been included in the analyses and the quality of their reports is a particular focus of this paper.

METHODS

Media Doctor reviews health news stories published in the Australian commercial and publicly funded media, including newspapers, online news and transcripts of television and radio broadcasts. Stories are gathered by a researcher who systematically searches news internet sites where articles or transcripts are downloaded. Most of these sites have dedicated health pages. Sites without health pages are searched using stem keywords such as 'health', 'test', 'research', and 'study'. However, it is possible that some relevant stories are missed using these search strategies. Stories are eligible for review if they cover new health interventions for humans, including drugs, surgical procedures, diagnostic tests, and complementary therapies. The stories are seen as a product of the media outlet and are rated in this capacity. Authorship is not a criterion for assessment and although we collect

this information, journalists' names are not publically listed on the website. While all stories rated on Media Doctor come from Australian media outlets, they are not limited to local content and include 'wire' stories imported from overseas news outlets. Most stories are derived from research-based interventions but this is not an inclusion criterion. Relevant material such as media releases or journal articles are sent with the story to two reviewers.

Media Doctor reviewers include clinicians and researchers who conduct the reviews in a voluntary capacity. Biographical details of reviewers are available on the website. New reviewers participate in an hour long induction session where all aspects of the website and rating instrument are discussed and demonstration ratings of stories are conducted. All reviewers are provided with ongoing email and telephone support as required. All new reviewers are paired with an experienced reviewer for the first year or so of rating. There have been over 20 reviewers during the four years Media Doctor has been operating and 17 of these remain active. Some review occasionally only, on subjects relating to their expertise. A core group of eight has been rating consistently since the site's inception and these reviewers are responsible for the majority of the reviews. Reviewers rate stories independently of each other using validated rating instruments (for medical interventions and diagnostic tests) (Smith, Wilson et al. 2005). The instruments contain 10 items (see Table 1). These are the same items used by media Doctor Canada and Health News Review in the USA.

For each news article, the ten criteria are scored as 'satisfactory', 'not satisfactory' or 'not applicable' if a criterion is not relevant. Scores are assigned by each reviewer based on a scoring guide. Total scores (expressed as proportion of items rated 'satisfactory') are posted for articles that have seven or more 'evaluable' items. Scores are visually depicted on the website using a 1-5 'star' rating along with commentaries from the reviewers. Cumulative scores for the major media outlets are also presented, which provides ongoing feedback on their performance compared with other outlets (http://mediadoctor.org.au/content/media.jsp). Reviewers post their draft reviews in a password-protected area of the website and discrepancies are resolved by consensus. If necessary, a third reviewer is used to settle disagreements. To ensure objectivity, all reviews are screened by a researcher who checks the scores and edits comments. Both reviewers contribute to the comment section, which is used to highlight the strengths of the story, or aspects that could have been improved, including areas not covered in the rating instrument, such as sensationalist language or inappropriate headlines. The turnaround for reviews is approximately two weeks from locating the news story to having it appear on the website.

Table 1. 10 Criteria used to rate news articles about medical interventions.

Rating Criteria*: The extent to which the story:
1. **Reported the novelty of the intervention**
2. **Reported the availability of the intervention**
3. **Described the treatment or diagnostic options that are available**
4. **Avoided elements of disease mongering**
5. **Reported evidence supporting the intervention**
6. **Quantified the benefits of intervention**
7. **Described the harms of intervention**
8. **Reported on the costs of intervention**
9. **Consulted with independent expert sources of information**
10. **Went beyond any available media release.**

*Stories are marked 'satisfactory', 'not satisfactory' or 'not applicable'. Criteria used to determine scores are available at http://www.mediadoctor.org.au/content/ratinginformation.jsp

Statistical Analysis

Cumulative total satisfactory scores for the nine media outlets were calculated. The media outlets were grouped into four broad categories for the purposes of analysis: Tabloid Newspapers (The Daily Telegraph and Herald Sun), Broadsheet Newspapers (The Australian, Sydney Morning Herald and The Age), Online News Services (ABC Online and ninemsn) and Commercial Current Affairs Television (Today Tonight' Channel 7 and 'A Current Affair' Channel 9).

Inspection of the data showed that they were normally distributed, and unweighted cumulative scores were compared between media outlets using analysis of variance

(ANOVA). To examine the trend in scores over time we performed linear unweighted regression analyses with time of publication (in days since March 2004) on the horizontal axis and percentage overall satisfactory scores for each article on the vertical axis. Separate regression analyses were performed for online and print media. To compare the proportions that were satisfactory for specific items across the media outlets, Fisher's exact test was conducted. All statistical calculations were made using StatsDirect (version 2.3.6, Stats Direct Ltd, Sale, Cheshire, UK).

RESULTS

Between March 2004 and July 2008 Media Doctor posted 1230 reviews of health stories from Australian mainstream media. Of these, 613 (50.7%) were about pharmaceutical products, 121 (10%) reported on diagnostic tests, 98 (8.1%) were about surgical procedures, and 387 (31.5) were classified under the heading 'other'. Stories classified as 'other' include complementary and alternative medicines, physiotherapy and dietetics.

Differences across media outlets

Current trend-lines of scores for individual media outlets are available on the website (http://mediadoctor.org.au/content/media.jsp). The average score for all outlets during the study period was 52% (95% CI 51-53%). Broadsheet newspapers performed best with an average score of 58% (95% CI 56-60%); followed by tabloid newspapers 48% (95% CI 44-52) and online stories 48% (95% CI 46-50); the current affairs television programs scored lowest (average score 33% (95% CI 28-38)) (see Figure S1). The differences in scores

across these outlets were statistically significant when assessed by Analysis of Variance (p<0.0001).

Figure S1. Mean scores across media outlets (with SE bars) over four years.
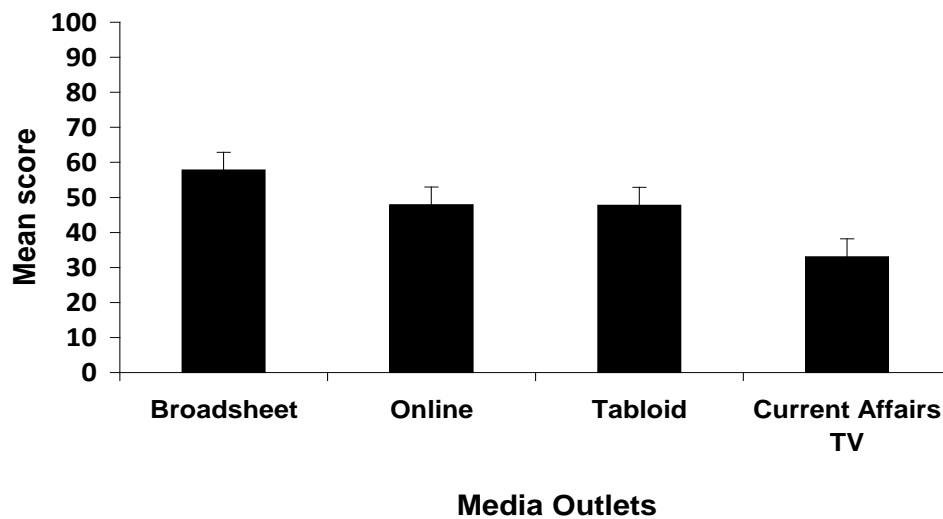
We carried out regression analysis of the trends in scores over time for online media outlets (Figure S2). The slope of the regression line was consistent with a small, but statistically significant increase in average score over time. Regression analyses for other forms of media outlets showed no associations.

Figure S2. Regression analysis* of average scores over the period of the study: online media only.
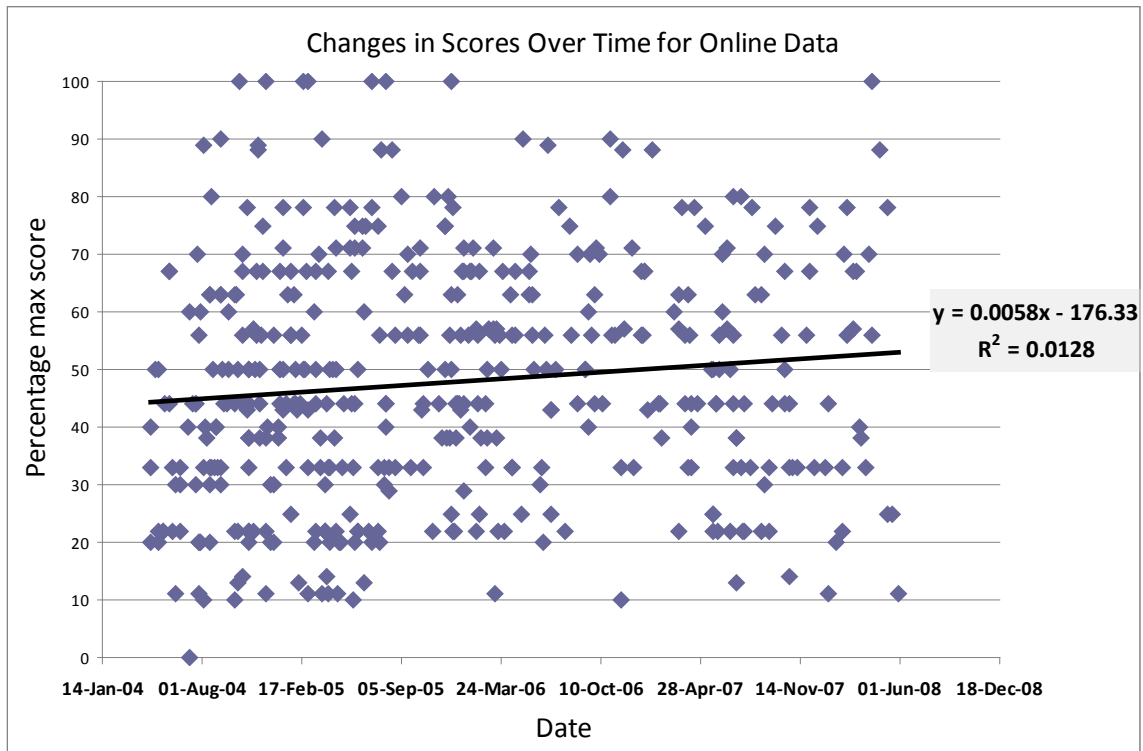
Score = 0.006 x elapsed time (days) + 44.301973; r² = 0.015073 (P=0.009); 95% Confidence Interval for slope 0.001514 to 0.010465

Changes in individual item scores over time for all media

An equi-point in data collection of December 2005 was selected to provide two time periods of monitoring with a similar number of articles in each. The average scores for these time periods for each of the 10 rating items are displayed in Table 2. This table illustrates the range and content underpinning the mix of health stories as well as reflecting how well different aspects of the stories are presented. Five items rated under 50%

satisfactory: 'cost', 'evidence', 'harms', 'benefits' and 'sources'. Three items
(quantification of benefits, the availability of treatment or diagnostic options, and
description of harms associated with the intervention) showed significant improvements
over the duration of the study (p = 0.007, p=0.019, p=0.0005 respectively). Despite the
improvement in the way benefits of interventions were reported, it is worth noting that only
36% of stories reviewed presented quantitative data in an adequate manner.

Table 2. Mean scores of Rating Instrument items rated satisfactory

Instrument Items	% Satisfactory	
	2005	2008
Avoided disease mongering	88	89
Novelty of intervention	81	83
Did not rely heavily on media release	73	70
Availability of intervention	53	56
Treatment options available	44	51
Consulted independent expert sources	38	39
Evidence supporting intervention	38	37
Quantified benefits	29	36
Reported costs of intervention	27	36
Described harms of intervention	13	18

Poor health reporting by commercial human interest programs

As the quantitative data show, television current-affairs programs scored poorly. Some of
their stories unashamedly promoted products and a substantial number of them (35%)
involved interventions to improve physical appearance: cellulite, wrinkles, body shape and

ageing. The fascination for stories about cellulite appears to be confined to current-affairs programs, as no other media outlet covered this topic in our analysis. Our reviewers struggled with gratuitous hyperbole involved in these stories: "After battling cellulite for years...", "Cellulite may not be life-threatening but..." and "Many women would do anything to get rid of the cellulite". Unusual and possibly harmful interventions were advocated in these stories. These included: 'hypoxitherapy' which involves 'gentle exercise' with the offending body parts in a vacuum; 'lipostabil' a product not licensed or proven for this sort of cosmetic use; a microwave device 'biomesosculpture'; and "a new, non-surgical technique called 'mesotherapy' in which a cocktail of drugs, vitamins and supplements is injected into the patient". The cellulite stories scored poorly overall and all were seen as containing strong elements of disease mongering.

More troubling were stories that involved untested cancer treatments or unproven interventions for children with learning or behavioural problems. 'Today Tonight' and 'A Current Affair' both promoted the Dore Program for learning disorders extolling its virtues with language including 'cure', 'groundbreaking', 'transformation', 'staggering' results and a 'permanent solution'. Despite this, there was no presentation of satisfactory evidence that the program works, nothing about alternative treatments, no information on adverse effects and no attempt to consult an independent expert. The only rating items that scored satisfactory were the 'availability of treatment' - which came close to blatant promotion, one story reported on the high cost of treatment. Earlier this year the Dore program went

into receivership leaving staff and clients financially disadvantaged; however, neither current affairs program has so far covered this aspect of the story.

Cancer was also the target of stories presenting unconventional treatments. An Australian doctor claimed to cure cancer using 'ultra high frequency microwave therapy' along with low dose cyclophosphamide, cystine disulphide or penicillamine (referred to by the practitioner as 'glucose blocking agents'). While Media Doctor reviewed only two stories on this topic, the current affair programs featured the doctor repeatedly (Jackson 2005). The campaign in support of this treatment was so intense that the Australian government commissioned an external review, carried out by a specially convened committee of the Australian National Health and Medical Research Council (Review Committee on Microwave Cancer Therapy 2005). This found no evidence of efficacy for the procedure. Despite this finding, the Media Doctor website received a large number of responses to our reviews, asking for help in locating this treatment.

Media Doctor has reviewed only a handful of stories from current affairs television programs that presented high quality stories about health. One such example was a story on corrective contact lenses to treat myopia; this rated highly with only one item – 'evidence' – scoring not satisfactory. However, the reviewers noted the story discussed planned studies associated with the intervention. The reviewers noted that this was an informative story which "*presented good coverage of the science and alternative treatments*". It proves these outlets have the potential to cover health issues in a restrained and balanced manner.

DISCUSSION

After the first 100 Media Doctor reviews, we concluded that the general standards of reporting of medical news in the general press in Australia were poor (Smith, Wilson et al. 2005). Over 1000 articles later, there are some small signs of improvement, but the overall quality remains low. Considered alongside recent reports from Canada and the USA (Cassels and Lexchin 2008; Schwitzer 2008), we are forced to conclude that the general media are generally failing to provide the public with complete and accurate information on new medical treatments. However, this analysis shows that the media are capable of improvement. The online news outlets demonstrated an overall improvement of around 5% over the course of the study. There were small improvements in coverage of the following items: the availability of the intervention in Australia; the novelty of the intervention, the cost of the intervention, and the use of independent sources for comment. The areas of significant improvement included the effort made by the journalists to accurately quantify the benefits of the interventions and describe the harms. This is important as it has been pointed out repeatedly that many journalists have difficulty distinguishing between relative and absolute measures of change (Moynihan, Bero et al. 2000; Voss 2003). The publication of relative risks in general media has resulted in significant numbers of people stopping medications, with potentially harmful impact of that cessation (Brunt, Murray et al. 2003; Haas, Kaplan et al. 2004; Majumdar, Almasi et al. 2004; Haas, Miglioretti et al. 2007).

One media sector that has shown no improvement is the genre of human interest 'current affairs' television programs. In Australia these are predominantly aired on commercial channels and their coverage of health news stories largely consists of exaggerated and uncritical endorsement of improbable treatments, including fad diets. It can be argued that when these are directed at relatively harmless conditions, such as cellulite, the stories are unimportant. However, these programs also addressed serious conditions including cancer and behavioral disorders in children. Interventions were portrayed as 'breakthroughs' and 'cures', no doubt raising false hopes and generating income for the relevant groups of practitioners. This is a source of concern for health, as these programs attract very large audiences with around 2.7 million viewers (17% of the Australian adult population) watching either program each night (Oztam 2008) and have the potential to influence the beliefs and expectations of a substantial portion of the public. There was strong promotional language in many stories and the transcripts on media websites frequently had links to the manufacturers of the 'treatments'.

There is little in the way of feedback, positive or otherwise, given to journalists and news outlets and none that provides the objective measurements that Media Doctor and similar sites do. Media Doctor has received both negative and positive reactions from journalists. Some have disputed the methodology, such as using the same rating instruments to score television, newspaper and radio stories. We are interviewing a cohort of journalists, editors and producers who are providing feedback on the site and suggesting changes to improve the impact on the media. Journalists and media outlets receive an email alert when their

articles are reviewed on the website. Consenting media outlets and journalists are also sent periodic information on their overall ratings compared with other outlets.

The responsibility for accurate health reporting is not solely the province of the media. Researchers and medical journal editors need to provide balanced and accurate media releases on published studies, designed to inform journalists, and through them the public, rather than generate a high media profile for the journal. There is evidence that many journalists feel they lack the medical knowledge to question the authority of experts (Hodgetts, Chamberlain et al. 2008) (Miranda, Vercellesi et al. 2004; Boyce 2006). Woloshin and Schwartz in their analysis of journal press releases identified problems including the lack of information about study limitations or industry funding. The majority of press releases present data in formats that overemphasize the significance of the findings. (Woloshin and Schwartz 2002) There have been repeated calls to limit press releases from early research, such as the kind presented at scientific meetings where the number of presentations that translate into effective treatments are low. (Schwartz, Woloshin et al. 2002; Ooi and Chapman 2003; Woloshin and Schwartz 2006)

We suggest that a uniformly structured style of media release could be used by medical journals to support journalists and increase quality in reporting of research. The release should address most of the items in the validated Media Doctor rating instrument, such as the novelty of the research, the availability of the intervention including the stage of research and the implications for human application. There should be a clear estimate of

when the intervention will be widely available and a rider stating that research at very early stages may never evolve to a treatment phase. The level of evidence presented and study design should be included as well as the number of subjects. Benefits or risks should be quantified in absolute terms. Presenting only relative percentages results in misinterpretation and possible deception. In the interviews described above, Australian health journalists have told of senior management who only deal with relative results, as these provide more sensational stories and many journalists admitted they did not understand the difference between the absolute and relative results. Any adverse events should be noted, as should the potential cost of the intervention especially if this can be compared with existing therapy. All links to industry and all funding should be included. Researchers and independent experts also need to be more widely available and accessible to provide comment to journalists (Schwitzer, Mudur et al. 2005).

Journalists are faced with many barriers to producing high quality health stories including a lack of time and space, problems understanding complex statistics and medical terminology and difficulty in accessing expert opinions (Schwitzer 2008). As the internet changes the way people access news, traditional forms of the media are also changing. Newspapers, radio and television news are losing audiences at a steady rate and the international trend has been for media outlets to reduce staff. This results in increased pressure on both journalists and editors to produce stories quickly, a situation where quality can become easily compromised (Roy 2008). The changing format of reporting, where stories are simultaneously used for traditional media as well as the internet, means journalists are

called upon to comply with new timelines, as news websites are updated when news breaks, rather than the traditional evening broadcast or printing deadline.

Against this backdrop it is important that health reporting provides the public with accurate and unbiased information on the value of new medical treatments. Prospects seem mixed. While online news sources have improved their coverage of health topics the increased coverage provided by commercial current affairs programs is of extraordinarily poor quality, at least in Australia. If this is representative of the situation in the rest of the world, large sections of the population are being poorly informed or misinformed about treatments that potentially affect them and their families. This presents a challenge for all of us including science and medical journals and the researchers themselves.

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CHAPTER 5: JOURNALISM AND HEALTH NEWS REPORTING

INTRODUCTION

After assessing media coverage of health and medical stories from 2004 - 2008 using the Media
Doctor website, it was evident that the quality of these stories was highly variable with common
low scoring items including: failure to consider the quality of evidence; inaccurate portrayal of
benefits, lack of consideration of adverse effects and costs; and the failure to obtain comments
from informants who are free of conflicts of interest. Little research has been conducted to
identify what journalists perceive as barriers to good quality health reporting. The reasons that
have been raised in various papers are complex and include lack of specialized knowledge, time
pressures on journalists, space limitations and difficulty in accessing expert unbiased informants
(Larsson, Oxman et al. 2003) (Voss 2002; Voss 2003; Avery, Lariscy et al. 2009). These are
discussed in more detail below. Additionally, the traditional media of newsprint and broadcast
are coming under severe financial pressure with falling circulation in the face of competition
from freely available web-based content (Fitzgerald 2009; Simmons 2009).

<u>Time</u>

Journalists have strict finishing times to research and write news stories in time for broadcast or
printing. Due to competition with other media outlets, they rarely hold stories to the following
day. These time constraints have been compounded with the advent of internet news and the
need to refresh news content a regular intervals during the day. Also, journalists often work on
multiple stories and do not have the luxury of in-depth exploration of information for one

particular story.

Knowledge

Given the wide range of subjects and complex terminology and methodology used in medical research, it is hardly surprising that many journalists feel they are not fully equipped to cover different research findings and interventions (Voss 2003). These are problems also experienced by many health professionals (Sturmberg and Pond 2009). The result can be misinformed or even misleading information in news stories. There has been an ongoing plea for medical health journals to enhance understanding by providing press releases that provide full and accessible information for journalists and especially highlighting limitations in research to prevent giving false hope (Woloshin and Schwartz 2002; Woloshin, Schwartz et al. 2009).

Space

Both newspaper space and broadcast time are extremely valuable. Advertising in both media is expensive and there is a designated ratio of advertising to news. Therefore news stories compete in terms of space and time. What is seen to be more newsworthy is given position and space, whereas the least newsworthy stories are smaller and buried further in the presentation. A story that is deemed to be overly long will be cut, usually by a subeditor who has not written the story and has no more knowledge than the copy in front of them. To make the story 'fit' may mean discarding the last paragraph without consultation with the journalist.

Commercialism and Audience Competition

Ask a journalist what his or her role in is in life and they will probably say they are paid to

inform, first of all, but also to entertain. Entertainment is important, because news is a commercial product. Media exists only if people pay money to consume it. If people are going to pay for a newspaper, the chances are that they are going to want a mixture of story types, from the deadly serious, to the comic. Journalists producing health news stories have to ask themselves who their target audience is and what the best angle for their story is, in order to pass the editorial process and make people want to read or listen to it. This process can mean that the less interesting although important aspects of the story are discarded or not explained fully (Hodgetts, Chamberlain et al. 2008).

Sources

Many press releases come with contact details of researchers or manufacturers who are happy to talk to reporters in order to have their product or work appear in the media. However, finding and interviewing an independent expert source can be a time consuming and difficult process (Larsson, Oxman et al. 2003). As a result studies focussing on sources used for health news stories have shown that most sources are not independent but have ties in some way to the research. (Boyce 2006; Moriarty, Jensen et al. 2009)

Editors

News editors and producers have the final say on whether a news story will be written and ultimately run. They look for the newsworthiness of a story and are not necessarily looking for the quality of the reporting. However, interventional studies have targeted editors as the gatekeepers of stories with good results (Michel, Frey et al. 2000; Fu and Yip 2008).

These barriers to improving the quality of health news reporting reflect international findings and there is strong qualitative evidence that lack of time, space and knowledge are the greatest constraints facing health journalists (Larsson, Oxman et al. 2003; Schwitzer 2008; Wilson, Bonevski et al. 2009).

Researchers are rarely accused as consciously promoting sensationalism or using the media for anything other than altruistic purposes such as to raise awareness of research findings or disease process. However, some articles have raised the claim that researchers may seek publicity in the media in order to increase their position, funding and career (Wilkes and Kravitz 1992). Quantitative analysis points to a correlation between specific findings reported in the general media and an increase in scientific citations (Chapman, Nguyen et al. 2007). A mixed methods analysis of reporting on diabetes in North American print media (Rock 2005) revealed that part of the sensationalism of reports on diabetes, e.g. "that diabetes maims and kills" came from researchers and advocates in their quest to raise awareness of the disease through the media.

Wilkes (1997) published a seminal paper on problems associated with the general media reporting on research findings published in peer-reviewed journals (Wilkes 1997). The paper discusses the Ingelfinger Rule, which prohibits the peer-reviewed publication on any research that has been previously published in the media, and the potential for public health impact, such as when a finding has obvious importance to the community but is withheld because it has not yet been published. At the time this article was written, journals could take many months to peer review and publish articles. To a large extent, this problem has been overcome by the speed of the internet. However, the potential for journals to use the associated benefit of being the first to

publish research findings with high levels of newsworthiness has not changed. Wilkes was

unflinching in his accusations that medical journals and researchers indulged in self-promotion

by courting the media and called for the end to embargos, claiming that important information

was being unethically withheld from the community.

ACTIVE FEEDBACK INTERVENTION (STUDY 1)

Aim

Since the Media Doctor website had commenced operation in mid 2004, the average article

scores had increased by 5-10 percentage points, but this could not be directly attributed to Media

Doctor. However, it was hypothesized that a more active intervention would have greater

potential to improve media coverage of health stories. Substantial evidence showed that timely

feedback on performance can improve practice standards (Mugford, Banfield et al. 1991; Axt-

Adam, van der Wouden et al. 1993; Jamtvedt, Young et al. 2006; Jamtvedt, Young et al. 2006).

The premise behind feedback as a behaviour change tool is that professionals would modify

practice if shown it was not consistent with their peers or accepted standards. It was

hypothesized that web-based audits of medical news articles and ongoing active feedback to

journalists and editors on individual performance would significantly improve reporting

standards and the quality of published reports.

The aim of this project was to extend the scope and scale of the Media Doctor project by

introducing an intervention designed to further improve the quality of health news reporting.

This intervention would involve an individualized performance feedback mechanism involving

journalists, editors and producers. Until this point, the feedback from Media Doctor had been

passive and journalists would not see their ratings unless they actively logged onto the Media

Doctor website and although through feedback forums, there was evidence that journalists were doing this, there was no formal way to monitor the extent of this activity. The new intervention would provide active feedback and evaluate its impact.

The primary aim of the proposed research was

1. The development, application of an intervention (performance feedback device), and
2. Evaluation of impact of intervention on quality of health and medical news reporting.

Methodology

The proposed research program combined quantitative and qualitative methods to systematically develop and evaluate the story rating instruments and the intervention. The intervention would use a before/after design utilizing the established stable baseline measures of article quality and measurement for impact of the intervention using interrupted time series analysis.

Design and assessment was undertaken of 'feedback reports' (summaries of comparative individual performance) with a graphical display of the comparative performance over time, including that of each media outlet or journalist's competitors. The feedback was not intended to instruct journalists on how stories should be written in a linguistic sense, but rather what information should be included in a balanced and informative story about the benefits and/or harms of medical interventions.

Journalist, editors and producers were identified through the stories on the Media Doctor website and invited to participate in the intervention study. Individual 'feedback reports' were generated

and e-mailed to individual journalists on a monthly basis for a period of six months. These reports compared their performance with those of their peers. A separate report was developed for editors and producers of major Australian media outlets, each of whom was responsible for a media outlet with up to several health journalists. This report related all stories and the Media Doctor ratings of these from their media outlet.

Evaluation of impact of the intervention would include time series analyses – aggregation of data with analysis of data slopes before and after introduction of intervention. Segmented linear regression would be used to compare slopes before and after the commencement of the feedback program. Stable estimates of slopes might be difficult to achieve in the case of individual journalists, because of small numbers of relevant stories, meaning it might not be possible to show changes in reporting quality at this level. However, the feedback to both journalists and editors or producers had the potential to have an effect at the media outlet level and it was expected that any intervention effects at this level would be likely to be detected.

In addition to the quantitative analyses, interviews with journalists were to be conducted to elicit in-depth feedback on the value and usefulness of the intervention. The duration of the intervention was six months in order to provide sufficient before and after time points to enable interrupted time series analyses.

Expected Outcomes

If the intervention was successful it was expected there would be an increase in the proportion of health related news articles incorporating the identified key elements of accurate reporting determined by average scores pre and post intervention.

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Results

Due to the low numbers of consenting participants, full analysis was not able to be conducted. However, the trends in scores over the six months for those involved did improve and in some cases this improvement was significant. N=6 journalists and two editors were enrolled and completed the study. The two media outlets from which the editor and producer came were among the highest scoring outlets. All the journalists involved were among the highest ranking (initial scores – post 6 months). This showed an interest from the more informed and experienced health writers and their outlets which echoed the information received anecdotally in the form of feedback to the website.

The results for the interviews were analysed using NVivo 8. While the analysis revealed insights in to the different category of health journalist (radio, broadcast tabloid, freelance, regional and capital areas) no television or current affairs. The full results have not been included in this thesis as there are currently no publications regarding these data. It is anticipated this will be a future peer-reviewed publication. Full details of the study and results to date are provided in Appendix 4.1

Discussion

Journalist interest in the Media Dr website has come in the form of feedback to the website (Table 1), formal publications (Sweet 2004; Cresswell 2009) and those collected in interview (see Appendix 4.2). The feedback has been varied, some positive and some negative, however virtually all feedback has come from a similar group of journalists, those acknowledged as 'health writers'. Health writers are those who are employed or have chosen to write or produce

stories primarily in the area of health and medicine whether for a major news outlets or in a freelance capacity. This mirrored the response to the Feedback study where without exception; all journalists who responded in any way to a request to participate in the research were all experienced health reporters.

QUALITY OF JOURNALISM (STUDY II)

The response to the Feedback Study was disappointing. The aim of Media Doctor was to improve health reporting and if the only journalists who were expressing interest were already health specialist writers, then was the intervention going to have an effect? On reflection, however, did the difference in experience translate into an ability to produce better quality stories about health when compared with other types of journalists? Journalists were not named on the Media Doctor web site, primarily because it was never the intention of this website to 'name and shame' but also because news stories were not seen as not solely the responsibility of the journalist but rather a collaborative output of the media outlet. Headlines are constructed by a subeditor or producer usually without consultation with the journalist. The editing process, performed by sub-editors, editors and producers, can change the content and structure of a story, sometimes dramatically, after it leaves the journalist's hands. Journalists' names are recorded however in a password-protected area of the Media Doctor data-base.

Aim

The media can influence health literacy and health seeking behaviours and studies have highlighted the poor quality of many medical news stories. The objective of this study was to determine if the differences in authorship of such stories matter.

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Methodology

An analysis of stories written by specialist and non-specialist journalists and those sourced from major news organizations was undertaken. Journalists are not named on the Media Doctor web site although they can usually be identified by a link to the by-line of the online news story. Author information is however entered into a password-protected area of the Media Doctor data-base, which can be downloaded from the website for analysis. For this analysis data was downloaded categorised by author name. Each author's name was entered into Google searches to determine their specialty (if any). Those identified by media outlets as being 'health' 'medical' or 'science' reporters or editors were tagged as 'specialists' with a sub-category of specialist reporters with 10 or more stories posted on the Media Doctor website during the period of the study. News stories produced by press agencies and overseas media outlets were identified as were stories which did not carry any journalists' name. Authors were divided into six categories:

- *No By-line* - where no by-line (author name) was provided
- *General Journalist* – where an author was identified but a Google search revealed no reporting specialty
- *Overseas Media* – Story imported from an overseas media outlet (e.g. New York Times)
- *News Organizations* – Story bought from a news syndicate such as Associated Press, Reuters
- *Health Journalist* – where a Google search identified the author as being a 'health' 'medical' or 'science' reporter

- *Specialist Health Journalist* – a subcategory of Health Journalist where the journalist had 10 or more stories posted on the Media Doctor web site during the period of the study.

Statistical analysis

The main hypothesis for this research was that stories written by specialist health journalists would have higher scores than those from other sources. In the primary analysis the association between author category and score was examined, using stories without by-lines as the reference group. Comparisons were made using random effects general least squares regression analysis, with media outlet as the cluster variable. Within the group of specialist health journalists, individual scores were compared using one way analysis of variance (ANOVA). In a secondary analysis the average scores for stories sourced from four major news organizations were compared: Associated Press (AP); Reuters; Agence France Presse (AFP); Australian Associated Press (AAP). Differences between these organizations were analysed by ANOVA. Analyses were performed using STATA (Version 10, StataCorp LP College Station, Texas, USA), except for the ANOVA and the multiple comparisons analyses, which were done in StatsDirect (Version 2.3.6, Stats Direct Ltd, Sale, Cheshire, UK).

Medical news articles identified by a media monitoring website (Media Doctor) that covered therapeutic claims about medical interventions (drugs, devices, procedures, diagnostic tests, complementary therapies), and were published in commercial and non-commercial Australian news media over a five year period between 2004 and 2008. Each article was measured against ten validated criteria by two individuals using a standardised rating guide. The criteria included the novelty and availability of the treatment, coverage of benefits harms and costs, the presence

of "disease-mongering" and the inclusion of independent expert commentary. Unweighted total scores were compared across categories of journalists and news organisations using general least squares regression analysis, with media outlet as the cluster variable

Results

The six categories of journalists wrote 1337 stories that were published by 12 Australian media outlets between February 2004 and March 2009 (Table 1). Of these, 320 had no 'by-line'. Of the remainder, 193 stories were written by 143 non-specialist journalists; 415 came from four news organizations (AAP, AP, AFP and Reuters) and 39 came from 12 foreign media outlets (including ABC, BBC, Boston Globe, Guardian, New York Times, The Telegraph UK, The Times, Los Angeles Times, Washington Post); 142 stories were written by 65 health/science journalists, and 228 stories were written by eight specialist health journalists, all based in Australia, who each wrote 10 or more stories that were rated on the Media Doctor website during the study period. The media outlets that published these stories comprised: online news services provided by the Australian Broadcasting Corporation (ABC) (publicly funded) and NineMSN (privately funded); tabloid newspapers (The Daily Telegraph, The Sunday Telegraph, The Herald Sun, The Sun Herald, The Courier Mail, The West Australian); broadsheet newspapers (The Australian, The Sydney Morning Herald, The Age) and commercial human interest programs (A Current Affair, Today Tonight).

Discussion

This analysis of a large number of stories from the Australian mainstream media indicates that it does matter who writes news stories that cover therapeutic claims regarding new medical

treatments. Stories written by specialist health journalists were superior to those written by other groups. However, even within this select group there was considerable variation in average scores. Variation in scores was also seen in the other groups of journalists.

Stories with no by-line had significantly lower scores than most other groups. This was consistent with stories considered to be of less importance being given to junior staff. They would be unlikely to have a by-line and their stories would be given less space or time than 'big' stories. Therefore, these stories may have rated poorly because they were written by a less experienced writer or because the piece was 'written short' or cut to fit editing needs. There were significant differences between the large news organisations. Associated Press achieved fairly high and consistent ratings, whereas Agence France Presse had lower average scores.

The differences in scores noted here are important and in our view are meaningful. The reasons for the high scores achieved by some specialist health journalists include their coverage of important issues (such as benefits harms and costs), and also their ability to place research information in a local context. That includes considerations such as the local availability of a new drug, procedure or diagnostic test, and the inclusion of informed comments from local subject matter experts. It does matter who writes news stories that cover therapeutic claims regarding new medical treatments. Stories written by specialist health journalists, working for a single media outlet scored more highly than those written by other groups. This is especially important because this source of health literacy is currently under pressure as falling revenues threaten the future of the traditional media.

This analysis showed that specialist health journalists produced news stories with the highest quality scores. There was variation in the experienced health journalist group showing the ability of journalists to achieve very high levels of quality in health reporting. Also, there was indication for potential improvement even at this level of expertise. Overall, it appeared the specialist health journalist group contributed to highest levels of quality reporting and public health information and this group of journalists should be encouraged and nurtured.

The following paper, published in PLoS Medicine September 2010, provides detail on the methodology, the participants and the results of the analysis of this study. A PDF version of the paper and a statement of contribution signed by all co-authors are included in Appendix 1.3).

PAPER 3

Does it matter who writes medical news stories?

(Wilson, Robertson et al 2010)

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Background

The news media have a crucial role in supporting health literacy, and multiple surveys have shown the extent to which the public relies on them for information about medical advances [1,2]. However, the mainstream media are undergoing rapid and unprecedented change, with a shift from the traditional outlets (broadsheet newspapers and flagship current affairs programs) to online news services and blogs that are available free of charge. These online sources, and the more recent Web 2.0 activities (e.g. FaceBook and Twitter), still rely on the quality of the news coverage by the traditional media, which they frequently cite as information sources [3].

A number of recent studies have pointed to the poor and variable quality of many health stories in the mainstream media, particularly those covering new drugs and procedures [4,5]. Some outlets are capable of producing excellent stories, but common flaws across all media include lack of attention to the quality of the research evidence, exaggerated estimates of benefits, inadequate coverage of potential harm, no information on the costs of new treatments and a failure to identify unbiased expert sources. Studies have revealed such deficiencies in Australia, Canada and the United States, with little evidence of improvement in reporting over the last five years [4,5,6,7]. The reasons for poor quality journalism are complex, and include lack of specialised knowledge, time pressures on journalists, space limitations, the difficulty of accessing expert unbiased informants, and the desire of researchers, their institutions and (sometimes) journals to exaggerate the significance of the research [8,9,10,11].

But what impact will the current financial pressures on the traditional media have on the already variable quality of medical news reporting? Should a newspaper editor faced with falling sales, and advertising revenue, retain the services of a specialised but more expensive medical journalist, who

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can interpret new scientific data and place it in a local context? Or will a non-specialist journalist do the job as well? Can medical news content be reliably imported from overseas media, or from news organisations such as Associated Press and Reuters? Here, we examine the question "does it matter who writes the stories"?

Monitoring the quality of medical news stories

In recent years, sites that monitor the completeness and accuracy of medical news reporting have been established in Australia (www.mediadoctor.org.au), Canada (www.mediadoctor.ca), Hong Kong (www.mediadoctor.hk) and the USA (www.healthnewsreview.org). To address the question posed in this Policy Forum we accessed and analyzed data from the Media Doctor Australia site. This site posts reviews of health news stories published in the Australian commercial and publicly-funded media, including newspapers, online news, television and radio broadcast transcripts [5,6,12]. The focus is on stories that make therapeutic claims about new treatments and procedures, including diagnostic tests. News stories are not limited to local content, and include 'wire' stories from major news organizations and stories from overseas media outlets that are carried by Australian media. The stories are identified from regular searches of a wide range of online news websites, along with media releases, journal articles and other material relevant to the stories. Two raters independently score each news story according to ten criteria (See Table 1 for a description of rating criteria and Media Doctor Australia methods).

Table 1: Media Doctor Rating Criteria*

Rating Criteria: The extent to which the story:

| 11. Reported on the novelty of the intervention |
| 12. Reported on the availability of the intervention |
| 13. Described any treatment or diagnostic options available |
| 14. Avoided elements of disease mongering |
| 15. Reported on evidence supporting the intervention |
| 16. Quantified the benefits of intervention |
| 17. Described the harms of intervention |
| 18. Reported on the costs of intervention |
| 19. Consulted with independent expert sources |
| 20. Did not rely heavily on a media release |

* Each story was sent to two of 15 reviewers, comprising clinicians, public health specialists, medical writers, journalists, clinical and population health researchers, who conducted the evaluations in a voluntary capacity. Reviewers rated stories about medical interventions and diagnostic tests independently, using validated rating instruments and rating guides [12]. The instruments contain 10 items (see above), which are identical to those used by the sister sites 'Media Doctor Canada' and 'Health News Review' in the United States [4,7]. Scores are assigned by each reviewer based on a scoring guide. Reviewers put their draft reviews in a password-protected area of the website and any discrepancies are resolved by consensus. If necessary, a third reviewer is used to settle disagreements. To ensure objectivity and reliability, all reviews are screened by a researcher, who checks the scores and edits comments. scored as 'satisfactory', 'not satisfactory' or 'not applicable' Both reviewers contribute to a comments section, which is used to highlight the strengths of the story or aspects that could have been improved and areas that are not covered in the rating instrument, such as the use sensationalist language or inappropriate headlines.

The quality of each news story was assessed using the Media Doctor rating criteria   (Table 1). For each news story, the ten criteria were scored as 'satisfactory', 'not satisfactory' or 'not applicable'. The total score for each story was expressed as a proportion of all items that were rated 'satisfactory'. Stories that rated 'not applicable' for more than three rating items were excluded.

Categorizing the authorship of health news reports

There has been little empirical research on the relationship between the authorship of articles and the content and quality of the stories. Anecdotally, specialist health journalists can provide lucid and succinct summaries of complex research, which can inform both the public and the researcher community. In operating the media monitoring sites, we have avoided naming specific journalists, preferring to concentrate on reporting the performance of the media outlets. We

examined the provenance of 1337 medical news stories published by the Australian mainstream media between 2004 and 2009, and subsequently rated by Media Doctor Australia. Although journalists are not named on the web site, author information is recorded in a password-protected area of the Media Doctor data-base. Based on the "by-lines" (who wrote the story) we placed the authors into six categories (Table 2).

Table 2: Categorisation of journalists used in this report

1. *No By-line:* all articles that did not identify authors

2. *General Journalist* – where a Google search on the author's name revealed no reporting specialty

3. *Overseas Media* – Story imported from an overseas media outlet (eg New York Times)

4. *News Organizations* – Story bought from a news syndicate, such as Associated Press or Reuters

5. *Health Journalist* – where a Google search identified the author as being a 'health' 'medical' or 'science' reporter

6. *Specialist Health Journalist* – a subcategory of Health Journalist where the journalist had 10 or more stories posted on the Media Doctor web site during the period of the study

Relationship between categories of journalists, media outlets, and the quality of the stories

The key issue was whether the more experienced specialist health journalists wrote stories of higher quality than journalists in the other categories. In making this judgement we were aware that the media outlet where the journalist worked was a potential confounder – even the best health journalist can have a story ruined by inappropriate editing or production. The 1337 stories were published by 12 Australian media outlets between February 2004 and March 2009 (Table

2). Three hundred twenty stories had no 'by-line'. Of the remainder, 193 were written by 143 non-specialist journalists; 415 came from four news organizations (AAP, AP, AFP and Reuters) and 39 came from 12 foreign media outlets (including ABC, BBC, Boston Globe, Guardian, New York Times, The Telegraph UK, The Times, Los Angeles Times, Washington Post); 142 stories were written by 65 health/science journalists, and 228 stories were written by eight specialist health journalists, all based in Australia.

The media outlets that published these stories are summarised in Table 3, which also presents the mean scores by media outlet and journalist category. The mean scores were highest for the broadsheet newspapers and lowest for the human interest current affairs programs (Table 3). The difference between the average scores of the highest and lowest performing media outlets was 26.1% (95% CI 19.9, 32.2) (Table 3). The variation in unadjusted scores between the highest and lowest performing categories of journalists was less – a range of 15.5 % (95% CI 11.2, 19.8%) (Table 3). To deal with potential confounding by media outlet, we adjusted the analyses that compared average scores by categories of journalists, and these are given in Table 4. Using stories published without a by-line as the reference category, those with significantly higher average scores were from news organizations, science/health journalists and specialist health journalists; the latter scored highest.

Table 3: Average unadjusted scores for medical news stories written by different categories of journalists and sourced from different news organisations

CATEGORY OF JOURNALIST	N	AVERAGE SCORE*	95% CI	AUSTRALIAN MEDIA OUTLET	N	AVERAGE SCORE*	95% CI
No By-line	320	44.1	41.8, 46.4	**Broadsheet Newspapers**			
General Journalist	193	44.8	41.7, 47.9	Sydney Morning Herald (Sydney)	252	58.8	56.3, 61.3
Overseas Media	39	50.6	43.9, 57.3	The Australian (National)	256	57.9	55.4, 60.5
News Organizations	415	54.9	53.0, 56.7	The Age (Melbourne)	96	55.0	51.0, 59.0
Health Journalists	142	56,2	52.8, 59.7	The West Australian (Perth)	11	50.7	31.3, 50.7
Specialist Health Journalists	228	59.6	56.7, 62.6	**Tabloid Newspapers**			
				The Sun Herald (Sydney)	14	53.7	43.6, 63.8
				The Daily/Sunday Telegraph (Sydney)	68	52.0	46.6, 57.4
				The Herald Sun (Melbourne)	58	43.7	37.7, 49.6
				The Courier Mail (Brisbane)	15	41.5	31.3, 51.6
				Internet News Sites			
				NineMSN (National: private)	247	51.4	48.9, 53.9
				Australian Broadcasting Corporation (National: public)	242	45.2	42.5, 48.0
				TV Current Affairs Programs			
				A Current Affair (Channel 9 – National)	30	34.7	27.3, 42.0
				Today Tonight (Channel 7 - National)	48	32.7	26.9, 38.6

*The data presented in this table are unweighted mean scores with their 95% confidence intervals

Table 4: Comparisons of Media Doctor scores for stories written by different categories of journalists

COMPARISON	MEAN DIFFERENCE	95% CI*	P*
No By-line (n=320)	Reference	Reference	Reference
General Journalist (n=193)	0.1	-3.9, 4.1	0.954
Overseas Media (n=39)	1.2	-5.7, 8.1	0.730
News Organization (n=415)	7.5	4.3, 10.7	<0.001
Health Journalist (n=142)	8.1	3.8, 12.4	<0.001
Specialist Health Journalist (n=228)	12.5	8.9, 16.2	<0.001

*Comparison of category with the reference group (No By-line) Comparisons were made using random effects general least squares regression analysis, with media outlet as the cluster variable.

Of the large news organizations examined, the company with the highest average scores was Associated Press [AP] (Table 5). Differences between AP and other news organizations ranged from 7 to 15% but after adjustment for multiple comparisons the only statistically significant difference was that between AP and Agence France Presse 15.3% (2.9 to 27.7%).

Table 5: Comparisons of Media Doctor scores for stories sourced from different news organisations

COMPARISON	MEAN DIFFERENCE	95% CI*	P*
AFP** vs. AP	-15.3	-27.7, -2.9	P = 0.008
AFP vs. Reuters	-8.2	-17.1, 0.7	P = 0.086
AAP vs. AP	-9.2	-19.3, 0.9	P = 0.088
AAP vs. AFP	6.1	-2.5, 14.8	P = 0.263
AP vs. Reuters	7.2	-3.1, 17.5	P = 0.278
AAP vs. Reuters	-2.0	-7.3, 3.2	P = 0.749

* Adjusted for multiple comparisons using the Tukey-Kramer procedure
**AFP = Agence France Presse, AP = Associated Press, AAP = Australian Associated Press

How should we interpret these results?

It does matter who writes news stories that cover the benefits and harm of health care interventions. Stories written by specialist health journalists were superior to those written by other groups. These data illustrate what can be achieved in terms of high quality health news reporting; but this ideal is seldom reached. The analyses also underscore the importance of which outlets journalists work for. Traditional broadsheet newspapers scored highest and commercial human interest programs consistently returned the poorest scores. We presume that these differences reflect not only the professional skills of journalists, but also editorial policies, which dictate the target audience, the writing style (favouring human interest over evidence), the length of the article and the extent to which it serves particular sectoral interests (e.g. a patient support group or identifiable victims of a disease). These findings are not surprising, but some of the differences were large and likely to translate into flawed information for consumers, with an adverse effect on health literacy.

These findings are also significant because financial pressures in the industry threaten the jobs of experienced health journalists and the future of broadsheet newspapers. The internet has become a formidable rival to the more traditional forms of news [13]. Newspaper circulations have fallen and some experts envisage the end of them within a decade [14]. While this is speculation, there is no doubt that the traditional media are in a state of flux and there is pressure to economize. One outcome has been the downsizing of newsrooms across the world. An easy option for a pressured editor is to purchase health stories from foreign media outlets or news organizations. But the data

presented here suggest that s/he should choose carefully. Associated Press achieved fairly high and consistent ratings, whereas Agence France Presse had lower average scores.

What are the policy implications of these results?

Obvious suggestions to improve health reporting include better training of all journalists about evidence based medicine during their undergraduate education. Major outlets could invest in more specialist health journalists and rely on fewer imported health stories. However, each of these suggestions comes at a cost, which may be substantial and unsustainable for the foreseeable future.

Another solution is to demand more responsibility from researchers and their institutions when interacting with the media. Research funding bodies usually require applicants for grants to describe how they will disseminate their findings. They should ensure that information given to the media through press releases and comments is accurate and balanced. This role properly lies with the principal investigators, but funding bodies, research institutions, universities, those responsible for media promotion, and journals publishing the work share the responsibility to make more balanced claims about the findings, their importance and implications. The intention has to be promotion of good science, not self-promotion by researchers, sponsors, institutions or journals, which all stand to benefit from media coverage. The public deserves to be well informed about the research it funds. While we may not be able to directly influence which journalist write health stories, researchers can make it easier

for less experienced journalists to do a good job. Better collaboration of researchers and

health professionals with journalists and news outlets is an important step towards more

objective communication.

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CHAPTER 6: SUBANALYSES OF STORIES:

1) Complementary and Alternative Medicine, and
2) Cancer

INTRODUCTION

The preceding chapters present papers examining the Media Doctor website as a tool for assessing and improving the quality of health reporting in the general Australian media. Paper 1 presents early data which provides an initial overview of health reporting using the four categories of pharmaceutical, surgical, diagnostic testing and 'other'. The second paper looks at changes in the quality scores of these categories, and changes across time and differences between different types of media outlets. There is also analysis of how different rating items were rated between subject categories, outlets and over time. The third paper looked at differences in quality by examining different author categories. As work into Media Doctor progressed, it became apparent that the four rating categories were limiting in terms of what stories could be rated. Many stories were not rated on the basis that they did not comply with the inclusion and exclusion criteria, e.g. stories dealing with adverse events of existing medications (an instrument rating Adverse Events stories has since been developed but is not included in this thesis). We wished to examine how sensitive the instruments were in rating stories that did not fall directly into the predefined categories. One important area was that of complementary and alternative medicines (CAM). Many (CAM) stories had been rated on Media Doctor and it was decided that these stories would be identified and analysed in order to assess the overall quality and compared with the scores of stories about

mainstream health interventions. The fifth paper of the thesis examined how well one disease, cancer, performed across both subject categories and rating items.

CAM INTRODUCTION

Complementary and Alternative Medicines (CAM) are a significant feature of the healthcare in Western nations (Tovey and Manson 2004; Harvey, Korczak et al. 2008) a trend reflected in Australia with increasing numbers of people public turning to CAM and CAM practitioners for their health care (MacLennan, Myers et al. 2006; Xue, Zhang et al. 2006). Research suggests the use of CAM in Australia is substantial and increasing (McLennan, 1996; 2002; 2006). Surveys of Australian CAM use have demonstrated a steady rise in consumption with the proportions reporting the use of at least one non-physician prescribed alternative medicine rising from 48.5% in 1993 to 52.2% in 2004 (in a group of 3000 subjects) (MacLennan, Myers et al. 2006). In 2004, Australians spent approximately AUS$1.31billion on CAM, or AUS$21.23 per CAM user each month (MacLennan, Myers et al. 2006). The increase in popularity of CAM has been paralleled by rising acceptance among the medical profession (Cohen, Huey et al. 1995; Hall and Giles-Corti 2000; Pirotta, Cohen et al. 2000; Pirotta, Farish et al. 2002). In 2002, the Australian Medical Association announced its support of the use of some CAM and this position was subsequently endorsed by the Royal Australian College of General Practitioners (Australian Medical Association 2002).

The increased role of CAM in public healthcare, and growing concern about issues such as product quality and the potential for CAM interaction with prescribed medicines,

prompted the Australian Government to establish the Expert Committee on

Complementary Medicines in the Health in 2003. Among the Committee's

recommendations was that the government should "take a more active role in ensuring

that consumers have access to reliable information about complementary medicines, and

the skills to interpret this information to be able to make informed decisions"

(Commonwealth of Australia 2003).

The media (print, broadcast and other electronic) has played a central role in the

diffusion of information on health and medical issues. Health, along with other

perennial topics like crime and disaster, is a staple of the daily news. For most people,

including health professionals, information about health issues and news of medical

developments is first obtained through often intense and pervasive media coverage (The

National Health Council Report 1997; Grilli, Ramsay et al. 2002; Dolan, Iredale et al.

2004; Haas, Kaplan et al. 2004; Hann, Baker et al. 2005). For the public, television,

magazines newspapers, magazines, radio and internet have been shown to be the most

frequently consulted sources of general health information often preferred to seeking

such information from their doctor (The National Health Council Report 1997;

Pennbridge, Moya et al. 1999; Dolan, Iredale et al. 2004; Haas, Miglioretti et al. 2007).

Media coverage clearly does influence the perception of health issues and impact on

health related behaviours (Grilli, Ramsay et al. 2002). The media often plays an

important role in public health campaigns, for example encouraging the change of

sexual practices to reduce the transmission of HIV (Lowicki-Zucca, Spiegel et al. 2005).

While difficult to quantify precisely, extensive news coverage has been linked to positive outcomes such as increased uptake of screening, but also to negative outcomes such as creating unwarranted panic about conditions or generating premature unrealistic hopes for new technologies. Extensive media coverage of the anti-impotence therapy Viagra induced demand for the product and widespread negative reporting about hormone replacement therapy was followed by dramatic decreases in HRT use (Lawton, Rose et al. 2003). Prominent coverage of suicide has been linked to "copycat" behaviours while extensive media linking mental illness to violence has contributed to the widely-held but erroneous view that all mentally ill persons are violent (Pirkis, Francis et al. 2002; Francis, Pirkis et al. 2003; Francis, Pirkis et al. 2004; Francis, Pirkis et al. 2005). Health Professionals too are influenced by media health reports (Schwartz and Woloshin 2004; Sturmberg and Pond 2009).

The public accesses much of its information about CAM via the media. A study of CAM users (also receiving conventional treatment for breast cancer) showed information about CAM was accessed chiefly via magazines or books (48%) and television and radio (31%) (Hann, Baker et al. 2005; Hann, Baker et al. 2005) (Hann et al 2005). As with other areas of health information, it is highly likely that media reports of CAM significantly influence behaviour (MacLennan, Myers et al. 2006). Therefore, public health literacy regarding CAM would appear dependent on the quality of the media's reporting on CAM.

Coverage of health and medical issues in the popular media has been shown to be inaccurate, sensational, superficial or simply absent on important medical issues. Studies conducted in the United States, Canada and Australia have documented the generally poor quality of the media coverage of health issues (Smith, Wilson et al. 2005; Bonevski, Wilson et al. 2008; Cassels and Lexchin 2008; Schwitzer 2008; Wilson, Bonevski et al. 2009). Common faults in the reporting of health and medical issues have included unnecessary sensationalism; failure to follow through on stories; ignoring the public health dimensions of a story; failure to consider the quality of the clinical evidence; the inaccurate portrayal of benefits, lack of consideration of adverse effects and costs of medical interventions and the failure to obtain comments from informants who are free of conflicts of interest.

The media has also become a vehicle for marketing of medical products. News stories are not subject to the restrictions on advertising of new drugs imposed by the Therapeutic Goods Act. The medical products industry use medical news stories to expand the boundaries of disease. 'Disease awareness' messages may be thinly disguised attempts to seed new products by playing on fears of disease. Specialised health journalists are well aware of these problems, but many stories are written by non-specialist reporters, are imported from foreign media or news services or are shortened by editors, with the loss of key information (e.g. adverse effects of treatment) (see Chapter 5).

Little is known about the quality of information the public receives about CAM. One small study examined the type of media reporting CAM in the UK and Germany (Ernst and Weihmayr 2000). The study analysed 256 newspaper reports in 1999 from both countries. Twelve percent (12%) of these articles reported specifically on CAM. The authors coded article tone as critical, neutral or positive. In contrast to articles on general medical matters, reporting on CAM in the UK was overwhelmingly positive (100% of articles). This suggested there were differences in the way health news on traditional or alternative medicine was reported. As evidence for the efficacy, safety, availability and costs of CAM grows in the scientific literature, it is important to ensure these results are accurately communicated to the public in the general media.

Aim

The aim of this analysis was to establish the quality of CAM reporting in the Australian media and compare these results with those of news stories on traditional medical interventions as well as comparing quality scores across time to estimate any improvement.

Methodology

In conjunction with the NHMRC definition (National Centre for Complementary and Alternative Medicine 2002), the Therapeutic Good Administration uses a categorisation system for CAM (Commonwealth of Australia 2003). It provides the following five categories:

1) biologically-based practices,

2) energy medicine,

3) manipulative and body-based practices,

4) mind-body medicine and

5) whole medical system.

An examination of Media Doctor data from 2004 to 2007 revealed that of 1087 stories rated on Media Doctor, 222 (20%) were about CAM.

Results

The CAM stories rated poorly over most of the 10 quality items with only three items averaging scores over 50%. CAM stories performed particularly poorly in the areas of reporting potential side effects, providing information on alternative available treatments and providing input from independent expert sources. Twenty per cent (20%) of CAM stories were rated as having elements of trying to promote inappropriate use and this was significantly worse than other categories of stories.

Conclusions

Maximizing the health benefits and minimizing the risks from Australians' increased use of CAM is dependent on sound health literacy regarding CAM. The importance of the media for health literacy and doubts about the current quality of media reporting of CAM presents a strong rationale for implementing measures to improve media coverage of CAM products and practices. If the media publishes and broadcasts quality articles about CAM the public is more likely to receive balanced and accurate information about CAM. If the public have accurate, reliable information about the effectiveness and safety of CAM, they are better placed to make informed decisions regarding its use.

These data suggested the need to improve the quality of news reporting of CAM in Australia.

Ensuring the public have access to reliable health information is a major challenge in promoting and maintaining good health for all Australians. As the popularity of CAM treatments has increased among Australians, there is an increased need for good quality information on their risks and benefits. The chief source of information on CAM for the public is what they see, hear and read in the general media. The quality of CAM related information in the media is therefore centrally important to the public's understanding of CAM. Despite concerns about the quality of the reporting of CAM-related health news, there is currently no systematic evaluation of CAM media reports or any initiative to ensure quality. The proposed research seeks to increase the accuracy and reliability of CAM information reported in the lay media. Good quality CAM related stories in the media can potentially improve public understanding of CAM and contribute to informed and appropriate use.

Paper 4 (Bonevski, B., A. Wilson, et al. (2008). "An analysis of news media coverage of complementary and alternative medicine." PLoS ONE **3**(6): e2406) provides detail on the methodology, the participants and the results of the analysis of this study. A PDF version of the paper and a statement of contribution signed by all co-authors are included in Appendix 1.4).

CANCER INTRODUCTION

By 2008, the Media Doctor website data had been analysed to establish the quality of health news reporting in the Australian Media (Chapter 3, Paper 1) and examined for changes in the quality scores over time (Chapter 4, Paper 2). By this time, enough stories had been collected and rated on the site in order to perform meaningful analyses of disease specific reporting. Cancer was chosen because of its importance as a public health issue, it was widely reported in the media, it was a subject that had been rated across the four categories of pharmaceutical, diagnostic testing, surgical and 'other', and there were many past content analysis studies of cancer news stories to provide comparison.

Previous analyses of news stories about cancer in the media had shown a disproportionate amount of media space devoted to breast cancer compared with other important cancers such as lung or bowel (Calloway, Jorgensen et al. 2006). The reasons for this were not obvious but may have included the number of young, high profile women who were diagnosed with or had died from breast cancer, such as entertainer Kylie Minogue and Jane McGrath, wife of former international test cricketer Glen McGrath (Greenberg 2003; Stryker, Emmons et al. 2007; Lewison, Tootell et al. 2008; Mackenzie, Chapman et al. 2008). There had been extensive study of how cancer was portrayed in the media. However, these studies had tended to only focus on one or two types of cancer, such as breast or skin (Kondro and Sibbald 2005; Wilson, Booth et al. 2008), one source of news, such as online or printed (Schwartz and Woloshin 2002; Calloway, Jorgensen et al. 2006; Atkin, Smith et al. 2008) or one type of therapy such

as medication or prevention (Kondro and Sibbald 2005; Mackenzie, Chapman et al. 2008; Wilson, Booth et al. 2008; Abelson and Collins 2009; Habel, Liddon et al. 2009). Also, previous analyses had been qualitative in nature examining the content of the reports for tone or themes (Clarke 2004; Tovey and Broom 2007; Clarke and van Amerom 2008; Moriarty and Stryker 2008; Gantz and Wang 2009; Habel, Liddon et al. 2009; Moriarty, Jensen et al. 2009).

Given the extent to which the public turn to the media for information about cancer and its treatment, (Rutten, Arora et al. 2005; Niederdeppe, Frosch et al. 2008; Tian and Robinson 2008) it is essential that media coverage is valid, comprehensive and balanced, as advocated in the Australian Press Council's guidelines for health reporting (Australian Press Council 2001). Media coverage of cancer, stories should accurately represent the potential benefits harms and costs of new treatments and diagnostic tests. The use of emotive language should be minimised, and when attempts are made to communicate the societal burden of disease, this should be done in a measured and balanced way.

Hypothesis

"That cancer reporting in the Australian media would demonstrate the same features as seen in the overall reporting of health news, that is, it would be generally poor in quality". It was expected that a higher rate of emotive devices would be used to portray cancer and the people who had cancer. It was hoped that the analysis would provide a

clearer picture of what sources were used to construct cancer stories in the news and where interventions would be best aimed to improve the quality of these stories.

Aim

To identify and analyse the content, context and quality of Australian health news stories about cancer that had been collected and rated on the Media Doctor database over a five year period between 2004 and 2009.

Methods

A critical review was conducted on 276 cancer-related stories reviewed by Media Doctor between 2004 and 2009. The analysis included any stories in the Media Doctor database about newly reported interventions or findings for cancer which were categorised under the four broad headings of pharmaceutical, diagnostic test, surgical and 'other'. A mixed methods approach was used for analyses of data and story content i.e. aspects of these stories have been analysed according to category of story, type of news outlets, media type (online versus print), and over time. A qualitative analysis examined the use of emotional language, sources used and how evidence was presented.

Quantitative Analysis

Cumulative total satisfactory scores across the nine media outlets were calculated. Inspection of the data showed that they were normally distributed, and unweighted cumulative scores were compared between media outlets and story topics using analysis of variance (ANOVA) (StatsDirect Ltd 1990-2007).

Qualitative Analysis

A mixed methods analysis was undertaken to take advantage of Media Doctor's capacity to effectively evaluate quantitative aspects of the qualitative data as well as qualitative aspects (Sorensen 2008). Coding was undertaken by text analysis and using areas of interest that had emerged over the years of working with these articles.(Smith, Wilson et al. 2005; Bonevski, Wilson et al. 2008; Wilson, Bonevski et al. 2009) The articles were coded for concepts, with coded segments then analysed and categorised thematically. Coded segments of text were compared for similarities and differences and then categorised. One third of the articles were coded by the candidate on two occasions to ensure consistency in coding. A further subset of 62 (23%) articles was re-coded by a second coder with a high level of agreement between coders (kappa 0.72, CI 0.40-1.03, $p<0.0001$).

Results

There were a total of 1323 stories on the Media Doctor website, of which 272 were about cancer across the four subject rating categories (see Table 6.1). Overall, the cancer stories rated higher than non-cancer stories. Broadsheet newspapers scored higher than online news services, tabloid newspapers or television and the overall difference between the outlets was statistically significant.

Table 6.1: Media Dr Cancer stories

Stories Category	N	Mean score (range)
pharmacology cancer stories	134	56 (10-100)
diagnostic test cancer stories	55	55 (11-100)
other cancer stories	59	56 (11-100)
surgery cancer stories	7	37 (11-78)
TOTAL	**255**	**52**

Sources of information

The predominant source (72%) in most cancer stories was the researcher leading the

cancer research. Industry comments comprised only 11% of all sources, while 44% of

all stories cited a medical journal article as a source. Many different journals were cited

but only two local journals: Medical Journal of Australia and The Australian and New

Zealand Journal of Surgery. Journals were used in the story to reinforce the significance

of the research (see Appendix 5.1 for a full list of journal citations).

Disease Burden

More than a third (39%) of stories referred to the disease burden of different types of

cancer. There was a wide assortment of population impact descriptions which were

often confusing and sometimes misleading (see Appendix 5.2) for an expanded version

of Text Box 1: *Variation in descriptions of the disease burden attributable to prostate*

cancer in Paper 5.

Emotive language and metaphor

There were numerous examples of highly emotive language, unnecessary use of

adjectives and literary devices such as hyperbole, analogy and metaphor, as well as

extensive citing of personal patient narratives. The most widely used emotive words were positive; 'hope' (145) and 'significant' (72) (Table 6.2).

Table 6.2: Frequency of Use of Emotive words (mentioned more than 10 times)

Word	Times used in all stories (n=268)
Hope	145
Significant	72
Fight	68
Suffer	68
Aggressive	60
Kill	42
Breakthrough	39
Cure	35
Attack	24
Excite	24

Emotive language by researchers

A high percentage of stories (41%) of stories contained overtly emotive language in a direct quote from a source. The majority of these (54%) were directly attributed to researchers. Analogies were commonly used by researchers, particularly when describing therapies. These were rather naive concepts, such as comparing cancer to 'common weeds' which needed to be destroyed, or personifying cancer as a 'stalker' or 'killer'. The use of the adjective 'exciting' was relatively frequent (appearing 24 times) and the source was usually researchers were describing their research, or external bodies commenting on findings (see Text Box 6.1).

Text Box 6.1: Expressions used to describe cancer research results

> *"It's very exciting..."*
> *"...really exciting results..."*
> *"These results are very exciting..."*
> *"...it's enormously exciting."*
> *"We are very excited..."*
> *"...something to get excited about."*
> *"The excitement is..."*
> *"This is real, this is significant, this is new and it is exciting."*

DISCUSSION

The reporting of cancer in the mainstream media was found to be of poor quality, particularly for stories carried by television and tabloid newspapers. Broadsheet newspapers performed marginally better than other types of outlets but the differences were small. The rating items that performed the worst included cost, harms, benefits and associated evidence i.e. those of the highest health literacy importance.

A high frequency of use of emotive words and metaphor was noted and while this has been demonstrated in previous content analysis, this research showed that the majority of these occurrences were directly attributable to the researchers themselves. There is no obvious benefit for a journalist producing a health story about cancer apart from informing the public on the latest health news. This stands in contrast to the potential impact of news articles on researchers and health industry. By raising awareness and profiles, researchers and industry alike stand to benefit (Mackenzie, Chapman et al.

2008).   In their research on cancer stories on the BBC, Lewiston et al also suggested a possible positive impact for researchers who had their work reported in the media (Lewison, Tootell et al. 2008).

The extent to which the word 'exciting' and its variations were used by researchers could simply be a result of habit and laziness. It falls into the category of 'weasel words' where the speaker appears to say something worthwhile but does not actually commit to a concrete concept (Watson 2004). It would be good practise for journalists to question researchers who use this expression to clarify 'exciting': exciting for whom and why? An alternative explanation is that in a competitive funding arena, researchers feel the need to promote their research as enthusiastically as possible and this is their word of choice.

The data showed many media stories are sourced from studies published in leading journals. These journals appear to have a varied approach to media engagement. While the Lancet distributes media releases widely, the New England Journal of Medicine distributes none (it provides media access to articles embargoed until date of publication). There have been repeated calls for leading journals to develop a common policy on media engagement with guidelines on preparation of media releases to correct frequently seen deficiencies (Woloshin and Schwartz 2002; Woloshin, Schwartz et al. 2009). This study concluded that researchers and journalists should re-examine the way they present their findings to the media.

Paper 5 (Wilson A, Bonevski B et al 2010) "Deconstructing Cancer: What makes a good quality news story?" is at the time of printing, in press with the Medical Journal of Australia to be published in December 2010. It provides detail on the methodology of analyses and discusses the finding of this study. A PDF version is not currently available however a statement of contribution signed by all co-authors is included in Appendix 1.4).

PAPER 4

An Analysis of News Media Coverage of Complementary and Alternative Medicine

(Bonevski, Wilson et al. 2008)

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Abstract

Background To examine the accuracy and adequacy of lay media news stories about complementary and alternative medicines and therapies.

Methodology/Principal Findings A descriptive analysis of news stories about complementary and alternative medicine (CAM) in the Australian media using a national medical news monitoring website, mediadoctor.org.au. Each story was rated against 10 criteria by two individuals. Consensus scores of 222 news articles reporting therapeutic claims about complementary medicines posted on mediadoctor.org.au between 1 January 2004 and 1 September 2007 were calculated. The overall rating score for 222 CAM articles was 50% (95% CI 47% to 53%). There was a statistically significant ($F= 3.68$, $p= 0.006$) difference in cumulative mean scores according to type of therapy: biologically based practices (54%, 95% CI 50% to 58%); manipulative body based practices (46%, 95% CI 39% to 54%), whole medical systems (45%, 95% CI 32% to 58%), mind body medicine (41%, 95% CI 31% to 50%) and energy medicine (33%, 95% CI 11% to 55%). There was a statistically significant difference in cumulative mean scores ($F = 3.72$, $p=0.0001$) according to the clinical outcome of interest with stories about cancer treatments (62%, 95% CI 54% to 70%) scoring highest and stories about treatments for children's behavioural and mental health concerns scoring lowest (31%, 95% CI 19% to 43%). Significant differences were also found in scores between media outlets.

Conclusions/Significance There is substantial variability in news reporting practices about CAM. Overall, although they may be improving, the scores remain generally low. It appears that much of the information the public receives about CAM is inaccurate or incomplete.

Introduction

News media coverage of health issues has increased dramatically in recent years.(Lupton 1995) In the United States, the New York Times increased its medical articles contents by 425% between 1969 and 1988.(Wilkes 1997) Chapman reported that in Australia too, the appetite for health news and health related television has increased.(Chapman and Dominello 2001) Newspapers, magazines, and journal articles are often cited by the public as common sources of health information.(The National Health Council Report 1997; Dolan, Iredale et al. 2004; Hann, Baker et al. 2005; Rutten, Arora et al. 2005) In a National Health Council Survey in 1997, 75% of Americans reported they paid a moderate amount or a great deal of attention to medical and health news.(The National Health Council Report 1997) Only 5% claimed they paid no attention. It is important that news coverage of health issues is of high quality as there is substantial evidence of a link between health news reports and health behaviour.(Haas, Kaplan et al. 2004; Chapman, McLeod et al. 2005) For example, news of Kylie Minogue's breast cancer generated a sustained 101% increase in never-screened women booking for mammograms.(Chapman, McLeod et al. 2005)   Despite its potential to inform and educate the public about health issues and influence health behaviour, studies have found varying degrees of inaccuracies and omissions in health news stories.(Chapman and Lupton 1994; Shuchman and Wilkes 1997; Moynihan, Bero et al. 2000; Cassels, Hughes et al. 2003; Schwartz and Woloshin 2004; Woloshin and Schwartz 2006) Common concerns about reporting include: unnecessary sensationalism, inadequate follow-through, failure to consider the quality of evidence, inaccurate portrayal of benefits, lack of consideration of adverse effects and costs, and

the failure to obtain comments from independent informants.(Chapman and Lupton 1994; Shuchman and Wilkes 1997; Moynihan, Bero et al. 2000; Cassels, Hughes et al. 2003; Schwartz and Woloshin 2004; Woloshin and Schwartz 2006)

Despite substantial growth in the use of complementary and alternative medicine (CAM) (Eisenberg, Davis et al. 1998; Thomas, Nicholl et al. 2001; Australian Medical Association 2002; MacLennan, Wilson et al. 2002; Cohen, Penman et al. 2005) very little is known about how the media reports on it. One small study, which examined the type and tone of media reporting about CAM in the UK and Germany suggested some variability in the reporting of CAM.(Ernst and Weihmayr 2000) As attempts continue to generate knowledge on the efficacy and safety of CAM the media has a crucial role in communicating that information to the public.(Vickers 2000)

Media Doctor (www.mediadoctor.org.au) is a web-based program that monitors, rates and critiques the accuracy and completeness of health news stories in Australia. It publishes quality assessments and critiques of news articles about medical treatments. This paper aims to examine the type and quality of health news reports about CAM in the Australian media.

Methods

A descriptive study was used to determine whether the type of variability evident in previous examinations of the quality of health news reporting exists within the field of

CAM news. More specifically, we examined whether differences exist in the quality of reporting according to the type of CAM practices reported on, the clinical condition of interest and the media source reporting the CAM news. As popular awareness and use of CAM increased during the study period, we examined whether there were any improvements in news reporting about CAM over time. As our rating instrument assesses several domains we examined whether there were particular areas of strengths and weakness in reporting CAM news, according to our ten rating criteria.

Defining CAM

Several definitions of CAM exist.(Berman 1997; Eisenberg, Davis et al. 1998; House of Lords Select Committee on Science and Technology 2000; National Centre for Complementary and Alternative Medicine 2002; Caspi, Sechrest et al. 2003; Commonwealth of Australia 2003) In order to be comparable and inclusive, this paper uses the definition from the Cochrane Collaboration that CAM "includes all such practices and ideas which are outside the domain of conventional medicine in several countries and defined by its users as preventing or treating illness, or promoting health and well-being."(Berman 1997)

To categorise the different forms of CAM falling under this definition, we adopted a US-based system (National Centre for Complementary and Alternative Medicine 2002) currently used by the Australian medicines regulator the Therapeutic Goods Administration. (Commonwealth of Australia 2003) It provides the following categories:

1. <u>Biologically-based practices</u> (including dietary supplements, botanicals, animal-derived extracts, vitamins, minerals, fatty acids, amino acids, proteins, probiotics, whole diets and functional foods).

2. <u>Energy medicine</u> (including visible light, magnetism, laser beams, other electromagnetic forces, and biofields such as ki, doshas, prana, atheric energy, and mana).

3. <u>Manipulative and body-based practices</u> (including chiropractic manipulation, osteopathic manipulation, massage therapy, reflexology, Bowen technique, Alexander technique).

4. <u>Mind-body medicine</u> (relaxation, hypnosis, visual imagery, meditation, yoga, biofeedback, qi gong, cognitive behavioural therapies and spirituality)

5. <u>Whole medical systems</u> (including traditional Chinese medicine, ayurvedic medicine, naturopathy, homeopathy, and acupuncture).

Selection of articles

Media Doctor collects health related articles from the major Australian news outlets (see Table 1). These media sources were chosen because they were national or state-wide in distribution, had a large circulation or audience base and represented the main forms of mainstream media in Australia; print, online and television. Articles identified through these sources are eligible for inclusion if they made therapeutic claims about new treatments, procedures and diagnostic tests. Generally, these claims were said to be based on clinical research findings.

Table 1: Summary of media outlets included in the current study.

Type	Media outlet
Broadsheet Newspapers	Sydney Morning Herald The Australian The Age
Tabloid Newspapers	The Daily Telegraph The Courier Mail Sunday Telegraph The Sun Herald Herald Sun
Internet News	ABC online ninemsn
Current Affairs Television Programs	Nine's 'A Current Affair' Seven's 'Today Tonight'

Main outcome measure

The Media Doctor rating instrument was adapted from one previously used to assess the quality of medical news reporting in the USA (Moynihan, Bero et al. 2000) and is consistent with Australian Press Council recommendations.(Australian Press Council 2001) It consists of ten criteria and simple dichotomous (satisfactory or not satisfactory) items. The criteria are; was the novelty of the treatment reported?, was the availability of the treatment reported?, were treatment options described?, did the story contain elements of disease mongering?, was the reporting of evidence (study methodology) included?, were benefits framed in both relative and absolute terms?, was there mention of potential harms?, was there mention of costs?, was an independent comment included?, was the story sufficiently different from the press release (where this was available)? To score as satisfactory, specified criteria had to be met. Raters were provided with detailed descriptions of how each criterion should be rated.

Data collection

Current news articles about medical treatments including surgical, pharmaceutical, and 'other' treatments and diagnostic tests were identified by daily web site searches by a research assistant. Eligible articles were sent to reviewers matching article content with reviewer expertise. Two trained reviewers assessed each article. All reviewers and their credentials are listed on the website (www.mediadoctor.org.au). Generally each article was reviewed by one non-physician, health-based academic and one medical practitioner. The results of inter-reviewer agreement scores are reported elsewhere (Smith, Wilson et al. 2005) and were moderate to substantial (McGinn, Wyer et al. 2004) (kappa scores between 0.49 and 0.74). We did not separately measure the levels of inter-rater agreement as the stories conformed to the structure of those covering non-CAM therapies and we were able to apply our rating form without modification.

Consensus scores were agreed on by the two reviewers with disagreements resolved by a third party. Raters wrote short commentaries based on the criteria listed in the rating instrument. All reviews are checked by an administrator before being posted on the website. Attempts were made to locate any relevant media releases, journal articles or other supporting literature that may assist reviewers.

Total scores were posted for articles that had at least seven criterion ratings and were expressed as percentages of the theoretical maximum score. For example, if all ten criteria are scored satisfactory, the article would receive a total score of 100%. If six out

of eight rated criteria were scored satisfactory and two unsatisfactory, the article would

receive a total score of 75%, and so on. On the website, the total scores are translated

into a star rating for general public ease of use (0 = no star, 1-20% = 1 star; 21%-40% =

2 stars; 41%-60% = 3 stars; 61-80% = 4 stars, 81-100% = 5 stars). Cumulative scores

for each media outlet were posted on the website, providing ongoing feedback on their

performance.

Statistical analyses

Mean proportions and their 95% confidence intervals were calculated for each outcome

of interest. The data were plotted and found to be normally distributed. Comparisons

using unweighted cumulative total scores for each group were performed. Where a

comparison involved more than two groups (as in the case of comparing CAM category

scores, scores across media outlets, scores during the first and second time period, and

clinical outcome category scores) one-way analysis of variance was used. To further

examine the trend in scores over time we performed simple linear unweighted

regression analysis with time to publication (in days since 31st May 2004) on the

horizontal axis and percentage scores for each article on the vertical axis. All statistical

calculations were made using StatsDirect (version 2.3.6, Stats Direct Ltd, Sale,

Cheshire, UK).

Results

Between 1 January 2004 and 1 September 2007, 1087 articles were reviewed by Media

Doctor. Of these, 557 reported 'pharmaceutical' treatments, 92 reported new 'surgical'

treatments, 108 reported 'diagnostic' developments and 330 were classified in the 'other' category. Articles in the latter group were individually reviewed to determine whether they were CAM (according to the definition and categorisation described above). One hundred and six (106) of these articles were ineligible for further inclusion since they included non-CAM developments (such as dental treatments, optical treatments, preventative screening methods). Two articles were excluded because they were double entries. As a result, 222 articles (20% of the total) classified as CAM were included in the study.

Comparison of the cumulative total mean scores for the four types of articles showed that although CAM articles scored lower than other types of stories (mean total score 50%, 95% CI 47% to 53%), they were not statistically different from stories about new medicines, (53%, 95% CI 51% to 54%), surgery, (52%, 95% CI 47% to 56%); and diagnostic interventions (51%, 95% CI 47% to 55%), ($F = 0.927$, $df = 3$, $p = 0.4271$).

Types of CAM treatments

The 222 articles were individually reviewed to determine their CAM category. One hundred and forty two articles (64%) reported biologically-based practices. The majority of these (101 articles) reported nutritional benefits to health (see Table 2 for examples of story headlines for each category). Eight articles (3%) reported developments in 'energy medicine', 28 (13%) reported news about 'manipulative and body based practises', 26 (12%) articles were about 'mind-body medicine' and 18 (8%) articles were about 'whole medical systems'. The total rating scores were compared

between groups. The highest scoring category was the 'biologically based practises' (55%, 95% CI 50% to 58%) and the lowest scoring category was 'energy medicine' (33%, 95% CI 11% to 55%). The differences between categories were found to be statistically significant (F = 3.676, df = 4, p = 0.0064).

Types of clinical outcomes

Articles were re-classified into pragmatic groupings according to the clinical outcome that the CAM treatment was claiming to modify (see Table 3). The following 11 categories were revealed: 30 articles (13%) reported the effects of CAM on cancer; 30 (13%) articles reported the effects of the CAM on cardiovascular disease and the risk factors of blood pressure and cholesterol; 27 (12%) articles reported claims about CAM improving health, general well being, prolonging life and preventing ageing; 25 (11%) articles reported about the effects of CAM on pain management, including headaches and pre-menstrual symptoms; 22 (10%) articles reported about mental health issues including Alzheimer's, dementia and depression; 15 (7%) articles reported about CAM treatments for healthy bones and joints; 13 (6%) articles were about CAM weight loss treatments; 11 (5%) articles were about CAM treatments for paediatric behavioural or mental health concerns, predominantly autism and attention deficit hyperactivity disorder (ADHD); 10 (5%) articles were about CAM for respiratory disorders, such as asthma and 'colds'; eight articles were about diabetes treatments; and 31 (14%) articles were classified as 'other' which included singular stories about a wide range of conditions including acne, 'cellulite', blindness, insomnia, post-surgical recovery, and multiple sclerosis.

2: Examples of news story headlines and cumulative rating score by CAM category for articles posted on Media Doctor Australia, January 2004 to September 2007.

CAM Category	N (%) articles	Five Typical Headlines for Each Category	Rating score (95% confidence intervals)
Biological	142 (64%)	"Trial looks at mushroom's effect on blood pressure" "Tomato and broccoli recipe to fight cancer" "The good oil on Alzheimer's" "Eating fish can help make brighter babies" "Herbal remedy eases SARS: study"	54% (50% to 58%)
Manipulative body-based	26 (12%)	"Pumping iron halts diabetes" "Osteopathy may reduce tension headaches" "A new way to treat arthritis" "Stress training can help lower blood pressure" "Good news for bad backs"	46% (39% to 54%)
Whole medical systems	18 (8%)	"Acupuncture linked to IVF success" "Chinese herbs provide period pain relief" "Acupuncture effective post-surgery medicine" "Acupuncture reduces knee pain" "Homeopathy ineffective, study finds"	45% (32% to 58%)
Mind body medicine	24 (11%)	"Yoga eases period stress" "Meditation sharpens brain: scientists" "Brain workout slows ageing" "Psychotherapy aids teen diabetics: study" "Space technology could provide ADHD cure"	41% (31% to 50%)
Energy medicine	8 (4%)	"New autism treatment: cruel or effective?" "Microwave your flab goodbye" "Magnet therapy" "The doctor many believe can cure cancer" "Shock wave useful for stress fractures"	33% (11% to 55%).

Table 3 shows the quality rating scores for each clinical outcome category. The highest rating category was cancer (62%, 95% CI 54% to 70%) and the lowest performing category was paediatric behavioural/mental health concerns (31%, 95% CI 19% to 43%). The differences between categories were found to be statistically significant (F = 3.72, df = 10, p = 0.0001).

Table 3: Cumulative rating scores by clinical outcomes of interest in CAM articles posted on Media Doctor Australia, January 2004 to September 2007.

Clinical Outcome Category	N (%) articles	Rating score (95% confidence interval)
Cancer	30 (14%)	62% (54% to 70%)
Cardiovascular disease (and risk factors blood pressure and cholesterol)	30 (14%)	59% (51% to 66%)
Bones and joints	15 (7%)	54% (43% to 65%)
Weight loss	13 (6%)	53% (37% to 70%)
Respiratory	10 (4%)	53% (39% to 68%)
General well-being/ improved health	27 (12%)	51% (40% to 61%)
Mental health	22 (10%)	49% (39% to 60%)
Diabetes	8 (3%)	48% (35% to 61%)
Pain	25 (11%)	44% (35% to 53%)
Other	31 (14%)	36% (29% to 44%)
Paediatric behavioural/mental	11 (5%)	31% (19% to 43%)

Differences across media sources

Differences in rating scores were compared across the four types of media outlets; broadsheet newspapers, tabloid newspapers, online news, television current affairs shows. The highest rating media source was the broadsheet newspapers (57%, 95% CI 53% to 61%), followed by online news (49%, 95% CI 43% to 54%), tabloid newspapers

(45%, 95% CI 34% to 56%) and the lowest rating media source was television current affairs programs (29%, 95% CI 22% to 36%). The differences between media sources were found to be statistically significant (F = 13.657, df = 3, p = 0.0001).

Change over time

To examine whether any change in rating scores has occurred over time we compared the scores for articles published before the study midpoint (13 January 2006) with those published later. There was an average improvement of 5.4% (95%CI - 0.72, 11.6; P=0.083), which was not statistically significant. Percentage scores were plotted over time but the slope from the regression analysis was not significantly higher than zero (Figure 1).

Individual criterion scores

Individual criterion scores were examined to explore the areas where CAM articles performed well or poorly. The proportion of CAM articles rated 'satisfactory' for each criterion is presented in Table 4. The highest scoring criterion was absence of features of 'disease mongering', which was rated satisfactory in 85% of CAM articles and the lowest scoring criterion was 'costs of therapy', which rated satisfactory in only 15% of CAM articles.

Figure 1: Scatterplot of change of percentage scores over time
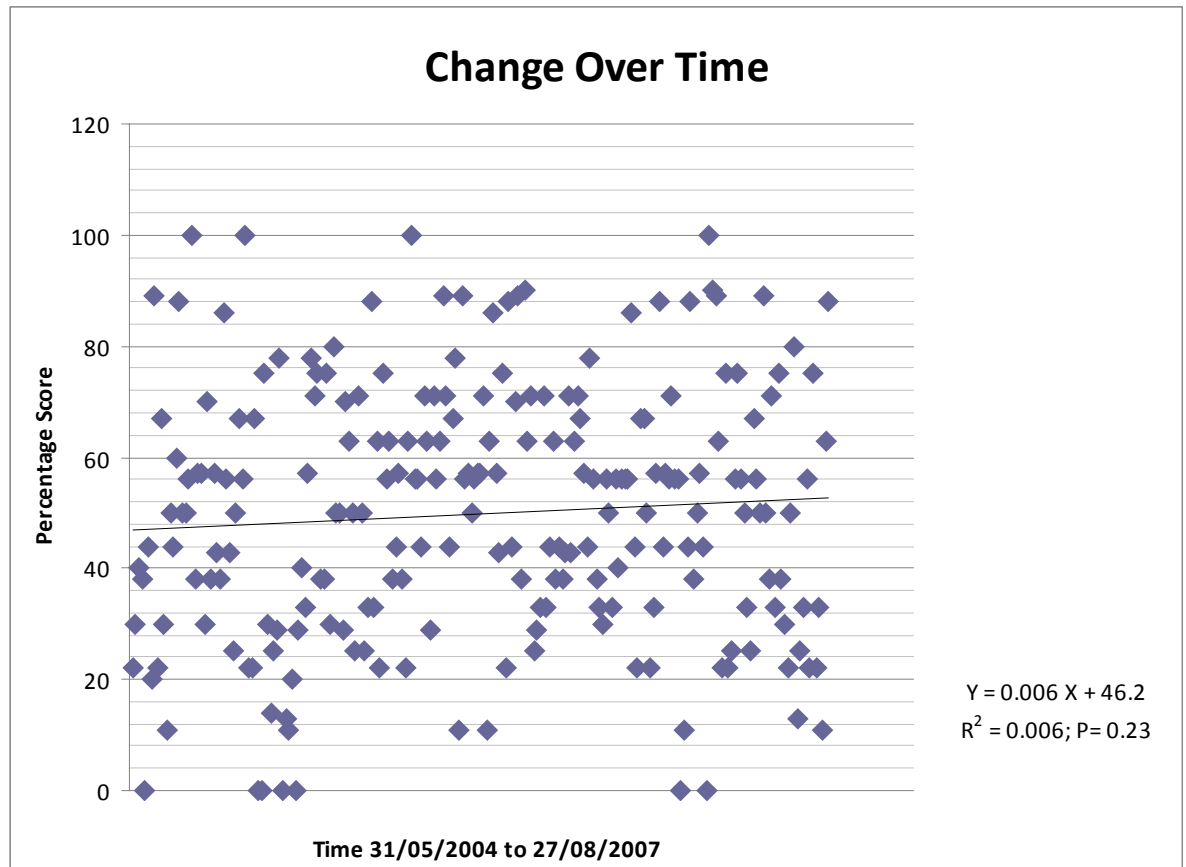
Figure 1. Scatterplot of change of percentage scores over time (31/05/2004 to 27/08/2007). There was an average improvement of 5.4% (95%CI - 0.72, 11.6; P=0.083), which was not statistically significant. Percentage scores were plotted over time but the slope from the regression analysis was not significantly higher than zero

Table 4: Percentage rated satisfactory for each of ten rating criteria for CAM articles posted on Media Doctor Australia, January 2004 to September 2007.

Criterion	% (and n)[*] rated satisfactory
Is there is evidence of 'disease mongering'?	85% (222)
Is the treatment genuinely new?	82% (220)
Does the article rely heavily on a media release for content?	79% (57)
Does the article report the availability of the treatment in Australia?	68% (188)
Doe the article report the type of evidence supporting the treatment?	42% (222)
Are alternative treatment options mentioned?	42% (187)
How are the benefits of the treatment framed (in relative and absolute terms)?	39% (222)
Is an independent source of information or comment included?	33% (222)
Are harms of the treatment mentioned?	29% (200)
Are costs of the treatment mentioned?	15% (148)

[*] The denominators vary as it was not always possible to rate each criterion with the information provided in an article (receiving a not applicable score). Denominators are given in parenthesis.

Discussion

The results show that when news stories about CAM are rated according to the extent

that they meet ten widely accepted criteria, scores are variable and generally low.

Scores varied according to the type of CAM therapy reported on, the clinical outcome

of interest and the media source reporting the story. When reporting about CAM, it appears the media are particularly inconsistent at reporting about the costs and potential harms and benefits. The highest ratings were seen for stories about biologically based CAM treatments and treatments for cancer. The lowest ratings were associated with stories about treatments for behavioural disorders in children. The results showed that there was a small increase in ratings between 2004 and 2007, but this change of around 5% did not reach statistical significance. Overall, the data show that the public are being poorly served by some media outlets, particularly current affairs television programs.

It is important to highlight that this study is not providing any comment on the efficacy or safety of CAM or on the quality of CAM research, but rather on the media portrayal of CAM. The aim of this study was to examine the quality, accuracy and comprehensiveness of media reporting of CAM. In that regard the study provides a number of potentially important conclusions.

How well is CAM news being reported?

The results show that the biological group of CAM therapies appear to be viewed by the media in a similar way to conventional medical treatments and reporting scores were similar (54% and 52% respectively). Other forms of CAM, particularly the energy medicine and mind body medicine forms were poorly reported. This may be due to a lack of evidence or an uncritical view on the part of the media. The latter groups contained stories about CAM therapies such as meditation, magnet therapy, yoga,

electric shocks, shock waves and visualisation. It may be difficult for journalists to access adequate and accurate information about these therapies.

The largest number of CAM stories covered treatments for cancer and heart disease. These stories were better reported than others. It is disconcerting that stories about CAM therapies for mental health, diabetes, pain, and children's behavioural and mental health concerns scored well below average. To help illustrate these differences, Box S1 shows an example of a high scoring article, and a low scoring example. It is difficult to understand why there would be differences in reporting standards for different health concerns. The evidence here suggests that claims of the success of CAM in treating some conditions are being inadequately scrutinised. There appears to be the need for universal standards which should apply to all health news reporting regardless of what they are reporting about and where it is published.

Examination of individual criterion scores showed that six of the ten criteria scored less than 50% satisfactory (see Table 4). Similar observations have been made in overseas studies of health news reporting about new drugs (Moynihan, Bero et al. 2000; Cassels, Hughes et al. 2003) and mammography screening.(Wells, Marshall et al. 2001) Most stories failed to mention the costs and potential harms of the CAM treatment. These results are concerning, given the limited amount of information about the safety of many CAMs, (Ernst 2002) and the potential for some to interact with conventional medicines.(Woodward 2005) Almost two thirds of stories failed to gain a comment from an independent source or expert. Information from independent sources has the

potential to offer balance in a story. Most articles that quantified the benefits of CAM framed them in relative terms which can give an overly optimistic impression of efficacy. Decisions about medical treatments are often made by balancing harms and benefits. Research has shown that most people, including clinicians, choose interventions whose benefits are framed in relative rather than absolute terms.(Bucher, Weinbacher et al. 1994; Hux and Naylor 1995)

The variation in scores across media outlets is consistent with previous results about health news reporting in general.(Bubela and Caulfield 2004) In 2005, Media Doctor reported the results of the analysis of its first 104 health news articles.(Smith, Wilson et al. 2005) In that study, the print media significantly outperformed online news services (overall mean scores of 56.1% and 40.1%, respectively). The earlier study was limited by the inclusion of only five media outlets (three national newspapers and two online news services). The current study has a number of advantages including larger sample size, greater specificity (examining CAM stories only), and coverage of a wider media base.

Box S1: Examples of high and low scoring articles in the fields of cancer treatments and child health treatments

"Study links red meat to breast cancer
A Harvard Medical School study has discovered a link between red meat consumption and breast cancer.”
Total score 88
Novelty of Treatment Satisfactory
Availability of Treatment Satisfactory
Treatment Options Not Applicable
Disease Mongering Satisfactory
Evidence Satisfactory
Quantification of Benefits of Treatment Not Satisfactory
Harms of Treatment Satisfactory
Costs of Treatment Not Applicable
Sources of Information Satisfactory
Relies on Press Release Satisfactory

Reviewers comments:
This story contains a lot more independent comment than that from AAP/ Reuters, which appeared in a number of media outlets. As a result it is a better story. The main problem is that the informants are trying to provide practical advice (some of it possibly conflicted by commercial interests) when the research itself only shows an association, not causation. In our view more time should have been spent commenting on the limitations of the study design and the need for replication of the results.

"New autism treatment: cruel or effective?
It may seem like cruel and unusual punishment, but intense electric shocks can help parents control children made violent and aggressive by autism, says one expert.”

Total score: 11

Novelty of Treatment Not Satisfactory
Availability of Treatment Not Satisfactory
Treatment Options Not Satisfactory
Disease Mongering Satisfactory
Evidence Not Satisfactory
Quantification of Benefits of Treatment Not Satisfactory
Harms of Treatment Not Satisfactory
Costs of Treatment Not Satisfactory
Sources of Information Not Satisfactory
Relies on Press Release Not Applicable

Reviewers comments:
This is a concerning piece of health reporting. There is no evidence that this treatment, consisting of electric shocks to children, is effective at treating autism. There is a good amount of evidence showing that it is painful. I am not sure how this treatment is allowed to be used since if a parent chose to do this to their child, child welfare agencies would probably rightly step in and stop it. There's no description of autism and what treatments are available. We only have the treatment creator's word for it when he says there are no side effects. I would like to see some more independent research on the psychological and physical effects of electric shocks on children who probably don't understand what is happening to them. Arguing that electric shocks are better than banging heads on walls is insufficient; I would like to see evidence guaranteeing that the treatment works AND has no side effects before inflicting on children.

Overall, we found that broadsheet newspapers scored higher than current affairs programs. These results mirror previous research which found that "hard" news reports are generally more accurate than feature stories (Henderson and Kitzinger 1999) and that print media are more accurate than television.(Condit, Ofulue et al. 1998) Regardless of the type of media, each of these outlets is responsible for the mass communication of health information and it would seem the challenge is to develop ways to lower the variability with which health news is reported.

Can health news reporting about CAM improve?

Media doctor provides a minimal, passive form of feedback to interested journalists via the provision of broad media outlet scoring trends over time on the website. We found no convincing evidence of improvement in the reporting of CAM during the study period, but a controlled parallel intervention, or formal time series analysis of a more active feedback program would be needed in order to draw any confident conclusions about the potential for improvement. However there is indirect evidence that the situation could be improved. Large differences in scores between media outlets indicate that some journalists are capable of writing excellent stories about CAM. Of the 222 articles analysed in this study, four achieved scores of 100%, suggesting that it is possible to meet all the criteria. These articles included discussions about the novelty and availability of the new treatment, its costs and potential harms, evidence about its effectiveness and the appropriate framing of data on benefits. They included comments from individuals with no conflict of interest, avoided disease mongering and did not rely heavily on the press release for the content of the story. A further 19 articles

achieved scores between 80-99% suggesting that it is possible to meet most of the criteria.

Some of the barriers often cited for the shortcomings in reporting include editorial pressures to produce short stories quickly (Schwartz and Woloshin 2004), lack of health news specific training (Voss 2002), inadequate press releases from the scientific community (Woloshin and Schwartz 2002), a focus on the controversial and exciting story (Johnson 1998), and a lack of high level evidence for CAM in general.(Fontanarosa and Lundberg 1998) Feedback and education for the health media may address some of the reported barriers to optimal health reporting. There is a need to change the methods of promoting research findings within the scientific community, and a need to improve training for health journalists.(Ransohoff and Ransohoff 2001) It is clear that feedback interventions need to be more active, tailored, intensive forms of feedback and education to produce more pronounced changes.

Limitations of the study

There are a number of limitations to the generalisability of our findings. Firstly, as a result of categorising the data, some comparison groups involved low numbers of news articles. It should be noted that this study is the largest of its type. Secondly, although attempts were made during the study period to collect all eligible news stories, some may have eluded capture due to resource limitations. However, the effects of incomplete sampling were random and we are confident that the study provides a broad and representative sample of CAM stories in the Australian media.

General reporting standards generally appear to be similar in other countries.(Moynihan, Bero et al. 2000; Cassels, Hughes et al. 2003) Thirdly, the rating instrument used for CAM was one developed for use with stories about more conventional medical interventions. Although evaluated, it is possible the rating instrument may have missed some important CAM-specific concerns or questions.

Conclusions

This study shows that there is substantial variability in the news reporting about complementary and alternative medicines and therapies. Overall, scores were generally low and the small improvement noted during the study period was not statistically significant. Currently, it appears that much of the information the public receives about CAM is inaccurate or incomplete. The development of strategies aimed at improving health news reporting deserves more focused attention from both the media and researchers.

PAPER 5

Deconstructing Cancer: What makes a good quality news story?

(Wilson, Bonevski et al. 2010)

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ABSTRACT

Objective: This paper describes an in-depth analysis of the content and quality of cancer reporting in Australian media over a five year period using data collected by the media monitoring website Media Doctor Australia (www.mediadoctor.org.au).

Design and Setting: A critical review was conducted of 272 cancer news stories reviewed by Media Doctor Australia between 2004 and 2009. Stories about newly reported cancer interventions including drugs, diagnostic tests, surgery and complementary therapies were included. A mixed methods approach was used to analyse data and story content. Other story types served as a comparison group.

Main Outcome Measures: Differences in quality scores using a validated rating instrument between cancer and non-cancer stories and media outlets; how cancer was reported in terms of cancer types, morbidity, mortality and the use of hyperbole and emotive language.

Results: Cancer stories had higher quality scores than non-cancer stories and this difference was statistically significant ($F=7.1$, $df=1$, $p=0.008$). Most cancer stories concerned disease affecting the breast and prostate with breast cancer appearing over-represented as a topic. Pair-wise comparisons showed statistically significant superiority for broadsheet over online stories ($F=12.7$, $df=1$, $p=0.0004$) and television stories ($F=10.7$, $df=1$, $p=0.0013$). Descriptions of morbidity and mortality were variable and often confusing in terms of numbers, time periods and locations. There was extensive use of literary devices including hyperbole and emotive language, the majority of which came from the researchers themselves.

Conclusions: While reporting of cancer in the general media continues to be of low quality, many of the poorer aspects of content are directly attributable to the researchers. Researchers and journals need to do more to ensure a higher standard of information on cancer is presented to the media.

INTRODUCTION

Cancer is a major cause of death and disability and as such attracts strong media attention[1,2]. The implication is clear: everyone is at risk of cancer[3]. Therefore, everyone has a vested interest in finding out about the latest treatments, diagnostic tests, and preventative measures against cancer. This is especially true for those directly affected by the disease actively seeking new information in the hope of improving their prognoses[4].

There has been extensive study of how cancer is portrayed in the media. However, studies have tended to focus on one or two types of cancer such as breast or skin, one source of news, such as online, or one type of therapy such as medication[5]. Analyses have also been qualitative in nature examining the content of the reports for tone or themes[6]. To our knowledge, there are no previous analyses using quantitative assessments of the quality of information contained in news reports about cancer.

This paper describes an in-depth analysis of the content, context and quality of cancer reporting in Australian media over a five year period (2004-2009) using data collected by the media monitoring website Media Doctor Australia (www.mediadoctor.org.au).

METHODS

Media Doctor Australia posts reviews of health news stories published in the Australian media, including newspapers, online news and television and radio broadcast transcripts. The aim is to provide an objective analysis of the strengths and weaknesses

of health news stories. The methods used for data collection and analysis has been described previously [7-10]. Similar web sites have been launched in Canada, the USA and Hong Kong using identical methods for appraising health news stories [11,12].

News stories about new treatments and procedures intended for human use are collected from individual media outlet websites by a trained researcher. Each story, along with any relevant material such as media releases and journal articles, is sent to two of 15 reviewers, comprising clinicians, medical writers, journalists, and public health specialists, who perform the evaluations in a voluntary capacity.

Reviewers rate stories independently using validated rating instruments [9]. The instruments contain 10 items (see Text Box 1); for each news story, the ten items are scored as 'satisfactory', 'not satisfactory' or 'not applicable'. A total score, which is the percentage of all completed items rated 'satisfactory', is posted for each story and given a visual depiction on the website as a 1 to 5 'star' rating. The more items rated satisfactory, the higher the score and corresponding star rating. A higher score represents a more informative and complete story according to our rating. The current average score for all health news articles on the Media Doctor website is 51%. .A short commentary from the reviewers is also posted. This is used to highlight strengths or weaknesses and areas not covered in the rating instrument, such as sensationalist language or inappropriate headlines. Any discrepancies in ratings are resolved by consensus, or if necessary, by using a third reviewer. All reviews are screened by a researcher who checks the scores and edits comments. The turnaround for reviews is up to two weeks.

Text Box 1: Items in the Media Doctor Rating Instrument

Rating Criteria: The extent to which the story:

1. Reported on the novelty of the intervention
2. Reported on the availability of the intervention
3. Described any treatment or diagnostic options available
4. Avoided elements of disease mongering
5. Reported on evidence supporting the intervention
6. Quantified the benefits of intervention
7. Described the harms of intervention
8. Reported on the costs of intervention
9. Consulted with independent expert sources
10. Did not rely heavily on a media release

This paper describes a critical review of 272 cancer-related stories reviewed by Media Doctor Australia between 2004 and 2009. Media Doctor does not routinely review multiple stories on the same subject on the website. In special circumstances, especially to show large differences in reporting, more than one story on the same subject may be reviewed, however for this analysis, no multiple stories were used. The analysis includes only stories about newly reported interventions under the four broad headings of: drugs, diagnostic tests, surgical interventions and 'others' (including complementary therapies, physiotherapy, and dietetic interventions). A mixed methods approach was used for analysis of data and story content.

For this analysis the Media Doctor database was searched to identify all news stories dealing with cancer. The search terms included: 'cancer', 'leukemia', 'melanoma' and 'tumour'. All other stories served as a comparison group.

Analysis

Cumulative total satisfactory scores for cancer and non-cancer stories were calculated by category and by types of media outlet. Inspection of the data showed that they were

normally distributed, and unweighted cumulative scores were compared between media outlets and story topics using analysis of variance (ANOVA). All statistical calculations were made using StatsDirect (version 2.3.6, Stats Direct Ltd, Sale, Cheshire, UK).

To analyse the content and tone of stories, text was entered into NVivo 8.0 (QSR NVivo version 8.0.148.0, QSR International Pty Ltd, Victoria, Australia). The qualitative analysis followed the 'grounded theory' method[14]. Coding was undertaken by text analysis and predetermined area of interest. The stories were coded for concepts, with coded segments then analysed and categorised thematically. Coded segments of text were compared for similarities and differences and then categorised. One third of the stories were coded by a single coder on two occasions to ensure consistency in coding. A further subset of 62 (23%) stories was re-coded by a second coder.

RESULTS

A search of the Media Doctor website identified a total of 1323 stories, of which 272 dealt with interventions for cancer. Of these, the text of four older stories could not be located and these were not included in the content analysis. However, their scores were included in the quantitative analysis.

Story topic and rating

The story categories are shown in Table 1. Overall, across three of the intervention categories (drugs, diagnostic tests and 'others'), cancer stories rated higher than non-cancer stories. Typically, the differences were 3 to 4 percentage points. The exception

was for stories about surgical procedures where cancer stories rated poorly, although the sample size was very small (n=9 for cancer stories). Overall, the difference between the four treatment modalities was statistically significant (F=7.1, df=1, p=0.008). However differences in pair-wise comparison of cancer and non-cancer stories for the individual treatment modalities were not statistically significant (data not shown). Many cancer stories described new medicines, and cancer was the primary focus of around 20% of all stories about new drugs. In contrast, 40% of all stories about diagnostic tests were concerned with cancer (Table 1).

Table 1: Summary of rating scores for cancer and non-cancer stories*

Story category	Surgical	Pharmaceutical interventions	Diagnostic Test	Other **
All stories (including cancer) = n	113	679	140	391
Cancer stories = n (%)	9 (7.9)	139 (20.3)	57 (40.0)	67 (17.1)
Average score for all non-cancer stories (95% CI)	52.6 (48.4-56.87)	52.0 (50.2-53.7)	47.5 (42.9-52.1)	50.2 (47.8-52.6)
Average score for cancer stories (95%CI)	37.3 (22.9-51.8)	55.7 (52.0-59.2)	53.6 (48.3-58.9)	54.4 (49.0-59.8)

*Difference between four story categories (F = 7.1, df = 1 p = 0.008)
**Other interventions include complementary therapies, physiotherapy, and dietetic

Most cancer stories concerned disease affecting the breast and prostate gland. Comparisons of the rates of different types of cancer in Australia and the proportion of stories covering these diseases demonstrated that breast cancer was over-represented as a topic (Table 2).

Table 2: Differences in the number of stories versus annual incidence of different cancers*

Type	Stories n (%)	Australian incidence per 100,000 (% of total cancers)	Australian mortality rate per 100,000 (% of total cancers)
Breast	85 (32)	58.5 (12.2)	11.9 (6.8)
Prostate	34 (13)	170.0 (29.5)	31 (13.0)
Melanoma	25 (9)	47.9 (9.9)	5.7 (3.2)
Bowel	23 (9)	62.2 (13.0)	17.8 (10.1)
Lung	22 (8)	43.8 (9.1)	34.0 (19.1)

* http://www.aihw.gov.au/cancer/data/acim_books/index.cfm

Outlet type and rating

Broadsheet newspapers scored higher than online news services or tabloid newspapers and the overall difference between these outlets was statistically significant (F=6.1, df=2, p=0.0026) (Table 3). Television had the lowest scores. Broadsheet newspapers scored between 6 and 21 percentage points higher than other outlets, and pair-wise comparisons were statistically significant for broadsheet versus online scores (F=12.7, df =1, p=0.0004) and versus television (F=10.7, df=1, p=0.0013).

Table 3

Outlet type	N	Average score of cancer stories (range)*
Broadsheet newspaper	136	59.2 (95%CI 55.9-62.5)
Tabloid newspaper	27	52.8 (95%CI 43.9-61.6)
Online	99	49.5 (95%CI 45.1-53.9)
Television	9	37.6 (95%CI 28.7-46.4)

*(F = 6.1, df = 2, p = 0.0026)

Sources of information cited in the news stories

Most cancer stories (83%) referred to their sources of information. The predominant source (72%) was the researcher or doctor testing or administering the intervention; the

next most common source (32%) was an independent expert (someone recognised as having specialised knowledge but not connected with the research or funding body). Industry sources comprised11% of sources. Of stories citing the researcher, (n=148), only four stories (3%) reported ties between the expert and a company. In each case the researcher was employed by or owned the company.

A comparatively high number of stories (44%) referred to a medical journal research paper as a source and 36 different journals were identified. The five most commonly mentioned journals comprised 57% of all journals cited and all had high impact factors.

Themes identified in the Qualitative analyses

Disease Burden

More than a third (39%) of the stories featured estimates of the disease burden of a particular type of cancer. Morbidity and mortality were variously expressed relative to other cancers, in whole numbers, in subgroups (eg age or sex) and in time periods (eg every day or annually). National and international figures were quoted, sometimes without making clear which was being used. The wide variety of population impact descriptions was confusing and sometimes meaningless (Text Box 2).

Text Box 2: Variation in descriptions of the disease burden attributable to prostate cancer

Morbidity
- Second most common cancer in Australian men
- Most common cancer in Australian men over 55
- More than 13,500 cases each year
- 30 men each day are diagnosed with it
- One in ten men develop this cancer in their lifetime

Mortality
- Second most common cause of cancer death in men after lung cancer
- 2,500 die from it each year

Emotive language and metaphor

There were numerous examples of highly emotive language, and use of adjectives and literary devices such as hyperbole, analogy and metaphor, as well as extensive use of personal narrative. The 'war' or 'military' metaphor' has been used for many decades to describe different disease, particularly cancer[15]. However, it was not commonly used in these stories with words such as 'strike', 'battle', 'weapon', 'victim', 'war' and 'desperate' occurring less than 10 times each.

Use of Patient Testimonials

Individual narrative or testimonial is a device widely used in the media, which is seen to add a human dimension of a story. However, it provides anecdotal information, which is the lowest form of evidence and this can be misleading if it is not balanced by the additional use of strong evidence. A relatively small number of stories (15%, n=37) used the narrative technique which usually took the form of a patient relating their experience of cancer. In 10 stories this technique comprised 20% or more (54% in one story) of the text. Approximately half (49%) of these narratives contained highly emotive language or related personal stories with moving or disturbing themes.

"(EJ) had a lot of living to do when she was told she had an aggressive form of bone cancer. At 18, doctors discovered she had a "galaxy of tumours". She lost her leg and underwent intensive chemo treatment to try and stop it spreading. Her cancer was so severe that she relapsed soon after."

At least five narratives were used as the primary source of information in the story. The majority were positive stories about cure or improved prognosis; however, none of these stories referred to any evidence beyond personal experience.

> *"'The PET scan was immediately conclusive so it was a tremendous relief ... I am just very fortunate that the machine is here and that I had access to it and I truly hope that it is more widely accessible to more women,' Ms (M) said."*

Only a few stories contained narratives that were negative and all were stories where a new intervention was being proposed for government funding, for example Herceptin:

> *"Herceptin is subsidised only for women with advanced breast cancer -- small comfort for (JG), who was diagnosed with HER2-positive breast cancer in March. (JG)'s doctor recommended she take Herceptin, but she cannot afford it."*

Most (61%) stories coded as containing narrative text contained emotive or hyperbolic language, compared with 41% of the stories coded as containing evidence-based information - results derived from high quality studies.

Emotive language by researchers

Text coded as 'emotive language' was linked to that coded under 'sources'. 'Sources' was divided into subcategories including government departments, support groups, researchers, independent sources , and patients. One hundred and eleven (111) stories

contained overtly emotive language in a direct quote from a source. The majority

(54%) were found to be directly attributed to researchers talking about their work:

> *"This is fantastically significant for the 2800 Australian men who die of the*
>
> *disease every year,"*
>
> *"I think it's going to wipe out a hell of a lot of these deaths."*

Some researchers took part in what appeared to be overt self-promotion:

> *"It shows our dedication to groundbreaking research,"*

Or, promotion of the intervention they had been studying:

> *"If I had a supply now, I'd be giving it out straight away."*

DISCUSSION

Reporting of cancer in the mainstream media continues to be of poor quality,

particularly stories carried by television and tabloid newspapers. This is troubling

considering the distress caused by cancer and its treatment. Although broadsheet

newspapers performed better than other types of outlets, the differences were small and

major weaknesses remained in the domains of cost of the intervention, potential harms

of treatment, the magnitude of treatment benefits and the quality of the clinical

evidence. Specialist health journalists produce high quality stories compared to other

authors and as most broadsheet newspapers employ these journalists, it may explain

their higher scores[10].

A key finding from our study was the frequency of use of emotive words and metaphor. Although the 'fight' or 'war' metaphor to describe diseases such as cancer and AIDS has been extensively described[14,15,16], we did not find substantial evidence of it. The term 'aggressive' was widely used and this may be because it has become an everyday part of the medical vernacular, eg 'aggressive therapy', 'aggressive cancer' and as such has lost its emotional impact to health professionals.

The medical literature often contends that the 'blame' for poor quality news coverage of cancer lies with the media[3,17]. However, we found   the majority of hyperbole and emotive statements were directly attributable to the researchers themselves. By raising awareness and profiles through media coverage, researchers, their institutions and industry alike stand to benefit in terms of grant funding and profits[18].

Likewise, public relations employees working for research institutions are compromised in their selection of research to promote. Their positions are based on achieving media coverage for their institutions. As such, they will choose stories they know will appeal to the general public[19]. Media officers write or edit research press releases, often supplying researcher quotes and patient narratives, which may be more sensational than the research warrants or the researchers would wish. In the interest of promoting good health literacy, researchers should ensure they have final say on what information is released; however, this does not always happen.

The findings of this research are limited in that we can only generalise the results to media reporting on new cancer therapies, not all types of cancer reporting. Also, as mentioned above, some comparison groups (eg surgery) involved low numbers of news stories. While a consistent and comprehensive strategy was used to collect all eligible stories over the past five years, it is probable that some stories were missed and these may have included stories on cancer. However, any incomplete sampling was random and the study provides a broad and representative sample of cancer stories in the Australian media.

This paper proposes that researchers have a responsibility to present their findings to the media in a manner that increases the probability of accurate reporting by the mainstream media. The host institutions, research institutes, universities and hospitals, share this responsibility, as do the journals. In this context we endorse previous calls for publishing journals to do more[20,21,22]. Journals take a great deal of interest in authors - the accuracy of their work, their academic freedom and their competing interests - to ensure that the information on new medical therapies is presented accurately to the public. In our view, the responsibilities of journals should extend to monitoring the quality of the post-publication coverage of the research, including the behaviour of the researchers.

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CHAPTER 7: CONCLUSION

INTRODUCTION

The 21st Century has not been called the "digital age" without good reason. The internet and its related technologies are influencing everyday life across the developed world. In the early days of the internet, available information was of doubtful quality and difficult to find. The advent of Google, however, changed all of that, and a plethora of online information centres sprang up to provide information – and quality information at that – on almost any subject. Importantly, almost all of this information is available free of charge and without obligation.

Not surprisingly, this has had profound implications for the old sources of information. The rise of evidence-based medicine and high-quality easily accessed information, such as the Cochrane Library, means health consumers can and should have a say in their treatment. The public has become, literally, empowered by the availability of online information to educate themselves about their medical conditions and state of health (Tian and Robinson 2008). In much the same way, the mainstream media has had to react to the internet with dramatic changes to the way they provide their information. This process of change continues and there are predictions that news media as it is known today might be all but gone within a decade, or certainly within a generation, if the internet boom continues at its present pace (Fitzgerald 2009).

As the internet changes the way people access news, traditional forms of the media are also changing. This thesis was set against a backdrop of change in the media as the concept of traditional media was being tested and threatened by the increasing power of the internet (Simmons 2009). Newspapers, radio and television news are losing audiences at a steady rate and the international trend has been for media outlets to reduce staff (Roy 2008). In August 2008, one of the most powerful media organizations in Australia, Fairfax Media Group, announced a reduction of 550 staff, and journalists responded with a three-day strike against what they perceived as an inevitable lowering of the standards of reporting (Roy 2008). This type of change results in increased pressure on both journalists and editors to produce stories quickly, a situation where quality can become easily compromised (Kovic, Lulic et al. 2008). The changing format of reporting, where stories are simultaneously used for traditional media as well as the internet, means journalists are called upon to comply with new timelines, as news websites are updated when news breaks, rather than the traditional evening broadcast or printing deadline.

The impacts of these changes on the health literacy of the community have not yet been comprehensively studied. One outcome has been the downsizing of newsrooms across the world and a trend to buy in pre-written stories via news organizations such as Reuters. Medical news is now covered by a wide range of media, including online magazines, online news services and many Blogs. But these, and even the more recent Web 2.0 activities (e.g. FaceBook and Twitter), rely to some extent on the quality of news coverage by the traditional media (Duncan 2009). Recent studies of the exchange

of information regarding H1N1 (Swine flu) infection have emphasised the importance of links to 'authoritative' sources such as Centre for Disease Control, the World Health Organisation and the mainstream media (Kovic, Lulic et al. 2008).

The media play a central role in the diffusion of information on health and medical issues. They are a primary source of information about health issues and medical developments (Chen and Siu 2001; Brodie, Hamel et al. 2003; Passalacqua, Caminiti et al. 2004). There is strong evidence that the news media informs and educates the public about health issues (Sudore, Landefeld et al. 2008) as well as influencing health behaviours (Chapman, McLeod et al. 2005). However, the quality of news media coverage of new health interventions remains generally poor (Wilson, Bonevski et al. 2009) therefore the public health impact of the media is potentially detrimental (Rabi, Lewin et al. 2009).

In this thesis, a systematic review of interventions to improve health news reporting found a small number of studies. The strongest of these used guidelines to influence and change the way suicide was reported in the media (Pirkis, Dare et al. 2009). Changes in reporting were assessed using a methodologically validated rating instrument (Pirkis, Francis et al. 2002). Use of guidelines as an intervention to improve the quality of reporting about suicide saw significant improvement over time (Pirkis, Dare et al. 2009). Using feedback as a behaviour change tool also has the benefit that it is efficient in terms of resources and funding (Hrisos, Eccles et al. 2008). This form of behavioural change was adapted as the basis for the Media Doctor intervention which would relay

feedback to journalists on individual stories as well as overall feedback to media outlets on the performance in reporting health news stories as compared to other news outlets (Smith, Wilson et al. 2005; Wilson, Bonevski et al. 2009).

Quality of Reporting

Quantitative research from Media Doctor Australia over five years, showed substantial variability in conveying important information on new medical treatments to the public and has highlighted a recurrent common factors contributing to poor quality reporting (Smith, Wilson et al. 2005; Bonevski, Wilson et al. 2008; Wilson, Bonevski et al. 2009) These included failure to include in the story adequate (or any) information regarding cost of the intervention, quantitative estimates of harms and benefits, the strength of evidence associated with the intervention and independent sources of information. These findings have been independently supported by findings from the Media Doctor sister sites of Media Doctor Canada and Health News Review in the USA (Cassels and Lexchin 2008; Schwitzer 2008).

Analysis of the first 100 Media Doctor reviews showed that the general standards of reporting of medical news in the general press in Australia were poor (Sturmberg and Pond 2009). Over 1000 articles later there were small signs of improvement, but the overall quality remained low (Wilson, Bonevski et al. 2009). Online news sources improved their coverage of health topics but the increased coverage provided by commercial current affairs programs was of extraordinarily poor quality. Subanalyses of specific areas of reporting including cancer and CAM stories also found poor quality,

particularly for stories carried by television and tabloid newspapers (Bonevski, Wilson et al. 2008; Wilson, Bonevski et al. 2010). Broadsheet newspapers performed better than other types of outlets but the differences were small.

Television

Television current-affairs programs scored poorly across all items over the entire study period (Wilson, Bonevski et al. 2009). Some of these stories were unashamedly commercial and little more than endorsement of a sponsor's product. A disproportionate amount of airtime was given to treatments that supposedly improved physical appearance; cellulite treatments, wrinkle removers, anti-ageing products, and other 'cosmeceuticals'. Many of these stories provided links to the manufacturers of the interventions. While this could arguably be seen as transparency of source, it is advertising and promotion in a way that bypasses the laws of advertising in Australia (Therapeutic Goods Administration 2005).

A story on cellulite treatment, for example, might do little harm beyond convincing audience members to part with money by buying the product, but programs like Today Tonight and A Current Affair regularly ran stories on untested or unproven treatments for more serious disorders. 'Miracle cancer cures' were a regular standby, as were stories aimed at children with learning or behavioural problems (Wilson, Bonevski et al. 2009). Treatments were described as 'groundbreaking' and 'staggering' when they are anything but. These programs attract very large audiences.

Benefits and Harms

The analyses presented in this thesis also showed that the media are capable of improvement. The online news outlets demonstrated an overall improvement of around 5% over the course of the study period and there were also improvements in the way availability of interventions in Australia, their novelty and cost were reported as well as better used of independent sources for comment (Wilson, Bonevski et al. 2009).

The areas of significant improvement included the accurate quantification of benefits of the interventions and the description of harms (Bonevski, Wilson et al. 2008; Wilson, Bonevski et al. 2009). There have been many calls from the research community for benefits or risks to be quantified in absolute terms both by medical journals and in the general media (Schwartz, Woloshin et al. 2007; Woloshin, Schwartz et al. 2007; Doran and Henry 2008; Wilson, Bonevski et al. 2009). In the interviews described in Chapter 5, Australian health journalists told of senior management, who only dealt with relative results, as these provide more sensational stories,

> *"Relative risk can make for better figures, if you say someone has a risk of doing something that is diminished by 50% that's kind of dramatic and makes a good headline."*

The majority of journalists interviewed said they were not confident in defining the difference between the absolute and relative results. The following question was posted to each journalist or editor interviewed: *Do you know the difference between the terms absolute and relative risk?* Answers included:

> *"No probably not"*

"I'm not sure I understand what that means"

"Absolute risk um…?"

As even some doctors have difficulty in differentiating between relative and absolute estimates of risk, it is likely to also be challenging for journalists (Simmons 2009).

Journalists

While change in news media format is irrevocable, the traditional forms of media, newspaper, television, radio and static internet news sites (Web 1.0) still provide many people with their primary source of information on new health interventions. Analysis indicated that the type of journalist who produces the story has a significant impact on the quality of information contained within it (Wilson, Robertson et al. In Press PLoS Medicine 2010). Stories written by specialist health journalists were shown to be superior to those written by other groups. The reasons for the high scores achieved by some specialist health journalists include the way they covered important issues (such as benefits, harms and costs), and also their ability to place research information in a local context. That includes considerations such as the local availability of a new drug, procedure or diagnostic test, and the inclusion of informed comments from local subject matter experts.

Even within this select group there was considerable variation in average scores, this showed the ability of journalists to achieve very high levels of quality in health reporting. There was also indication for potential improvement even at this level of expertise. Overall, it appeared the specialist health journalist group contributed to highest levels of quality reporting and public health information and this group of

journalists should be encouraged and nurtured. In order to improve health reporting, possible suggestions include better training of journalists in the area of health during their undergraduate education, more specialist health journalists and fewer imported health stories.

There is an important role for collaboration of researchers and health professionals with journalists and news outlets to provide more accurate and balanced communication. The majority of emotive words and metaphors used in cancer stories were directly attributable to the researchers themselves (Wilson, Bonevski et al. 2010). There is no obvious benefit for a journalist in producing a health story about cancer apart from informing the public on the latest health news. This stands in contrast to the potential impact of news articles on researchers and health industry. By raising awareness and profiles, researchers and industry alike stand to benefit (Mackenzie, Chapman et al. 2008).   There is also a well recognised need for research institutions and journals to make more balanced claims about their work and publications (Moynihan, Bero et al. 2000; Cassels and Lexchin 2008; Schwitzer 2008) and to be more widely available and accessible to provide comment to journalists (Larsson, Oxman et al. 2003). Journalists, especially the more experienced ones, will be alert to many of the 'tricks' that can lie behind a simple press release alerting them to a new treatment, or behind the friendly tip-off from a researcher in a local university. But the media, too, is a commercial business. Even the government subsidised outlets have to compete, to some degree, for ratings. Compromises are made in just about every health story that is published in print, put to air or put on the internet.

Strengths of the Research

The main advantages of the Media Doctor intervention were that it was ongoing, the results were accessible (there are now over 1400 articles reviewed on the website) and provided a regularly series of reviews for journalists and the public to read. These data provided continuously updated measures of the performance of the main Australian media outlets in reporting health news. The data came from methodologically sound, evidence-based rating instruments which provided a consistent means of assessing quality across different types of health news reporting. It was based on a large, broad and representative sample of health news stories over five years and was the largest quantitative analysis of health news reporting using a validated instrument. There has been ongoing international interest in this type of rating from journalists, researchers and the community (Sweet 2004; Cresswell 2009). The website operated as a low cost and low maintenance intervention which provided a relatively wide dissemination and the ability to increase awareness in both the general public and journalists.

Limitations of the Research

Although consistent changes in increased ratings in a number of items over time were demonstrated, there was no substantial evidence that the Media Doctor intervention was instrumental in contributing to these improvements. This was due to the passive design of the intervention which, although it sent email alerts to each media outlet when one of their stories was rated and posted, depended on the journalist, editor or producer to go to the website and read their review.

Another possible limitation was that the rating instruments used in the research

concentrated on the evidentiary aspect of news reporting. This led to some criticisms

from journalists disputing the methodology employed by the Media Doctor website. In

an article critiquing Media Doctor in the Australian Doctor magazine, a senior journalist

with a leading broadsheet newspaper *The Australian*, Adam Creswell, took Media

Doctor to task over a range of issues, including its insistence that 'complete'

information be a primary aim of health news media (Council 2001). Creswell wrote

that Media Doctor had the

> *"…general expectation that the media will provide accurate, unbiased and*
> *complete information. Accurate and unbiased, yes; but complete? Nice if you*
> *can get it, but really – who expects that?"*

Creswell's interpretation of the subject bows to the commercial realities of newspapers

but it is worth comparing his view with the ethical obligations of media outlets, as

expressed by the Australian Press Council, which advocates 'a conservative, careful

approach to health and medical reports'(Australian Press Council 2001).

Another weakness of the research was that it covered only a limited number of media

outlets (due to limited resources) so the results cannot be considered representative of

all Australian media. The media outlets covered included major newspaper outlets, two

online news outlets (one commercial and one government), one government broadcast

outlet (radio and television), and two commercial television current affairs programs.

There are many other media outlets that have possibly greater influence on public health

behaviour. There include magazines and journals, smaller regional and community

newspapers, regional radio broadcasts, commercial and government television programs that are dedicated to health information, and web blogs and chat rooms concerned with health topics. Limited resources also meant that it is possible some stories were missed however any incomplete sampling was random and the study provides a broad and representative sample of health news stories in the Australian media. General reporting standards generally appear to be similar in other English speaking countries (Cassels and Lexchin 2008; Schwitzer 2008).

There were a number of limitations to the generalisability of the findings in that it was only possible to generalise the results to media reporting on new cancer therapies and complementary medicines and not all types of cancer and CAM reporting. The rating instrument used for the CAM analysis was the same one developed for use with stories about more conventional medical interventions. Although evaluated, it is possible the rating instrument may have missed some important CAM-specific concerns or questions.

Reflection on the research

The most unexpected finding that this research revealed, for me, the candidate, has been the enormous interest by medical and health researchers in the media. I assume this is because the media is such an accessible and interesting medium. However, despite this interest, there is a large imbalance between the number of researchers analysing what the media are saying and how they are saying it, and those providing suggestions to improve reporting of health issues. The concentration of research on content analysis

contrasts sharply with the few interventions to improve content. It is time for researchers to pause and reflect on this pattern.

Another problem is the apparent lack of cross-pollination between media and communications theory and the medical models of health media analysis. Both academic areas have produced high quality research and findings but there is little acknowledgement of this from either side. This thesis has not included media theory to any large degree and in retrospect; this was a limiting factor.

An unanticipated aspect of the research was the initial defensive attitude taken by journalists to the website. Feedback was generally defensive and some questioned the motives behind the website. Some journalists felt that doctors should stick to what they know and not tell journalists how to do their job (Smith, Wilson et al. 2005). As time passed, the website received increasingly positive feedback from journalists and although some continued to view the site negatively, many liked the sites objectives and the findings it produced (See Appendix 4.2).

The initial hypothesis underlying the research was that health news reporting in the Australian media was of poor quality and an intervention such as Media Doctor might be a way to teach journalists and media outlets how to improve the way health was reported. In retrospect, this was paternalistic and probably deserved at least some of the initial responses received. However, the long-term data supported our hypothesis with findings showing quality was low and that people relying on the media as a source

of health knowledge were not receiving good quality information. Over time the data showed that some aspects of health reporting were improving and that different types of media performed better than others. While it may appear axiomatic, the fact that the best health information in the media comes from broadsheet newspapers and from skilled health journalists, these finding have never previously been supported with quantitative data.

Future research in this area would benefit from engaging health journalists at an earlier stage. Although journalists were consulted and contributed to the research, more intensive contribution and advice from dedicated health journalists would have made it a richer study. It may have also made it easier to engage journalists and media outlets in a more active role in the research. The problem of engaging or even contacting journalists meant that one major aspect of the research was not able to be fully conducted and this may have been overcome had there been a more active journalism component to the research. However, ways to overcome these barriers remain undetermined.

Another future direction would be to take this type of intervention to media students and provide them with knowledge and tools to engage more comfortably with health research. Instruments like the Media Doctor rating tools (Appendix 3.4), Ray Moynihan's tip sheet for journalists (Moynihan 2004) or the Woloshin and Schwartz (Woloshin and Schwartz 2008) tip sheets, are invaluable references for journalist and health writers.

Implications

There are definitive steps the research community can take to improve the quality of health messages in the media. The large amount of research being conducted in this area shows that there is international concern about the public health implications of poor quality health reporting. However, much of this research is overlapping with different research groups reproducing similar results in the same areas. A more co-ordinated approach to content analysis and the use of rigorous methodology is to be encouraged. Similarly, researchers should aim to be more consistent in the type of information they supply to the media. Researchers and medical journal editors need to provide balanced information and accurate media releases on studies designed to inform rather than increase media profiles. Emphasis should be on providing information that is easily comprehended and facilitates the correct interpretation of results rather than erring on the side of what could be considered more newsworthy analyses. Promotion of early research should be avoided or at least dealt with advisedly to avoid raising false hope or unwarranted fear.

Media Doctor style websites exist in four countries (USA, Canada, Hong Kong and Australia) with interest expressed in establishing site in several more countries. This type of media analysis has the capacity to provide ongoing monitoring of news quality which is important in the transition and expansion of media formats and especially as electronic media will be largely unmonitored. This monitoring also has the capacity for large, international, collaborative research and the possibility to provide more active and interactive interventions in the form of education for journalists and researchers, as well

as interventions to improve the transfer of information. The ultimate benefit is to the health consumer by providing high quality information, and the means to distinguish between variations in quality. This would be especially valuable in developing countries and communities.

Another prospect is further engaging the media to work alongside health researchers in this area. Both journalists and media outlets have expressed interest in the work of Media Doctor and this is especially apparent in the Health News Review website where the site is led by prominent health journalist academic Gary Schwitzer. Future interventions of this type need to be more active, tailored and intensive. The implication for measurement of quality should be expanded to include a wider variety of rating instruments to address the spectrum of health stories in the media. Media Doctor Australia is currently using CAM and Adverse Event specific instruments and in developing another looking at sources used in health stories. The overall format of the Media Doctor rating instrument could be revisited to include different form of media both traditional and web 2.0.

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Appendix 1: Original Papers and Co-Author Statements

(These papers and statements have not been included in this version of the thesis. However the links to online versions of the papers are provided on the following pages)

Monitoring the quality of medical news reporting: early experience with *media doctor*

David E Smith, Amanda J Wilson, David A Henry, on behalf of the *media doctor* study group*

http://www.mja.com.au/public/issues/183_04_150805/smi10755_fm.html

An Analysis of News Media Coverage of Complementary and Alternative Medicine

Bonevski B, Wilson A, Henry DA, 2008 An Analysis of News Media Coverage of Complementary and Alternative Medicine. PLoS ONE 3(6): e2406. doi:10.1371/journal.pone.0002406

Media Reporting of Health Interventions: Signs of Improvement, but Major Problems Persist

[Does It Matter Who Writes Medical News Stories?](#)

Wilson A, Robertson J, McElduff P, Jones A, Henry D, 2010 Does It Matter Who Writes Medical News Stories?. PLoS Med 7(9): e1000323. doi:10.1371/journal.pmed.1000323

Deconstructing cancer: what makes a good-quality news story?

Amanda J Wilson, Billie Bonevski, Alison L Jones and David A Henry

http://www.mja.com.au/public/issues/193_11_061210/wil10266_fm.html

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Appendix 2

Appendix 2.1: Questionnaire for Assessing the Sensibility of an Instrument to Rate the Quality of Health News Stories

1. To what extent is the instrument applicable to the variety of health news stories as defined in inclusion criteria? (i.e. new interventions for human use)

SMALL EXTENT		LIMITED EXTENT		FAIR EXTENT		LARGE EXTENT
1	2	3	4	5	6	7

Note any type of story to which the index is unlikely to be applicable:

_____

2. How would you rate the instrument in terms of clarity and simplicity?

UNACCEPTABLE		POOR		GOOD		EXCELLENT
1	2	3	4	5	6	7

Note any questions that are not clear

_____

3. Do you think the instructions provided for the use of the instrument are adequate?

UNACCEPTABLE		POOR		GOOD		EXCELLENT
1	2	3	4	5	6	7

_____

4. How often will information not available in the news stories be necessary to answer the questions? (e.g. journal articles, press releases)

MOST OF THE TIME		FREQUENTLY		SOMETIMES		SELDOM
1	2	3	4	5	6	7

---

5. To what extent will subjective decisions be required to answer the questions?

LARGE EXTENT		FAIR EXTENT		LIMITED EXTENT		SMALL EXTENT
1	2	3	4	5	6	7

---

6. Is the way the questions are presented likely to lead to a bias in response?

VERY LIKELY		LIKELY		UNLIKELY		VERY UNLIKELY
1	2	3	4	5	6	7

---

7. The separate items of this instrument are intended to examine one domain - the quality of health news stories. To what degree do you think this goal has been achieved?

UNACCEPTABLE		POOR		GOOD		EXCELLENT
1	2	3	4	5	6	7

8. How many of the items are crucial or necessary and how many are redundant or unnecessary?

MANY UNNECESSARY		SOME UNNECESSARY		FEW UNNECESSARY		NONE
1	2	3	4	5	6	7

Note any items that are redundant or unnecessary

_____

9. Are there important areas that should be included in a measure of the quality of health news stories that have not been included?

CRUCIAL GAPS		IMPORTANT GAPS		MINOR GAPS		MINIMAL GAPS
1	2	3	4	5	6	7

Note any areas that should be included that are not

_____

10. How likely is the instrument to be successful in discriminating between news stories of high and low quality?

VERY UNLIKELY		UNLIKELY		LIKELY		VERY LIKELY
1	2	3	4	5	6	7

_____

ADDITIONAL COMMENTS:

Appendix 2.1: Statistical Calculations (kappa) for pilot testing of the Media Doctor rating instrument

```
Kappas for Assessment of New Stories - PWS vs DS


Table of colRater by rowRater


colRater      rowRater(New Stories Ratings)


Frequency,

Percent  ,

Row Pct  ,

Col Pct  ,A         ,B         ,  Total

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A, 8, 2, 10

,  26.67 ,   6.67 ,  33.33

,  80.00 ,  20.00 ,

,  66.67 ,  11.11 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B        ,      4 ,     16 ,     20

,  13.33 ,  53.33 ,  66.67

,  20.00 ,  80.00 ,

,  33.33 ,  88.89 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total          12      18      30

40.00   60.00   100.00

McNemar's Test

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Statistic (S)   0.6667

DF                   1

Pr > S          0.4142
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              Simple Kappa Coefficient

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Kappa                      0.5714

ASE                        0.1538

95% Lower Conf Limit       0.2700

95% Upper Conf Limit       0.8729


          Test of H0: Kappa = 0


ASE under H0               0.1807

Z                          3.1623

One-sided Pr >  Z          0.0008

Two-sided Pr > |Z|         0.0016


           Sample Size = 30
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   4 ,   0 ,   4
         , 20.00 ,   0.00 , 20.00
         , 100.00 ,   0.00 ,
         , 44.44 ,   0.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   5 ,   11 ,   16
         , 25.00 , 55.00 , 80.00
         , 31.25 , 68.75 ,
         , 55.56 , 100.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   9   11   20
             45.00   55.00   100.00

McNemar's Test
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Statistic (S)   5.0000
DF   1
Pr > S   0.0253

Simple Kappa Coefficient
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Kappa   0.4681

```
ASE                      0.1744

95% Lower Conf Limit     0.1262

95% Upper Conf Limit     0.8100


          Test of H0: Kappa = 0


ASE under H0             0.1893

Z                        2.4721

One-sided Pr >  Z        0.0067

Two-sided Pr > |Z|       0.0134


          Sample Size = 20
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   2 ,   0 ,   2
          , 22.22 ,   0.00 , 22.22
          , 100.00 ,   0.00 ,
          , 50.00 ,   0.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   2 ,   5 ,   7
          , 22.22 , 55.56 , 77.78
          , 28.57 , 71.43 ,
          , 50.00 , 100.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   4   5   9
                44.44   55.56   100.00

McNemar's Test
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Statistic (S)   2.0000
DF   1
Pr > S   0.1573

Simple Kappa Coefficient
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Kappa   0.5263

Appendix 2   286

```
ASE                      0.2602

95% Lower Conf Limit     0.0164

95% Upper Conf Limit     1.0362


        Test of H0: Kappa = 0


ASE under H0             0.2936

Z                        1.7928

One-sided Pr >  Z        0.0365

Two-sided Pr > |Z|       0.0730


        Sample Size = 9
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   2 ,   0 ,   2
         , 20.00 ,   0.00 , 20.00
         , 100.00 ,   0.00 ,
         , 50.00 ,   0.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   2 ,   6 ,   8
         , 20.00 , 60.00 , 80.00
         , 25.00 , 75.00 ,
         , 50.00 , 100.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   4   6   10
             40.00   60.00   100.00

        McNemar's Test
     ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
     Statistic (S)   2.0000
     DF   1
     Pr > S   0.1573

     Simple Kappa Coefficient
   ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
   Kappa   0.5455

```
ASE                        0.2561

95% Lower Conf Limit       0.0436

95% Upper Conf Limit       1.0473


        Test of H0: Kappa = 0


ASE under H0               0.2817

Z                          1.9365

One-sided Pr >  Z          0.0264

Two-sided Pr > |Z|         0.0528


        Sample Size = 10
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,B   ,A   , Total

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

A	, 1 ,	0 ,	1
	, 10.00 ,	0.00 ,	10.00
	, 100.00 ,	0.00 ,	
	, 14.29 ,	0.00 ,	

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B	, 6 ,	3 ,	9
	, 60.00 ,	30.00 ,	90.00
	, 66.67 ,	33.33 ,	
	, 85.71 ,	100.00 ,	

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total	7	3	10
	70.00	30.00	100.00

McNemar's Test

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Statistic (S)   6.0000

DF   1

Pr > S   0.0143

Simple Kappa Coefficient

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Kappa   0.0909

```
ASE                        0.0978

95% Lower Conf Limit      -0.1007

95% Upper Conf Limit       0.2826


        Test of H0: Kappa = 0


ASE under H0               0.1317

Z                          0.6901

One-sided Pr >  Z          0.2451

Two-sided Pr > |Z|         0.4902


        Sample Size = 10
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

A   ,   2 ,   0 ,   2

         , 22.22 , 0.00 , 22.22

         , 100.00 , 0.00 ,

         , 66.67 , 0.00 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B   ,   1 ,   6 ,   7

         , 11.11 , 66.67 , 77.78

         , 14.29 , 85.71 ,

         , 33.33 , 100.00 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total   3   6   9

              33.33   66.67 100.00

McNemar's Test

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Statistic (S)   1.0000

DF   1

Pr > S   0.3173

Simple Kappa Coefficient

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Kappa   0.7273

```
ASE                     0.2474

95% Lower Conf Limit    0.2424

95% Upper Conf Limit    1.2121


        Test of H0: Kappa = 0


ASE under H0            0.3207

Z                       2.2678

One-sided Pr >  Z       0.0117

Two-sided Pr > |Z|      0.0233


        Sample Size = 9
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   4 ,   3 ,   7
          , 20.00 , 15.00 , 35.00
          , 57.14 , 42.86 ,
          , 100.00 , 18.75 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   0 ,   13 ,   13
          ,   0.00 , 65.00 , 65.00
          ,   0.00 , 100.00 ,
          ,   0.00 , 81.25 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   4   16   20
                20.00   80.00 100.00

        McNemar's Test
      ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
      Statistic (S)   3.0000
      DF   1
      Pr > S   0.0833

      Simple Kappa Coefficient
    ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
    Kappa   0.6341

```
ASE                      0.1812

95% Lower Conf Limit     0.2789

95% Upper Conf Limit     0.9894


        Test of H0: Kappa = 0


ASE under H0             0.2081

Z                        3.0472

One-sided Pr >  Z        0.0012

Two-sided Pr > |Z|       0.0023


        Sample Size = 20
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct	,A	,B	, Total
A	, 1 ,	1 ,	2
	, 10.00 ,	10.00 ,	20.00
	, 50.00 ,	50.00 ,	
	, 33.33 ,	14.29 ,	
B	, 2 ,	6 ,	8
	, 20.00 ,	60.00 ,	80.00
	, 25.00 ,	75.00 ,	
	, 66.67 ,	85.71 ,	
Total	3	7	10
	30.00	70.00	100.00

McNemar's Test

Statistic (S)	0.3333
DF	1
Pr > S	0.5637

Simple Kappa Coefficient

Kappa	0.2105

```
ASE                        0.3282

95% Lower Conf Limit     -0.4328

95% Upper Conf Limit      0.8538


          Test of H0: Kappa = 0


ASE under H0               0.3051

Z                          0.6901

One-sided Pr >  Z          0.2451

Two-sided Pr > |Z|         0.4902


          Sample Size = 10
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

A   ,   1 ,   1 ,   2

         , 10.00 , 10.00 , 20.00

         , 50.00 , 50.00 ,

         , 50.00 , 12.50 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B   ,   1 ,   7 ,   8

         , 10.00 , 70.00 , 80.00

         , 12.50 , 87.50 ,

         , 50.00 , 87.50 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total   2   8   10

             20.00   80.00 100.00

McNemar's Test

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Statistic (S)   0.0000

DF   1

Pr > S   1.0000

Simple Kappa Coefficient

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Kappa   0.3750

```
ASE                        0.3589

95% Lower Conf Limit      -0.3284

95% Upper Conf Limit       1.0784


        Test of H0: Kappa = 0


ASE under H0               0.3162

Z                          1.1859

One-sided Pr >  Z          0.1178

Two-sided Pr > |Z|         0.2357


        Sample Size = 10
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

A   ,   7 ,   4 ,   11
         , 23.33 , 13.33 , 36.67
         , 63.64 , 36.36 ,
         , 70.00 , 20.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B   ,   3 ,   16 ,   19
         , 10.00 , 53.33 , 63.33
         , 15.79 , 84.21 ,
         , 30.00 , 80.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total   10   20   30
            33.33   66.67 100.00

           McNemar's Test
        ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
        Statistic (S)   0.1429

        DF   1

        Pr > S   0.7055

        Simple Kappa Coefficient
        ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
        Kappa   0.4878

```
ASE                        0.1665

95% Lower Conf Limit       0.1615

95% Upper Conf Limit       0.8141


        Test of H0: Kappa = 0


ASE under H0               0.1821

Z                          2.6790

One-sided Pr >  Z          0.0037

Two-sided Pr > |Z|         0.0074


        Sample Size = 30
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

A   ,   5 ,   3 ,   8

         , 25.00 , 15.00 , 40.00

         , 62.50 , 37.50 ,

         , 71.43 , 23.08 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

B   ,   2 ,   10 ,   12

         , 10.00 , 50.00 , 60.00

         , 16.67 , 83.33 ,

         , 28.57 , 76.92 ,

ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ

Total   7   13   20

                35.00   65.00 100.00

McNemar's Test

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Statistic (S)   0.2000

DF   1

Pr > S   0.6547

Simple Kappa Coefficient

ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

Kappa   0.4681

Appendix 2   302

```
ASE                       0.2026

95% Lower Conf Limit      0.0710

95% Upper Conf Limit      0.8651


        Test of H0: Kappa = 0


ASE under H0              0.2223

Z                        2.1053

One-sided Pr >  Z        0.0176

Two-sided Pr > |Z|       0.0353


        Sample Size = 20
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   2 ,   0 ,   2
         , 20.00 , 0.00 , 20.00
         , 100.00, 0.00 ,
         , 66.67 , 0.00 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   1 ,   7 ,   8
         , 10.00 , 70.00 , 80.00
         , 12.50 , 87.50 ,
         , 33.33 , 100.00,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   3   7   10
            30.00   70.00 100.00

McNemar's Test
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Statistic (S)   1.0000
DF   1
Pr > S   0.3173

Simple Kappa Coefficient
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Kappa   0.7368

```
ASE                        0.2409

95% Lower Conf Limit       0.2648

95% Upper Conf Limit       1.2089


        Test of H0: Kappa = 0


ASE under H0               0.3051

Z                          2.4152

One-sided Pr >  Z          0.0079

Two-sided Pr > |Z|         0.0157


        Sample Size = 10
```

Table of colRater by rowRater

colRater   rowRater(New Stories Ratings)

Frequency,

Percent ,

Row Pct ,

Col Pct ,A   ,B   , Total
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
A   ,   7 ,   2 ,   9
         , 24.14 , 6.90 , 31.03
         , 77.78 , 22.22 ,
         , 70.00 , 10.53 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
B   ,   3 ,   17 ,   20
         , 10.34 , 58.62 , 68.97
         , 15.00 , 85.00 ,
         , 30.00 , 89.47 ,
ƒƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆƒƒƒƒƒƒƒƒˆ
Total   10   19   29
              34.48   65.52 100.00

        McNemar's Test
    ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
    Statistic (S)   0.2000
    DF   1
    Pr > S   0.6547

    Simple Kappa Coefficient
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Kappa   0.6092

```
ASE                          0.1568

95% Lower Conf Limit         0.3017

95% Upper Conf Limit         0.9166


        Test of H0: Kappa = 0


ASE under H0                 0.1851

Z                            3.2905

One-sided Pr >  Z            0.0005

Two-sided Pr > |Z|           0.0010


        Sample Size = 29
```

Appendix 3: Media Doctor Website

Appendix 3.1: About Media Doctor

http://mediadoctor.org.au/content/about.jsp

About Media Doctor

The primary aim of the Media Doctor project is to improve standards of journalism as they apply to specific topic media coverage of new medical drugs and treatments. Media Doctor will review current news items about medical treatments, assess their quality using a standardised rating scale and present reviews of good and bad examples of reports on a specially designed website. It is anticipated that independent and objective critiques will improve journalistic practices in reporting new medications and treatments.

Specific Objectives

- Ensure that, when possible, all important information associated with new treatments are reported, including benefits, harms, costs, adverse effects, availability, and conflict of interest.
- Establish the interest and usefulness in providing alerts to GPs on media coverage of new treatments.
- Establish a website called Media Doctor to provide feedback to journalists about the quality of their news stories.
- Evaluate the impact of Media Doctor on the quality of reports on new medical treatments in the lay press using time series analysis of serial scores achieved by individual media outlets.
- To investigate the international potential for such a process, especially in developing countries.

First Line of Information

The lay press plays a crucial role in the communicating health messages and notifying the public about research findings and new treatments. Members of the public often base their opinions on what they have read or heard in the press, and subsequently, press cuttings are presented to doctors and become the basis of discussions about treatment decisions. Doctors themselves may hear first about developments through the lay press ([1],[2],[3],[4],[5]).

A GP Tool

A secondary aim is for Media Doctor to act as a GP service in providing email alerts to relevant, current media articles that patients may approach them about. We believe the impact on the media would be far greater when applied in developing countries.

Current Reporting Practices

In general, the coverage of new medical treatments in the lay press is regarded as poor and is prone to exaggeration of facts in order to create unnecessary sensationalism (1,3,4,5). Promoters of new therapies employ professional public relations companies to prepare press releases that over-emphasise the benefits and minimise the potential harms of new products. These press releases often form the basis for stories in the lay press and are sometimes used directly without attribution. Advocates for treatments use the media to create pressure from the community to have them approved and funded and often do not take account of data on comparative efficacy and cost effectiveness. Examples of this include the opiate antagonist naltrexone and sildenafl for erectile dysfunction (6).

There is evidence in other professional areas that timely feedback on performance can improve practice standards (7). Therefore, audits of quality in health reporting in the lay press and feedback of these may improve the informative value of media stories.

In many countries, direct to consumer advertising activities are a large and very important part of the marketing strategy of the pharmaceutical industry (8,9). In developing countries, there is limited government control of advertising content and comparatively low levels of journalistic training. There is evidence that the activities of drug companies are less well controlled in developing countries and therefore these is a greater potential for the media to be used inappropriately to influence public knowledge.

Outcomes and Significance

The main outcome will be an objective evaluation of the quality of current health reporting in the lay press and a mechanism by which to inform journalists and media organisations on the quality of their stories with the view to improvement.

With increasing pressure on healthcare funding, it is important that the lay press adopts a neutral position on the value of new expensive medical treatments, and is able to provide accurate and unbiased information to the public. It is hoped this site will have a positive influence on journalists, their editors and executive producers, and that it may change the internal culture of the media organisation.

A major and sustained improvement in reporting standards will probably require changes to the culture of media companies, improved education of young journalists, and a change in the behaviour of drug companies and researchers. What we have outlined here is a 'minimal' intervention, but if it works it will be sustainable and cost-effective and could be used to educate the industry, health professionals and the public.

Developing Media Doctor will assess the impact of the system on the western media. However we feel this impact could be even greater if applied in developing countries. Increasingly news in developing countries

is available online, making it easier to retrieve medical news stories. The Media Doctor team is interested in working with partners to extend the appraisal of medical news stories to other countries.

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Appendix 3.2: Media Doctor Article Search

http://mediadoctor.org.au/content/search.jsp

Please note that if **no** sources or categories are selected below, the search results will include articles from **all** categories or sources.

Search for the following keywords: ☐   contains **all** keywords

---

Restrict to the following sources:

☐ 7:30 Report   ☐ A Current Affair   ☐ ABC Health and Wellbeing

☐ ABC News Online   ☐ ABC Science Online   ☐ Adelaide Now

☐ Catalyst   ☐ Daily Telegraph   ☐ Herald Sun

☐ Hobart Mercury   ☐ Lateline   ☐ news.com.au

☐ NineMSN   ☐ Sunday Telegraph   ☐ Sydney Morning Herald

☐ The Age   ☐ The Australian   ☐ The Courier Mail

☐ The Sun-Herald   ☐ The West Australian   ☐ Today Tonight

Restrict to the following categories:

☐ Adverse Effects   ☐ Complementary and Alternative Medicines   ☐ Diagnostic Test

☐ Other   ☐ Pharmaceutical   ☐ Surgical Procedure

Show articles published in the: [All ▼]

Results per page: [20 ▼]

[Search Articles]

Appendix 3.3: Public Forum

http://mediadoctor.org.au/content/forum.jsp

An example from the public forum

"Packing a punch for blood pressure"

(22 Sep 2009) **LP** writes,

"What the Media Doctor is not telling us is the long term effects of hypertension medication on the human body, as it is standard practice that once you start on hypertension medication it is for the rest of your life, so is the cholesterol and the diabetes medication, that as time goes on more and more medication is added to the list just to take care of the side-effects of these medications. The physical damage caused by the long term use of medication is never taken into account as a cost factor, it seems that the cheapest and most expendable commodity is the human life. A relation of mine ended up having a kidney transplant due to the damage done by the long term use of hypertension medication.
I find it unconscionable that doctors not only do not advise their patients to look for alternatives to their conditions but most of the time when a patient presents their doctor with an alternative option they are advised against it. It's gone beyond a joke the arrogance of doctors harping on 'there is no hard evidence and no proof' and not undertaking to monitor a patient who chooses to go on an alternative supplement or remedy. Besides, until a few decades ago most of prescribed medication was and still is made from natural ingredients. LP"

Media Doctor response,

"Dear LP

The aim of Media Doctor is to look at how well the media report health interventions.

We do not advocate any particular intervention and although our reviewers are mainly health based, we are not all doctors and some have no clinical background at all.

We do believe that people should be aware what level of evidence is available for any treatment - whether it is mainstream or alternative.

Most alternative treatments have active ingredients which is why they can be used as treatment. However, they can also be harmful under certain conductions, e.g. if too much is taken or if that ingredient interacts with other medication. Just because something is natural doesn't mean it can't be harmful - many poisons are also natural.

The Therapeutic Goods Association (TGA) which looks at registration of medications in Australia is calling for more and better information regarding alternative medicines to be made available to the public.

Best wishes
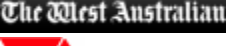
Media Doctor"

Appendix 3.4: Comparison of Media Sources

http://mediadoctor.org.au/content/media.jsp?intSourceID=6

Comparison of media sources

		Article Count	Average Rating	Line Chart
	7:30 Report	2	50%	
	A Current Affair	32	33%	
	ABC Health and Wellbeing	227	45%	
	ABC News Online	13	38%	
	ABC Science Online	13	66%	N/A
No Image	Adelaide Now	1	63%	N/A
	Daily Telegraph	72	49%	
	Herald Sun	62	42%	
No Image	Lateline	1	25%	N/A
No Image	news.com.au	1	44%	N/A
	NineMSN	272	51%	
	Sunday Telegraph	5	40%	
	Sydney Morning Herald	275	58%	
	The Age	98	55%	
	The Australian	274	58%	
	The Courier Mail	20	41%	
	The Sun-Herald	14	54%	
	The West Australian	25	43%	N/A
	Today Tonight	53	32%	

Appendix 3.5: Rating Information

http://mediadoctor.org.au/content/ratinginformation.jsp

rating information

News stories will be identified by daily reviews of the major media outlet websites using a hand-searching approach.

In order to be eligible for review, the article should:

- Be relevant to the management and prevention of disease in the source country, in particular should relate to claims about new treatments, procedures or diagnostic tests
- Discuss an intervention that is intended for use on humans
- Make explicit or implicit claims of efficacy, lack of efficacy, safety or lack of safety
- Be published in the mainstream media of the source country

Reviewers are also asked to provide comments on the stories which may include the use of sensationalist words.

Rating instruments are displayed on the following pages.

Category: Adverse Effects

Rating Criteria	Satisfactory	Not Satisfactory
Benefit to harm ratio	Tries to balance reporting of both benefits and harms or gives some sense of the ratio between the two.	No mention of whether therapy has more benefits or more harms.
Novelty of harm	Mentions whether or not harm was previously identified or mentions what is added to previous knowledge about harm.	No mention of whether or not harm has previously been recognised.
Evidence	Where relevant there is mention of strength of evidence and correct interpretation.	No mention of the nature of clinical research that lead to recognition of harm or increased frequency of harm.
Quantification of harms	Even some quantification of harm rates an 'S'.	No quantification of harm or describes it using words such as 'minor' or 'not serious'.
Number of people affected by harm	Some quantification of number of people or percent of people affected by the harm.	No mention of numbers or percent of people taking treatment expected to be harmed.
Stratification of patients with regard to harm.	Mentions which groups of patients are most likely to be harmed.	No mention of which groups of patients are most likely to suffer harm.
Sources of information	Provides detail on information sources and their potential COI, and reports independent source or mentions unsuccessful attempt to obtain corroboration.	No mention of sources or possible conflicts of interest. No attempt at independent corroboration.
Treatment options	Mentions alternatives and discusses whether alternatives are more or less harmful.	No mention of alternatives or whether the alternatives are more or less harmful.
Relies on Press Release	No obvious use of text from the press release.	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story.

Category: Complementary and Alternative Medicines (CAM)

Rating Criteria	Satisfactory	Not Satisfactory
Novelty of remedy	Accurate information on the novelty of the remedy. Has it existed for many years in some cultures? Is it only now being tested?	Does not mention (or inaccurately represents) if remedy is genuinely new or just a re-formulation of an existing treatment or drug.
CAM classification	Accurately identifies it as CAM, mentions what type of CAM it is, i.e., biological, energy, body-based, mind-body or whole systems and outlines other common names it is known as.	No mention of CAM, other common names or CAM classification.
Availability of Treatment	Accurate information regarding availability in Australia (registration, PBS status, types of outlets where sold).	No mention of availability in Australia.
Treatment Options	Mentions appropriate alternatives (CAM and conventional) and provides comparative information.	No mention of alternatives or their comparative performance.
Disease Mongering	No evidence of disease mongering.	Frames risk factors (e.g. cholesterol) as a disease. No mention or misrepresentation of natural history of disease. Exaggerates prevalence or incidence or medicalisation of normal human variation.
Evidence	There is mention of strength of evidence and correct interpretation.	No mention of the nature of clinical evidence or interpretation or discussion is inappropriate.
Quantification of Benefits of Treatment	Estimate in both absolute and relative frames, or absolute frame only or rates with and without remedy.	No quantitative estimate of benefit or in relative frame only.
Harms of Remedy	Balanced information about harms (frequency or seriousness).	No mention of potential harms or discounts harms.
Costs of Remedy	Mentions comparative costs and comments on cost-effectiveness.	No mention of costs or downplays cost as an issue.
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Category: Diagnostic Test

Rating Criteria	Satisfactory	Not Satisfactory
Availability of Test	Accurate information on availability of test in Australia, including Medicare status.	Does not mention availability of test in Australia
Novelty of Test	Accurate information on novelty (or lack of), and stage of development from bench discovery to clinical test.	Does not mention (or inaccurately represents) whether the test is genuinely new.
Diagnostic Options	Mentions appropriate alternatives and considers the need for a new test.	No mention of alternatives or their comparative performance
Disease Mongering	No obvious elements of disease-mongering	Frames risk factors (e.g. BMD cholesterol) as a disease, or no mention (or misrepresentation) of natural history of disease, or Exaggerates prevalence or incidence, or Medicalisation of normal human variation
Evidence	Where relevant, there is mention of how the research was done, the comparator test and description of the population who were tested.	No mention of the nature of clinical evidence. or Mention of the nature of the evidence but interpretation or discussion is inappropriate. or No mention of the gold standard used.
Quantification of diagnostic accuracy and benefits	Mentions both sensitivity and specificity, or the numbers from which these are derived, or NPV and PPV. Considers the patient benefits from improved diagnostics.	No quantitative estimate of diagnostic accuracy. Estimate of sensitivity only, ignores specificity. No consideration of why diagnosis is useful
Potential harms of Testing	Balanced information about harms (frequency or seriousness)	No mention of harms, or discounts potential harms
Costs of Testing	Mentions comparative costs	No mention of costs, or downplays cost as an issue. No comparative information on alternate tests.
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest. No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Category: Other

Rating Criteria	Satisfactory	Not Satisfactory
Novelty of Treatment	Accurate information on novelty (or lack of)	Does not mention (or inaccurately represents) if treatment is genuinely new or just a re-formulation of an existing treatment, or another member of a well established drug class
Availability of Treatment	Accurate information on availability of treatment in Australia including reimbursement status (where relevant)	Does not mention availability of treatment in Australia
Treatment Options	Mentions appropriate alternatives and provides comparative information	No mention of alternatives or their comparative performance
Disease Mongering	No obvious elements of disease-mongering	Frames risk factors (e.g. BMD cholesterol) as a disease, or No mention (or misrepresentation) of natural history of disease, or Exaggerates prevalence or incidence, or Medicalisation of normal human variation
Evidence	Where relevant, there is mention of strength of evidence and correct interpretation	No mention of the nature of clinical evidence, especially RCTs Mention of the nature of the evidence but interpretation or discussion is inappropriate
Quantification of Benefits of Treatment	Estimate in both absolute and relative frames, or absolute frame only, or rates with and without treatment	No quantitative estimate of benefit Quantitative estimate in relative frame only
Harms of Treatment	Balanced information about harms (frequency or seriousness)	No mention of harms, or discounts potential harms
Costs of Treatment	Mentions comparative costs and comments on cost-effectiveness	No mention of costs, or downplays cost as an issue Mentions cost only, no comparative information
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Category: Pharmaceutical

Rating Criteria	Satisfactory	Not Satisfactory
Novelty of Treatment	Accurate information on novelty (or lack of)	Does not mention (or inaccurately represents) if treatment is genuinely new or just a re-formulation of an existing treatment, or another member of a well established drug class
Availability of Treatment	Accurate information on availability of treatment in Australia (both registration and PBS status)	Does not mention availability of treatment in Australia
Treatment Options	Mentions appropriate alternatives and provides comparative information	No mention of alternatives or their comparative performance
Disease Mongering	No obvious elements of disease-mongering	Frames risk factors (e.g. BMD cholesterol) as a disease, or No mention (or misrepresentation) of natural history of disease, or Exaggerates prevalence or incidence, or Medicalisation of normal human variation
Evidence	Where relevant, there is mention of strength of evidence and correct interpretation	No mention of the nature of clinical evidence, especially RCTs Mention of the nature of the evidence but interpretation or discussion is inappropriate
Quantification of Benefits of Treatment	Estimate in both absolute and relative frames, or absolute frame only, or rates with and without treatment	No quantitative estimate of benefit Quantitative estimate in relative frame only
Harms of Treatment	Balanced information about harms (frequency or seriousness)	No mention of harms, or discounts potential harms
Costs of Treatment	Mentions comparative costs and comments on cost-effectiveness	No mention of costs, or downplays cost as an issue Mentions cost only, no comparative information
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Category: Surgical Procedure

Rating Criteria	Satisfactory	Not Satisfactory
Novelty of Treatment	Accurate information on novelty (or lack of)	Does not mention (or inaccurately represents) if treatment is genuinely new or just a re-formulation of an existing treatment, or another member of a well established drug class
Availability of Treatment	Accurate information on availability of treatment in Australia, including reimbursement (Medicare) status	Does not mention availability of treatment in Australia
Treatment Options	Mentions appropriate alternatives and provides comparative information	No mention of alternatives or their comparative performance
Disease Mongering	No obvious elements of disease-mongering	Frames risk factors (e.g. BMD cholesterol) as a disease, or No mention (or misrepresentation) of natural history of disease, or Exaggerates prevalence or incidence, or Medicalisation of normal human variation
Evidence	Where relevant, there is mention of strength of evidence and correct interpretation	No mention of the nature of clinical evidence, especially RCTs Mention of the nature of the evidence but interpretation or discussion is inappropriate
Quantification of Benefits of Treatment	Estimate in both absolute and relative frames, or absolute frame only, or rates with and without treatment	No quantitative estimate of benefit Quantitative estimate in relative frame only
Harms of Treatment	Balanced information about harms (frequency or seriousness)	No mention of harms, or discounts potential harms
Costs of Treatment	Mentions comparative costs and comments on cost-effectiveness	No mention of costs, or downplays cost as an issue Mentions cost only, no comparative information
Sources of Information	Provides detail on information sources and their potential COI, and reports independent source, or mentions unsuccessful attempt to obtain corroboration	No mention of sources or possible conflicts of interest No attempt at independent corroboration
Relies on Press Release	No obvious use of text from the press release	Evidence from press release or other news stories that the journalist has relied on a press release as the only information source and used the text in the story

Appendix 3.6: Media Doctor Links

Media Doctor does not provide medical advice, and does not assess the quality of the evidence on which the stories are based. Instead, we concentrate on the articles themselves. For more information on the treatments featured on this site, please try the following links.

Australian Prescriber
http://www.australianprescriber.com/
A reliable and non-commercial source of information on drug treatments

Informed Health On-line
http://www.informedhealthonline.org//item.aspx?tabid=25
An important source of information on medical treatments, based on reviews performed by the Cochrane Collaboration and written for consumers

Bandolier
http://www.jr2.ox.ac.uk/bandolier/
An excellent site that reviews the evidence for health care interventions

Australian Medicare Services Advisory Committee Reports of New Technologies
http://www.msac.gov.au/reports.htm
Site which stores reviews of new medical technologies performed by the Australian Medicare Services Advisory Committee prior to their consideration of listing as medical benefits

Pharmaceutical Benefits Advisory Committee - recommendations to list new drugs
http://www.health.gov.au/pbs/healthpro/outcomes_full.htm#recent
Outcomes of PBAC considerations of requests to list drugs on the Australian Pharmaceutical Benefits Schedule (the list of drugs subsidised by the Federal Government)

Behind the Medical Headlines
http://www.behindthemedicalheadlines.com/
A site that is maintained by the Royal Colleges of Physicians and Surgeons in Edinburgh, Scotland. This site provides detailed commentaries on the facts lying behind medical headlines in the international press.

Cochrane Library
http://www.cochrane.org
This is the most authoritative compilation of evidence in the World. It is designed mainly for health professionals. Read the newcomer's guide if it is your first visit. Put in the search term of interest under 'reviews' and you will access the abstracts of all relevant reviews completed by the Cochrane Collaboration.

Tipsheet-For Reporting on Drugs, Devices and Medical Technologies
http://www.cmwf.org/publications/publications_show.htm?doc_id=239323
"Some simple questions to consider and discuss." This tip sheet, developed by Ray Moynihan for the Commonwealth Fund, provides a selection of questions which may assist reporters in choosing directions in their research. It is widely used and recommended by health reporters.

Statement of Principles Association of Health Care Journalists
http://www.ahcj.umn.edu/files/AHCJ_principles.pdf
This is a very comprehensive guide to the responsibilities of health care journalists

Therapeutics Initiative/ Therapeutics Letter

http://www.ti.ubc.ca/pages/letter.html

This is a regular newsletter with evidence-based reviews of therapeutic topics. The group that publish the newsletter are fiercely independent, but match this with considerable knowledge and skill in the areas of clinical practice and drug therapies.

Medical Journal of Australia

http://www.mja.com.au/public/issues/183_04_150805/contents_150805.html

Monitoring the quality of medical news reporting: early experience with media doctor

Media Doctor Canada

http://www.mediadoctor.ca

With the help of various academics and clinicians from University of British Columbia, York University and the University of Victoria, the Media Doctor Canada site is a partner website to Media Doctor Australia, and covers the media outlets in Canada

Scottish Medicines Consortium

http://www.scottishmedicines.org.uk

Their name may suggest to you that they manufacture drugs, but don't be deceived. The consortium carries out some very detailed and quite hard hitting evaluations of new drugs in Scotland. The evaluations are first class and can be downloaded in full.

Health News Review

http://www.healthnewsreview.org/

A new site that has just commenced an ambitious program of assessing and reporting the quality of health news stories in the media in the USA. This site uses very similar methods to Media doctor Australia and Media doctor Canada and we regard it as a sister site.

7 Words (and more) You Shouldn't Use in Medical News

http://www.healthnewsreview.org/ThingsYouShouldKnow/The7words.php

A lovely piece on how certain words used in medical news stories can mislead and sometimes even offend

Behind the Headlines

http://www.nhs.uk/news/Pages/NewsIndex.aspx

A UK site that examines the research on which health stories are based.

Media Doctor Hong Kong

http://www.mediadoctor.hk

The Media Doctor Hong Kong website was started in 2008 by a team from the Journalism and Media Studies Centre at the University of Hong Kong. Much like the original Media Doctor project, their aim is to promote excellence in health and medical news reporting.

Appendix 4: Journalists

Appendix 4.1: Journalist Feedback Study

HYPOTHESIS

The hypothesis for this research was that web-based audits of medical news articles and ongoing feedback to journalists and editors on individual performance would improve reporting standards and the quality of published reports by 5% - 10%. Substantial evidence showed that timely feedback on performance can improve practice standards (Mugford, Banfield et al. 1991; Axt-Adam, van der Wouden et al. 1993; Jamtvedt, Young et al. 2006; Jamtvedt, Young et al. 2006). The premise behind feedback as a behaviour change tool is that professionals would modify practice if shown it was not consistent with their peers or accepted standards.

Aim

The aim of this project was to extend the scope and scale of the Media Doctor project by introducing an intervention designed to further improve the quality of health news reporting. This intervention would involve an individualized performance feedback mechanism involving journalists, editors and producers. Until this point, the feedback from Media Doctor had been passive and journalists would not see their ratings unless they actively logged onto the Media Doctor website and although through feedback forums, there was evidence that journalists were doing this, there was no way to monitor the extent of this activity. The new intervention would provide active feedback and evaluate its impact.

The primary aim of the proposed research was

1. The development, application of an intervention (performance feedback device), and

2. Evaluation of impact of intervention on quality of health and medical news reporting.

Methodology

The proposed research program combined quantitative and qualitative methods to systematically develop and evaluate the story rating instruments and the intervention. The limited number of available Australian journalists and outlets precluded the application of the ideal research design – a parallel group cluster randomized controlled trial. The intervention instead was applied using a before/after design utilizing the established stable baseline measures of article quality and measurement for impact of the intervention using interrupted time series analysis.

Design and assessment was undertaken of 'feedback reports' (summaries of comparative individual performance) with a graphical display of the comparative performance over time, including that of the media outlet's or journalists' competitors. The reports included the five 'best' and five 'worst' scoring stories from all outlets Appendix 5:1). The feedback was not intended to instruct journalists on how stories should be written in a linguistic sense, but rather what information should be included in

a balanced and informative story about the benefits and/or harms of medical interventions.

Journalist, editors and producers were identified through the stories on the Media Doctor website and invited to participate in the intervention study. Individual 'feedback reports' were generated and e-mailed to individual journalists on a monthly basis for a period of six months. These reports compared their performance with those of their peers. A separate report was developed for editors and producers of major Australian media outlets, each of whom was responsible for a media outlet with up to several health journalists. This report related all stories and the Media Doctor ratings of these from their media outlet.

Evaluation of impact of the intervention included time series analyses – bi-monthly aggregation of data with analysis of data slopes before and after introduction of intervention. Segmented linear regression would be used to compare slopes before and after the commencement of the feedback program. Stable estimates of slopes might be difficult to achieve in the case of individual journalists, because of small numbers of relevant stories, meaning it might not be possible to show changes in reporting quality at this level. However, the feedback to both journalists and editors or producers had the potential to have an effect at the media outlet level and it was expected that any intervention effects at this level would be likely to be detected.

In addition to the quantitative analyses, interviews with journalists were to be conducted to elicit in-depth feedback on the value and usefulness of the intervention. The duration of the intervention was six months in order to provide sufficient before and after time points to enable interrupted time series analyses.

Expected outcomes

If the intervention was successful it was expected there would be an increase in the proportion of health related news articles incorporating the identified key elements of accurate reporting determined by average scores pre and post intervention.

Recruitment

Journalists

Initially all journalists whose work had been featured on the Media Doctor web site within the previous 12 month period were invited to participate in the feedback study. This period was chosen to give a broad coverage of media outlets and types of articles (over 300 articles from all media outlets) and to capture these journalists as journalists change media outlets and rounds frequently. Only Australian based journalists were included. A total sample size of 51 journalists was identified from the database and information pack about the study was sent to the address of the media outlet where they were working when the story was published. The information pack including a letter of

introduction and information regarding the study, a consent form and a reply paid envelope. (Appendix 5.3)

The introductory letter stated that a follow-up telephone call would be made within the next two weeks. Of the 51 packs sent out, three signed consent forms were returned, along with two unopened envelopes marked return to sender. Another two journalists contacted the candidate by telephone to discuss the study, one of these gave consent to participate, while the other declined with no reason given. All other journalists who had been sent information packs were then telephoned over the next two weeks.

Establishing contacting with journalists was more difficult than anticipated. Telephone numbers listed on website and in telephone directories for media outlets were to news room gatekeepers (mainly administrative staff). The majority of these said they could not to disclose direct numbers for journalists. They did however take messages and promised to pass them on. Of the few (less than 10) direct telephone numbers that were obtained out, all calls went to voice mail, and only three of these messages were returned. These numbers were followed up again with similar results. The majority of journalists spoken to were hesitant to take part in the study mainly because of lack of time. However, a number of these (6) did give their consent to take part in the interview section of the study.

Editors and Producers

All media outlets featured on the Media Doctor website were sent an information pack addressed to either the producer or editor. In most instances, the names of the people in these roles were not known. The information pack was similar to those sent to the

journalists, but did not reveal the fact that journalists would be receiving a different set of data. The information sent to the editors showed graphs comparing their media outlet with the current Media Doctor average ratings from all other outlets. The information pack was sent to (10) media outlets and of these, only one returned a signed consent form. Follow-up telephone calls were conducted, however, editors and producers proved even more difficult than the journalists to make contact with. Finally, two editors (one radio and one newspaper, agreed to participate) of these only one agreed to an interview.

Interviews

Of the 51 journalists contacted above, six (6) consented to take part in the interviews. In an attempt to increase this number an advertisement was placed in the newsletter of the Australian Medical Writers Association and also on the Media Doctor website. This resulted in four health journalists expressing interest; however, one of these was located in India and could not therefore be included. The remaining three had not been rated on Media Doctor and as they worked as freelance capacity, it was unlikely they would be rated regularly enough to be included in the study. However they consented to be included in the interview process. Four other journalists were recruited through means of snowball effect where one journalist passed on the details of someone they think may be interested in participating. None of these journalists had been rated on the website however they were aware of Media Doctor and gave consent to be involved in the interview section of the study.

This gave a sample size of 12 interviews, 11 journalists and one editors/producer. Once written informed consent had been received, a time was made to conduct the interview. All interviews, except one were conducted by telephone. The one interview conducted face-to-face involved a local journalist. All interviews were recorded with the interviewee's written consent. During the interview, the subject was referred to only by their first name and their media outlet was not identified. Interviews were transcribed by a professional transcriber and the data was entered and analysed in NVivo (Version 8) by the candidate.

Results

Due to the low numbers of consenting participants, full analysis was not able to be conducted. However, the trends in scores over the six months for those involved did improve and in some cases this improvement was significant. N=X number of journalists and two editors were enrolled and completed the study. Each month a feedback card was emailed to the participants' nominated e-mail address.

The two media outlets from which the editor and producer came were among the highest scoring outlets. All the journalists involved were among the highest ranking (initial scores – post 6 months). This showed an interest form the more information and experienced health writers and their outlets which echoed the information received anecdotally in the form of feedback to the website.

The results for the interviews were analysed using NVivo 8. While the analysis revealed insights in to the different category of health journalist (radio, broadcast tabloid, freelance, regional and capital areas) no television or current affairs. The full results have not been included in this thesis as there are currently no publications regarding these data. It is anticipated this will be a future peer-reviewed publication.

Appendix 4:2: Journalist Responses to Media Doctor

Journalists were asked in interview what they thought of the Media Doctor website and any aspects that they would change. Following are some of the responses.

Journalist 1:

"I started looking at the website a few years ago when I first started writing health and my initial response was 'Oh my God, hope they never review my stuff'. It's a bit intimidating but I do think it's useful. I like to see what the comments are on the web site, wanting people to write about costs, benefit and that kind of thing. It's probably made me more conscious of what to include and not to include. One criticism is that it doesn't take into consideration the fact that we've got time constraints and can't always locate the right people to get that information."

Journalist 2

"I actually do think it (the Media Dr web site) is quite useful."

"I'd like to see it expanded and cover features and that type of thing."

"I was at a medical writers' conference and there was a girl there who'd had one of her articles just rated and she was pretty devastated. She'd only been reporting for a month and didn't know how to do background, that kind of thing. It would be interesting to talk to people like that and see whether it changed the way that they report."

Journalist 3

"The email reminders are good because I always forget to check it (the website). So definitely keep the email reminders."

Journalist 4

"When I discovered it (the Media Doctor website) about a year or two ago. I was like, how cool is this - I mean my stuff gets put up there!"

Journalist 5

"I think a tip sheet explaining things about absolute/ relative risk, that kind of terminology, would be really good. Also how to interpret data because ... a lot of people think if something doubles it's an increase of 100% but it's not, its 50%. Very easy to get that stuff wrong."

Journalist 6

"I think a lot of researchers don't comprehend that other people don't have their degree of understanding of things like stats. They put out press releases - we've seen certainly examples of press releases that are just wrong. But that's what goes out and that's what gets printed. I think that's something you should cover (on the website)."

Journalist 7

Broadsheets have a really different style (to other media outlets) and really different variety (of stories). If you can differentiate (between the different media) because we report on different stuff."

Journalist 8

"When it's been mine (the rated story) and I've looked at it, I've tried to take on the criticisms. I see one of the upcoming stories is one of mine and I have a feeling that it's going to get a bit criticised..."

Journalist 10

"I think that sometimes it (the Media Doctor website) is not really comparing apples with apples. So it's hard to get a legitimate comparison if you're not comparing the same thing. It compares a copy which is very detailed, like a Routers story, with say a little three paragraph online story which comes from a radio bulletin. You're never going to be able to put that much detail in what is effectively just a transcript of radio compared to a Routers or AAP story which is very detailed and thorough. So that's one concern. The other thing is the cost of a medication. We would never put the cost in a story unless it is very, very expensive. Otherwise it would seem like an ad. It's not something that you routinely would put in unless it's newsworthy and it's usually not.

Maybe something like benefits with new treatments (where) you compare and contrast the benefits with existing treatments would be better than cost because I don't think many people would put cost in."

"... I can't possibly list all the side effects cause it would take a minute and a half just to list all the side effects so you'd normally just pick some significant ones - you might list a couple. But you just don't have the time and the space to list all of them. It would sound weird if you listed all of them."

Appendix 5

Appendix 5.1: Number of Time Different Medical Journals Were Cited in Cancer News Stories

Table 1:

Journal	n
New England Journal of Medicine	20
Journal of the National Cancer Institute	14
Lancet	11
International Journal of Cancer	9
Journal of the American Medical Association	9
Journal of Clinical Oncology	7
British Medical Journal	3
Cancer Epidemiology, Biomarkers and Prevention	3
Lancet Oncology	3
Annals of Oncology	2
British Journal of Cancer	2
International Journal of Clinical Practice	2
Medical Journal of Australia	2
American Journal of Epidemiology	1
American Journal of Public Health	1
Archives of Dermatology	1
Australian and New Zealand Journal of Surgery	1
Blood	1
Cancer Research	1
Clinical Gastroenterology and Hepatology	1
Clinical Pharmacology and Therapeutics	1
Emerging Infectious Diseases	1
Epidemiology	1
Journal of Clinical Cancer Research	1
Journal of Steroid Biochemistry and Molecular Biology	1
Journal of the American Academy of Dermatology	1
Journal of Thoracic Oncology	1
Journal of Urology	1
National Academy of Science Journal	1
Nature Genetics	1
Platelets	1
Proceedings of the National Academy of Science	1
Radiology	1
Science	1
Thorax	1
Transplantation	1

Appendix 5.2: Descriptions of Disease Burden of Different Cancers Cited in Cancer News Stories

Table 1: Description of the impact of different types of Cancer

Type	N (%)	Aust rate /100,000 (% of total)	Referred to in news stories
Breast	85 (32)	57.8 (12.2)	*Every year, there are about 4000 new cases of breast cancer diagnosed in NSW. One in 11 women will develop the disease by the age of 75 and it's the leading cause of female cancer death.* *About 12,000 women a year in Australia get breast cancer, but only about 2000 of those have the HER2-positive gene.* *Breast cancer is the commonest form of female cancer and its incidence increases with age.* *It is diagnosed in more than a million women worldwide each year, and accounts for at least 400,000 deaths annually.* *About 20-25 per cent of the 12,000 Australian women diagnosed with breast cancer each year have the aggressive HER-2 positive breast cancer that Herceptin attacks.* *The Australian Institute of Health and Welfare predicts the number of Australian women diagnosed with breast cancer will rise from 13,261 in 2006 to 14,800 in 2011. Of these, about 25 per cent will have HER2 positive breast cancer, a more aggressive form of the disease.* *About 1.2 million people a year are diagnosed with breast cancer globally and the disease kills 40,000 women and men in the United States every year.* *More than 10,000 new breast cancer diagnoses are made in Australia each year, and 20 per cent are HER2 positive.*
Prostate	34 (13)	76.3 (16.3)	*prostate cancer, the most commonly diagnosed cancer in Australia, at 13,526 new cases in 2003* *With one in 10 men developing the disease throughout their life times, oncologists have welcomed its approval in Australia.* *Prostate cancer is the second most common cancer in Australian men, after skin cancer.* *More than 10,000 new cases are diagnosed in Australia each year.* *About 10,000 Australian men are diagnosed with prostate cancer each year and more than 2,500 die of the disease.*

			Many of the 20,000-odd Australian men receiving treatment for prostate cancer are set to benefit from a new six-monthly injection that delays the cancer's progress.
			With 10,000 new cases of prostate cancer each year, and 2500 deaths, doctors are urging men to have regular checkups so treatment can be effective.
			About 12,000 men a year in Australia are diagnosed with prostate cancer, and more than 2700 die of the disease.
			An estimated 219,000 US men will this year be diagnosed with cancer of the prostate, a walnut-sized gland that makes fluid for semen, and 27,000 will die of it, according to the American Cancer Society.
			Close to 3000 Australians die each year of the disease, according to the [Prostate Cancer Foundation of Australia](). Radio DJ Alan Jones was diagnosed with it this year.
			Prostate cancer is the most common cancer among British men. It affects one in 18 Australian men. It is rare in men under 50 years old but is the most common cancer in Australian men over 55
			Prostate cancer is the most common cancer in US men.
			It is diagnosed in 232,000 men every year and kills up to 30,000 of them.
			Worldwide, 221,000 men die from prostate cancer each year.
			More than 15,700 Australian men were diagnosed with prostate cancer in 2004, although many of these cases were mild and could be treated relatively easily.
			A smaller number were harder to treat. In the same year, 2792 men died of the disease.
			In 2005, the death toll from prostate cancer rose to 2946.
			It is the most common cancer in men after non-melanoma skin cancer -- there are more than 13,500 cases in Australia each year, and it is the second most common cause of cancer death in men after lung cancer, causing 2761 deaths in 2003.
			Prof Denham said prostate cancer affected just as many men as breast cancer affected women. *In Australia, 10,500 men get the cancer each year, and 2,500 die from it.* *"We heard the other day that Kylie (Minogue) is just one of 30 women each day who learn they've got breast cancer," Prof Denham said. "It's exactly the same with prostate cancer, 30 men every day learn that they have got prostate cancer. "About four out of 10 of them find themselves in this boat."*
			Around 10,000 Australian men are diagnosed with prostate cancer each year and 2,600 die from it.
			Prostate cancer is the second-leading cancer killer of men in
			Australia,

Skin (Melanoma)	25 (9)	50.6 (10.6)	*Some 160,000 cases of melanoma are diagnosed around the world every year, particularly affecting white men living in very sunny regions.* *Australia is the skin cancer capital of the world with more than 380,000 new cases each year.* *Australia has the highest rate of melanoma in the world, with 9500 cases diagnosed annually. One in 19 Australians can expect to be diagnosed with a melanoma in their lifetime. If detected early, there is an excellent chance of survival.* *Skin cancers comprise 81 per cent of all new cancers diagnosed in Australia annually.* *More than 382,000 people are treated for skin cancer each year and more than 1300 die from the disease in that time.* *Australia has the highest rate of skin cancer in the world. Melanoma kills almost 1000 Australians each year.*
Colorectal	23 (9)	61.3 (13)	*There are 12,000 new cases a year of bowel cancer, making it the most common internal cancer in Australia. It kills about 90 a week, second only to lung cancer.* *Bowel cancer is the second most commonly diagnosed cancer in Australia, accounting for about 13,000 new cases a year.* *Bowel cancer is also the second most common cause of cancer death in Australia, accounting for 4372 deaths in 2003, or 11.5 per cent of the total fatalities.* *colon cancer, which is diagnosed in about 145,000 Americans each year.* *Bowel cancer is the second leading cause of cancer deaths in Australia after lung cancer, killing around half the 12,000 men and women diagnosed with the disease each year, most of them aged over 50.*
Lung	22 (8)	43.1 (9.1)	*Each year 10 million people are diagnosed with it, according to the Global Lung Cancer Coalition, and half of all patients die within a year of diagnosis.* *Lung cancer killed 7500 Australians each year, three times more than breast cancer, he said.* *Lung cancer is by far the most common cause of cancer death in the United States and much of the world.* *The American Cancer Society says that in 2006 there will be an estimated 174,470 new cases of lung cancer and it will kill 162,460 people.*
Cervical	19 (7)	3.5 (0.7)	*The vaccine is one of two being trialed to prevent the disease, which causes more than 280,000 deaths each year worldwide.* *Cervical cancer kills about 250,000 women annually worldwide.* *About 750 new cases of cervical cancer are diagnosed each year in Australia. Most are linked to HPV.*

			Around 300,000 women worldwide die from cervical cancer annually. Many of these women are in countries with no pap smear programs and where a vaccine would save lives.
			The cancer killed 227 Australians in 2002.
			Cervical cancer kills more than one quarter of a million women worldwide each year.
			Ms Webb said although ovarian cancer was only ranked sixth on the list of the diseases that strike Australian women, once diagnosed it had the highest mortality rate.
			Ms Webb said of 1,200 women diagnosed with ovarian cancer each year, about 750 died.
Leukaemia	12 (4)	12.3 (2.6)	*There were about 2,516 new cases of all types of leukaemia in Australia in 2001, according to figures by the Australian Institute of Health and Welfare. Rates are about 8.6 cases per 100,000 people between the ages of 0 and four, and then decline until the mid-20s. As people get older than that rate rise steadily, reaching 10.8 new cases per 100,000 for those aged 50-54, 23.5 for those aged 60-64, and 77.3 for those aged 80-84.*
Ovarian	12 (4)	10.7 (2.7)	*Of the 1500 Australian women diagnosed with ovarian cancer each year, half do not survive another five years.*
			But if the disease is identified in its early stages, more than 80 per cent of those women can survive.
Head and neck	9 (3)		*The study involved glioblastoma multiforme which kills about 10,000 Americans each year, usually within a few months of diagnosis.*
Urinary	8 (3)	2.3 (10.8) Each kid and bladder	*About 800 Australians die of kidney cancer each year.*
Upper GIT	8 (3)		
Lymphoma	6 (2)	21 (4.4)	*Dr Bentley said around 10 Australians were diagnosed with non-Hodgkin lymphoma every day and another four died of the condition.*
			More than 80 per cent of those who die from the cancer are aged more than 50.
Myeloma	3 (1)	5.6 (1.2)	*The Hepburn grandfather is one of just 200 Australians being offered a treatment for multiple myeloma, a blood cancer.*
			Each year, 1200 cases are diagnosed.
			Multiple myeloma - the second-most common blood cancer - accounts for 1 per cent of all cancers and 2 per cent of cancer deaths.
Neuroblastoma	1 (0.4)		
Bone	1 (0.4)		
Total number*	268		

*Some articles referred to more than one study or interventions that worked on more than one type of cancer.

THE END