

Perspectives on Chronic Diseases – needs, technologies and priorities

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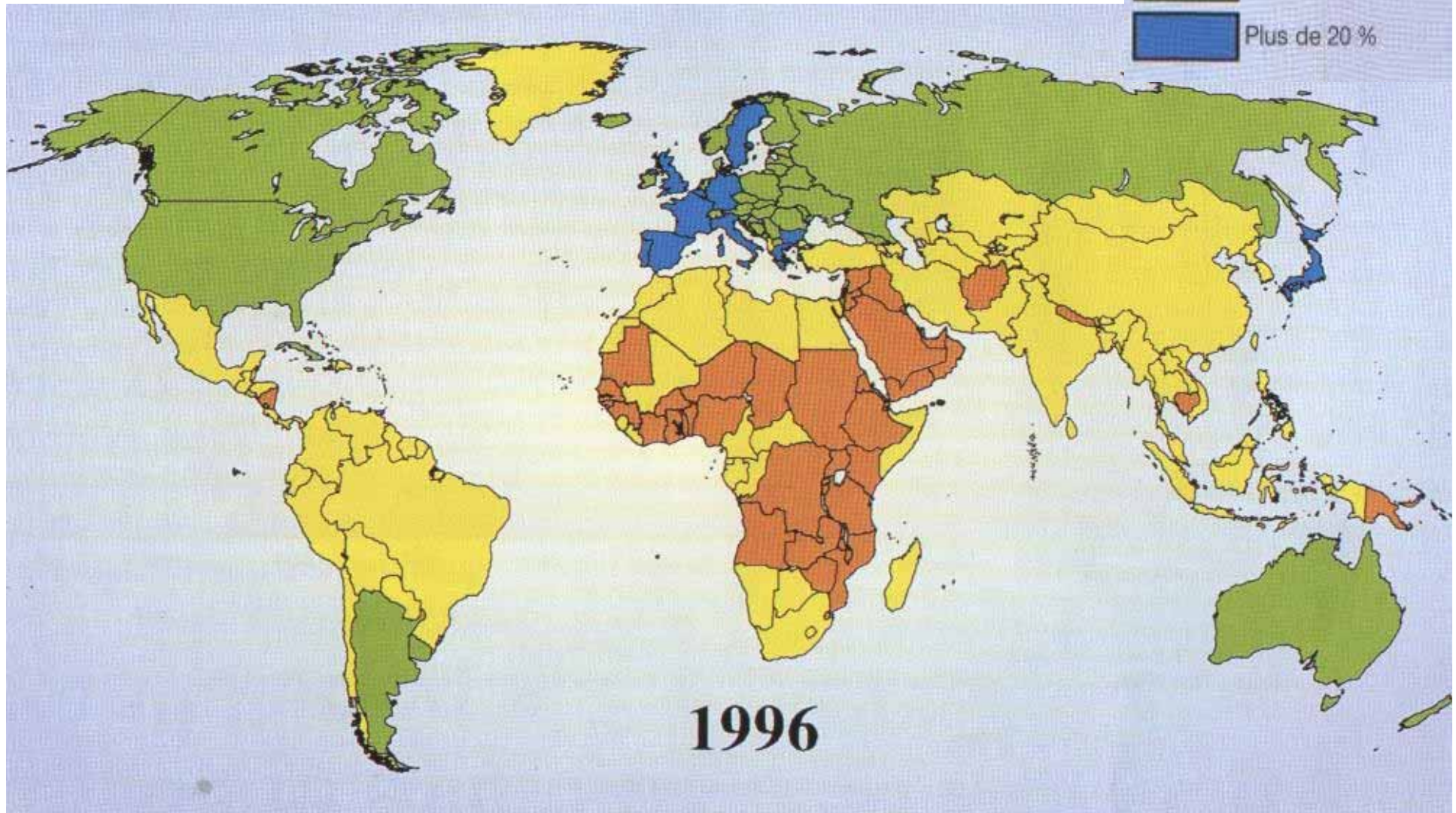
CNRS UMR5525



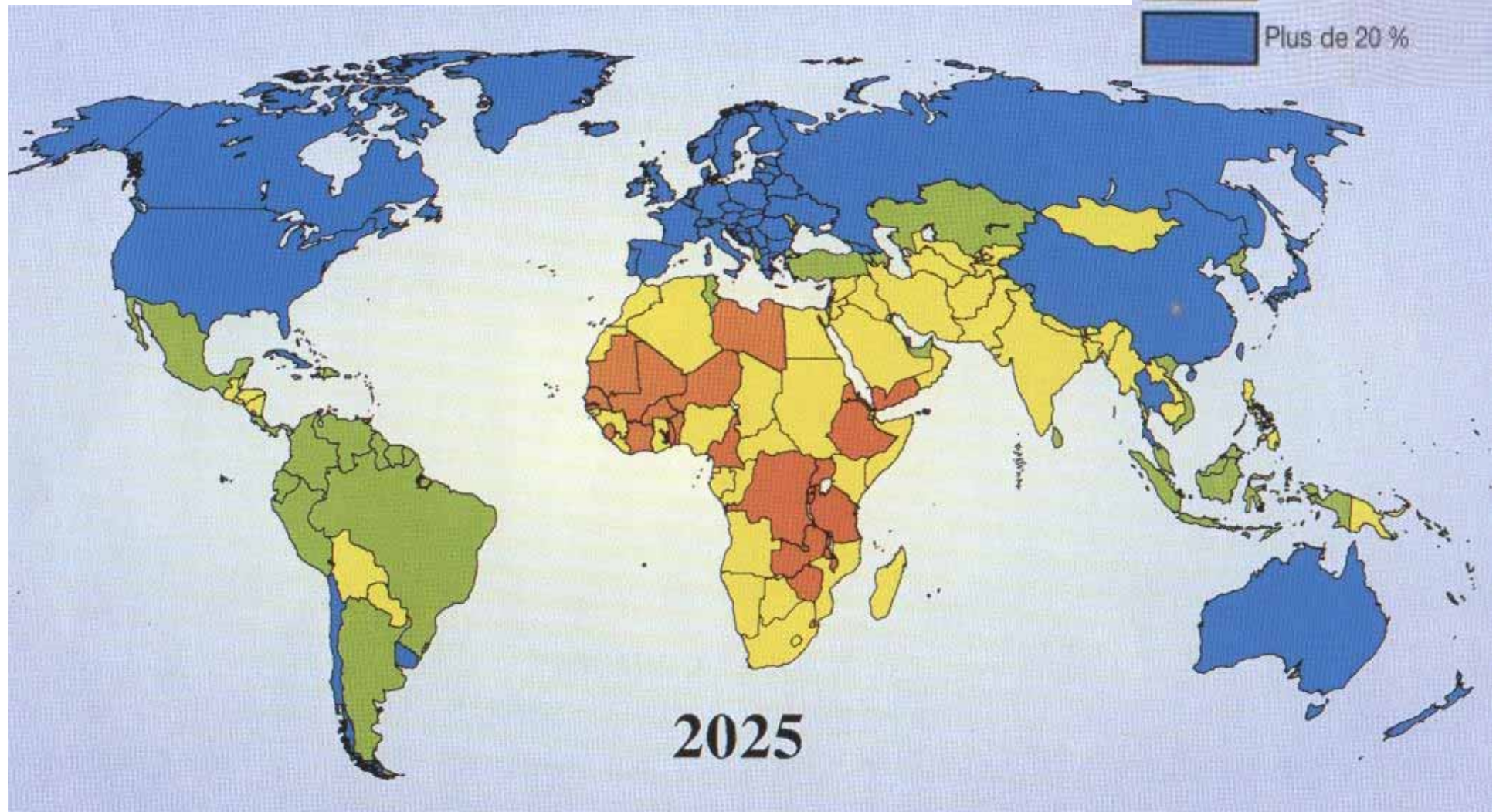
**◆ Health and care
management**

World's population

Pourcentage



World's population



Demographic transition

- ◆ **> 10% of the 65+**
 - Europe 2000 **15%**,
World's number
one
 - Developed
countries in 2020
20%
- ◆ **Chronic diseases >
acute diseases**



Chronic Conditions (random)

- ◆ Heart
- ◆ Lung COPD, Asthma
- ◆ Diabetes
- ◆ Obesity
- ◆ Cancer
- ◆ Depression
- ◆ Alzheimer's & rel D
- ◆ Alcohol
- ◆ Polypharmacy
- ◆ Chronic pain
- ◆ Schizophrenia
- ◆ Caregivers care
- ◆ Stroke survivors
- ◆ Inflammatory bowel D
- ◆ Renal failure
- ◆ Anemia
- ◆ Low vision
- ◆ Presbycusis
- ◆ Hypertension
- ◆ Arthritis
- ◆

Qual Life Res. 2006 Oct;15(8):1403-14. Epub 2006 Sep 8

The impact of 29 chronic conditions on health-related quality of life: a general population survey...using 15D and EQ-5D.

Saarni SI al. Helsinki, Finland. samuli.saarni@helsinki.fi

◆ Study of the impact of **major chronic conditions on HRQoL**, using 15D and EQ-5D in a representative sample of Finns.

◆ largest negative impact on HRQoL at the individual level

- Parkinson's disease
- anxiety disorders
- depressive disorders
- arthrosis of the hip or knee

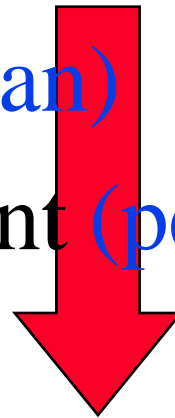
◆ greatest loss of HRQoL at the population level (prevalence)

- arthrosis of the hip or knee
- depression
- back problems
- urinary incontinence

Philip Wood's Sequence (WHO)

Disease

- ◆ Organ Deficiency (organ)
- ◆ Functional Impairment (person)
- ◆ Handicap (social life)



Dependency

Expression of the needs by

- ◆ The disease
 - Diagnostic, Treatment
 - Monopathology
 - Patients' group or association or lobby
- ◆ The consequences of the disease(s)
 - Pain, palliative care
 - Polypathology (ageing)
 - Disability, handicap

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Disease management

Expression of the needs by

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Disease management

Case management

Disease management (DM)

- ◆ The concept of reducing healthcare costs and/or improving quality of life for individuals with chronic disease conditions by preventing or minimizing the effects of a disease through integrative care.
- ◆ Also can be called care management, health management programs, or disease self-management.
- ◆ In the United States, Disease Management (DM) is a large industry with many vendors.

Case management (CM)

- ◆ A collaborative process of assessment, planning, facilitation and advocacy for options and services to meet an individual's health needs through communication and available resources to promote quality costeffective outcomes.
- ◆ The definition of case management notes the focus upon the meeting of an individual person's (client's) health needs.

Case management (CM)

- A method: *user centered*
 - Identification of the needs of *end users* and *intermediate users*
 - Step by step evaluation of solutions (iteration)
 - Global expectations are different from younger population
 - Integration of aged persons in the process

Disease & Case management

Disease management

Monopathology

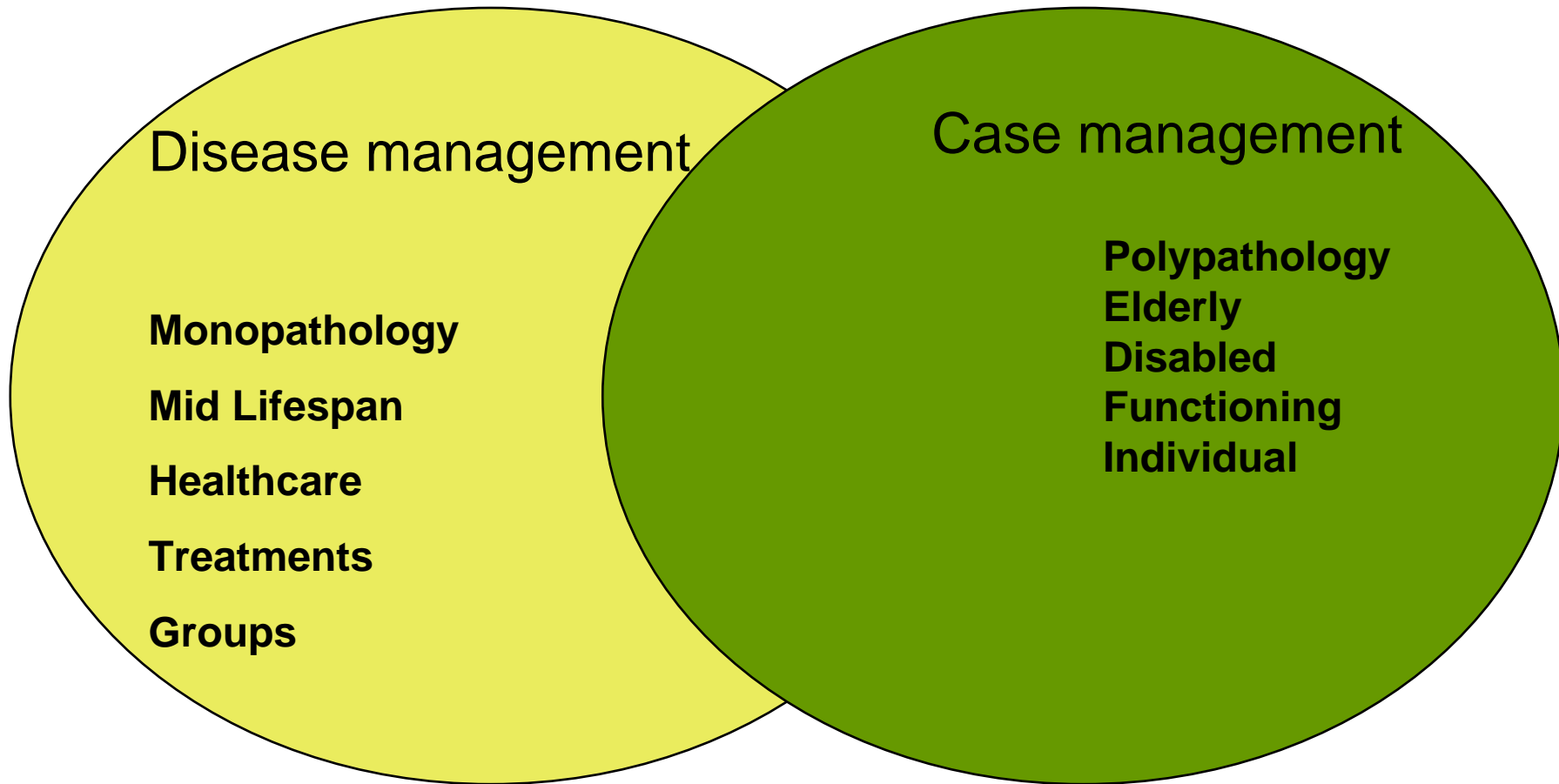
Mid Lifespan

Healthcare

Treatments

Groups

Disease & Case management



Dis Manag. 2006 Feb;9(1):45-55.Related Articles, Links _

Population-based medical and disease management: an evaluation of cost and quality.

Wise CG, al. UMHS, University of Michigan

- ◆ Study population compared to another population from the same geographic service area and covered by a traditional fee-for-service plan.
- ◆ Evaluation of the difference in utilization was based on the difference in the cost per-member-per-month (PMPM) in a 1-year measurement period, after adjusting for differences in fee schedules, case-mix and healthcare benefit design.

Dis Manag. 2006 Feb;9(1):45-55.Related Articles, Links _

Population-based medical and disease management: an evaluation of cost and quality.

Wise CG, al. UMHS, University of Michigan

- ◆ The study group is \$ 63 PMPM less costly than the comparison population for all members.
- ◆ Cost differences are largest in the 55-64 and 65 and above age groups. The study group is \$115 PMPM lower than the comparison population for the age category of 65 years and older, after adjustments for case-mix and benefits.

◆ Users

Handicap

- Progressive loss of capacity to perform daily activities:
 - IADL
 - ADL

Daily Living Functioning

◆ **Activities of Daily Living (ADL)**

- Bed – chair transfer
- Get washed
- Feeding
- Toilet
- Self-dressing
- Continence

◆ **Instrumental Activities of Daily Living (IADL)**

- Meal preparation
- Shopping
- House cleaning
- Financial activities
- Telephone
- Drugs
- Travel

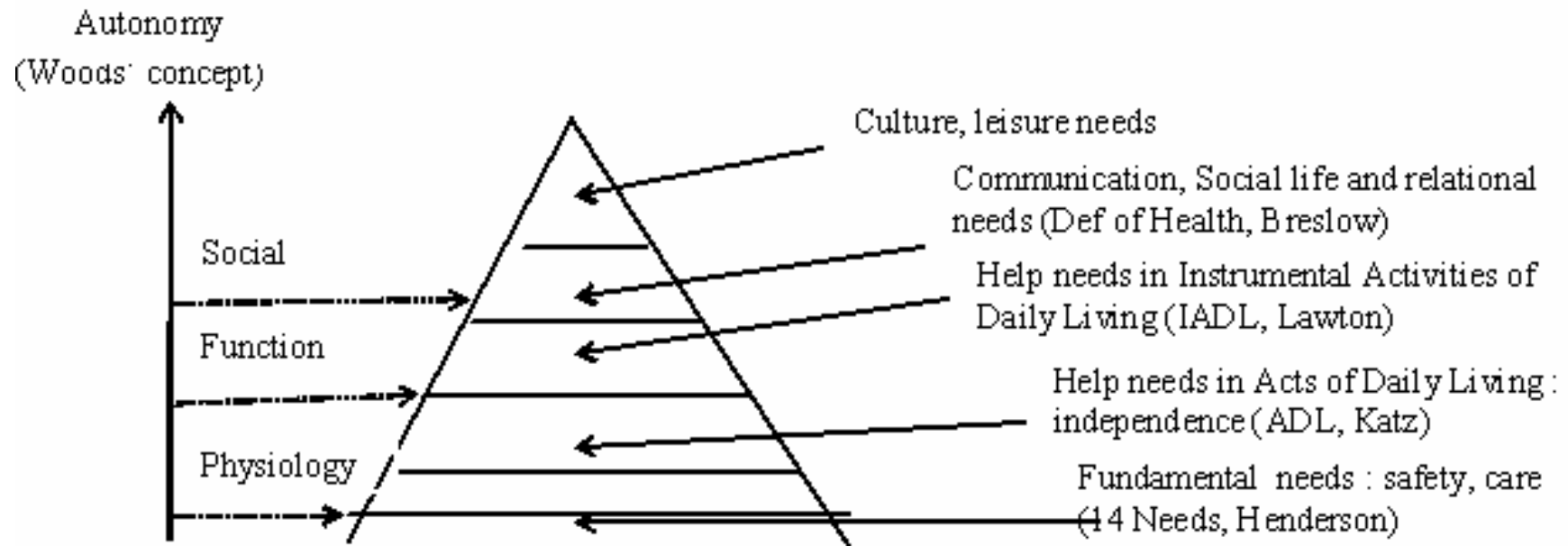
Alzheimer's disease loss of mental and physical functions

- ❑ Memory
- ❑ Praxis, gestures
- ❑ Language
- ❑ Executive functions, organization, planification
- ❑ Visuo-spacial function
- ❑ Modifications of personality
- ❑ Behavioural modifications, agitation, apathia
- ❑ Somatic complications

End-users' needs

End-users : disabled elderly people

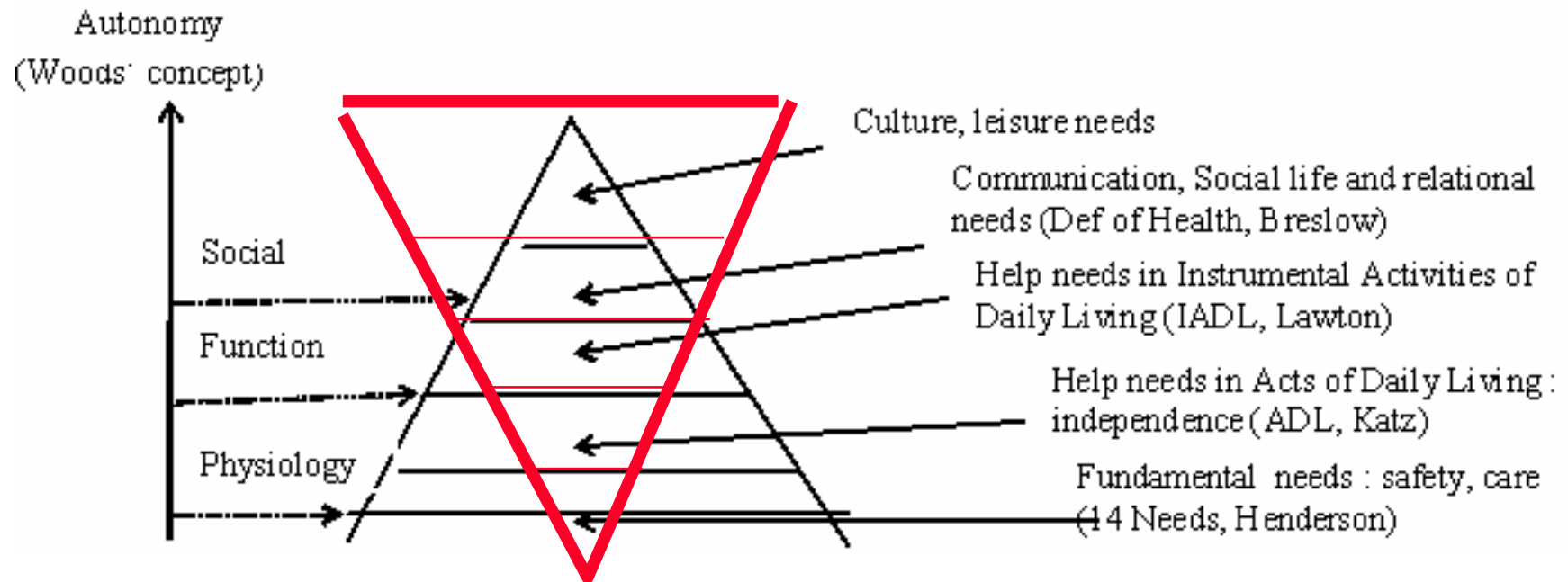
Maslow's pyramid for needs



End-users' needs

End-users : disabled elderly people

Maslow's pyramid for needs



The market

Intermediate users of gerontechnologies. Who ?

Intermediate users : Medical care services

- ◆ Hospital (including home hospitalisation)
- ◆ Social care services (nursing home, home care, social services)
- ◆ Health professionals (physicians, nurses)
- ◆ Bio-medical material providers
- ◆ Telecommunication companies
- ◆ Computer science companies
- ◆ Etc...

Intermediate users of gerontechnologies, pro & con

P COUTURIER Entretiens du Carlat 2006/05/12 n°9, 96-103.

Reluctance

- ◆ Fear to change
- ◆ Subsidiarity person/device
- ◆ Scepticism vs. Performance
- ◆ Lack of intimacy
- ◆ Intrusion of technology in the field of care
- ◆ « Big Brother » syndrome

Favorable

- ◆ Enhancement of the security
- ◆ Help for clinical survey
- ◆ Enhancement of interactions between professionals
- ◆ Decrease of loneliness
- ◆ Better work conditions
- ◆ Better quality of care

Socio-professional impact of telemedicine

- ◆ Modification of the nurse-doctor interaction

SÄVENSTEDT, Nurse-doctor interaction in teleconsultations between a hospital and a geriatric nursing home, J Telemed and Telecare 2002;8:11-8

- ◆ Increase of the health and social professional relative power in the remote situation vs. the medical doctor
- ◆ Collaboration between referent and remote doctor is compulsory

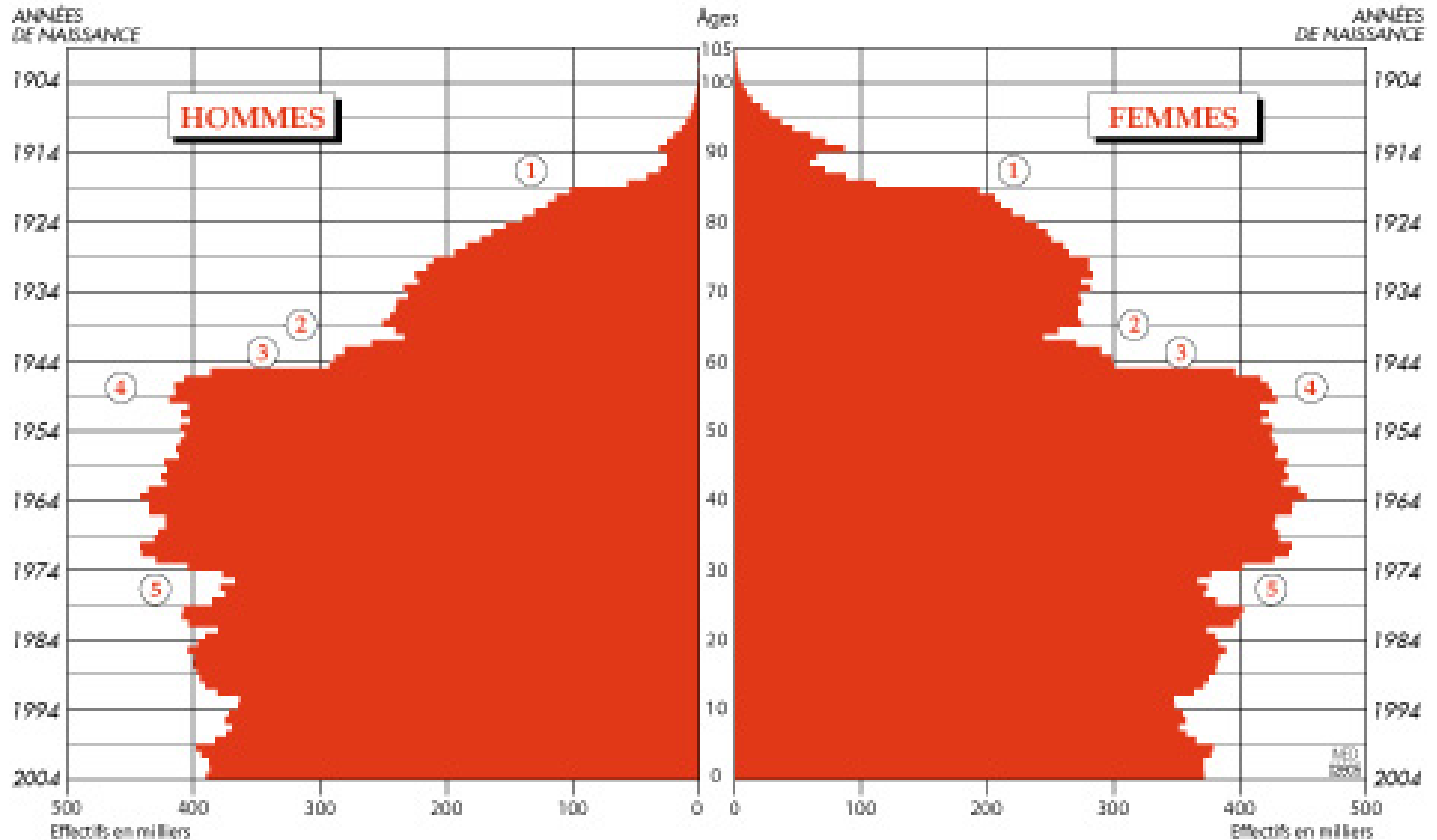
Caregiver, intermediate or end user ?



- ◆ **Iris MURDOCH**
(1919 - 1999)
and husband
- ◆ **John BAYLEY**
- ◆ « In his memoir *Elegy for Iris* John Bayley gives an account of his life with Murdoch, whose benevolent personality was not broken by her Alzheimer's disease. »

POPULATION DE LA FRANCE

ÉVALUATION PROVISOIRE AU 1^{er} JANVIER 2005



- ① Déficit des naissances dû à la guerre de 1914-1918 (classes creuses)
- ② Passage des classes creuses à l'âge de fécondité

- ③ Déficit des naissances dû à la guerre de 1939-1945
- ④ Baby-boom
- ⑤ Fin du baby-boom

**◆ Technologies for the
(productivity and the)
quality of care**

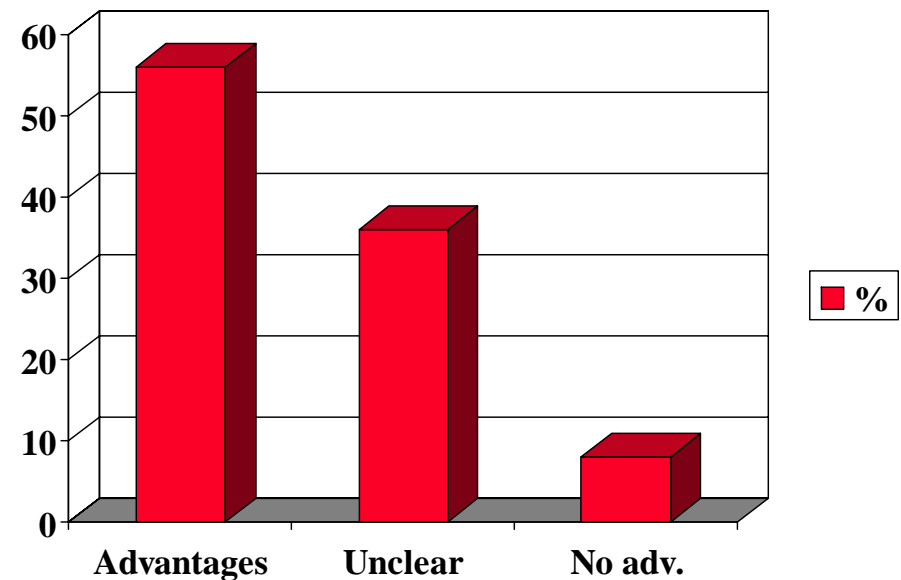
Most convincing applications of telemedicine

Hailey al., J Telemed and Telecare, 2002; 8/1: 1-7.

- ◆ Teleradiology (neurosurgical applications)
- ◆ Telemental health
- ◆ Echocardiographic images
- ◆ Teledermatology
- ◆ Home care
- ◆ Medical consultations

- ◆ meta-analysis
- ◆ 66 publications
- ◆ from 1996 to 2000

However number of papers had methodological limitations



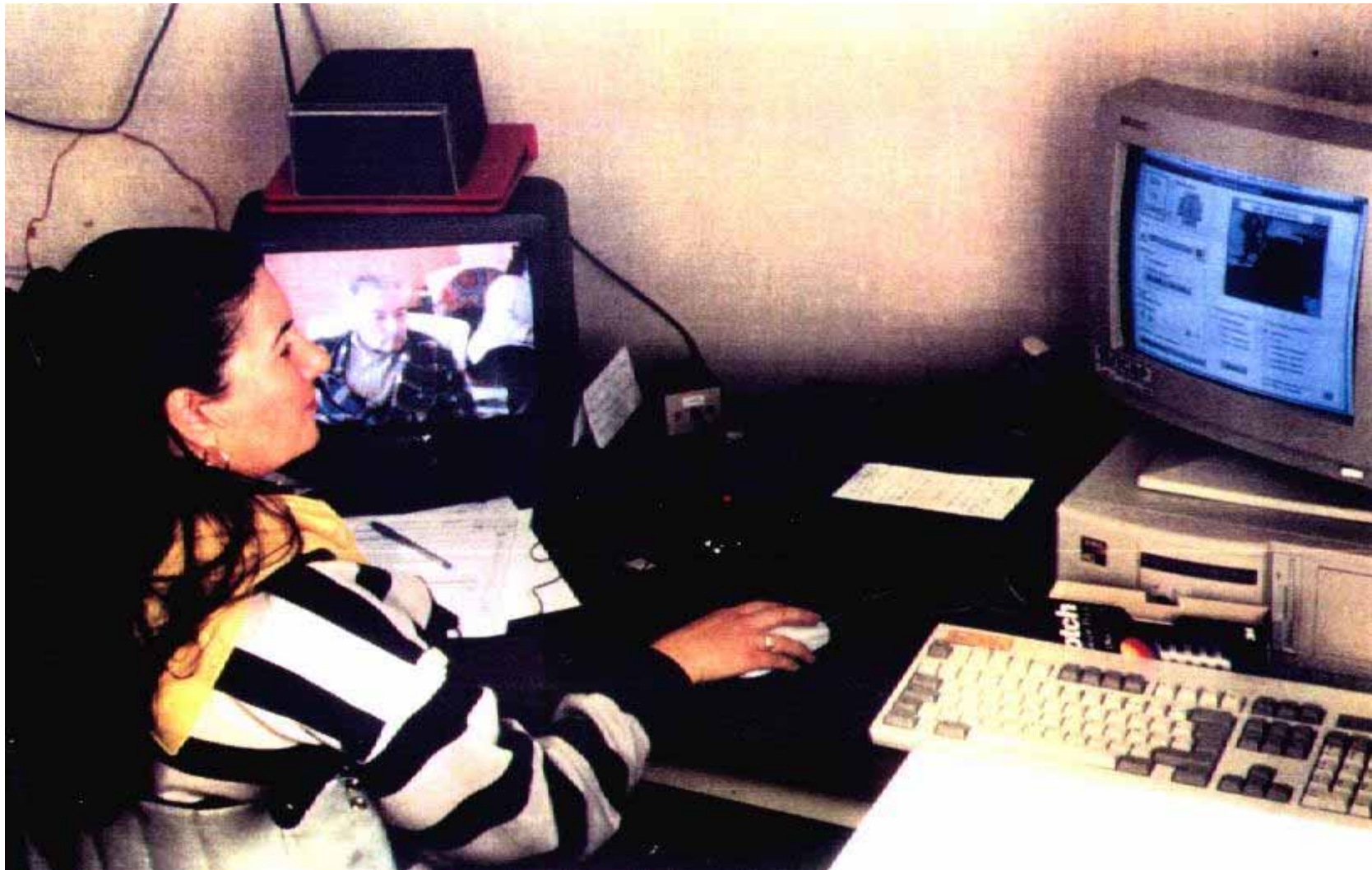
Videoconferencing device



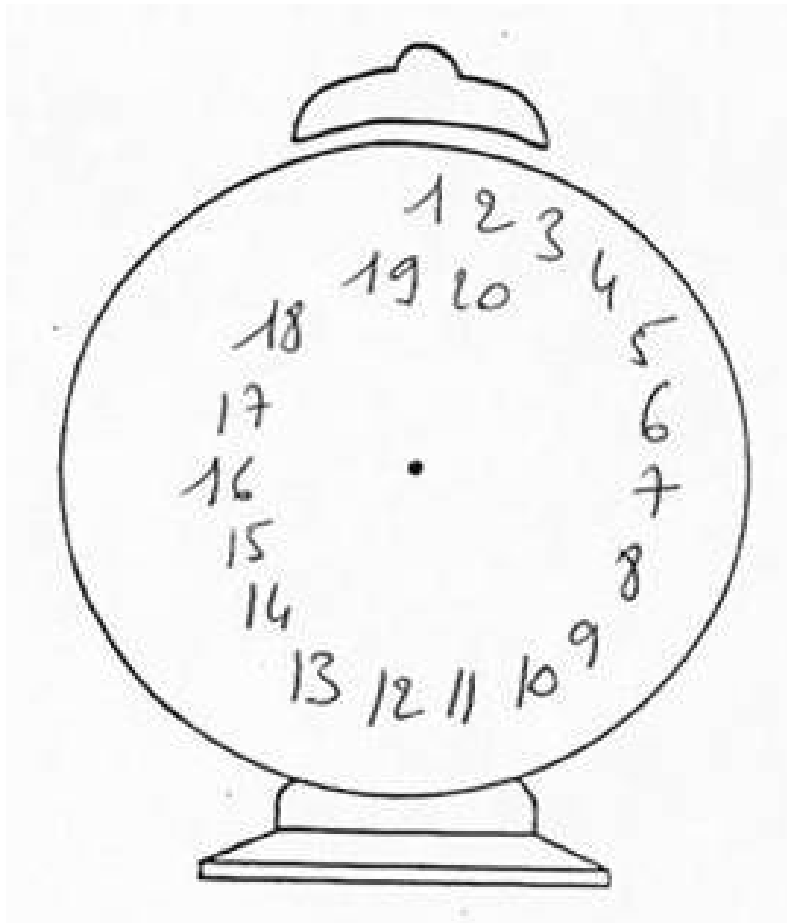
- ◆ Standard
- ◆ Adapted to health care

Video-Telepsychometry

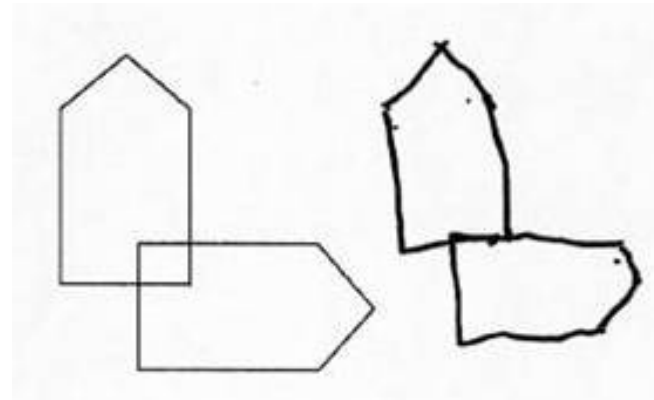
MONTANI al, Journal of Telemedicine, Vol 2 : 2, 1996, 145-149



Video-Telepsychometry



CLOSE YOUR EYES



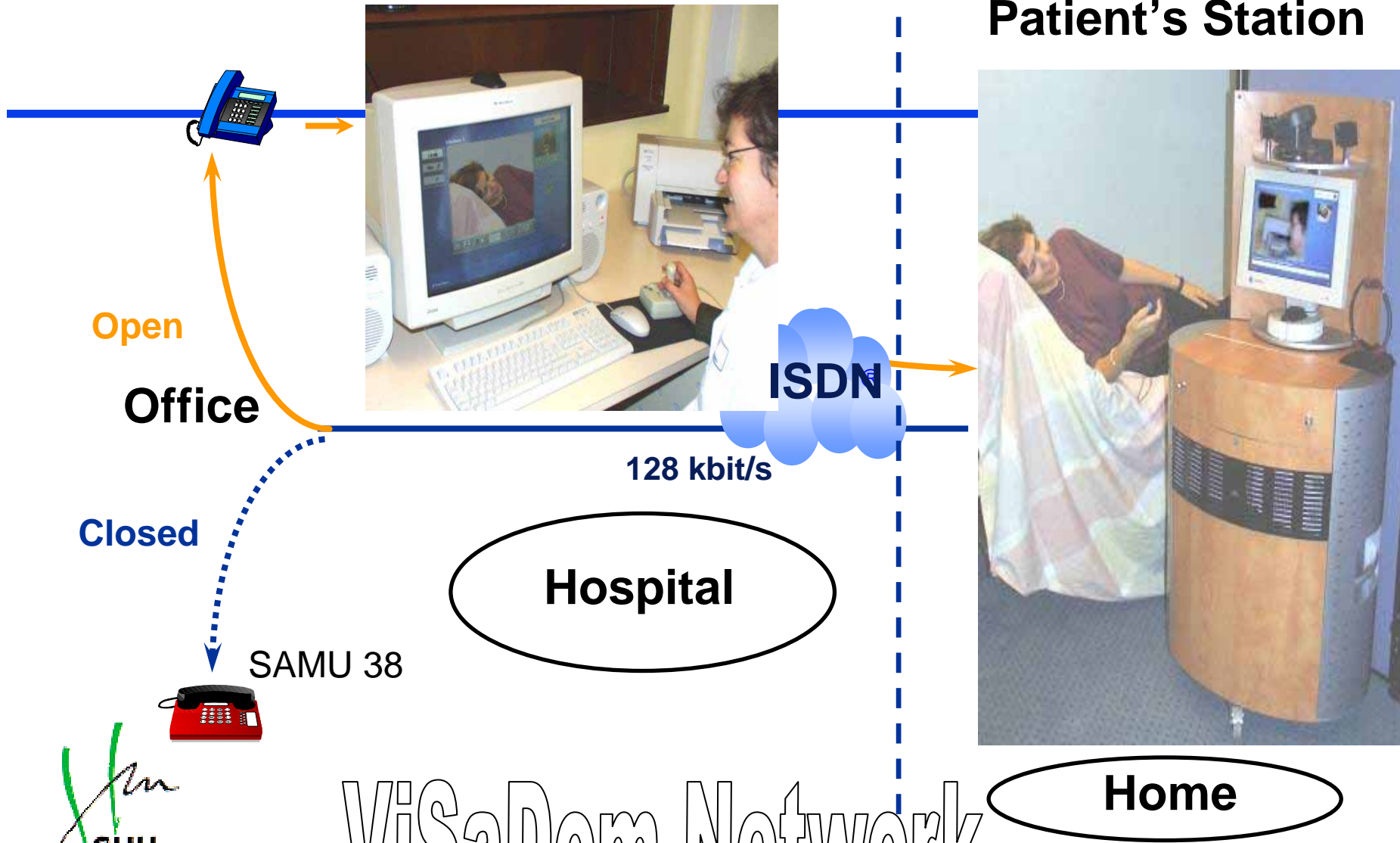
**Clock Face Test
and MMSE**

Video-Telepsychometry



Carer's Station

Patient's Station



Département de Médecine
Communautaire du C.H.U. de
Grenoble¹ – Pr Alain FRANCO

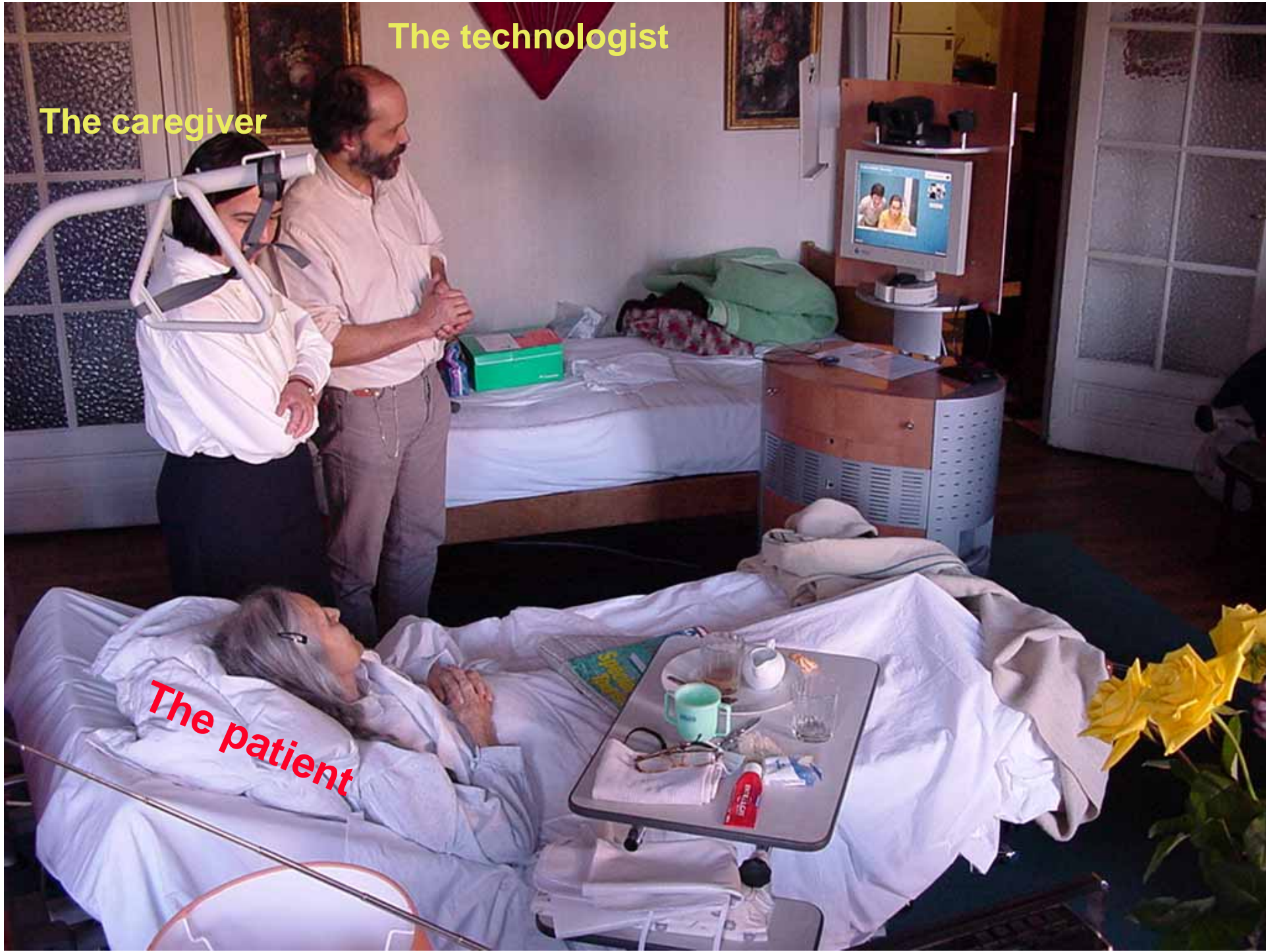
ViSaDom Network



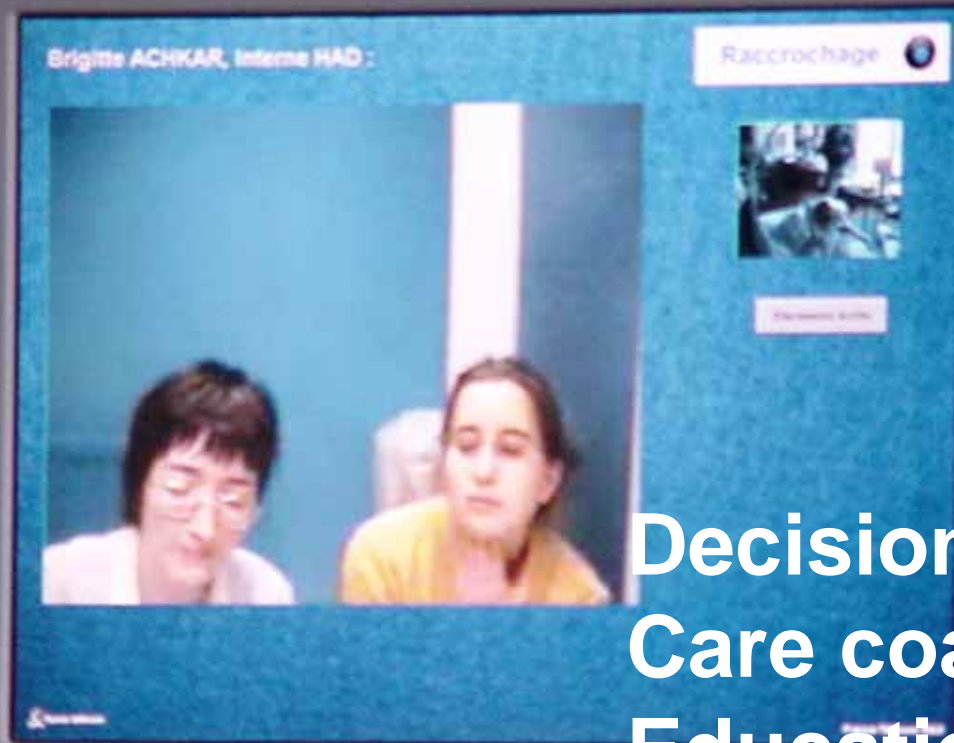
The technologist

The caregiver

The patient



Lydie NICOLAS al. Presse Med (Masson) 2005; 34:1059-64.



The Doctors

Decision making
Care coaching
Education
Medical data tr.
Logistic information
Cooperative work

ViSaDom: screen photography

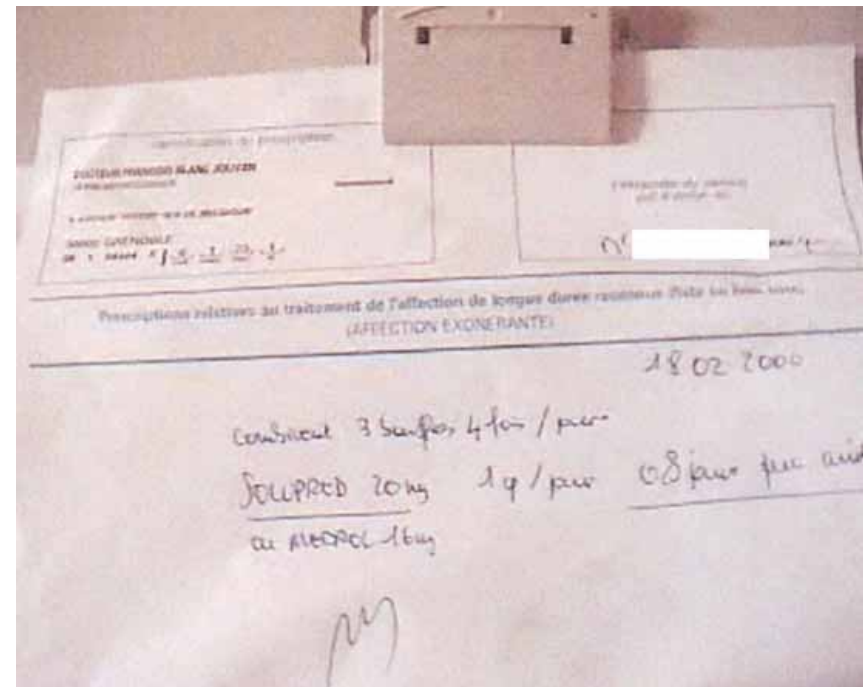


ViSaDom: screen photography



- ◆ Supervision during artificial nutrition
- ◆ Training of the caregiver

ViSaDom: screen photography

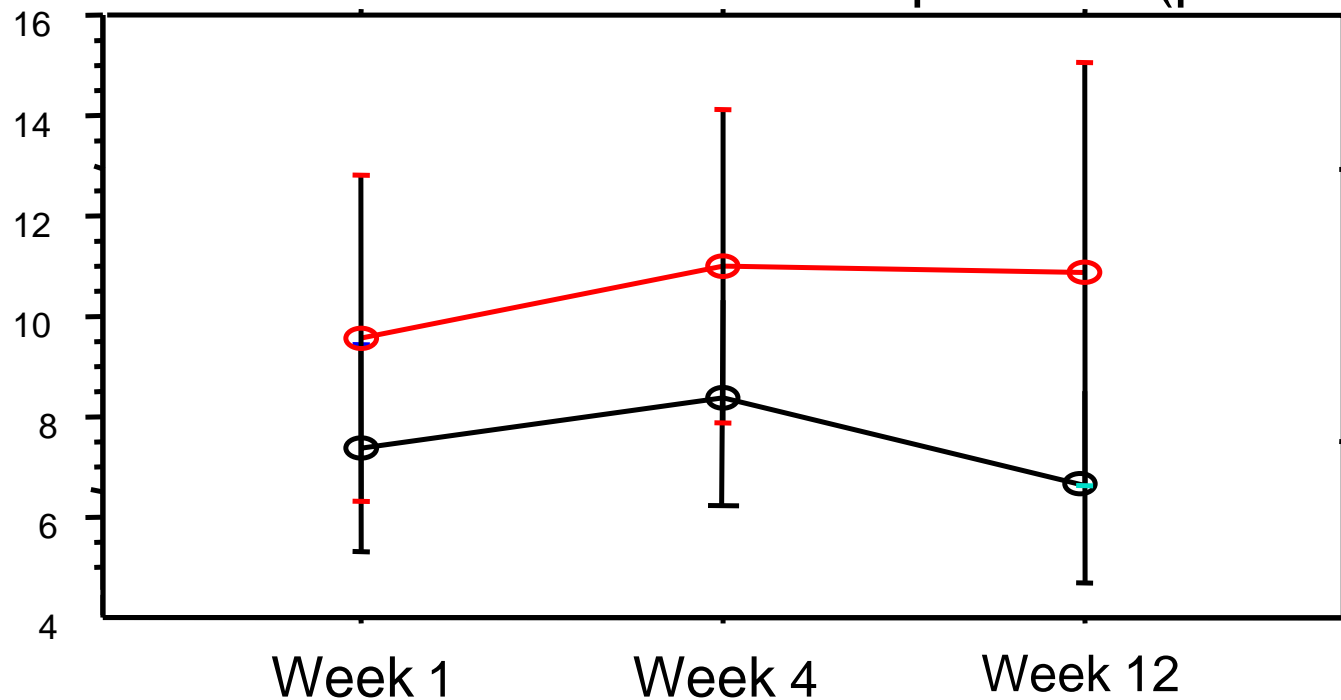


- ◆ Drug compliance and patient education

Results: Anxiety scale (HADS)

Patients ○ The anxiety score is significantly lower for the patients with videophony than for the control patients ($p < 0.05$).

Control ○

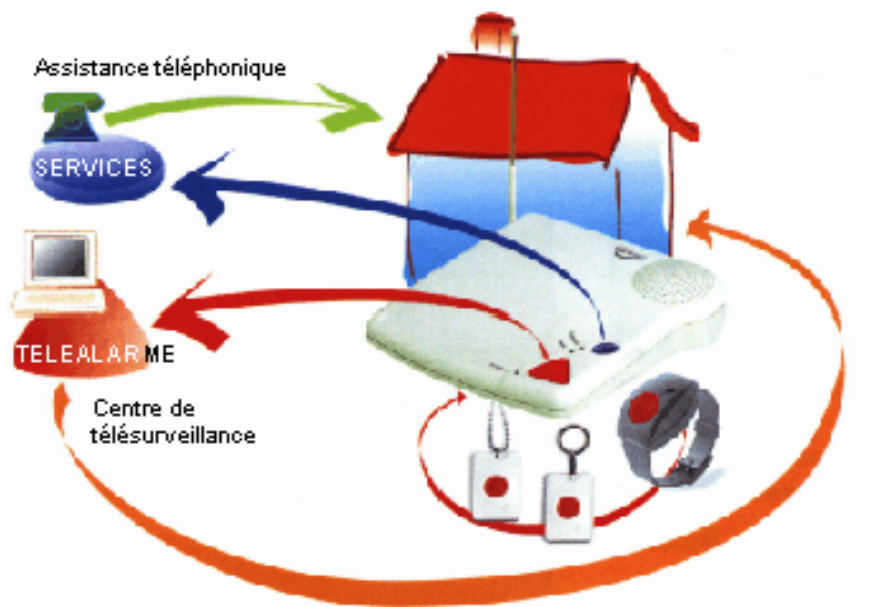


Telehomecare addresses needs

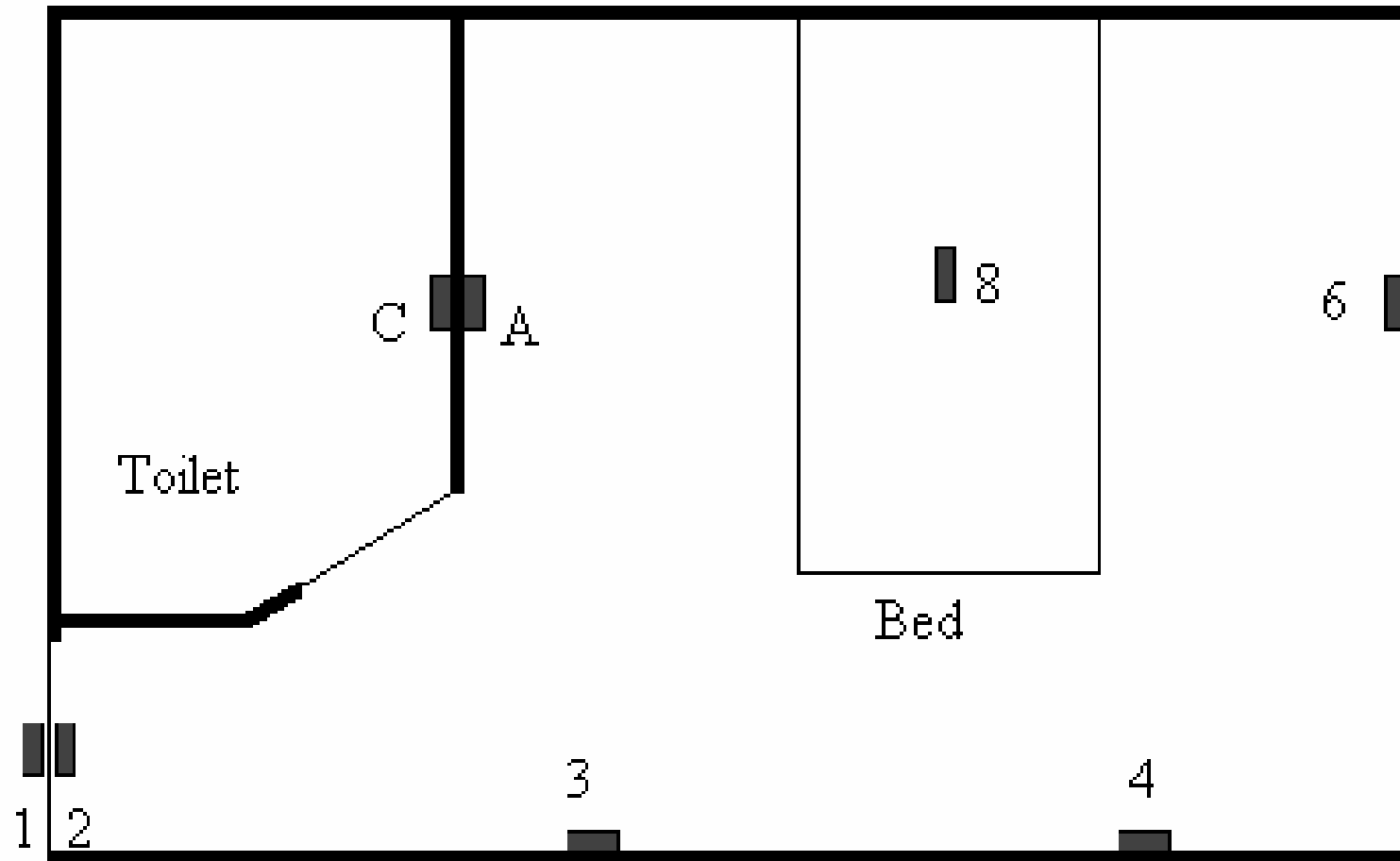
MERRELL RC Telehomecare: where are we ? Telemedicine & e-health 2006;12:79-80

- ◆ Decline by 30% in hospital beds.
- ◆ Decline in average length of stay.
- ◆ Ponderous shift in care from hospital to ambulatory environment and the home.
- ◆ Heart failure, diabetes, asthma, COPD
- ◆ Nursing shortages (1 million in US ?)
- ◆ Telehomecare, a special interest group of the American Telemedicine Association
- ◆ Overwhelming worldwide interest

Telealarm



« Smart room » and infra-red sensors

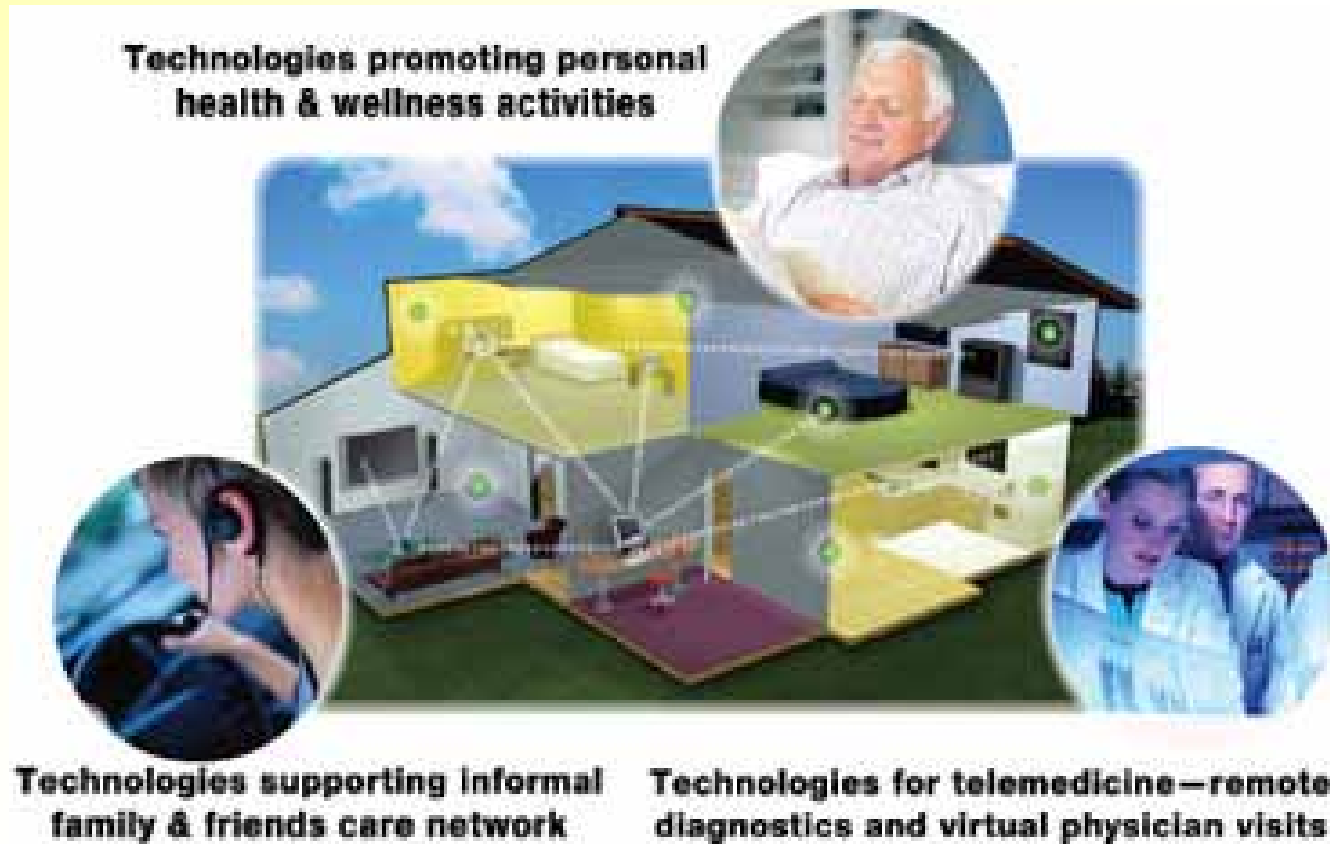


A FRANCO La chambre intelligente, Rev hospit de France, 1998 n°1 Janvier

“Smart homes” for disabled & elderly persons

- **Europe**: AID House, Gloucester ‘Smart’ House for people with dementia and ‘Dementia Friendly House’ (UK), ‘Smart model house’ (NL), comHOME (Sweden) , PROSAFE, Gardien, Grenoble HSH, Smardep, H2AD (France)
- **North America**: Rochester’s ‘Smart Medical Home’, Georgia Tech’s Aware Home (USA), MIT’s House of the future, Sherbrooke’s ‘smart’ home (Canada)
- **Asia**: ‘Smart House in Tokushima’ (Japan). Australia: Functional health status of the elderly people at home.

Digital Home from Intel



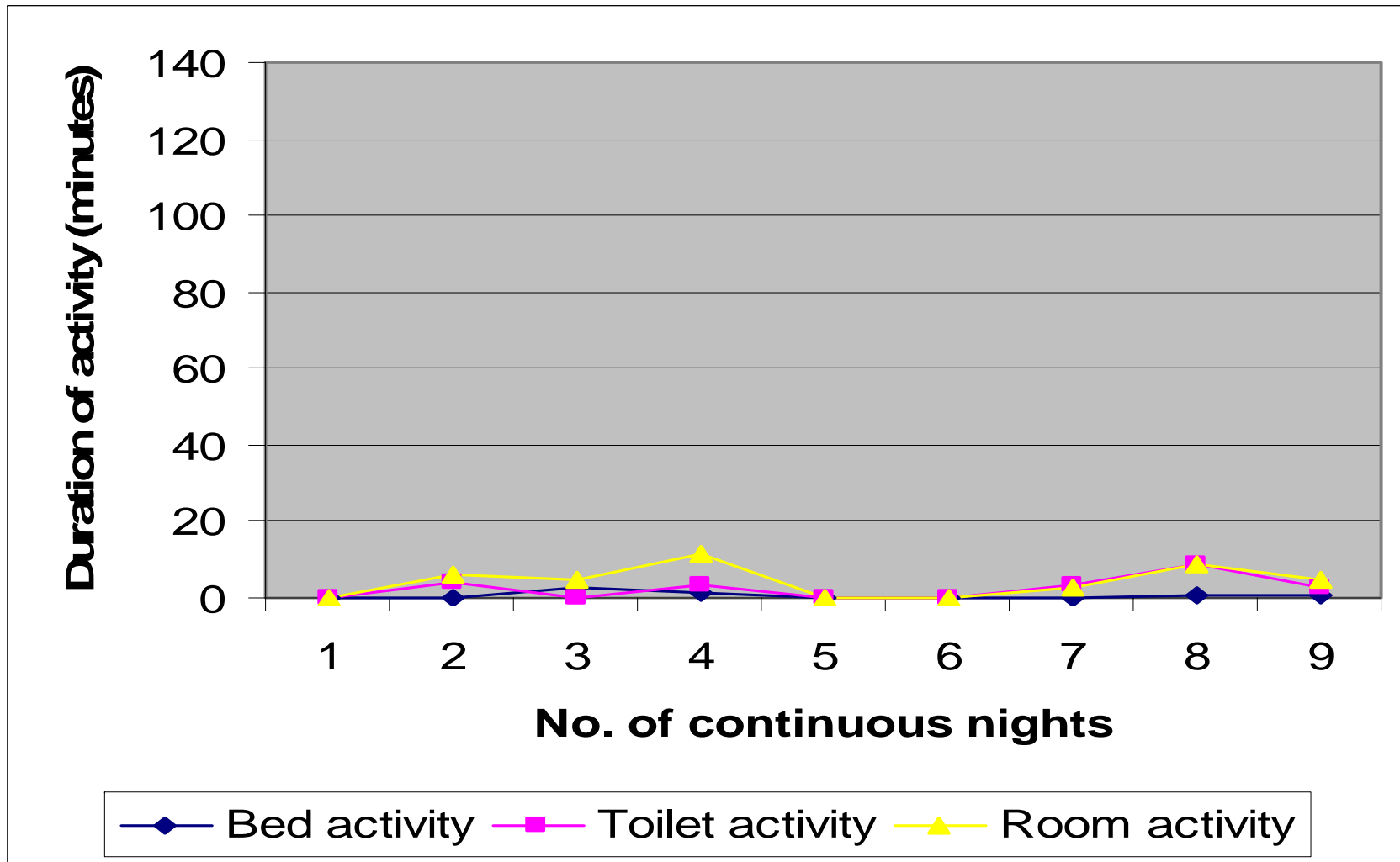
http://www.intel.com/research/exploratory/digital_home.htm

An equipped smart room

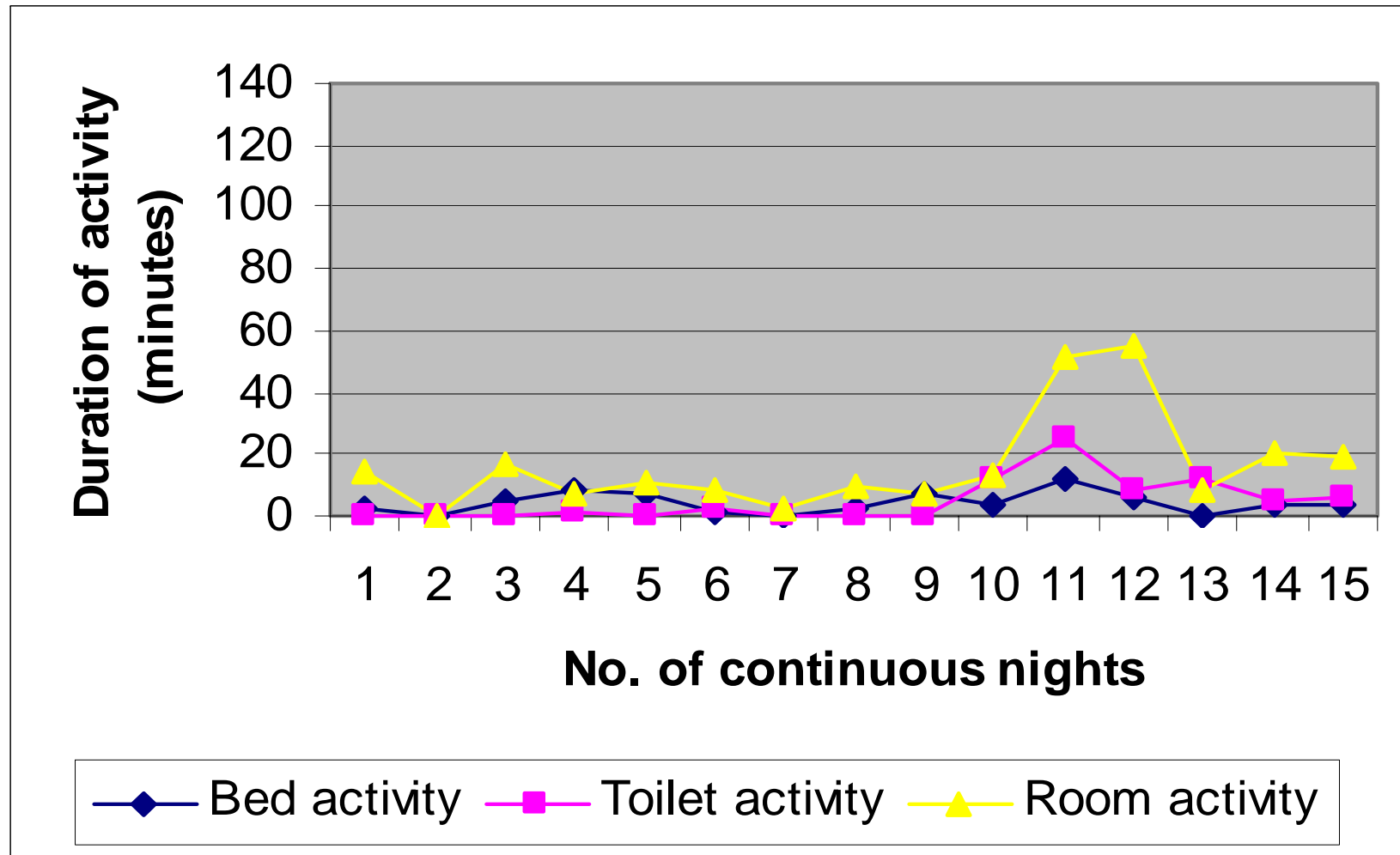


GARDIEN: nocturnal activity: quiet pt

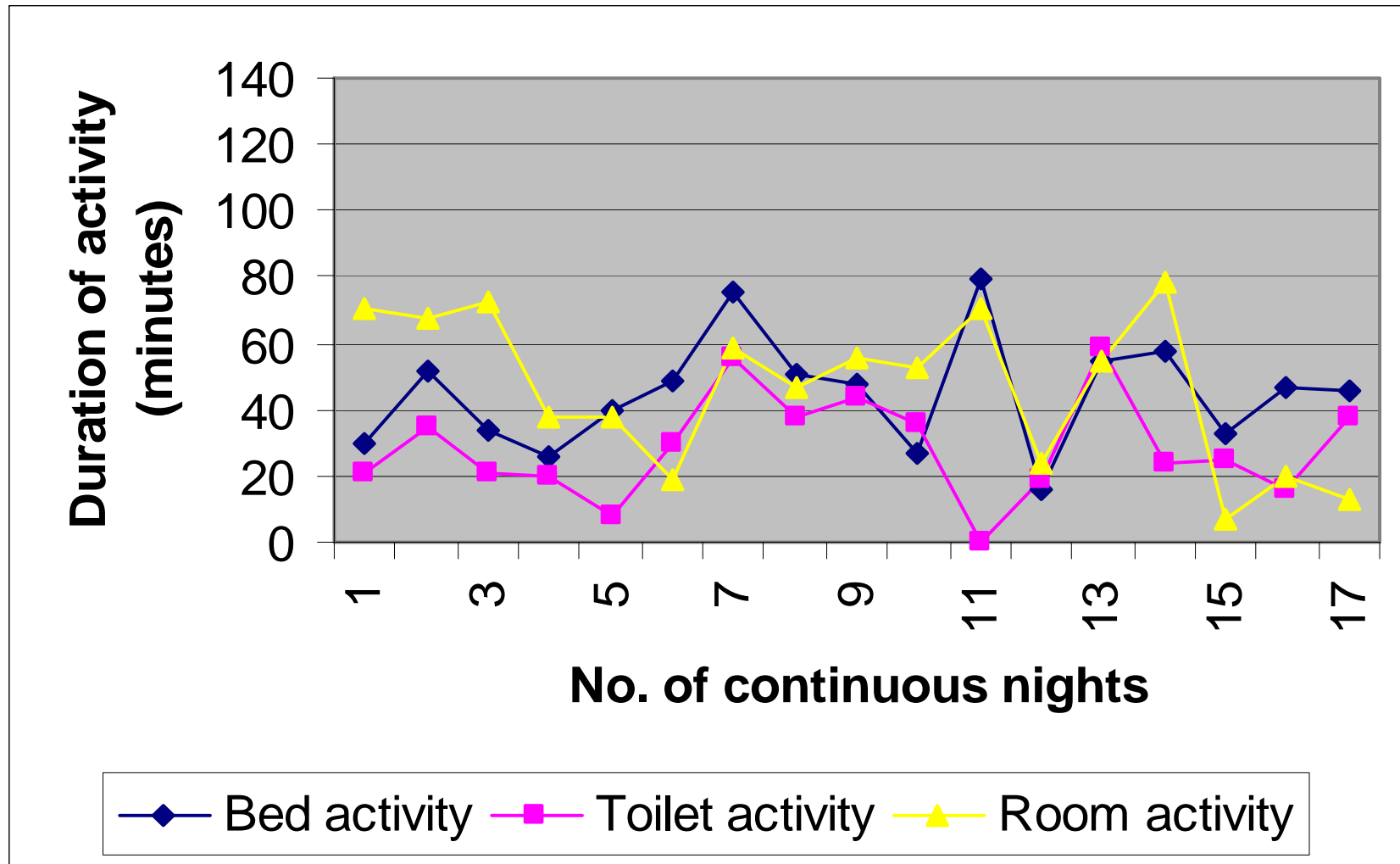
STEENKESTE, BANERGEE, COUTURIER The Journal on Information Techn
in Healthcare 2005;3(2)



GARDIEN: nocturnal activity: paroxysmic agitation



GARDIEN: nocturnal activity: chonical agitation (sleep disorders)

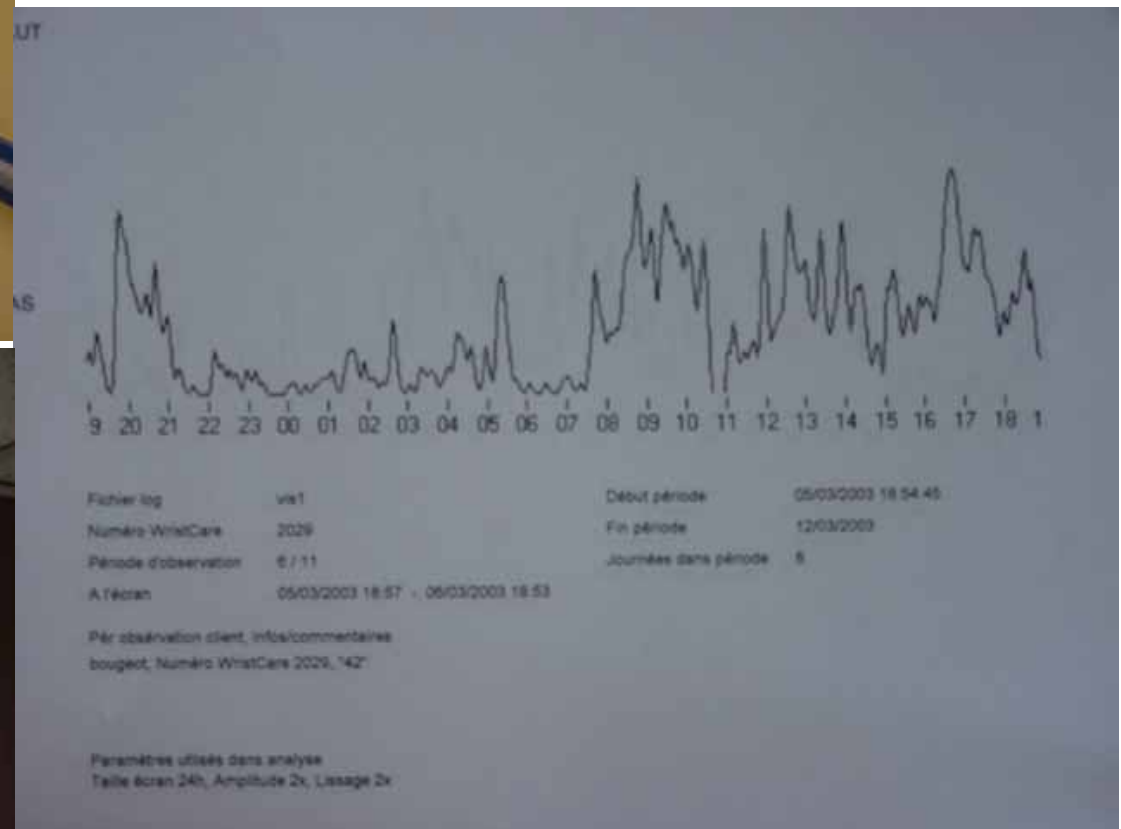


Actimetry



VIVAGO Bracelet, IST Finland

24/24 activity, hypothermia, out of zone
Real time alarms for the caregivers



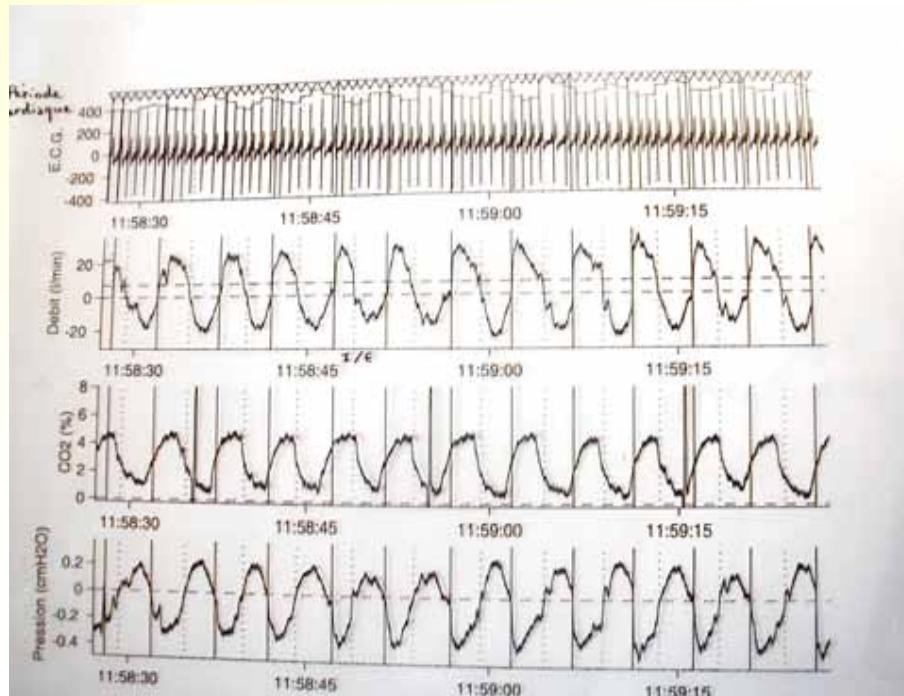
Actimetric overmattress

COUTURIER P, al., The Lancet, Vol 347, march 2,1996.



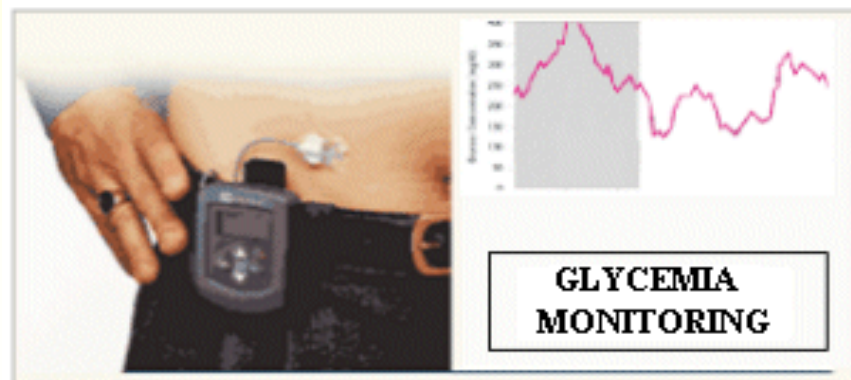
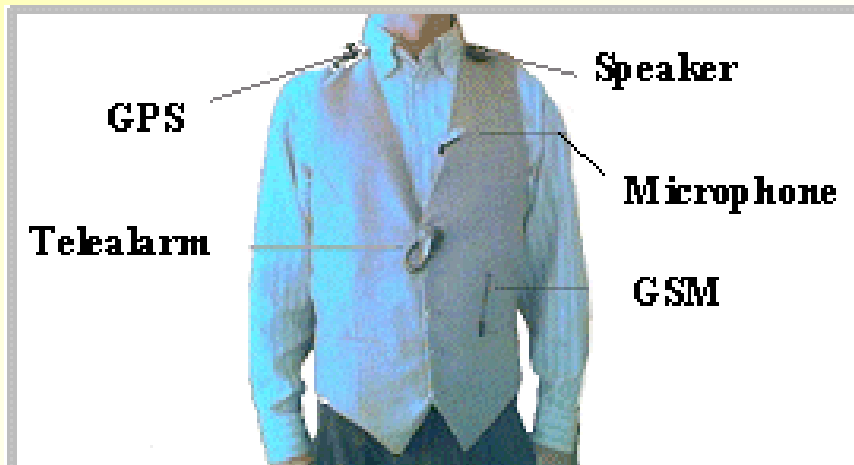
Smart jacket

- Gilet intelligent : système Visuresp
 - Arythmie sinusale respiratoire



TIMC-PRETA & Sté RBI, G. BenChetrit, R. Baghai

Smart jacket



<http://www.medes.fr/VTAMN.html>

(2001, projet VTAMN : MEDES, ITECH, TAM, INSA, MEDIAG, RBI, TIMC)

- Robots for elderly persons

Selection from Vincent RIALLE

Japan



Paro, the seal

- Therapeutic robot developed by AIST and tested in a Japanese nursing home
- Sensors for light, sound, pressure
- Move adequately head and hands
- Seems to decrease mood disturbances (14 cases)



Japan

- **AIBO (Sony), the Dog**

- “Besides providing often lonely and under-stimulated older persons with a playful and interactive toy, researchers in the United States also think robot dogs such as Aibo can play an important role in helping older persons overcome tendencies toward solitude and isolation.”



Japan



- **Teddy Bear for tele-survey of elderly persons** (Matsushita Electrics)
- The 106-bed facility run by Matsushita Electrics, called Sincere Kourien, features robot bears whose sole purpose is to watch over the elderly residents.
The bears monitor patients' response times to spoken questions. They record how long they spend performing various tasks, before relaying conclusions to staff or alerting them to unexpected changes."

J Mark Lytle (BBC), « Robot care bears for the elderly », @ :
<http://news.bbc.co.uk/1/hi/sci/tech/1829021.stm>

Japan



- **Human washing robot**
- “Japanese elderly are being cleaned by automated human washing machines”
<http://www.futurepundit.com/archives/002046.html>
- MACHIDA, Japan- With an electronic whir, the machine released a dollop of "peach body shampoo," a kind of body wash. Then, as the cleansing bubbling action kicked in, Toshiko Shibahara, 89, settled back to enjoy the wash and soak cycle of her nursing home's new human washing machine.

**◆ And some
important issues**

And some important issues

- ◆ Difficulties for the assessment of telemedicine and technologies for autonomy
- ◆ Behaviour of patients facing home telehealth and new technologies
- ◆ Ethics and legal aspects

Financing the technologies

- ◆ End-user itself
- ◆ Family or substitute
- ◆ Foundations
- ◆ Social insurance system
- ◆ Health care system
- ◆ City or community solidarity
- ◆ (Welfare) state

Eur J Public Health. 2005 Oct;15(5):494-7. Epub 2005 Jul 13

Association between chronic diseases and disability in elderly subjects with low and high income: the Leiden 85-plus Study.

Bootsma-van der Wiel A, al. Dpt Gerontology & Geriatrics, Leiden , NL

RESULTS: Elderly with low income had

- ◆ higher prevalence of ADL-disability (23% versus 12%),
- ◆ higher prevalence of impairments
- ◆ equal prevalence of chronic diseases, except for dementia and co-morbidity.

Conclusion

- ◆ Multiple needs for technologies
- ◆ Lack of caregivers in a close future
- ◆ The market for healthy aging must be differentiated from the market for diseased and frail persons
- ◆ Who will pay in the routine ?
- ◆ Gerontechnology is also a political science