Electromagnetic and Other Environmental Effects Following Near-Death Experiences: A Primer

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ABSTRACT: Results of both informal investigation and formal research indicate that in the aftermath of a near-death experience (NDE) many experiencers report environmental effects, some of which types do clearly and others of which may, but do not clearly, involve electromagnetism (EM). Both types take two forms: the person acting on the environment and the person reacting to the environment. In this article we discuss the electrical nature of the human body and the literature regarding electromagnetic issues in the general population. We then review the literature on post-NDE electromagnetic changes and the non-EM changes that sometimes co-occur with and may be related to them. Finding inconsistencies in terminology both within and between authors’ works, we propose more precise terminology—including the relationship of non-EM and EM reaction to the World Health Organization’s terms idiopathic environmental intolerance (IEI) and IEI-electromagnetic field attributed symptoms (IEI-EMF). We conclude by discussing implications of the environmental effects literature for healthcare professionals whose clientele include near-death experiencers and for future directions in environmental effects research, including a call to future authors on these topics to foster greater clarity by using the more precise terminology we propose.

KEY WORDS: near-death experience, electromagnetic aftereffects, electromagnetic effects, electrical sensitivity, idiopathic environmental intolerance (electromagnetic field attributed symptoms)

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Both formal research and informal investigation indicate that many people who have had near-death experiences (NDEs), as well as people in the general population, have reported and sometimes been observed to manifest electromagnetically-related phenomena (Holden, 2012; Noyes, Fenwick, Holden, & Christian, 2009). In our recent review of the professional literature addressing these phenomena, we found inconsistent terminology both between and within publications that contributed to a lack of clarity about these phenomena. We also found that recent contributions to the professional literature indicated the value of an updated literature review. Thus, our purpose in writing this article was to provide a contemporary review of relevant literature using a proposed model of terminology that, if future authors adopt it, may bring greater conceptual order to the study of these phenomena.

To begin with, some of the literature frames electromagnetic (EM) phenomena in terms of the field rather than the individual—for example, how an EM field affects a person rather than how a person responds or reacts to a field. We think this distinction is important, because the only way it can be known that a field is having an effect is by the person’s reaction. Even more accurately, the only way it can be known that a presumed field is having an effect is by the person’s reaction. This presumption becomes relevant with regard to a factor in EM field research: the placebo and nocebo effects whereby, in a clinical study, a person is told falsely that an EM field is changing, and the person responds as if it actually did. In these cases, one would not refer to an effect of the field on the person, because an affecting field did not exist—but one would refer to a person’s reaction to a presumed field. For this reason, we framed our terminology from the perspective of the person rather than the field.

We begin with the umbrella concept of environmental effects. These effects can be distinguished from other types of effects that occur in the aftermath of NDEs and in other circumstances: psychospiritual effects, such as changes in values and goals; biological effects, such as a reduced need for sleep; and social effects, such as changes in career, friendships, and marriage. Despite distinctions, the effects in these various domains may be related. We consider environmental effects to manifest with regard to two dimensions. One dimension is action/reaction: whether a person is acting on the environment or is receptively reacting to the environment. The second dimension is the presumed involvement or non-involvement of an EM field: whether the action/reaction involves electromagnetism or it involves some mecha-
nism not currently known to be related to electromagnetism. The interaction of these two dimensions yields a four-quadrant model.

In the first quadrant, EM action, the person experiences and/or is observed acting on electromagnetic devices in her or his vicinity by either unintentionally or intentionally causing them to malfunction, stop functioning, or function unusually. To illustrate some of the forms EM action can take, we draw from our own experiences or observations of these phenomena.

Multiple near-death experiencer (NDEr) P. M. H. Atwater has reported numerous experiences with malfunction of devices ranging from personal wristwatches to large-scale electrical systems. On one occasion, she inadvertently penetrated a security system by passing undetected through its allegedly state-of-the-art detectors. She also has had repeated difficulty with recording equipment, including a power outage that seemed to have been provoked by a surge of joy she experienced at the start of a radio interview as well as numerous “drop outs” or blank spaces in her recorded presentations that, again, seemed related to moments when she was particularly emotionally invested in the point she was making. In another case at an International Association for Near-Death Studies (IANDS) conference, Atwater was seated about 8 feet from the recording equipment. When the speaker finished, the tape was discovered to be blank. Conference administrators asked Atwater never again to sit close to recording equipment at future IANDS conferences. Holden has witnessed a similar phenomenon. At the start of her recorded interview with a suicide NDEr, he was discussing how emotionally wrenching it was for him to revisit the distressing aspects of his NDE. After the interview, the experienced videographer reported to Holden that at the start of the interview, he heard through his earphones a loud buzzing that he said he had never heard before. He reported that when the NDEr turned to a more emotionally neutral topic, the buzzing stopped. During Atwater’s public presentations she has also experienced room lights blinking and then ceasing to blink in response to her prayers that they do so. She has experienced disruption of EM devices so often at speaking engagements that she has adopted the practice of purposefully calming her energy before she speaks.

NDErs have reported to both Atwater and Holden how EM actions can be not only mildly to strongly irritating, inconveniencing, and even expensive but also downright life threatening. One NDEr related to Holden that on one occasion, she was flying in a two-person
airplane when a mechanical problem suddenly occurred. The woman became frightened, at which point all of the dials on the plane dropped to 0—a change unrelated to the original mechanical problem. Having concluded from past experience that emotional arousal exacerbated her EM action, she quickly calmed herself, after which the dials returned to normal functioning and the pilot was able to land the plane safely despite the ongoing mechanical problem.

Though EM action is reported significantly more often by NDErs than by others (Nouri & Holden, 2008), it is not limited to them. Blalock is not an NDEr but has had numerous other transpersonal experiences including after-death communication and mystical experiences of communication with God—and has also had numerous experiences of EM action. She was unaware that EM action was a known phenomenon until taking a graduate course taught by Holden. When Holden described the inability of some NDErs to wear wristwatches due to rapid battery death, Blalock was startled to discover that this phenomenon happened to other people and not just to her. In another recent episode reminiscent of Atwater’s experiences with lights, Blalock was in a counseling session discussing an emotionally intense topic when the light bulb in the switched-on lamp next to her burned out. Regarding EM action, the possible role of explanatory models such as coincidence and selective attention will be discussed below in the context of research on this phenomenon.

In the second quadrant, EM reaction, rather than acting on EM devices, the experiencer reports and/or is observed responding with unusual sensitivity to EM events in the environment. Examples include perceiving noxious electrical currents or fields in electronic devices or electrical substations—currents and fields that other people report they do not perceive. Another example is sensitivity to EM-related changes in weather. An illustration is that a few years ago while speaking at a conference in North Carolina, Atwater noticed an atypical and sudden difficulty in thinking, speaking, and breathing while on stage delivering a talk to a large audience. Shortly afterwards, conference participants were notified that during the time of her presentation, a major storm had occurred approximately 40 miles from the convention center, including not only intense lightening but also 10 tornado touchdowns that caused destruction and death to the point that the National Guard had been called out. Childhood drowning NDEr Audrey Dalton reported:
When I swim and there is a thunderstorm lurking, I feel a tingling in my skin and get out of the water before the lightning alarm goes off at the pool. Seconds later when the alarm sounds, the lifeguards will look at me and say, “She knows ahead of time every time!!” This happens on land as well: I feel a tingle when a thunderstorm is near. (A. Dalton, personal communication, August 13, 2015)

Although these reactions have come to awareness because people experienced them consciously, they also may occur outside the range of conscious perception, such as during sleep, a phenomenon that some researchers have exploited in their studies, which we discuss below.

As also will be addressed below, both experiencers and researchers have sometimes associated post-NDE EM actions and reactions to actions and reactions not currently known to be associated with electromagnetism. Thus, our third quadrant, non-EM action, includes phenomena such as healing others and psychokinesis. In psychokinesis, objects in a person’s environment unintentionally or intentionally move in the absence of physical contact with them. As with experiencers’ reports and researchers’ findings, discussed below, that EM action is exacerbated by emotional arousal, several researchers have found that psychokinesis increases with emotional arousal (Gauld & Cornell, 1979; Houran & Lange, 2001; Roll, 2004). Another parallel is that in both cases the person usually manifests the phenomenon unintentionally but can sometimes manifest it intentionally.

The fourth quadrant, non-EM reaction, refers to a person responding with exceptional sensitivity to environmental conditions not known to directly involve electromagnetism. These phenomena include perceptual sensitivities, such as to sound; chemical sensitivities; and sensitivity to other people’s thoughts and emotions.

The four quadrants of our model are depicted in Table 1; references to IEI and IEI-EMF will be explained below. In this paper we first address the electromagnetic nature of the human body and review the literature regarding the occurrence of EM reactions among the general population. We then review the published literature as well as previously unpublished informal investigations of NDE EM actions and reactions along with associated research and investigation of non-EM actions and reactions. In the process, we note terminology for these phenomena that, as will be seen, has often been inconsistent both between and within publications. We then discuss the importance of healthcare professionals being educated about post-NDE environmental effects, and we address future directions in research, including our recommendations for consistency in terminology in fu-
ture publications on the topics of these and related phenomena. In reviewing the literature, where we use our terms, we include them for clarity along with the term(s) the author(s) originally used.

The Electromagnetic Nature of the Human Body

Since at least the early 20th century, researchers have provided evidence that animal life has electromagnetic properties and responds to electromagnetism outside itself. In 1917, George Parker and Anne Van Heusen published their finding that blindfolded catfish are able to detect metal objects, which can conduct electricity, but not glass objects, which cannot. In 1971, A. J. Kalmijn showed that many species of marine life depend on the perception of bio-electromagnetic energy for survival-related activities, including navigation, predation, detection, communication, and protection. Recently, researchers found that electricity is involved in communication as fundamental as between bees and flowers (Clarke, Whitney, Sutton, & Robert, 2013).

Meanwhile, in 1952, British neuroscientists Alan Hodgkin and Andrew Huxley published a series of papers in which they reported how a nerve cell—of which the human body may contain a billion—generates an electrical impulse each time it fires—which occurs myriad times per second while an organism is alive (Nobelprize.org, 2015). This electrical output also characterizes muscle cells and is measured in assessments such as electroencephalogram of the brain and electrocardiogram of the heart.

In 1974, Albert Davis and Walter Rawls examined the EM energy, or aura, that living organisms emit. Their research confirmed the existence of various intensities and polarities of EM energy in living things, such as the existence of polarity between right and left sides of the human body. According to the authors, the study of magnetism had great potential for natural healing and for medicine in areas such as pain management and cancer treatment.

In 1985, Robert Becker, orthopedist and pioneer in the field of regeneration, and co-author Gary Selden, published The Body Electric: Electromagnetism and the Foundation of Life. Becker’s research with animals supported a connection between electrical currents and physical regeneration. The authors found that “nearly all tissues have been proven to produce or carry various kinds of electrical charge” (p. 185), that electrical and magnetic charges in the body are related to healing, and, thus, that electricity and magnetism can be used to accelerate healing. They asserted that EM fields within the body are so sensi-
tive to those external to the body as to be impacted by the annual cycle of the earth’s magnetic field or by solar winds. Additionally, they found evidence of harmful effects of modern EM pollution on living things.

In 1987, Janusz Slawinski hypothesized EM energy was the essence of life and consciousness. He based his hypothesis on a phenomenon called the “death flash.” Upon stress or at death, emission of EM energy increases 10 to 1,000 times its level at homeostasis. This emission, called the death flash, is universal and is not dependent on the cause of death. Slawinski hypothesized the death flash may explain the intense light reported by NDErs—although that hypothesis does not correspond with the prolonged perception of light that most NDErs report. Slawinski also proposed the death flash as a biophysical hypothesis for the continuation of consciousness. At death, this light radiates into space at the speed of light. According to the theory of relativity, this consciousness would then exist in a plane unlimited by time or space. Slawinski was a pioneer in attempting to integrate biological research with phenomenological experiences near death (Greyson, 1987).

In 2010, Flavio Frohlich and David McCormick built on the widely accepted belief that, as part of neuronal functioning through the body, neurons generate electrical fields. They found that, in the brain, those fields could function as feedback, influencing the activity of the brain cells containing the neurons that originally generated the fields.

The above literature indicates that humans are electromagnetic by nature and lays a foundation to consider the possible roles of human electromagnetism in intra- and inter-organism and -species communication and healing. We turn now to research on how the human body reacts to electromagnetism.

**The Human Body’s Reaction to EM**

Several researchers outside the field of near-death studies have published their findings about the human body’s reaction to EM energy. In this section, we review relevant sources including those that investigators and researchers of NDE EM effects have referenced.

In his book *The Electric Connection*, Michael Shallis (1988), an astrophysicist and Oxford lecturer, discussed the dangers to living organisms of high exposure to electricity and magnetism. After soliciting “electrical sensitivity” case studies, Shallis sent a questionnaire to over 200 persons and followed up completed questionnaires with extended interviews. His book was his attempt to compile find-
ings regarding electrical sensitivity from various sources. Shallis used the term “electrical sensitivity” to describe symptomology of people who were affected by the presence of electricity—what we are calling EM reaction—and, in turn, affected electrical appliances by their presence—what we are calling EM action. Shallis observed that under conditions of increased emotional stress, these phenomena increased. He also noted a connection between these phenomena, physical health, psychological health, and psychic ability. He listed five categories of health problems related to high exposure to electricity, typically through close proximity to overhead power cables: (a) physical symptoms such as dizziness, weakness, poor concentration, headache, and black-outs; (b) stress symptoms such as insomnia and depression; (c) allergy symptoms such as worsened asthma and skin rash; (d) life-threatening illnesses such as heart attack, leukemia, and other cancers; and (e) genetic effects, as demonstrated with animals in scientific trials. Shallis reported a typical profile of people with these symptoms. Sufferers were predominately married women, suffered from static electricity, had allergies, had undergone surgery, were adversely affected by loud noises and bright lights, and were affected by thunderstorms. He found that 24% of these people reported becoming significantly ill in the presence of electricity.

Although Shallis’s (1988) work is suggestive rather than conclusive due to absence of a valid control group (Ring, 1992), his work on electrical sensitivity is relevant to research on NDE EM and non-EM reactions. Shallis asserted that people have a “threshold level of tolerance to hazards” (p. 65). Once this threshold is exceeded with accumulated stressors, symptoms occur. Shallis also hypothesized that a variety of factors, such as stress, overwork, viruses, allergens, smoking, overindulgence of food and drink, or even the menstrual cycle, can serve to overload people’s thresholds, leaving them more prone to be affected by allergies and/or electricity in the environment. Although he did not name NDEs, other transpersonal phenomena, or even close brushes with death among those factors, these phenomena could be considered in the context of his hypothesis.

Albert Budden (1998) investigated the effect of electromagnetic fields (EMFs) on human health and the connection of EMFs to various paranormal phenomena. He presented his synthesized findings from case studies provided by colleagues as well as his own investigations, including his administration of a 25-item questionnaire to 50 participants from EMF “hot spots”—electrical high intensity areas—exhibiting various EM reactions and to 50 control subjects—
the results of which he did not explicitly present. From this synthesis, he drew conclusions. He used the term “environmental sensitivity syndrome” to describe persons who, as a result of exposure to high levels of EM pollution, exhibited food allergies, chemical sensitivities, “electromagnetic hypersensitivity,” and epileptiform conditions. Budden borrowed the term “electromagnetic hypersensitivity (EH)” from Smith and Best (1989). The symptoms of EH include uneasiness, loss of concentration, muscle weakness, headache, detachment, short amnesiac period, unconsciousness, or hallucination as a result of overexposure to electrical or magnetic fields. Budden noted a connection between electrical sensitivity syndrome and the malfunction of electrical equipment in the presence of the affected individual, which he explained as the body’s reaction to overexposure to EM. He noted this reaction was exacerbated by stress. Budden also noted a link to reports of paranormal experience, which he credited to epileptiform conditions related to overexposure to EM or to environmental conditions (odd sounds and lights, doors opening or closing, object relocation) created by high levels of EM (hot spots). Budden classified the effects of EM pollution into three categories: (a) environmental effects (effects on objects or devices); (b) health effects, such as asthma or leukemia; and (c) consciousness effects—perceptual experiences such as hallucinations. We found lack of specificity for the basis of Budden’s conclusions rendered them suggestive but not conclusive.

Lucinda Grant (1995; 1999) is director of the Electrical Sensitivity Network, a national support group, and author of The Electrical Sensitivity Handbook (1995). An “electrical sensitivity” (ES) sufferer and advocate for those who suffer from ES, though not herself a scientific researcher, she gathered scientific evidence regarding ES from various sources worldwide. Grant (1999) called ES a “hidden illness” (p. 1). In this condition—which she also called electromagnetic hypersensitivity—a patient develops symptoms when “exposed to common levels of electromagnetic fields (EMF) from electrical sources in the environment: power lines, motors, computers, etc.” (p. 1). The most common symptoms of ES were skin problems, memory problems, concentration problems, joint or muscle pain, nausea, eye or ear problems, dizziness, weakness/fatigue, headache, and heart problems. Less common but more serious symptoms include unconsciousness, seizures, or paralysis (Grant, 1995; 1999). Grant (1999) described a related syndrome, “multiple chemical sensitivity (MCS)” (p. 1) as an illness in which “the patient develops symptoms from exposure to ordinary levels of synthetic chemicals in common use such as perfumes, pesticides,
and household cleaning products” (p. 1). Grant (1995; 1999) stated that ES and MCS are conditions that often co-occur, perhaps due to the electromagnetic properties of chemicals.

In 1996, the World Health Organization’s (WHO’s) International Programme on Chemical Safety sponsored a workshop. A recommendation that came out of the workshop was to use the term “idiopathic environmental intolerances” (IEI) instead of the earlier term “multiple chemical sensitivities” to refer to multiple symptoms attributed to various environmental exposures—both EM and otherwise—but diagnosed in the absence of objective criteria or laboratory findings validating the relationship between exposure and symptomology.

In 1999, representatives of the American Academy of Allergy, Asthma, and Immunology (AAAAI) published a position statement on the topic of environmental sensitivities. According to the report, although numerous theories existed, no etiology had been scientifically determined, and no treatments had been found effective.

In 2004, the WHO held a workshop on electrical hypersensitivity. The group, which included the WHO secretariat, recommended the term “electrical hypersensitivity” be changed to the term “idiopathic environmental intolerance (electromagnetic field attributed symptoms)” or IEI-EMF, because, at the time, no scientific evidence yet existed of a causal relationship between symptoms and EMFs. The specification of EMF served to distinguish individuals who attribute their illness to EMFs from those who attribute their illness to another environmental source, such as odorous chemicals. Their working definition for IEI-EMF was:

Symptoms that are experienced in proximity to, or during the use of, electrical equipment, and that result in varying degrees of discomfort or ill health in the individual and that an individual attributes to activation of electrical equipment (WHO, 2004, p. 2).

IEI is a working definition rather than a diagnostic criterion. The most typical symptoms are headache when using a cellular phone, skin symptoms, and neurovegetative symptoms. The members of the WHO working group asserted IEI patients suffer from “real health problems” for which no diagnostic test or biological marker had yet been discovered. Preliminary studies on IEI indicated a relationship to an imbalance in the autonomic nervous system (WHO, 2004).

Subjectively reported IEI-EMF appears to be fairly common. In 2002, researchers Patrick Levallois, Raymond Neutra, Geraldine Lee, and Lilia Hristova conducted a telephone survey of California resi-
out of 2,072 participants, 3.2% reported being “allergic or very sensitive” to being in the proximity of electrical devices. Researchers found an association between participants reporting electrical sensitivity and those reporting chemical sensitivity, although 1.3% of respondents reported electrical hypersensitivity only.

In 2005, in an attempt to determine whether or not participants with IEI-EMF were better than control participants at detecting EMFs and whether or not they reported increased symptomology in the presence of EMFs, G. James Rubin, Jayati Das Munshi, and Simon Wessely conducted a systematic review of the 31 blind or double-blind experiments published as of that date. Rubin et al. (2005) discounted seven of the studies based on inability to replicate, statistical issues, or mutually incompatible results; from the remaining 24, they found no evidence that EMFs triggered IEI-EMF symptoms.

In a 2010 follow-up study, Rubin, Rosa Nieto-Hernandez, and Wessely reviewed an additional 15 studies, making 46 total studies involving a total of over 1,175 participants with IEI-EMF. Again, these authors found none of the studies produced robust evidence that EMFs caused participants’ symptomology. However, they did find some evidence for the nocebo effect in that participants who reportedly suffered from IEI-EMF and who, during the course of a study, were “exposed” to sham EMF sometimes reported symptoms in response to that “exposure.”

Then, in 2011, Rubin, Lena Hillert, Nieto-Hernandez, Eric van Rongen, and Gunnhild Oftedal assessed whether or not EMF exposure was related to physiological or cognitive changes in subjects. They reviewed 29 blind or double-blind studies in which researchers exposed IEI-EMF and control participants to various levels of EMFs and measured objective outcomes. Researchers from five studies found EMF exposure was related significantly to reduced heart rate and blood pressure, altered pupillary light reflex, reduced visual attention and perception, improved spatial memory, movement away from an EMF source during sleep and altered EEG during sleep (Rubin et al., 2011, p. 593).

Interestingly, regarding sleep behavior and EEG, the control group responded with similar changes as the IEI-EMF group. However, the results of these five studies were outweighed by those of 24 studies in which researchers found no relationship between EMF exposure and objective data. Rubin et al. (2011) concluded that no evidence exists that people with IEI-EMF respond differently to EMFs than do
members of the general population (Rubin et al., 2011). To date, many scientists remain skeptical that IEI-EMF symptomology is caused by electrical devices (Eldridge-Thomas & Rubin, 2013).

Grant (1999) referenced the American Academy of Environmental Medicine (AAEM), a group of international clinicians who research and educate about the interaction between the environment and human health. Between 1980 and 2013, they published numerous position papers (AAEM, 2015), including two in 2012 that addressed the topic of EM and radiofrequency exposure on human health (AAEM, 2012a, 2012b). In their paper *Electromagnetic and Radiofrequency Fields Effect on Human Health*, they referenced radiofrequency (RF) emissions, including those from WiFi and cell phones, and cited “studies [that] clearly show causality and disprove the claim that health effects from RF exposure are uncertain” (AAEM, 2012b). They concluded that “because of the well documented studies showing adverse effects on health, . . . AAEM calls for exercising precaution with regard to EM, RF and general frequency exposure” (AAEM, 2012b).

In summary, many researchers claim that scientific support for IEI-EMF being caused by EMFs is unreliable (Staudenmayer, 2001), yet other professionals maintain that a causal relationship exists. Although the WHO (2004) recognized symptoms of sufferers to be “real,” they acknowledged that no researchers who have conducted provocation studies have been able to verify a causal relationship between EMFs and IEI-EMF. Some researchers claim to have evidence that IEI is a “stress disorder” (Hausteiner, Bornschein, Zilker, Henningsen, & Forstl, 2007, p. 6), citing that IEI sufferers have elevated neurotic or anxiety traits (Osterberg, Persson, Karlson, Eek, & Orbaek, 2007) and that these people’s “modern health worries” (Bailer, Witthoft, & Rist, 2008, p. 425) contribute to the acquisition of IEI. Conversely, Gibson (2009) posited neurological or psychological issues could be caused by living with IEI, rather than the other way around. Other researchers claim to have evidence that implicate EMF sources in health problems (American Cancer Society, 2014; American Academy of Environmental Medicine, 2015; Firstenberg, 2004; International Agency for Research on Cancer, 2011). Thus, IEI remains a controversial subject.

As the contents of this section indicate, although some people report sensitivity to EMFs and vulnerability to detrimental effects of it, results of research have not unequivocally substantiated those claims. Although some of the EMF-IEI studies may have included NDErs, none specified NDErs among the participants, and no study to date has focused specifically on NDErs.
Regarding terminology in referring to EM effects, some researchers have used more than one term to refer to the phenomena they were addressing, and different researchers have used different terms to refer to what appear to be the same phenomena. In addition, authors have found relationships between reaction to the environment and action on the environment but have not distinguished between the two manifestations of environmental effects. WHO terminology has clarified how to refer to reactive phenomena, both EM and non-EM related, that are problematic for people, but not those reactions that manifest in the absence of “discomfort or ill health,” and not active phenomena. These confusions and limitations also have characterized the NDE literature on EM action and reaction, to which we now turn.

**Review of NDE Literature on EM Action and Reaction**

NDEs are a relatively common occurrence; in studies of people who have survived a close brush with death, approximately 20% report an NDE (Zingrone & Alvarado, 2009). An NDE usually involves lucid consciousness that one often perceives to be functioning at a location apart from the physical body. The experience typically includes a material aspect—perception of the physical, material environment both in the vicinity of and distant from the body—and/or a transmaterial aspect—perception of and interaction with non-physical entities, such as deceased people and spiritual figures, and non-physical environments. People of both sexes and of various ages, ethnicities, nationalities, educational levels, religions, lifestyles, and conditions of health have reported NDEs. NDEs are usually subjectively real or hyper-real and can range in complexity from very simple, with few and/or less intense features, to very complex. Following NDEs, people typically experience a variety of psychological, spiritual, biological, and/or social aftereffects (Noyes et al., 2009); in general, the more complex and intense the NDE, the greater the number and intensity of aftereffects. For a variety of reasons, NDEs and their aftereffects can be challenging for NDErs to integrate into their subsequent lives.

Among NDE aftereffects are EM action and reaction. Regarding EM action, although early researchers did not report it (Grey, 1985; Kason, 1994; Moody, 1975; Ring, 1980, 1984; Sutherland, 1992), more recent researchers have increasingly reported it (Atwater, 1994; Bonenfant, 2005; Nouri & Holden, 2008; Ring, 1992; Ring & Valarino,
2000). As Farnoosh Nouri and Janice Holden (2008) suggested, the seemingly delayed timing of reported EM aftereffects may be due in part to electronic devices only relatively recently flooding the Western world: the quartz watch in the 1970s (Silva, 2007), the computer in the mid-1980s (Boeree, n.d.), and the cell phone in the mid-1990s (Keith, 2004).

In 1992, Kenneth Ring published the first systematic study of EM aftereffects of NDEs. He compared two categories of people who had survived close brushes with death—74 persons who reportedly had NDEs to 54 persons who had not—using his Omega Psychophysical Changes Inventory (PCI). This inventory included a single item that addressed EM action: “I found that electric or electronic devices (e.g. car batteries or electrical system, lights, watches, tape recorders, computers, etc.) more often malfunctioned in my presence than I remember being the case before” (p. 268). Ring reported that 24% of NDErs answered affirmatively to this item as compared to only 7% of non-NDErs; he did not analyze the statistical or practical significance of this difference. He noted that although he had previously conducted two other NDE studies, this was the first time he had discovered this particular aftereffect. Ring (1992) also reported some of his research subjects’ narrative comments. Respondents reported wristwatches stopping, light bulbs popping, streetlights going out, and general “bad luck” with electronics. Among his narrative responses was the first published report that EM effects intensified when the NDEr was experiencing intense emotion.

Upon discovering Shallis’s work, Ring (1992) reexamined his data gathered from the PCI in the Omega Project and found that both NDErs and people who had experienced UFO encounters reported two to four times the occurrence of allergy, light and sound sensitivity, emotional lability, psychic ability, and healing gifts as the control group. Ring concluded that both types of experience often result in a “generalized sensitivity effect” (p. 154). Borrowing the term “electrical sensitivity” from Shallis (1988), Ring referred to a cluster of EM effects, both active and reactive, as well as chemical, environmental, and paranormal sensitivities, as “Electrical Sensitivity Syndrome” (p. 156) and people experiencing them as “electrical sensitives” (p. 161). By referencing Shallis’s (1988) work, Ring connected research on these phenomena among NDErs with that among non-NDErs.

In Atwater’s 1994 book, Beyond the Light, she reported similar case narratives. Whenever possible, she interviewed not only NDErs but also their family members, friends, and healthcare workers. It was
through these interviews that she first noticed many NDErs’ reports of electromagnetic effects that began after their NDEs.

For her book, Atwater (1994) sent 100 NDErs a questionnaire she had developed about “electrical sensitivity”—included reference to both EM action and EM reaction, which she did not differentiate but which, for the purpose of clarity, we will. Regarding EM action, depending on the specific type of electrical device, from one third to one half of her 46 respondents reported this phenomenon. Included were that in respondents’ vicinities, television reception acted strangely and other electronic equipment also tended to malfunction, including unusual problems with radio and microphone reception and recording equipment. Many respondents reported that wristwatches and other electronic devices did not work for them or frequently broke and had to be replaced. Conversely, some respondents reported being able to operate electronic equipment better and easier than prior to their NDEs, and some reported being able to start electronic devices without turning them on or able to start dead car batteries by touching them. In addition, with reference to non-EM action, a few of her respondents claimed that metal objects in their vicinities that they had not directly contacted fell off of tables and shelves. Regarding EM reaction, Atwater found that 52% of NDE respondents reported these phenomena as compared to 1.3% of the general population in the California study (Levallois et al., 2002), indicating prevalence of EM reaction is much greater among NDErs than the general population. Atwater surmised from these data that something about NDEs amplifies EM action and reaction. Most NDE respondents claimed to have other non-EM reactions since their NDEs such as increased allergies (45%) and sensitivity to light (59%) and sound (74%). Many respondents expressed both their eagerness to express, and their relief at the opportunity to express, their experiences with EM actions and reactions to someone interested in and open to such experiences (Atwater, 1994; Atwater, 1999).

In 1997, John Knitweiss described the first and, so far, only attempt to actually measure EM action which, like Ring (1992) and Atwater (1994), he called “electrical sensitivity,” a category that, in his case, included EM action, EM reaction, and the non-EM action of healing ability. Through informal investigation, he tried to detect a difference in the electrical fields of persons who had and had not had NDEs. Using a thermistor to measure heat in participants’ fingers and an electronic electroscope to measure electron flow, Knitweiss did not find statistically significant differences between NDErs and non-NDErs.
However, he reported that NDErs who claimed to have healing abilities following their NDEs appeared to have statistically significantly more overall heat and electron flow from their hands than did non-NDErs. Knitweiss’s research supported Ring’s (1992) and Atwater’s (1994) earlier findings of increased EM action reports among NDErs, at least with regard to those claiming healing abilities. However, due to his research design, which did not include masking, whereby the researcher does not know whether a particular participant is or is not an NDEr, and did not control for confounding variables that are known to produce electrostatic effects, such as ambient humidity and participants’ clothing material, Knitweiss’s research remains suggestive rather than conclusive.

In her 2000 book, Atwater again reported on “electrical sensitivity” which she defined as having an effect on electrical or electronic equipment leading to malfunction or other unusual reaction—EM action. From her experience, she affirmed a link between “electrical sensitives” and EM reactions of heightened awareness of or ability to sense EM energy; non-EM actions in the form of healing abilities; and non-EM reactions of increased allergies, emotional lability, sensitivity to light and sound, and psychic phenomena the exact form(s) of which she did not specify.

Also in 2000, physician Barbara Rommer in her book on distressing NDEs mentioned cases of EM action, including on watches, appliances, computers, and, in one case, an electrical transformer. She had no term for these phenomena but quoted Melvin Morse from his book Transformed by the Light, referring to them as related to changes in a person’s “electromagnetic force field” (Morse, 1992, p. 156; Rommer, 2000, p. 175).

In 2005, Rebecca Stephens, a physician and, at the time, director of the Leesburg Hospital in Gainesville, Florida, gave possibly the most extensive testimony to date of EM aftereffects when Richard Bonenfant featured her as a case study in his International Association for Near Death Studies (IANDS) conference presentation titled “Electromagnetic Sensitivity: A Physician’s Experience Following a Childhood NDE.” Bonenfant was a retired research scientist who had specialized in environmental epidemiology of congenital birth defects at the New York State Department of Health. He also had research and publications in the area of long-term aftereffects of NDEs. Bonenfant noted a relationship between NDEs and subsequent EM actions.

In Bonenfant’s (2005) presentation, Stephens reported she had an NDE at the age of 5. According to Stephens, it was when she began
to work in a medical lab as a medical student that people began to recognize her presence was related to the malfunction of electronic equipment. She reported she was not allowed in the chemistry lab with electronic devices. She noticed that the dashboard lights in her car went on and off as she drove. She reported being notorious in her work environment as being an electronic liability after having gone through six computer hard drives in 5 years. Her employers eventually invested in static mats for Stephens to stand on before entering the lab and in an anti-static cover for her keyboard. Stephens reported she had to get a new watch battery every couple of months, and her cell phone needed frequent repair. She considered these EM actions problematic and said she coped by doing things the “old fashioned” way, such as washing dishes by hand, relying on her husband’s skills as a handyman, and purchasing warranties for her electronic products. She reported that fluctuations in her emotions, such as experiencing anger, appeared to be related to more negative effects on electronic equipment. On the positive side, however, Stephens reported the non-EM reaction of a healing “sensitivity” that assisted her in medical diagnosis—an intuition or even an audible voice telling her where to look for the presence of disorder. She reported the EM reaction interference that being in the presence of electricity hampered this intuitive ability. She also reported the non-EM reaction of being sensitive to disturbance by sounds and light.

Bonenfant (2005) used the words “electromagnetic effects,” “electromagnetic phenomenon,” and “electromagnetic sensitivity” to refer to all four categories of environmental effects, although he made a distinction between actions and reactions. In response to Atwater’s (1994) findings that 54% of respondents reported EM reaction as compared to 1.3% of non-NDE respondents, Bonenfant posited that whereas some people are naturally affected by electricity in their environments, NDErs who are affected by their environment also have an effect on their electrical environment. He further posited NDErs might have a more powerful electrical field than people who are naturally electrically sensitive. He proposed two possible explanations: Perhaps a neurological flood/cascade occurring during an NDE amplifies an already naturally occurring electrical sensitivity, or perhaps all people have the ability to sense EM fields but something in the brain inhibits this ability that an NDE somehow disinhibits. He recounted that a small percentage of NDErs—but larger than the general population—report synesthesia, another sensory experience perhaps related to environmental effects.
Atwater (2007) again addressed the topic of environmental effects. She reported 73% of the approximately 3,000 adult NDErs she had interviewed reported EM effects, including many who reported the EM reaction of a heightened awareness of EMFs and/or being affected by extreme weather.

In 2008, Nouri and Holden published a quantitative, retrospective study of EM action by investigating reported functioning of EM devices among three groups of participants: persons who reportedly (a) survived a close brush with death with an NDE, (b) survived a close brush with death without an NDE, and (c) had no memory of ever having come close to death and, as a reference point instead of a close brush with death, used their most life-changing event. Their 102 participants, adults with equivalent demographics, completed two versions of the Electromagnetic Experiences Questionnaire (EMEQ) that the researchers had developed. One version, the EMEQ-L, measured reported EM actions in the previous (last) year, and the other, the EMEQ-B, measured retrospectively reported EM actions before the referent event: the NDE, the non-NDE close brush with death, or the life-changing event. Two experts in the field established face validity of the instruments, and Cronbach’s alpha reliability coefficients for the EMEQ-L total scale and subscales met Nunnally’s (1978) guideline of at least .70 with alphas of .94 for the entire study and .76 to .96 for four of the five subscales—lights, watches, computers, and effect of emotional state; the cell phones subscale yielded an alpha of .64. Supporting construct validity, all subscales were significantly correlated ($p < .001$), indicating convergent validity, and correlations ranged from .46 to .75, indicating discriminant validity. Participants who had a close brush with death, with or without an NDE, also completed the Near-Death Experience Scale (Greyson, 1983) to confirm their NDE-related status.

The researchers assessed six variables: reported overall degree of EM malfunctions; malfunction of lights, watches, computers, and cell phones; and the effect of emotional arousal on EM malfunction. In terms of EM actions over just the year prior to data collection, whereas the researchers found no significant difference in reported degree of malfunctions between the non-NDE close brush group and the never-close-to-death group, they found statistically significant differences in all variables between the NDEr group and each of the other two groups, with effect sizes ranging from medium to large.

Examining the difference between EM actions before and after the referent event, Nouri and Holden (2008) found NDErs reported
a greater increase of EM effects when compared to each of the other groups—but not always a statistically significant increase. Specifically, the NDE group reported significantly more malfunctions overall, with regard to lights, and during emotional arousal.

Additionally, Nouri and Holden (2008) found that deeper NDEs were significantly positively associated with more EM action. Thus, of all survivors of a close brush with death, the higher the NDE Scale scores—both total and for each component: cognitive, affective, paranormal, and transpersonal—the greater the reported electrical malfunctions, with effect sizes ranging from small to medium. For the first time through analysis of statistical significance and effect size, their results confirmed previous findings of increased reports of EM action among NDErs compared to non-NDErs. Their findings also refuted the hypothesis that those increased reports are the result of merely surviving a close brush with death and supported the hypothesis that they are specifically the result of an NDE.

In their research, Nouri and Holden (2008) addressed only EM action, using the terms “electromagnetic aftereffects” in their article and “electromagnetic experiences” in their questionnaire. These researchers neither included the other three categories of environmental effects in their questionnaire nor made any mention of these phenomena in their article.

In her next work addressing environmental effects, Atwater (2011) found that the presence of EM action and reaction was related to NDErs’ sense of having been “power punched” (p. 142) by their NDEs: “It was the intensity of their near-death episode that had been the determining factor in causing this aftereffect—not how long or short their episode, or how much light they had been exposed to during their scenario” (p. 142). Atwater (2011) also reported strategies she had discovered to minimize EM actions: “I learned . . . to enter a meditative state, join with the equipment, introduce myself and state my purpose while assuring no harm, bless the equipment, then return to normal consciousness. Whenever I did this, no problem” (p. 78). She also cited NDEr Linda Jacquin who, unable to wear a battery-powered watch, found success wearing a solar-powered one.

Prompted by her own numerous unusual responses to weather, in 2011 Atwater conducted an informal inquiry. She sent out a Special Bulletin from her website (http://www.pmhatwater.com) regarding possible electrical phenomena accompanying weather extremes. This bulletin was sent to approximately 1,000 people and was aimed at NDErs as well as others who experienced electrical sensitivity. She
received 300 replies from self-identified NDErs with reports of experiencing “buzzing” noises, numbness, dizziness, or emotional lability associated with extreme weather. Additionally, some people responded that they believed there was a connection between living close to an electrical substation, electrical sensitivity, and degeneration of their spines, joints, or nervous systems. These responses challenged Atwater to enlarge what she had previously considered the range of electrical sensitivity and how it can occur.

In 2012, Holden recorded an in-depth interview with Leslie Wimmer, a young Caucasian woman in her mid-20s who had an NDE during an auto accident at age 17 (Holden & Gutierrez, 2012). Though the purpose of the interview was to educate healthcare professionals, during a role play in which Holden was demonstrating helpful ways to respond to NDE disclosure, she noted that Wimmer was not wearing a watch and mentioned that some NDErs experience an NDE aftereffect of EM action. At this point in the interview, the tone shifted from role play to real, as Wimmer “made the connection” that various unusual electrical effects had manifested since her NDE. These effects included wrist watches not keeping time and “giving out,” the alarm on her oven going off frequently for no known reason, and the volume on her TV going up quickly for no known reason. She reported that her boyfriend had commented to her that events like those did not happen when he was alone but only when she was present. Wimmer also reported having electrical difficulties at work, such as the TV going black or her computer crashing. She then spontaneously reported the non-EM action of pictures often falling off of walls when she was emotionally upset; she recounted one particular morning when she woke up extremely upset from a distressing dream, and a picture flew forward off the cabinet and then fell to the floor. This psychophysical effect seemingly provoked by intense emotion presented an interesting parallel to the role of intense emotion in exacerbating EM actions that some NDErs had reported anecdotally and that was confirmed in Nouri and Holden’s (2008) research.

Wimmer and Holden’s interview included reference to EM action but not EM reaction. When Wimmer mentioned the non-EM reaction of being able to tell if people were upset and in need of support, Holden called her experience “another sensitivity” that other NDErs had reported—alluding to a possible connection between the categories of environmental effects.

In 2012, Cheryl Fracasso reported results of a pilot study she conducted for her doctoral dissertation exploring EM action and reaction
in people reporting NDEs. Ten NDErs were assessed with the EMEQ (Nouri & Holden, 2008) and the Electromagnetic Phenomenon Questionnaire (EPQ; Greyson, Liester, Kinsey, Alsum, & Fox, 2015) to gather both quantitative and qualitative data. The EMEQ assessed for EM action only, and the EPQ assessed for both EM action in many forms and EM reaction, the ability to sense EM fields or being made dizzy or nauseated by them. Fracasso added questions to the EPQ regarding non-EM reactions of allergies, chemical sensitivities, and psi-related abilities, as well as the EM reaction of sensitivity to geomagnetic weather activity. Quantitatively, 70% of NDErs reported EM action, a rate that was comparable to results of previous studies. Qualitative data demonstrated NDErs’ reports of difficulty with electrical appliances such as watches, clocks, batteries, lights, computers, and cell phones. Fracasso found that participants who experienced EM actions also often described EM reactions such as being able to sense EM fields (when others do not), nausea or dizziness in the presence of electricity or high EM fields, as well as enhanced sensitivity to geomagnetic activity and weather events. According to Fracasso, these same participants following their NDEs also tended to experience high rates of non-EM reactions such as allergic or chemical sensitivity and reported increased psi experiences, as well as the non-EM action of healing abilities. She proposed the NDE Electrical Sensitivity theory, suggesting NDErs reporting EM effects may have distinctly different characteristics than NDErs who do not report these effects. Unfortunately, due to small sample size, Fracasso’s results, though suggestive, could not be generalized to all NDErs. For example, one point of disparity between Fracasso’s and Atwater’s results was some of Fracasso’s 10 participants’ reports of nausea and dizziness in the presence of electricity or high EMFs versus several of Atwater’s hundreds of participants reporting sensations of being insect-bitten or pricked but not to the point that the sensations were noxious or debilitating.

Additionally, Fracasso (2012) linked the research of EM effects experienced by NDErs with that of EM effects in non-NDErs. Numerous researchers in the non-NDE literature have connected electrical sensitivity to chemical and environmental sensitivities (Budden, 1998; Gibson, 2009; Gibson & Vogel, 2008; Grant 1999; Hviid, 2010; Levallois et al., 2002; Osterberg et al., 2007; Shallis, 1988; Sledd, Suwal, & Gibson, 2010). Fracasso made a distinction between ES (electrical sensitivity), CS (chemical sensitivity), and EM (electromagnetic sensitivity). CS included sensitivity to chemicals such as pesticides, ex-
haust fumes, perfumes, paint, and cleaning products. EM included sensitivity to phenomena such as light, sound, and static.

Fracasso (2012) proposed ES “may co-occur with high rates of allergies, chemical sensitivities, high rates of psi experiences, and enhanced sensitivity to geomagnetic activity” (p. 92). Fracasso distinguished between problems with the malfunction of electronic equipment and problems with how participants experienced EM energy. She introduced the idea of a co-occurrence between what we are calling EM action, EM reaction, and other phenomena. However, regarding terminology, she appeared to refer to both EM action and EM reaction with one term: EM effects (EMEs). Her use of the term “electrical sensitivity” appears not to have been consistent, perhaps due to the absence of a precise definition at the time, which highlights the need for more precise terminology.

Fracasso and Harris Friedman (2012) reported preliminary data on a larger study in process, a follow-up to Fracasso’s (2012) pilot study. Researchers Ring and Fracasso developed the Electrical Sensitivity Inventory (ESI) for this study, which included questions about EM action—detrimental effects on electronics—as well as “General Sensitivity” questions regarding allergies, chemical sensitivities, and psychic phenomena—non-EM reactions. Participants also completed the NDE Scale (Greyson, 1983), the Psychological Changes Inventory (Ring, 1992), and the Life Changes Inventory—Revised (Greyson & Ring, 2004). Although data collection was still underway, researchers had already collected data from a convenience sample of 127 NDE participants, recruited from the Near-Death Experience Research Foundation website, from snowball sampling of referrals from NDE experts, and through advertisements to members of the International Association for Near-Death Studies. Researchers had also conducted in-depth interviews with 22 randomly selected participants experiencing EMEs. Although no formal data analysis had been conducted on the second study, preliminary analysis indicated participants who reported EM action also reported increased EM reactions—ability to sense electrical fields and sensitivity to geomagnetic activity (weather patterns), non-EM actions—healing ability, and non-EM reactions—increased allergies, chemical sensitivity, and psychic abilities. In the article discussing their research, Fracasso and Friedman (2012) used the term EME to describe both EM action and EM reaction. Currently, researchers Fracasso, Ring, Friedman, and Young are conducting a third phase of this study in which they are exploring what they are calling “electrical sensitivity” in non-NDErs.
Atwater’s (2011) observation about the relationship between NDE intensity and EM action appears to be consistent with Nouri and Holden’s (2008) finding that deeper NDEs were related to more EM actions. In contradiction, however, Fracasso (2012) found a statistically nonsignificant trend that those scoring lower on the NDE Scale tended to score higher on the EMEQ and that those who saw a “being of light” in their NDEs reported fewer EMEs (p. 103). Thus, findings correlating NDE contents with EME aftereffects are mostly consistent, with some less robust contradictory findings.

A final topic worth consideration is some authors’ hypothesis that environmental effects do not actually occur more frequently among NDErs; rather, NDErs recall these phenomena more frequently via the mechanism of selective attention. In reflecting, for example, on Nouri and Holden’s (2008) well-controlled study, we are unable to determine how selective memory could explain significantly greater reports of EM actions by NDErs than by non-NDErs or people who never came close to death; by what mechanism would NDErs, but not the other two groups, have greater selective memory? Furthermore, in Holden’s (2008) interview, Wimmer reported that her boyfriend had commented that electronic malfunctions did not occur when he was alone but only when she was present. Holden has interviewed another NDEr who reported her husband’s confirmation of—and sometimes dismay regarding—her frequent EM actions. In Atwater’s investigations, she also has found that NDErs’ intimates by and large confirmed the increase in EM action that the NDErs reported. These two lines of reasoning and evidence call into question the selective memory hypothesis for EM actions. A controlled study of both NDErs and their intimates could provide further clarity in this matter.

**Final Notes on Terminology**

Considering the cacophony of terminology we found among authors addressing the various physical effects discussed in this article, we believe that uniform and shared terminology would clarify these phenomena for NDErs and professionals alike. In that spirit, we offer our aforementioned lexicon for experiencers, as well as health professionals, educators, and future researchers, to use.

Terminology developed by the WHO (2004) seems to call for its integration into our lexicon. Thus, non-EM reaction to phenomena such as sound, drugs, and allergens that is so severe as to generate distressing symptoms constitutes IEI. Similarly, EM reaction to proximity or use
of electrical equipment that is so intense as to manifest as distressing symptoms constitutes IEI-EMF. The relationship of these terms in our proposed lexicon is represented in Table 1.

Implications for Healthcare Professionals Working with NDErs

The findings reported above carry implications for healthcare professionals (HPs) whose patients and clients include NDErs. In general, NDErs have reported both helpful and harmful experiences disclosing their NDEs to HPs—medical, such as nurses and physicians; mental, such as counselors and psychologists; social, such as social workers; and religious/spiritual, such as chaplains and pastors (Holden, Kinsey, & Moore, 2014). Holden et al. (2014) found that harmful disclosure experiences involved the HP responding to NDE disclosure by failing to recognize the experience as an NDE, by failing to acknowledge its reality or potential reality, by pathologizing the NDE or NDEr based on the NDE alone, and/or by demonizing the experience or experiencer. In addition to general recommendations for HPs to respond helpfully rather than harmfully to NDE disclosure (Holden, 2015), we offer the following specific suggestions regarding the possible existence of NDErs’ environmental effects.

First, in the process of interviewing hundreds of NDErs, we have noticed that although NDErs readily report numerous NDE after-effects, they are less likely to spontaneously report the specific after-effect of environmental effects—particular EM effects. Rather, as in the cases of Wimmer and Blalock described above, when we have mentioned or inquired about EM actions—for example, beginning with an observation that the NDEr is not wearing a watch—many NDErs discovered that the EM actions they had been experiencing were not merely a personal idiosyncrasy but are an empirically established phenomenon known often to follow NDEs. Upon reflection, they realized that, indeed, their NDEs marked the onset of their EM actions. They also were already aware or, in the process of discussion, became aware that their EM actions are often exacerbated by emotional arousal—no matter the specific emotion involved. It has also been our experience that in discussing EM actions with NDErs, they often spontaneously bring up experiences that are not known to be electromagnetic in nature but that they consider related, such as the non-EM reaction of increased drug and allergy sensitivity or, as in the case of Wimmer, the non-EM action of psychokinesis.
Table 1: *Categories of Environmental Effects*

<table>
<thead>
<tr>
<th>Active Forms</th>
<th>Reactive Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-EM Action</td>
<td>Non-EM Reaction</td>
</tr>
<tr>
<td>Ex: psychokinesis, healing others</td>
<td>Ex: to sounds, chemicals, other people’s moods</td>
</tr>
<tr>
<td></td>
<td>If symptoms distressing: <strong>Idiopathic Environmental Intolerance</strong> [IEI]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presumably related to electromagnetism (EM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM Action</td>
</tr>
<tr>
<td>Ex: malfunctioning electrical devices</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

In response to these realizations and discoveries, NDErs often express the relief that accompanies the awareness that what they have experienced is a recognized phenomenon and that they are not alone in these experiences. Typically, this discussion then lays the groundwork to address, if they did not spontaneously mention the other three categories of environmental effects, whether they might have experienced one or more of them; to explore the extent to which these effects have been problematic for them; and, if problematic, to discuss strategies to manage them.

Regarding EM action, among the strategies we and our investigation and research participants have discovered are that, to the extent practical, minimizing contact with electronics or using anti-static devices prior to employing them might be helpful. If contact is unavoidable and a device malfunctions, simply moving away from it, even
briefly, may restore its functionality. Whether remaining in or out of proximity of a malfunctioning device, psycho-physically calming and centering oneself and generating an attitude of good will may avoid malfunction or restore functionality. For clients or patients unfamiliar with relaxation strategies, such as progressive relaxation and breathing techniques, HPs could teach and help clients to practice them. Regarding EM reaction, similar to the AAAAI (1999), we are unaware of readily available treatments from most conventionally trained health practitioners for these phenomena, apart from avoiding proximity to electrical substations and, as much as is practical, electrical devices. Although treatment for IEI is controversial, a few health centers, such as the Environmental Health Center in Dallas, Texas, do offer it.

In order to be helpful to NDErs who report environmental effects, HPs themselves need to be well educated about these phenomena. We echo the call for these topics to be addressed in HPs’ initial professional preparation and their continuing education (Foster, James, & Holden, 2009; Holden, Kinsey, & Moore, 2014).

**Future Research and Conclusion**

Although reports of environmental effects in the general population and, to an apparently greater degree among NDErs, are fairly well established, several questions remains. These include what history other than NDEs might be common among people experiencing these effects; for example, is Blalock’s history of other transpersonal experiences always or often present—and/or perhaps a forgotten close brush with death that might have involved a forgotten NDE? Another question is the relationship between the various categories of environmental effects—which may be answered in part by Fracasso and Friedman’s (2012) promised follow-up study.

As Fracasso and Friedman (2012) suggested, because EM actions are potentially directly measurable, they may offer the most promising source of evidence that NDEs are objective experiences that point to the continuation of consciousness beyond physical life. Research so far has consisted of case examples and self-report questionnaires. The next step would be to conduct objective systematic inquiry (Nouri & Holden, 2008, p. 107).

In 2011, then-doctoral-candidate Kathleen Hoy investigated the possibility of conducting her dissertation research on NDErs’ electromagnetic aftereffects—what we now term EM action. Although she did not actually conduct the research, the following results of her in-
vestigation could prove helpful to a researcher endeavoring to take on this line of research (K. Hoy, personal communication, Sept. 8, 2014).

Hoy’s plan was to enact Nouri and Holden’s (2008) recommendation to create three experimental groups—NDErs, participants who had survived a close brush with death without an NDE, and participants who did not recall ever having come close to death, and, with the assessor masked with regard to the category of each participant, measure the EM field as each participant experienced a guided imagery exercise to evoke a series of four intense emotional states, each for three minutes: “calm, frightened/anxious, calm, frustrated/angry, calm, excited/happy, calm” (p. 107.) Hoy’s plan was to use an EM shielded room such as a Faraday cage to avoid outside EM interference. She consulted Bill Joins, an electrical engineer at Duke University, who had conducted research at the Rhine Center testing energetic healers and measuring light emitted by them with a photomultiplier tube (personal communication, Robert Mays to J. Holden & K. Hoy, Feb. 18, 2011). He advised Hoy to use an electronically cooled infrared camera detector and an electronically cooled photomultiplier tube as well as an extremely efficient darkroom to measure the visible-invisible end of the electromagnetic spectrum. Holden’s further inquiries with other electrical engineers have yielded a few other possible research protocols, none of which have resulted in an actual study to date.

In conclusion, research and investigation support the existence of a phenomenon whereby in the aftermath of an NDE, experiencers are likely to manifest environmental effects. EM phenomena, in particular, may be plausible in light of the naturally occurring electromagnetic energy associated with living things and the environment—and the phenomena have been observed in non-NDErs, in some cases documented to occur to a lesser degree. Researchers have recently moved beyond initial investigations of case examples and informal investigations to quantitative, retrospective research that has largely confirmed results of the previous methods. Systematic objective inquiry is the next logical step, in which electrical outputs are comparatively measured between NDErs and non-NDErs—which process may also begin to reveal the mechanism(s) underlying the phenomena of EM action and reaction. People experiencing EM effects could benefit from understanding and education by healthcare professionals who, themselves, need to be well informed about EMEs through their own preparatory and continuing education. Greater clarity regarding these phenomena might be achieved if future researchers use consistent terminology, which we proposed in this article.
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