HOME HEALTH CARE

opportunities and recommendations

J.A.M. Graafmans

Paper presented at the World Congress of Gerontology
The XVth Congress of the International Association of Gerontology
4-9th July 1993 Budapest, Hungary
HOME HEALTH CARE, OPPORTUNITIES AND RECOMMENDATIONS

Jan A.M. Graafmans
Center for Biomedical and Health-care Technology
Eindhoven University of Technology
P.O. Box 513, 5600 MB Eindhoven, the Netherlands
Tel. # 31-40-472008, Fax. #31-40-443335

Introduction
More than 10% of the total research capacity of the Eindhoven University is
directed toward the field of biomedical and health care technology. Research in
this field forms an important element of the profile of the university. The related
research is concentrated in the following programmes:
- perception and technology, user interfaces, information ergonomics
- technology for vital human functions
- industrial engineering applications
- architecture and urban planning
- mathematics and computer science.

The Center for Biomedical and Health-care Technology puts a strong emphasis
on the development of new research and educational programmes using a
survey approach that is similar to Constructive Technology Assessment (CTA).
Recently developed are programmes in:
- Gerontechnology
- Healthy Housing.

The activities in this field are multidisciplinary. Interactions always enclose three
general domains: Health-care, Industry and University.

The Center participates in networks on a national level, within the EC (BIOMED)
and within the EFTA countries (COST)

Home health-care technology
It is evident that there are substantial possibilities for product development and
marketing for medical care and self-care in the home. In our definition, home
care is "looking after patients in a non-institutional environment" or preferably
"be able to take care of yourself at home".

To provide home-care you need:
- an acceptable home environment
- adequate support for the individual (in need) and for those providing care.

It is beyond the scope of medicine or any other single discipline to secure appro­
priate homes and support. Therefore, is requires input from many disciplines,
among which technology has much to offer, in order to realize the provision of
such support. However, the emergence of technical products with which to
support home care has been haphazard, fragmentary and sporadic. There is a
need for a more systematic approach to:
- the identification of needs and preferences
- the specifications of devices and systems to meet those needs
- the prototyping, early evaluation and refinements of such devices/systems
- the exploitation of relevant markets
- the instruction and training of professionals and consumers.
Similar approaches have been suggested by Czaja (1990) and the European Science Foundation (1991). Clinicians, paramedics, academics and industry must have one or more loci for multidisciplinary interactions, where they can jointly develop products for this undoubtedly expanding area of opportunities; opportunities for better care for individuals and for business and industry.

A few trends and problems emerge in the home health-care market. A major factor that hinders growth in the area of home health-care products is the fragmentation of industry. It is hard to get a firm grasp on the market, mainly because of the many and ever-changing methods of reimbursement and due to the non-institutional setting of home-care. Manufacturers of home care products do not have uniform rules and procedures and the health-care industry is represented by a number of different trade organizations or branches. Then there is the fragmentation at the distributional level which raises questions about the most adequate route for selling home health-care products: pharmacy, home health agency or mass merchandiser?

Some current trends are:

**New distribution channels**
Many overlapping distribution channels show up. For example, hospital supply wholesalers are expanding into the retail market. Industry marketers believe that manufacturers will begin to make products available at the wholesale level to pharmacies or even to supermarkets, and medical/surgical dealers will branch out further into home care products. The development of fully equipped home health centers is also expected.

**Mass merchandising**
Home care products get more and more interest from mass merchandisers. In the USA Montgomery Ward and Sears are making moves in this direction. In the Netherlands, Vendex International shows initiatives. But also small and medium enterprises are becoming active. In Japan, 50% of the home care products is bought by the users themselves (Kaihara, 1990). This percentage might differ from other countries due to differences in culture and legislation. The private market in Europe is still smaller than in the USA.

**Big or small enterprises**
Health economists see a trend in home care that is similar to the situation in hospital supply by the pharmaceutical industries. It is the consolidation of distribution and manufacturing with only a few big companies emerging as strong competitors.

**Marketing strategies**
Manufacturers must decide whether these products fall into the home care or self-care category. They will have to determine whether the dominant buying influence is the paramedic, the hospital discharge department or the consumer. Some believe that it is the home care nurse who is the most influential in the buying decision. This can be true for home health agencies. More than 80% of the home health care nurses believe that they are the principal influence on what and where a home care patient buys.
A possible creation of a new market then might be a technical and human factors training for nurses.

Problems and opportunities
Some problems of the elderly are of a big magnitude and threaten independent living. On the other hand there are technological developments that might sustain autonomy or quality of life.

Urinary incontinence, not a disease but a symptom of a whole range of disorders affects about 60% of the population. Only 7% receives some professional help. Incontinence can often be cured, often alleviated, but always managed. Some technologies emerge that can help improve this situation (Cottenden, 1990):
- materials technology (super absorbent polymers)
- production technologies (thinner products, faster production)
- consensus on product performance standards.

Decrease in mobility and manipulation skills is the first and biggest cause of loss of independence. Although early attempts to use robotic aids in health-care failed, the availability of new technology will overcome problems such as: safety, user friendliness, operation in chaotic environments and even de-personalization. Already in existence are:
- a guide robot for visually handicapped (Japan)
- sensor guided wheelchairs (Scotland)
- patient handling robot (UK)
- wheelchair or table-top mounted robotic arm.

Expected are:
- a free ranging domestic robot in a normal house
- speech controlled robots.

For robotics the success will depend on the quality and the effectiveness of the interfaces. This is vital for the success of the product as well as for the quality of life of the user. Until now, the single purpose-built robotic products, like a toothwasher or a bowel irrigation system, seem to be the most successful approach.

Home care technology is not necessarily high-tech. A number of diseases cause eyeproblems. Some cannot be cured but if the eyes are medicated properly, they remain in good shape for a long time. There are many reasons why people cannot drip their own eyes (tremor, fear, arthritis) and need (professional) help. The problem was recognised by the Students Scientific Consultancy Shop of the Eindhoven University and after a survey that revealed the magnitude of the problem and the possible market behind that, an eye-drip aid was designed. The evaluation using 20 formerly dependent was positive in all aspects. The development of products like the eye-drip aid might be even more attractive for the home health-care market than most of the high tech examples as mentioned before. The only prerequisite that has to be met, however, is a more technology oriented group of caregivers, or an active participation of designers, engineers and ergonomists in caregiving processes. The creativity and concern, present in all these professionals, should be encouraged.
Statements and recommendations
The Center for Biomedical and Health-care Technology of the Eindhoven University carried out a survey for the Dutch Ministry of Economic Affairs. The objective was to identify possibilities for innovative projects in the domain of home care and self-care (Heijnen, 1991).

Three areas of interest were selected:
- adaptation of hospital-based technology
- alternatives for the "hotel" function of institutions
- support for or substitution of home care as delivered by care professionals.

As far as adaptation of intramural technology is concerned, a number of diagnostic and therapeutic interventions is already being transferred to the home (dialysis, pain treatment, etc.). A further growth is expected towards other therapies and diagnostics.

Until now, a lot of activities such as nursing, caring, and physical therapy are combined with a stay at a nursing ward of a hospital. It is disputable whether this is always necessary. Some of these activities are routine and they can be transferred to the home environment when appropriate technical support and service are available. Home care is provided by professionals or partners. It is conceivable that some help in the home situation is also routine and could be made unnecessary if adequate over-the-counter products were put in the hands of the patient.

About 30 site-visits to experimental home care projects and discussions with researchers, companies and care professionals resulted in 12 statements given here as input for discussion.

Cost-benefit, cost-effectiveness
Home care is important. The magnitude, complexity and diversity make it hard to define the best strategy to put into operation efficient and effective home care. Large investments are made in home care projects. However, technological aspects do not receive enough attention. There is not much coherence between projects, nor much mutual exchange of information. The cost-effectiveness of all this effort should be improved. It is recommended that a supranational platform be established to achieve this goal. Tasks of the platform could be co-ordination, "brainstorming", progress control, knowledge and information transfer, development of an expertise centre and international collaboration.

User orientation
The development of home care should be oriented to the patient and his or her situation. Identification of patient problems and needs must have the highest priority. Projects could be aimed at solving problems of a given individual in a given home environment.

Categorization
Efficiency demands a certain scaling-up based on categorization of problem areas. This categorization should be related to function and user related (act-utilitarian approach as opposed to rule-utilitarian approach).
To meet the criteria for this function relation, a division in four main target groups is suggested:
- patients who are chronically ill or handicapped
- patients who are temporarily ill or handicapped
- patients who are terminally ill or who have a progressive disease
- elderly.

As far as the technological aspects of home care are concerned, these target groups cluster a number of similar technical problems. This is a fact for the degree of technical complexity, as well as for the organizational/infrastructural problems that arise with the necessary complementary care and financing.

Networking
Networking of companies that could be active in the delivery of total packages of home care products plus additional services is necessary. It is not only the medical technology industry per se that participates in these networks.

Product = product and care
Companies that participate in home care projects must not only be capable of product realization, but should also be responsible for providing the necessary care system that comes with the products. It is obvious that existing healthcare agencies could be incorporated into this proposed system.

Turn key delivery
Some product innovations are mostly changes in concepts of care and service delivery systems. A total package of home care products plus additional care and service includes:
- instruction, training and manuals for the introduction of products and services
- guarantees, maintenance, routine checks and liability laws
- safety and user-friendliness criteria
- round-the-clock accessibility and service
- additional support for medical, paramedical and technical staff.

Project development
Each new project should incorporate the full size of an underlying problem. This implies that within each project equal attention should be paid to all phases until completion. This includes steps from problem analysis to technical realization, to assistance with introduction and evaluation. Each project should be:
- matched with other projects on a national level (Collins, in press)
- aimed at a specified target group (Czaja, 1990)
- clear in its technical complexity (Czaja, 1990; Drost, 1989)
- specific in its demands concerning the need for additional infrastructure for service and care (European Science Foundation, 1991; Graafmans 1989).

Low tech
It is recommended that the highest priority should be given to development of products that support or substitute the home care that, until now, is delivered by care professionals.
Characteristic for this category of products is that they combine technical complexity with "user-friendliness", high reliability and a low price. These over-the-counter products are typically designed for non-professional users. Some examples are pregnancy-test, eye drip aid and blood pressure meter.

Adapted technology
Much is expected if alternatives to the "hotel" function of hospitals are developed. Therapeutic and diagnostic techniques are often carried out in hospitals because of the medical technology that is available there. When this technology is adapted for and transferred to the home environment, a lot of additional care and service is necessary. Through improvement of product design, most of this extra care might become superfluous or could be left to professionals and partners with less training.

High tech
Until now most attention has been given to the adaptation of hospital-based technology. The results are not astounding, although many medical technology industries have put great effort in this area. Some "high tech" treatments can be realized in the home environment, but the high complexity of the additional infrastructure and feelings of fear by the patient, justified or not, cause a shift back to in-hospital treatment.

Consumer technology
Home care technology is totally different from hospital-based technology. Products designed for hospital use are, even after adaptation, rarely successful in the home environment. Home health care products demand a conceptual design on their own.

Training and education
More emphasis should be put on technical and ergonomic training and education of health-care professionals. It is recommended that a new function in home care is introduced: the technical therapist.

References and recommended reading
Collins, S., Rabbitt, P.
Age & design for new technology.
Research Center, University of Manchester, Manchester, U.K. (in press).

Cottenden, A.
Continence care.
In: CEST-conference presentation material.
Home-care, the health-care market opportunity for the 1990's.

Czaja, S. (ed).
Human Factors Research Needs for an Aging Population.
Drost, I.J.E.
The helping hand, simple devices for the elderly. (in Dutch).

European Science Foundation.
Draft proposal for a scientific network on communication and handicap.
Strasbourg, April 1991.

Graafmans, J.A.M., Brouwers, A.
Gerontechnology, The modelling of normal aging.

Heijnen, M.C.G., Graafmans, J.A.M.
Home health-care technology. Reconnaissance of qualitative criteria for the
review of developments in home health-care technology.

Kaihara, S.
Medical Systems for Home and Community Care; Japanese Experiences.
In: CEST-conference presentation material.
Home-care, the health-care market opportunity for the 1990's