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Mind the Gap: Uncovering Medication Adherence through Intake and Refill Discrepancies

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Outline

□ **By the end of today, you should be able to...**

- **A**ppreciate the concept and definition of medication adherence

- **B**e aware of the potential consequences of medication non-adherence

- **C**ompare and contrast various methods used to measure medication adherence

- **D**evelop an understanding of the process for translating and validating an existing scale

- **E**xplore the use of the Adherence to Refills and Medications Scale in Traditional Chinese version (ChARMS-T) for adherence assessment

"Drugs don't work if people don't take them"

- C. Everett Coop
former US Surgeon General

Medication adherence

"Adherence is the extent to which a person's behavior [in] taking medication… corresponds with agreed recommendations from a health care provider"
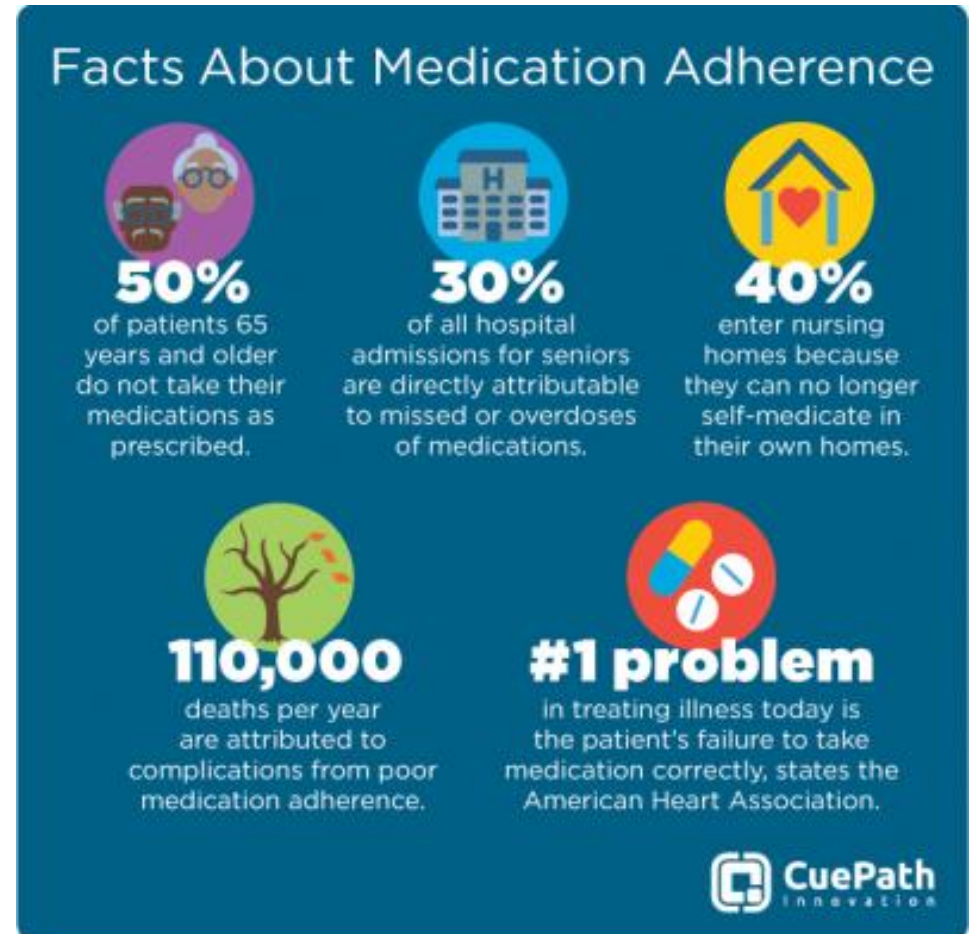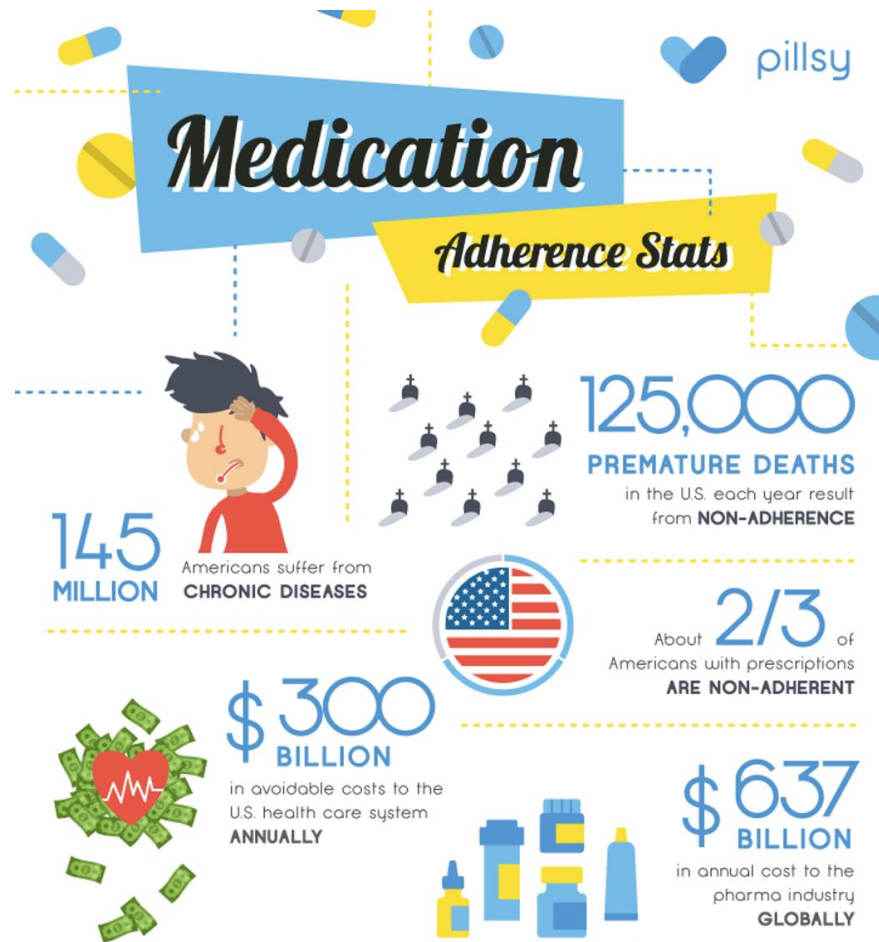
(World Health Organization, 2003)

▶ It means taking medications:
- at the right time
- in the right dose
- in the right way
- for the right duration

On average, 50% of medications for chronic diseases are not taken as prescribed.

https://www.niddk.nih.gov/health-information/communication-programs/ndep/health-professionals/promoting-medication-adherence-diabetes

Why does adherence matter?

Medication Adherence Stats (pillsy)

145 MILLION Americans suffer from CHRONIC DISEASES

125,000 PREMATURE DEATHS in the U.S. each year result from NON-ADHERENCE

About 2/3 of Americans with prescriptions ARE NON-ADHERENT

$300 BILLION in avoidable costs to the U.S. health care system ANNUALLY

$637 BILLION in annual cost to the pharma industry GLOBALLY

Facts About Medication Adherence

50% of patients 65 years and older do not take their medications as prescribed.

30% of all hospital admissions for seniors are directly attributable to missed or overdoses of medications.

40% enter nursing homes because they can no longer self-medicate in their own homes.

110,000 deaths per year are attributed to complications from poor medication adherence.

#1 problem in treating illness today is the patient's failure to take medication correctly, states the American Heart Association.

CuePath Innovation

Medication Adherence

Detection of medication non-adherence

☐ **Healthcare providers often overestimate adherence and are not skilled in detecting poor adherence**

☐ **Community pharmacists are not consistently detecting and managing possible medication adherence**

☐ **Reasons**

- Little *time* to explore nonadherence issues
- Lack of *cues* to remind to explore non-adherence
- Lack of *training* on how to resolve non-adherence issues effectively

Methods for measuring medication adherence

Measure	Use in clinical practice or research study	Strengths	Limitations
Direct			
Blood/serum level	Research	Proof of use	Invasive, expensive, patient variability
Ingestible sensor	Practice, Research	Proof of use	Patient acceptability
Indirect			
Electronic monitoring devices	Research	Data on dosing intervals, accuracy	Expensive, patient may use other bottles
Patient interview	Practice, Research	Inexpensive, ease of use, may provide reasons for behavior	Social desirability, skills of interviewer, patient recall, can overestimate
Pill count	Practice, Research	Inexpensive, ease of use	Obtrusive, pill dumping, accuracy
Prescription refill records	Practice	Inexpensive, ease of use, accessible to pharmacists	All scripts must be filled in the same pharmacy
Structured questionnaire(s)	Practice, Research	Ease of use, may provide reasons for behavior, many validated tools	Patient recall, social desirability, can overestimate

Interventions to improve medication adherence

□ Only a third of interventions improve medication adherence and other outcomes

□ Comprehensive interventions (involving multiple components) more successful than interventions involving one approach

□ What can a pharmacist do after a patient has been identified with poor or inadequate medication adherence?

Improving our Patient's Health Outcomes

It's not just *IF* a patient is non-adherent, but *WHY*

https://www.niddk.nih.gov/health-information/professionals/diabetes-discoveries-practice/getting-parents-buyin-medication-adherence

Medication adherence – expectation vs. reality

Mismatch Between Medication Intake and Refill: Validation of the Traditional Chinese Version of the Adherence to Refills and Medications Scale (ARMS) among Adults with Type 2 Diabetes

Study design and process flow

Theory selection → Questionnaire selection → Expert meeting

Pharmacist referral → Subject recruitment → Data analysis

Translation Phase　　　**Application Phase**

EMORY UNIVERSITY

School of Pharmacy, National Taiwan University

By: _Todd Sherer_

Name: Todd Sherer, PhD

Title: Executive Director

Date: 7/24/2024

By: _Yen-Ming Huang_

Name: Yen-Ming Huang, PhD

Title: Director of International Affair

Date: July 9 2024

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Title: ___Executive Director___   Title: ___Director of International Affair___

Date: 7/24/2024   Date: ___July 9 2024___

ADHERENCE TO REFILLS AND MEDICATIONS SCALE (ARMS)

I would like to ask you how often you actually miss taking your medicines. There are no right or wrong answers. For each question, please answer "none of the time," "some of the time," "most of the time," or "all of the time."

	None	Some	Most	All
1. How often do you forget to take your medicine?	1	2	3	4
2. How often do you decide not to take your medicine?	1	2	3	4
3. How often do you forget to get prescriptions filled?	1	2	3	4
4. How often do you run out of medicine?	1	2	3	4
5. How often do you skip a dose of your medicine before you go to the doctor?	1	2	3	4
6. How often do you miss taking your medicine when you feel better?	1	2	3	4
7. How often do you miss taking your medicine when you feel sick?	1	2	3	4
8. How often do you miss taking your medicine when you are careless?	1	2	3	4
9. How often do you change the dose of your medicines to suit your needs (like when you take more or less pills than you're supposed to)?	1	2	3	4
10. How often do you forget to take your medicine when you are supposed to take it more than once a day?	1	2	3	4
11. How often do you put off refilling your medicines because they cost too much money?	1	2	3	4
12. How often do you plan ahead and refill your medicines before they run out?	1	2	3	4

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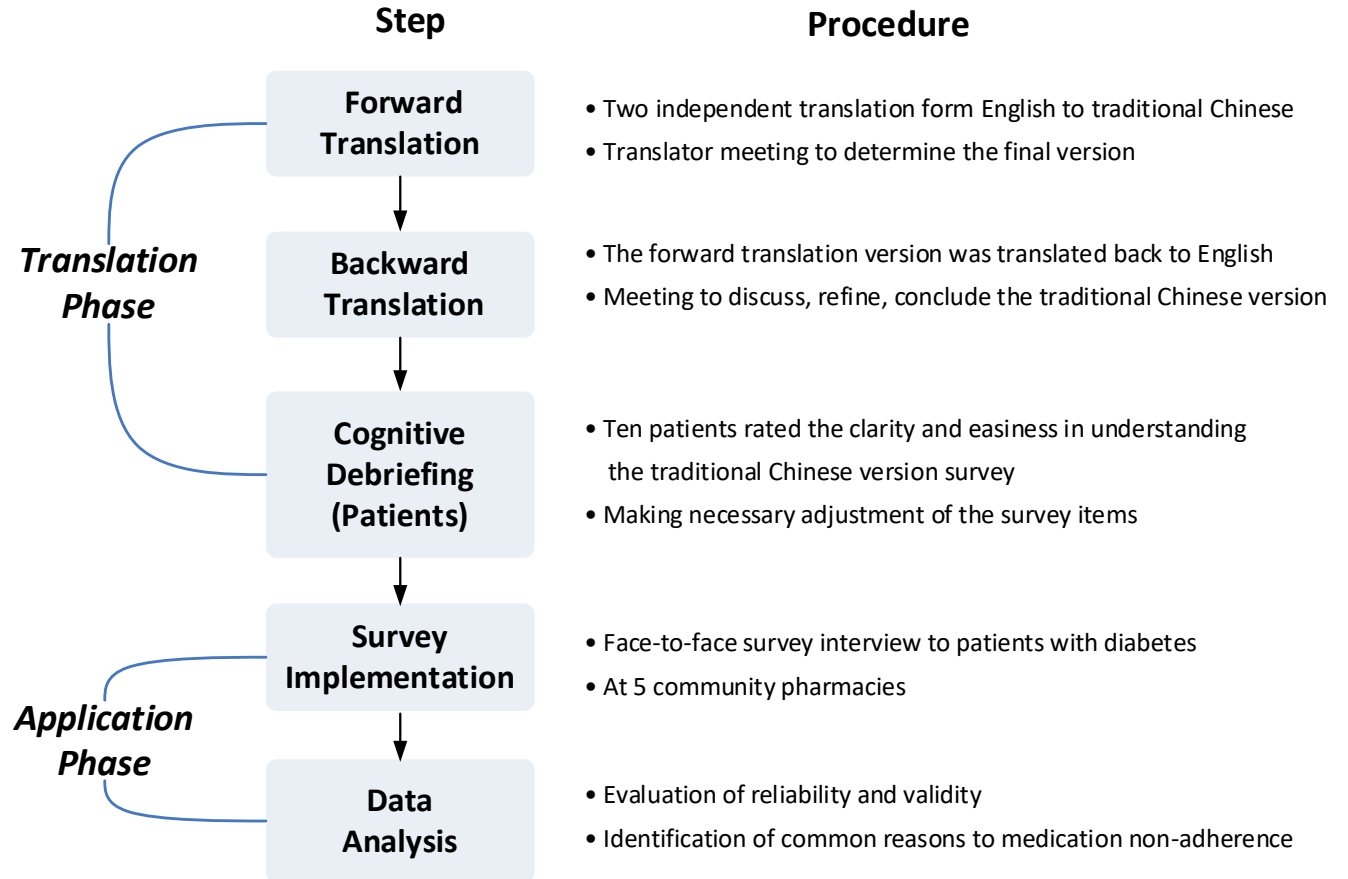
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Step

Procedure

Translation Phase

Forward Translation
- Two independent translation form English to traditional Chinese
- Translator meeting to determine the final version

Backward Translation
- The forward translation version was translated back to English
- Meeting to discuss, refine, conclude the traditional Chinese version

Cognitive Debriefing (Patients)
- Ten patients rated the clarity and easiness in understanding the traditional Chinese version survey
- Making necessary adjustment of the survey items

Application Phase

Survey Implementation
- Face-to-face survey interview to patients with diabetes
- At 5 community pharmacies

Data Analysis
- Evaluation of reliability and validity
- Identification of common reasons to medication non-adherence

量表問題	從未如此 1分	有時如此 2分	經常如此 3分	總是如此 4分
1. 您有多常忘記吃藥？				
2. 您有多常決定不要吃藥？				
3. 您有多常忘記拿處方去領藥？				
4. 您有多常會用完藥之後未再領藥？				
5. 在看醫生之前，您有多常少吃一次藥？				
6. 當您覺得狀況好轉時，您有多常錯過吃藥時間？				
7. 當您感到身體不適時，您有多常錯過吃藥時間？				
8. 您有多常因疏忽而錯過吃藥時間？				
9. 您有多常依照您的需求調整用藥劑量？(例如：增加或減少原本需使用的藥粒顆數)				
10. 當您應該一天吃藥超過一次時，您有多常會忘記吃藥？				
11. 您有多常因為藥費過高而延後領藥？				
12.* 您有多常會提前計畫好，在藥品全部吃完前就領藥？				

Sample

Participant recruitment

- Convenience sampling at five community pharmacies

Inclusion criteria

- At least 18 years old
- Diagnosed with T2D
- Presently prescribed to take at least 1 diabetes medicine by mouth daily
- Able to understand Traditional Chinese

Data collection and analysis

Measures

- ChARMS-T
- Medication refill
  - ✓ Proportion of days covered
- Clinical outcome
  - ✓ A1C level

Statistical analyses

- Descriptive statistics
- Reliability
  - ✓ Item-total correlation coefficients
  - ✓ Internal consistency with McDonald's omega (ω) scores
- Validity
  - ✓ Construct validity
    - Confirmatory factor analysis
  - ✓ Criterion validity
    - Correlation coefficients
    - Gwet's agreement coefficients

Proportion of days covered (PDC)

$$PDC = \left(\frac{\text{Number of days in period "covered"}}{\text{Number of days in period}} \right) \times 100\%$$

Patient ID	Generic Product Identifier (GPI) number	Fill Date	Days of Supply
A	394000---HMG-CoA Reductase Inhibitors	12/20/2010	30
A	394000---HMG-CoA Reductase Inhibitors	08/25/2011	30
A	394000---HMG-CoA Reductase Inhibitors	09/05/2011	30
A	394000---HMG-CoA Reductase Inhibitors	09/26/2011	30
A	394000---HMG-CoA Reductase Inhibitors	12/10/2011	30

Proportion of days covered (PDC)

Figure 1 : Prescription Fill Pattern before Adjustment

Proportion of days covered (PDC)

Figure 2 : Prescription Fill Pattern after Adjustment
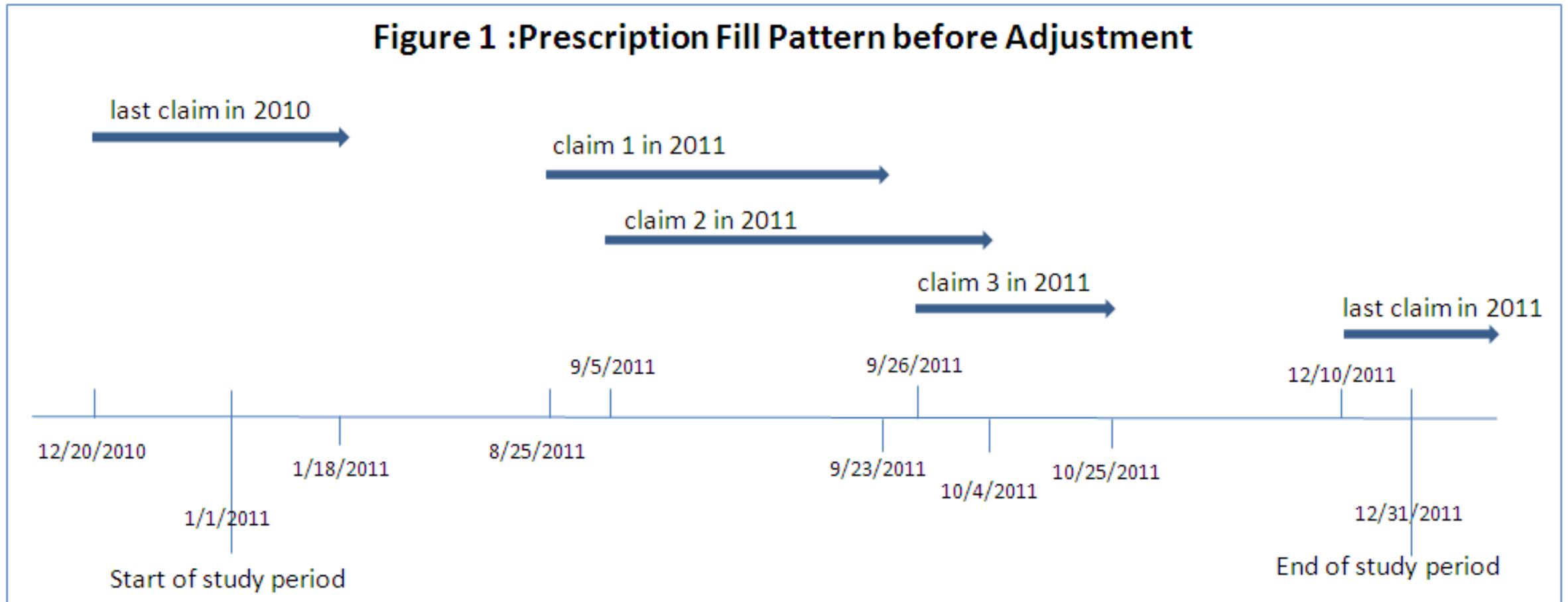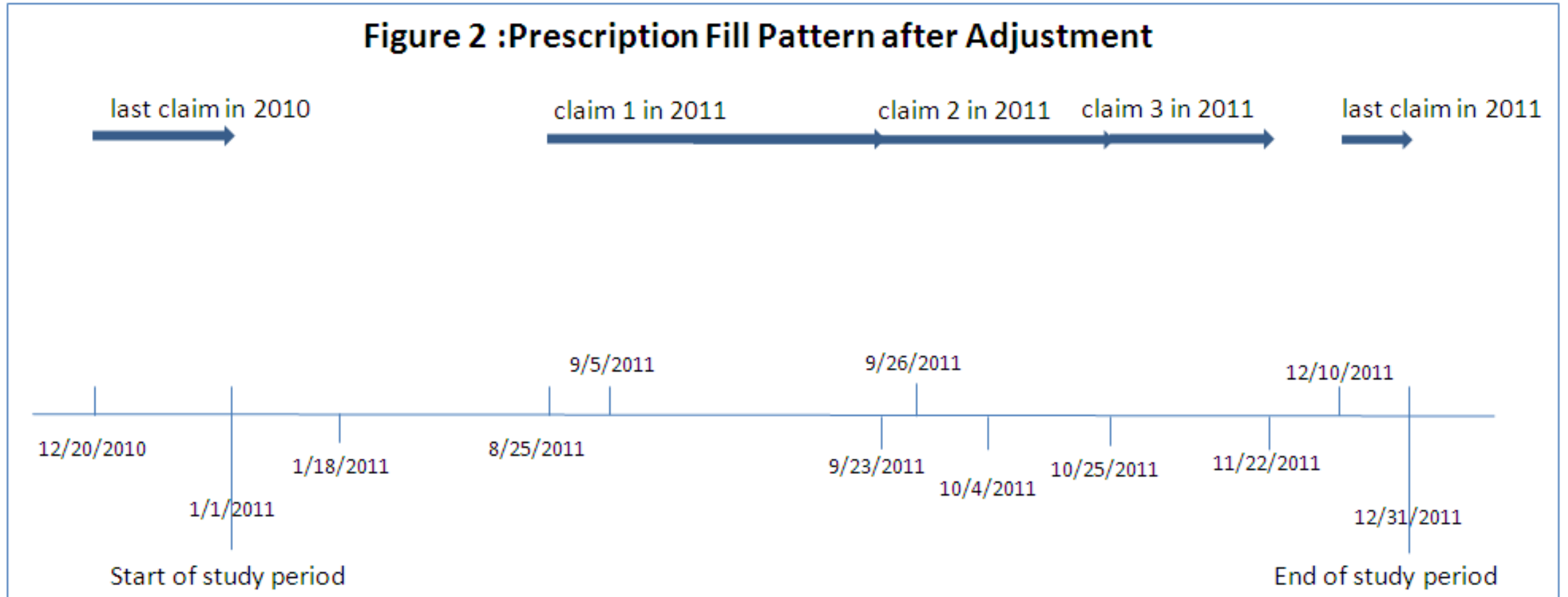
PDC = 112/129 = 86.82%

Sample characteristics (n = 343)

Sociodemographic	Mean or %
Age	66.7
Gender	
Female	52%
Education	
At least a college degree	45%
Annual household income	
Equal or more than 660,000	50%

Clinical Characteristics	Mean or %
Number of diabetes medications	1.96
Frequency of medication use	
At least twice daily	70%
Use of injectable medications	9%
A1C level	6.95

Performance of medication adherence

Variables	Mean or %
Self-reported diabetes medication adherence (score = 12-48)	14.9
Medication-taking (score = 8-32)	10.6
Medication refill (score = 4-16)	4.3
Proportion of days covered	

Patients refill prescriptions may not take their medications as prescribed.

Psychometric prosperities of the ChARMS-T

Reliability

- Item-total correlation coefficients
  - ✓ Ranging from 0.469 to 0.892

- Internal consistency
  - ✓ Medication taking: McDonald's ω of 0.841
  - ✓ Medication refill: McDonald's ω of 0.647

Validity

- Construct validity: Two factors
  - ✓ Medication taking
  - ✓ Medication refill

- Criterion validity
  - ✓ PDC and refill subdomain demonstrated a very good agreement coefficient of 0.86
  - ✓ A significant difference was found between the ChARMS-T and glycemic control (p = 0.047)

Common barriers to medication adherence

□ **Medication-taking**

- Carelessness (n = 191; 55.7%)

- Forgetfulness (n = 188; 54.8%)

- Frequent dosing intervals (n = 148; 43.1%)

□ **Medication refill**

- Not planning ahead (n = 33; 9.6%)

- Forgetfulness (n = 26; 7.6%)

https://www.slideshare.net/slideshow/medipense-infographics-medication-adherence-problem/63484928
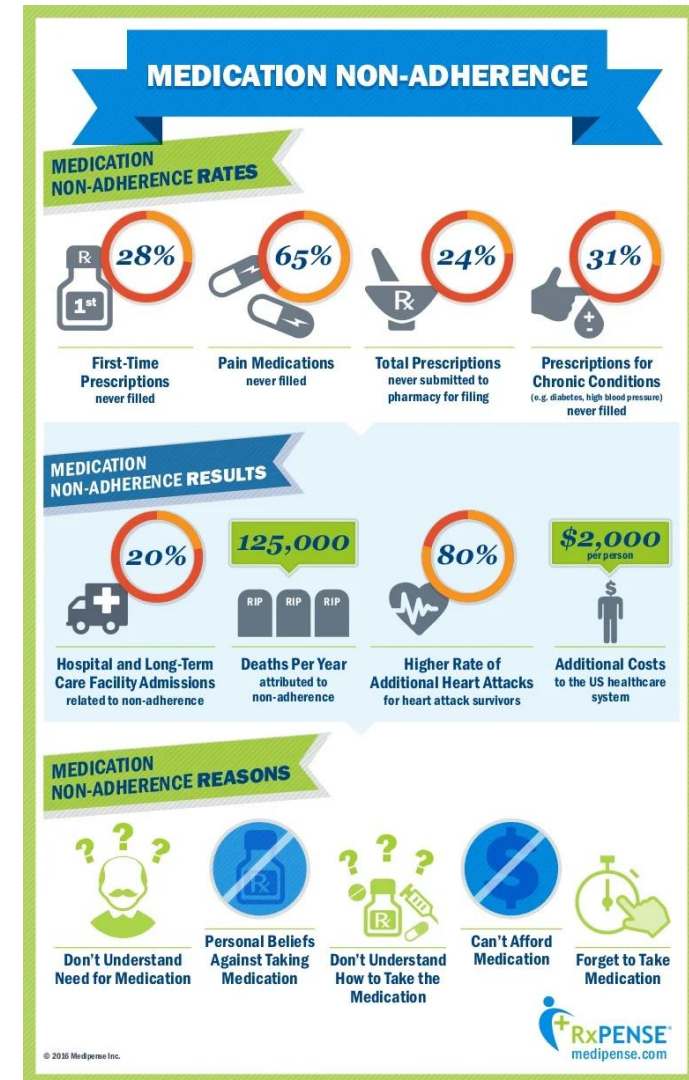
Principal findings

☐ The ChARMS-T has good reliability and construct validity.

☐ The ChARMS-T identified more patients with barriers to medication-taking than those with refill issues.

☐ Gaining a better understanding of the reasons behind non-adherent behavior, coupled with tailored interventions, is crucial for reducing the increased morbidity and mortality linked to non-adherence in chronic disease management.

☐ The ChARMS-T can be integrated into practice settings for screening and follow-up to enhance communication between healthcare professionals and patients.

如何使用 ChARMS-T 於藥事照護與研究

- **設定一個時間段**評估用藥配合度

- 評估量表勾選：依**發生頻率來提示估算**

  - 從未如此：從未發生
  - 有時如此：**每週**發生**1-3天**
  - 經常如此：**每週**發生**4-6天**
  - 總是如此：**每天**發生

- 第12題為反向題，統計時需反轉後計算

3.
- 人們時常會錯過用藥時間，或是未依照醫囑用藥，因此我們想瞭解您的糖尿病藥品使用的實際情形。

- 如果您正使用超過一種以上糖尿病藥品，請根據您過去三個月日常使用的所有糖尿病藥品的經驗回答以下問題，而不是僅針對某項特定藥品。

- 回答沒有對或錯，請於各題目圈選一個最符合您狀況的選項。

		從未如此	有時如此	經常如此	總是如此
a.	您有多常忘記吃藥？	○	○	○	○
b.	您有多常決定不要吃藥？	○	○	○	○
c.	您有多常忘記拿處方去領藥？	○	○	○	○
d.	您有多常會用完藥之後未再領藥？	○	○	○	○
e.	在看醫生之前，您有多常少吃一次藥？	○	○	○	○
f.	當您覺得狀況好轉時，您有多常錯過吃藥時間？	○	○	○	○
g.	當您感到身體不適時，您有多常錯過吃藥時間？	○	○	○	○
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i.	您有多常依照您的需求調整用藥劑量？(例如：增加或減少原本需使用的藥粒顆數)	○	○	○	○
j.	當您應該一天吃藥超過一次時，您有多常會忘記吃藥？	○	○	○	○
k.	您有多常因為藥費過高而延後領藥？	○	○	○	○
l.	您有多常會提前計畫好，在藥品全部吃完前就領藥？	○	○	○	○

使用ChARMS-T注意事項

□ ChARMS-T分為兩個構面，總分**超過12分**，代表填答者可能有用要配合度的困難

□ 量表分析或詮釋

- 將量表分為兩個部分，分別進行算分與詮釋

  ✓ **配合醫囑服藥(medication-taking)** ：分數**超過8分**，可考慮提供未配合醫囑領藥之改善策略

  ✓ **配合醫囑領藥(medication refill)** ：分數**超過4分**，可考慮提供未配合醫囑領藥之改善策略
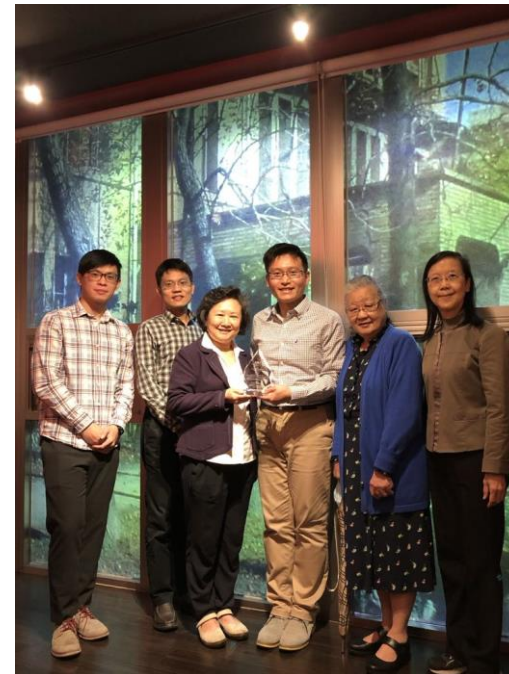
避免將兩個不同概念的用藥配合度，混合簡化成一個單一概念

Acknowledgment

☐ **Students**

- Yu-Meng Yang
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- Yunn-Fang Ho

Thank you!

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