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ENVIRONMENTAL HEALTH RESEARCH ON HAZARDS IN THE HOME AND THE DUTY TO WARN

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Abstract

When environmental health researchers study hazards in the home, they often discover information that may be relevant to protecting the health and safety of the research subjects and occupants. This article describes the ethical and legal basis for a duty to warn research subjects and occupants about hazards in the home and explores the extent of this duty. Investigators should inform research subjects and occupants about the results of tests conducted as part of the research protocol only if the information is likely to be accurate, reliable, and medically useful. Investigators should warn subjects and occupants about hazards they happen to discover while they are in the home, if a reasonable person would warn the subjects and occupants about those hazards. Investigators should not report illegal hazards discovered in the home to the authorities, unless those hazards constitute abuse or neglect of children or mentally disabled people living in the home. When investigators decide to warn research subjects and occupants about hazards in the home, they should take some steps to help them make effective use of this information, such as providing additional counselling or making a referral for remediation or medical treatment. Investigators should discuss these issues with research subjects during the informed consent process.

Keywords

hazards in the home; duty to warn; environmental health; ethics

INTRODUCTION: THE KENNEDY KRIEGER INSTITUTE LEAD ABATEMENT STUDY

When environmental health researchers study hazards in the home, they often discover information that may be relevant to protecting the health and safety of the research subjects and occupants. Consider, for example, the controversial Kennedy Krieger Institute (KKI) study on lead abatement, which was funded by the Environmental Protection Agency and the Maryland Department of Housing and Community Development. In this study, investigators from KKI, which is associated with Johns Hopkins University, conducted a controlled trial to test the effectiveness of different levels of lead abatement in housing with lead-based paint in Baltimore, Maryland. The goal of the study was to determine whether less expensive forms of lead abatement were as effective as more expensive forms. Twenty-five families were recruited to participate in the study. They were randomly assigned to one of five groups: three experimental groups, which received three different levels of lead abatement; one control group that received full abatement; and one control group living in a home that never had any lead paint. The investigators collaborated with landlords for this study. The investigators

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encouraged landlords to rent to families with young children and they helped the landlords to obtain grants for lead abatement. The landlords could not afford the most expensive forms of lead abatement. The reason it was important for the families to have young children is that the investigators planned to monitor lead levels in the children's blood. In addition to collecting blood from the children periodically, the investigators measured lead levels in dust samples collected from the homes. Success in lead abatement would be equated with a reduction in lead levels in the homes and in the children's blood. Although the investigators told the parents that they would measure lead levels in the children's blood, they never informed them that these lead levels would be a key indicator of experimental success or failure. The children were healthy prior to the beginning of the study.¹

The parents of two children, Myron Higgins and Eric Grimes sued KKI, alleging that the investigators were negligent in performing their duties to the research subjects. The plaintiffs argued that the defendants were negligent in two ways: 1) they failed to warn the parents in a timely fashion that their children were exposed to dangerous levels of lead, and 2) they failed adequately to inform the parents of the risks of the research. The defendants made a motion to dismiss the case, on the grounds that the investigators had no legal duties toward the research subjects. The district court found in favour of the defendants, but the Court of Appeals of Maryland vacated this ruling and held that the investigators did, in fact, have legal duties to the subjects, based on a special relationship with the subjects. The Court of Appeals remanded the case to the district court for additional findings consistent with its opinion.²

This legal case generated considerable scholarly debate and spurred the Institute of Medicine (IOM) to study the issues related to research on health hazards in the home and publish a report. The IOM report addressed many different scientific and ethical issues, including the level of risk that children may be exposed to in research, privacy and confidentiality in research on home environments, community participation in research, and investigators' duty to warn occupants about health hazards discovered in the home.³ Although the IOM report provides a useful introduction to the issues surrounding the duty to warn, it does not explore the ethical and practical problems in great depth. In an earlier publication, we delved into the issue more deeply, but we did not provide investigators with sufficient guidance.⁴ The purpose of this article is to explore the duty to warn in more depth and make specific recommendations for warning subjects or occupants about hazards discovered in the home.

ENVIRONMENTAL HEALTH RESEARCH IN THE HOME

To help clarify the ethical issues that we would like to address in the article, it will be useful to provide the reader with some additional background concerning environmental health research conducted in homes. Because many different environmental agents in the home can impact human health, it is important to gather data on exposures to those agents (e.g. allergens, lead, pesticides, etc.), to understand how these agents can cause or exacerbate diseases, and to develop effective interventions, such as lead abatement or allergen reduction. Investigators may test for the presence of agents in different parts of the home and gather data on people living in the home. For example, in a recently published study, the investigators measured dust mite and cockroach allergen and collected data on the health of asthmatic children living in the homes, before and after an intervention (i.e. allergen education and remediation).⁵ The people potentially affected by research on health hazards in the home include the people whom investigators gather data about (i.e. the research subjects) as well as other occupants of the home.

Because investigators must go into homes to make observations and collect data, research on hazards in the home necessarily involve some invasion of privacy. Investigators are likely to observe private information in the home environment, some of which may be part of the study,

and some of which may be incidental to the study. For example, an investigator collecting dust in the home might also happen to observe cracks in the walls, leaks from the roof, or evidence of illegal drug use or child abuse. How should investigators respond to what they happen to observe in the home? We will address this question shortly.

THE ETHICAL AND LEGAL OBLIGATIONS OF INVESTIGATORS

To provide additional background for our discussion, it will be useful to give a brief overview of the ethical and legal duties that investigators have toward research subjects. This will be useful in helping to clarify their duty to warn. The *Belmont Report* is one of the most influential documents concerning the ethics of research with human subjects.⁶ The *Belmont Report* was written by the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, which was appointed by President Richard Nixon in 1974 in accordance with the National Research Act. The National Commission included physicians, scientists, psychologists, attorneys, theologians, and ethicists. It heard testimony from a number of different scholars and researchers on the ethics of research with human subjects. The *Belmont Report* is the product of four days of intensive deliberations held at the Smithsonian Institution's Belmont Conference Center.

The authors of the *Belmont Report* synthesized two different approaches to the ethics of research with human subjects - Kantianism and utilitarianism - into a single framework. The authors of the report declared that three ethical principles apply to research with human subjects: (1) respect for persons, (2) beneficence and (3) justice. Respect for persons obligates investigators to respect the autonomous choices of individuals who are capable of making decisions and to protect individuals who have a diminished capacity for decision-making. Respect for persons justifies informed consent, safeguarding privacy and confidentiality, and special protections for vulnerable subjects. Beneficence obligates investigators to 1) do no harm, and 2) maximize benefits and minimize risks related to research. Beneficence justifies strategies to minimize research risks, such as inclusion/excluding criteria for subjects and data and safety monitoring. Beneficence also implies that risks to human subjects should be reasonable in relation to benefits to the subjects or society. Justice obligates researchers to ensure that the benefits and burdens of research are distributed fairly. Justice justifies rules pertaining to the recruitment of subjects and the protection of vulnerable subjects. The authors of the *Belmont Report* held that researchers should carefully balance and weigh these different principles when applying them to actual cases.⁷

The most significant impact of the *Belmont Report* was that it provided a conceptual foundation for a major revision of the US federal regulations pertaining to research with human subjects in 1981. The revision resulted in the refinement and expansion of the Department of Health and Human Services (DHHS) regulations, 45 C.F.R. 46. These regulations are also known as the Common Rule because they have been adopted by 17 federal agencies. The Common Rule sets forth a structure for the review and oversight of research with human subjects, and states responsibilities for research institutions.⁸ Although other nations have adopted legal rules and regulations for research with human subjects, we will focus on the Common Rule, because it has had considerable international influence: many of the important concepts and requirements contained in the Common Rule can be found in legal frameworks in Canada, the UK and many other countries.

The institutional review board (IRB), a committee that reviews and oversees human research, is the focal point of most of rules contained in the Common Rule. The IRB has the authority to approve or disapprove research protocols or amendments to protocols, require changes to protocols, investigate problems with research, and audit research activities.⁹ An IRB can approve a research protocol only if it determines that all of the following requirements are met:

1) risks to the subjects are minimized, 2) risks are reasonable in relation to benefits to subjects or society, 3) selection of subjects is equitable, 4) informed consent will be sought from the subject or the subject's legally authorized representative, 5) informed consent will be appropriately documented, 6) the protocol includes adequate plans for data and safety monitoring, where appropriate, and 7) the protocol has adequate provisions to protect vulnerable subjects and maintain confidentiality, where appropriate.¹⁰ The Common Rule includes a list of specific requirements for obtaining and documenting informed consent, and also some exceptions to these requirements.¹¹ The Common Rule also defines important terms, such as 'research' and 'human subject' and includes some categories of research that are exempted from IRB review.¹²

There are more ethical and legal rules and guidelines pertaining to research with human subjects than we could possibly cover in this article; but the brief summary we have given here should suffice for our purposes. We are interested in how these standards of conduct might apply to investigators' obligations to inform research subjects and occupants about environmental hazards discovered in the home. For the purposes of our discussion, we will focus on the *Belmont Report* and the Common Rule. Although the Common Rule does not state specific duties for investigators, it implies that investigators have ethical and legal duties to comply with the requirements for the approval of research by the IRB. For example, an investigator has an obligation under the Common Rule to obtain informed consent, because he has agreed to conduct research in accordance with a protocol approved by the IRB.

THE DUTY TO WARN

How do these guidelines and regulations apply to the situation where investigators discover a hazard in the home? What should they do with that information? The *Belmont Report's* principle of beneficence obligates investigators to inform subjects (or their representatives) about hazards discovered in the home, because providing them with this information would help to minimize risks to research subjects and maximize benefits. The *Common Rule's* requirements to minimize risks and ensure that risks are reasonable in relation to benefits would also imply that investigators should inform subjects about hazards discovered in the home. Providing subjects with information about hazards discovered in the home can help them to take effective action to avoid or minimize these risks. For example, if an investigator informs a parent that her child has dangerous lead levels in his blood, then she can take measures to minimize the harm to her child, such as consulting a physician, hiring a company to perform lead abatement on the home, or possibly moving out of the home.

The *Belmont Report's* principle of respect for persons also obligates investigators to inform research subjects about hazards discovered in the home, because providing them with this information would help them to make autonomous choices concerning their participation in research. The Common Rule's informed consent requirements would also imply that investigators have an obligation to inform subjects about hazards discovered in the home, since information about hazards in the home is relevant to a research subject's decision-making. To use the lead example again, research subjects who learn about dangerous lead levels can use this information to decide whether to continue participating in the study, see a physician, move out of the home, and so on.

Do investigators also have obligations to warn other occupants of the home about hazards that they discover? The Common Rule says nothing that directly applies to this situation. The Common Rule addresses investigators' duties to research subjects but it does not address their duties to people who are not in the research study, i.e. third parties. One might argue, however, that the *Belmont Report's* principle of beneficence implies that researchers have obligations to people who are not directly involved in research, since beneficence obligates researchers to

minimize harm and maximize benefits but it does not specify to whom.¹³ Third parties in home-based environmental research may include occupants of the home, other than the research subjects. Warning families about health hazards in their home can help them minimize harms to all of the people living in the home. Normally, investigators will not need to warn all occupants of the home directly to ensure that information is conveyed to them. For example, if investigators inform a mother about dangerous lead levels in the home, she can share that information appropriately and use it to protect her children, husband, or other occupants.

THE EXTENT OF THE DUTY TO WARN

There is, therefore, an ethical and legal basis for a duty to warn research subjects and occupants about hazards discovered in the home. Most environmental health researchers would probably agree with this conclusion. Controversies may arise, however, when one considers the extent of this duty. Should investigators warn subjects/occupants about all hazards discovered in the home? How should investigators help subjects/occupants make use of this information? Should investigators inform subjects/occupants about how they plan to deal with hazards discovered in the home? To make some headway on these questions, it will be useful to distinguish between 1) hazards that the investigators plan to study as part of the research protocol (i.e. research-related findings); and 2) hazards that investigators happen to discover while they are collecting data in the home (i.e. incidental findings). The IOM report discusses the first type of hazard at length and concludes that investigators have an ethical obligation to inform subjects about research-related findings, provided that the information conveyed to the subjects is based on well-validated tests. To be well-validated, a test must be a) analytically valid, i.e. reliable and accurate; and b) medically useful, i.e. useful in diagnosing, preventing, treating a disease.¹⁴ The IOM report also notes that sometimes research subjects may want to have access to test results that have not been well-validated. The report observes that the benefits of making unvalidated experimental tests available may not outweigh the risks, but it stops short of concluding that investigators should never share these results with subjects. The report simply recommends that investigators discuss the issues of reporting test results with research subjects or their representatives.¹⁵

We agree with the IOM report's recommendations that investigators discuss the issue of reporting test results with research subjects during the informed consent process, but we think that investigators should share these results with research subjects only if the tests are analytically valid. Sharing the results of an analytically invalid test can cause great harm. If a test has a high false positive rate, for example, families learning about a test result might take drastic action, such as moving out of the home, even though there would be no factual basis for taking such a step. If families decide to repeat the test because they suspect that it may be a false positive, they may have to spend their own money unnecessarily, and they may experience considerable anxiety while waiting for the test results. Information shared with research subjects should be reliable, accurate, and useful.¹⁶

Even when a test is analytically valid, difficult questions may still arise concerning whether to share test results with subjects/occupants, due to problems with determining whether the information is medically useful. There are many different potential uses of health-related information as well as professional disagreements about how information relates to potential medical interventions. Additionally, research subjects may want access to test results for their own purposes, such as record-keeping. For example, the normal blood lead level for children is less than 10 micrograms per deciliter. Medical treatment is indicated at more than 25 micrograms per deciliter.¹⁷ Suppose investigators discover that a child's blood lead level is 12 micrograms per deciliter. Should they share this information with the parents? Though this blood lead level is slightly above normal, it is well below the level at which treatment is indicated. If the parents do not understand the significance of this blood lead level, they may

make rash decisions based on this information, such as withdrawing from the study or moving out of the house. Sharing the information with parents without explaining its significance can do more harm than good. Investigators should consider questions like these when developing their protocol and they should have a plan for sharing information with research subjects/occupants. They should specify what types of information will be shared and what types will not be shared. They should also discuss these issues with subjects (or their representatives) during the consent process.

It is worth noting that investigators sometimes have an obligation to inform research subjects or occupants when they fail to discover hazards in the home. For example, if investigators are studying lead in a particular home, and they determine that the lead levels in that home are not dangerous, they should share this information with subjects or occupants, as they may find the information useful and reassuring, especially if they have been worried about lead in their home. The IOM report does not discuss the second type of hazard reporting at length, although the report mentions it in passing.¹⁸

INCIDENTAL FINDINGS

What should investigators do when they observe hazards not related to the topic of their study? Should they disclose all incidental findings they observe? What if they are not qualified to evaluate these findings? How should they help subjects/occupants to deal with them? This problem is similar to the situation in medical research where an investigator makes an incidental finding on a neurological MRI exam conducted for a brain imaging study.¹⁹ To approach the problem of addressing incidental findings in research, we will distinguish between the researcher's obligations *as a researcher* and the researcher's obligations *as a member of society*. All members of society have moral obligations to protect one another from harm.²⁰ Though no one is required to act as a hero or saint, everyone should make at least a minimal effort to prevent harm from occurring to other members of society, when they are able to so and no one else can. For example, if someone is drowning in a pool, another person standing beside the pool should at least throw the person a life preserver or call a lifeguard (if there is one nearby). The person is not required by morality to jump into the pool to save the drowning person (and thereby risk his own life), but he should at least take some reasonable steps to render aid.

Some people have special obligations to protect others, based on their professional, social, or institutional roles, which go far beyond the moral obligations that all members of society have toward one another.²¹ For example, a lifeguard has an obligation to jump in the pool to save someone who is drowning. A physician has an obligation to treat people who are sick, possibly risking his own health. A parent has an obligation to provide for his child's welfare and protect that child from harm. Researchers also have special obligations to protect research subjects from harm which go beyond their ordinary, moral obligations. Many of these obligations are spelled out in legal and ethical rules and guidelines, such as the *Belmont Report* and the US federal research regulations, which we discussed earlier.²²

There are several reasons why researchers have special obligations to research subjects. First, researchers have knowledge and expertise in a particular area of inquiry or professional practice, and they therefore have an obligation to make good use of that knowledge and expertise. Knowledge (power) implies responsibility. Second, research subjects are often vulnerable. Even if a research subject does not belong to a designated vulnerable class under research regulations, i.e. 'children,' 'fetuses,' 'prisoners,' etc., he or she may still have vulnerabilities due to a lack of knowledge, expertise, or power. Researchers should not take advantage of people who are vulnerable. Third, research subjects often expect researchers to protect them from harm or to promote their interests, even when the research study involves

no prospect of direct medical benefit.²³ These expectations may not be justified in some cases, but they exist nonetheless.

When researchers observe hazards related to the topic they are investigating, they have special moral and legal obligations to protect research subjects from those hazards, because they are acting their roles as researchers. When researcher observe hazards not related to their research, they are no longer acting as researchers and are only bound by the obligations that apply to all people in society. Although researchers still have obligations to protect research subjects from potential harms unrelated to research, their obligations are not as extensive or demanding as the obligations to protect research subjects from hazards related to research. The situation is analogous to a lifeguard who witnesses an automobile wreck while on duty. While the lifeguard has special obligations to prevent people in the pool from drowning, based on his institutional role, his obligations to help the accident victims are not as extensive and demanding. The lifeguard could fulfill these obligations by calling the police or rescue squad, or rendering some minimal aid, but he need not risk his own life to save the accident victims.

There are several reasons why researchers are not bound by the special duties to protect research subjects from harm when they observe hazards not related to their research. First, investigators usually lack the expertise to address these other risks. An investigator who is studying lead in the home may know a great deal about the risks of lead but know very little about dangerous mould or a defective heating system. Second, investigators usually lack the time and resources to address risks unrelated to research. An investigator who observes mould may not have a test kit available, for example. Third, research subjects do not normally expect investigators to deal with risks that are unrelated to research. Someone who participates in a study of lead in the home probably does not expect to have his home to be thoroughly inspected for all hazards and problems, such as roaches, termites, a defective heating system, etc. If he wants to take care of these other concerns, the home-owner can call a heating service, exterminator, and so on.

When researchers discover hazards in the home that are not related to the matter they are investigating, they should still take steps to protect subjects or occupants from harm, even though they need not do as much as they would if the hazards were part of the matter being investigated. Researchers should act not as scientists collecting data or building inspectors examining the house, but as reasonable people, bound by the moral obligations that apply to all members of society. They should warn the subjects and occupants about risks that a reasonable person would warn them about. A reasonable person would not warn subjects/occupants about risks that they probably already know about. For example, if the home is located on a busy street, this presents a serious risk for children at play, but a reasonable layperson would probably not mention this risk, since she would assume that the occupants already know about it. A reasonable person would also not warn occupants about insignificant risks, such as the risk of slipping on the front steps, unless a brick or piece of railing is loose. A reasonable person would warn occupants about significant risks that they may not know about. For example, someone who sees a large wasp nest in his neighbour's attic or smells a gas leak in the basement would probably warn the neighbour about these risks.

PROTECTING CHILDREN FROM HARM

Some of the hazards unrelated to the research that investigators observe may place children at risk of harm. These incidental findings could include problems with the home itself or behaviours by occupants of the home. For example, suppose that an investigator discovers pornographic photographs of children living in the home. How should an investigator respond to this situation? On the one hand, the investigator would have an ethical obligation (and also legal obligation in many jurisdictions) to report suspected child abuse/neglect to the proper

authorities. On the other hand, the investigator would also have an ethical obligation to protect the privacy and confidentiality of the research subjects or occupants. The IOM report addresses this situation and notes that reporting child abuse/neglect could violate confidentiality or be ineffective or counterproductive.²⁴ Though the IOM does not make any specific recommendations of how to handle this type of situation, we think that investigators should report suspected child abuse/neglect. Although it is very important to protect the privacy and confidentiality of research subjects and occupants, the welfare of the child carries more weight. If investigators have reasons to suspect that a child faces a significant risk of substantial harm, they have an ethical obligation to take some action to address that risk, such as reporting it to the proper authorities. They may also often have a legal obligation to do so, as nearly every state in the USA has a law mandating that specific professions, such as health care providers or educators, report child abuse/neglect.²⁵

Investigators may observe evidence of other illegal activities in the home, some of which may place people at risk of harm. For example, investigators may find evidence of spouse abuse, domestic violence, recreational drug use, gambling, or illegal immigrants in the home. We recommend that investigators should not report these other illegal activities unless the activities also pose an imminent threat to children or other vulnerable people, such as incompetent adults, who are living in the home. There are several reasons why we make this recommendation. First, investigators are not police officers: they cannot and should not report every violation of the law that they observe in the home. Indeed, many people would not consent to participate in a study of health hazards in the home if they believed that researchers would investigate and report all illegal activities in the home. Second, investigators have strong ethical and legal obligations to protect the privacy of research subjects and occupants of the home. They should violate these obligations only for a very important reason, such as protecting children (or incompetent adults) from harm. Third, while ethical (and legal) obligations to report suspected child abuse/neglect are well-established, ethical obligations to report abuse to competent adults are not well-established, because adults have a right to autonomy that should be respected. A victim of spouse abuse or domestic violence may not want the problem reported to the authorities. The victim may fear retaliation from the aggressor, the victim may be financially dependent on the aggressor, the victim may refuse to testify in court, and the victim may simply want to deal with the matter without outside interference. Investigators may advise a competent, adult victim of spouse abuse or domestic violence about reporting the problem to the authorities, but they should not make a report without the consent of the victim.²⁶

There may be some instances where the duty to warn subjects or occupants about hazards in the home may conflict with the goals of the research study. For example, if subjects are participating in a controlled intervention trial comparing the current method of mould remediation to a new one, warning subjects or occupants in the control group about mould discovered in the home might compromise the study, because the subjects or occupants might withdraw from the study, which would affect enrolment numbers, or they might hire someone to remove the mould, which would bias the data. The best way to minimize risks to the subjects without compromising the study is to inform subjects at the outset of the study that they will not be informed about hazards discovered in the home until after the study has been completed, unless those hazards present an immediate and significant threat to their health or safety. Some hazards that are discovered pose an immediate and significant threat, while others do not. For example, dangerous levels of lead pose an immediate threat, but above average levels of pet dander do not (unless someone in the house has an allergy to pet dander). Since deciding whether a threat is immediate and significant depends on the particular facts related to the threat, we will not offer any general guidance in this article.

Warning subjects or occupants about risks may also pose risks to third parties not living in the home. For example, if an investigator warns a tenant about lead in his apartment, the tenant

may decide to move out of the apartment, which may have a negative financial impact on the landlord. The landlord may need to pay for lead remediation in order to rent the apartment again. To deal with this type of scenario, investigators should try to anticipate whether any identifiable third parties outside the home may be harmed (or financially burdened) by the research. If the investigators can identify these third parties, then they should discuss the research with them before initiating it, and, if necessary, obtain their consent. For example, investigators could approach a landlord about a research project and obtain permission from the landlord to enroll some of his apartments in the project. It may also be desirable to obtain some funding to help the landlord pay for his financial costs related to the research, such as lead remediation. In the KKI lead abatement research, mentioned earlier, the investigators reached an agreement with the landlords before initiating the study.

COUNSELLING AND REFERRALS

When investigators decide to warn research subjects/ occupants about hazards in the home, they should take some additional steps to help the subjects/occupants make effective use of this information, such as providing additional counselling or making a referral for remediation or medical treatment. Investigators should take these additional steps because information is not very useful, and can even be harmful, if one does not know how to act on it. By providing counselling or making a referral, investigators can help subjects/occupants to take effective action to deal with the hazard. For example, if investigators inform research subjects/occupants about dangerous lead levels in the home, they should help the subjects/ occupants to understand the significance of the information and find a health care provider or other expert who can help them minimize the harms related to lead exposure. Investigators should anticipate the need for referrals in their research protocols and develop handouts and other informational materials to give to research subjects or occupants, when needed.

Although investigators have an obligation to help subjects/occupants respond effectively to warnings about hazards in the home, this obligation does not include a duty to provide a medical intervention, such as treatment or remediation, because biomedical research is ethically different from medical therapy.²⁷ Environmental health researchers perform tests and procedures in the homes of research subjects for the purpose of gathering data that can be used in developing scientific knowledge. These tests or procedures may also promote the health of subjects, but that is not their main goal. This situation is very different from medical therapy, in which tests or procedures are performed to benefit the patient. If a physician performs a test that shows that one of his patients has high blood pressure, then he must do more than merely warn the patient about his condition: he also should recommend a treatment plan, such as lifestyle changes or medication. If an investigator discovers lead in the home, then he may recommend remediation, but he has no obligation to provide it, because his aim is to conduct research, not to provide lead remediation. Furthermore, the investigator is under no obligation to provide financial support for remediation, unless this support has already been promised to home occupants (or landlords) as an incentive for participating in the study.

INFORMED CONSENT

Finally, we would like to mention that investigators should discuss issues related to communicating hazards discovered in the home with research subjects (or their representatives) during the informed consent process. They should inform subjects about the information that they will or will not disclose, when they will disclose it, how they will disclose it, and why. They should inform subjects or their representatives if they are planning to disclose suspected child/abuse neglect to the proper authorities. Research subjects or their representatives should also have an opportunity to ask the investigators questions about their plans for disclosing tests

results or information about hazards observed in the home, during their initial enrolment in the study and as the study progresses.²⁸

CONCLUSION

Environmental health research on hazards in the home poses some unique ethical challenges for investigators. In this article, we have explored investigators' duties to warn research subjects/occupants about hazards discovered in the home. We have argued that investigators should share research-related findings with subjects/occupants if the information is likely to be accurate, reliable, and medically useful. Investigators should report incidental findings to subjects/occupants if a reasonable person would warn the subjects/occupants about those hazards. Investigators should report suspected abuse or neglect of children or mentally disabled people living in the home to the appropriate authorities. Investigators should also take some steps to help research subjects/occupants make effective use of the information they disclose, such as providing additional counselling or making a referral for remediation or medical treatment. Investigators should discuss these issues with research subjects during the informed consent process.

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