house for clean living

ew cars literally make Barb sick. Off-gassing from new materials triggers her multiple chemical sensitivities (MCS), resulting in migraines and mild cognitive impairment. Barb also has an inherited condition called multiple epiphyseal dysplasia, which caused her joints to grow incorrectly and limited her adult height to under 5 ft. Repeated hip surgeries have helped her walk with less pain, and with occasional use of a wheelchair. She also has a scooter and vanlift for long journeys.

Barb and her husband Hans decided that a new home offered the best chance for chemical-free and accessible living. Under a doctor’s guidance, they embarked on a program to test construction products and choose the least disabling materials (see the sidebar on the facing page). At the same time, they contracted with McMonigal Architects to begin planning. Rosemary McMonigal recalls the couple’s wish list and its implications for the design:

- Promote togetherness, so that everyone uses the same path of travel.
- Let the sun shine in. Maximize daylight and natural ventilation.
- Plan for accessibility and adaptability as Barb’s needs change.
- Accommodate variations in user height, for both tall Hans and short Barb.
- Choose materials and finishes that do not trigger reactive symptoms.

A farmer’s porch connects the house (right) with the garage (left).
Rosemary chose an L-shaped layout to give all major living spaces windows on three sides. She centralized circulation using a scissor-type stair with an adjacent elevator, and she separated the garage and house to keep automobile fumes away from living spaces, linking both areas using a zero-step covered pathway for all-weather protection.

The environmental heroes in this house’s story are the building systems (heating, ventilation, cooling, plumbing, and electrical systems) and materials selection (nontoxic finishes, no-biocide paints in neutral colors, and galvanized metal). An air-to-air heat exchanger warms the exhaust air, tempering the make-up air entering the system from outdoors. With six control zones, the number of air changes per hour can be fine-tuned for days of high allergen content or for extra indoor humidity generated through cooking, showering, and other activities. There is a whole-house water filtration system to remove chlorine and other chemicals from showers, laundry, and cooking. A reverse-osmosis system cleans drinking water using pressurization to remove undesirable chemicals and biological contaminants. House heating is electric, as natural gas was one of the strongest environmental triggers of Barb’s MCS. Appliances and the domestic hot water heater are electrical as well.

At only 880 sq. ft. per floor, the house plan is compact, but well-designed details combine with a clean environment to meet all the homeowners’ needs. ♦

A TESTING PROTOCOL FOR CHEMICAL SENSITIVITIES

Many common building materials contain and release toxic chemicals that cause severe allergic reactions for those with MCS. Barb and her medical team developed a kinesiology protocol for identifying and avoiding these in construction. Paints, adhesives, laminates, and finishes were applied to materials to be used in the work, such as wood or drywall, and then either left in the open or placed in a closed jar for a period of time. Barb would open the jar and breathe the concentrated vapors, and her chiropractor would manually test her arm strength, both before and after exposure. Materials that caused any reduction in muscle strength were not used in construction. Two years of research paid off: The new home environment does not trigger Barb’s chemical sensitivities.
CASE STUDY 1
Accessible Prairie Style: the Wright Touch (pp. 97-102; and p. 39)
Architects: Frank Lloyd Wright Architects (original house); William Simpson, Architect, AIA, Orinda, CA; onndaaarchitect.com
Contractor: Keith Alward, Alward Construction, Berkeley, CA; www.alwardconstruction.com

CASE STUDY 2
Accessible, Adaptable, and Historic (pp. 103-108; and pgs. 23 [top left], 65 [bottom])
Architect: John Salmen, AIA, Universal Designers & Consultants, Takoma Park, MD; www.udconsultants.com
Historic specialist: Alan Abrams, Washington, DC
Kitchen designer: Jane K. Langmuir, Providence, RI

CASE STUDY 3
Urban Loft (pp. 109-113; and pgs. 11 [bottom right], 59 [left, right], 82)
Architect: Carol Sundstrom, AIA, röm architecture studio, Seattle, WA; www.romarchitecturestudio.com
Contractor: Thomas Jacobson Construction, Seattle, WA; www.thomasaaroncon.com
Accessibility consultant: Karen Braimayer, FAIA, Studio Pacifica; www.studiopacifica.com

CASE STUDY 4
Living Big in a Small House (pp. 115-120; and pgs. 10, 27 [left], 56, 57 [left], 70, 71 [left])
Architect: Carol Sundstrom, AIA, röm architecture studio; www.romarchitecturestudio.com
Contractor: George Piano, Phoenix Construction, Lake Forest Park, WA; www.mypicconstruction.com
Interior designer: Lucy Johnson, Seattle, WA
Accessibility consultant: Karen Braimayer, FAIA, Studio Pacifica; www.studiopacifica.com

CASE STUDY 5
Accessible Ranch House (pp. 121-124; and p. 66)
Architect: Acton Ostry Architects, Vancouver, BC; www.actonerychitects.com
Contractor: Heatherbrae Builders, Richmond, BC; www.heatherbrae.com

CASE STUDY 6
Low-Effort Living (pp. 125-130; and pgs. 31 [top left, top right], 51, 54 [top], 57 [right], 61, 68 [bottom], 75, 80, 81 [bottom], 85, 87 [bottom], 93 [top])
Architects: Jeffrey L. Day, AIA, Min 1 Day, Omaha, NE; www.linday.com;
Burks Toma Architects, Berkeley, CA; www.burksstoma.com

CASE STUDY 7
Accessible Farmhouse and Barn (pp. 131-135; and pgs. 9, 11 [top right], 14, 42 [top], 43 [left], 48, 77 [bottom], 81 [top], 87 [top, center])
Architect: John P. Gordon, AIA, Bucksport, ME; www.johngordonarch.com
Interior designer: Jessica Russell

CASE STUDY 8
Locating a Lift (pp. 137-139; and p. 24)
Architect: Catherine Roha, AIA, Berkeley, CA
Contractor: Keith Alward, Alward Construction, Berkeley, CA; www.alwardconstruction.com

CASE STUDY 9
Raised Loft (pp. 140-145; and pgs. 35 [bottom], 69 [bottom], 91 [top])
Architect: Lon Bothe, Studio C, Kansas City, MO (formerly G3 Collaborative)
Historic preservationist: Susan Richards Johnson & Associates, Kansas City, MO

CASE STUDY 10
Urban Infill (pp. 146-151; and pgs. 8, 12 [right], 73, 84 [bottom], 91 [bottom], 94 [top])
Architect: Emory Baldwin, AIA, Seattle, WA
Contractor: John Breier, Lakeland Builders, Milton, WA

CASE STUDY 11
House for Clean Living (pp. 152-153)
Architect: Rosemary McMonigal, AIA, MCMonigal Architects, Minneapolis, MN; www.cmmonigal.com
Contractor: Lufko, Inc., Cook, MN; www.lufkofinc.com
Accessibility consultant: Barb Gasterland, Rosemary McMonigal

CASE STUDY 12
Lakeside Cottage (pp. 155-159; and pgs. 31 [bottom], 49)
Architect, interior designer: Janis Herman, New York, NY

CASE STUDY 13
Universal Design in a Second Home (pp. 160-163; and pgs. 42 [bottom], 55 [top], 63)
Designer: Josh Sadie, Institute for Human Centered Design, Boston, MA; www.humancentereddesign.org

CASE STUDY 14
Bathroom for Mother and Son (pp. 165-167)
Designer: Stephanie Gilboy, Gilboy Interiors by Design, Nashville, TN
Contractor: Tallman Enterprises, Franklin, TN

CASE STUDY 15
Indoor-Outdoor Living (pp. 168-173; and pgs. 6, 18, 20 [bottom right], 35 [left, top, right], 54 [bottom], 83, 89)
Architect: LDA Architecture & Interiors, Cambridge, MA; lda-architects.com
Contractor: Monaco Johnson Group, Marblehead, MA; monaco-johnson.com
Interior designer: Kristen Rivioli Interior Design, Winchester, MA

CASE STUDY 16
Suburban Renovation (pp. 174-179; and pgs. 4, 7, 43 [right], 60, 65 [top], 74)
Architect: Pierce Lamb Architects, West Newton, MA; www.piercelambarchitects.com
Contractor: Gallagher Home Builders, Maynard, MA; www.gallagherhomebuilders.com
Interior designer: Rachel Reider Interiors, Boston, MA

CASE STUDY 17
A House that Grows with Its Owner (pp. 180-184; and pgs. 13 [right], 19 [center], 20 [left], 52, 55 [bottom], 67, 95)
Architect: Catherine Roha, AIA, Berkeley, CA
Contractor: Keith Alward, Alward Construction, Berkeley, CA; www.alwardconstruction.com

CASE STUDY 18
Modernist Chicken Coop (pp. 185-187; and p. 64 [top])
Architect: Lindsay Suter, AIA, North Branford, CT
Contractor: Pierce Builders, Granby, CT; piercebuildersinc.com
Lift installer: Bullock Access, Ellington, CT

CASE STUDY 19
The Visible Home (pp. 189-194; and pgs. 16-17, 25, 26, 37, 45, 47, 54 [bottom], 62, 88, 90)