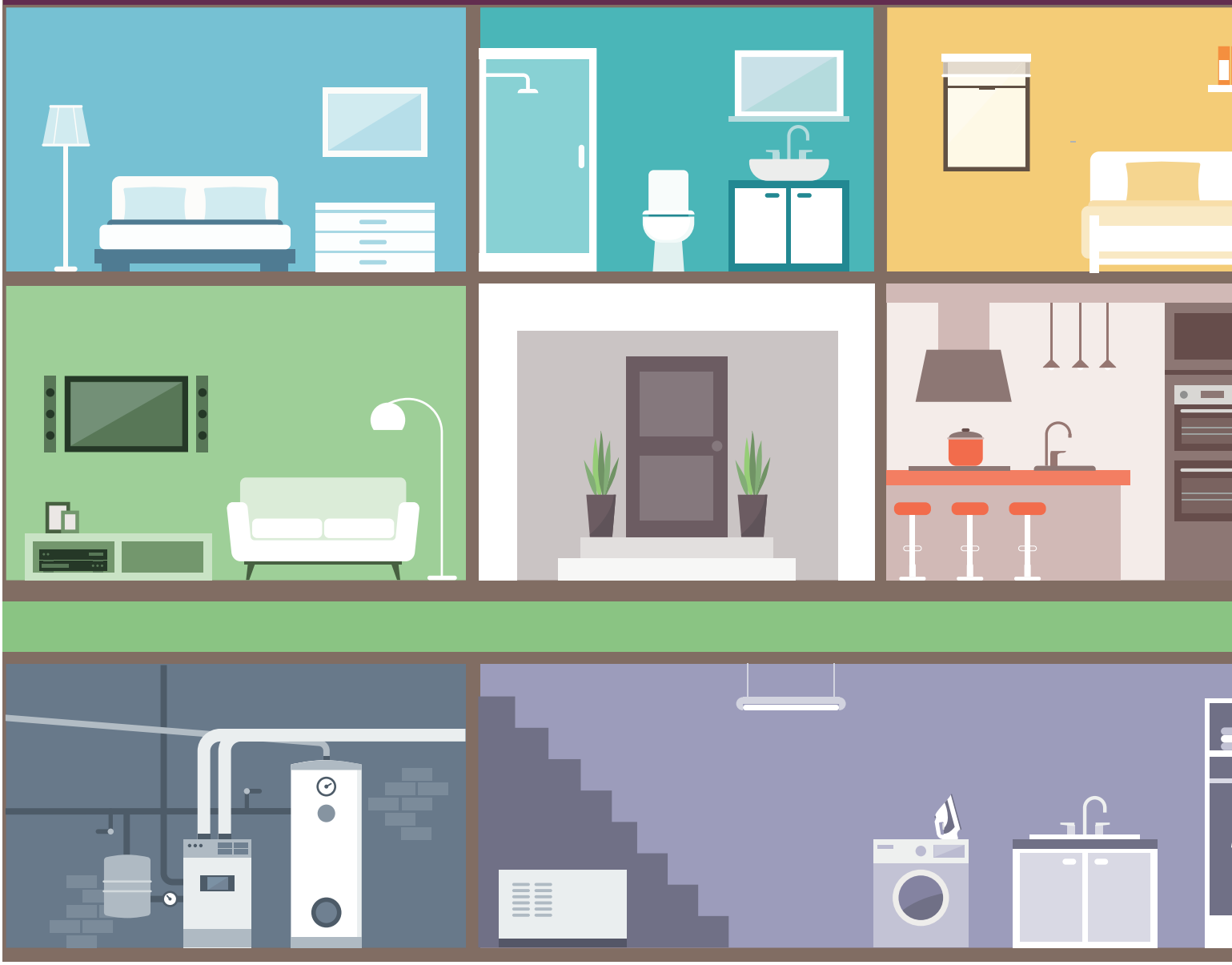
HOMES FOR HEALTH

36 EXPERT TIPS TO MAKE YOUR HOME A HEALTHIER HOME



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Homes for Health: 36 Expert Tips to Make Your Home a Healthier Home

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Homes for Health: 36 Expert Tips to Make Your Home a Healthier Home

TABLE OF CONTENTS

WHY HOMES FOR HEALTH?

A Note from Joe and Jack

Consider this – you spend 65% of your entire life inside your home. In fact, a full one third of your life is spent in *one room* in your home – your bedroom.

Your home = your health. It's that simple.

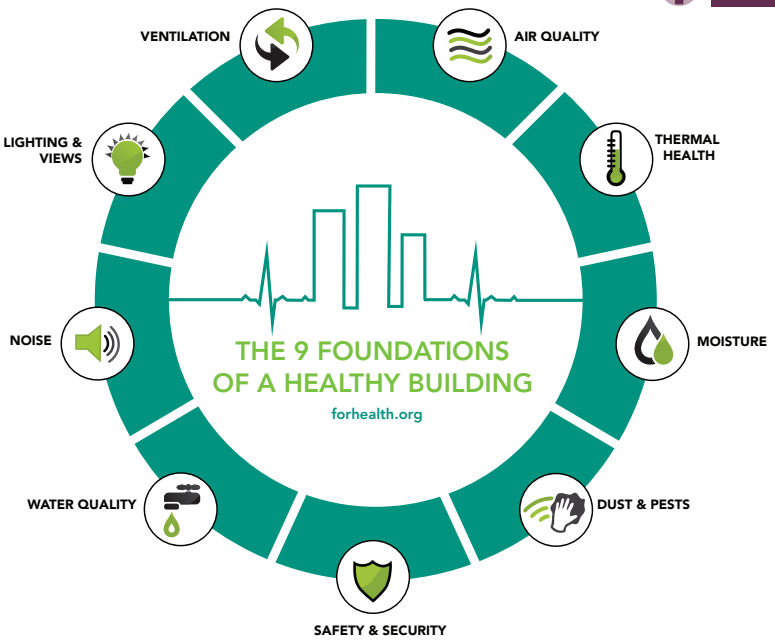
Homes for Health is a project borne out of our many years of hearing the question – 'How do I Make My Home a Healthy Home?' We have been actively engaged in the field of researching healthy indoor environments for decades, Joe for 10+years and Jack for 40+ years. We think we've seen it all – everything that can go wrong in the places where we live, work, play, pray and heal. We've also seen how to do it right.

This report, *Homes for Health* outlines 36 expert tips that can be implemented to make your home a healthier home. It follows two of our previous reports – 'The 9 Foundations of a Healthy Building' and 'Schools for Health: Foundations for Student Success' – that explain the science for how healthy buildings lead to healthier work and school environments, respectively. Now we turn our attention to the place we spend the most time – our homes.

In preparing *Homes for Health*, we relied on the best available scientific evidence, our decades of combined experience evaluating the factors that determine our health indoors, and the brilliant researchers on our team. Great academic research or knowledge that is locked up in scientific journals, wasting away in the heads of faculty, or rendered inaccessible through jargon, is not helping to advance public health. This report is part of our effort to translate research into actionable recommendations.

We did our best to ensure that the 36 expert tips are generalizable to most homes. However, we recognize and acknowledge that each home and living environment is different. Most certainly our recommendations would be slightly different for a single-family home v. a multi-unit apartment complex, for example, just as our recommendations would be slightly different for a family with young children v. homes for seniors. Each environment and demographic requires special considerations and needs; specific recommendations for each situation would necessarily vary accordingly. That said, we felt it was not possible to capture all of this nuance in one short report, and we also felt that this complexity should not hold us back from putting out solid recommendations that are relevant to most people in most homes.

Our field is the field of environmental health. As such, this report focuses on *environmental* factors in the home that drive health. This is not about all of the other things that make us healthy: our community, friends and family; social interactions; happiness; nutrition; or exercise. This is also not a guide for construction or design, nor do we tackle sustainability measures like energy and water efficiency, solar panels or siting concerns.



What this report is, however, is a quick guide with simple steps that people can take to make their home a healthier home. To keep the report short and practical, we employed two tactics. First, we organized the tips according to the rooms they pertained to, offering 5 tips for each room. Of course, some tips apply to multiple rooms. We encourage readers to look at all recommendations across the home. Second, we eliminated deep descriptions of specific concerns and we have avoided overly technical language where possible. For readers interested in learning more about a specific topic, we have highlighted key words in this report for which our team and collaborators have prepared an additional two-page summary that goes a bit more in-depth on the science. This is all available on our website at www.ForHealth.org.

Last, we want to explicitly recognize that this report is tailored to homes in the developed world and does not attempt to address the massive global burden of disease created by unhealthy living environments in developing countries.

Our first and most important recommendation is this – #1 Trust Your Senses. The world's most advanced scientific instruments can't match your own body's sensing ability. In our experience, when people report poor conditions indoors, they are often quickly dismissed as complainers. Our experience also tells us that these people are very often 100% correct about the nature, source and timing of the issue they are experiencing. So, Trust Your Senses.

We welcome your feedback on *Homes for Health*. Our plan is to update this report periodically, and to supplement it based on requests from end-users. We hope you find this information helpful.

Joe and Jack

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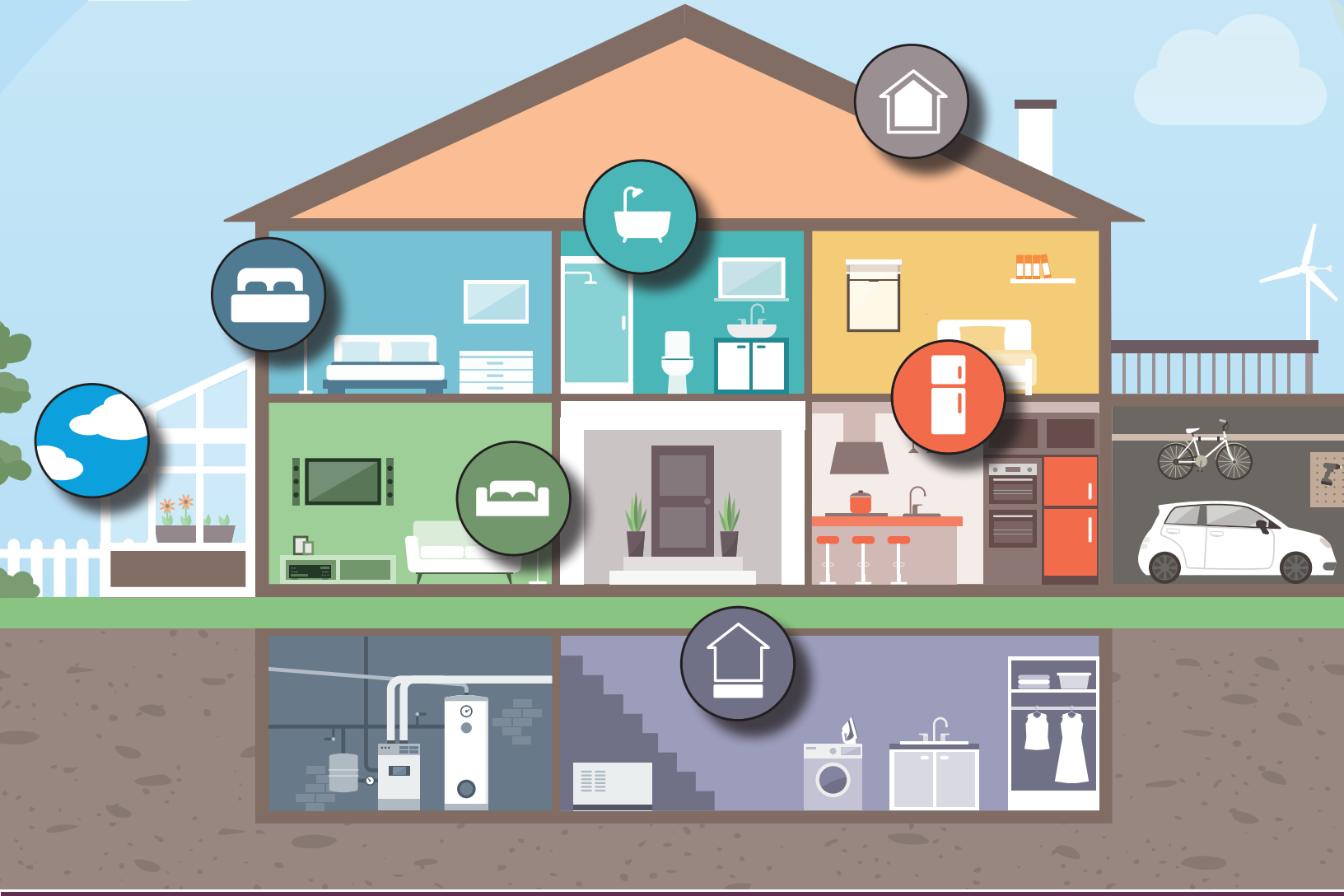
36 EXPERT TIPS TO MAKE YOUR HOME A HEALTHIER HOME



 WHOLE HOME	 BEDROOM	 LIVING ROOM	 KITCHEN	 BATHROOM	 BASEMENT	 OUTSIDE
1. Trust Your Senses						
2. Kick your shoes off at the door	**7.** Train your brain and make this the sleeproom	**12.** Vacuum. Regularly. With HEPA.	**17.** Cook with the exhaust hood on (and vented outdoors)	**22.** Control moisture by exhausting air outdoors	**27.** Measure and control radon	**32.** Ditch the pesticides and herbicides
3. Bring in fresh air	**8.** Black out the room (and 'blue-out' your lights)	**13.** Don't smoke indoors (better yet, don't smoke at all)	**18.** Keep a fire extinguisher within easy reach	**23.** Limit the use of air fresheners	**28.** Do not disturb signs of asbestos	**33.** Beware of air from attached garages
4. Install detectors for smoke and 'the silent killer'	**9.** Treat the air (and yourself)	**14.** Stamp out the candles and incense	**19.** Filter your drinking water where necessary	**24.** Detoxify cleaners and personal care products	**29.** Dehumidify and inspect for signs of water issues	**34.** Secure the perimeter
5. (Re)connect with nature and natural light indoors	**10.** Keep your cool at night	**15.** Choose furniture and carpets without harmful chemicals	**20.** Control pests using IPM, not more pesticides	**25.** Skip the antimicrobials	**30.** Choose a hard floor	**35.** Tighten up your envelope
6. Get the lead out (for homes built before 1980)	**11.** Block out the noise	**16.** Properly vent fireplaces and woodstoves	**21.** Choose glassware and cast iron or ceramic cookware	**26.** Prevent slips, trips and falls with handrails and non-slip mats	**31.** Solve the solvent storage issue	**36.** Be resilient

HOMES FOR HEALTH

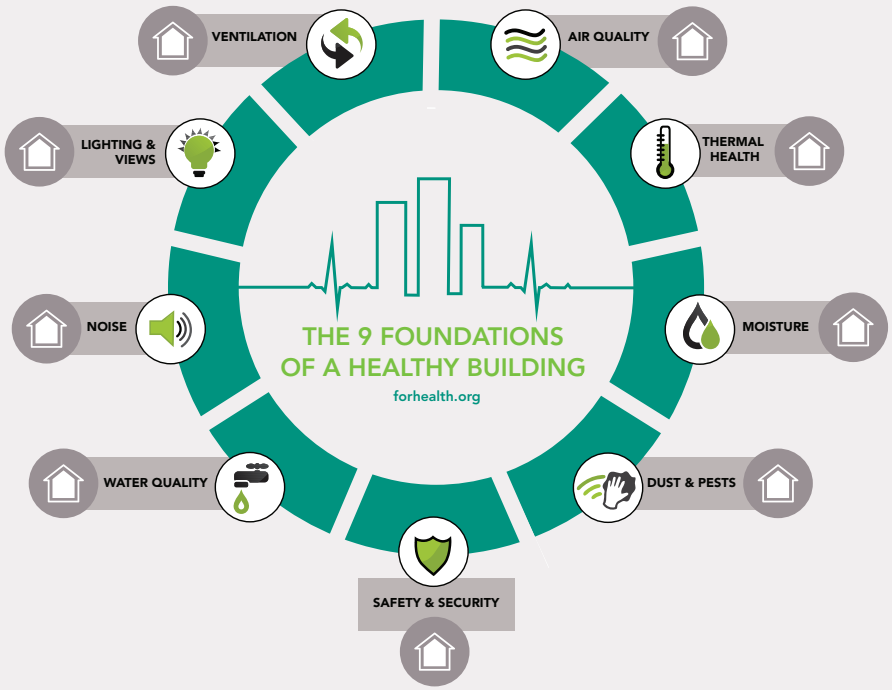
HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

HOMES FOR HEALTH: WHOLE HOUSE

Did you know...the typical American spends 65% of their life inside their homes?

They say "Home is where the heart is," but this is more than just a figurative expression. The typical American spends 65% of their life in their home – our home is quite literally where our heart spends most of its time. And it turns out that heart health (and brain health and hormone health and mental health) is dependent on home health.

So, what to do? Where does one start in making their home a healthy home? The best place to start is right at the front door. Kick your shoes off at the door and keep all the junk that is outside from coming inside.



5 EXPERT TIPS FOR YOUR WHOLE HOME

2 Kick your shoes off at the door

Anything you step on in the street or on the sidewalk, you bring into your home. One of the best healthy home steps you can take is to kick your shoes off at the door. This will reduce the amount of dirt and dust you track in from outdoors. In addition to helping to keep your house clean by reducing dust brought into your home, it also limits corrosive road dust, salt, and oils that maybe harmful for pets and damaging to floor surfaces.

3 Bring in fresh air

The concentrations of air pollutants are often 2-5 times higher indoors than outside. Ventilate your home as much as possible, especially when the outdoor air is clean. Higher ventilation rates (in other words, more fresh air) have been linked to many benefits, including reductions in so-called 'sick building' symptoms, like headaches and eye irritation, and help us dilute any contaminants we generate indoors. When you can, bring more fresh outdoor air into your home by opening windows and skylights or increasing the outdoor air intake through your central mechanical system. In homes with mechanical ventilation, make sure to install high efficiency air filters and replace them every 3-6 months.

4 Install detectors for smoke and 'the silent killer'

Every home must have smoke and carbon monoxide detectors on every floor. These are designed to alert you – loudly and quickly – in the event of a life-threatening situation. Smoke detectors alert you to a fire in the house, and CO detectors warn you about this odorless and deadly gas, aptly named The Silent Killer. Because CO is a byproduct of combustion, things like the hot water heater, boiler, or natural gas stove can all emit CO. If not fully combusted, or not properly vented, this can lead to a deadly build-up of CO in the home. Over 350 people die of unintentional CO poisoning each year in the US. Test your detectors regularly to be sure they're working. And a really good tip is to change the batteries in all of your detectors every time you change your clocks for daylight savings time. This will ensure you change the batteries twice per year, and it's an easy way to remind yourself.

5 (Re)connect with nature and natural light indoors

The human species evolved over millennia in close connection with nature, and in close alignment with light-dark cycles from the rising and setting sun. Only recently have we walled ourselves off from the natural environment with our buildings. This made sense – homes are designed to protect us from the elements, after all. But it turns out that connections with nature are good for our health, and exposure to light (or darkness) at the right times is critical to our natural circadian rhythm. So consider the field of biophilic design and (re) connect with nature in your home. Likewise, open up those window shades in the morning and let the light in.

6 Get the lead out (for homes built before 1980)

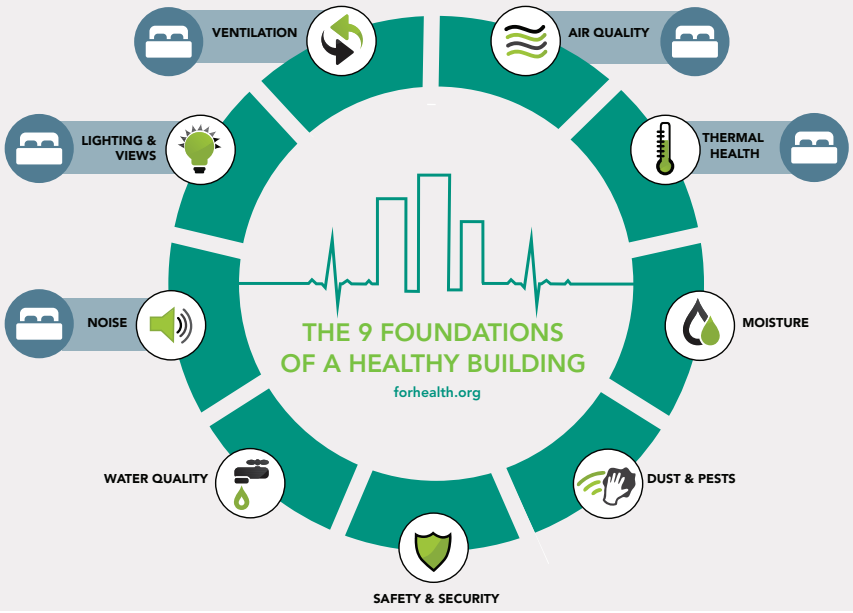
If you're in a home built before 1980, there is a good chance you have lead in the paint, indoors and outdoors. Lead is one of the most potent neurological toxicants known, causing lifelong impacts on IQ, learning and behavior. If you're in an old home, test the interior and exterior paint for lead, and remediate it if you find it. (University of Massachusetts has an inexpensive test that will let you know about lead in your soil, amongst other things.) This is especially important for homes with young kids. Women of child-bearing age should also pay close attention; the lead the mom is exposed to, even before becoming pregnant, gets passed down to the developing fetus during pregnancy.

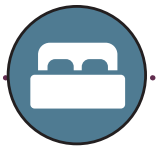
HOMES FOR HEALTH: BEDROOM

Did you know...A third of all the air you breathe in your life will be the air in one room...your bedroom?

You're probably not surprised to learn that the typical person spends 90% of their time indoors. And we open our Homes for Health report pointing out that 65% of your time is spent in your home. But here's something obvious yet shocking to think about – an entire 1/3 of your life is spent in just one room.

Think of everything you do to lead a healthy lifestyle. You may pay attention to what you eat, and how much you exercise. But have you ever seriously given much thought to the one place in the world where you spend 1/3 of your life? The main activity for the bedroom is, of course, sleep. 70% of adults report that they get insufficient sleep at least once a month, and 11% report insufficient sleep every night. If you have given your bedroom some thought, you've probably gotten yourself a comfortable pillow and blanket. But it turns out that there are many other environmental factors that impact how well you sleep. Optimizing your bedroom conditions for sleep in advance will help you fall asleep, stay asleep, and sleep better.





5 EXPERT TIPS FOR YOUR BEDROOM

7 Train your brain and make this the sleeproom

Having a space dedicated to sleep, and sleep only, is a strong external cue to our circadian rhythm that primes the body to sleep onset. This sounds obvious enough, but you do really need to set yourself up for sleep success by making your bedroom a zone of relaxation, not stimulation. That means removing things that activate the brain, like your T.V. or cell phone. So put away the electronics and don't do work in the bedroom. Train your brain that this room is for sleep and relaxation.

8 Black out the room (and 'blue-out' your lights)

Just as light is good as we wake up, a bright environment at night can shift our natural clocks, keeping us awake. Get room-darkening shades to block out the light. Blue light stimulates your brain, while warm light can help induce sleepiness. Follow tip #7 and remove the electronics that can emit the blue light, since it has been shown that people reading from a screen take longer to fall asleep and have less REM sleep when compared to reading from a printed book. Use tunable lights to tune your circadian rhythm; swap out your light bulb for a tunable bulb and dim the light intensity to give you the warm light you need to read without stimulating your brain.

9 Treat the air (and yourself)

We breathe about 11,000 liters of air every day; a third of all that air you breathe will be in your bedroom. Consider adding environmental control systems like portable humidifiers and air purifiers (or whole-house air purifiers) to capture airborne dust, in particular if you live close to a busy road or in an area with poor outdoor air pollution.

Increased particulate matter exposure at night can reduce oxygen saturation in blood and increase the risk of having a cardiac ailment. When the outdoor air quality is particularly bad, consider keeping your windows closed. In cold, dry seasons consider using a portable humidifier – a higher moisture level is good for your skin, respiratory system, and it helps to decrease airborne influenza survival times.

10 Keep your cool at night

Sleep disruption due to too cold or too hot bedroom temperatures is linked to mental health problems, loss of productivity, and diminished cognitive function. As we fall asleep, our bodies begin to shed heat. Controlling room temperature and keeping your bedroom cool at night help to improve sleep quality. Set a temperature target between 65-70°F to help keep you comfortable throughout the night. You can adjust your bedding and blankets by season to find your optimum comfort zone. During the warm summer nights, use a ceiling or portable fan and/or keep windows cracked open (whenever it's safe) to help create air movement in the room.

11 Block out the noise

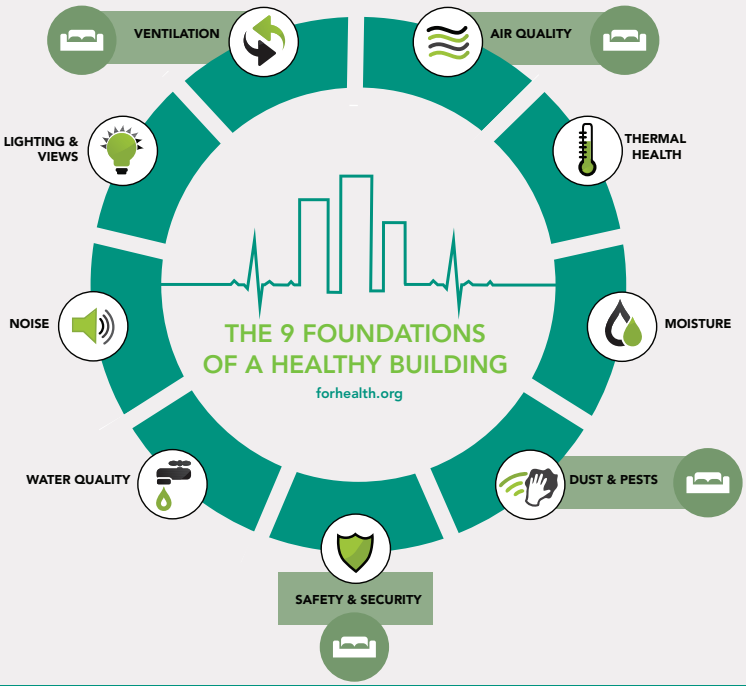
Intermittent or unexpected noise is one of the key disrupters of sleep. Nighttime noise is associated with increases in blood pressure and higher risk of developing cardiovascular disease. Some find the white noise from portable air purifiers helpful to hide background noise, and there are other devices you can use to create relaxing background noise. Once you are ready to go to sleep, set your smartphone and other devices to silent mode. Consider sleeping with ear plugs if you have to.

HOMES FOR HEALTH: LIVING ROOM

Did you know...the typical person ingests about 50 micrograms of dust per day?

You're probably thinking, "Not me, I don't eat dust!" None of us do intentionally, of course, but dust nonetheless gets into our bodies. As we go through our day we accumulate dust on our hands. When we touch food, or touch our hands to our mouth, some of that dust inevitably gets transferred into our body. (For kids, it's up to 200 micrograms per day.) Dust is a reservoir for allergens from pests, dust mites, toxic chemicals and air pollution. Anything that's in dust can get inside you.

In addition to ingesting dust incidentally, dust also gets into our body another way. After airborne dust settles out onto the floor and other surfaces, like your couch, it can get resuspended into the air when we walk around or sit down. We literally have a dust cloud all around us from these types of activities, just like the Charlie Brown character PigPen. Once those dust particles are back in the air, we breathe them in. So take note of our recommendations here on controlling dust, both the kind that's on the floor and the kind that's in the air.



5 EXPERT TIPS FOR YOUR LIVING ROOM

12 Vacuum. Regularly. With HEPA.

Carpets and floors can be a reservoir for chemicals, dirt and dust, which get continually resuspended when people walk or play on the carpeting. Vacuums that don't use HEPA (High Efficiency Particulate Air) filtration may simply be picking up dirt, breaking it up into a million smaller pieces, and then scattering it around your house. A HEPA filter will trap the dust particles before they can be released into the air. Regular use of a HEPA vacuum can help control levels of dust, settled pollen, and allergens from cats, dogs, or pests. You should also maintain your vacuum by emptying the bin and replacing the filter when necessary.

13 Don't smoke indoors (better yet, don't smoke at all)

This one is obvious, but we had to say it. Smoking is extremely hazardous to health. So is secondhand smoke. And there is now evidence that thirdhand smoke – the stuff that comes out of cigarettes and then sticks to walls, carpets and furniture – also harbors some of the toxic material from cigarettes. Smoking in the backyard, on the porch, or on the front stoop does not necessarily prevent secondhand smoke exposure, as smoke can infiltrate back inside the home. E-cigarettes can emit toxic chemicals, too. While the secondhand exposure to e-cigs and vapes is less studied at this time, follow the precautionary approach and don't use them indoors, either.

14 Stamp out the candles and incense

Any type of combustion causes the release of particles into the air. If you use candles or incense, you are creating small combustion sources inside your home. The evidence is clear – in homes with candles or incense burning there is a sharp increase in airborne particles, sometimes reaching levels that are higher than what is typically measured outside in US cities. Candles are also a fire hazard. So stamp them out for cleaner air.

15 Choose finishes, furniture and carpets without harmful chemicals

The safest strategy to reduce your exposure to nasty chemicals is avoid bringing them indoors. Stay away from products with known toxic chemicals such as formaldehyde and other red listed compounds. For example, the chemicals used for flame retardancy and stain repellency have a long track record of being toxic. And new alternative chemicals aren't necessarily any safer than the past ones. You can now find products like couches and chairs that meet fire safety standards without the use of chemical flame retardants, and you can look for products that offer protection against stains without the use of toxic stain repellent chemicals, or the need to apply 'stain-repellent' sprays.

16 Properly vent fireplaces and woodstoves

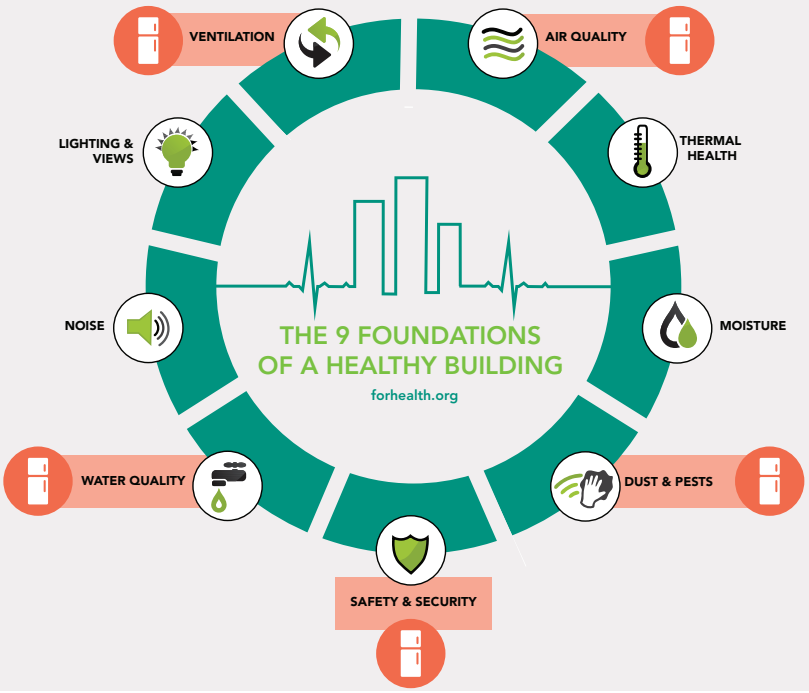
If you have a fireplace or woodstove, you are no doubt aware of the flammability risks, which you can mitigate by keeping flammable materials away from the fireplace, putting a screen in front of the fire, and regularly having your chimney swept. But fires also pose a risk to air quality. Unvented fireplaces and woodstoves increase the likelihood of CO poisoning, which is at its highest in the winter months due to use of heating appliances. Make sure you have a strong draft sucking fire smoke up the chimney, and keep the flue open for 12 hours after the fire has gone out to prevent particulates and carbon monoxide from entering your home.

HOMES FOR HEALTH: KITCHEN

Did you know...particle levels while cooking with an unvented stove can reach 10x higher than our health-based limits for outdoor air pollution, and they can linger indoors for hours?

If you've come to this section looking for tips on healthy eating, well, you've come to the wrong place! While it is of course important to focus on food and nutrition, don't forget that the kitchen environment can have an impact on your health, too. Cooking releases all sorts of wonderful odors into the home. It can also release a whole host of airborne contaminants that you'll want to control. And with all that food comes the potential for pests (and with pests come pest allergens). Then we have to think about the quality of the water we're drinking and the basics like fire safety.

If you did come here looking for nutrition tips, we'll point you to our colleagues in the Nutrition Department at the Harvard T.H. Chan School of Public and their excellent website, The Nutrition Source.



5 EXPERT TIPS FOR YOUR KITCHEN

17 Cook with the exhaust hood on (and vented outdoors)

Cooking can generate particles that get distributed around the house, and cooking with a gas stove can generate NO_2. Exposure to air pollution during cooking can cause or worsen a wide range of health problems such as nose and throat irritation, headaches, fatigue and nausea. Using an exhaust hood, if it's properly ventilated to the outdoors, can dramatically decrease the amount of cooking-related pollution in your home.

18 Keep a fire extinguisher within easy reach

A fire extinguisher is not a fire-fighting tool; you cannot use it to fight through a fire during an escape. It is meant to quickly put out a small fire in the home, and a typical fire extinguisher for use in the kitchen gives you a few seconds to put out the fire. In a review of 2,100 fire incidents, 80% were successfully put out by fire extinguishers. Remember to P.A.S.S.: Pull out the pin, Aim at the base of the fire, Squeeze the handle, and Sweep across the fire. DO NOT LET GO until the extinguisher is emptied. If the fire is not out after that, evacuate the house immediately. Make sure everyone in the family knows where it is, and make sure they know how to use it.

19 Filter your drinking water where necessary

Tap water delivered to your home has to meet national drinking water standards, so you should feel confident in the water quality as it arrives at your house. But these drinking water standards do not cover everything, and once that water enters your house pipes, it can change. For example, homes with leaded pipe or solder can leach lead into the water. During the water crisis in Flint, Michigan, the tap water provided to homes of approximately 140,000 Flint residents was contaminated with lead. And millions of people in the U.S. have toxic "Forever Chemicals" in their water above safe levels. Consider installing a whole-house water filter system, or using a smaller water filter at the faucet. If you have a well, test your water.

20 Control pests using IPM, not more pesticides

Many homes have pest problems and it's not the fault of the homeowner or tenant. Use Integrated Pest Management, or IPM, which emphasizes tiered strategies to prevent pests. For example: remove clutter, trash, standing water, open food, and dirty dishes; properly identify and monitor pests; and control pest problems using physical traps, natural pest enemies, or targeted pesticides as a last resort. IPM has been shown to successfully control pest issues while minimizing the use of toxic pesticide chemicals.

21 Choose glassware and cast iron or ceramic cookware

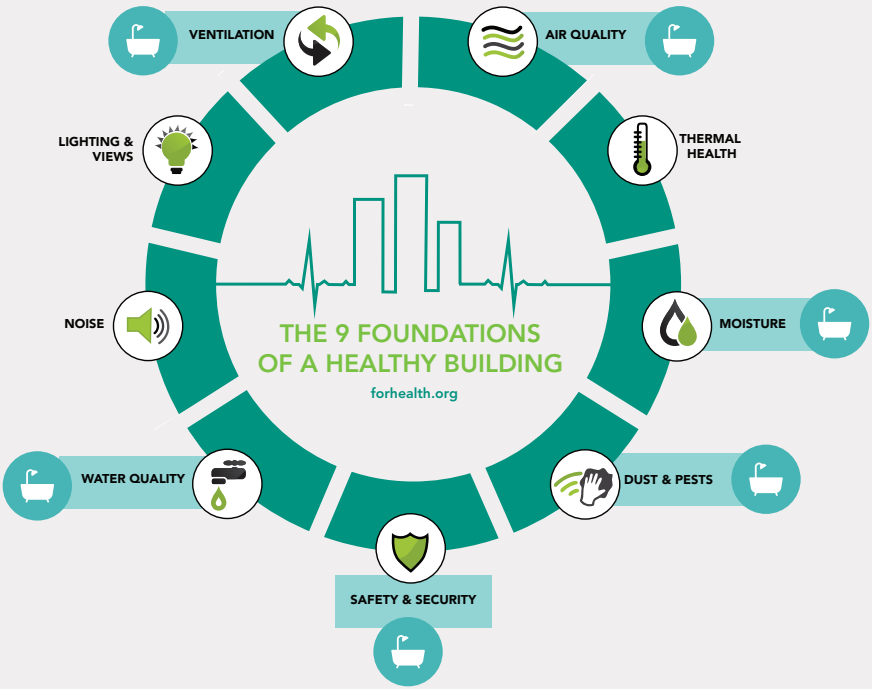
Life seems so much easier with lightweight plastic containers and easy-to-clean skillets. But the chemicals that make plastic so desirable and 'non-stick' pans so, well, non-stick, also make them harmful to health. Even kitchenware labeled free of a toxic chemical (heard of 'BPA-free'?) can have equally concerning replacements that leach into food. For a (chemically) healthier diet, choose glassware over plastic and cast iron or ceramic cookware over non-stick.

HOMES FOR HEALTH: BATHROOM

Did you know...on average adults use nine personal care products each day with 126 different ingredients?

We can't talk about being in the bathroom without talking about the number one public health recommendation – wash your hands. But don't let that be the end of your efforts in making your bathroom healthier. Our focus in Homes for Health is the physical environment in your home, so pay attention to these other expert tips that go beyond healthy behaviors like hand-washing.

Some of our recommendations for the bathroom, as you might have guessed, concern water. Like the basement, bathrooms are a place where humid conditions can lead to mold growth. And pooling of water can lead to slippery conditions. Our other recommendations address the chemicals in the cleaning products and personal care products we use. Some of these chemicals are toxic and there are safer product alternatives available. Remember, whatever you apply to surfaces in your home or your skin may end up getting inside your body.



5 EXPERT TIPS FOR YOUR BATHROOM

22 Control moisture by exhausting air outdoors

Showers and baths distribute small water droplets around the bathroom. If not exhausted to the attic or outdoors, this moisture can build up and remain on surfaces long after the shower, creating perfect conditions for mold growth and water damage to materials and flooring that are not properly sealed. To prevent mold, run your bathroom ventilation fan while using the shower and right after.

23 Limit the use of air fresheners

Plug and play air fresheners deliver a constant stream of VOCs (volatile organic chemicals) into the air. These chemicals are irritants. They can also react with ozone to create formaldehyde and other pollutants. If you're worried about odors, consider using a small spray bottle-type air freshener and limit use to times when it's really needed. Or even better, use the exhaust fan instead.

24 Detoxify cleaners and personal care products

Many surface cleaners can introduce VOCs into the air in your home. Look for effective green cleaners labeled as certified safer by a third-party organization like EPA Safer Choice, Green Seal, or ECOLOGO. Only use harsher disinfectants when and where you really need it, and avoid aerosol sprays. Your bathroom may also be loaded with personal care products – the average adult uses nine a day, with 126 unique ingredients. Fewer ingredients listed is always better – especially ones you can pronounce! Avoid phthalates (sometimes listed as 'fragrance') and parabens in ingredient lists. And take claims of 'green,' 'natural,' or 'non-toxic' with a grain of salt; these claims aren't regulated.

25 Skip the antimicrobials

Many products like soaps contain antimicrobials and are marketed with a health claim about killing microorganisms. Antimicrobial chemicals, such as triclosan and triclocarban, mimic your body's hormones and can be harmful to health. They may also contribute to antimicrobial drug resistance. The simple truth is that soap and water do just fine. In fact, Kaiser Permanente, one of the leading U.S. healthcare organizations, has banned antimicrobials in soaps and cleaning products. We think this means you can, too!

26 Prevent slips, trips and falls with handrails and non-slip mats

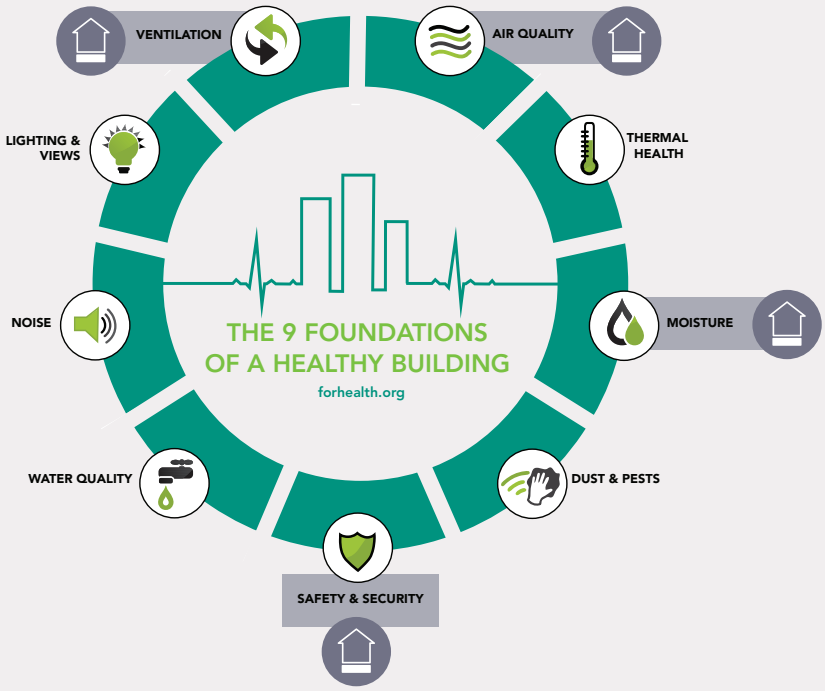
Falls in the bathroom remain a leading cause of injury, in particular for the old and young. (Falls are the #1 cause of death for older adults in the US.) Install non-slip mats in your shower and in the area where you step out of the tub or shower. Be sure your shower curtain prevents water from escaping and creating pools of water on the floor. Last, consider installing handrails in the shower and tub.

HOMES FOR HEALTH: BASEMENT

Did you know...radon is the second leading cause of lung cancer and it can seep into your house through the basement?

As a kid you were rightly scared of the basement, but it turns out you were scared for the wrong reasons! Basements don't harbor monsters, but they often do harbor some nasty environmental contaminants.

The basement is your first line of defense against vapors that like to penetrate into homes from the ground below – gases like radon and VOCs. The basement is also typically where combustion sources can be found. And any time there is a combustion source, you have the potential for releasing the silent killer – carbon monoxide (don't forget our recommendation on monitoring for CO in the whole home). Last, basements can be damp places, making them a terrific home for mold. So be brave, head to the basement and make sure no environmental monsters are lurking!



5 EXPERT TIPS FOR YOUR BASEMENT

27 Measure and control radon

Radon is the second leading cause of lung cancer after cigarette smoking in the US, killing 21,000 people each year. Most radon enters your house through penetrations in the basement foundation, and typically about half of the radon finds its way onto the first floor of your home. If you don't already know what the radon level is in your house, go find out. The tests are easy and cheap. If the levels are high, consider installing a passive or active radon mitigation system to help control indoor radon concentrations.

28 Do not disturb signs of asbestos

Mesothelioma is a lung cancer associated caused by exposure to asbestos. In industrialized countries, 20% of mesothelioma cases are attributable to non-occupational exposure to asbestos. Asbestos can be used in insulation, floor tiles, wallboard, and many other building materials. Because it can cause serious and irreversible lung disease, homes built after the 1970s typically have fewer asbestos products. Fortunately, asbestos fibers are only an issue when they're disturbed and released from the product into the air. In the basement keep an eye-out for asbestos around old boilers and pipes, and look for 8x8 inch floor tiles. Treat any damaged suspect material as 'possibly contains asbestos,' don't disturb it, and hire a professional to test and remediate, if necessary.

29 Dehumidify and inspect for signs of water issues

Basements are typically more damp than other areas of the home, and damp areas are a great environment for mold to grow. Exposure to mold is linked to cough, wheezing, and upper respiratory tract symptoms. Damp homes increase the risk of developing these conditions by up to 120%. Consider dehumidifying your basement to help control moisture in the air during humid months. Also, look for telltale signs of water damage like mold growth, water stains on walls and ceilings, or warping floor or wall boards. Most importantly, remember our first expert tip and "Trust Your Senses!" If you smell something 'musty' or 'moldy,' or if you see water staining or sagging paint, start looking for that water source and get it fixed, immediately.

30 Choose a hard floor

Water alone doesn't allow mold to grow – it also needs a food source. Carpets can trap moisture which when combined with embedded dust produces mold and mildew. In addition to being damp from moisture in the air, basements are prone to water damage from infiltration, pipe leaks and hot water heater and washing machine leaks. Choosing a hard floor surface minimizes places for mold to grow if you have excess water, and it's a lot easier to manage a leak event when you have a non-porous floor.

31 Solve the solvent storage issue

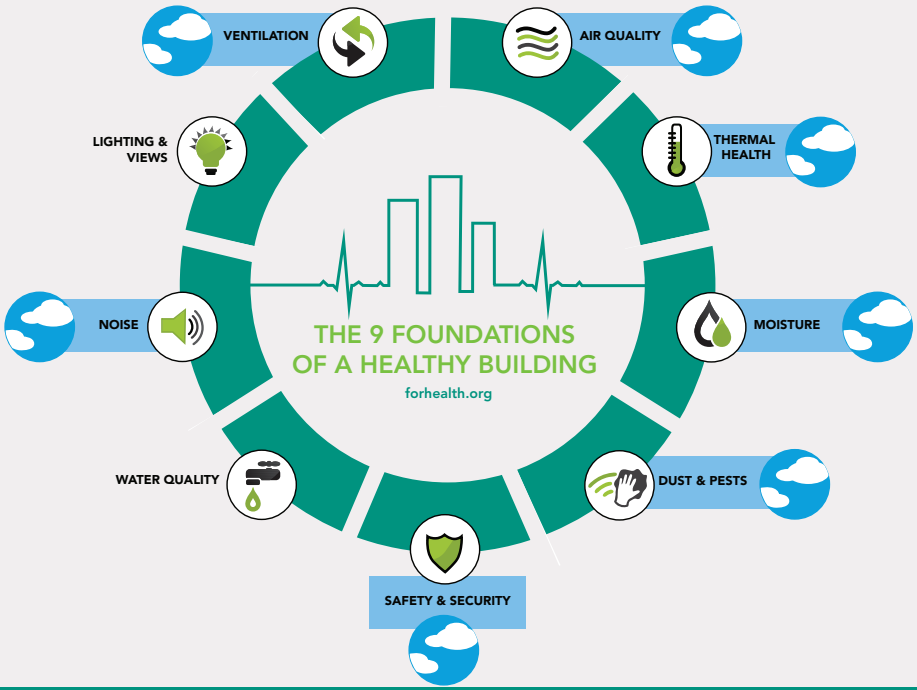
Placing leftover paint, paint thinner, gasoline or other solvents out of sight doesn't mean we are totally safe from them. In fact, these substances smell so strong to us because they contain chemicals that easily volatilize, and can make their way from the basement to the rest of the house. Infiltration from basements into living areas can account for up to 60% of volatile organic compounds (VOCs) present in living areas. Even when in a closed container they can be a constant source of harmful chemicals. In addition, many of these substances are flammable, making it a bad idea to have them nearby boilers and other home systems. Avoid having any kind of solvents (or other chemical storage) inside your basement.

HOMES FOR HEALTH: OUTSIDE YOUR HOME

Did you know...when our sense of security is threatened, it can trigger a cascade of 'fight or flight' responses that alter our physical and psychological functioning?

We spend the majority of our time inside our homes, but the stuff immediately outside our homes is important, too. For one, whatever is on the ground outside of our home, be it pesticides on a lawn or lead in the soil, can be tracked inside on our shoes (if you haven't yet looked, check out our recommendations for the whole house, which includes kicking the shoes off at the door).

And, while many people in the field of environmental health wouldn't consider 'safety and security' a key topic, we do. Here's why. There are obvious health concerns from acute security events (e.g., break-ins, assaults), but there are less obvious health concerns from chronic stress associated with feeling unsafe. In additional to security risks, there are physical hazards to contend with like swimming pools, the leading cause of accidental death for kids aged 1-4. So do as much as possible to take that worry off your plate and "secure the perimeter"!



5 EXPERT TIPS FOR OUTSIDE YOUR HOME

32 Ditch the pesticides and herbicides

Many pesticides and herbicides can be toxic. Glyphosate, one of the most widely used pesticides in the world, has been associated with a 41% increase of risk of non-Hodgkin lymphoma among the highest exposed group. Avoid or limit the use of the chemicals on your lawn and in your garden in order to keep your exposure low. This will limit how much gets tracked into your house on the soles of shoes.

33 Beware of air from attached garages

If you live in a house or apartment building with an attached garage, or an underground garage, be aware that the air in those spaces can sometimes infiltrate into your home. That means that exhaust from cars can find their way into your home, so don't let cars idle in the garage - exhaust from cars worsens asthma symptoms and may cause respiratory illnesses and heart problems. Diesel exhaust is ranked as a Group 1 carcinogen. For multi-family apartments, make sure garages have plenty of ventilation and air movement. Watch for pathways for that air to enter your home, like an air intake close to the ground-level or near the garage.

34 Secure the perimeter

There are many things you can do to improve the safety and security of your home. You can install motion-activated perimeter lights to shed light on activities around your home, check your locks and ensure deadbolts are installed on doors, or install a home alarm system. Security is also about protecting kids and seniors from hazards around the house. Make sure kids cannot access the pool or other dangerous parts of the home without supervision - drowning accidents are the leading cause of death and injury of children under 5 years of age in the US. More than 80% of the drownings occur in residential pools or spas. Last, keep walkways clear of debris to avoid trips and falls.

35 Tighten up your envelope

Many issues inside a house have their origin in the outer building envelope. Check that your roof has no leaks that could lead to water damage issues and future expensive repairs. Be sure to fix cracks and holes in outer walls that could become an open path to pests and unwanted drafts. Ensure that you have a proper vapor barrier under your house to limit vapor intrusion.

36 Be resilient

The word shelter is derived from the word shield – your home shields you from the elements. Make sure you have a plan to withstand the local natural phenomena that affect your region, and be mindful that new risks might arise from climate change. Have batteries, flashlights, and a radio to listen to emergency responder instructions. Plan on having enough water and food for any contingency. Follow the advice of authorities whenever you are told to evacuate your house, and know the evacuation routes. Take additional precautions based on your local area. In an area prone to wildfire smoke? If you're far enough from the fire hazard and trying to avoid smoke, cover small openings around exterior doors and windows, and consider having some air cleaning devices. In an area prone to tornados? Drill with your family the plan to reach your predefined safe space. You get the picture – be prepared.

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