

An analysis of newspaper reports of cancer breakthroughs: hope or hype?

Ethel S Ooi and Simon Chapman

HEALTH AND MEDICAL stories are among the most frequent type of story on the front pages of newspapers.^{1,2} While people who use the news as a source of medical information are often better informed than those who do not,³ clinicians are concerned about how medical news is portrayed and how it is interpreted by patients.⁴

Media coverage can fuel demand for new treatments, regardless of their efficacy.⁵ It can “hype” the benefits of medications, while failing to reveal adequately their risks and costs or to report financial ties between researchers, “expert” commentators and pharmaceutical manufacturers.⁶ In addition, both journalists⁷ and journal editors⁸ may deem positive outcomes more newsworthy or publishable than negative or equivocal results. The media, through their influence on public and political opinion, can also affect research funding.⁹ A former Australian federal health minister explained why the 1994 national research budget for prostate and testicular cancer was \$A150 000 a year, compared with \$A13 million for HIV/AIDS research: “... it isn't fashionable, it's not at all in the front pages, it's not sexy to have testicular or prostate cancer so you don't get a run”.¹⁰

Newspapers increasingly obtain leads on medical advances and breakthroughs from medical journals, universities and hospital staff.¹¹⁻¹³ Journal articles selected for press releases are, not surprisingly, more likely to be reported in newspapers than those without press releases,¹⁴ reflecting conscious efforts by journals to publicise material deemed newsworthy.¹⁵ In turn, researchers are more likely to cite journal articles that have been reported in the popular press.¹⁶

ABSTRACT

Objective: To assess the importance of cancer “breakthroughs” reported in the popular media 10 years after their publication.

Study design: Questionnaire-based survey in 2003 of expert opinion on the importance of all alleged cancer “breakthroughs” in cancer research or treatment reported in news articles in *The Sydney Morning Herald* between 1992 and 1994.

Main outcome measures: Assessment of each “breakthrough” by an expert in the relevant cancer subspecialty on seven measures of current importance.

Results: 31 unique reports of alleged cancer “breakthroughs” were identified, and experts responded to questionnaires on 30. Thirteen of these 30 reports (43%) were judged as not having been supported by further research in the following decade, with three (10%) having been refuted, while 16 (53%) were judged to remain potential breakthroughs, but more research was required. Eight “breakthroughs” (27%) had, or would soon be, incorporated into practice.

Conclusion: Cancer research findings reported in newspapers as “breakthroughs” are often not true breakthroughs but may be important for ongoing research. Consumers are likely to be receiving an overly optimistic picture of progress in understanding and treating cancer.

MJA 2003; 179: 639–643

Because of these ripple effects of medical-breakthrough reporting in the popular media, we sought to investigate whether reports about cancer lived up to their promise a decade later.

METHODS

Newspaper articles describing cancer “breakthroughs” were obtained for the period 1992–1994 from *The Sydney Morning Herald*, a quality “newspaper of record”. The complete text of this newspaper on CD ROM was searched using the term “cancer” combined with any one of the following: “breakthrough”; “hope”; “promise”; “research”; “announce”; “cure” and “wonder”. We assessed articles to identify unique articles describing alleged specific breakthroughs in cancer research or treatment.

For each article, a MEDLINE search was undertaken in July 2003 for the quoted scientist and subject to locate any scientific publications describing the alleged breakthrough.

The newspaper articles were categorised into cancer subspecialty areas (breast, ovarian, cervical, colorectal, skin, haematological, paediatric, radiotherapy, general anticancer drugs, genetics and cancer prevention) and sent to experts currently listed by the Cancer Council NSW as scientific reviewers for peer reviewed grants in these subspecialties. Each cancer expert was sent one newspaper article along with an abstract of the most relevant journal article. The experts were also sent a questionnaire containing seven statements about the current status of the reported research and asked if they strongly agreed, agreed, were neutral or undecided, disagreed or strongly disagreed with each statement.

Experts who did not reply within 6 weeks were sent a reminder. If there was still no response, the article was sent to a reserve expert.

School of Public Health, University of Sydney, Sydney, NSW.

Ethel S Ooi, MB BS, MPH Student; Simon Chapman, PhD, Professor.

Reprints will not be available from the authors. Correspondence: Professor Simon Chapman, School of Public Health, University of Sydney, Camperdown, NSW 2006. simonchapman@health.usyd.edu.au

1: Newspaper reports on cancer “breakthroughs” and expert assessment of their importance after 10 years

Headline (date of publication)	Précis of newspaper report	Expert comments on importance
A new therapy for skin cancer (5 May 92)	Treatment of basal cell carcinomas with interferon A will decrease scarring and may be an acceptable alternative. ¹⁷	Has been incorporated into practice and contributed to subsequent research.
Hope for tumours in gene therapy (13 Jun 92)	Injecting mouse cells with a genetically modified virus to treat inoperable brain tumours. ¹⁸	Still has potential and has contributed to subsequent research. Not currently used clinically.
US finds cancer vaccine (1 Aug 92)	A vaccine developed for melanoma will improve survival in patients with metastases. ¹⁹	Current trials under way. Still has potential, is used for other diseases and has contributed to further research.
New proton therapy zeroes in on tumours (6 Aug 92)	Proton treatment will destroy cancer cells and double cure rates. ²⁰	Not considered a new breakthrough. Not supported by further research.
Disease breakthrough (16 Sep 92)	Geneco technology will fast track the early detection of genetic cancers using enzymes rather than radioactive labels. ²¹	Substantiated, used for other diseases and has contributed to subsequent research. Extension to mass screening is not supported.
New PAP smear campaign launched (22 Sep 92)	A new device, Polarprobe, offers early cervical cancer detection. ²²	Substantiated and incorporated into current practice. Potential remains.
New clue to cancer's cause —damage to body's 'guardian' gene may start tumours (17 Oct 92)	<i>p53</i> and <i>cyclin</i> are crucial genes in the formation of cancer. ²³	Still has potential, contributed to further knowledge and used for other diseases.
Test for cancer vaccine (28 Oct 92)	Immune response to E7 protein will stop the spread of cervical cancer. ²⁴	Has made a significant contribution to further research and shows greater promise. Potential remains; treatment vaccines are in clinical trials.
Cancer link clue in gene defects (4 Feb 93)	The gene associated with Beckwith–Wiedemann syndrome may also cause a tendency to develop cancers. ²⁵	Potential remains but there has not been much progress since.
Aspirin reduces cancer risk: study (16 Mar 93)	Aspirin reduces the risk of gastrointestinal cancer by 40%. ²⁶	Shows greater promise than initial reports, still has potential, has been substantiated, is used for other diseases and is a significant contribution to further research.
Test gives hope to cancer victims (26 Mar 93)	Simple blood test based on inhibin will detect early ovarian cancer. ²⁷	Expert commented that “report is misleading” and there is no “real benefit of inhibin.” Has not been supported by further research but is used for other diseases.
New hope for ovarian cancer patients (3 May 93)	There is improved survival after high doses of chemotherapy together with autologous bone marrow transplants for ovarian cancer. ²⁸	Not substantiated. Expert commented that the report is “marketing” related. Further research refutes and does not support this breakthrough.
Umbilical cord offers cancer hope (2 Jun 93)	Umbilical cord transplants can cure certain leukaemias or anaemias. ²⁹	Has been substantiated, is used for other diseases and is a significant contribution. Has not been supported, but is not refuted, by further research. Still has potential.*
Breast cancer vaccine hope from mice tests (4 Jun 93)	Antibodies produced by mice in response to breast cancer cells may give a breast cancer vaccine. ³⁰	There is still potential requiring more research. Has been extended to other diseases.
Researchers develop new blood test for cancer (13 Jun 93)	A simple new blood test will detect 40% of gastrointestinal cancers. ³¹	Has potential but more research required.
Discovery that gave tiny James hope (23 Jun 93)	A faster test based on neuroblastoma genetic material has been developed and will also enable prognosis to be determined. ³²	Not a new breakthrough, expert commented that it was a “me-too” report following the discovery by others. Not supported by further research. Already incorporated into practice.*
World's first treatment saves Ayman's brain (9 Jul 93)	Slow infusion of vincristine improves the survival rate of people with brain tumours. ³³	Not supported by further research.
Peptide signs deal with UK government (22 Jul 93)	Diabodies, antibody fragments with a novel molecular format, will revolutionise treatment and diagnosis of cancer. ³⁴	Potential remains; expert commented that report may have influenced share prices.
The cancer beater, and it's all done with a freezing probe (12 Nov 93)	Cryotherapy is now used to freeze liver, bowel and prostate cancer. ³⁵	Expert commented that although this may be used on a very select subgroup, other methods of tumour ablation show more promise.
Breast cancer hope (14 Jan 94)	Breastfeeding reduces the risk of breast cancer by half. ³⁶	Not supported by further research although some future potential remains.

* Some apparently conflicting comments may have applied to different claims in the newspaper report.

1: (continued) Newspaper reports on cancer “breakthroughs” and expert assessment of their importance after 10 years

Headline (date of publication)	Précis of newspaper report	Expert comments on importance
Shane takes his chances with drug (1 Mar 94)	Interferon may be used to treat malignant brain tumours (no relevant research publication was found).	Is used for other diseases, there is still potential but not incorporated into current practice.
Caution over tumour claims (7 Apr 94)	A drug, 105AD7, will contain colon cancer in previously unresponsive patients. ³⁷	Has been refuted and not supported by further research, but potential remains.
A neglected killer identified (5 May 94)	Routine testing for the <i>BRCA1</i> gene will be available in 1–2 years. ³⁸	Substantiated, used for other diseases, potential remains and is a significant contribution to research, but risk estimates are overstated in report.
Research uncovers breast cancer gene (9 May 94)	The discovery that the <i>p16</i> gene causes breast cancer may lead to future drug treatment. ³⁹	Not supported by further research.
Hormone tamed (19 May 94)	Genetically engineered granulocyte-macrophage colony-stimulating factor will limit the growth of leukaemia cells. ⁴⁰	Currently undergoing clinical trials. There is uncertainty about its future, but potential remains and has been extended to other diseases.
RNS research team makes breakthrough in cancer detection (1 Sep 94)	A method to detect the <i>RET</i> gene in familial multiple endocrine neoplasia type 2 has been found and will save lives. ⁴¹	Substantiated and incorporated into current practice. Has not been supported by further research.*
Cancer project a family affair (3 Sep 94)	The testicular cancer gene will soon be identified, which will help the understanding of this cancer. ⁴²	The article is advertising for patients to participate in the study. It continues to show promise.
A step closer to ovarian cancer screen test (11 Oct 94)	Antibody OVX1 can lead to earlier ovarian cancer detection than CA125. ⁴³	Not supported by further research, has not been heard of since.
Australian cell breakthrough raises hopes for cancer treatment (7 Dec 94)	The protein actin may be harnessed to combat cancer. ⁴⁴	Not substantiated by research and no further potential.
New drug to halt cancer successfully treated in lab (31 Dec 94)	The antibody LM609 chokes off blood supply for cancer cells. ⁴⁵	Not substantiated by further research, has been refuted, and no further potential.

* Some apparently conflicting comments may have applied to different claims in the newspaper report.

RESULTS

Thirty-one unique articles describing an alleged specific breakthrough in cancer research or treatment were identified. Scientific articles were located on MEDLINE for 30 of these newspaper articles. In three cases, the newspaper articles appeared to have been published well (up to 6 years) in advance of scientific publications describing the research.

A total of 34 cancer experts were invited to participate. Questionnaires were returned within 4 months for 30 of the 31 newspaper articles. For three articles, the initial expert did not respond, and a second expert was invited. No response was received for one article, on gene therapy in melanoma.

The 30 newspaper articles included in the study are described in Box 1. The current importance of the alleged breakthroughs is summarised in Box 2. Thirteen breakthroughs (43%) were

considered not to be supported by subsequent research, with three (10% of the total) having been refuted by research. Sixteen breakthroughs (53%) were judged to have continuing potential, and eight (27%) to have been incorporated into current practice. Ten breakthroughs (33%) were considered to have created knowledge that was applicable to other diseases. Nearly a third (9 or 30%) were judged to have been a significant contribution to subsequent research, while three (10%) were considered to have greater promise now than initially reported.

DISCUSSION

We found that 31 reports of different cancer breakthroughs appeared in 3 years in one Australian newspaper — nearly one per month. All were positive about the significance of the finding. Ten years later, 13 (43%) of these reports were judged as not having been

supported by further research, with three (10%) having been refuted. Just over one in four had, or would soon be, incorporated into current practice or patient care.

As cancer is both feared and common, it is understandable that research promising hope in our understanding and treatment of this disease is attractive to the news media. However, the frequency and positive nature of these news reports may imply that a cure for the particular cancer, and perhaps for cancer in general, is imminent. With just over a quarter of reported breakthroughs being incorporated into practice a decade later, the falseness of this hope is obvious.

While progress in medicine is nearly always “evolutionary”, newspaper reports of developments are typically framed as “revolutionary”.⁴⁶ The need for brevity in newspaper reports mitigates against anything more than a headline-driven summary of a study; the cautious and conservative nature of

2: Assessment by experts of 30 cancer “breakthroughs” 10 years later

Statement	Number of “breakthroughs” for which expert:		
	Agreed/strongly agreed	Was neutral/ undecided	Disagreed/strongly disagreed
<i>Reported discovery/breakthrough:</i>			
Has not been supported by further research	13 (43%)	6 (20%)	11 (37%)
Has been refuted by subsequent research	3 (10%)	10 (33%)	17 (57%)
Remains a potential breakthrough but more research is required	16 (53%)	4 (13%)	10 (33%)
Has been substantiated and has been/will soon be incorporated into current practice or patient care	8 (27%)	2 (7%)	20 (67%)
Now shows greater promise than initially reported	3 (10%)	9 (30%)	18 (60%)
Is now also used for other diseases besides the initial disease	10 (33%)	8 (27%)	12 (40%)
Represented a significant contribution to subsequent research breakthroughs	9 (30%)	6 (20%)	15 (50%)

scientific assessment is seldom allowed space. In addition, few readers would have the knowledge or critical skills to evaluate alleged breakthroughs or place them in perspective in the field. Readers are also unlikely to follow the progress of the research or its translation into clinical practice.

Breakthrough reports may also reinforce a belief among people who are not living with cancer that “science will conquer all”, potentially undermining efforts to modify cancer risk factors such as smoking and sun exposure. These reports may also consolidate a community belief that cancer control is mainly about attacking cancer after it is detected, rather than preventing its development. The drama and heroics implied in breakthrough reports, together with the journalistic convention of including a (usually welcoming) response from a person living with the disease, create stories that are often far more compelling than the sometimes imperceptible gains reported by epidemiological cancer research.

Publication and publicity bias favouring studies with positive outcomes are understandable. Negative or equivocal findings have little news or public relations advantage unless they overturn conventional wisdom or practice, no matter how important they may be to the progress of science. There are strong pressures to publish good news

in research; the publicity can raise the profile of research institutions, universities and hospitals and attract benefactors. The added imperative for each media outlet to be the first to report a breakthrough can also generate errors and important omissions.⁴⁷

Scientists, institutions, research journals and the news media are mutually dependent,⁴⁸ and the breakthrough story seems destined to remain a staple of medical reporting. The person who benefits least is the consumer. Editors of medical journals would do well to require authors to include perspectives on breakthroughs that are intelligible to lay people and that address:

- What questions remain before this research could conceivably be of benefit to patients?
- Have patient trials been conducted, and with what results?
- How long is it likely to be before these findings are commercialised, pass through regulatory processes and become available to patients?

Our study has two important limitations which might be addressed in future research. Ideally, more than one expert should have reviewed each of the 30 newspaper reports. Secondly, studies involving cancer patients and the general public are needed to assess the impact of regular reports of cancer breakthroughs on patient expectations

and the general public’s beliefs about progress in cancer control.

REFERENCES

1. Lupton D. Medical and health stories on the Sydney Morning Herald’s front page. *Aust J Public Health* 1995; 19: 501-508.
2. Burns RB, Moskowitz MA, Osband MA, Kazis LE. Newspaper reporting of the medical literature. *J Gen Intern Med* 1995; 10: 19-24.
3. Pentz RD, Flamm AL, Sugarman J, et al. Study of the media’s potential influence on prospective research participants’ understanding of and motivations for participation in a high-profile phase I trial. *J Clin Oncol* 2002; 20: 3785-3791.
4. Chen X, Siu LL. Impact of the media and the Internet on oncology: survey of cancer patients and oncologists in Canada. *J Clin Oncol* 2001; 19: 4291-4297.
5. Benelli E. The role of the media in steering public opinion on health care issues. *Health Policy* 2003; 63: 179-186.
6. Moynihan R, Bero L, Ross-Degnan D, et al. Coverage by the news media of the benefits and risks of medications. *N Engl J Med* 2000; 342: 1645-1650.
7. Koren G, Klein N. Bias against negative studies in newspaper reports of medical research. *JAMA* 1991; 266: 1824-1826.
8. Olson CM, Rennie D, Cook D, et al. Publication bias in editorial decision making. *JAMA* 2002; 287: 2825-2828.
9. Crandall RL. Research funding and the media. *JAMA* 1991; 266: 1279, 1282.
10. Dow S. The politics of breast cancer. *The Australian* 1994 Apr 16-17; *The Weekend Magazine*: 35.
11. Entwistle V. Reporting research in medical journals and newspapers. *BMJ* 1995; 310: 920-923.
12. Van Trigt AM, De Jong-Van Den Berg LTW, Voogt LM, et al. Setting the agenda: does the medical literature set the agenda for articles about medicines in the newspapers? *Soc Sci Med* 1995; 41: 893-899.
13. Van Trigt AM, De Jong-Van Den Berg LTW, Haaijer-Ruskamp FM, et al. Journalists and their sources of ideas and information on medicines. *Soc Sci Med* 1994; 38: 637-643.
14. de Semir V, Ribas C, Revuelta G. Press releases of science journal articles and subsequent newspaper stories on the same topic. *JAMA* 1998; 280: 294-295.
15. Stryker JE. Reporting medical information: effects of press releases and newsworthiness on medical journal articles’ visibility in the news media. *Prev Med* 2002; 35: 519-530.
16. Phillips DP, Kanter EJ, Bednarczyk B, Tastad PL. Importance of the lay press in the transmission of medical knowledge to the scientific community. *N Engl J Med* 1991; 325: 1180-1183.
17. Cornell RC, Greenway HT, Tucker SB, et al. Intraleisional interferon therapy for basal cell carcinoma. *J Am Acad Dermatol* 1990; 23(4 Pt 1): 694-700.
18. Culver KW, Ram Z, Wallbridge S, et al. In vivo gene transfer with retroviral vector-producer cells for treatment of experimental brain tumors. *Science* 1992; 256: 1550-1552.
19. Morton DL, Foshag LJ, Hoon DS, et al. Prolongation of survival in metastatic melanoma after active specific immunotherapy with a new polyvalent melanoma vaccine. *Ann Surg* 1992; 216: 463-482.
20. Slater JM, Slater JD, Archambeau JO. Carcinoma of the tonsillar region: potential for use of proton beam therapy. *Int J Radiat Oncol Biol Phys* 1992; 22: 311-319.
21. Pecheniuk NM, Marsh N, Walsh TP, Dale JL. Use of first nucleotide change technology to determine the frequency of factor V Leiden in a population of Australian blood donors. *Blood Coagul Fibrinolysis* 1997; 8: 491-495.
22. Quek SC, Mould T, Canfell K, et al. The Polarprobe — emerging technology for cervical cancer screening. *Ann Acad Med Singapore* 1998; 27: 717-721.
23. Buckley MF, Sweeney KJ, Hamilton JA, et al. Expression and amplification of cyclin genes in human breast cancer. *Oncogene* 1993; 8: 2127-2133.
24. Tindie RW, Fernando GJ, Sterling JC, Frazer IH. A “public” T-helper epitope of the E7 transforming pro-

- tein of human papillomavirus 16 provides cognate help for several E7 B-cell epitopes from cervical cancer-associated human papillomavirus genotypes. *Proc Natl Acad Sci U S A* 1991; 88: 5887-5891.
25. Besnard-Guerin C, Cavenee WK, Newsham I. A new highly polymorphic DNA restriction site marker in the 5' region of the human tyrosine hydroxylase gene (TH) detecting loss of heterozygosity in human embryonal rhabdomyosarcoma. *Hum Genet* 1994; 93: 349-350.
 26. Thun MJ, Heath CW Jr. Aspirin use and reduced risk of gastrointestinal tract cancers in the American Cancer Society prospective studies. *Prev Med* 1995; 24: 116-118.
 27. Healy DL, Burger HG, Mamers P, et al. Elevated serum inhibin concentrations in postmenopausal women with ovarian tumors. *N Engl J Med* 1993; 329: 1539-1542.
 28. Thigpen JT, Bertelsen K, Eisenhauer EA, et al. Long-term follow-up of patients with advanced ovarian carcinoma treated with chemotherapy. *Ann Oncol* 1993; 4 Suppl 4: 35-40.
 29. Vowels MR, Tang RL, Berdoukas V, et al. Brief report: correction of X-linked lymphoproliferative disease by transplantation of cord-blood stem cells. *N Engl J Med* 1993; 329: 1623-1625.
 30. Apostolopoulos V, Xing PX, McKenzie IF. Murine immune response to cells transfected with human MUC1: immunization with cellular and synthetic antigens. *Cancer Res* 1994; 54: 5186-5193.
 31. Pilbrow SJ, Hertzog PJ, Linnane AW. The adenoma-carcinoma sequence in the colorectum — early appearance of a hierarchy of small intestinal mucin antigen (SIMA) epitopes and correlations with malignant potential. *Br J Cancer* 1992; 66: 748-757.
 32. Telford DJ, Kavallaris M, White L, et al. Association of N-myc amplification with neuroblastoma: the Australian and New Zealand experience. *J Paediatr Child Health* 1992; 28: 58-63.
 33. Kellie SJ, De Graaf SSN, Bloemhof H, et al. Neurotoxicity and pharmacokinetics of 96-h vincristine infusion in children with CNS tumors [abstract]. International Society of Pediatric Oncology, SIOP XXVII meeting; 1995 Oct 10-14; Montevideo, Uruguay. *Med Pediatr Oncol* 1995; 25: 258.
 34. Holliger P, Prospero T, Winter G. "Diabodies": small bivalent and bispecific antibody fragments. *Proc Natl Acad Sci U S A* 1993; 90: 6444-6448.
 35. Preketes AP, King J, Caplehorn JR, et al. CEA reduction after cryotherapy for liver metastases from colon cancer predicts survival. *Aust N Z J Surg* 1994; 64: 612-614.
 36. Newcomb PA, Storer BE, Longnecker MP, et al. Lactation and a reduced risk of premenopausal breast cancer. *N Engl J Med* 1994; 330: 81-87.
 37. Denton GW, Durrant LG, Hardcastle JD, et al. Clinical outcome of colorectal cancer patients treated with human monoclonal anti-idiotypic antibody. *Int J Cancer* 1994; 57: 10-14.
 38. Ford D, Easton DF, Bishop DT, et al. Risks of cancer in BRCA1-mutation carriers. *Lancet* 1994; 343: 692-695.
 39. Musgrove EA, Lilisckis R, Cornish AL, et al. Expression of the cyclin-dependent kinase inhibitors p16INK4, p15INK4B and p21WAF1/CIP1 in human breast cancer. *Int J Cancer* 1995; 63: 584-591.
 40. Hercus TR, Bagley CJ, Cambareri B, et al. Specific human granulocyte-macrophage colony-stimulating factor antagonists. *Proc Natl Acad Sci U S A* 1994; 91: 5838-5842.
 41. Marsh DJ, Robinson BG, Andrew S, et al. A rapid screening method for the detection of mutations in the RET proto-oncogene in multiple endocrine neoplasia type 2A and familial medullary thyroid carcinoma families. *Genomics* 1994; 23: 477-479.
 42. Faulkner SW, Leigh DA, Oosterhuis JW, et al. Allelic losses in carcinoma in situ and testicular germ cell tumours of adolescents and adults: evidence suggestive of the linear progression model. *Br J Cancer* 2000; 83: 729-736.
 43. Berek JS, Bast RC Jr. Ovarian cancer screening. The use of serial complementary tumor markers to improve sensitivity and specificity for early detection. *Cancer* 1995; 76(10 Suppl): 2092-2096.
 44. De Silva R, Englezou A, Schevzov G, et al. Induction of anchorage independent growth and serum resistance in immortalized human bronchial epithelial cells by alteration of the cytoskeleton. *Cell Mol Biol Res* 1994; 40: 323-335.
 45. Brooks PC, Montgomery AM, Rosenfeld M, et al. Integrin alpha v beta 3 antagonists promote tumor regression by inducing apoptosis of angiogenic blood vessels. *Cell* 1994; 79: 1157-1164.
 46. Rowe SB. Food for thought: an in depth look at how the media report nutrition, food safety, and health. *Am Med Writers Assoc J* 2000; 15: 5-9.
 47. Johnson T. Shattuck Lecture — medicine and the mass media. *N Engl J Med* 1998; 339: 87-92.
 48. Nelkin D. An uneasy relationship: the tensions between medicine and the media. *Lancet* 1996; 347: 1600-1603.

(Received 23 Sep 2003, accepted 20 Oct 2003) □

DrFarrahCancerCell.com