

Self-care, the need for over-the-counter products

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**SELF-CARE, THE NEED FOR
OVER-THE-COUNTER PRODUCTS**

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INTRODUCTION

An ample 10% of the total research capacity of the Eindhoven University is directed towards the field of Biomedical and Health Care Technology. Research in this field forms an important element of the profile of the university. It is mainly concentrated around the following research programs:

- perceptive information processing in interaction with equipment and software;
- technology for vital human functions;
- nuclear medical technologies;
- industrial engineering applications;
- building and architecture;
- mathematics and computer science.

The Center for Biomedical and Health Care Technology (BMGT) puts a strong emphasis on the systematic development of new research programs using a reconnaissance approach that is best characterized as prospective technology assessment.

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

Currently under development are research programs for:

- gerontechnology;
- information ergonomics.

The Center participates in networks on a national level, within the EC (European Committee) and within the EFTA countries.

HOME HEALTH CARE TECHNOLOGY

It is evident that there are substantial possibilities for product development and marketing for medical home-care and self-care. In our definition home-care is "looking after patients in a non-institutional environment" or preferably "the ability 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 those providing care.

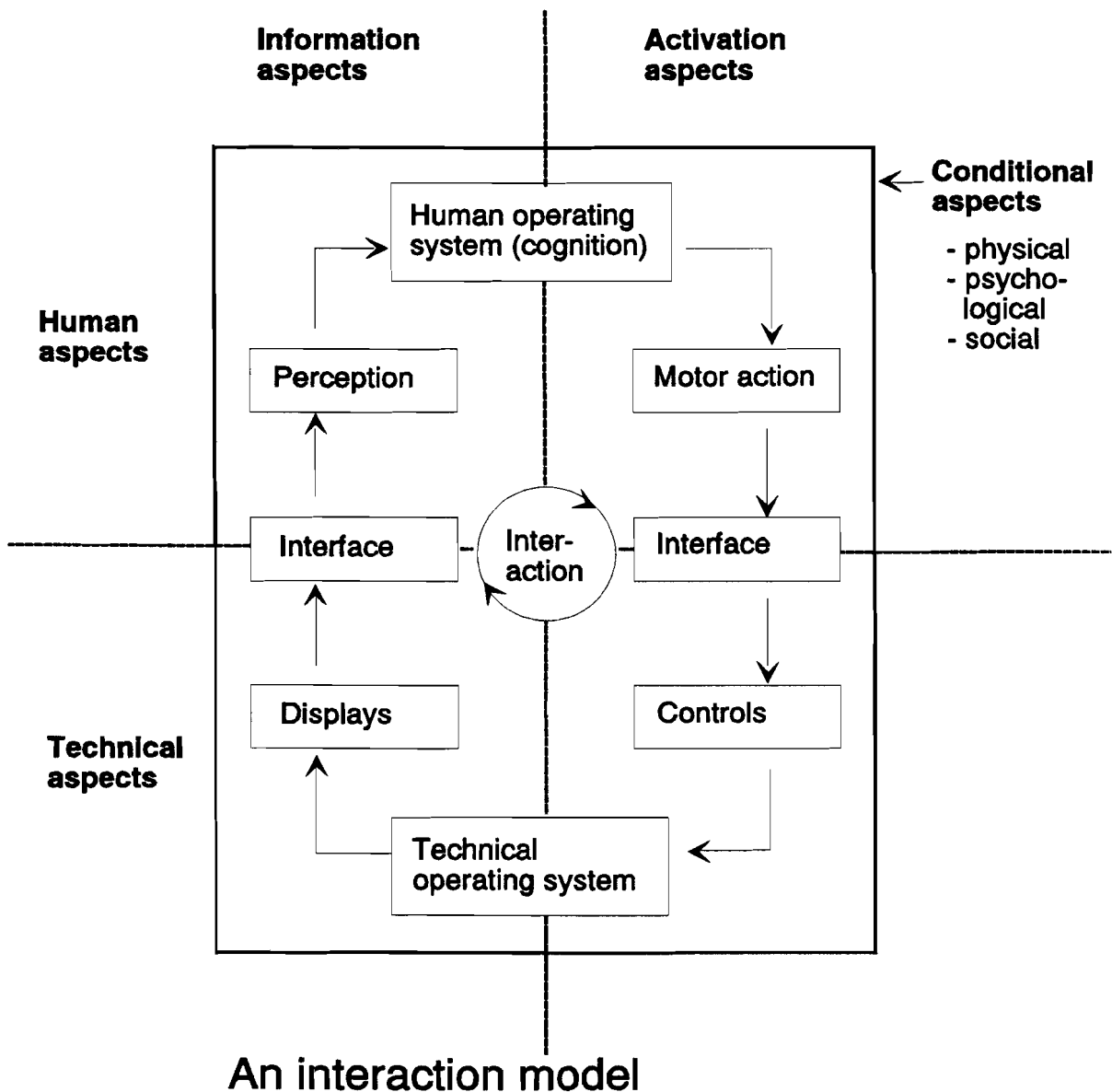
It is beyond the scope of medicine or any other single discipline to secure appropriate homes and support, therefore it requires input from many, among which technology has much to offer in facilitating provision of such support.

However, the emergence of technological 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;
- the specification of devices/systems to meet these needs;
- the prototyping, field testing and refinement of such devices/systems;
- the exploitation of the relevant markets;
- instruction and training of professionals and consumers.

Similar approaches have been suggested by Czaja (Human Factors Research Needs for an Aging Population, National Academy Press, Washington D.C., 1990) and the workshop "Communication and Handicap" of the European Science Foundation (Strasbourg, F, 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.



Before getting into details, a few observations on emerging trends in the home health-care market: A factor that hinders growth in the area of home-care products is the fragmentation of industry. It is difficult to get a firm grasp on the industry mainly because of the many and ever changing methods of reimbursement and 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. This again stresses the importance of setting up experiments (loci) with active participation of all parties involved.

Then there is fragmentation at the distribution 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:

- Many overlapping distribution channels are developing. 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 supermarkets, and medical/surgical dealers will branch out further into home-care products. A strong movement towards the development of fully equipped home health-care centers is also expected.
- Mass merchandising
These product lines get more and more interest from mass merchandisers. In the U.S.A. for example one sees Montgomery Ward and Sears making moves in this direction. In the Netherlands it is Vendex International that shows initiatives towards this market. But also small and medium enterprises such as Linido are becoming active in this area. In Japan 50% of the equipment/products for home-care is bought by the patients themselves (ref. S. Kaihara, proceedings CEST-conference, 1990, London). This percentage might differ from other countries due to differences in culture and legislation. Europe is different from the USA with mostly limited retail/private market.
- Big or small enterprises
A number of health economists see the beginning of a trend in home-care that is similar to the trend that has already occurred in hospital supply and pharmaceutical industries. It is the consolidation in 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 (nurse), the hospital discharge department, or the patient/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. An agency nurse may supply an initial catheter or disposable supply item and at that time the nurse generally advises where replacements can be obtained (pharmacy, home health center or surgical supply dealer). More than 80% of home health-care nurses believe that they provide the principal influence on what and where a home-care patient buys. A possible niche in the market is the technical and human factors training for nurses.

SERVICES TO SUSTAIN INDEPENDENT LIVING (SOME EXAMPLES)

Urinary incontinence

Urinary incontinence is characterized by the involuntary escape of urine to a degree that imposes a socially or hygienically unacceptable situation to the individual. It is not a disease but a symptom of a whole range of disorders. About 6% of the population is more or less severely affected. However only 7% of this group is reached by some professional help. This assumes a large hidden, but silent, market that is thought to be mostly present in the female age groups 40-60. Incontinence can often be cured, usually alleviated, but always managed. The individual assessment is of vital importance. No large advancement is expected in surgery or other therapy, on the other hand, there is continuous development of pads and appliances (There are about 170 different disposable absorbent products that account for approximately 70% of the market). The most important design criteria for pads are: discretion, dry/-wet comfort, normality, no smell, fixation, skin friendliness, low leakage, price, cost-effectiveness, environmental issues. Emerging technologies are:

- New materials (super absorbent polymers).
- New production technologies resulting in thinner products and faster production.
- Consensus on product performance standards.

The commercial trends that show up are:

- Environmental pressures (pollution, biodegradation, composting, recycling).
- A shift to re-usables.
- More emphasis on total service.
- Growing retail activities.
- More collaboration resulting in acquisitions, joint ventures and globalization.

The marketplace will develop in it's own way because of a gradual erosion of taboo, installment of self help groups and a growing co-ordination that leads to increasing expertise and better product evaluation studies (ref. Cottenden, 1990).

Robotics

The first industrial robot (1961) was a disappointment for those who anticipated a future with co-operative androids. Since then robots have improved and public perception has come closer to reality. Some distance from the original science fiction dream still remains. More advanced robots have two distinct characteristics: They are autonomous and designed to work in unstructured environments. Intelligent, mobile manipulators of considerable dexterity result from improvements in sensor technology and computer processor power. We are coming closer to virtual reality. Early attempts to use robots in health-care failed (threatening, de-personalizing, difficulties with the chaotic nature of the environment, safety concerns, unfriendliness of the human-robot interface, high demand on computer literacy). The availability of new technology overcomes these problems to a great extent. Robotic aids to support independent living are becoming realizable.

Robotic aids:

- will provide extended independence;
- are cost-effective compared to institutional care;
- enhance vocational prospects;

- support education and training for the young disabled.

In the past, robotic aids to daily living were designed for a low price-range because potential buyers were (and are still) unlikely to have a high discretionary income due to their age or condition. This resulted in a small number of low-tech robots with limited help in tasks such as page turning or controlling audio equipment. The sales of such robots was and is negligible due to limited usefulness and the existence of simpler aids that do the same job more cheaply.

Expensive aids, however, can become cost-effective if they are designed to create extra hours of independent living. If a user is provided 8 hours of independent living, this aid removes an entire shift of caring staff. In terms of saving in residence costs of institutional care this means approximately \$ 40,000. per year. There are a series of independence thresholds above which increasingly expensive aids become cost-effective.

Health-care robots can be divided in a number of different ways. For the scope of this workshop medical and surgical applications are ignored. The focus will be on rehabilitation robots in two main categories: aids to increase mobility and aids for daily living.

Mobility aids include:

- the guide robot for visually handicapped (Japan);
- sensor guided wheelchairs (Edinburgh);
- patient handling robot (UK, expected in 1993).

Robots to assist daily living are aimed at substitution or support of manual functions. Fixed robots (table-top or wheelchair mounted) are among others developed in the Netherlands (MANUS). More autonomous are mobile robots/domestic assistants.

Features that can be expected within 5-10 years are:

- free ranging in a normal house as opposed to following fixed tracks;
- speech controlled.

It is obvious, that the market for these robots is beyond the health-care market (hotel-room fetch-and-carry tasks, domestic robot for household service, etc.).

Europe is the better place for the development of this market for a number of reasons:

- the number of elderly in Europe is at least twice as much as in the U.S. (over 60 Million compared to 30 Million);
- current technical and research pole position in medical/health-care robotics;
- lesser risk of vexatious and frivolous litigation.

Some technical and legal problems remain to be resolved, especially with regard to man-machine interface optimization and safety validation. The effectiveness of interfaces, - whether it concerns the control or the display functions - ,will be of vital importance for success of the product (robot) as well as for the quality of life of the user.

Robots and manipulators will not be the factotum to conserve independence. They can be used amongst other assistive technology preferably single purpose-built for one function at a time like a tooth washer or a bowel irrigation system (currently in use in the U.S.). Maybe the most important rule of thumb is: Match the device very carefully with the user.

Eye-care

Not all products in the home-care market are necessarily high-tech. It might even be that much more independence/quality of life/comfort can be achieved through very simple devices. Devices that can assist in routine daily activities that become more prevalent and necessary when we grow older.

A very illustrative example is taking care of the eyes. A number of diseases cause eye problems that cannot be cured, but when the eyes are medicated properly, they remain in good shape for a long time.

Dripping the eyes with special fluids is one of the treatments, necessary after surgery and often required indefinitely. There are many reasons why people cannot drip their own eyes (tremor, fear, arthritis) and therefore need the assistance of a partner or even a care professional. For people in remote areas it is considered a contra-indication for eye-surgery when they are not able to do so themselves or do not have access to post surgery eye-care.

This problem was recognized by the Students Scientific Consultancy Shop of the Eindhoven University. After a survey that revealed the magnitude of the problem and the possible market behind that, an eye-drip aid was designed with the following characteristics:

- positioning : possible for left and right eye;
- dose : one drip at a time;
- universal : every eye-drip bottle fits;
- operation : one-hand, no instruction necessary;
- price : approximately 50 US \$ (mass production).

Evaluation studies proved (20 dependant subjects) that the eye-drip aid functioned in all trials.

The development of products like the eye-drip aid might even be 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 fulfilled however is a more technology-proneness of care givers and/or an active participation of designers, engineers, ergonomists in care giving processes. The creativity and concern present in all these professionals should be encouraged. Their encounter on the work floor where the daily action is going on will solve a lot of problems that many of us have to face one day.

STATEMENTS AND RECOMMENDATIONS

The Center for Biomedical and Health-Care Technology of the Eindhoven University was granted a project by the Ministry of Economic Affairs to carry out a survey on home health-care technology. The objective of the project was to provide suggestions for stimulation of innovative projects in the domain of home-care/self-care.

The basic directives for the project were:

- identification of niches in available knowledge and in the organizational and economic constraints;
- criteria for stimulation of activities;
- criteria for synergetics in the various projects;
- management strategies for successful innovations.

In summary: The reconnaissance of qualitative criteria to assess developments in home health-care technology at an early stage (ref. Heijnen, Graafmans, 1991).

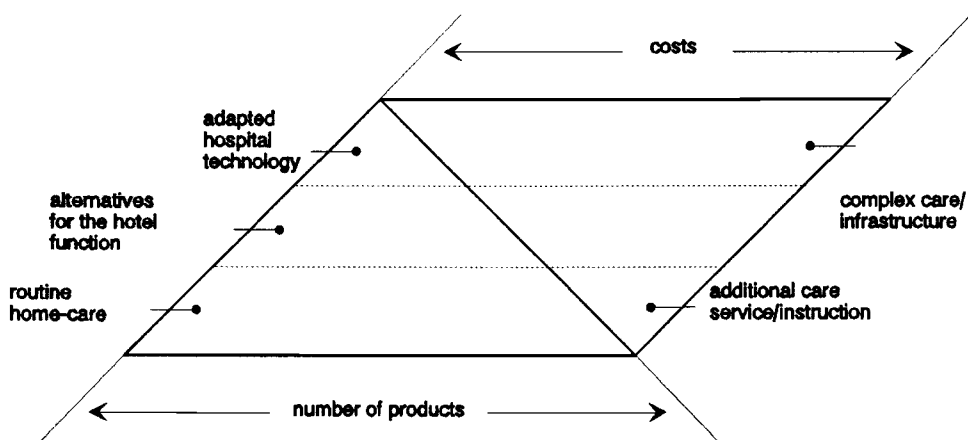
At the start of the survey three areas of interest were selected:

- Adaption of hospital-based technology;
- Alternatives for the residence function;
- Support for, or substitution of, home-care as delivered by care professionals.

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

Currently a lot of activities (nursing, caring, 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 could be transferred to the home if appropriate technical support and service were 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/consumer.



Areas of interest in home health-care technology

The following statements and recommendations are based upon approximately 30 site-visits to experimental home-care projects in the Netherlands and discussions with researchers, companies and health-care professionals. They are given here as input for discussion in the working groups.

1. Home-care is important. The magnitude, complexity and diversity make it hard to define the best strategy to operationalize efficient and effective home-care. Large investments are made in home-care projects, however, technological aspects do not get 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 (supra)national platform be established to achieve this goal. Tasks of the platform could be: coordination, inventarization, progress control, knowledge and information transfer, development of an expertise center, international collaboration.

2. The development of home-care should be patient and situation oriented. Identification of patient problems and needs must have the highest priority. Projects should be aimed at problem solving for a given individual in a given home environment.
3. Efficiency demands a certain scaling-up based on categorization of problem areas. This categorization should be function and user related (act-utilitarian approach as opposed to rule-utilitarian approach). To meet the criteria for this function relation a division into four main target groups is suggested:
 - chronically ill patients and handicapped;
 - temporary patients;
 - progressive diseases/terminal patients;
 - 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 the financing.
4. Networking of companies that could be active in the delivery of total packages of home-care products plus additional service is necessary. It is not only the medical technology industry per se that participates in these networks.
5. 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 health-care agencies could be incorporated in this scheme.
6. 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;
 - guarantees, maintenance, routine checks and liability rules;
 - safety and user friendliness criteria;
 - round-the-clock accessibility/service;
 - additional support of (para)medical and/or technical staff.
7. Each new project should incorporate the full extent of an underlying problem. This implies that within each project equal attention should be paid to all phases until realization. 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 (see 1);
 - aimed at a specified target group (see 3);

- clear in it's technical complexity (see 3 and 4);
 - specified in it's demand for the need of the additional infrastructure for service and care (see 5 and 6).
8. It is recommended that the highest priority should be given to the development of products that support or substitute the home-care that is presently delivered by care professionals. Characteristic of 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 (pregnancy test, eye-drip aid, blood pressure meter, canes, etc.).
 9. A lot is expected if alternatives for the residence function of hospitals are developed. Therapies and diagnostics 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/partners with less training.
 10. Until now most attention has been given to the adaption of hospital based technology. The results in this area are not outstanding, in spite of the fact that many medical technological 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 of the patient, justified or not, cause a shift back to in-hospital treatment.
 11. Home-care technology is totally different from hospital based technology. Products designed for hospital use are, even after adaption, rarely successful in the home environment. Home health-care products demand for a conceptual design of their own.
 12. More emphasis should be put on technical/ergonomical training and education of health-care professionals. It is recommended that a new function in home-care is introduced: the technical therapist.

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