



## Intel's Proactive Health Lab

*In 1999, Intel researchers began focusing on healthcare needs and how technology could address them. Three years later, Intel established its Proactive Health Lab, to explore new technologies that will help people to proactively manage their health and wellness, to prevent or delay the onset of disease. The Proactive Health Lab has evolved into the [Health Research and Innovation \(HRI\)](#) group, within [Intel's Digital Health Group \(DHeG\)](#), established in 2005 to begin developing platforms for proactive healthcare. Following is an overview of Intel's Proactive Health Lab—the foundation on which HRI was built.*

### Overview

Intel's Proactive Health Lab, opened in 2002, explored the ways in which ubiquitous computing can support the daily health and wellness needs of people in their homes and everyday lives. The lab employed social scientists who studied the needs of seniors dealing with physical and cognitive decline. In particular, the researchers focused on technologies that will help tomorrow's elderly population to age in place from wherever they and their families choose. These social scientists worked with Intel engineers to create prototypes of home health technology to test with real families. One goal of the Lab was to determine if proactive systems that anticipate a patient's needs could help prevent disease and foster independence as well as improve the quality of life for both patients and their caregivers.

The Proactive Health Lab focused on three types of research. First, ethnographic field research was conducted in people's homes to identify their needs, through observation and interviews. Then, field results were applied to develop and test early prototypes of future home systems that could help to meet the health needs of the entire household. Finally, outcome studies of more developed prototype systems were conducted to determine whether or not such systems lead to positive outcomes.

The complex problems addressed by Intel's Proactive Health researchers are beyond the capability of any one organization to solve. With that in mind, one of Intel's goals was to catalyze a research ecosystem of universities, industry labs, and government agencies to assist in this effort. Several organizations worked with the Proactive Health research team. Key collaborators included [Intel Research Seattle](#), the [University of Washington](#), the [Oregon Health and Science University \(OHSU\)](#), the [University of Rochester](#), and [Georgia Tech](#). In addition, ideas were exchanged and knowledge shared with other university, industry, and government researchers through conferences, workshops, and articles.

## Research Agenda

### Aging in Place

The goal of this research was to develop technology to assist the aging people in continuing to live meaningful lives at home.

- **Digital Home Technologies for Aging in Place**  
How can we deliver quality care to a rapidly growing population of older adults—historically the most expensive demographic to treat—while reducing the nation's healthcare costs? This solution can be enabled by a range of proactive computing technologies in the digital home enabling seniors to "age in place," maintaining their independence and deferring more costly institutional care as long as possible.
- **The Promise of Wireless Sensor Networks**  
The combination of social isolation, inactivity and failing nutrition is alarmingly common among today's aging population, but information technology may offer the means to counteract a harmful outcome. Intel has taken the initiative to invest in research and development of these sensor networks, recognizing this technology as crucial to addressing the pending global age wave and public health crisis.
- **Aging in Place Case Study: Helping the Elderly Age Gracefully at Home**  
This study focuses on approximately 60 households in four cities across the U.S. that are dealing with everything from mild cognitive impairment to the advanced stages of Alzheimer's disease.

## Projects

### Activity Detection Technology

Prototypes of smart homes were built and equipped with a network of sensors that track and monitor everything from cooking habits to purchasing activities to level and quality of physical movement. One potential outcome of this research is the early detection of the onset of dementia by monitoring changes in activity patterns and levels. A broader goal is to use the sensor data to build assistive technologies that support and enhance people's abilities to conduct normal daily activities, by providing an appropriate level of support without making people prematurely dependent on technology-based assistance.

### Caregiver Relief Technologies

Burnout is a major problem among the caregivers of people with cognitive or physical disability. The same sensor network used for activity tracking could allow a caregiver to take a nap or pursue other activities while the system monitors safety throughout the home. New communication technologies could allow remote households to participate in monitoring and, more importantly, provide social support from a distance. The goal is not to replace the caregiver with technology but to apply technology to ease logistical burdens, so the caregiver can spend more time engaging in meaningful activities with the people in their care.

### **Adaptive and Distributed Interfaces**

Efforts were also focused on adaptive and distributed interfaces to assistive technologies within the home. These interfaces would go well beyond the mouse-and-keyboard setup. The goal is to have a variety of interfaces-on telephones, televisions, PDAs or other electronic devices-distributed throughout the home, within easy reach of the person needing assistance. The particular interfaces used would depend on what is most familiar and comfortable for the person needing assistance. Longer term, the hope is to create interfaces that can assess the current level of a person's cognitive function and adjust to provide the appropriate level of assistance. Given the day-to-day variability of cognitive function in many households, one day the system may only need to remind a person to cook, while the next day it may have to provide detailed instructions on how to prepare a meal.

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