

Social Considerations in Ambient Healthcare Awareness

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Sharing health information with a social network is increasingly recognized as an important motivator in home healthcare. A look at the history of behavioral medicine – smoking cessation, treatment of alcoholism, and weight loss– show the success of social interaction and the formation of a community with shared treatment goals. Weight Watchers, Alcoholics Anonymous, and support groups for all kinds of problems revolve around a basic equation: one trades personal information (and a little privacy) for the support and positive competition provided by a social group. We believe ambient display of social information in the home is likely to increase the efficacy of support groups by removing temporal and geographic boundaries. Continual background information awareness could extend the positive social influences of a group between face-to-face meetings.

Wireless networks enable these communities to share information (weight, daily exercise, depression symptoms, etc.) at a distance. This increased transparency may be effective at motivating positive change, but many people report unease with sharing intimate information outside the controlled environment of a face-to-face meeting. Presenting highly summarized ambient information may help ameliorate these privacy problems. For example, sharing trends in data, rather than discrete numerical values protects confidentiality while still providing meaningful information to the intended audience. . In contrast, to someone unfamiliar with the source of the data or its context, a highly summarized display will be difficult to interpret.

Many health websites attempting to provide information sharing are frustrated that customers inconsistently use their web-based tracking tools. We at Ambient Devices suspect this is because most web-based interfaces are rather arduous, especially when connected through a slow computer and dialup connection. We believe that health metrics are most effective when sensed with minimal user intervention, and represented on a glanceable device integrated into the living environment. It is interesting to note that home barometers and thermometers, now frequently called 'weather stations', continue to be popular despite the availability of the same data from other sources: 24-hour weather channels on TV, automated weather alerts to an email inbox and customized forecasts by entering your zip code on the web. We attribute the appeal of "weather stations" to their glanceability, simplicity, and range of expressive, home-friendly designs.

A presupposition of the marketing industry is that exposure changes behavior. We have found ambient devices change their users' actions: an informal survey of several of the early adopters of our Stock Orb (which uses color to display information about the current state of the stock market or your portfolio) showed a 300% increase in online stock research. This finding is consistent with the forthcoming Mankoff et. al.[1]: which also suggests that ambient awareness of information changes behavior.

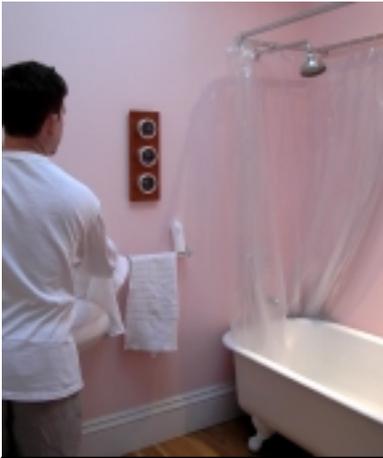


Figure 1: Design is important in health applications

We are currently involved in several projects exploring applications for healthcare-related ambient devices. We have initiated a relationship with several doctors at Massachusetts General Hospital (MGH), who believe in the power of ambient displays to motivate medication and exercise compliance. We are also working with a team of students at Boston College to understand the business potential for home health awareness devices. As part of this work, we are developing prototype “health dashboards” to display personal health metrics to both individuals and their social network. Examples include environmental factors such as air quality and pollen forecasts, body metrics like blood pressure and peak flow, and behaviors that influence health like steps walked today.

With a major pharmaceutical manufacturer, we are studying the utility of ambient information for persuasion at point of sale; a wireless pollen meter installed near the antihistamine medications displays realtime local pollen forecast. We are measuring the impact of this display on sales of allergy medication to determine at least one aspect of the behavioral effect of the information. This pollen meter will be installed nationwide in sixteen stores of a major drugstore chain, and if successful, rolled out across the country. If ambient displays influence consumers for marketing goals, it suggests the efficacy of such devices for non-marketing purposes such home healthcare. The same pollen meters may be sold directly in drugstores, given to allergists, and distributed as part of standard equipment in allergy-related medical practices.



Figure 2: Pollen meter displays current and projected pollen counts

Another application of ambient devices to support home healthcare is with The Asthma Project Working Group: medical and scientific experts on air quality from John Hopkins, MGH, Harvard Public Health, the EPA, and other researchers at MIT. The aim of the group is to deploy in-home air quality sensor units, and complimentary devices for displaying both in-home data (second-hand smoke) and larger, neighborhood-sized air quality sampling information (black carbon from diesel buses and major highways). Initially this study is concentrating on a neighborhood in Springfield, MA, which has the highest asthma morbidity rate in the state. Ambient displays may be able to make a large impact on an important problem. Cases of asthma are on the rise nationwide[2][3], and asthma medication compliance is low: 73% of asthma patients with prescriptions take less than the minimum recommended dosage.[4] This study is one of the first attempts to explore the problem of asthma in the context of the home, rather than the individual or the neighborhood.

We feel that work on ambient display of healthcare information requires a particular methodology for the design and implementation of devices, and feel that this workshop will provide an excellent forum to discuss the issues inherent in such design.

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[1]: Mankoff, J., Dey, A., Hsieh, G., Kientz, J., Lederer, S., Ames., M. Heuristic Evaluation of Ambient Displays. Proceedings of CHI'03.

[2] Sly RM. Asthma mortality, east and west. Ann Allergy 1992;69:81-4.

[3] Morb Mortal Wkly Rep 1996 May 3;45(17):350-353

[4] Voelker, Rebecca. Taking Asthma Seriously. Journal of the American Medical Association. 1997;278:11.