Readmission of Heart Failure:

Root-cause analysis

สุรภา, ภานุพงศ์, ภูริภัทร นิสิตแพทย์เวชปฏิบัติ

Introduction

What is readmission?

A hospital readmission is an episode when a patient who had been discharged from a hospital is admitted again within a specified time interval

Why bother with heart failure?

- *Congestive heart failure is top-ten readmission disease in Soidao hospital*
- *Significantly increased mortality and morbidity in patient who readmit within 30-day timeframe*

"Previous topic was mostly about statistics and numbers, provide some insights about the problem. This time, we aim to collect and analyze data to show possible causes of heart failure readmission"

Root-cause analysis?

- *To truly prevent something, you need to intervene at the right point and time*

Patient-Identified Factors Related to Heart Failure Readmissions

Jessica H. Retrum, LCSW, PhD, **Jennifer Boggs, MSW**, **Andrew Hersh, MD**, **Leslie Wright, MA**, **Deborah S. Main, PhD**, **David J. Magid, MD, MPH**, and **Larry A. Allen, MD, MHS**

School of Public Affairs, University of Colorado Denver (J.H.R.); Kaiser Permanente Institute for Health Research, Denver, CO (J.B., L.W., D.J.M.); Department of Medicine, University of California Davis (A.H.); Department of Health and Behavioral Sciences, University of Colorado Denver (D.S.M.); Department of Emergency Medicine, University of Colorado School of Medicine (D.J.M.); Colorado Cardiovascular Outcomes Research Consortium, Denver, CO (D.J.M., L.A.A.), and Section of Advanced Heart Failure and Transplantation, University of Colorado Anschutz Medical Center, Aurora (L.A.A.)

## Rehospitalization for Heart Failure
Predict or Prevent?

Akshay S. Desai, MD, MPH; Lynne W. Stevenson, MD

Trends in 30-Day Readmission Rates for Patients Hospitalized With Heart Failure
Findings From the Get With The Guidelines-Heart Failure Registry

Kristin E. Bergethon, BA; Christine Ju, MS; Adam D. DeVore, MD; N. Chantelle Hardy, MPH;
Gregg C. Fonarow, MD; Clyde W. Yancy, MD; Paul A. Heidenreich, MD;
Deepak L. Bhatt, MD, MPH; Eric D. Peterson, MD, MPH; Adrian F. Hernandez, MD, MHS
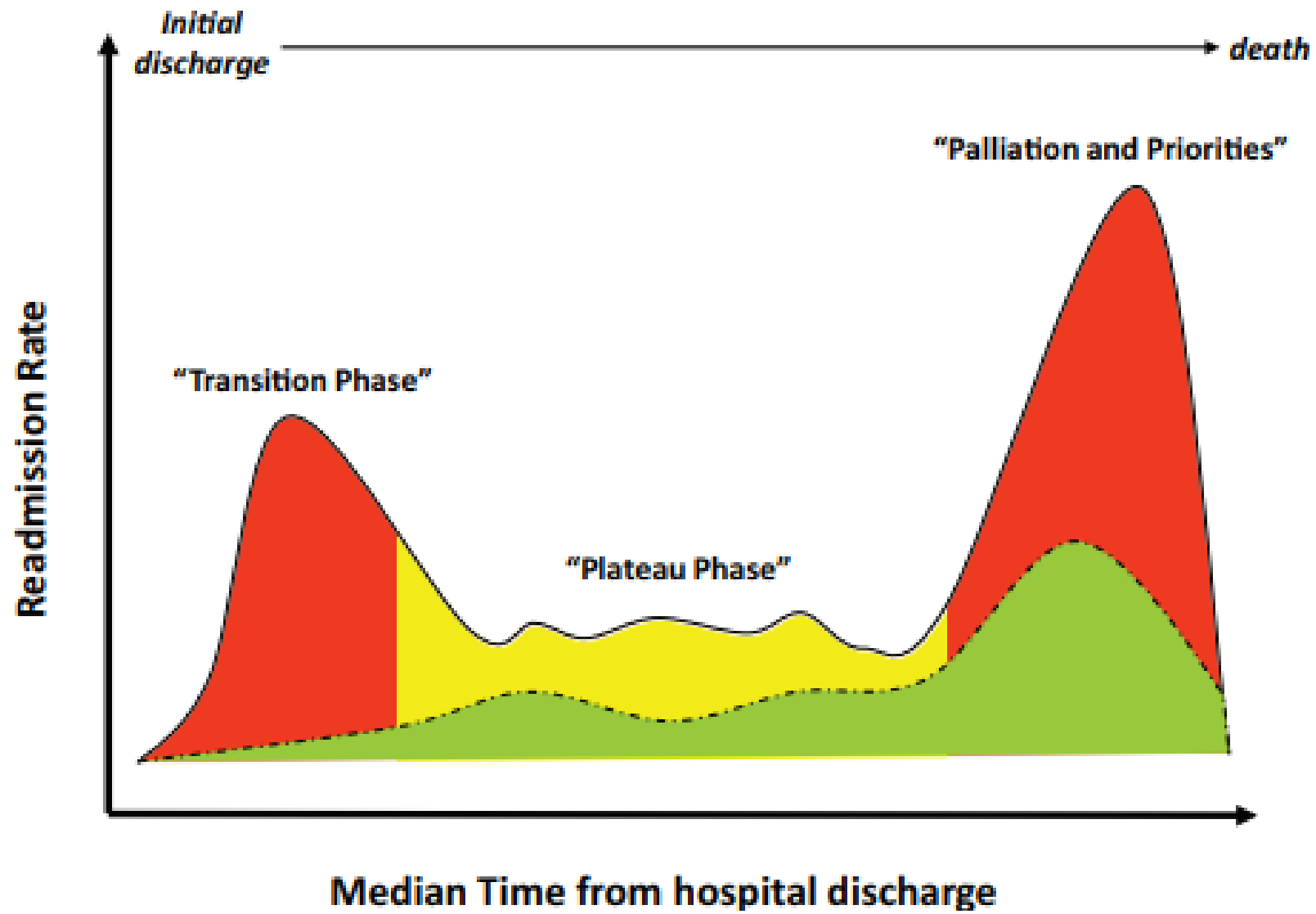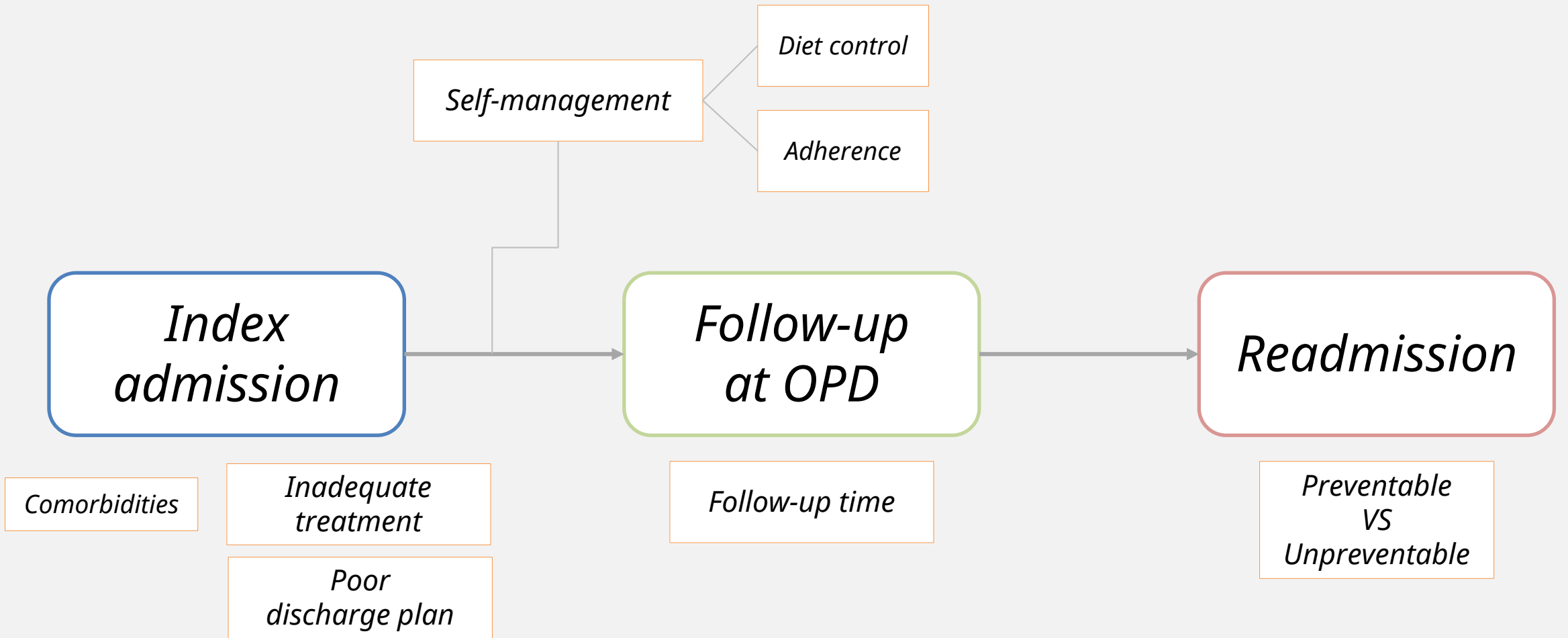
**Data collection
Analysis**

Inclusion criteria

❏*Index admission and its readmission with principle diagnosed with congestive heart failure (ICD-10 I500) from Fiscal year 2014 (2557) to Fiscal year 2017 (2560)*

❏*Readmission must not be planned, e.g. Referral back from other hospital*

Exclusion criteria

❏*Unavailable medical record either index admission or readmission*

Definitions

1. *Index admission - the admission with a principal diagnosis of a specified condition that meets the inclusion and exclusion criteria for the measure*

2. *Readmission (30-day) - an episode when a patient who had been discharged from a hospital is admitted again within 30 days*

Root-cause category

- *Inadequate treatment*
  - *Inadequate decongestion*
  - *No correction of precipitating cause*
- *Poor discharge plan*
  - *Home medications*
  - *Patient education*
- *Transition phase (from hospital to home)*
  - *Self-management*
    - *Adherence to medications*
    - *Diet control*

- *Follow-up*
  - *Loss follow-up*
  - *Readmission before follow-up*
  - *Medication titration*
- *Readmission*
  - *Preventable VS Unpreventable*

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┌────────────────────────────────────────────┐
│  Index admission and readmission with      │
│  principal diagnosed with congestive heart │
│  failure (ICD-10 I500) from Fiscal year    │
│  2014 – Fiscal year 2017 were pulled from  │
│  HosxP database using designed query from  │
│  registry department staff                 │
└────────────────────────────────────────────┘
                     │
                     ▼
┌────────────────────────────────────────────┐        ┌──────────────────────────────────────┐
│  All admissions were manually screened and │───────▶│  8 index admissions were excluded    │
│  selected by authors. Those are not met    │        │  -  1 planned readmission            │
│  with the inclusion criteria are excluded  │        │  -  2 duplicated admissions          │
└────────────────────────────────────────────┘        │  -  5 unavailable medical records    │
                     │                                 └──────────────────────────────────────┘
                     ▼
┌────────────────────────────────────────────┐
│  33 admissions are included and reviewed   │
│  by author                                 │
└────────────────────────────────────────────┘
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Flow chart of selection process

Results

- ❑ 2557
- ❑ 2558
- ❑ 2559
- ❑ 2560
- ❑ All admissions

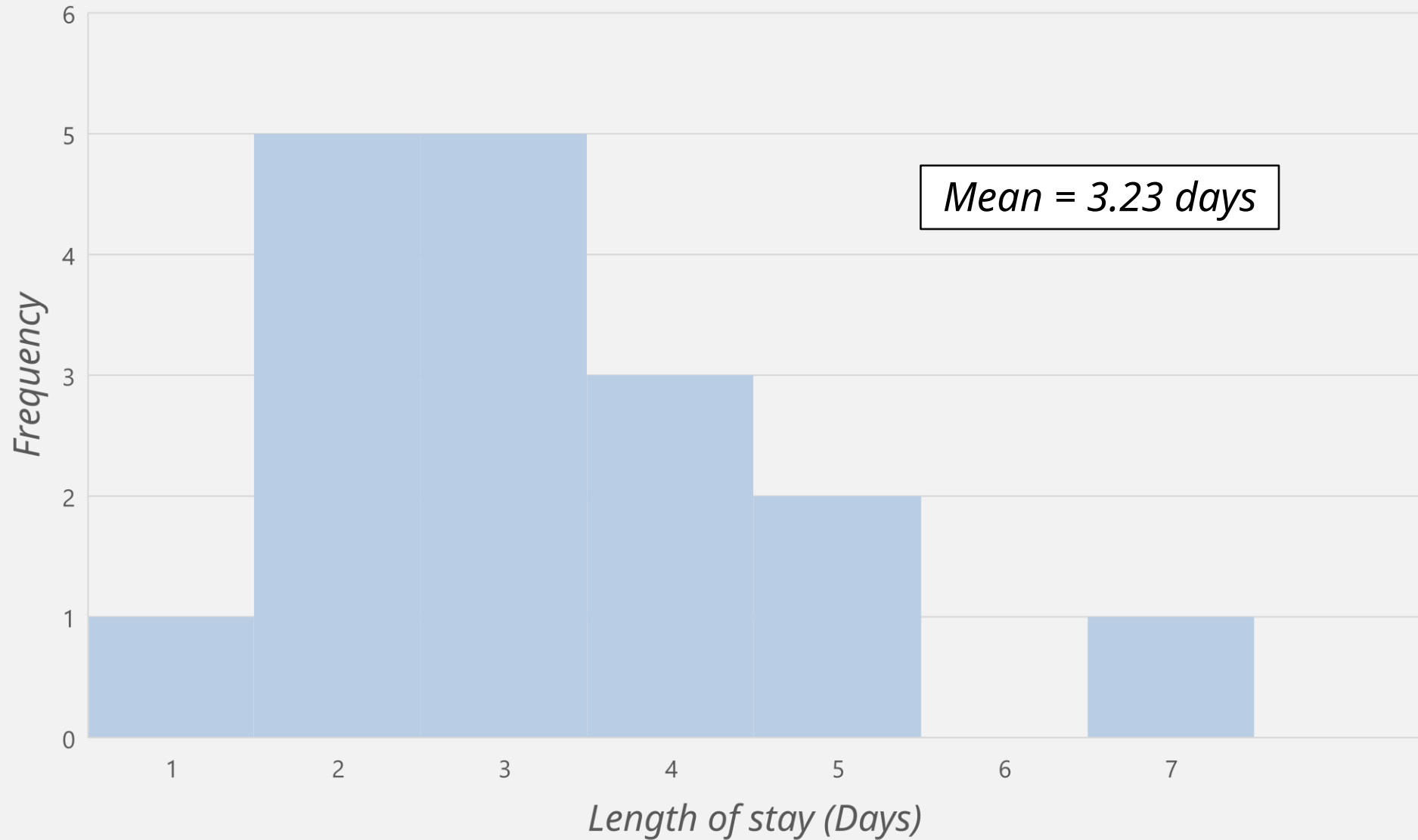| Years	Number of readmissions
2557	17
2558	2
2559	7
2560	7

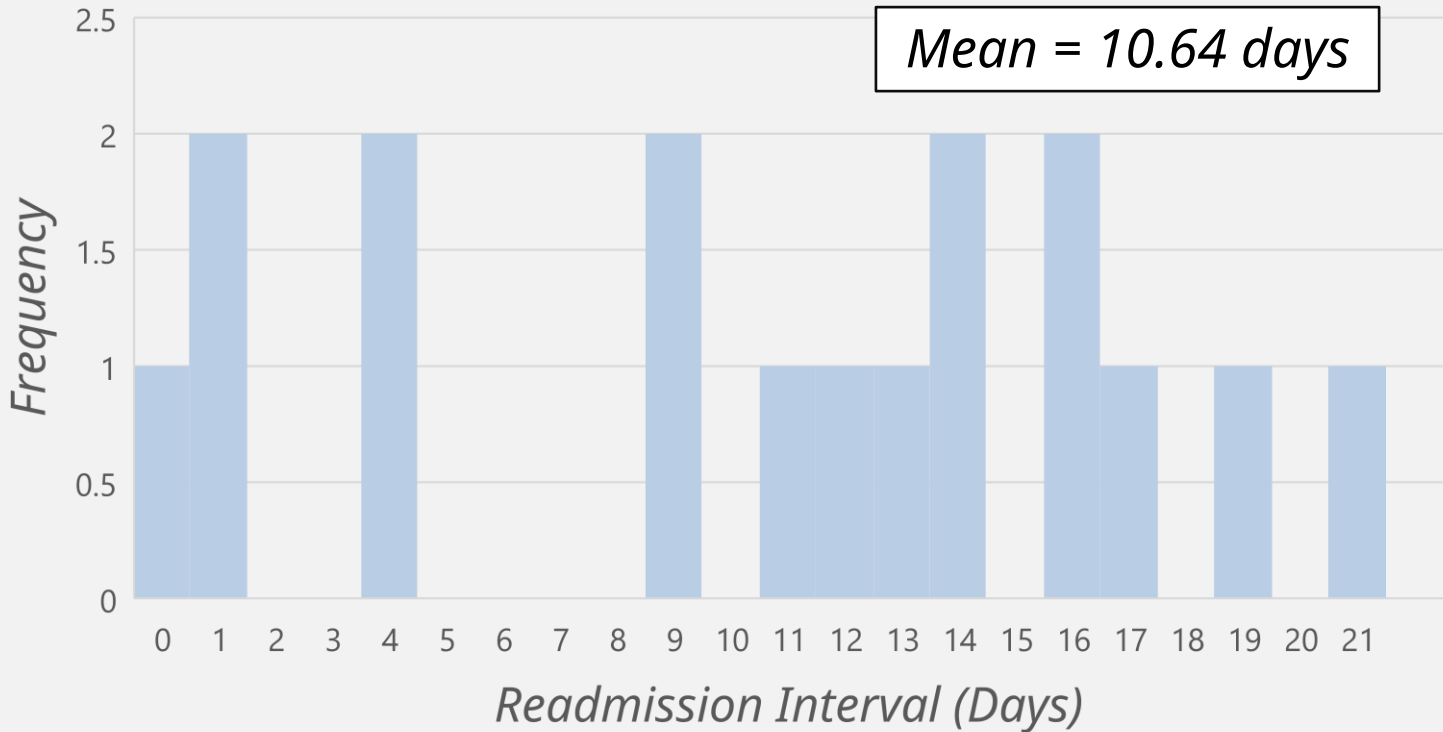Numbers of index admission in each Fiscal year
(with available medical records)

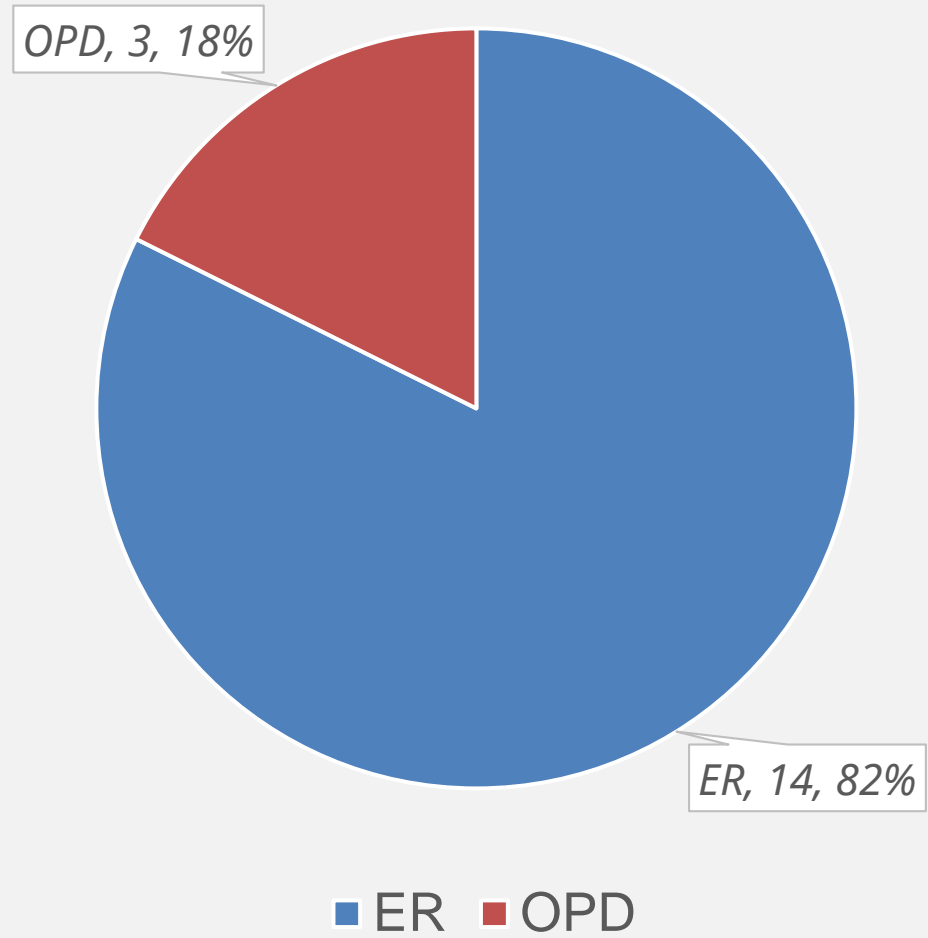# ปีงบประมาณ 2557

Histogram of "Length of Stay" (2557)

Mean = 3.23 days

Histogram of "Readmission Interval" (2557)

Mean = 10.64 days

(wk)	
< 1	5 (29.41%)
1 – 2	7 (41.17%)
2 – 3	5 (29.41%)
3 – 4	0

Patient setting at Readmission (2557)

OPD, 3, 18%

ER, 14, 82%

■ ER ■ OPD

Root-cause category (2557)

Category	Total = 17
Inadequate treatment	
- Inadequate decongestion	5
- Correction of precipitating cause	0
Poor discharge plan	
- Home medications	
- no diuretics	2
- no ACE-I/ARB	11
- no Beta-blocker	12
Transition phase	
- Poor adherence to medication	2
Follow-up	
- Loss follow-up	6
- Readmission before follow-up	8
- No titration of medication	16

Reasons for not prescribing ACE-I/ARB (2557)

Reasons	
ESRD patient	5 (45.45%)
Cr rising	4 (36.36%)
Drug allergy	1 (9.09%)
Not specified	1 (9.09%)

ปีงบประมาณ
2558

Histogram of "Length of Stay" (2558)
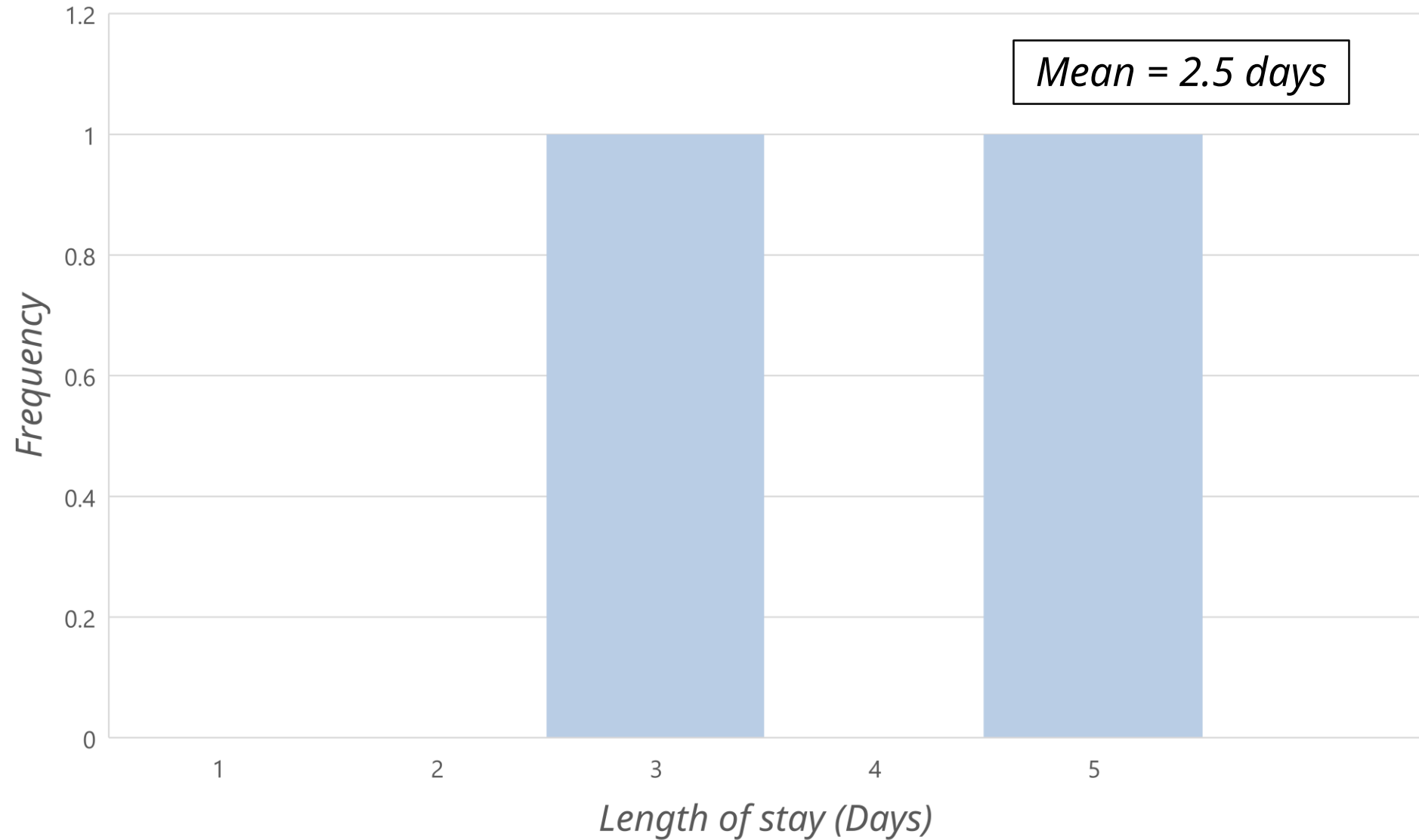
Histogram of "Readmission Interval" (2558)

Mean = 7.5 days
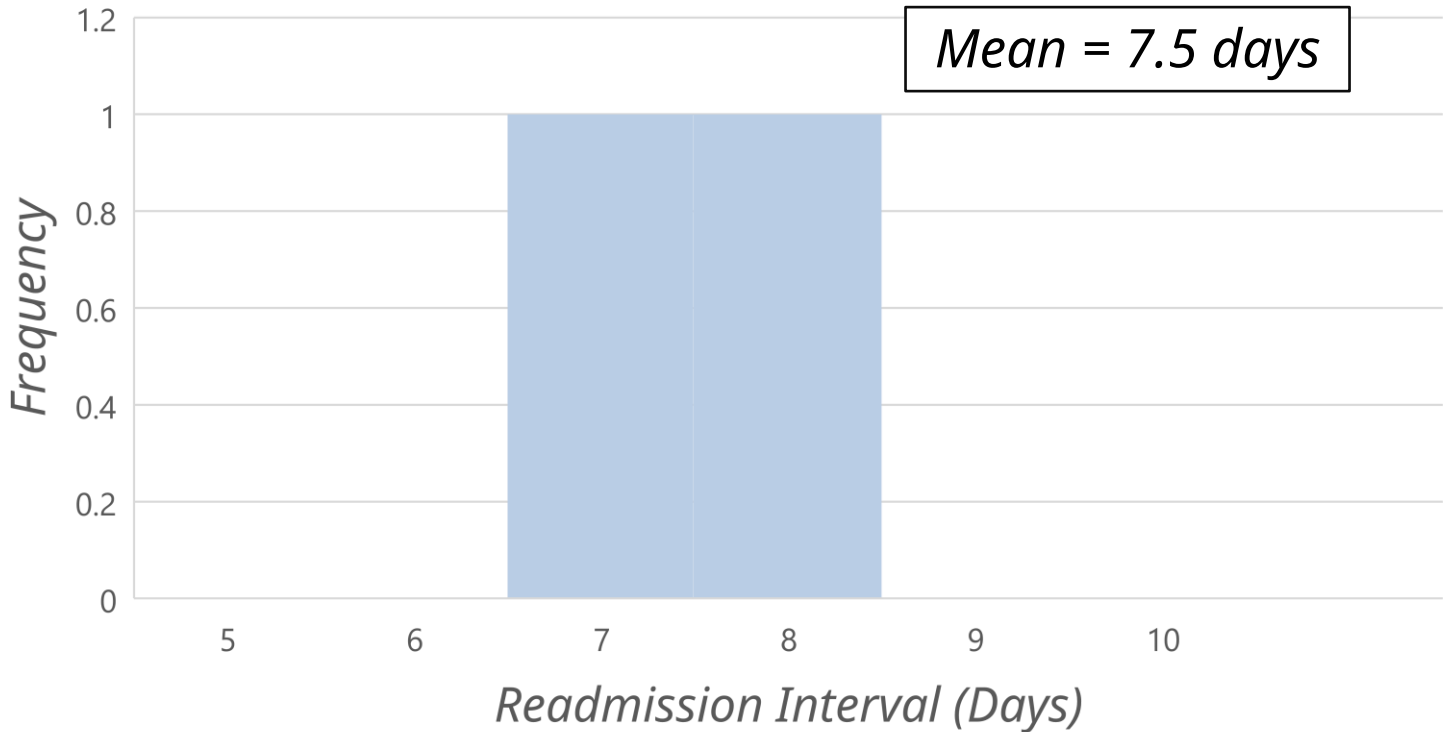
(wk)	
< 1	1 (50%)
1 – 2	1 (50%)
2 – 3	0
3 – 4	0

Patient setting at Readmission (2558)

OPD, 0, 0%

ER, 2, 100%

■ ER ■ OPD
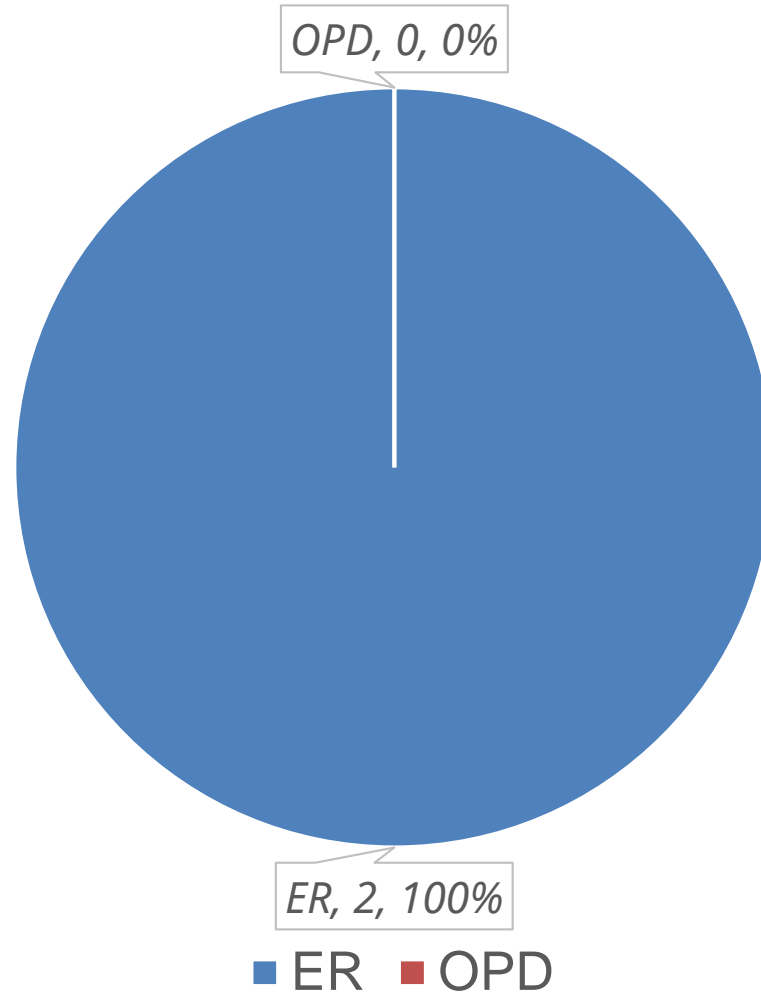
Root-cause category (2558)

Category	Total = 2
Inadequate treatment	
- Inadequate decongestion	0
- Correction of precipitating cause	0
Poor discharge plan	
- Home medications	
- no diuretics	0
- no ACE-I/ARB	1
- no Beta-blocker	0
Transition phase	
- Poor adherence to medication	0
Follow-up	
- Loss follow-up	1
- Readmission before follow-up	0
- No titration of medication	2

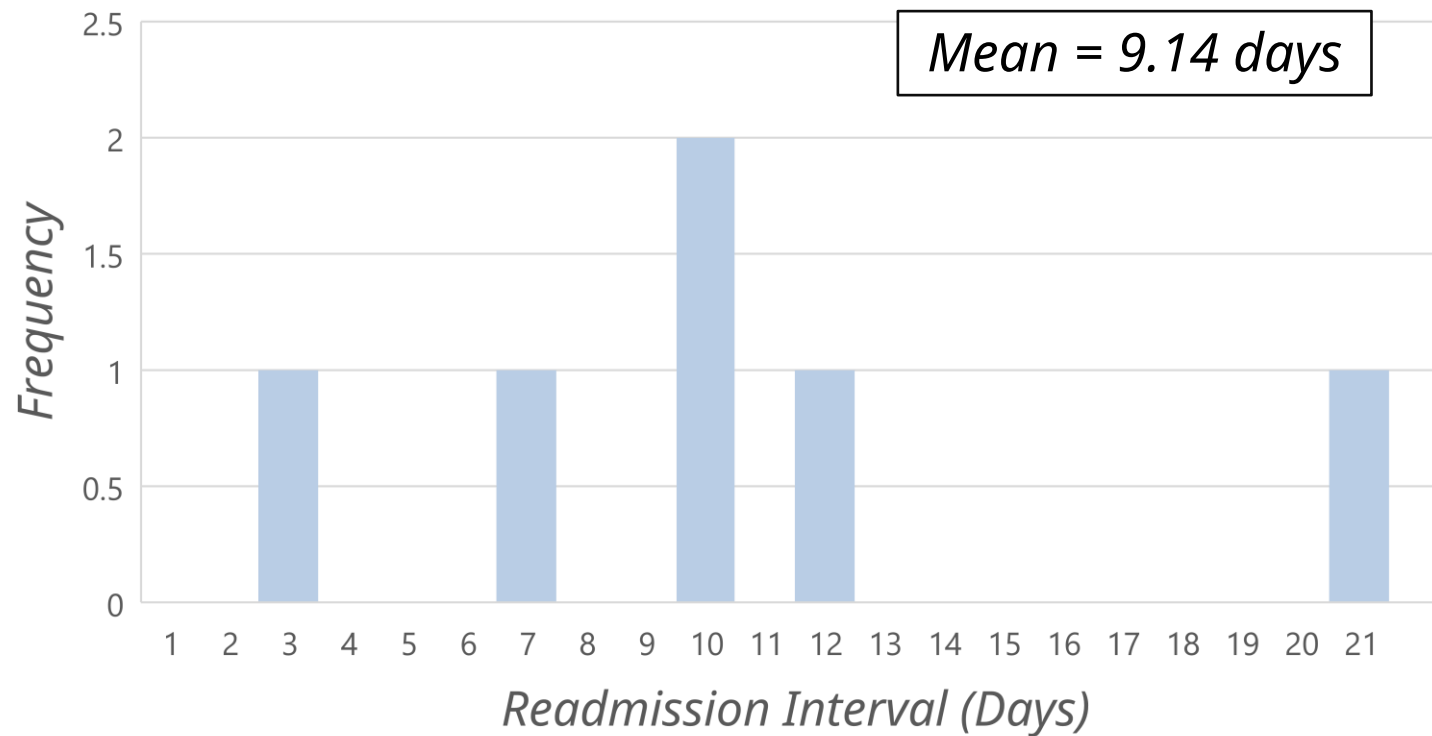## Reasons for not prescribing ACE-I/ARB (2558)

Reasons	
CKD patient	1 (100%)

ปีงบประมาณ
2559

Histogram of "Length of Stay" (2559)

Mean = 4.28 days
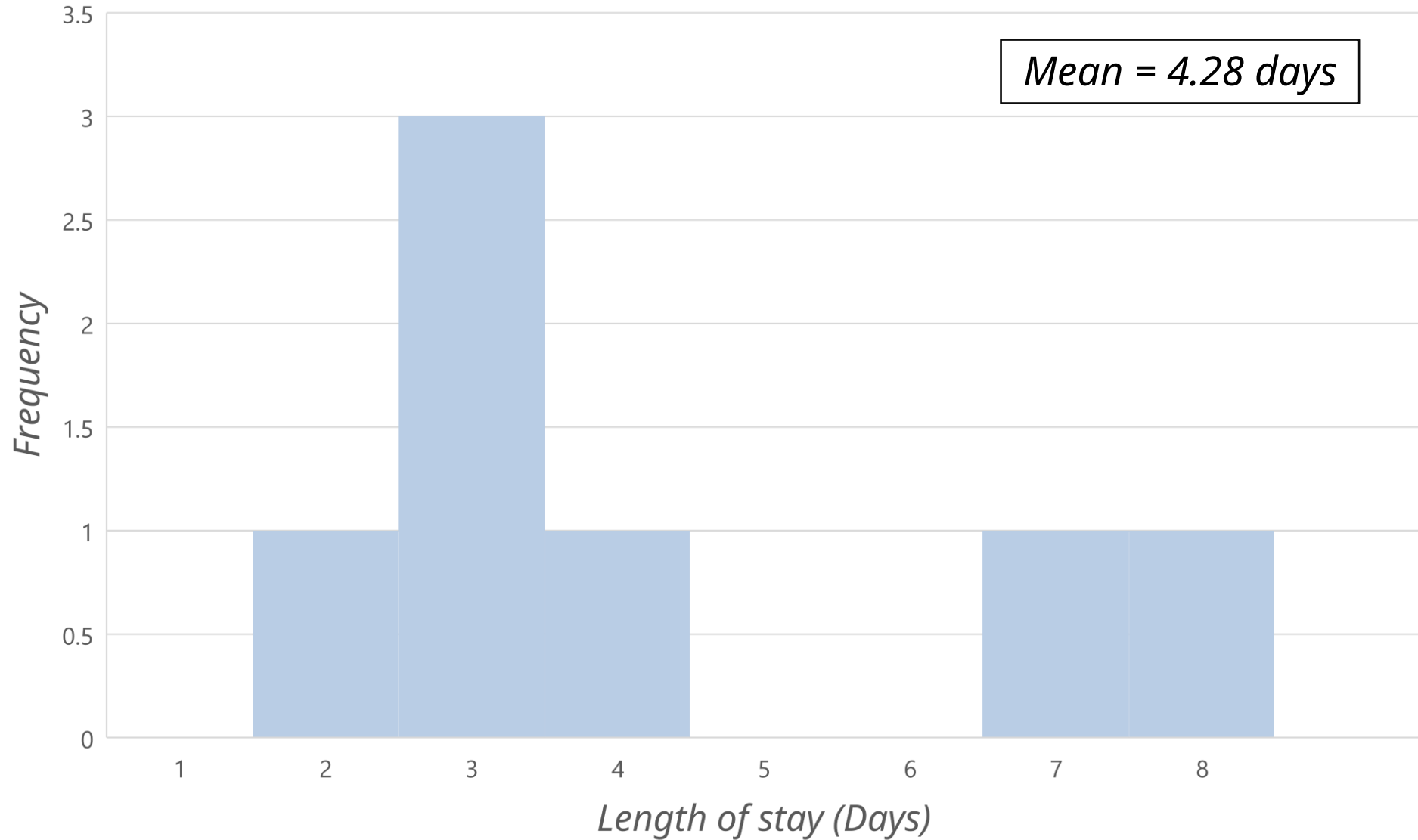
Histogram of "Readmission Interval" (2559)

Mean = 9.14 days

(wk)	
< 1	3 (42.85%)
1 – 2	3 (42.85%)
2 – 3	1 (14.28%)
3 – 4	0

Patient setting at Readmission (2559)

OPD, 2, 29%

ER, 5, 71%
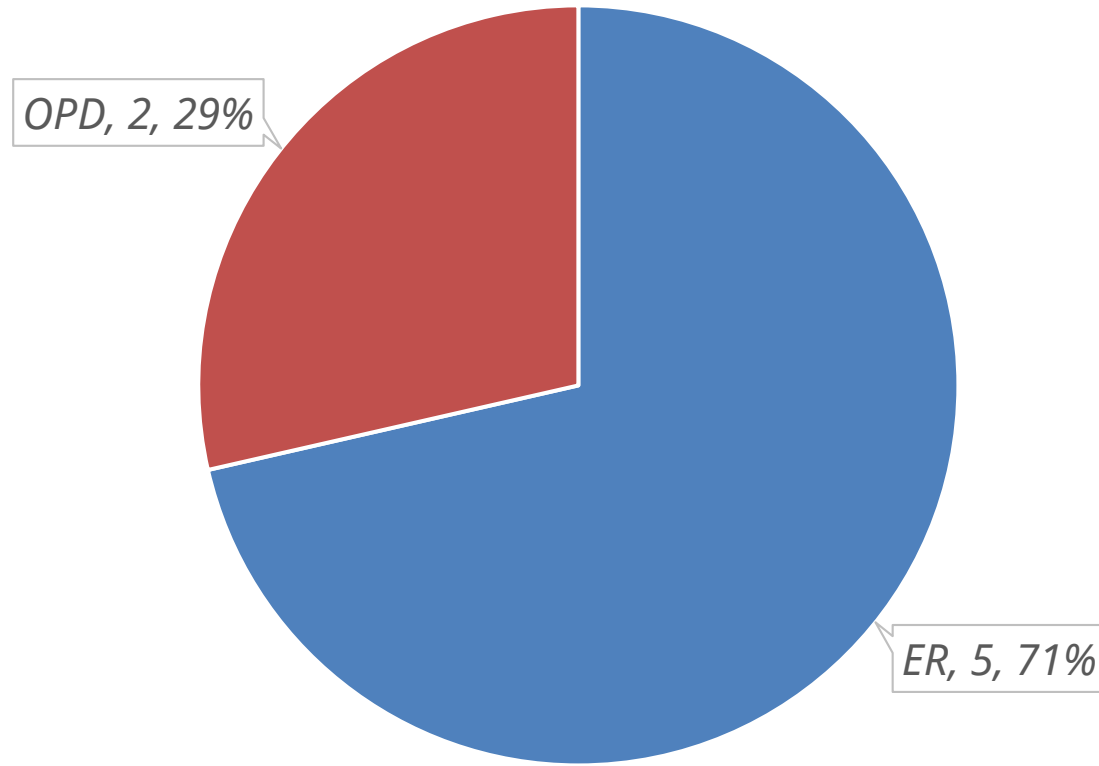
■ ER ■ OPD

Root-cause category (2559)

Category	Total = 7
Inadequate treatment	
- Inadequate decongestion	1
- Correction of precipitating cause	0
Poor discharge plan	
- Home medications	
- no diuretics	1
- no ACE-I/ARB	3
- no Beta-blocker	2
Transition phase	
- Poor adherence to medication	0
Follow-up	
- Loss follow-up	1
- Readmission before follow-up	4
- No titration of medication	6

Reasons for not prescribing ACE-I/ARB (2559)

Reasons	
AKI	1 (33.33%)
Not specified	2 (66.66%)

ปีงบประมาณ
2560

Histogram of "Length of Stay" (2560)
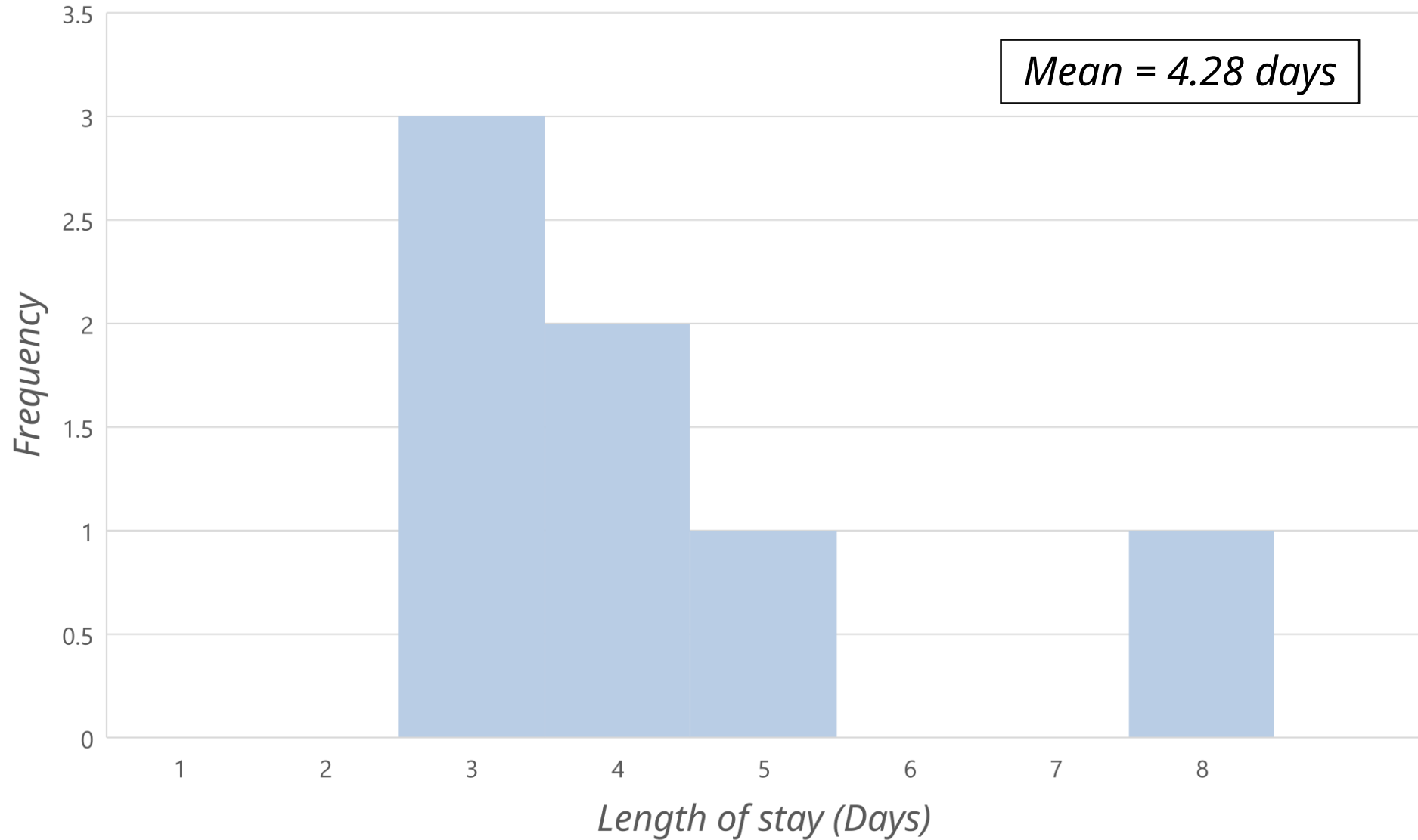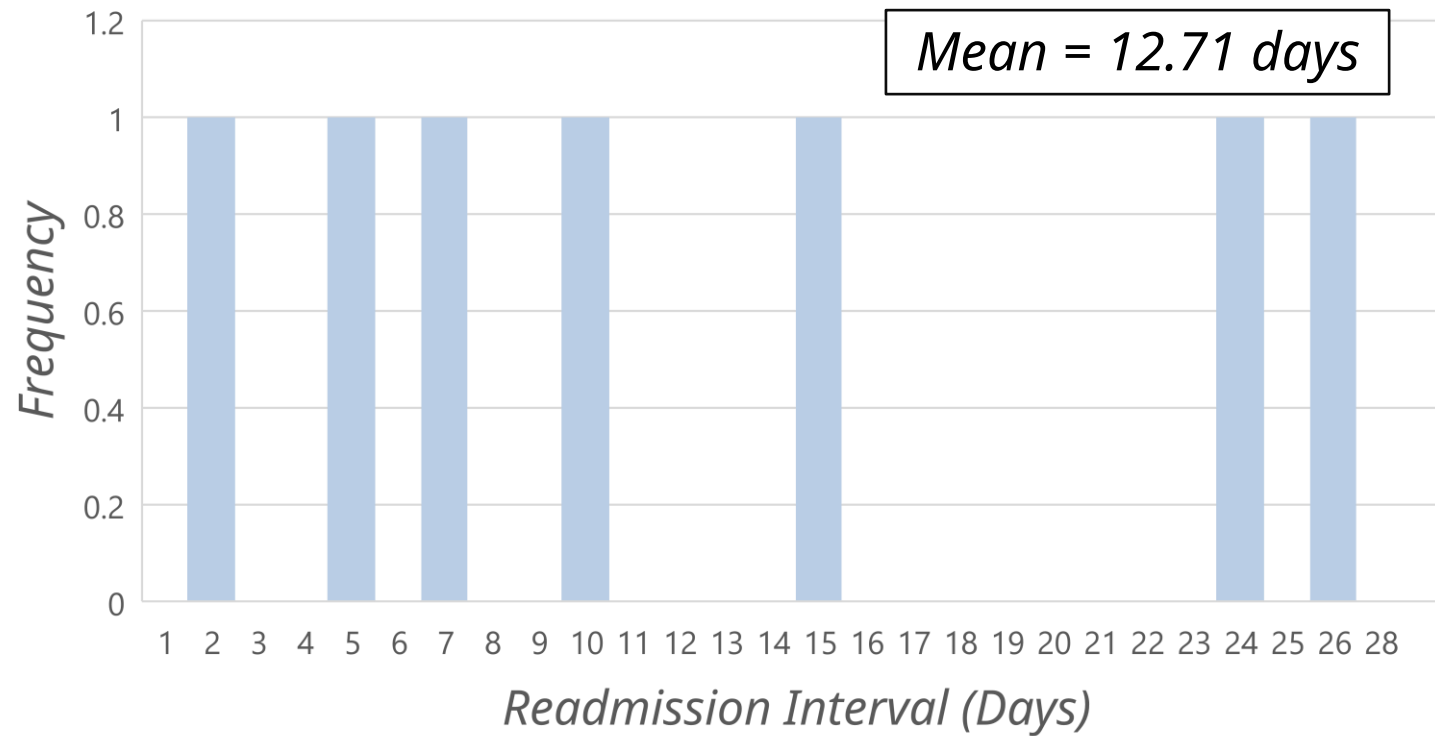
Mean = 4.28 days

Patient setting at Readmission (2560)

OPD, 0, 0%

ER, 7, 100%

■ ER ■ OPD
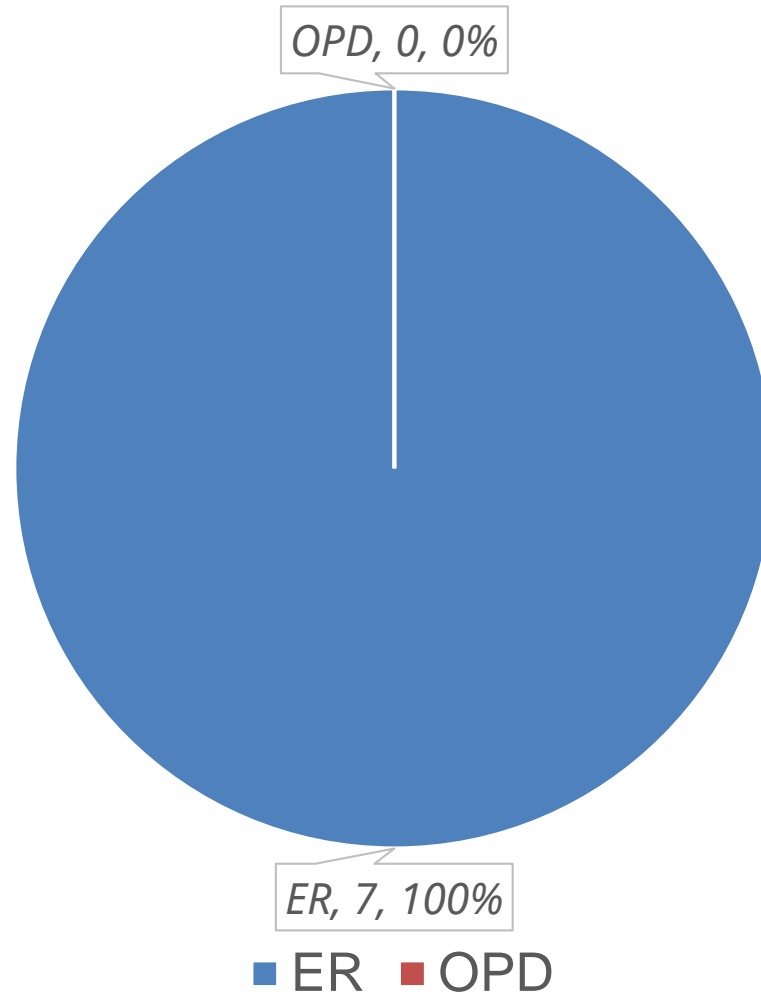
Root-cause category (2560)

Category	Total = 7
Inadequate treatment	
- Inadequate decongestion	0
- Correction of precipitating cause	0
Poor discharge plan	
- Home medications	
- no diuretics	2
- no ACE-I/ARB	3
- no Beta-blocker	3
Transition phase	
- Poor adherence to medication	0
Follow-up	
- Loss follow-up	4
- Readmission before follow-up	1
- No titration of medication	7

Reasons for not prescribing ACE-I/ARB (2560)
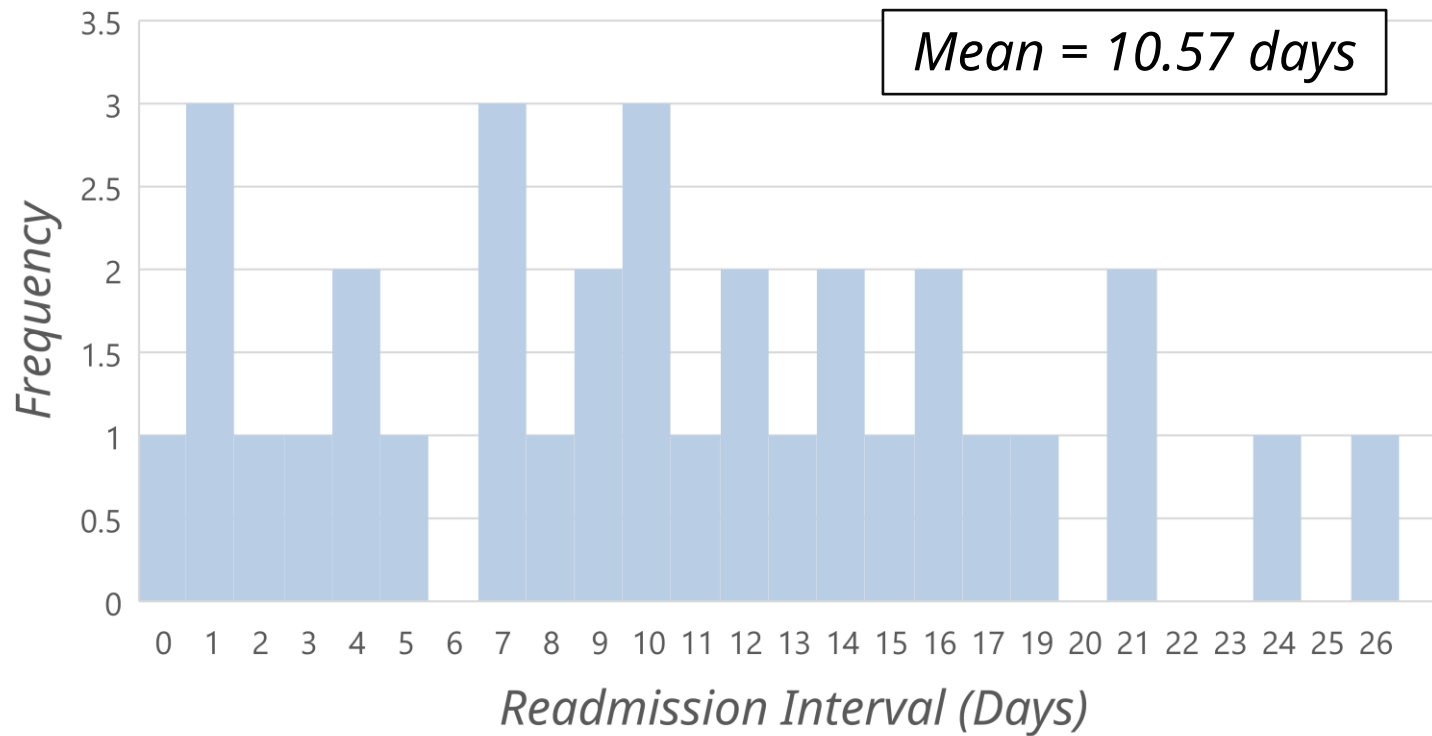
Reasons	
CKD Patient	1 (33.33%)
Drug allergy	1 (33.33%)
Not specified	1 (33.33%)

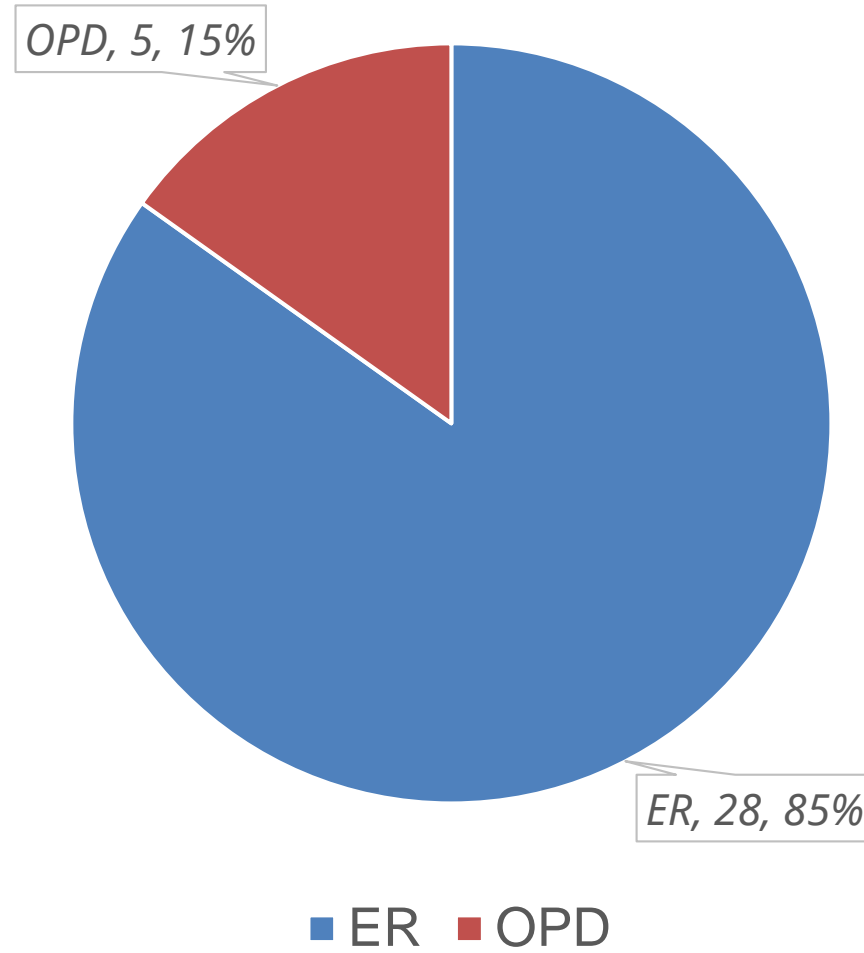Histogram of "Length of Stay" (2557-2560)

Mean = 3.72 days
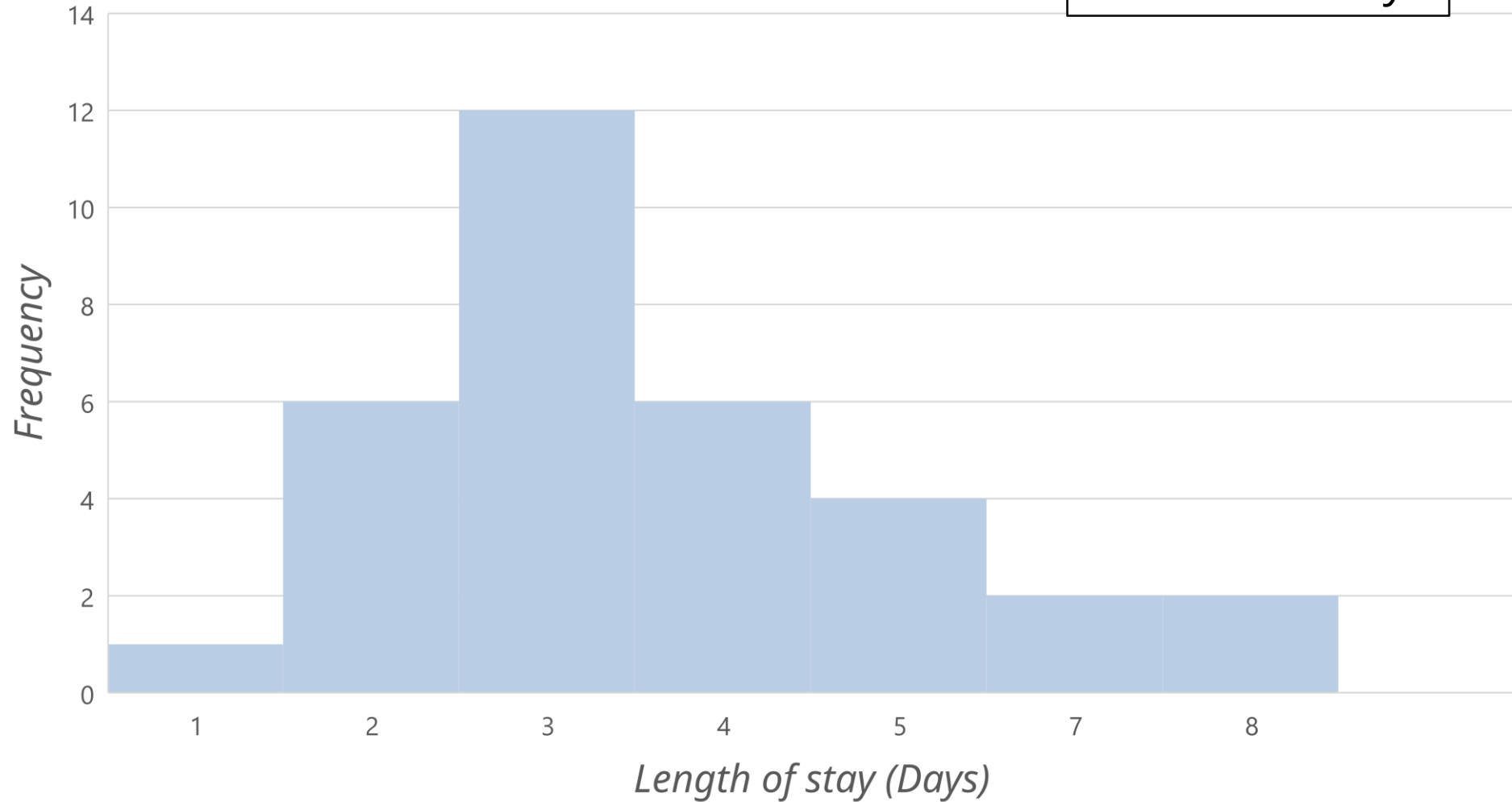
Histogram of "Readmission Interval" (2557-2560)

Mean = 10.57 days

(wk)	
< 1	12 (36.36%)
1 – 2	12 (36.36%)
2 – 3	7 (21.21%)
3 – 4	2 (6.06%)

Patient setting at Readmission (2560)

OPD, 5, 15%

ER, 28, 85%

■ ER ■ OPD

Root-cause category (2557-2560)

Category	Total = 33
Inadequate treatment	
- Inadequate decongestion	6
- Correction of precipitating cause	0
Poor discharge plan	
- Home medications	
- no diuretics	5
- no ACE-I/ARB	18
- no Beta-blocker	17
Transition phase	
- Poor adherence to medication	2
Follow-up	
- Loss follow-up	11
- Readmission before follow-up	13
- No titration of medication	31

Discussions

- การนับจำนวน *Readmission* อาจมีปัญหาตั้งแต่การ *Design query* สำหรับค้นข้อมูลจาก *database* ของโรงพยาบาล
- จำนวนของ *Readmission* ที่เพิ่มขึ้นหรือลดลงในแต่ละปีไม่สามารถบอก *trend* ของการ *Readmission* ในปีต่อๆ ไปได้เนื่องจากไม่มี *control variable* และยังไม่มี *intervention*
- จำนวน *Length of stay* มีค่าเฉลี่ย *(mean)* อยู่ที่ 3.72 วัน อาจเป็นระยะเวลาที่สั้นเกินไป

Discussions

- ผู้ป่วยส่วนใหญ่กลับมา *Readmission* ภายใน *2* สัปดาห์หลัง *discharge;* การนัด *follow-up* นานกว่า *2* สัปดาห์อาจจะนานเกินไป
- ผู้ป่วยบางส่วนมาตรวจที่ *OPD* และถูก *Readmit* แต่จากข้อมูลเวช ระเบียนไม่สามารถประเมินได้ว่าเป็น *Preventable* หรือ *Unpreventable* อาจอนุมานได้ว่าผู้ป่วย *OPD* มี *severity* น้อยกว่า ผู้ป่วย *ER* น่าจะสามารถ *treatment* เป็น *OPD case* ได้
- พบว่ามีตัวเลขของปัญหาในทุก *root-cause* จาก *hypothesis* ของ ผู้จัดทำ *(*ยกเว้นการ *correct precipitating cause)* ซึ่งแสดงให้เห็นว่ามี ปัญหานี้อยู่จริง แต่มีข้อจำกัดเรื่องการบอกขนาดของปัญหาเนื่องจากไม่มี *control group*

Limitations

- *Limited access to database*

- *Some medical records are unavailable*

- *Some categories were assessed using subjective data (extern opinion, not expert)*

- *No control variables*

- *Results provide only that there are problems, but not the size of those problems*