Designing a Home for Multiple Chemical Sensitivities

In a time of drastic change it is the learners who inherit the future. The learned usually find themselves equipped to live in a world that no longer exists. – Eric Hoffer

Building Biology Institute
The science of healthy buildings

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Introduction: Designing and Building a Healing Home for Multiple Chemical Sensitivities

Everybody deserves to have a healthy home that is free from harmful chemicals, is resilient against mold infestation and that is wired and equipped to minimize electromagnetic field exposures. Unfortunately, current conventional building practices fall short in addressing harmful chemicals and often fail to prevent mold. As designers and builders become more aware, the gap between conventional and healthy construction is narrowing with respect to chemicals and mold but many designers and builders are not even aware of the need for electromagnetic safety.

Even with growing general awareness, for those suffering from acute or chronic sensitivities, finding a home that will be good enough for them to regain their health in can be as difficult as looking for a needle in a haystack.

For a person with severe sensitivities the selection of the design/build/consulting team, and the choice of the building systems, protocols, products are all essential to achieve success that will result in a healing sanctuary.

While the primary focus of this course will be the special needs, strategies, and solutions for those with Multiple Chemical Sensitivities, it has been our experience that people who are sensitive to chemicals are often also sensitive to mold and electromagnetic fields or quickly become so when they encounter elevated exposures in conventionally built environments. For example, after becoming ill from a mold exposure, someone may notice that they can no longer tolerate chemicals or fragrances, or elevated electromagnetic frequencies even when they have been asymptomatic with exposures in the past. So, in designing for MCS it is also important to design for the healthiest electro-climate and employ the best mold prevention practices that go far beyond current code compliance. Mold prevention and electromagnetic field reduction are both the subjects of current and future online courses by the BBI. This course will also lay out some of the basic strategies since these topics are intertwined in the Building Biology holistic approach to health in the built environment.

Setting realistic expectations at the outset of any project is very important and often very disconcerting to someone struggling with environmentally induced chronic illness.

Building a home that is healthier than most conventionally built homes is an easy task, but it is not a guarantee that, even with the best of efforts, a new home will be immediately inhabitable by someone with acute sensitivities. There is a lot that is currently still unknown including accurate health information about the majority of chemicals and the exact medical basis behind severe sensitivities.

At best a committed team can work with the information that is known, in partnership with the sensitive individual and their support team. (We will use SI as an abbreviation for “Sensitive Individual” throughout the rest of this document.)

In building a healthy home, the SI will be responsible for making a myriad of timely decisions which can be stressful even for healthy individuals who have full energy.

While a healthy home expert can provide a list of potential products for each of the hundreds of choices needed based on a product's chemical profile and previous track record only the SI can determine which of those choices is the best for them. There is no single formula that can universally meet the needs of all people who suffer from MCS because everyone is unique in their sensitivities. Refer to Product Testing Modalities below.

If the SI has spent time in another house designed and built for a person with sensitivities and feels well when in that home, then they have a formula for their own potential success. This makes the process much easier, and the SI and team can be more confident moving forward. In our practice we are forever grateful to previous health-challenged clients who, with empathy and generosity, are willing to open the doors to their own healthy homes so that health-challenged strangers can see how they feel.

Understanding the cause of illness, if known, can be helpful in determining areas where extreme caution must be exercised. For example, someone who is sensitive only to electromagnetic radiation may prefer and tolerate properly installed and vented gas appliances while someone who has been injured through an exposure to combustion byproducts would be better off with electric appliances.

Another example of individual sensitivity is tolerance to wood. Wood can have many benefits for the well-being of occupants. Building Biology teaches us that unsealed, or naturally waxed or oiled wood allows for sound absorption which improves acoustics, has some ability to balance ambient moisture content and promotes good ion balance. However, for someone sensitive to wood terpenes, exposed wood can render a space uninhabitable.

While some SI's have a heightened sense of smell and react immediately to substances that are harmful to them, others have lost all sense of smell and have delayed reactions to exposures. Many SI's have had years of inadvertent experimentation in their search for somewhere to live and have gained tremendous insight into what does and doesn't work for them. When one member of a family has sensitivities, the family may be faced with the need to build or remodel to that person's more demanding requirements.

What follows is a number of specific strategies that we have employed as architects and consultants in working with highly sensitive individuals. The stakes are high. Unlike our healthy clients who have come to us to help them achieve a happy dream, many of our sensitive clients have come as a last resort after failing to find an existing home that can help them or a family member to heal. In this course we will discuss the unique challenges and solutions for achieving these special environments. We will look at choosing a site, putting together and overseeing a can-do team, designing the home, maintaining quality control during the construction process and maintaining a healthy home once occupied.

Finding the Right Site

Before a healthy building can be planned careful site assessment is required to assure that the proposed site is one that will support health. This is described in detail in IBE 215: Healthy Building and Community Planning. To summarize here:

Anyone, regardless of their current state of health, who wishes to purchase a home site should perform due diligence in order to avoid phenomena that could lead to expensive or problematic construction. These could include unfavorable soil conditions such as clay soils, high water tables, radon gas, climatic conditions such as flood and fire hazards and unfavorable microclimates (high wind, dampness, erosion etc.). This topic is discussed more thoroughly in IBE 215.

For those with MCS, mold, and electro hypersensitivity, there are a number of additional factors to be evaluated which can greatly affect the success of the home to support the health of the SI.

Air Quality

The more unpolluted the better. The EPA publishes yearly Air Quality Index summaries[1] so you know what to expect on an annual basis, how conditions have changed over time, and historical trends.

- Avoid industrial areas, power plants, agricultural lands with heavy pesticide use, and other major pollution producers.
- Determine the direction that prevailing winds blow and how they change seasonally. Consider what is upwind from you. Factories, chemical-based agricultural operations and coal power plants are a few examples of things to avoid upwind.
- Avoid sites adjacent to parking lots and traffic corridors.
- Crest locations generally have better air quality and more air movement than valley sites.
- If the site is in an established neighborhood visit the site often at different times of day to determine if there are close-by neighbors who use scented dryer sheets, landscaping products such as pesticides, or wood burning stoves and fireplaces that impact the lot you are considering.

Light and Noise Pollution

Evaluate levels of noise pollution at different times of day and night. Visiting the site at night will help determine if there are sources of night sky pollution generated by surrounding lighting.

Water Quality

So-called “potable” water may contain radon, pesticides, chlorine, e-coli, and a host of other contaminants. Water can become contaminated by ingredients intentionally added to disinfect it, by not being sufficiently treated, or by contaminants present in the delivery system.

- If the site does not have community or municipal water system and is dependent on a site or shared well, test the water quality if possible.
- Request a well report.

- Consult with a local water quality expert to find out what problems, if any, are typically found in the aquifer in the area.
- If the site has municipal water service to it, check published water quality reports. The Environmental Working Group (EWG) maintains a database[2] of annual municipal water test results and has more stringent thresholds for the various potential pollutants.
- If needed consult with a local water specialist to understand what the best purifying solutions and the associated costs will be based on both the published reports and their experience.

Existing Electro-climate

- Avoid proximity to high-voltage power lines, microwave relay stations, and cellular phone and broadcast towers. As a rule of thumb, distances of one-tenth mile from high-voltage power lines and one-half mile from microwave cellular and broadcast towers are adequate. Many public utilities will provide free site measurements for background electromagnetic field levels. Ensure that measurements are taken at a time when power lines in the area are operating at peak load, or have the field calculated based on peak load projections. Utility companies should provide this information in writing.
- Radio frequencies or microwave frequencies generated by surrounding cell towers or wireless installations should be measured to determine their impact on the site. Measurements should be taken during several different time frames because use patterns will create fluctuations. Special RF meters will be required for this work and unless you are experienced yourself and have your own equipment you may wish to hire a trained and equipped consultant such as a BBI EMRS[3] in the area. Of course, there are no guarantees about future utility installations off-site.
- Find out if smart utility meters are installed on neighboring buildings that would impact the site. Also determine if there is a viable “opt-out” plan or if smart meters are mandatory.

Past and Future Pollution Potential

- Past industrial or farm uses may warrant soil and water testing for potential pollutants such as pesticides that could be present in the soil or water.
- Find out how land use may change in the future. A zoning study may reveal that the land use patterns may change in the future to include undesirable densities or activities. For example, a pristine adjoining field could be zoned for a future airport.
- In a populated area, analyze the present use and future development of your surrounding neighborhood. How are nearby empty lots or current homes zoned? If they have commercial or multifamily zoning, the nature of the neighborhood could change to become busier, noisier, and more polluted.

Geopathic Stress Zones

These are invisible zones that lie beneath the earth’s surface. They occur over geophysical disturbances such as underground water ways, ore deposits or caverns. Traditionally these stress zones are detected through dowsing but can be detected on specialized equipment such as a Geo magnetometer. Geopathic stress zones should be avoided especially around sleeping areas. While a healthy individual may not be noticeably bothered by them, they do not provide the optimal conditions for healing. Some people choose to have the site surveyed for geopathic stress zones and avoid them especially in sleeping areas. This topic