

# Tele-geriatrics

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### The application of telemedicine to geriatric medicine

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#### Abstract

**Background:** telemedicine has the potential to improve access to the specialty of geriatric medicine, particularly in rural and remote settings. While telemedicine is widely used in some specialties, this is not yet the case in geriatric medicine.

**Objective:** to review the current literature to identify proven and potential strategies for application of telemedicine in geriatric medical practice.

**Method:** a comprehensive review of literature pertaining to the application of telemedicine in geriatric medicine and relevant related sub-specialties was undertaken.

**Results:** a large number of small studies of limited quality, and a small number of robust studies including randomised trials, were identified.

**Conclusions:** there is evidence to suggest that a variety of telemedicine techniques can be applied effectively and safely in geriatric medicine across a variety of clinical settings. Patient satisfaction is generally reported as high. However, caution is advised due to the paucity of robust studies in the literature.

**Keywords:** telemedicine, geriatrics, elderly, remote consultation

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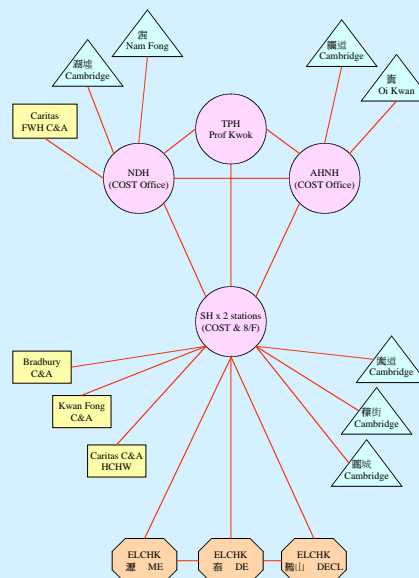
# Our History

- 1998 – 99  
Pilot study in a residential care home for the elderly (RCHE)  
– Medical, nursing, psychiatry, PT, OT, podiatry, dermatology
- Extension of telemedicine network  
– To other local RCHEs  
– To other hospitals in New Territories and their local RCHEs  
– To a Home Care service provider
- 2003 - 04  
Community rehabilitation programmes  
– DM, OA, CVA, dementia, incontinence

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# NTE Geriatric Service Network

- 4 hospitals
- 11 RCHEs
- 5 elderly centres
- ISDN (remote areas) & 10 Mbps Broadband networks
- Multi-point VC machines



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## Videoconferencing Hardware



### Tandberg 880

(HKD 110 000)

- Shatin Hospital
- Norway
- 768kbps (IP/ ISDN)
- Multi-point (max 4)
- max 4 video outputs
- 72° wide field of view

### Polycom ViewStation FX

(HKD 75 000)

- Hospital and remote sites
- USA
- 512kbps (IP/ISDN)
- Multi-point (max 4)
- max 4 video outputs
- 48° field of view



## Tele-geriatrics in the institutional setting

- **Direct care**
  - Geriatric and GP care in residential care homes for the elderly
  - physiotherapy & occupational therapy
  - podiatry
- **Specialist consultation**
  - Dermatology
  - Radiology
  - Pathology
  - Psychiatry

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## Intervention

- CGAT and a local nursing home were linked via teleconferencing.
- Services provided via telemedicine wherever possible.
- Face-to-face visits were conducted if telemedicine inadequate for patient management.

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## Results

- Feasibility
- Costs
- Services provided & limitations
- User satisfaction

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Table 1. Summary of activities and feasibility of Telemedicine

Discipline	Patient-episodes	% adequate with teled
Geriatrician	356	97.2
Psychogeriatrician	149	99.3
Dermatologist	74	74
Nurse	101	88.7
PT	105	87.1
OT	117	59.8
Podiatrist	99	84.9

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## Telemedicine is Cheaper

Table 2. Cost comparison between Telemedicine and outreach service or outpatients

Discipline	Telemedicine	Outreach	Outpatients
Geriatrician	\$40.3	\$153	\$455
Psychogeriatrician	\$91.6	\$105.9	\$455
Dermatologist	\$117.9	N/A	\$455
Nurse	\$22.7	\$67	N/A
PT	\$63.6	\$330.4	N/A
OT	\$54.6	\$290.8	N/A
Podiatrist	\$29.2		\$160.8

N/A = not applicable

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## Geriatrician

- Follow-up of old cases
- Triaging urgent medical problems
- Saves time and increases productivity
- Reduced unnecessary A&E visits by 10%
- Reduced acute hospital admissions by 11% over 1 year
- Limitations - new patients, chest auscultation

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## Nurse

- Assessment - swallowing test, wounds, use of inhaler, placement
- Educate patients and carers
- Act as liaison between in-patient service and nursing home
- More frequent review
- Facilitate earlier discharge
- Limitations - complex dressing procedures, clients with communication problems

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## Physiotherapist

- Screening new cases
- Reduces waiting time and shortens follow-up intervals
- Nursing home staff able to facilitate assessment and supervise rehabilitation
- Limitations - patients with severe communication difficulties, examination e.g. auscultation, neurological or musculoskeletal, specialized treatment modalities e.g. TENS, manual techniques

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## Occupational Therapist

- Useful for screening - better prepared for site visit, reduces inappropriate referrals
- Reduces waiting time and shortens follow-up intervals
- Closer monitoring
- Limitations - assessing range of movement, activities of daily living in real life situation, environmental barriers, prescription of splints, wheelchairs and pressure garments

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## Podiatrist

- Foot screening - nails, between toes, heels
- Assessment of wounds, footwear, gait
- Advise staff and patients on dressing techniques and foot protection
- Triaging referrals according to urgency
- Allows earlier discharge from hospital
- Limitations - cannot perform full neurological or vascular assessment

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## User satisfaction

- Patients - depending on discipline, 82% to 95% were satisfied with telemedicine.
- Nursing home staff - system was user-friendly, boosted confidence, enhanced support from CGAT.

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## Conclusions

- Telemedicine is an acceptable and useful adjunct to conventional outreach services.
- It enhances the CGAT's efficiency and improves support to nursing home residents.
- Costs can be off-set by linking up with more homes and extending hours of service.

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## Publications

1. Telemedicine: a pilot study in nursing home residents. Hui E, Woo J, Hjelm M, Zhang YT, Tsui HT. *Gerontology*. 2001 Mar-Apr;47(2):82-7.
2. The role of telenursing in the provision of geriatric outreach services to residential homes in Hong Kong. Chan WM, Woo J, Hui E, Hjelm NM. *J Telemed Telecare*. 2001;7(1):38-46.
3. Telepsychiatry in psychogeriatric service: a pilot study. Tang WK, Chiu H, Woo J, Hjelm M, Hui E. *Int J Geriatr Psychiatry*. 2001 Jan;16(1):88-93.
4. Telehealth for older patients: the Hong Kong experience. Hui E, Woo J. *J Telemed Telecare*. 2002;8 Suppl 3S3:39-41.
5. The acceptability of telemedicine for podiatric intervention in a residential home for the elderly. Corcoran H, Hui E, Woo J. *J Telemed Telecare*. 2003;9(3):146-9.

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## Electronic Stethoscope

(USD 700)



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- Directly plugged-in to VC hardware
  - but image is lost
- Quality seems better using broadband
- Heart sounds distorted
- Breath sounds hopeless!
- Not much extra contribution to physician care
- Easier to train nurses (at patient's end) to auscultate!!!



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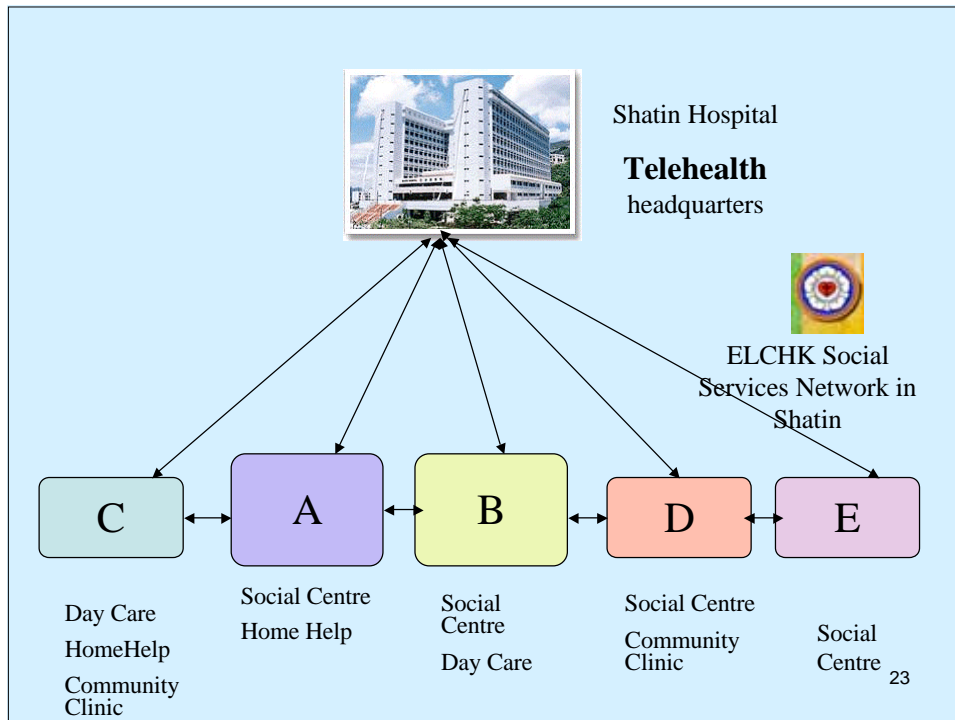
## Telemedicine in rehabilitation and maintenance of chronic diseases

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## Rehabilitation programmes

- **Chronic conditions**
  - DM
  - dementia
  - OA
  - stroke
  - incontinence
  - COPD
  - CHF
- **Content**
  - exercise
  - education
  - group discussion
  - peer support
- **Outcomes**
  - objective
  - subjective
  - qualitative
  - teleconferencing as medium of instruction
- **Role of lay personnel**
  - staff of elderly centres
  - volunteers
  - patients

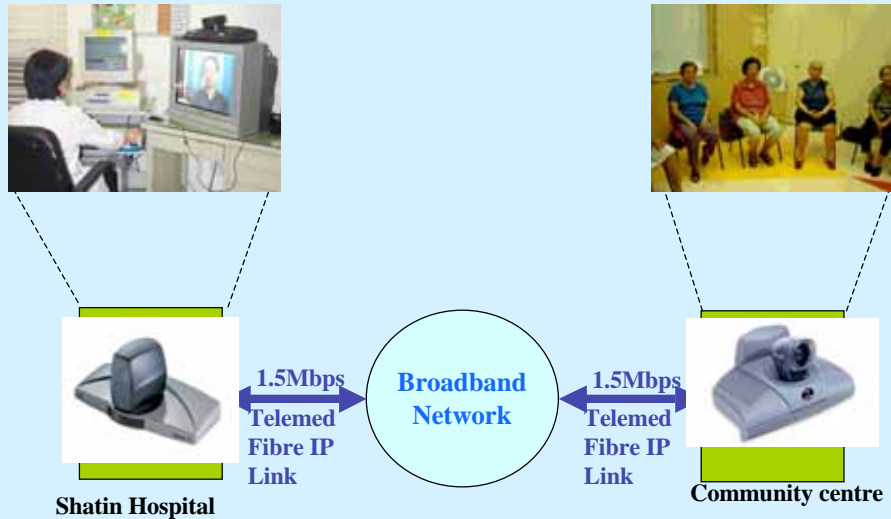
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## Why Tele-rehabilitation?

- More cost-effective
  - utilise community resources
  - multiple subjects / sites
- Real-time link allows interaction
  - instructor - subject
  - subject - subject
- 'Group' has advantages over 1:1 intervention
  - CDSMP model

## Video conferencing link



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## An example: Diabetes

Aim: to examine the effect of a self-management program in elderly DM patients via teleconference

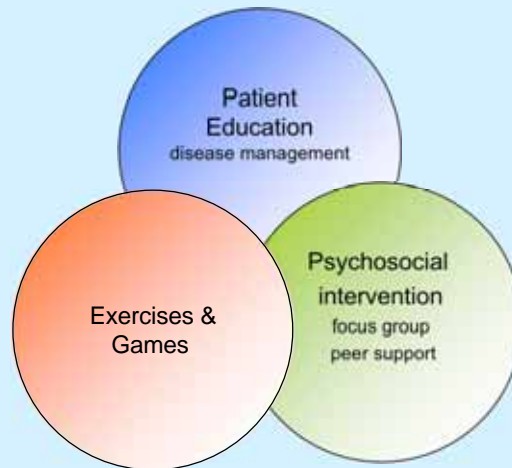
- Features:
  - 8 sessions
  - 1 one-hour session/ week
  - Groups of 8 – 12 patients
- Outcome measures:
  - Diabetes quality of life questionnaire (DQOL-revised)
  - SF-36
  - DM knowledge test
  - 24-hours dietary recall



Dietary advice

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# Program Content



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## Exercise training

- The whole exercise session lasted for 30 minutes.
- It started with a 5-minute warm up



- 10-minute resistance training with the use of elastic tubing (Theraband®)



- Followed by a 10-minute aerobic dance



- And ended with a 5-minute cool down or progressive muscle relaxation training.

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## Foot examination & blood sugar monitoring



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## Key Findings

Significant changes were observed in the following outcomes:

- Diabetes Knowledge Test
- Mean post-prandial blood glucose (12 → 8 mmmol/l)
- Nutritional status
  - Dietary intake (carbohydrates, protein, fat)
  - Body Mass Index (25.4 → 24.9)
  - Sig weight reduction in 36% of subjects
- QOL
  - Diabetes QOL questionnaire (*all* domains)
  - SF-36 (6 out of 8 domains)

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## Publications

- **Telemedicine in rehabilitation**  
Elsie Hui. In *Teleneurology*, 2005; Royal Society of Medicine Press Ltd. Eds. Richard Wootton & Victor Patterson
- **DM**  
Chan WM, Woo J, Hui E et al. A Community model for care of elderly people with diabetes via telemedicine. *Applied Nursing Research* 2005;18:77-81
- **OA**  
Wong YK, Hui E, Woo J. A community-based exercise programme for older persons with knee pain using telemedicine. *J Telemed telecare* 2005;11:310-315
- **Stroke**  
JCK Lai, J Woo, E Hui, W M Chan. Telerehabilitation – a new model for community based stroke rehabilitation. *J Telemed Telecare* 2004;10:199-205
- **Dementia**  
Poon P, Hui E, Dai D, et al. Cognitive intervention for community-dwelling older persons with memory problems: telemedicine versus face-to-face treatment. *Int J Geriatr Psychiatry* 2005;20:285-286.
- **Urinary incontinence**  
Hui E, Lee PSC, Woo J. Management of urinary incontinence in older women using videoconferencing versus conventional management: a randomised controlled trial. *J Telemed Telecare* 2006;12:343-347

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## Conclusions

- Community-based group rehabilitation programs incorporating **exercise prescription, education and peer support** can improve patients' **physical and psychological** outcomes in various common chronic diseases.
- The programs should be part of a **comprehensive care package** offered to patients with chronic diseases.
- **Community centres** for older persons are the ideal location for running these programs.
- **Teleconferencing** is a feasible and acceptable means to deliver such programs, and allows health care professionals to reach out to more patients in the community.

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## Success & Failure in Tele-geriatrics (our experience)

### Success

- 'Believers'
  - Service users
  - Service providers
- User-friendly equipment
  - Commercially available
  - affordable
  - High / low end
- High volume
  - Nursing homes, social centres
  - Multidisciplinary
  - Health promotion & maintenance

### Failure (Limitations)

- Skepticism
- Techno-phobia
- Stethoscope
- Home alone
- Changes in health care delivery model
  - Visiting Medical Officer after SARS

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Thank you

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