



Telemedicine in Chronic Lung Disease in Hong Kong

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Telemonitoring



COPD Assessment Test (CAT) - Mild-Moderate Disease



Pulse oximetry - Severe Disease with Hypoxic Risk



Home NIV - Very Severe Disease with Resp Failure



慢性阻塞肺病 COPD 評估問卷



這問卷幫助你及醫療人員評估慢性阻塞肺病(COPD)對你身心健康及日常生活的影響。測試結果及其分數可幫助你及肺病(COPD)的處理方法，及讓治療發揮最大的作用。

請就以下每題，選出一個最符合您現況的一格。請確保每題只選一個答案。

例子: 我十分快樂 0 1 2 3 4 5 我十分傷心

1

我沒有咳嗽

0 1 2 3 4 5

我不停咳嗽

Cough

2

我肺內完全沒有痰液

0 1 2 3 4 5

我肺內完全充滿痰液

Phlegm

3

我胸口完全沒有繃緊的感覺

0 1 2 3 4 5

我胸口感到十分繃緊

**Chest
tightness**

4

當我行上斜路或上一層樓梯時，
我沒有氣喘

0 1 2 3 4 5

當我行上斜路或上一層樓，
我感到十分氣喘

**Walking
Uphill**

5

我在家中的活動不受限制

0 1 2 3 4 5

我在家中的活動十分

**Home
Activities**

6

儘管我的肺部情況，
我仍有信心離家外出

0 1 2 3 4 5

因為我的肺部情況，
我完全沒有信心離家

**Confidence
leaving home**

7

我睡得很好

0 1 2 3 4 5

我因肺部情況而睡不

**Sleeping
soundly**

8

我精力充沛

0 1 2 3 4 5

我完全沒有精力

Energy level



				26/1	27/1	28/1	29/1
1	我沒有咳嗽	0-5	我不停咳嗽	Cough 1	4	3	3
2	我肺內完全沒有痰液	0-5	我肺內完全充滿痰液	Phlegm 1	5	3	3
3	我胸口完全沒有繃緊的感覺	0-5	我胸口感到十分繃緊	SOB 1	5	3	3
4	當我行上斜路或上一層樓梯時,我沒有氣喘	0-5	當我行上斜路或上一層樓梯時,我感到十分氣喘	1	4	4	5
5	我在家中的活動不受限制	0-5	我在家中的活動十分受限制	1	4	3	3
6	儘管我的肺部情況,我仍有信心離家外出	0-5	因為我的肺部情況,我完全沒有信心離家外出	1	3	3	4
7	我睡得很好	0-5	我因肺部情況而睡得不好	1	4	4	3
8	我精力充沛	0-5	我完全沒有精力	1	2	4	3
總分				8	31	27	27

- Overall CAT score increase ≥ 5 suggests the onset of an exacerbation
- Symptoms of exacerbation scores > 3 highlighted in red

Fast Track Clinic



Crisis pack



Phone advice



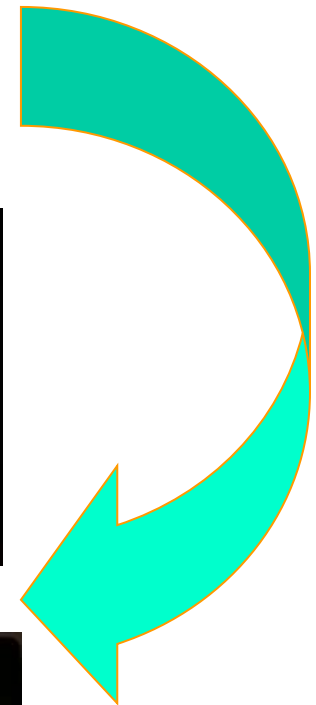
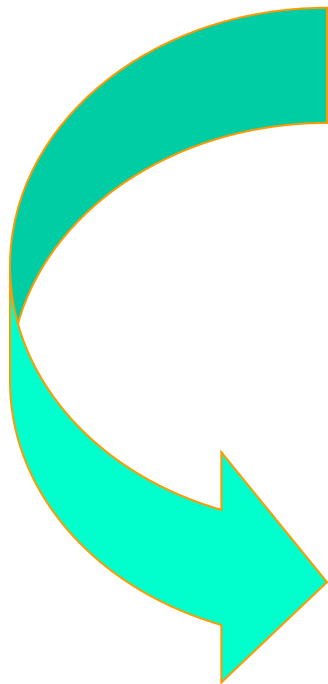
Responding to

Deterioration...

Community team



Automated Instruction based on symptom scores



Non-pharmacological treatment

- Animated demonstrations of breathing and coughing techniques

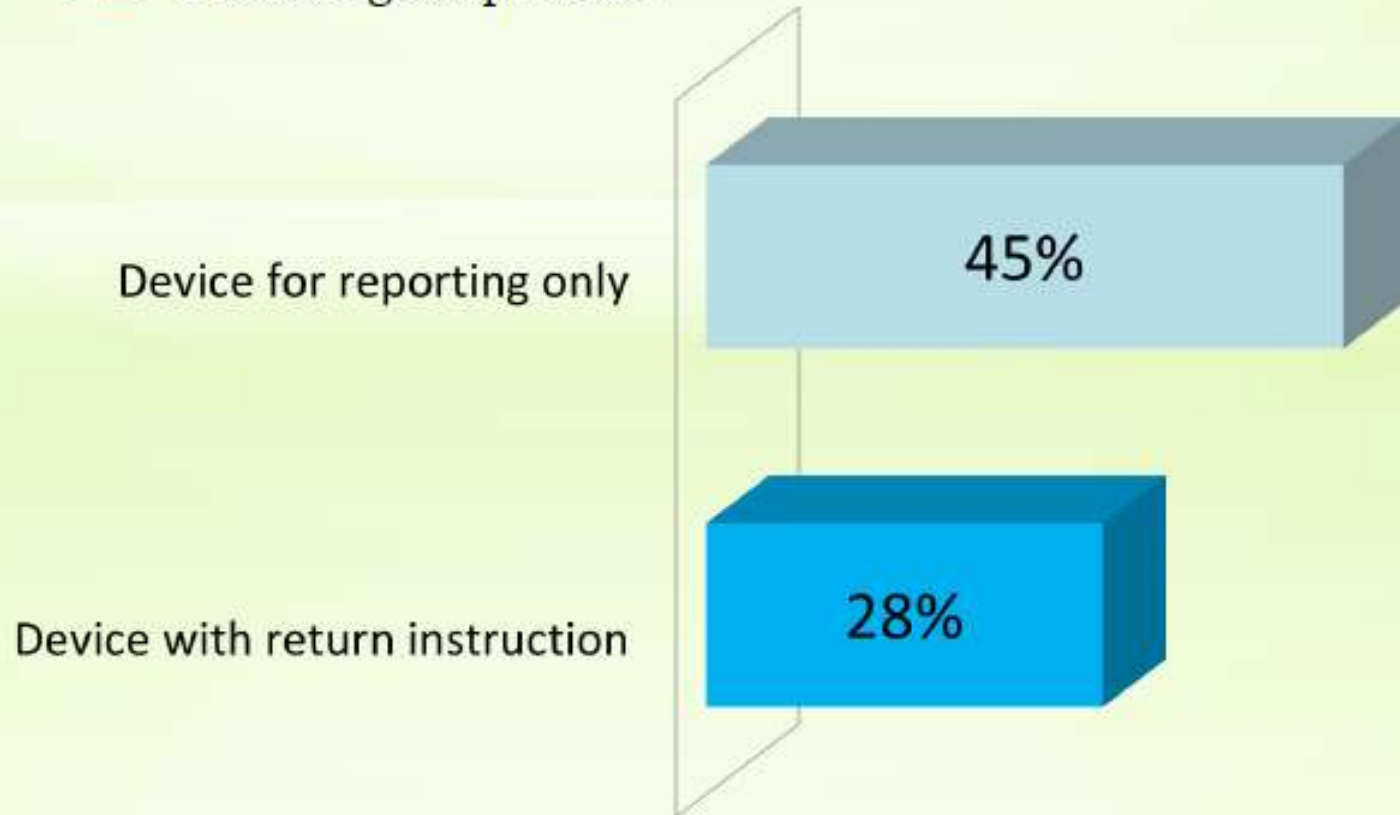


- Tips on energy conservation

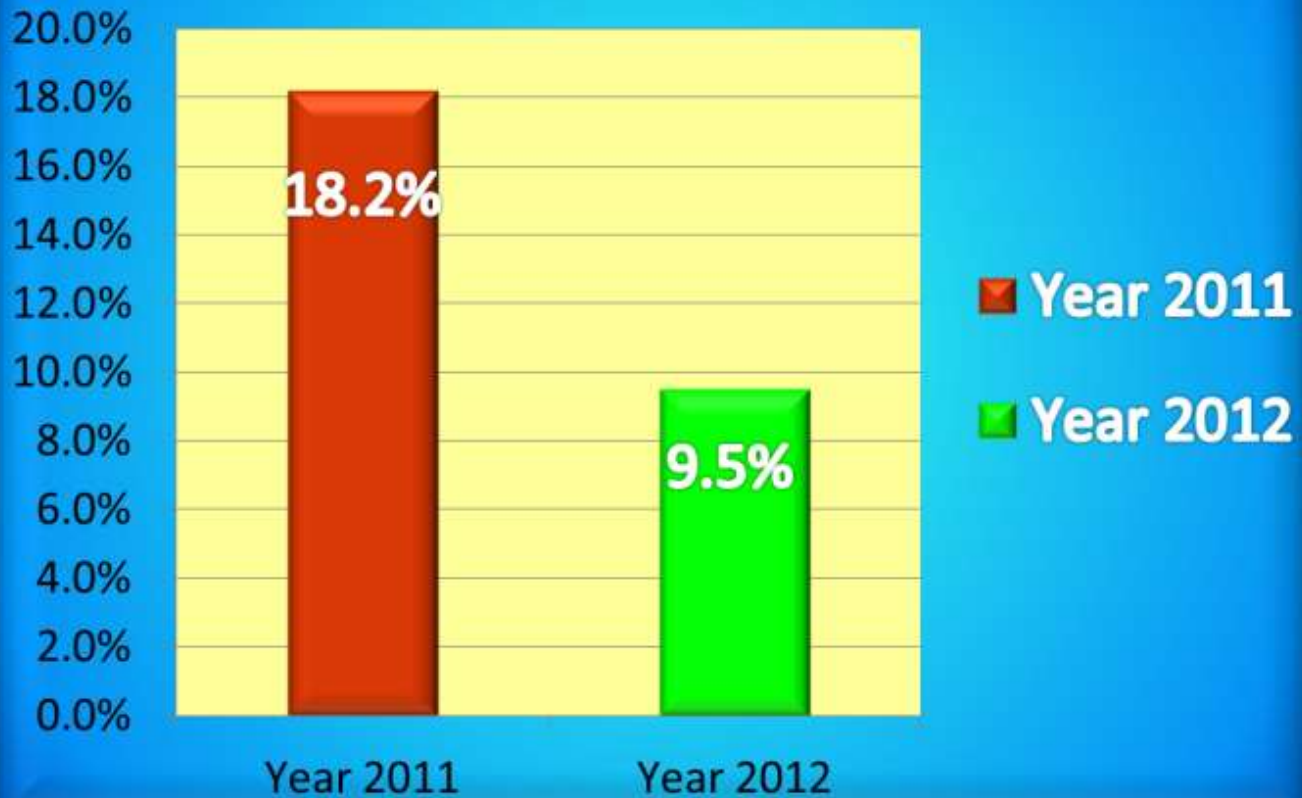


28-day re-exacerbation rate

Percentage of patients



28-day hospital re-admission in %



Telemonitoring



Mild-Moderate Disease



Pulse oximetry - Severe Disease with Hypoxic Risk



Very Severe Disease with Resp Failure





Patients and caregivers instructed on transmitting data to equipment company's server



Pulse Oximetry Telemonitoring Workflow



Pulse oximeters delivered to COPD patients' homes after informed consent



Oxygen concentrator arrangement



On-site assessment and intervention



Inhaler therapy advice



Crisis pack prescription after physician consultation

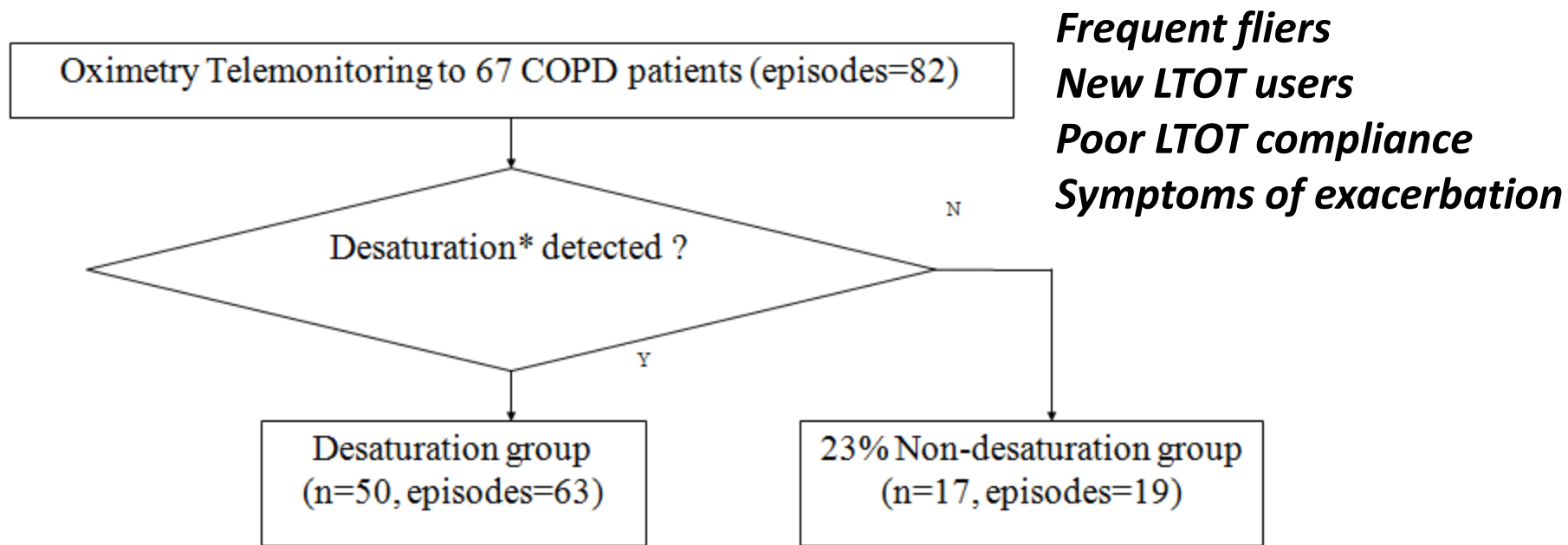


Phone advice on self management of COPD symptoms

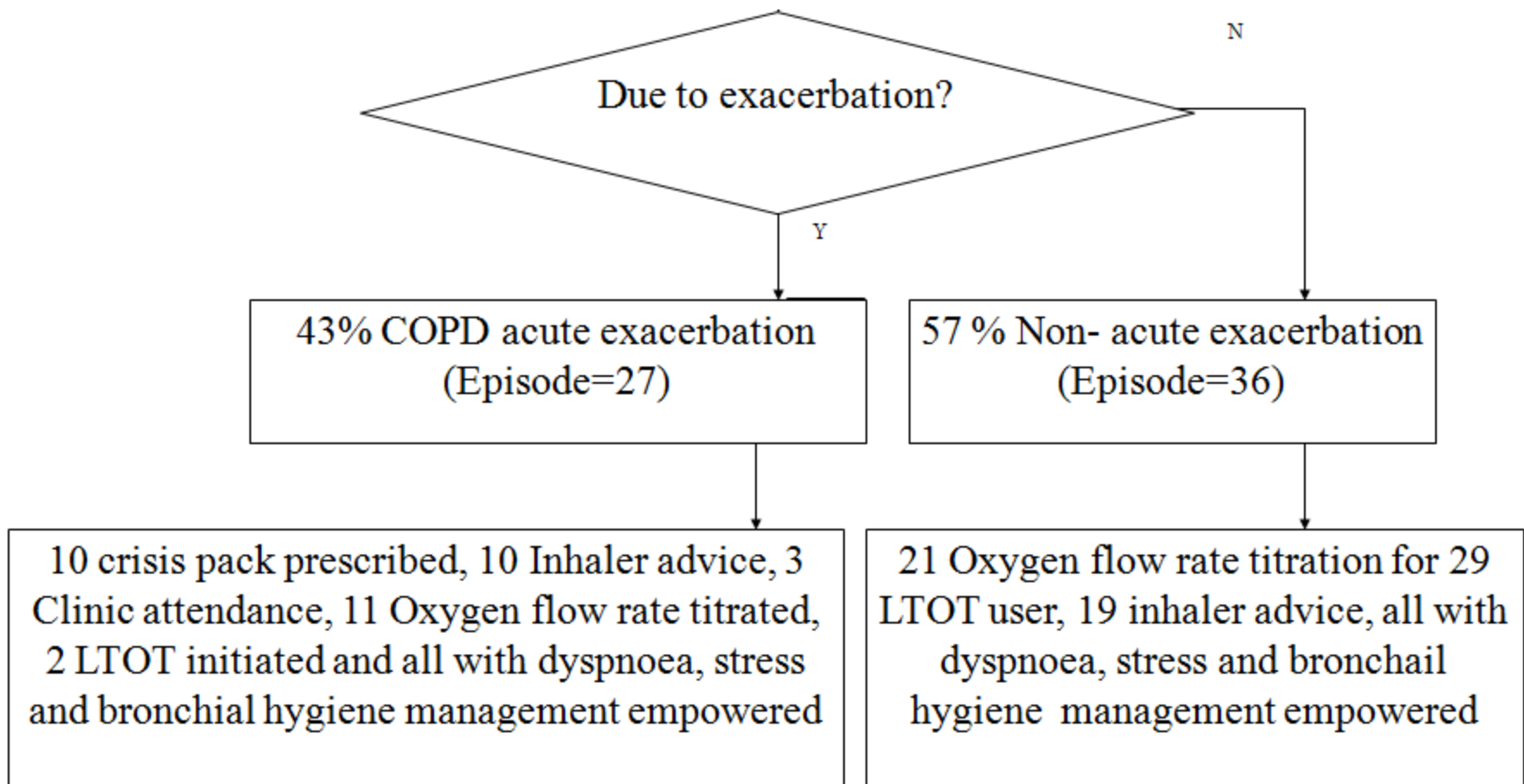
Telemonitoring Pulse Oximetry Enhances the Safety of High-Risk Respiratory Patients in the Community

Vong YP(1), Choo KL(2), Man CS(2), Tong MH(3), Cheung KY(1), Lam G(1), Tam KC(1), Leung SM(1), Lai KW(1), Chan YY (1), Lam WK(2), Cheung NY(2), Cho N(2), Chim CK(3), Lau E(2), Tong M(2), Chow A (1), ManCY(4), Fung H(5)

(1)Physiotherapy Department, (2)Medical Department, (3)Community Outreach Service Team, (4)North District Hospital Chief Executive, (5)New Territories East Cluster Chief Executive



Desaturation in 77% episodes among 50 patients



***Hospitalization avoided in 84% (42/50) patients
of the Desaturation group***

Low oxygen therapy compliance

- Among the 43 long-term oxygen therapy users,
- 35 episodes were related to poor compliance
 - 32 received titration of O2 flow rate
 - 19 required inhaler advice
 - All received training on breathing control and pacing of activities
 - 6 had suspected OSA features; referral for sleep study was made



2.4 kg



1.3 kg

68 hypoxic respiratory patients recruited from June 2013 to Feb 2014 from ward to community

- Comprehensive care for patients who required oxygen therapy:
1. Respiratory assessment
 2. Exercise tolerance assessment (6-min-walk Test)
 3. Breathing and stress management
 4. Trial of different oxygen devices after explanation
 5. Oximetry telemonitoring with POC if indicated

Suitable and competent
to use POC?

Y

N

Conventional group (n=51)
(Stationary oxygen concentrator and oxygen
cylinder)

POC group (n=17)
(Stationary oxygen concentrator and POC)

Cases completed one year review (n=39)

Conventional group (n=28)

- Mean daily physical activities: 2 hr 41 min
- Mean daily outdoor activities: 1 hr 17 min

POC group (n=11)

- Mean daily physical activities: **3 hr 22 min**
- Mean daily outdoor activities: **2 hr 16 min**

- **Mean daily oxygen usage** was **17h 46min** among all users
- **69.2%** reported using oxygen for **> 15 hours a day**
- ***Unplanned hospital readmission***
7.4% among **compliant users** vs.
16.7% oxygen users for **< 15 hours a day**

Telemonitoring



Mild-Moderate Disease



Severe Disease with Hypoxic Risk



Home NIV - Very Severe Disease with Respiratory Failure



Telemonitoring Work Flow



At Home

Point of contact
for patients

Patient education
& problem-solving

Monitoring
of data



Nurse
co-ordinator

Inform on changes in
patient condition

Doctor & nurse
discussion



Determine treatment
approach

Refer CPT for home visit
& problem-solving

Discuss the
intervention



GPRS
Network



Technical Team



Data Receiving,
Process and
Control Centre



Data
Storage
Centre



Internet

TeleTREK 關懷網

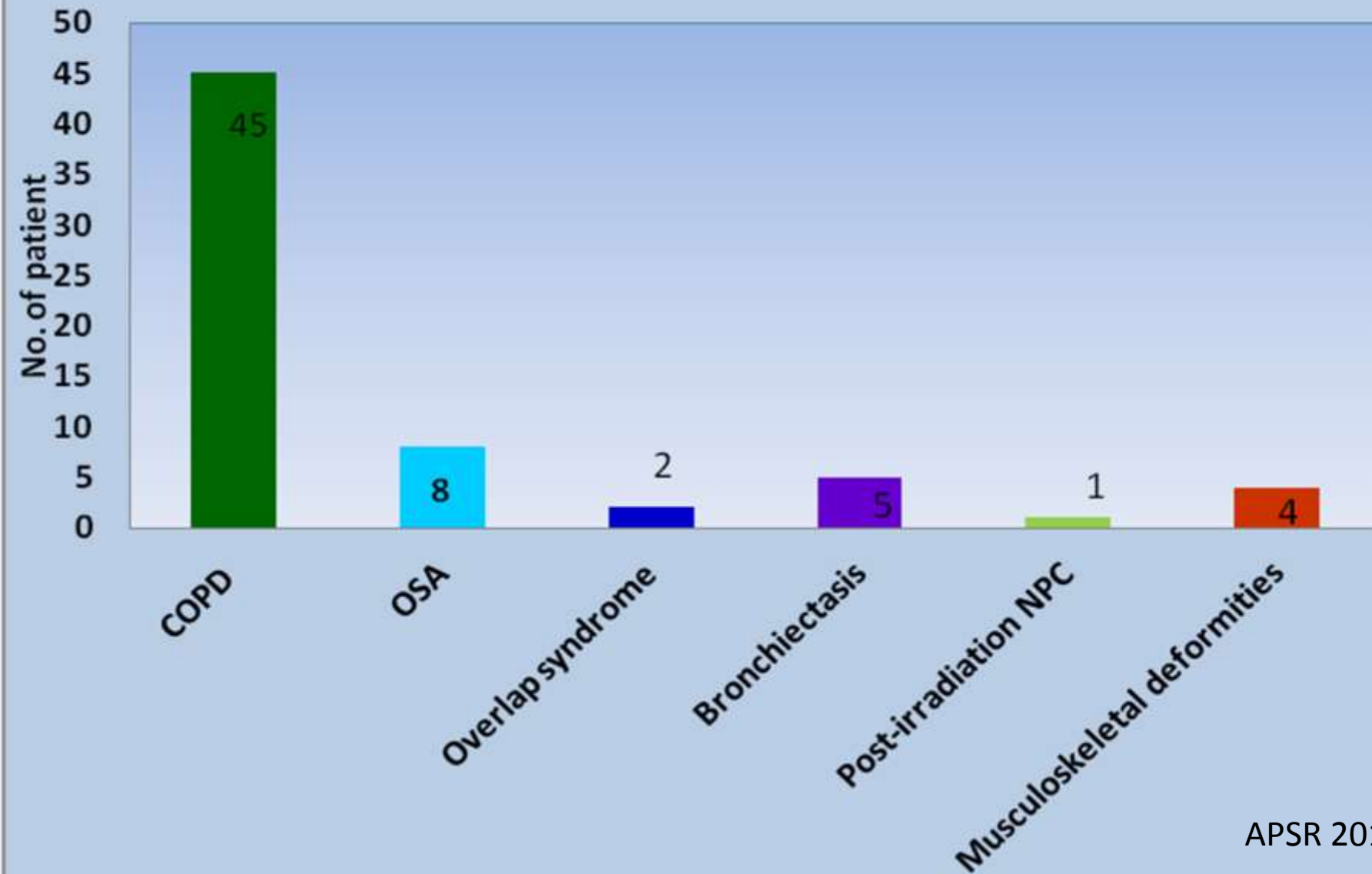
用戶登入 首次登記

已完成首次登記用戶, 在此登入

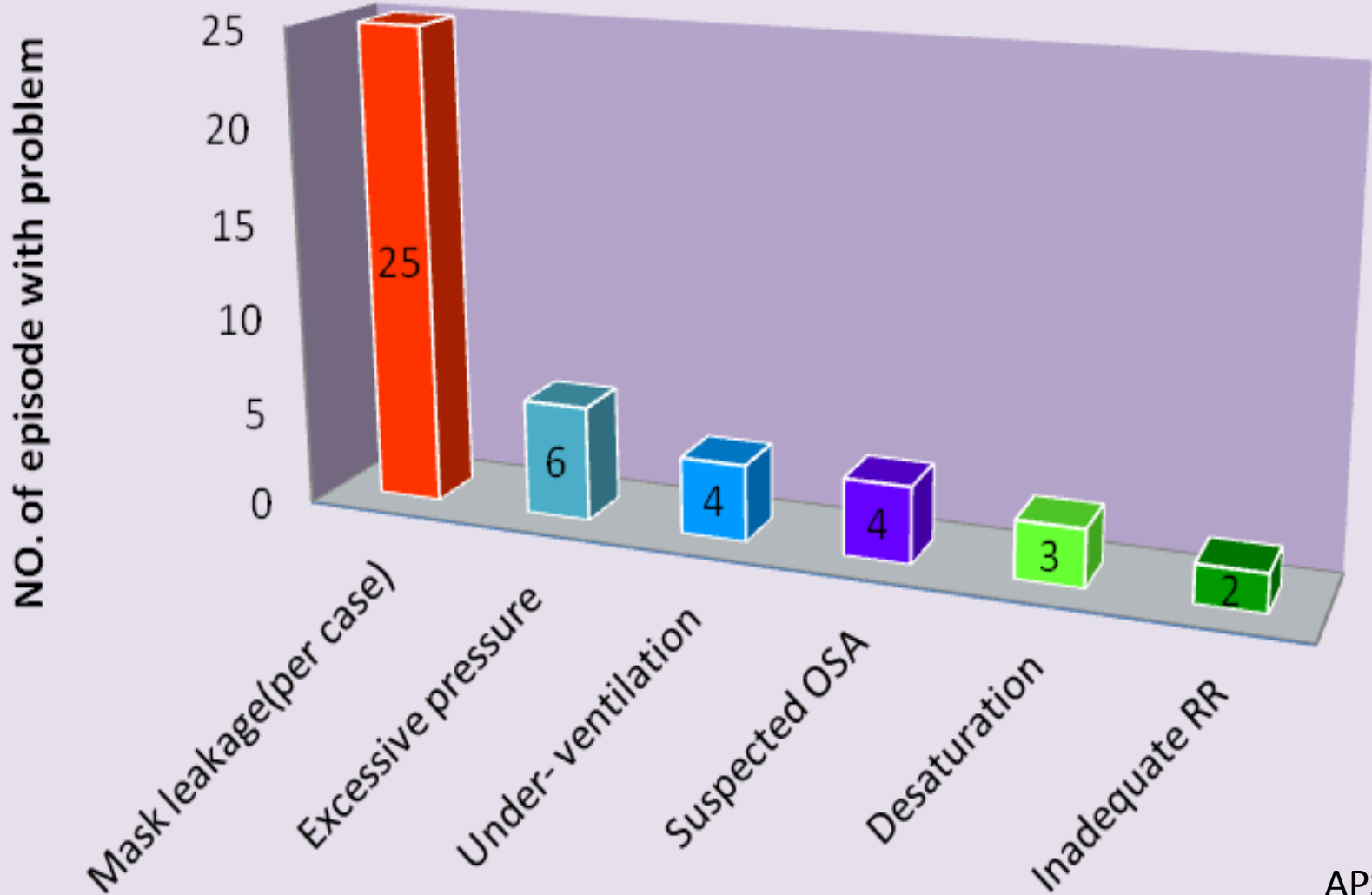
用戶名稱(已登記電郵)

密碼

The disease type of patients with Telemonitoring of NIV at home



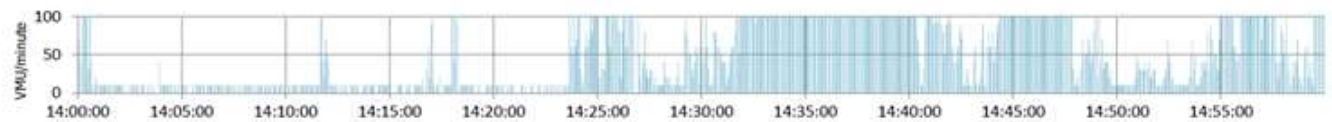
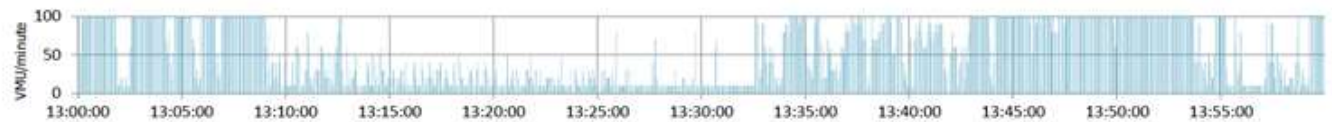
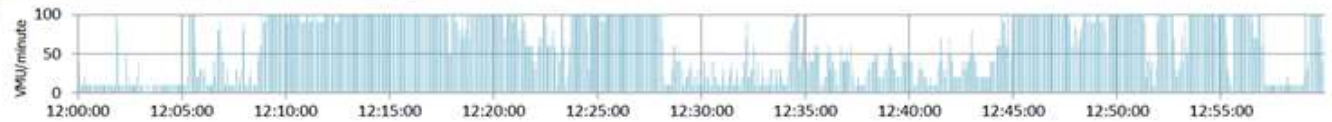
Main problems encountered during Telemonitoring



Workload

- 99 episodes of telemonitoring were provided to 65 patients (including 21 re-admitters) between May 2010 and May 2012
- 166 phone calls by respiratory nurse
 - 1.7 calls/patient
- 176 home visits by community physiotherapist
 - 1.8 visits/patient
- 28-day readmission was avoided for 67.6% of the episodes

Telerehabilitation



Physical Activity Telemonitoring

Active stage: activity > 50 VMU/minute

Target setting

- Weekly target based on total cumulative active VMU minutes in the previous week +25%
 - If total cumulative active VMU in week 2 is 300 min, target for week 3 will be 375 min
 - If cumulative active minutes less than 210 min per week, then starting target set at 210 min per week

Activity Monitoring

Weekly Dashboard

6th Jan 2016 - 12 Jan 2016

Ranking for the week



803
minutes



450
minutes

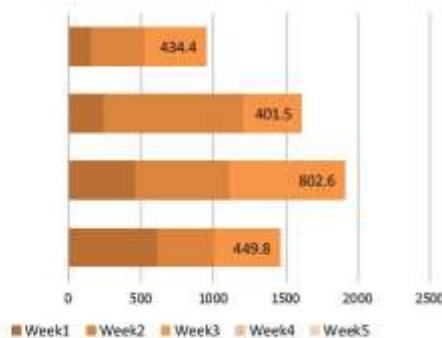


434
minutes



401
minutes

Overall cumulative ranking

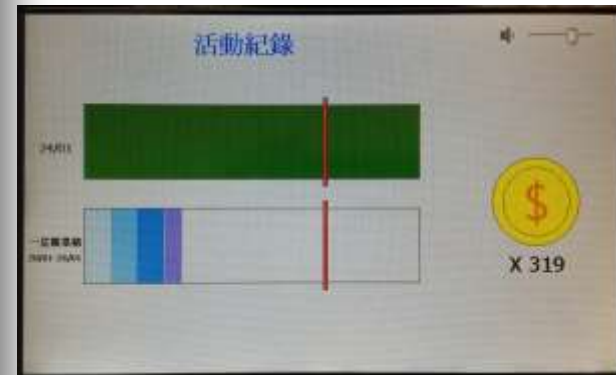


Week 1: 23rd Dec 2015 - 29th Dec 2015
Week 4: 13rd Jan 2016 - 19th Jan 2016

Week 2: 30th Dec 2015 - 5th Jan 2016
Week 5: 20th Jan 2016 - 26 Jan 2016

Week 3: 6 Jan 2016 - 12th Jan 2016

Pulmonary Rehabilitation Program participants





Telemonitoring



Crisis pack



Community team



Maintenance treatment



Thank you



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