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Recommendations for health reporting: Proposal of a working paper

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Abstract

Objective: Media are a main source of medical information for the public, as well as for decision makers. This scenario demands a good selection of stories and correct medical reporting.

Design: Our study aimed to analyze if journalistic guidelines or similar documents were already available and whether they provided satisfactory advice for appropriate communication in the field, and to detail recommendations which could become a reference working document.

Methodology: Sources for this paper were obtained from PubMed and from websites (and related links) of organizations known to be working in the area of health reporting. Documents providing recommendations for the activity were analyzed and compared through a scheme including nine macro-categories relevant to the selection, verification and building of the story, considering scientific and journalistic issues. The scheme was derived from the most complete document. We then compiled a comprehensive list of recommendations merging the contents of the documents considered and our professional experience.

Results: Nine existing guidelines and similar documents representing the worldwide situation were compared. All the documents examined provided interesting indications. Some of these indications shared the basic principles of mainstream journalism (reliability and independence of sources); others were more specific, such as the understanding of the scientific method and its jargon, the need to avoid extrapolations and to understand the difference between *in vitro* and animal studies and clinical trials, statistical parameters, and so on. Most of the topics specific for health communication are concepts which can be grasped only with an adequate scientific background and continuing education. The nature and level of the details provided by these documents vary considerably and in most cases can be fully understood only by experienced journalists with a relevant background.

Discussion: Our proposal provides a useful tool listing nearly 70 recommendations ranging from the education of journalists, to all the aspects of selection, understanding and translating of medical and drug information deriving from scientific reports. It is intended for a journalist with a biomedical background, and therefore highlights critical issues without providing detailed descriptions. The proposal endeavors to answer to the main criticisms of medical journalism, particularly the use of sources, the verification of clinical value,

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the need to follow up on the story. Our work focuses on the prerequisite for a medical journalist to acquire the knowledge that enables him to assess the results of pharmacological and medical research in order to accurately and reliably convey his message to a lay reader. The strength of our working paper derives from the preliminary 'benchmarking' of existing documents, as suggested in the literature, but even more so from the concerted effort of the authors, who represent the key stakeholders of the system (researchers, academic teachers, medical journalists and publishers).

Conclusion: Our work identifies the major issues entailed in correct health reporting, and constitutes a step forward in overcoming existing barriers between scientists and journalists. The aim is to encourage the mediation of 'public-centred' information, which limits the false hopes and expectations that may arise due to communication problems between the two worlds.

Keywords

codes, guidelines, health communication, mass media, medical journalism, working paper

Introduction

According to research carried out in western countries[1,2], the lay public's interest in scientific topics – particularly anything concerning health, medical practice and drugs – is growing continuously throughout the world. Correspondingly, mass media also show a keen interest in these topics.

The growing demands on health care – eg risk factors and lifestyles to prevent chronic diseases and to defeat infectious diseases and potential pandemics – require stable and reliable information sources in today's evolving (and often confused) health care systems. News media and the internet are now the major sources of information for the public about medicine-related issues, but there is concern that some coverage may be inaccurate and overly enthusiastic, a conclusion reached by the first systematic content analysis of a random sample of news articles on specific drugs[3].

In contrast with the need of the public to understand health problems in a social context, the relationship between scientists and the media is often uneasy due to the complexity of the scientific method and its jargon. Physicians become irritated when the press turn the results of a new study into a health crisis[4]: the medical community needs time to evaluate the preliminary results, while the journalist is looking for news for front-page stories. The role of the media in delivering these findings to the public is important for the high volume of information to be conveyed, the speed with which it is communicated, and the simplicity (compared to the scientific article) of its reporting. There is a consensus that accuracy and completeness should be essential components of health news, especially in view of the increased role individuals take in managing their health. To avoid fears and false hopes there is no room for incomplete and inaccurate information. In the last few years the press have covered a number of emerging diseases – from 'mad cow' disease to SARS and avian flu – and with their announcement of impending global health risks, they have contributed to engendering a sense of anxiety and panic due to the saturation of news and the speed with which it circles the globe. Anxiety has been aggravated by the apparent inability of technology to provide medical solutions, but also by the use of terms emphasizing negative emotions (such as fear, confusion, risk, danger), thereby constructing emerging diseases in an apocalyptic manner.

In this confusing situation, journalists accuse the medical community of limiting access to information and of erecting barriers to the public dissemination of medical research. On the other hand, scientists and physicians blame the press for 'hyping' their reporting[4]. Unfortunately, the use of articles from scientific literature is not a safe means of assuring quality, even if papers have been submitted to a peer review process. In fact, scientific literature does not distinguish between biomedical information, which is of interest to the researcher, and clinical information, which is of interest to the

doctor and his practice – and thus the patient. The journalist must be able to critically select the news and translate every step of the scientific research. This is difficult within the daily routine of journalism (lack of time, space and knowledge; speed of technology and overload of information).

The need to bridge the gap between science and society is great and is shared by all the private and public stakeholders in the system: academics, scientists, governments, mediators, and the lay public. A new way to deliver medical and health information must be developed, one which guarantees balanced and scientifically correct reporting: information which maintains the rules of science, in respect of the journalistic basics. The press should be translators of scientific jargon, as well as selectors of sources and content, and check every step of the research. Wrong information could prompt patients to seek out costly cures, or to embark on hopeful journeys, to find the miraculous cure to rebuild their diseased organs. The public, including decision makers, normally places a great deal of trust in the mass media. People are looking for the clear, fast and easily accessible messages that the press and other media can deliver. The 1970s witnessed the advent of a new form of journalism based on social science research method: precision journalism[5]. In a period of information overload, the journalist must be a filter, an organizer to improve the standard of journalism by adopting the scientific method to make news. There are several fundamental points that a good scientific journalist, like any scientist, should know: how to find the latest information, how to assess it, how to analyze and filter it, how to use it best, how to render it accessible and useful to the general public, and how to deal with information biased by conflict of interest. The general rules of good journalism do not cover medical journalism enough; medical research reports are not targeted for journalists and the results reported are not easily understood and selected. Are instruments available that allow journalists to effectively put these rules into practice?

Health reporting is now at a pivotal crossroads, where a strong need for quality must complement a new form of creative writing. Blogs about single experiences continue to grow: case reports outside any scientific research, assuming an unknown emphasis; a desperate celebration of an individual voice, a description of fears and pain in a narrative form, but also a means to conquer illness, suffering and solitary death.

Aims

The aims of this study were: (i) to assess the existence of practical recommendations enabling health reporters to translate medical and clinical information into reliable and usefulness of news articles, and (ii) to propose a clear working document listing a complete set of recommendations in this field.

Materials and methods

(i) Current documents for this paper were obtained from PubMed using the concepts *medical journalism*, *health communication*, *medical messages in the media*, *solutions to improve medical journalism*, and from visits to websites and links to related organizations known to be working in the area.

The selected documents were analyzed and compared for their contents in an empirical scheme consisting of nine macro-categories and relevant sub-categories which were derived from the most complete document.

(ii) Our proposal of recommendations is based on a comparison of the examined documents, integrated with issues deriving from direct experience in the professions and from the academic teaching curriculum.

Results

(i) Current documents

In the retrieved documents on the basis of their content, we identified (i) selection of the news (eg, the source of the evidence and any conflict of interest of authors, the protocol of the study); (ii) how to deal with contents when moving from the scientific article to the lay press article (type of study, statistical issues, details of treatment, verification) and (iii) general recommendations (eg, the use of terms, attention to emotional impact, the journalist's background and follow-up of the information disseminated).

Our analysis distinguished specific issues related to medical communication from unspecific and general issues relating to ethical and professional codes of journalism. Tables 1 and 2 illustrate two specific aspects, namely the use of words in news articles and particular recommendations regarding sources.

Short descriptions of the origin of the major documents selected and considered follow.

Table 1. Recommendations on the use of words in news articles

Document	Recommended qualifiers	Words of caution	Words to be avoided
Guidelines for print and broadcast journalists[6]	May Could Claims Possible Potential Absolute risk	Cause Cure Relative risk Odds ratios	
Reporting guidelines[7]			Wonder cure Near-miracles
Rating instruments (Category: Pharmaceutical)[8]	Absolute frames	Relative frames	
A statement of principles[10]	Absolute risk Number needed to treat (NNT)	Relative risk	Cure Miracle Breakthrough Dramatic Promising
Journalist Toolkit. Tips for Understanding Studies[11]	Absolute risk Number needed to treat (NNT)	Relative risk	Cure Miracle Breakthrough Promising Dramatic Hope Victim
Science, risk and the media[12]			Zero risk
A journalist's guide to covering prescription drugs[13]	Absolute magnitude of benefit or harm of a drug	Relative magnitude of benefit or harm of a drug	
Communication guidelines for journalists[14]	May	Cause Effect	Scientific breakthrough Medical miracle

Table 2. Recommendations on the use of scientific sources

Document	Recommended sources	Attention to	Caution with
Guidelines for print and broadcast journalists[6]	Peer reviewed journals	Reputation of the institute in which an investigation has taken place. Professional qualifications, track record and affiliation or interest of the investigators.	Unpublished works Conference papers Hand-out from press briefings
Rating instruments (Category: Pharmaceuticals)[8]		Conflict of interest	Press release as the only information source
A statement of principles[10]	More than a single source	Possible links between researchers and private companies, researchers and public institutions non profit health and professional organizations and their sponsor	Single-source stories
Journalist Toolkit. Tips for Understanding Studies[11]	More than a single source Peer reviewed journals	Financial, advocacy, personal or other interests	Single-source stories News from scientific meetings
Science, risk and the media[12]	Peer reviewed journals	Publication bias	Press release
A journalist's guide to covering prescription drugs[13]	Peer reviewed journals Independent sources	Publication in peer reviewed journals does not guarantee that the results provide meaningful information to evaluate the safety and effectiveness of new drug Conflict of interest	Meeting and conferences
Communication guidelines for journalists[14]	Peer reviewed journals Third-party health source	Conflict of interests of all sources of information – from scientists, to public relations/press offices, to journals, to industry, to consumer and special interest groups	Abstracts News releases Wire reports Other secondary sources of information

Guidelines for print and broadcast Journalists (2001)[6] is a consensus document of the Royal Institution of Great Britain (a society devoted to scientific dissemination), the Forum of the Social Issues Research Centre (a non-profit organization active in social research) and the Royal Society

of Great Britain (Academy of Science), one of the oldest scientific societies in Europe, and was approved by the UK Press Complaints Commission. The Guidelines are a part of the document 'Guidelines on Science and Health Communication' and were elaborated in response to a proposal of the House of Commons Science and Technology Committee. The document provides journalists with systematic indications to improve accuracy and reduce misrepresentation and distortion of scientific reports.

The major issues addressed are the reliability of sources, the correct understanding and interpretation of results deriving from scientific study, and the emotional impact of news. Recommendations are made to avoid the dissemination of unfounded public health alarms, as well as of false hopes, citing the fact that the harm and distress generated by reports of miracle cures are particularly difficult to measure. The focus on the reliability of sources is particularly stressed: the peer review system – with its innate exceptions and limits – is viewed as a major guarantee. The information emerging from the process is compared to the more debatable content of unpublished works, conference papers or hand-outs from press briefings that are not subject to such scrutiny. Journalists are urged to consider the reputation of the institute or academic department where an investigation has taken place, the professional qualifications and publication track record of the investigators and their affiliations (even though the impartiality of some particular affiliations is, at times, disputable). The credentials of researchers should be assessed through consultation with other scientists in the pertinent field. Regarding scientific studies, the importance of the methods used is considered and details on the assessment of results are provided, with the recommendation to ascertain if they are preliminary or inconclusive, if they differ markedly from evidence deriving from previous studies or appear to contradict mainstream scientific opinions, or if they are based on small or unrepresentative samples. The document also refers to statistics and points out that a statistically significant result may not be clinically relevant; a strong invitation to ensure the correct use and interpretation of statistical parameters and results is also given, such as the difference between 'absolute risk' and 'relative risk'. Titles and captions should be thought out, with a careful selection and use of terms; the same applies to images, tables and other info-graphics. The recommendation is to prefer qualifiers such as 'may', 'could' and 'possible', limiting the use of terms such as 'cause' and 'cure' to when they are justified by the scientific evidence.

Reporting guidelines (2001)[7] was issued by The Australian Press Council, the self-regulatory body of the print media in Australia, established in 1976 with two main aims: to help preserve the traditional freedom of the press within Australia and to ensure that the free press act responsibly and ethically. These guidelines are addressed to those working in print media, and provide suggestions on the ways in which newspapers and magazines should approach the reporting of medical matters, particularly novel and putatively effective treatment approaches. The document focuses on the risks linked to news about new treatments. Regarding emotional impact, the media have a responsibility to consider the impression that stories of medical breakthroughs might have on vulnerable, sick individuals. Moreover, reporters and writers may not be competent in judging the value or benefit of the reported treatments, be they pills, potions, vaccines and low-tech alternatives like herbal remedies, or high-tech wonders like dialysis machines. Regarding sources, journalists should cross-check information with other sources, and should be able to distinguish between anecdotes and evidence. Finally, journalists are recommended to assess whether conflicts of interests exist between researchers/clinicians and pharmaceutical companies.

The Media Doctor Canada *Rating instrument (Category: Pharmaceutical)*[8] is a checklist for journalism available from the Canadian web portal Media Doctor, as well as from the Australian web-portal Media + Doctor. The document lists rating criteria to assess health news stories. Evidence from press releases is considered unsatisfactory when the journalist uses these as the only

information source; news stories without mention of sources or with possible conflicts of interest are also considered as unsatisfactory. Conflict of interest is considered in the light of the broader case of disease mongering, with particular attention to the hawking of normal human variations and the consideration of risk factors as a disease. Great emphasis is given to details of treatments: satisfactory news stories are those which provide accurate information on the availability, cost, novelty of and alternatives to a treatment and those that quantify the dangers and benefits estimated in both absolute and relative terms or absolute terms only. Another important rating criteria is clinical evidence: where relevant, it is important to mention the strength of evidence and its correct interpretation. These guidelines are currently used by a group of Australian academics and clinicians to analyze medical reporting on new treatments[9]. Researchers in Canada, New Zealand and Pakistan have all expressed interest in replicating this service.

'A statement of principles for health care journalists'[10] embraces the Society of Professional Journalists' code of ethics and identifies some unique challenges. Regarding sources, the recommendation is to avoid single source stories, above all in view of a potential conflict of interest. It is important to recognize that most stories harbour a degree of nuance and complexity that no single source could provide, and journalists have a responsibility to present diverse viewpoints in context. Many vested interests reside among government health spokespersons, researchers, universities and drug companies, and journalists have to investigate and disclose relevant financial, advocacy, personal or other interests. An entire section is devoted to personal interest: journalists are recommended to avoid favoured treatment to advertisers and to resist pressure from them to influence news coverage. The importance of understanding the process of medical research in order to accurately report details is also emphasized, and the distinction between phase I, II and III drug trials is made. It is misleading to report any bold or conclusive statements about efficacy in phase I trials, since the primary goal of phase I trials is to evaluate safety, not efficacy. Journalists must give accurate portrayals of the status of research and be cautious in reporting results of preliminary studies, *in vitro* or animal studies, and must identify the meaning of results that indicate an association, rather than a causal link, between factors in a study. It is also important to quantify the magnitude of the benefit or the risk of a treatment, along with the possible outcomes of alternative approaches, including the choices of 'watchful waiting'. This document also contains a reminder on how to report on risk, which must be explained in terms of absolute risk. Regarding statistics it is necessary to consider the 'number needed to treat'. Journalists are required to avoid vague, sensational language such as 'cure', 'miracle' and 'breakthrough', and must ensure that headlines, teases and graphics do not oversimplify or misrepresent some of the elements to be considered when writing a scientific story. Other suggestions include avoidance of the 'tyranny of the anecdote': personal stories used as examples must be consistent with the larger body of evidence. To conclude, the Association of Health Care Journalists endeavors to influence the management of journalist organizations, advocating decisions that would implement proper training actions for employees on these complex topics.

The Statement of Principles for Health Care Journalists (US) is available from the web-portal FIMDM Health News Review, which originally produced the document *Journalist Toolkit. Tips for Understanding Studies*[11]. The two documents can be read together, since one complements the other by providing additional explanations and including new topics.

The document includes a full list of terms which journalists should avoid in medical news reporting, and attention is drawn to the need to assess the clinical phase of the study and to ensure the correct interpretation of statistics. The importance of peer reviewed journals is stressed, as is caution in writing stories on 'off label' drug indications and drugs not yet approved by the relevant regulatory agencies. Indeed, journalists should be particularly aware of the potential pitfalls of

'off-label' prescriptions, and should know that a regulatory authority's approval is not automatic. Many stories about drugs that are still in the clinical trial phase include some projection of when the drug will be submitted to regulators for approval, when the drug might be approved, or when the drug might be available on the market: far too often such projections are just shots in the dark. Until the trials are completed and the regulatory agency has made a decision, many of these predictions may be empty promises and could be proven wrong. Journalists are advised to be particularly careful when their source is a scientific meeting, since this pre-publication dissemination channel for medical research often brings findings to the public before the validity and importance of the work have been fully established by the scientific community.

Science, risk and the media. This checklist[12] is issued by the Social Market Foundation, a UK independent research center, to help journalists with medical news. Journalists are advised to be rigorous in their investigations, checking sources and not just relying on press releases, as well as distinguishing between scientific theory and studies and clinical evidence. Rather than just amplifying solitary voices, the need to measure the weight of evidence, in particular peer-reviewed information, is crucial. This is an invitation to avoid individual cases, anecdotal reports and unusual evidence, all of which have a strong newsworthy value in lay journalism. The importance of an adequate background for the medical and health communicator is emphasized, the opinion being that no journalists should be allowed to work in this area without an understanding of statistics or how to read a scientific paper. Moreover, journalists should endeavor to elicit the intervention of scientists who are often reluctant to talk about controversial issues. The document also refers to a well-known publication bias: when scientists undertake research relating to a potential hazard, there is a far greater likelihood they will get it published if they find a positive rather than a negative result (the so called 'positive result' bias).

A journalist's guide to covering prescription drugs[13] is issued by the Canadian Centre for Policy Alternatives (an independent research centre) and focuses on treatment, conflict of interest and study protocol. Journalists are asked to understand what research method was used in a given study, because research data on drugs is only as good as the study design and involving more patients for greater periods of time improves the strength of the data. The document concludes that a randomized controlled trial (RCT) is the only study design that yields reliable results. This is in agreement with the principles of evidence-based medicine, which deem RCT to be the lowest level of information which should be considered for clinical use (and thus for dissemination to lay people). Regarding sources, publication in peer-reviewed medical journals is suggested as more reliable in comparison with data presented at congresses or published in non peer-reviewed journals. Still, the peer-reviewed publication does not guarantee that the result provides meaningful information to evaluate the safety and effectiveness of drugs. Moreover, journalists must seek out independent sources of information for expert opinion on the quality of drug claims, since financial dependencies can strongly influence the interpretation of data. If an unapproved drug is discussed in an article, it is worth mentioning that its use has not been approved and there may be little to no evidence of benefits. Great emphasis is given to those details on treatment which should appear in the news article. The journalist should attempt to identify the following:

- Do the claimed benefits of the drug have a tangible impact on the health of patients?
- Is the article based on surrogate or intermediate endpoints that can lead to an exaggerated impression of drug effectiveness?
- Are the harmful effects of the drug mentioned?
- Have numbers been included to unambiguously explain the degree of benefit or harm?
- Have magnitudes of benefits and dangers been provided as absolute differences?

- How long do patients need to take the drug to achieve a benefit?
- Has the price of the drug therapy been included in the article?
- Are there contraindications?
- Are there drug and non drug alternatives to the drug of interest, and have these been included in the story?

According to the Canadian Center for Policy Alternatives, the ability to answer some of these queries requires a biomedical background.

IFIC Communication Guidelines for Journalists[14] was issued by the US International Food Information Council Foundation (IFIC), which participates in an informal network of independent food information organization in Europe and elsewhere in the world. In fact, these same guidelines are also present on the Asian Food Information Centre (AFIC) website. It is an integral part of the document *Improving Public Understanding: Guidelines for Communicating Emerging Science on Nutrition, Food Safety and Health*. As regards sources, and hence selection, these guidelines list as priority issues the following: reliability, comparison with experts, revision, the use of the same parameters to all sources, the importance of referring to the entire published study and not only to the contents of the abstract, media releases or wire reports, or any other secondary source of information. The understanding of the study protocol and its results is important: items to be considered are the presence of a control group, randomization, double blind study, plausible results, a careful examination of limits and its newsworthiness. Particular attention must also be paid to titles and info-graphics, conflict of interest and terms (eg, the use of 'may' instead of 'will', 'some' instead of 'all' or 'most' people, and avoidance of hyper words such as 'miracle').

Turning to the Italian situation, in this paper we have considered only the *Manifesto for Information*[15], even if other local attempts are available. The *Manifesto* is intended as a sort of checklist, developed in 1998 and endorsed by a group of Italian scientific journalists. The *Manifesto* was, for all practical purposes, the outgrowth of the Italian media case surrounding the Di Bella cancer multi-therapy, which was highly publicized and caused a public frenzy for this banned miracle cure ultimately proved ineffective when experimentally tested[16]. The scope of the which *Manifesto* was to instill in the mass media a more critical and less sensationalistic attitude towards health issues. Information is expected to draw a clear line between science and faith, facts and hopes, to respect the truth and to avoid any negative emotional impact that alarmistic or illusionary news could have on readers.

(ii) Proposal for a working paper

The rationale underlying our proposal arises from the consideration that the major selected documents are partially incomplete and sometimes complementary. Moreover, not all the health reporters have a proper medical background, and in any case the high specialization of medical sciences[17] represents a limit even to those who are medically qualified.

Our proposal provides a working instrument for medical journalists and health reporters, that is meant to alert them to the major issues underpinning the key phases entailed in the process of writing: to select published and unpublished medical research, to assess, understand and verify the sources[18], to translate the information from clinical studies into useful medical reports, with particular emphasis given to drug reports, to construct according to the concept of evidence-based journalism[19] and in the light of journalistic news values. We have also considered the importance of following up on stories, which is particularly relevant for retractions, which clearly are not new

press releases[20], and have provided some advice on 'desirable' information and services. In practice, we have adapted the so-called 5 'W's of journalism – who, what, when, where, why; adding to these 'how' – to the reality of health reporting and have given indications on how, where appropriate, to select on the basis of the news' value. Our detailed recommendations cover nearly 70 individual issues to be considered and analyzed, which are clustered in eight categories:

1. Education. We recommend a specific background and continuing education.
2. Selection. We advise journalists to:
   - consider medical papers alerted from scientific journals for media diffusion;
   - read abstracts for patients, when available;
   - consider papers published in peer-reviewed journals, with their innate exceptions and limits, as a major guarantee;
   - select from papers commented on in editorials;
   - be careful with results presented at congresses, which do not undergo the peer-review process;
   - be cautious with press releases and handouts from press briefings and refer to the original publication;
   - be cautious of unpublished work;
   - assess works presented in media releases or conferences by the academic institute that did the research;
   - avoid wasting time with inaccurate or inconclusive research and be careful with preliminary results;
   - do not use studies based solely on statistical extrapolations and findings;
   - assess the sample and its statistical value; avoid studies with small and unrepresentative samples;
   - assess the accuracy of the statistical method and type of study;
   - consider alternative explanations or interpretations for the results;
   - find out what stage the clinical trial is at;
   - identify those results that indicate an association rather than a casual link;
   - watch out for disease mongering;
   - read the papers in the light of the news values;
   - avoid reporting of anecdotal cases, unusual evidence, individual voices, even if they all have great journalistic value;
   - assess whether international data can be extrapolated to the local situation;
   - assess the potential impact on your audience.
3. Assessment of sources. We recommend that journalists should:
   - consider the reliability, authoritativeness and current interest of the sources;
   - consider the reputation of the academic institutions that did the research, even if particular affiliations are at times disputable;
   - consider the reputation of the research group and of the authors and their publication track record;
   - watch out for clear or hidden conflicts of interest of any nature (between researchers and industry, personal interest of researchers and socio-economical);
   - be very careful when using abstracts, news releases, wire reports, or other secondary sources of information;
   - be careful also with peer reviewed articles;
   - consider the 'positive result' publication bias;
   - use the same parameters for all sources.

4. Verification. Under this item, we recommend to:
   - be rigorous in your investigation;
   - cross check the information with other sources;
   - consider if results differ markedly from previous studies and contradict mainstream scientific opinions;
   - ask for a second opinion from other members of the scientific community, particularly in the case of controversial issues;
   - analyze critically the data, especially if distributed by industry, at press conferences or in press releases;
   - check whether the results differ significantly from those reported in earlier studies and try to find a reasonable explanation;
   - consider what we already know and what is new.
5. Contents of stories:
   - base the story on reading the full paper;
   - always indicate your sources;
   - make a distinction between data (facts) and opinions (theory);
   - draw a clear line between science facts and faith hopes;
   - indicate the strength and power of the results presented;
   - make a quantitative estimate of the benefits using absolute data and NNT (numbers needed to treat to obtain the benefit);
   - specify whether tests were *in vitro* or in animals, and indicate the potential clinical relevance;
   - state clearly if the results are not final and when firm proof might be available;
   - state why no assurance can be given about results, or if there is no absolute certainty;
   - outline the natural course of the disease;
   - indicate funding;
   - avoid sensationalism in the title, captions, images, tables and info-graphics;
   - avoid the dissemination of public health alarms and false hopes;
   - indicate the value of a risk factor, by comparing it, for instance, with the weight of other risks;
   - use words like: ‘may’, ‘could’, ‘claims’, ‘possible’, ‘potential’;
   - avoid words like: ‘cure’, ‘miracle’, ‘breakthrough’, ‘promising’, ‘dramatic’, ‘hope’, ‘victim’, ‘zero risk’, ‘medical miracle’;
   - reduce coverage of suicide stories to avoid copycats;
   - consider the principle of precaution.
6. Contents for drug stories:
   - call a drug ‘innovative’ only if from it derives a new II or III class in the ATC classification;
   - call a drug ‘new’ only if it has been available for less than two years;
   - be cautious with off-label drugs or indications;
   - avoid efficacy statements for phase I and II studies, which are meant to evaluate safety; “or run in small numbers of patients”;
   - indicate whether the drug is locally available on prescription and reimbursed by National Health System;
   - indicate the clinical effects of the drug;
   - always provide information on warnings, contraindications, frequency and severity of adverse reactions;
   - avoid encouraging drug consumption;
   - avoid encouraging the use of drugs in situations that are not pathological or are still controversial;

   - set the drug in its appropriate context by comparing it with existing drug and non drug options, including careful watching;
   - report the cost compared to existing therapies, and state whether generic drugs are available for the same indication;
   - stress the doctor's role in relation to prescription drugs;
   - avoid mentioning regulatory approval, which is not automatic.
7. Follow-up is critical:
   - make any corrections as obviously and promptly as the original article;
   - provide similar emphasis to retractions as to original article;
   - follow-up on the topic from the international literature.
8. Page lay-out and 'nice to have':
   - avoid mixing information and advertising;
   - indicate an expert to contact for advice;
   - identify local centres of excellence;
   - create a clear framework;
   - ask the editor for space for discussion and comparison;
   - use info-graphics.

The proposal derives from the careful reading and comparison of major international documents described in this paper, from the professional skills of authors in the fields of journalism and the media, as well as from internal experience gained from teaching health reporters as part of a post-graduate Master's degree course of the University of Milan, School of Pharmacy[21].

In addition to the working recommendations which we detail, good medical journalism should adhere strictly to deontological rules. News articles should be drawn in respect of professional rules and local laws on privacy and dignity of persons, the substantial truth of facts and the right of information and chronicle.

Facts should be assessed in full impartiality, for general interest and usefulness for the reader, and should take into account the patient's agenda[22]. The primary objective will be to transfer reliable and transparent information, thus avoiding arbitrary, partial, sensationalistic, miraculous information, which gives rise to undue hopes or alarms, deformation of reality, unmotivated anxiety to patients and families, and which could produce an unbiased optimism or further damage.

Our recommendations are meant to provide a useful tool for medical reporting, providing assistance in all the phases of mediation: identification of the newsworthy facts, verification, assessment of sources, understanding of evidence and of its originality, writing of the article (titles, corollary information, info-graphics, etc), follow-up, useful services, such as the indication of centers of excellence, or experts for advice and counseling.

Discussion

Mass media constitute an important source of information for the general public about health and therapies and there is a great interest in the quality of reporting. As a consequence, medical writing associations both in the US and in Europe are working to provide quality and transparency in health reporting: in fact, the general rules of good journalism do not sufficiently cover the needs of correct medical reporting. An attempt to improve the scenario is the idea of the new precision journalism[23], which holds that the journalist should be a filter, an organizer to improve the standard of journalism by adopting a scientific method to document news. Evidence-based journalism[19] represents a further improvement and can be helpful at least when considering the selection of medical

publications to translate into medical reports. All of the existing guidelines and codes summarized in this paper – if read in the light of these two approaches – could prove useful in properly addressing the translation of medical research into a medical report.

We focus on main problem areas of the documents reviewed. Often there is a contradiction between the need to understand the study protocol and its statistics and the fact that there is no indication of the need for a specific background and continuing education. The specific issue of the background and education of a medical journalist has been recently dealt with in the literature[24]. Moreover, it is worth mentioning that the increased specialization of medical sciences and terminology, often difficult enough for unspecialized doctors[30], may be a barrier even to journalists with a scientific background. The selection, evaluation, and translation of clinical publications into useful medical reports thus becomes all the more challenging.

Most of the documents reviewed stress the importance of sources, but only two specifically cite the premise that peer-reviewed articles are no guarantee of meaningful evidence, an idea which would be familiar to scientific graduates. Likewise, the publication bias of the positive result[25], which prevents the diffusion of negative findings or other reversal fortune for investigational drugs, is considered only by the 'A statement of principles for health care journalists'[10].

Emotional impact is under-described, even though communication should be reader-centered, with special attention given to the avoidance of 'hype' words. A particular *caveat* on the reporting of suicide is made, and recommendations are given not to chronicle copycats[26]: according to a recent paper[27] the media guidelines in Austria have had a positive impact on the quality of reporting and on suicidal behavior in that country.

Follow-up of a reported area should be essential, but nonetheless receives scarce consideration: indeed, this is an issue that lay journalism tends to avoid, since it is deemed to contrast with the logic of 'news'. In this regard, it is interesting to note that follow-up and retraction in medical reporting was recently discussed in a letter published in the BMJ[28].

Conflict of interest is the issue that is shared by all the guidelines. Nevertheless, pharma industries are increasingly offering health reporters educational and training workshops on medical topics: while these events purportedly aim to provide correct and updated information supported by clinical literature, they are potential incubators of severe side effects, namely, disease mongering[29].

Most of the documents analyzed are addressing primarily English speaking journalists. Consequently research is more active in English speaking journalism: an example is the working practice of the UK *Hitting the headlines*, in which the National Health Service assesses health news items in the light of the clinical evidence[30]. In Europe, there is no document issued by the European Commission dealing specifically with medical reporting, in spite of the attention of the European community to the relationship between scientists and the media: the Science and Society Action Plan approved in 2002 originated a conference on the topic and a handbook for scientists and journalists[31].

Papers published in peer-reviewed journals should be assessed with some caution, recalling the positive result bias in publication, and bearing in mind the possibility of future retractions and that refereed articles do not necessarily guarantee conclusive evidence on the efficacy and safety of a drug[25].

Our proposal focuses on the need for the medical journalist to acquire and master the knowledge that will enable him/her to assess the results of medical and pharmacological research in order to write accurately and effectively.

The strength of our recommendations derives from a preliminary 'benchmarking' of similar guidelines, as suggested in the literature[9], but even more so from the joint effort of the authors, who represent research (FB, PM, MDC), academic education (FB), associations of medical journalists

and medical publishers (BP), and medical journalism (AB) and media communications (CC, LV). In other words, the authors bring experiences and expertise that merge the theory and the practice of medical reporting. Interestingly, the authors with backgrounds in the life sciences advocate the emerging category of health reporters/medical journalists with scientific skills.

Our recommendations are ready for validation, and negotiations are underway with associations and other less formally organized groups of medical journalists and publishers in order to carry out an assessment exercise to evaluate their comprehensibility and usefulness in real situations.

In conclusion, we think that the proposed recommendations are a strong starting point for collective consideration: clearly, they can be improved, with additions and integrations. Some limitations are already clear, such as the lack of space and the difficulty for the medical journalist to access reliable, authoritative and timely information to integrate and make more understandable newsworthy topics, particularly considering the time constraints in which journalists are working.

This detailed analysis is a step forward towards overcoming existing barriers between scientists and journalists, two professional categories that should establish an interactive and dynamic dialogue in order to share responsibility for communication that accurately portrays medical issues and limits false hopes and expectations.

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