



Published in final edited form as:

Nat Rev Neurol. 2009 December ; 5(12): 643–644. doi:10.1038/nrneuro.2009.192.

Incidental findings: in practice and in person

Judy Illes and Emily Borgelt

National Core for Neuroethics, Division of Neurology, Department of Medicine, The University of British Columbia, Vancouver, Canada

Abstract

Prospective research participants, patients and consumers are faced with a cacophony of information about the risks and benefits of brain scans. In light of new data on Incidental findings, the professional community has a duty to explicitly and systematically encourage questions that promote rational decision-making and informed choice.

In a paper published in August 2009, Morris et al 1 contributed to the conversation about clinically unexpected findings ('Incidental findings') on brain MRI with a systematic retrospective review and meta-analysis spanning almost 60 years of published literature. Their review focused on studies of people without neurological symptoms who underwent imaging for the purposes of research, for occupational or clinical screening, or commercially for reassurance of good brain health. The authors confirmed what many investigators have been reporting for the past 10 years, 2–4 namely, that clinically significant incidental findings are more common than previously thought (a prevalence of 2–3%, or 1 of every 37 neurologically asymptomatic people scanned), increase in occurrence with age, and are primarily neo-plastic and vascular in nature. In addition, high-resolution MRI elevates the likelihood of an incidental finding and the risks and benefits associated with that discovery.

...clinically significant incidental findings are more common than previously thought...

The authors also contribute meaningfully to the discussion by pointing out that awareness of unexpected brain disease, such as an unruptured aneurysm, might lead to improved clinical management of risk. In our own examination of incidental findings on functional MRI from a health economics perspective, we concluded that, given the varying risks of intracranial aneurysm between different populations, screening strategies must be tailored to the specific characteristics of the prospective study participant.⁵ For example, before enrollment into a trial, a full clinical examination of women who have a positive family history of intracranial aneurysm is economically indicated. We also demonstrated that a review by a non-specialist of structural prescans that precede the acquisition of functional data—a strategy used by many research laboratories—is not justifiable from a health economics point of view. Overall, and regardless of the population under study, we have suggested, along with Morris and colleagues, that disclosure of the possibility of incidental findings belongs in the realm of informed consent. Correctly Morris *et al.* further conclude from their data that the frequency of occurrence of such findings in the general population is insufficient to justify universal screening.

Correspondence: J. Illes, National Core for Neuroethics, Division of Neurology, Department of Medicine, The University of British Columbia, 2211 Wesbrook Mall, Koerner S124, Vancouver V6T 2B5, Canada jilles@interchange.ubc.ca.

Competing Interests

The authors declare no competing interests.

The work conducted over the past decade on the problem of incidental findings has been rigorous and meritorious. Nevertheless, we propose a moratorium on further retrospective studies of the nature described in the Morris *et al.* paper. Despite excellent methods and diverse approaches, such studies are becoming largely redundant. We must now shift our attention to the challenges ahead. Two critical concerns, which we will not dwell on here, are incidental findings discovered in banked data, and individual findings that fall outside a normative range yielded by group-averaged functional images. These issues will require substantial time and effort to resolve. We instead focus on a third challenge of equal immediacy and possibly easier tractability: a need for specific direction for study participants, patients and consumers to enable them to navigate through the labyrinth of information about incidental findings in research, in clinical care, and in the rapidly evolving industry of personalized medicine. Reference to prevalence statistics, for example, as we and others have proposed as a minimum criterion for advising people about incidental findings,^{6,7} is not sufficient to meet the requirement of 'informed' in any of these settings.

...we now propose a moratorium on further retrospective studies...

To support this call to action in the context of a brief commentary, we probed the information available in the public domain about unexpected findings in people presumed to be brain healthy. Specifically we conducted a content analysis of press, blog and other internet coverage of the Morris *et al.* paper. In the period following its publication, we captured 17 distinct articles through Google Alerts and a comprehensive sweep of Google search engines (Web, News, Blogs and Scholar). We coded the articles for type of posting (news article, blog post, organization press release, or live forum), accuracy of article content (proximity of the match with the text of the original paper), and accuracy of headline (proximity of the match with conclusions of the paper), using previously established methods.⁸ We excluded direct links to the Morris *et al.* paper.

Of the 17 postings captured, 13 were news articles, 3 were blog posts, and 1 was a press release. Each of these postings reappeared fewer than three times, except, for two news articles—"Brain Scans Often Unnecessary, Study Finds" and "Incidental Findings on Brain MRIs Pose Dilemma"—which were reposted in full to 9 and 13 sites, respectively, including other news websites, blogs, and a live forum. Of the 17 postings, 59% ($n=10$) provided a content account that we classified as balanced for accuracy, 53% ($n=9$) carried headlines that we classified as sensational, such as "Experts Issue Warning over Private Brain Screening Tests", and "Health MoTs do More Harm than Good" promulgating false or hyperbolic notions about the purpose of the Morris *et al.* study and the private sale of brain screening. We found that four postings with sensational headlines actually had accurate content, while two postings with seemingly objective headlines, such as "Incidental Findings are Common on Brain MRI: Meta-Analysis", contained erroneous content. Also noteworthy was that the type of online source did not predict the objectivity and veracity of reporting; for example, reputable online newspapers were as prone to spinning or hyping the study as were uncurated blogs or live forums.

From this select sample of rapid online communications, we found both objective review and misleading discussion about incidental findings in the brain. Given the increasing breadth of applications of brain imaging, and in light of the fundamental commitment by medical researchers and clinicians to nonmaleficence and respect for persons, the professional community has a duty to ensure that rational decisions can be made amid this cacophony of information. Key issues are continued eligibility in a study or clinical trial, the transfer of information to others, including health-care providers or others designated to receive medical information, next steps for follow-up, including complications and cost, and assessment of immediate health and the implications for future health and behavior. At present, information available online to the self-guided user is noisy and unreliable. In any context in which an

incidental finding in the brain might become a part of a person's life, questions about anticipating and managing such a finding must be explicitly and systematically encouraged.

Acknowledgments

The authors are supported by NIH/National Institute of Mental Health grant R01 #9R01MH84282, Canadian Institutes of Health Research/Institute of Neurosciences, Mental Health and Addiction grant CNE #85117, the Canada Foundation for innovation, and the British Columbia Knowledge Development Fund.

References

1. Morris Z, et al. Incidental findings on brain magnetic resonance imaging: systematic review and meta-analysis. *BMJ* 2009;339:b3016. [PubMed: 19687093]
2. Katzman GL, Dagher AP, Patronas NJ. Incidental findings on brain magnetic resonance imaging from 1,000 asymptomatic volunteers. *JAMA* 1999;281:36–39. [PubMed: 10404909]
3. Illes J, et al. incidental findings in brain imaging research. *Science* 2006;311:783–784. [PubMed: 16469905]
4. Vernooij MW. Incidental findings on brain MRI in the general population. *N. Engl J. Med* 2007;357:1821–1828. [PubMed: 17978290]
5. Sadatsafavi, M.; Marra, C.; Li, D.; Illes, J. An ounce of prevention is worth a pound of cure: a cost-effectiveness analysis of incidentally detected aneurysms in functional MRI research; Canadian Association for Neuroscience Annual Meeting; May 24–27, 2009; Vancouver, Canada.
6. Illes J, Desmond JE, Huang LF, Raffin TA, Atlas SW. Ethical and practical considerations in managing incidental neurologic findings in fMRI. *Brain Cogn* 2002;50:358–365. [PubMed: 12480483]
7. Wolf SW, et al. Managing incidental findings in human subjects research. *J. Law Med. Ethics* 2008;36:219–248. [PubMed: 18547191]
8. Racine E, Bar-lian O, Illes J. Brain imaging; a decade of coverage in the print media. *Sci. Commun* 2006;28:122–143. [PubMed: 17330151]