Telehealth – Management of High Risk Elderly

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Hong Kong East Cluster, Hospital Authority
Outline

- Who are the High Risk Elderly?
- Where & How can we locate them?
- What are the Strategies to manage them in the Community with the aid of IT?
- Examples of intervention services
- Critical Success Factors
High Risk Elderly

- Risk of frequent admissions
- Risk of accidents and falls
- Risk of increased complications from their drugs and diseases
- Risk of increased morbidity
- Risk of increased mortalities
# Elderly A&E admission

<table>
<thead>
<tr>
<th>Year 2006</th>
<th>Total</th>
<th>Aged ≥ 65 (%) of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HK Resident Population(^1)</td>
<td>6,864,346</td>
<td>852,796 (12.4)</td>
</tr>
<tr>
<td>A&amp;E admission (MED)(^2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of patients</td>
<td>166,929</td>
<td>107,189 (64.2)</td>
</tr>
<tr>
<td>No. of episodes</td>
<td>258,836</td>
<td>181,023 (69.9)</td>
</tr>
</tbody>
</table>

Elderly accounted for a disproportionate high share of medical emergency admissions of public hospitals.

Source:  
1. 2006 Population By-census, Census & Statistics Department  
2. Data Warehouse
Figure 2: Average No. of Bed Days for 1,000 Persons in Each Age Group (2002)
Who are the High Risk Elderly persons

– 30,356 elderly has unplanned readmission

  • Living in RCHE (11,453)
  • Living in Community (18,903)
    – Frequent hospital admissions ($\geq$ 3 acute admission in one year) 13,011
    – Multiple pathology ($\geq$ 3 co-morbidity)
    – Special diagnostic group (CHF, COPD, Dementia, Malignancy)

Targets of HARRPE

Hospital Admissions Risk Reduction Program for the Elderly
Real Life Situations
Their devices

Bed Sores
Their Drugs
How can we pick them up?

- Clinical Assessment
- High Risk Elderly Database
- HA Risk Prediction Model
- The Hidden Elderly Project
Clinical Assessment

• All patients are assessed for
  – Risk of avoidable hospitalisation
  – Service needs of the patients and care-givers
• Multi-disciplinary assessment
• Tools
  – Minimum Data Set-Home Care (MDS-HC)
  – Standardised Care Need Assessment Management (SWD)
  – High Risk Elderly System
  – Probability of Repeat Hospital Admissions Score (Pra score)
  – Frailty Index (Canadian Study of Health and Aging)
Using IT to help

- Electronic Patient Records System
- High Risk Elderly Alert System
- Hospital Admissions Risk Prediction Model
- Telephone Nursing Consultation Service
- Personal Emergency Link
- Tele-medicine Consultations
High Risk Elderly Alert

- Computer batch job at 3am daily
- Scanning whole HA corporation for patients flagged as high risk
- For AED attendance, admissions, discharge and death
- Summary reports downloaded by community teams for immediate actions and follow up
- To date a total of 10490 active cases are marked as high risk (10% of >65 in HKEC)
MRO retrieved High-risk Cases

- With the aid of CDARS (Clinical Data Analysis and Reporting System)
- Elderly patients discharged from Department of Medicine & Geriatrics in HKEC hospitals and fit 2 out of 3 of the following criteria:
  - Frequent hospital admissions
    - >= 3 acute medical admissions in one year
  - Multiple pathology
    - >=3 co-morbidities
  - Special diagnostic groups
    - Congestive Heart Failure, Chronic Obstructive Airway Disease, Chronic Renal Failure, Malignancy
### High Risk Elderly Report

**PAMELA YOUDE NETHERSOLE EASTERN HOSPITAL**
**CLINICAL MANAGEMENT SYSTEM**

Report on High Risk Elderly Admission/Discharge during 17/05/2005 to 18/05/2005

**High Risk Category: CGAT**

<table>
<thead>
<tr>
<th>HKID</th>
<th>Patient name</th>
<th>Sex</th>
<th>Age</th>
<th>Death date</th>
<th>Case no</th>
<th>Adm hosp</th>
<th>Source</th>
<th>Adm dtm</th>
<th>Dis. dtm</th>
<th>Dest</th>
<th>Last Bed</th>
<th>Last Bed spec</th>
<th>Ward no</th>
<th>Home</th>
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<tbody>
<tr>
<td>80333765</td>
<td>KOK, KWEI</td>
<td>M</td>
<td>83</td>
<td></td>
<td>HN05009223V</td>
<td>RH</td>
<td>4</td>
<td>17/05/2005</td>
<td></td>
<td></td>
<td>GERA A4</td>
<td>28 SHUN FUK HOME FOR AGED</td>
<td>(CHAI WAN BRANCH): CY - CHAI WAN ROAD 229, SHOP G ON GF, 1/F 7 SHOP G ON 2/F, WAI TAI MANSC.null</td>
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<td>A4072475</td>
<td>CHEUNG, YUEN YU</td>
<td>F</td>
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<td>HN05009216S</td>
<td>RH</td>
<td>4</td>
<td>17/05/2005</td>
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<td></td>
<td>GERA B4</td>
<td>23 SUN LIGHT (GERIATRY CENTRE (C.W.): CY - CHAI WAN ROAD 111, 2/F, Rm 3</td>
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<td>A7644615</td>
<td>AU, KWOK</td>
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<td>73</td>
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<td>AINM A7</td>
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<td>R9039185</td>
<td>TSE, SAU CHUN</td>
<td>F</td>
<td>62</td>
<td></td>
<td>HN05009222X</td>
<td>RH</td>
<td>3</td>
<td>17/05/2005</td>
<td></td>
<td></td>
<td>AING B4</td>
<td>37 T.W.G.HS. YU CHUN KENG MEMORIAL CARE AND ATTENTION HOME: WCH - WONG CHUK HANG PATH 2, PORTION OF LOWER LEVEL EAST, WEST &amp; N/E M/F, WAI TAI MANSC.null</td>
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<td>A1060097</td>
<td>CHAN, SO</td>
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<td>HN05009205X</td>
<td>RH</td>
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<td>17/05/2005</td>
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<td></td>
<td>GERA B4</td>
<td>09 T.W.G.HS. YU CHUN KENG MEMORIAL CARE AND ATTENTION HOME: WCH - WONG CHUK HANG PATH 2, PORTION OF LOWER LEVEL EAST, WEST &amp; N/E M/F, WAI TAI MANSC.null</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**High Risk Category: ALL**

**Start Date:** 17/12/2003

**End Date:** 22/12/2003

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**Retrieved:** 5 records

**Page Up** | **Page Down** | **Close**
The Risk Prediction Model

Index episode

An encounter with elderly (aged 65+) during:
- Attendance at A&E for medical conditions
- Emergency admission to acute medical ward
- Elective admission to acute medical ward
- Attendance at medicine specialist outpatient clinic

HARRPE focus on A&E admission (MED) in view of cost-effectiveness

Look back period

Discharge Alive

Day 0

14 Predictors:
- Socio-demographics: Sex, Age and On social security allowance (CSSA) or not
- Prior utilization in past 1 year: No. of A&E attendances (MED), No. of unplanned readmissions (MED), No. of A&E admissions (MED) [excluding unplanned readmissions], No. of acute and non-acute patient days (MED)
- Co-morbidity: COAD, Congestive heart failure, Cancer, Whether treated with renal dialysis in past 1 year and No. of distinct diagnosis groups
- Index episode: Which type

Risk Prediction Model

Look forward period

To predict the probability of A&E admission (MED) in 28 days ahead

Risk stratification
Data Elements for the Computation of Risk of A&E Admission (Medical Specialty)

1. Type of admission (current episode)
2. Male Sex
3. Age
4. CSSA recipient
5. No of A&E 1st attendances
6. No of unplanned readmissions (MED)
7. No of A&E admissions (MED)
8. No of acute patient days (MED)
9. No of non-acute patient days (MED)
10. Chronic obstructive airway disease (COAD)
11. Heart Failure
12. Cancer
13. Ever treated with Haemodialysis or Peritoneal Dialysis (for Renal patient) in the past 1 year
Data Elements for the Computation of Risk of A&E Admission (Medicine Specialty)

14. No of distinct diagnosis groups ever coded in CMS

1. Nutritional deficiencies
2. Malignant neoplasms
3. Diabetes mellitus
4. Epilepsy
5. Dementia, other degenerative & hereditary CNS disorders
6. Parkinson disease
7. Ischaemic heart disease
8. Heart failure
9. Cerebrovascular disease
10. Chronic obstructive pulmonary disease
11. Bronchiectasis
12. Cirrhosis of liver
13. GI haemorrhage
14. Chronic renal failure
15. Chronic ulcer of skin
Development vs Validation of Risk Prediction Model

Development dataset
2005
No. of episode: 1,167,521
No. of headcount: 304,900

Validation dataset
1Q 2006
No. of episode: 294,749
No. of headcount: 195,448

Model building

Model validation

Model
Model Discrimination Performance by Area Under ROC Curve

“Receiver Operating Characteristics”

ROC curve (Development Dataset)

AUC = 0.821

ROC curve (Validation Dataset)

AUC = 0.825

Model Predictive Performance: Good discrimination power (Area under ROC curve = 0.82 for both development & validation dataset)
TNCS

- Telephone Nursing Consultation Service
- Started Jan 2003, full function Jun 2004
- Supporting an active pool of 4558 high risk elderly in the community setting (excluding those in residential care homes)
- Becoming the HARRPE in 2007
早晨，「護訊鈴」，我喺陳姑娘，請問有咩可以幫到你？

我食咗D血壓藥後就覺得好頭暈，姑娘，點算呀？
宗旨
透过電話聯絡，為居住於社區內的體弱高危人士提供延續性之護理及社區支援。

對象
經「護訊鈴」審核及評定之體弱高危人士。

如何使用「護訊鈴」?
只需致電 2572 6896 便有註冊護士解答你的查詢

服務內容
護士透過電話的聯絡，按個別需要提供以下服務：
- 即時評估
- 護理指導
- 藥物指導
- 營養指導
- 健康教育
- 諮詢醫生及各專職醫療的專業意見
- 轉介往物理治療、職業治療、社康護士等
- 介紹及轉介社區資源，如長者地區中心、家居照顧服務等
- 安排提早覆診
- 安排入院檢查及治療

為確保服務質素，電話對話可能會被錄音

服務時間
星期一至五
- 上午八時至下午八時

星期六、日及公眾假期
- 上午八時至下午四時
28 Telephone Triage Protocols Developed

- Abdominal Pain
- Appetite Loss
- Back Pain
- Black / Bloody stool
- Chest Pain
- Confusion
- Constipation
- Cough
- DM
- Diarrhoea
- Dizziness
- Falls
- Fatigue
- Fever
- Headache
- Hemorrhoids
- Hypertension
- Hypotension
- Insomnia
- Itching
- Joint Pain / Swelling
- Leg Pain / Swelling
- Numbness and tingling
- Rash
- SOB
- Skin Lesions
- Swallowing Difficulty
- Weakness
# Develop 50 more clinical protocols

<table>
<thead>
<tr>
<th>Condition</th>
<th>Condition</th>
<th>Condition</th>
<th>Condition</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasions</td>
<td>Depression</td>
<td>Hearing Loss</td>
<td>Muscle Cramps</td>
<td>Suicide Attempt, Threat</td>
</tr>
<tr>
<td>Allergic Reaction</td>
<td>Domestic Abuse</td>
<td>Heartbeat, Rapid</td>
<td>Nausea/Vomiting, Adult</td>
<td>Swelling</td>
</tr>
<tr>
<td>Altered Level of Consciousness</td>
<td>Eye Injury</td>
<td>Heartbeat, Slow</td>
<td>Neck Pain</td>
<td>Tongue Problems</td>
</tr>
<tr>
<td>Ankle Problems</td>
<td>Eye Problems</td>
<td>Heartburn</td>
<td>Nosebleed</td>
<td>Toothache</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Facial Pain</td>
<td>Hoarseness</td>
<td>Overdose</td>
<td>Urination, Difficulty</td>
</tr>
<tr>
<td>Arm or Hand Problems</td>
<td>Fainting</td>
<td>Hypothermia</td>
<td>Scabies</td>
<td>Urination, Painful</td>
</tr>
<tr>
<td>Asthma</td>
<td>Finger and Toe Problems</td>
<td>Jaundice</td>
<td>Seizure</td>
<td>Urine, Abnormal Color</td>
</tr>
<tr>
<td>Bone, Joint and tissue Injury</td>
<td>Foot Problems</td>
<td>Jaw pain</td>
<td>Shoulder Pain</td>
<td>Vision Problems</td>
</tr>
<tr>
<td>Bruising</td>
<td>Gas/Flatulence</td>
<td>Knee Pain/Swelling</td>
<td>Sore Throat</td>
<td>Wheezing</td>
</tr>
<tr>
<td>Dehydration</td>
<td>Head Injury</td>
<td>Mouth Problems</td>
<td>Stools, Abnormal</td>
<td>Wound Healing and Infection</td>
</tr>
</tbody>
</table>
**ABDOMINAL PAIN**

Key Questions: Name, Age, Onset, Recent surgery, Injury

A. Are any of the following present?
   - Severe pallor
   - Loss of consciousness
   - Signs of shock
   - Severe persistent pain
   - Fainting/lightheadedness
   - Vomiting blood or dark coffee—ground-like emesis
   - Rapidly worsening of symptoms

   **Recommendation**
   - YES
     - Seek Emergency Care
   - NO
     - Go To B

B. Are any of the following present?
   - History of recent abdominal surgery
   - RLQ pain with poor appetite, nausea and/or vomiting, or fever
   - Bloody or black stools
   - Ingestion of new medication
   - Severe nausea and vomiting
   - Temperature > 101°F (38.3°C)

   **Recommendation**
   - YES
     - Medical care within 2-4 hrs
   - NO
     - Go To C

C. Are any of the following present?
   - History of hepatitis or exposure
   - Unexplained progressive abdominal swelling
   - Painful or difficult urination
   - Blood in urine
   - Pain interferes with activity

   **Recommendation**
   - YES
     - Medical care with 24 hrs
   - NO
     - Go To D
D. Are any of the following present?
- Vaginal or urethral discharge
- Nausea, vomiting, diarrhea for more than 24 hours
- History of abdominal pain and usual treatment is ineffective
- Constipation
- History of irritable bowel
- Significant increase in stress level
- Intermittent mild pain associated with an empty stomach, eating certain foods, or use of antibiotic, or anti-inflammatory medications
- Mild infrequent diarrhea
- Other family members are ill

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Home Care Instructions: Abdominal Pain,

- Clear liquids or bland for 12 to 24 hours.
- Take medications as directed by your doctor
- Apply heat (moist hot towel or heating pad) to the abdomen for cramping.

Additional Instructions:

Report the Following Problems to Your TNCS/GP/GOPC
- Severe pain > 2 hours and relieve by general measure
- Fever
- Bloody or black stools or emesis
- Pain worsens with heat or activity

Seek Emergency Care Immediately If Any of the Following Occur
- Unusually firm or hard abdomen
- Persistent vomiting
- Severe persistent pain
- Fainting/lightheadedness
### Patient Information

- **Case:** [Redacted]

### General Info.

- **Assessment:** [Redacted]
- **Intervention 1:** [Redacted]
- **Intervention 2:** [Redacted]
- **F.U. Call:** [Redacted]
- **Return Call:** [Redacted]

#### Referral Date
- **Date:** 11-08-2005

#### Initial Call

- **Date & Time:** 00-00-0000
- **Called by:** [Redacted]
- **Relationship with patient:** [Redacted]
- **Finished at:** 00-00-0000
- **Name of Caller:** [Redacted]
- **Tel. No.:** [Redacted]

### Membership Status

- Under the care of Post Discharge Follow-up Programme
- Under the care of Home Help Service
- High risk elderly data base project

### Other Relevant Information

#### Regular F.U. in O.P.
- **Name of O.P.:** [Redacted]
  - **Yes:** [Redacted]
  - **No:** [Redacted]

#### Regular F.U. in other Clinics
- **Name of Clinic:** [Redacted]
  - **Yes:** [Redacted]
  - **No:** [Redacted]

#### Current Community Support
- **Home Help:** [Redacted]
  - **CNS:** [Redacted]
  - **Others:** [Redacted]
- **AHCP:** [Redacted]

**Created by:** [Redacted] on [Redacted]
Daily operations of TNCS

- **Service Hours**
  - Mon - Fri: 8am – 8pm
  - Sat, Sun & Holidays: 8am – 4pm

- **Manpower**
  - 4 Full Time Equivalent Registered Nurses
  - 1 Clerk
  - 1 Advanced Practice Nurse
## Workload of TNCS in Mar 08

<table>
<thead>
<tr>
<th></th>
<th>Mar 08</th>
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</thead>
<tbody>
<tr>
<td>No of patients registered</td>
<td>5998</td>
</tr>
<tr>
<td>No of active cases</td>
<td>4558</td>
</tr>
<tr>
<td>No of calls made/month</td>
<td>2313</td>
</tr>
<tr>
<td>Average duration/call (min)</td>
<td>11.5</td>
</tr>
<tr>
<td>No of calls initiated by nurses</td>
<td>1809</td>
</tr>
<tr>
<td></td>
<td>(78.2%)</td>
</tr>
<tr>
<td>No of calls initiated by patients / care-givers</td>
<td>504</td>
</tr>
<tr>
<td></td>
<td>(21.8%)</td>
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</tbody>
</table>
## Triage

<table>
<thead>
<tr>
<th>Advice given (multiple choices)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to A&amp;E Department</td>
<td>16</td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td>See G.P. within 24-48 hours</td>
<td>8</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>See GOPD within 24-48 hours/ (no. of cases referred by TNCS nurses)</td>
<td>33(1)</td>
<td>38(6)</td>
<td>33(5)</td>
</tr>
<tr>
<td>Book early F.U. appointment</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Arrange Ad hoc doctor's clinic</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Arrange direct admission to hospital (PYNEH/RHTSK/WCHH)</td>
<td>8</td>
<td>2/3/0</td>
<td>3/0/0</td>
</tr>
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</table>
## Triage & Advices

<table>
<thead>
<tr>
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<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
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</thead>
<tbody>
<tr>
<td>Refer to CNS/CGAC/GDH</td>
<td>44/0/0</td>
<td>35/0/0</td>
<td>33/0/0</td>
</tr>
<tr>
<td>Refer to Allied Health</td>
<td>5</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Health Education</td>
<td>1461</td>
<td>1458</td>
<td>1423</td>
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<tr>
<td>Drug Management</td>
<td>1453</td>
<td>1409</td>
<td>1378</td>
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<tr>
<td>Environmental advice</td>
<td>1055</td>
<td>953</td>
<td>781</td>
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<tr>
<td>Information on community resources</td>
<td>1657</td>
<td>1594</td>
<td>1562</td>
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<tr>
<td>Refer to volunteer service</td>
<td>3</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Refer to DECC/IFSC</td>
<td>6/5</td>
<td>12/2</td>
<td>13/2</td>
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<tr>
<td>Others</td>
<td>1323</td>
<td>1213</td>
<td>1251</td>
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</table>
HARRPE Program

- Invite patient to be member of TNCS
- Active phone follow-up:
  - Upon discharge from ward/AED
  - 3 days after the initial call + as necessary
- Phone consultation from patient/care giver
- CNS home follow-up
  (score \( \geq 0.3 \) + unplanned readmission)
- Community Support from NGOs
- Case conference
- HARRPE clinic
Strong Backup System

- Direct clinical admissions
- Early follow-up appointments in SOPD
- Ad hoc doctor’s clinics
- Advice from experts – Medical/NS/Allied Health
- Refer to CNS/Community allied health
- Support from Patient Resource Center
- Medical support after normal service hour from Department of Medicine, RHTSK and + PYNEH
Results

- Outcomes evaluated in terms of hospital utilization statistics, and 90 days mortality rates
- Patient and care-givers satisfaction
- Significant reduction of hospital resources utilization
- Good cost benefit ratios
Outcomes
Decreased Total AED Attendance

Episodes of AED Attendance

Control Group: 85
TNCS Group: 54

No of episodes

p=0.025
36.5%
Outcomes
Decreased Total Emergency Admissions

Episodes of Emergency Admission

<table>
<thead>
<tr>
<th>Episodes of Emergency Admission</th>
<th>No. of Episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL GROUP</td>
<td>67</td>
</tr>
<tr>
<td>TNCS GROUP</td>
<td>43</td>
</tr>
</tbody>
</table>

\[ p = 0.05 \]

\[ \text{Reduction} = 35.8\% \]
Study Methodology

- 476 patients recruited 26/07 – 14/09/2007
  - Treatment group: 249
  - Control group: 227
- Randomly assigned to
  - Treatment group
  - Control group (conventional, no TNCS)
- Demographic Data compared
- Evaluates the outcomes after 28 & 90 days
  - A&ED attendance
  - Number of admissions
  - Length of Stay
# Results - Demographics

<table>
<thead>
<tr>
<th></th>
<th>Control Group (n = 227)</th>
<th>HARRPE Group (n = 249)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>80.76</td>
<td>79.76</td>
<td>0.244</td>
</tr>
<tr>
<td><strong>Sex</strong> M:F</td>
<td>121 : 106</td>
<td>131 : 118</td>
<td>0.960</td>
</tr>
<tr>
<td><strong>No. of regular medications</strong></td>
<td>6.46</td>
<td>6.93</td>
<td>0.776</td>
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<tr>
<td><strong>HARRPE score</strong></td>
<td>0.26647</td>
<td>0.25187</td>
<td>0.054</td>
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All Comparable (p>0.05)
## Post 28 days’ data

<table>
<thead>
<tr>
<th>No. of Episodes</th>
<th>Control N=227</th>
<th>Treatment N=249</th>
<th>Relative Reduction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned readmissions</td>
<td>61</td>
<td>52</td>
<td>↓ 22.3%</td>
</tr>
<tr>
<td>A&amp;ED Attendances</td>
<td>82</td>
<td>67</td>
<td>↓ 5.5%</td>
</tr>
<tr>
<td>Clinical admissions</td>
<td>46</td>
<td>32</td>
<td>↓ 36.6%</td>
</tr>
<tr>
<td>Total Bed Days (unplanned adm)</td>
<td>426</td>
<td>329</td>
<td>↓ 29.6%</td>
</tr>
<tr>
<td>Total Bed Days (planned adm)</td>
<td>178</td>
<td>132</td>
<td>↓ 32.4%</td>
</tr>
</tbody>
</table>
### Post 28 days’ data – Multiple Utilization of Hospital Service

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>1st utilization</th>
<th>2nd utilization</th>
<th>&gt;2 utilizations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
<td>Treatment</td>
</tr>
<tr>
<td>Unplanned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AED</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Treatment</th>
<th>Control</th>
<th>Treatment</th>
<th>Control</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned</td>
<td>55</td>
<td>44</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Planned</td>
<td>30</td>
<td>28</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>AED</td>
<td>69*</td>
<td>54*</td>
<td>9</td>
<td>11</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Remarks: * p value = 0.036
## Post 90 days’ data

<table>
<thead>
<tr>
<th>No. of Episodes</th>
<th>Control N=131</th>
<th>Treatment N=134</th>
<th>Relative Reduction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned readmissions</td>
<td>110</td>
<td>79</td>
<td>↓ 29.8%</td>
</tr>
<tr>
<td>AED Attendances</td>
<td>148</td>
<td>99</td>
<td>↓ 34.6%</td>
</tr>
<tr>
<td>Clinical admissions</td>
<td>94</td>
<td>37</td>
<td>↓ 61.5%</td>
</tr>
<tr>
<td>Total Bed Days (unplanned adm)</td>
<td>986</td>
<td>715</td>
<td>↓ 29.1%</td>
</tr>
<tr>
<td>Total Bed Days (planned adm)</td>
<td>229</td>
<td>128</td>
<td>↓ 45.8%</td>
</tr>
</tbody>
</table>
### 28-day A&E admission & 90-day mortality for HKEC Study Cohort vs HKEC Control Cohort

<table>
<thead>
<tr>
<th></th>
<th>HKEC Study Cohort</th>
<th>HKEC Control Cohort</th>
<th>Change in Absolute Risk</th>
<th>Change in Relative Risk</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-day A&amp;E admission (MED)* rate %</td>
<td>15.66</td>
<td>22.12</td>
<td>- 6.46</td>
<td>- 29.2%</td>
<td>0.0715</td>
</tr>
<tr>
<td>90-day mortality rate %</td>
<td>6.02</td>
<td>11.95</td>
<td>- 5.92</td>
<td>- 49.6%</td>
<td>0.0232</td>
</tr>
</tbody>
</table>

* Note: A&E admissions (MED) also include EMW admissions with subsequent transfer to MED
Personal Emergency Response System
PE Link Service

- Elderly Alarm Pendants
- Senior Citizens Home Safety Association
Telegeriatrics

Ruttonjee Hospital
Shatin Hospital
Caritas Medical Centre

...
Key to Success

- One on One
- Pro-active
- Your NGO partners and other stakeholders are extremely important
Co-ordinate with relevant healthcare stakeholders

Volunteers

NGOs
District
Elderly Care Center

GOPCs
GPs

Community Allied Health
Community Nursing Service

Hospital Service

TNCS
The Bottom Line

- The revolving door phenomenon should no longer exist!
- Targeted one-on-one surveillance
- Proactive approach
- Liaise with your community partners
- Using Information Technology to help
- Ultimate benefits are to the elderly
Thank You