

Nakada H, Murashige N, <u>Matsumura T</u> , Kodama Y, Kami M.	Informal network of communication tools played an important role in sharing safety information on H1N1 influenza vaccine.	Clin Infect Dis	51	873-8 74	2010
<u>Yuji K</u> , <u>Matsumura T</u> , Kodama Y, Murashige N, and Kami M.	Japan's health policy	Lancet	376	1900	2010
<u>湯地 晃一郎</u>	新薬を使う～現場はなぜ、「合 法的」にがんワクチンを使え ないのか	楽天内憂外 憂			2010
Kishi Y, Kodama Y, Hatanaka N, Nakada H, <u>Yuji K</u> , <u>Matsumura T</u> , Kami M.	The current status of the coverage of 'cancer patients' in major newspapers in Japan.	Health Communicati on			submi tting
<u>Nagata M</u> , Takita M, Kishi Y, Kodama Y, Matsumura T, Murashige N, Homma Y, Kami M	Cancer articles in weekly magazines -useful media to deliver cancer information to the public ?				submi tting

Ⅲ. 研究成果の刊行

sequence information from these strains was not available. False-positive Xpert rifampicin resistance occurred during our demonstration projects, and triggered a root-cause analysis by the manufacturer, and a subsequent development plan to improve reagents, microfluidics, and software. Software solutions have been only partly successful, but we expect that the other refinements will eliminate most remaining false-resistance calls. Ideally, Xpert should equal or surpass DST reliability. In settings with a low prevalence of multidrug-resistant (MDR) tuberculosis, even low error rates would affect predictive values, and repeat molecular or phenotypic testing might be required. Countries will need to decide, depending on prevalence of MDR tuberculosis, second-line treatment availability, budget, phenotypic DST capacity, and how they handle Xpert results suggesting MDR tuberculosis.

Giovanni Ferrara and colleagues correctly point out that performance data provide an incomplete picture of a new diagnostic's usefulness. We also agree that implementing improved tuberculosis diagnostic testing will require substantial investment. Fortunately, Xpert MTB/RIF testing gets us very close to the goal of universal access to culture and DST without the need to construct unsustainable biosafety laboratories or wait for culture results.

MDP, PN, and CCB are employed by FIND, a non-profit organisation that collaborates with industry partners, including Cepheid, for the development, evaluation, and demonstration of new diagnostic tests. DA has served as a consultant to Cepheid and received royalties personally and to his laboratory under a licensing agreement between his institution and Cepheid. His royalties generated by the Xpert assay have been voluntarily, but irrevocably, capped at US\$5000 per year (personal income) and \$50 000 per year (laboratory income) to mitigate potential conflicts of interest. No commercial partner was involved in the study.

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Sharing information on adverse events

It is highly regrettable that you ran the letter by Koichiro Yuji and colleagues (May 14, p 1654)¹ which labels a report that ran in *Asahi Shimbun* as “misleading”. The article from Oct 15, 2010,² was written from the viewpoint of protecting trial participants, and critically appraised a clinical trial at the Institute of Medical Science, University of Tokyo (IMSUT, to which one of the authors of the letter is affiliated) and other sites. Yuji and colleagues' letter contains serious misinterpretations of facts.

Our article reported that, despite a serious adverse event developing during the clinical trial of a cancer peptide vaccine at the IMSUT Hospital, IMSUT, as the vaccine developer, failed to report the incident to other clinical trial sites which had been supplied with the vaccine. The point of the article was to raise the question as to the appropriateness of the handling of safety information.

Yuji and colleagues wrote: “The newspaper seems to have interpreted a ‘serious adverse event’ as a ‘significant complication’ of the cancer vaccine.” In fact, nothing in the article indicates confusion between an adverse event and a complication.

Yuji and colleagues also wrote: “In an Editorial, the newspaper went on to accuse the researchers of hiding the adverse event, and likened them to doctors in Nazi Germany.” This sentence

is also based on a misinterpretation. The *Asahi Shimbun* merely stated that the Declaration of Helsinki was developed as a response to human experiments carried out by the Nazis—it did not liken the clinical researchers to the Nazis.

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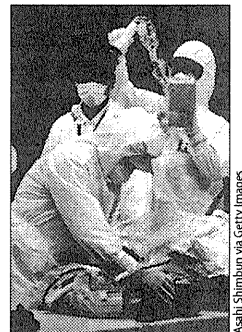
- 1 Yuji K, Narimatsu H, Tanimoto T, Komatsu T, Kami M. Sharing information on adverse events. *Lancet* 2011; **377**: 1654.
- 2 Idegawa M, Noro M. The Institute of Medical Science, the University of Tokyo did not share the information of the adverse event to other research groups (in Japanese). *Asahi Shimbun* Oct 15, 2010.

Blood-cell banking for workers at the Fukushima Daiichi nuclear power plant

Tetsuya Tanimoto and colleagues (April 30, p 1489)¹ propose collection and storage of blood cells (equivalent to bone-marrow cells) from nuclear workers at the Fukushima nuclear power station, Japan, for possible use after accidental exposure to high-dose ionising radiation. We think that this recommendation is well intentioned but ill-advised for several reasons.

First, the best strategy in any nuclear or radiation exposure event is prevention. Workers at Fukushima are carefully monitored with dosimeters that detect external and internal radiation exposure levels. There are also numerous stable and robotic environmental monitoring devices.

Second, transplantation of blood or bone-marrow cells is relevant only if there is exposure to uniform, high-dose, whole-body radiation. Such exposure requires that the person be at a substantial distance from the radiation source (probably 3–4 m). Our study of the geometry of the Fukushima nuclear power station makes this type of exposure exceedingly unlikely.



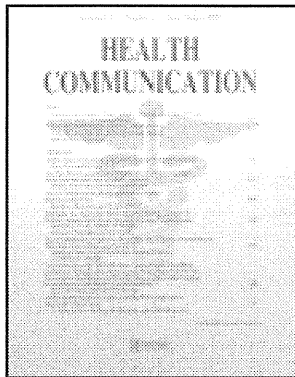
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Internet-Based Survey on Medical Manga in Japan

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RESEARCH IN BRIEF

Internet-Based Survey on Medical Manga in Japan

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The more manga (Japanese graphic novels) communicate medical information, the more people are likely to be influenced by manga. We investigated through an Internet search using Google the characteristics of medical manga published in Japan, defined as those in which the main character is a medical professional and that occur in a medical setting. As of December 2008, 173 medical manga had been published. For a period of time after the first medical manga by Osamu Tezuka in 1970, the number of publications maintained a steady level, but increased rapidly in the mid 1980s. The professions of the protagonist were 134 doctors, 19 nurses, 3 dentists, 3 medical students, and 1 nursing student. Although the main character was mostly a doctor, manga featuring paramedical professionals have increased since 1990s. Medical manga may be a powerful tool for increasing the awareness of the public regarding medicine.

It is well established that the number of medical reports has been increasing in the mass media (Kishi et al., 2008), and that many people obtain information on medicine through the media (Hochman et al., 2008). It is possible that these reports could significantly influence the behavior of patients. We previously reported that TV programs could

also influence the manner in which doctors write prescriptions (Matsumura et al., 2008). The mass media could be a powerful tool for improving the medical literacy of patients.

There has been increasing diversification in the manner in which the media present medical information. For example, in addition to traditional forms such as newspapers, television, and magazines, new media including free papers, Web media, and blogs have emerged. Moreover, as more and more manga (Japanese graphic novels), movies, and television dramas communicate medical information, it

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is likely that many people—mainly young people—will be influenced by these media. In particular, manga are topics of great interest as a research subject in the social sciences. Since the 1950s, many such studies have been reported. The importance of manga as a communicative medium has been shown through investigation on influence of manga and possible clinical applications (Butterworth & Thompson, 1951; Caruth, 1968; Kirsh & Olczak, 2002; McDermott, 1989).

Medical manga may well have played an important role in creating awareness among people regarding aspects of the medical field. However, since a systematic study on medical manga has never been undertaken, the actual status of its influence is unclear. We have investigated the characteristics of medical manga published in Japan.

In Japan, there is no comprehensive database of manga. Information on medical manga was obtained through an Internet search using Google. Medical manga were defined as those in which the main character is a medical professional, such as a doctor, nurse, or pharmacist, and that occur in a medical setting. This study excludes those manga in which the main character is a veterinarian, patient, or volunteer at a hospital.

As of December 2008, 173 medical manga had been published. The first medical manga published was Osamu Tezuka's 1970 work, "Kirihito Sanka." For a period of time thereafter, the number of publications maintained a steady level, but increased rapidly in the mid 1980s (see Figure 1). While the reason for this increase is unknown, there have also been other, related changes occurring at the same time, such as increasing demands for patients' right and more emphasis on "informed consent" as practiced in Western countries.

In the 173 medical manga, the occupation of the protagonist was indicated. The breakdown according to professions was 134 doctors, 19 nurses, 3 dentists, 3 medical students,

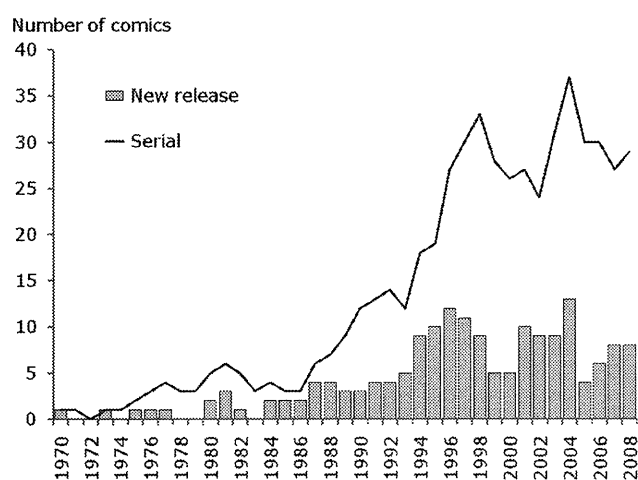


FIGURE 1 Change in the number of medical manga. The solid line represents the number of serial manga. The bar graph shows the number of new manga published in that year.

and 1 nursing student. Thirteen belonged to other medical professions. The main character in the medical manga was most commonly a doctor; however, since the 1990s, manga have been published featuring nutritionists, psychiatrists, counselors, physical therapists, pharmacists, masseuses, and other paramedical professionals as the main characters. While various medical professionals were featured as the main character, a majority of them were doctors. For readers who are not medical professionals themselves, the sole representative of the medical field in the manga was a doctor; it was rare to depict a medical scene through a viewpoint other than that of a doctor. However, in recent years the number of main characters in medical manga who were paramedical professionals has been increasing.

A doctor played a leading role in the 134 medical manga, and his or her specialty was identified in 127. These included 47 internal medicine specialists, 71 surgeons, and 7 resident doctors. Generally, the public image of doctors in Japan is closer to that of surgeons, who bring about dramatic and complete cures, than it is to that of internal medicine specialists, who frequently treat patients with chronic maladies. Furthermore, compared to the drug therapy administered by internal medicine specialists, operations are more dramatic representations of the medical setting. This is probably the reason many artists chose surgery to be the theme of their medical manga.

Recently, there have been many instances of the adaptation of manga to television and the silver screen. Through these adaptations, it is possible to reach a larger audience than just the readers of manga. Research by Kubo and Toya (2004) revealed that 14 medical manga (8.1%) had been adapted as videos, which is roughly the same adaptation ratio as for general manga. Regarding the adaptation of medical manga, it is interesting to note that compared with the rate of those animated (2.3%), the rate of those adapted for the silver screen (5.8%) was higher. Among general manga, more become animated series than are adapted for the silver screen. This difference could be attributed to the fact that since medicine is based on real-life events, it will appeal to the audience more as a drama than as an animated series.

For medical manga, it is desirable that depictions of medical procedures be accurate. This study found that medical professionals participated in the creation of 18 of the works that were examined (10.4%). Amongst the medical manga, it is unclear in some cases whether there was a medical editor or not; the value of reliance on a medical editor should not be underestimated. Nonetheless, it is noteworthy that medical personnel were not involved in any works except for 10.4% of them. Although the main character was a medical professional, the depiction of the health care system is not the main focus of these manga; hence, supervision by medical professionals is not always necessary. However, since there is a possibility of inaccuracy in the depictions of medical procedures in medical manga due to the absence of supervision by

medical personnel, there is a danger of presenting inaccurate information to readers regarding medical care.

This study presents the current statistics regarding the Japanese publication of medical manga. Since the latter half of the 1980s, the number of medical manga has increased rapidly, and more paramedical professionals have been featured. As manga readers span all age groups, medical manga can be a powerful tool for increasing the awareness of the population regarding the field of medicine. Medical manga should be an important focus for researchers of medical media.

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Police Investigation into Multidrug-Resistant *Acinetobacter baumannii* Outbreak in Japan

TO THE EDITOR—A major outbreak of multidrug-resistant *Acinetobacter baumannii* (MDRAB) hit Teikyo University Hospital in Tokyo, Japan. Since last year, 53 patients have been infected, and at least 9 may have died as a result of the infection. Japanese mass media blames the hospital officials, saying that they should have prevented in-hospital infection and reported the infections to the authorities earlier [1]. The Metropolitan Police Department has begun investigation on suspicion of manslaughter. So far, 3 cases

of in-hospital infection involving malpractice have been accused and convicted in Japan. However, this is the first case in pursuing criminal charges against outbreak of multidrug-resistant bacteria, whose control is difficult to attain.

Acinetobacter baumannii is an opportunistic gram-negative pathogen with increasing relevance worldwide in the past several decades [2] and can be fatal to immunocompromised patients. In Japan, 98 MDRAB isolates were obtained in the past 2 years [3]. In Teikyo's case, the dead patients had hematological diseases.

What should be done for the containment of an outbreak is intervention, not by the police, but by the infection control professionals [1, 4]. If the hospital is accused of manslaughter, other hospital would tend to act defensively and refuse multidrug-resistant bacteria carriers for fear of prosecution. Carriers would be discriminated against during admission, resulting in patients' penalty. There is one historical precedent in Japan. Due to the manslaughter arrest of an obstetrician in 2004, defensive medicine accelerated [5].

Police investigation into the MDRAB outbreak may irreparably damage medical practice in Japan and would eventually threaten patients' safety.

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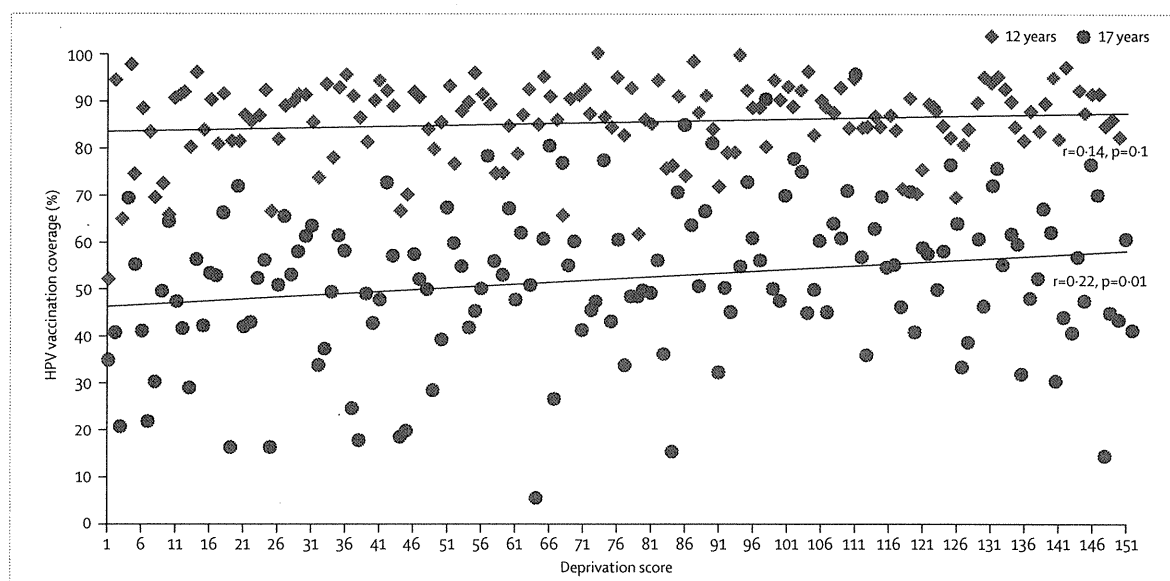


Figure: Relation between local-area HPV vaccination coverage (at least one dose) in girls aged 12 years and 17 years and area deprivation score rank: England, 2008-09

1=most deprived area, 152=least deprived area.

HPV vaccination of schoolgirls in England seems to be achieving sufficiently equitable delivery to reduce, in due course, inequalities in cervical cancer prevention, and not accentuate them as Bach fears for the USA. Hopefully, the recent reforms to the US health-care system will eventually help reduce the inequalities there.

We declare that we have no conflicts of interest.

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Peter Bach states in his Comment¹ that poorer states in the USA with higher mortality from cervical cancer have lower coverage with the human papillomavirus (HPV) vaccine than do wealthier states; however, he does not indicate the disparities in vaccination policies and financial coverage within each state. We would like to know how the vaccine legislative proposals and vaccination charges differ between states.

A bivalent HPV vaccine was approved in Japan in December, 2009. This vaccine is expected to be beneficial for Japanese people, whose coverage for cervical cancer screening is extremely low (24%) compared with other Western countries.² This vaccine is not insurance-covered, and no national financial support is currently planned. Recipients have to pay US\$350-500 for the full vaccine dose. Several local governments decided to fund the HPV vaccine in April, 2010, but the number is extremely low (only 32 of 1747 local governments in Japan).³ The factor that influenced the funding decision seems to be the activity of the New Komeito Party, Japan's third largest political party, which led a campaign to promote female cancer prevention and submitted 1544 087 signatures

to the Ministry of Labor, Health, and Welfare on March 29, 2010.⁴

The biggest impediment to vaccine implementation is its cost.⁵ In Japan, vaccine financing policies and recipients' charges differ between local governments. We fear that funding inequalities could result in local disparities in cervical cancer incidence and mortality.

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Author's reply

We appreciate the instructive comments from Sarika Desai and colleagues regarding international differences in vaccine policies. Koichiro Yuji and colleagues enquire about differences in vaccination and funding policies between states in the USA. Although the US Federal Government approves and recommends vaccine use through the Food and Drug Administration (FDA) and Centers for Disease Control and Prevention (CDC), respectively, individual states determine legislation concerning mandated vaccinations and private insurance coverage.

In the USA, the primary method of mandating childhood vaccination is making enrolment in public schools conditional on proof of vaccination. 24 states and the District of Columbia have proposed legislation to mandate vaccination against human papillomavirus (HPV).¹ To date, only Virginia and the District of Columbia have enacted these requirements.¹ These requirements went into effect for the 2009-10 school year.^{2,3} Both jurisdictions allow parents to opt out of the requirement for any reason. Since our analysis did not include data from the District of Columbia and used data collected in 2008, our findings should not be affected by these policies.

As of April, 2010, seven states have enacted legislation that requires private insurers to cover HPV vaccination.¹ Five states had these laws in effect before 2009 (Colorado, Illinois, Nevada, New Mexico, and Rhode Island). Additionally, before 2009, 13 states had laws promoting HPV vaccine education programmes.¹ Although HPV vaccine coverage is optional for insurance companies in states without legal mandates, many health insurance policies cover the vaccine.

In addition to these state-based policies, the CDC's Vaccines for Children Program serves as a major source of financing for childhood vaccines, including the HPV vaccine. As we described, Gardasil was included in the Vaccines for Children Program in 2006. This nationwide programme provides free vaccines (with an administration fee which is typically less than US\$18) to children who are eligible for a state Medicaid insurance programme, underinsured, or uninsured. In 2002, 41% of administered vaccines were purchased through the Vaccines for Children Program.⁴

We declare that we have no conflicts of interest.

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Colorectal cancer

In their Seminar on colorectal cancer (March 20, p 1030),¹ David Cunningham and colleagues present a thorough and well referenced guide which is notable for two major omissions. First, there is just a single mention of multidisciplinary team working in an unreferenced sentence: "Involvement of the multidisciplinary team from the start helps to provide the best treatment" (p 1034). This comment reinforces a dismissive attitude to multidisciplinary team working which remains too prevalent;

there is copious evidence that the multidisciplinary approach benefits patients,² but it can only be effective if all the relevant practitioners are truly committed to it.

The second omission is the absence, in Cunningham and colleagues' discussion on metastatic disease, of any mention of palliative care or end-of-life care. This is perhaps unsurprising when one reads their search strategy, but, as they point out in their Introduction, around 330 000 individuals die of this disease worldwide each year. Most of those people will need good symptom management if they are not to suffer when oncological treatment is at an end, and to ignore their needs does them a disservice. The current political focus on end-of-life care is not a gimmick, but a real attempt to help our patients to die well and in the place of their choice.

We cannot help but suspect that these two omissions are linked and that the very reason why some shy away from multidisciplinary team working is that they fear the failure of their patients dying, and find it hard to accept that patients dying from cancer might be better served by teams concentrating on their holistic needs and their death. As Yawar has cogently pointed out,³ "medicine flirts dangerously with futility", for "we manipulate matter more and more heroically, to less and less effect".

We declare that we have no conflicts of interest.

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A study of the changes in how medically related events are reported in Japanese newspapers

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Abstract: Media reports of medically related events have a major effect on the healthcare community but there have been few detailed investigations conducted to investigate their content. The Nikkei Telecom 21 database was used to investigate the number of reports concerning medically related events between 1992 and 2007 in Japan's 5 national newspapers. For this period, both the total number of articles and the number of articles containing medically-related keywords were determined. The number of reports relating to medically related occurrences increased sharply from 1999 to 2000 and displayed a decrease from 2003 before increasing again in 2008. As of 2008, such reports account for 0.17% of total newspaper articles. The use of the word 'iryokago' (medical professional negligence or error) drastically increased in 1999 but showed a consistent decrease from 2004. On the other hand the frequency of reports relating to 'litigation' and 'punishment' increased rapidly in 1999 before leveling off. Despite this, the number of articles relating to medically related occurrences that were caused by doctor shortages and system errors increased sharply between 2006 and the present. Results indicate that the manner in which newspapers report medically related events is undergoing major changes.

Keywords: coverage, incident, doctor shortage, system error, litigation

Medically related events represent a major problem for the healthcare community. In the United States, the healthcare provision system is influenced by the medical malpractice insurance crisis that occurred in the early 1970s.¹ Society's interest in this issue increased further due to the medically related occurrence that took place at the Dana-Farber Cancer Institute in 1994.² In this particular case, a breast cancer patient was administered an overdose of an anticancer drug and, as this patient was also the health columnist for the Boston Globe newspaper, the story was elevated to the front page. This incident prompted the United States to review and improve medically related occurrence measures³ and stimulated research into the media coverage of medically related occurrences.⁴

Meanwhile, high-profile medical institutions in Japan have been accused of negligence and committing errors⁵ following a string of medically related occurrences including two 1999 cases in which a patient was administered a fatal IV drip at the Tokyo Metropolitan Hiroo Hospital and in which surgery was performed on the wrong patient at the Yokohama City University Hospital,⁶ and a 2001 case in which a heart-lung machine malfunctioned during heart surgery at the Tokyo Women's Medical University.⁷ The Tokyo Metropolitan Hiroo Hospital incident was also treated as a criminal case in which the hospital director and nurses were found guilty at the Supreme Court in 2004. By contrast, the Tokyo Women's Medical University incident was also treated as a criminal case but all defendants were found not guilty in 2009. During this period, the

number of medical litigation cases in Japan also increased, with the number of new cases filed rising from 678 in 1999 to 1110 in 2004.⁸ As in the United States, Japan also reinforced its medical safety measures as a result of such events.^{9,10}

In 2006 an obstetrician at the Fukushima Prefectural Ono Hospital was arrested in Japan.¹¹ In this incident, the doctor in charge was arrested for professional negligence and involuntary manslaughter after a patient suffering from both placenta accreta and placenta previa died while undergoing a caesarian section procedure. As a result of this incident, many physicians were concerned that attending doctors who lost patients may face criminal charges even in the absence of negligence. This caused many doctors to turn to practicing defensive medicine or to abandon the specialty of obstetrics, which has a high risk of litigation. As time passed, the same mass media that was initially critical of the arrested physician began to report that the incident had had a destructive effect on Japan's obstetric care system.

Media reports into medically related occurrences have a major effect on the healthcare community.¹² Imposing safety measures on the healthcare community will also serve to invite the practice of defensive medicine. Physicians sincerely wish for the reporting of medical accidents to be conducted in a manner that is both accurate and appropriate. However, until now there have been few detailed investigations conducted into the media coverage of medical accidents.^{4,13} However, until now there have been a few detailed investigations conducted into the media coverage of medical accidents; Stebbing et al analyzed newspaper coverage of pediatric medication errors and adverse drug events in many countries.⁴ These researchers concluded that media coverage of pediatric medication safety has increased in the past 10 years and that reporting of patient safety failures was generally fair, and reports were generally framed in light of a culture of safety. Another investigation is that carried out by Lupton et al, in which a systematic and comprehensive analysis of the representation of doctors and the medical practice in metropolitan Australian newspapers and major news magazines was reported.¹³ These authors reported that malpractice and medical negligence/mistakes are the most frequent medical topic.

In this study, we conducted an investigation of the current state of medical occurrence reports in Japanese newspapers.

Method

Search method

The Nikkei Telecom 21 (<http://telecom21.nikkei.co.jp/>) database was used to identify articles containing the word 'iryojiko' (medically related occurrence, event, or incident) or 'iryokago'

(medical professional negligence or error). The basic Nikkei Telecom 21 database contains the article content of newspapers published within Japan. When a search word is inputted, the relevant data is identified from the areas 'title', 'content', and 'keywords'. Those articles containing the following keywords were then selected from the search results.

Hospital related

Ono Hospital; Tokyo Women's Medical University; Yokohama City University; university hospital; prefectural hospital; public hospital; private hospital; medical corporation; practice.

Litigation related

lawyer; trial; civil; damages; compensation; victim.

Punishment related

Professional negligence; police; criminal; prosecution; filing charges; administrative penalty; Medical Ethics Council.

Healthcare system/medical accident cause investigation related

Ministry of Health, Labor, and Welfare; National Police Agency; Ministry of Justice; medical accident investigation; independent committee; healthcare safety investigation committee; healthcare system collapse; doctor shortage; system error; reduction of healthcare costs; uneven distribution; passing the buck, overwork.

Newspapers investigated

From the newspapers included in the database, we selected the 'Asahi Shimbun', 'Mainichi Shimbun', 'Yomiuri Shimbun', 'Sankei Shimbun', and 'Nihon Keizai Shimbun'. These are the five largest national newspapers in Japan and have a combined circulation of between 2,190,000 and 10,020,000. The database includes complete archives for all of these newspapers but the earliest year available is 1992 so this was selected as the starting point for our investigation.

Research objectives

We aimed to assess the changes in society's awareness of medically related occurrences by investigating the number of articles relating to medical accidents and the annual trends thereof within Japan's major national newspapers.

Results

Total articles

Annual trends in the total number of articles in each of the five newspapers studied are displayed in Figure 1. The total

number of articles in the database increased during the first half of the 1990s and leveled off after 2001. From the year 2000, approximately three times more article data is included for the Asahi, Yomiuri, and Mainichi newspapers than for the Nikkei and Sankei newspapers.

Articles containing the word 'iryojiko' (medically related occurrence, event, or incident)

Annual trends for the number of articles containing the word 'iryojiko' are shown in Figure 2 and displayed as a proportion of the total number of articles in Figure 3. In all newspapers studied, the number of articles increased sharply between 1999 and 2000 and displayed a decrease from 2003 before increasing in 2008. In 2008, the number of articles containing the word 'iryojiko' numbered 1978; accounting for 0.16% of the total number of articles.

Articles containing the word 'iryokago' (medical professional negligence or error)

Annual trends for the number of articles containing the word 'iryokago' are shown in Figure 2 and displayed as a proportion of the total number of articles in Figure 3. In all newspapers studied, the number of such articles showed a consistent decrease from the year 2003. In 2008, the number of articles that included the word 'iryokago' numbered 673; accounting for 0.052% of the total number of articles.

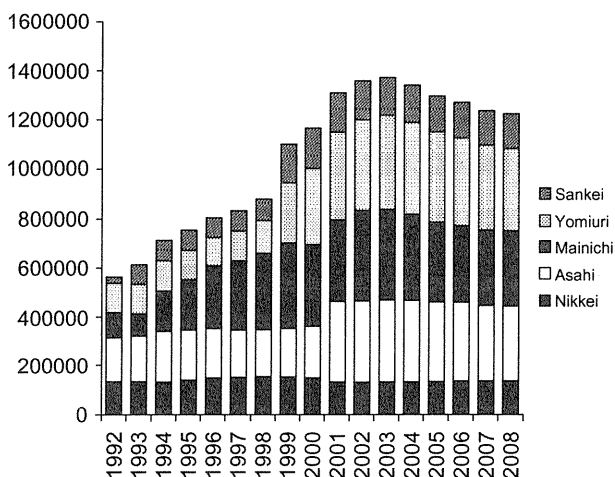


Figure 1 Total number of articles in each newspaper.

Newspaper comparisons

The use of the word 'iryojiko' increased around the year 2000 before leveling off. Major differences were observed in usage frequency between newspapers. The newspaper containing the highest proportion of articles that include the word 'iryojiko' is the Yomiuri Shimbun, with approximately twice as many mentions as each of the other newspapers (Figure 3) studied. On the other hand, there were no major differences between newspapers regarding the usage frequency of the word 'iryokago', with all newspapers showing a recent decreasing trend.

Annual keyword trends

Annual trends in the number of articles containing each keyword are displayed in Figure 4. From 1998 to 2003, the transient increase in the number of reports into specific incidents such as those at the Tokyo Women's Medical University and the Tokyo Metropolitan Hiroo Hospital were observed for the years in which these cases occurred. On the other hand, there were more reports regarding the Fukushima Prefectural Ono Hospital case in 2008 than when the event occurred actually in 2006 (Figure 4A). The number of reports relating to 'litigation' and 'punishment' increased rapidly from 1999 before leveling off (Figures 4B and C). Despite this, the number of articles relating to incidents caused by 'iryojiko' and 'iryokago' rose sharply from 2006 (Figure 4D).

Discussion

Our results indicate there have been changes in how newspapers in Japan cover medically related occurrences. As can be seen in Figure 2, the number of Japanese reports relating to this issue increased rapidly following the Tokyo Metropolitan Hiroo Hospital incident¹⁴ in 1999. The heightened public interest created by an increase in the number of newspaper reports stemming from this specific medically related occurrence is similar to what occurred in the United States.^{2,15} Particular attention must be paid to the fact that, during this incident, the expression 'iryokago' (medical professional negligence or error) was used in the majority of Japanese newspaper articles even before accurate investigations had been conducted. This expression that assumes negligence on the part of the healthcare worker was used before the truth of the incident had been fully elucidated and it is highly likely that such sensationalist newspaper coverage creates preconceptions regarding a case. It is the mass media that makes the general public aware of the occurrence of medical accidents, and there are some constant characteristics in how the mass media covers medical accidents. This is something that healthcare workers should be aware of.

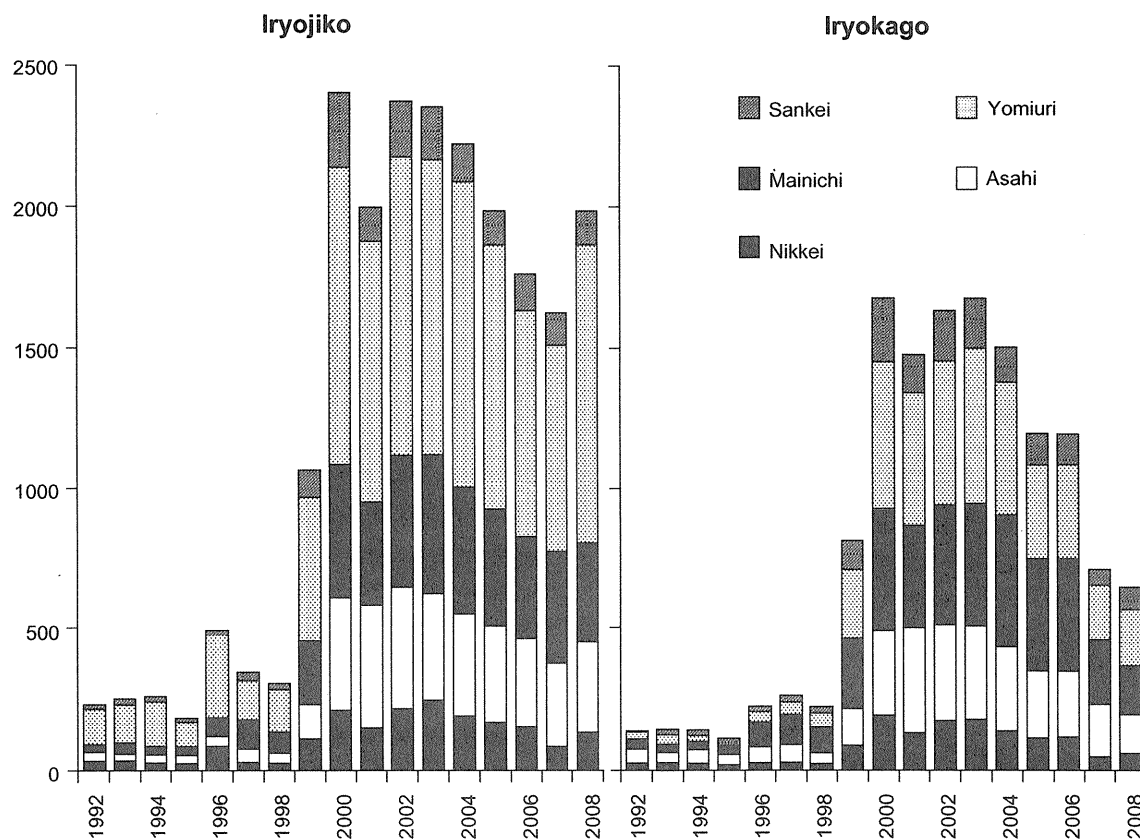


Figure 2 Number of articles containing the word 'iryojiko' (medically related occurrence or incident) or 'iryokago' (medical professional negligence or error).

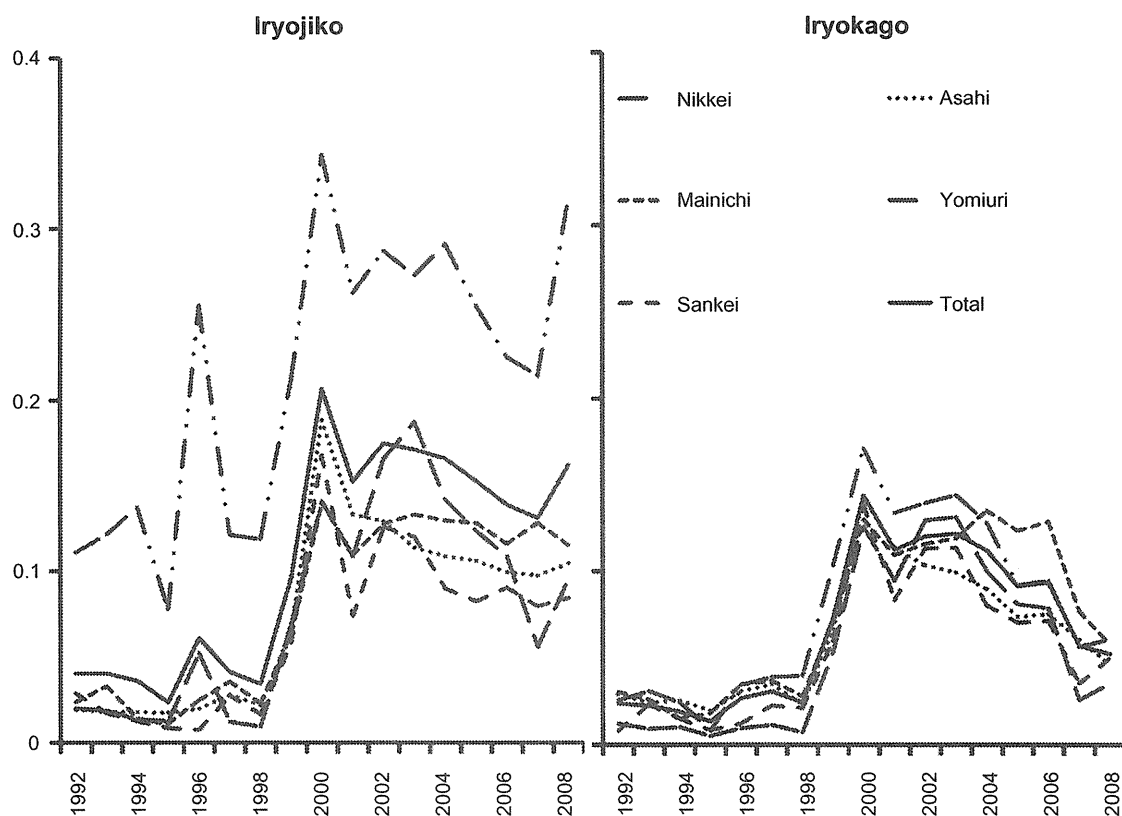


Figure 3 Proportion of articles containing the word 'iryojiko' (medically related occurrence or incident) or 'iryokago' (medical professional negligence or error).

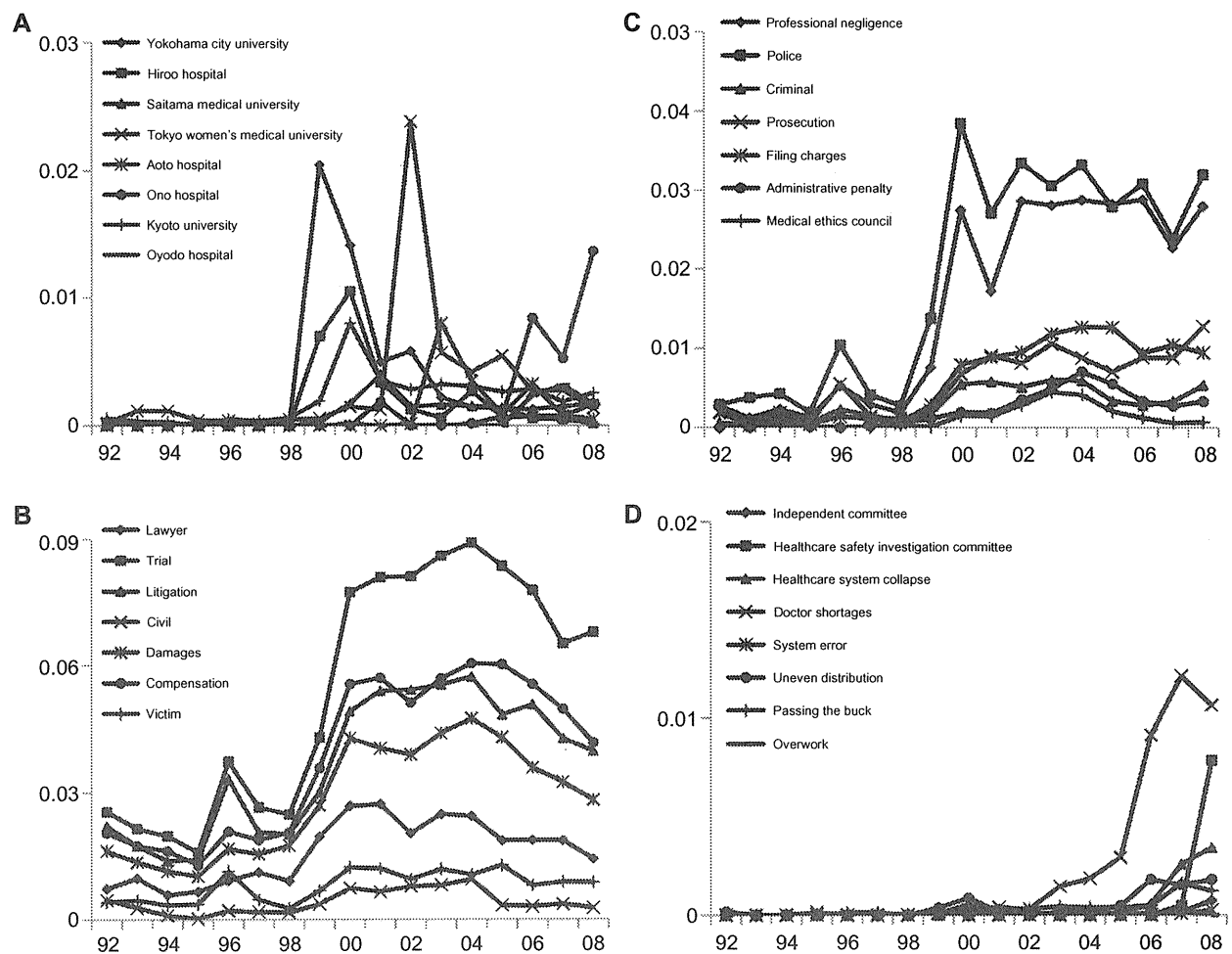


Figure 4 Annual trends in the usage frequency of each keyword. **A)** Hospital name, **B)** Litigation related, **C)** Punishment related, **D)** Healthcare system related.

In 2004 the media coverage of medical accidents in Japan began to change. Reports of major medically related occurrences⁵⁻⁷ continued from 1999 to 2001 and served to make the public aware of the occurrence of these incidents. Also, until the Supreme Court ruling on the Tokyo Metropolitan Hiroo Hospital incident was made in 2004,¹⁴ medically related occurrence reports focused on 'litigation' and 'punishment' (Figure 4B and C), while reports regarding 'system errors' and 'investigations into causes' were sporadic (Figure 4D). However, the number of reports relating to system errors and investigations into causes has been on the rise since this ruling, albeit gradually (Figure 4D). This situation resembles that in the United States, in which society's interest in medically related occurrence increased as a result of sensationalist media coverage and attention was initially paid to the punishment of doctors, but a consensus was eventually reached that it is important to consider the underlying system errors in order to decrease the number of medically related occurrence.¹⁶ If society is to form a consensus regarding medically related occurrences, it is necessary to have both incidents that act as triggers for long-term discussions.

The state of medical reporting in Japan underwent a major change in 2006 with the arrest of an obstetrician employed at the Fukushima Prefectural Ono Hospital.¹¹ In this incident, images of the obstetrician arrested for professional negligence and involuntary manslaughter were broadcast nationwide; invoking a backlash from the healthcare community and the wider public, and heightening the discussion regarding medical accidents. In reality, the use of the word 'iryokago' (medical professional negligence or error) in newspapers decreased from 2006 and started to be replaced by the word 'iryojiko' (medically related occurrence, event, or incident) (Figure 3). Additionally, the legal trial surrounding this case in 2007–2008 saw sharp increases in the frequency of the words 'system error' and 'investigation' as well as words relating to the background of medical accidents such as 'doctor shortages' and 'healthcare system collapse'. After years of discussions, such changes have led to a deeper public understanding of medically related occurrences and it could be considered that the Fukushima Prefectural Ono Hospital incident acted as the trigger for the forming of a consensus.

Differences were found in how newspapers reported medical accidents. There were no differences in the frequency of the use of the word 'iryokago' (medical professional negligence or error), and all newspapers investigated showed sharp decreases in usage frequency. On the other hand, there were twice as many reports containing the expression 'iryojiko' (medically related occurrence, event, or incident) in the Yomiuri Shimbun than in any of the other four newspapers. This implies that, although there are differences between newspapers with regard to the emphasis of their medical malpractice coverage, all newspapers are restricting their use of the expression 'iryokago' (medical professional negligence or error) and are attempting to conduct composed, balanced analyses.

Medically related occurrences are closely related to medical litigation and have the potential to impact the healthcare system. Medically related occurrences and medical litigation could be seen as sources of friction between the healthcare community and the public, so it is therefore vital that trends in public opinion regarding these matters are accurately gauged. Although our study provides useful information, some limitations need to be discussed. While newspapers exert a major influence on public opinion, it is also important to assess how newspapers report medically related occurrences when it is considered that newspapers reflect public opinion. However, it would not have been possible to conduct such an investigation if a database of newspaper archives had not been created and made cheaply available. We were able to carry out this study due to the fact that a searchable database containing all newspaper articles published in Japan has been created and made available over the Internet. This resembles how information technology such as PubMed has changed the face of medical research. There have recently been a variety of studies conducted into the relationship between healthcare and the media^{4,17,18} but the creation and accessibility of databases is likely to accelerate the progress of such studies. Newspapers were the subject of this particular study but it is necessary to conduct similar investigations into other media such as television, magazines, and the Internet. However, databases have not yet been created for these alternative forms of media.

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Disclosure

The authors declare no conflicts of interest in this work.

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Structural problems of medical news reports in newspapers: a verification of news reports on an incident of mass nosocomial *Serratia* infection

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Abstract It is unclear how changes in the content and number of news reports over time affect the impressions made in the minds of newspaper readers. This study targeted news reports in major newspapers regarding an incident of mass nosocomial *Serratia* infection that occurred at one clinic. The trends in the total number of articles and total number of characters contained in the articles were congruent, with a peak on the day after the incident was disclosed and a rapid decrease thereafter. The numbers of articles and characters that appeared during the first 3 days corresponded to 45 and 51% of those that appeared during the entire study period. On day 9, it was published that *Serratia liquefaciens* propagated on medical instruments, and both the number of articles and the number of characters increased by approximately 40% in comparison to those published on the day after the initial report of the incident. The individual articles were deemed to be medically accurate; however, the main problem was that only part of

the specific medical issue had been emphasized because of a poor balance in the number of news reports on this topic.

Keywords Sterilization · *Serratia liquefaciens* ·
Media literacy · Coverage · Newspaper

Introduction

Background of this study

Physicians often believe that medical news reported by the mass media is inappropriate, and several earlier studies on the problems thereof have been reported [1]. Several study groups have reported that some aspects of studies about medical problems were highlighted while others were not. For example, problems with medical news reports included sensationalism; an insufficient number of follow-up reports; a lack of consideration in regard to the quality of the evidence; inaccurate explanations of the benefits of treatments/procedures and understatement of their side effects and costs; and a lack of unbiased reporting in regard to comments from informants [2–5]. These earlier studies commonly focused on the structure of journalism that produced inappropriate medical news reports [6], and the content and form of the medical news reports have not been sufficiently discussed. Therefore, it is unclear as to what aspects of the medical news reports cause physicians to sense that they are inappropriate.

Accuracy in media coverage has been discussed as a very important matter [7]. At the time of an incident, initially there is much coverage while the incident attracts public attention. After a considerable time has passed, when the results of more precise investigations appear, interest among the public has usually dropped. Therefore,

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the more accurate and comprehensive coverage is rarely reported to the public and, as a result, people understand only some aspect of the incident. We raise this concern especially in regard to the coverage of medical incidents, as such coverage needs exclusive and technical knowledge for a complete understanding of the incident. However, to the best of our knowledge, there is no study on the relationship between media accuracy and alterations of stories as time advances.

In this study, to reveal the features of coverage about healthcare, we investigated how changes in the content and amount of news reports over time affected the formation of impressions in the minds of readers.

Incident summary

In June 2008, a nosocomial infection occurred at a clinic in Mie Prefecture. In this incident, among the patients who received IV solutions at that clinic between May 23 and June 9, 2008, 1 patient died, 18 patients were admitted to hospital, and 10 patients required outpatient treatment. The IV solution in question contained normal saline solution mixed with a vitamin B12 preparation (product name, Methycobal; Eisai, Japan) and an analgesic (product name, Neurotropin, Nippon Zoki, Japan), but, as part of the procedure, rather than individually packaged alcohol swabs being used, swabs that were dipped in chlorhexidine gluconate that had been diluted at least 20-fold in comparison to standard procedures had been used. Subsequently, the presence of *Serratia liquefaciens* was identified in the diluted chlorhexidine gluconate solution, the IV solution, and in the patients, thus suggesting that *Serratia liquefaciens* had proliferated in the diluted chlorhexidine gluconate solution and the IV solutions that had been prepared using swabs that had been sterilized in this way had thus become contaminated by *Serratia liquefaciens*. Moreover, the IV solution had been left at room temperature for a long period of time, thereby allowing the *Serratia liquefaciens* to proliferate, resulting in mass nosocomial infections. Also, the presence of *Serratia liquefaciens* was identified in the original undiluted chlorhexidine gluconate that was used for sterilization. The route of infection remains uncertain because the particular strain of *Serratia liquefaciens* in this incident was not identified.

Purpose of this study

In this study, in order to elucidate the features of coverage regarding healthcare issues, we investigated how changes in the content and number of news reports over time affected the impressions in the minds of the newspaper readers.

Materials and methods

This study targeted news reports in major newspapers regarding the incident of mass nosocomial infection that occurred at a clinic in Mie Prefecture in June 2008.

Using Nihon-Keizai (Nikkei) Telecom 21, which is Japan's largest database of newspaper articles, we extracted articles regarding this case that appeared in the top five Japanese national newspapers for 1 month between June 11 and July 10, 2008. We used "Iga" (the name of the city in which the clinic is located) and "Tanimoto," as well as "Tanimotoseikei" (for the name of the clinic), "Mie" (the name of the prefecture in which the clinic is located), and "Serratia" as the search terms. The top five newspapers are: the *Nihon-Keizai Shimbun*, *Asahi Shimbun*, *Mainichi Shimbun*, *Yomiuri Shimbun*, and *Sankei Shimbun*. The circulation of these five Japanese newspapers is 60% of the circulation of all Japanese newspapers combined [8].

Each newspaper has multiple headquarters, and these edit the papers independently; however, regarding topics of national concern, the office at each headquarters usually uses the articles published by the Tokyo headquarters. Although this incident occurred in Mie Prefecture, the articles on this incident were published in the Tokyo edition, thus indicating that those same articles were probably published in all editions throughout Japan. However, using the Nikkei Telecom 21, we were not able to investigate whether or not these articles were in fact published in each edition.

The total number of extracted articles, the total number of characters contained in the articles, the number of key words, and the trends of the time-lines thereof were investigated. The key words were defined as follows: *Serratia*, gram-negative rods (GNR), advance preparation, towel, swabs, sterilization, antiseptic solution, source of infection, nosocomial infection, hygienic management, manual, death or bodily injury due to professional negligence, house search, charges, medical monitoring, medical association, false claims for health insurance reimbursement, academic conference, and guideline.

Errors in the contents of the articles were checked independently by two expert researchers (Y.M. and Y.K.). They have worked for more than 5 years as medical doctors and are researchers in the field of health communication.

Results

Coverage of the top five newspapers

All five top newspapers reported on this incident. Besides the Tokyo headquarters editions, the Nagoya and Osaka editions of *Nihon-Keizai Shimbun*, the Nagoya and Osaka editions of

Asahi Shimbun, the Midland, Osaka, and local editions of *Mainichi Shimbun*, the Midland and Osaka editions of *Yomiuri Shimbun*, and the Osaka edition of *Sankei Shimbun* reported with unique articles. Midland is the name of the region that includes Nagoya. The term “Midland edition” is used almost interchangeably with “Nagoya edition.”

Trends in the total number of articles and the total number of characters

The total number of articles and the total number of characters contained in the articles that were published during the study period were 188 and 131 014, respectively. These trends are shown in Fig. 1. The contents of the articles were generally accurate. Of the 188 articles, only 2 articles (1.1%) were judged to be medically inaccurate. The number of articles and the number of characters that appeared during the first 3 days after the incident corresponded to 45% and 51% of those that appeared during the entire study period. On day 9 after the incident was initially reported, *Serratia liquefaciens* was reported to have propagated on medical instruments, and both the number of articles and the number of characters increased by approximately 40% in comparison with those published on the day after the initial report of the incident.

Frequency of the appearance of the key words

The frequency of the appearance of the key words is shown in Table 1. The key words that most commonly appeared were “advance preparation,” followed by “nosocomial infection” and “serratia,” in that order.

Comparison of the number of articles among the newspaper companies

A comparison of the number of articles among the newspaper companies is shown in Table 1. The *Mainichi Shimbun* reported this incident 57 times; the *Yomiuri Shimbun*, 41 times; the *Asahi Shimbun*, 38 times; the *Nihon-Keizai Shimbun*, 38 times; and the *Sankei Shimbun*, 14 times.

Alterations in the frequency of the key words

The first day that an article on the incident was published in the Tokyo edition was the day on which the key words “prepared and kept” were described in the Tokyo edition and the day on which the key words “swabs” or “towels”, or “sterilization” were used, as shown in Table 2. The frequency of the phrase “prepared and kept” was 84% before 18 June, while it was 55% after 19 June. However, the frequency of the use of the words “swabs” or “towels,” or “sterilization” was 24% before 18 June, while it was 64% after 19 June.

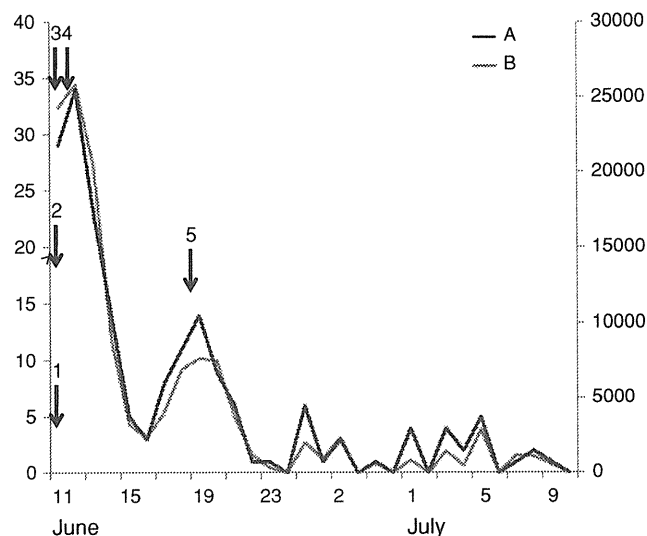


Fig. 1 Trends in the number of newspaper articles regarding the incident of mass infection and trends in the number of characters contained in the articles. *A* Total number of articles on the incident in five major newspapers. *B* Total number of characters in articles on the incident in five major newspapers. *1* The incident disclosed, *2* intravenous drip solutions found to be prepared and kept, *3* gram-negative rods detected in patient’s blood, *4* detected bacteria identified as *Serratia* spp., *5* *Serratia liquefaciens* detected on multiple medical instruments

Discussion

The number of news reports on the incident described above reached a peak immediately after the incident was initially reported and rapidly decreased thereafter. This fact indicates the possibility that, in news reports on malpractice in newspapers, the mass media reports when the case is initially disclosed significantly affect the formation of impressions in the public. In this incident, key words such as “advance preparation” and “nosocomial infection” frequently appeared in all the newspapers when the incident was initially disclosed, so readers would have interpreted that the bacteria had proliferated because the prepared IV solutions were left at room temperature. However, bacteria are not likely to proliferate in an aseptically prepared IV preparation even if it is stored at room temperature for a long period, so many physicians felt uncomfortable with the theory that developed from the newspaper reports. Subsequently, as the investigation of the incident by the police proceeded, it was revealed that chlorhexidine gluconate that had been diluted with water had been used for sterilization at the hospital and that *Serratia liquefaciens* consequently proliferated therein. Because the IV solutions were prepared using contaminated swabs, *Serratia liquefaciens* became mixed into the IV solutions, which were left at room temperature, and thus proliferated in the IV solutions, leading to mass nosocomial infection. It has been reported in the past that *Serratia*

Table 1 Comparison of article content among major newspapers

	Asahi			Mainichi				Nihon-Keizai			Sankei		Yomiuri		
	Tokyo	Nagoya	Osaka	Tokyo	Midland	Osaka	Local	Tokyo	Nagoya	Osaka	Tokyo	Osaka	Tokyo	Midland	Osaka
Total number of articles ^a	16	20	2	9	27	6	15	13	24	1	3	11	9	21	11
Frequency of appearance of the key words															
Prepared and kept	32	64	0	24	76	20	13	30	51	0	8	37	31	49	40
Nosocomial infection	23	47	0	9	44	5	16	10	32	0	2	11	2	31	12
Serratia	12	28	0	1	40	3	6	17	34	0	4	11	3	27	17
Sterilization	6	30	0	2	27	1	11	1	18	0	0	7	7	20	8
Swabs	8	24	0	2	18	1	6	3	16	0	0	6	4	6	7
Hygienic management	7	10	0	5	8	3	4	3	17	0	1	2	0	12	4
Death or bodily injury through professional negligence	7	8	0	4	7	0	0	6	10	0	2	2	8	12	4
House search	9	11	0	3	10	2	4	3	11	0	1	2	0	0	0
Towel	1	6	0	5	10	5	0	3	8	0	0	0	0	5	4
Charges	1	1	0	3	4	0	0	4	8	0	1	3	3	6	2
Medical monitoring	10	0	0	0	4	0	10	0	1	0	0	0	0	4	0
Manual	6	8	0	1	2	0	1	0	1	0	0	1	3	2	2
Gram-negative rod-shaped bacteria	2	4	0	2	2	0	0	5	1	0	2	0	3	3	3
Medical association	0	3	0	0	6	0	6	0	4	0	0	0	0	5	0
Antiseptic solution	1	4	0	0	1	0	1	0	0	0	0	1	2	2	2
Source of infection	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0
False claims for health insurance reimbursement	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Academic conference	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Guideline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

^a We counted only the total number of extracted articles and the number of key words in the original articles that were originally provided by the Nagoya, Midland, and Osaka headquarters of the newspapers. We were not able to count these items in the articles that were provided by Tokyo headquarters for the Nagoya, Midland, and Osaka editions

liquefaciens proliferate within antiseptics that have been left for a long period [9, 10], and many physicians concur with this explanation. *Serratia liquefaciens* were detected in the diluted solution and in the IV solutions on 18 June. Subsequently, the major newspapers began reporting that the *Serratia liquefaciens* that had proliferated in the sterilized swabs had become mixed into the IV solutions during the process of preparing the IV solutions, which had been left at room temperature for a long period of time, thus resulting in the proliferation of the bacteria. However,

the absolute number of news reports regarding the contaminated antiseptic was small, so it is highly unlikely that these reports would have led to a change in impressions in the public after they had been formed.

Many physicians believe that newspaper reports regarding medical care are often inaccurate. However, in a series of news reports on this incident, individual articles contained only two expressions that were deemed medically incorrect. In addition, when we viewed the news reports by the major newspaper companies over time, we