Understanding Your Patient Population and Patterns of Utilization

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Hospital of the University of Pennsylvania

Learning Objectives

- Use existing data to understand your target patient population
- Analyze and display utilization, financial, and quality metrics
- Develop target outcomes to include in a business plan
- Use the data to drive your programmatic priorities and financial planning
- Develop realistic care-quality and financial goals

Outline

- Defining your patient population
- Using the data to guide institutional business planning
- Establishing the Penn Comprehensive Sickle Cell Program
  - Building a business plan
  - Using data to guide program development
    - Improving care in the emergency department
    - Establishing an SCD Infusion Center
    - Improving inpatient care
    - Establishing a pediatric to adult transition program
- Increasing patient access to SCD care beyond your institution

Define Your Patient Population

- Two universes

  - Within your institution

  - Outside your institution
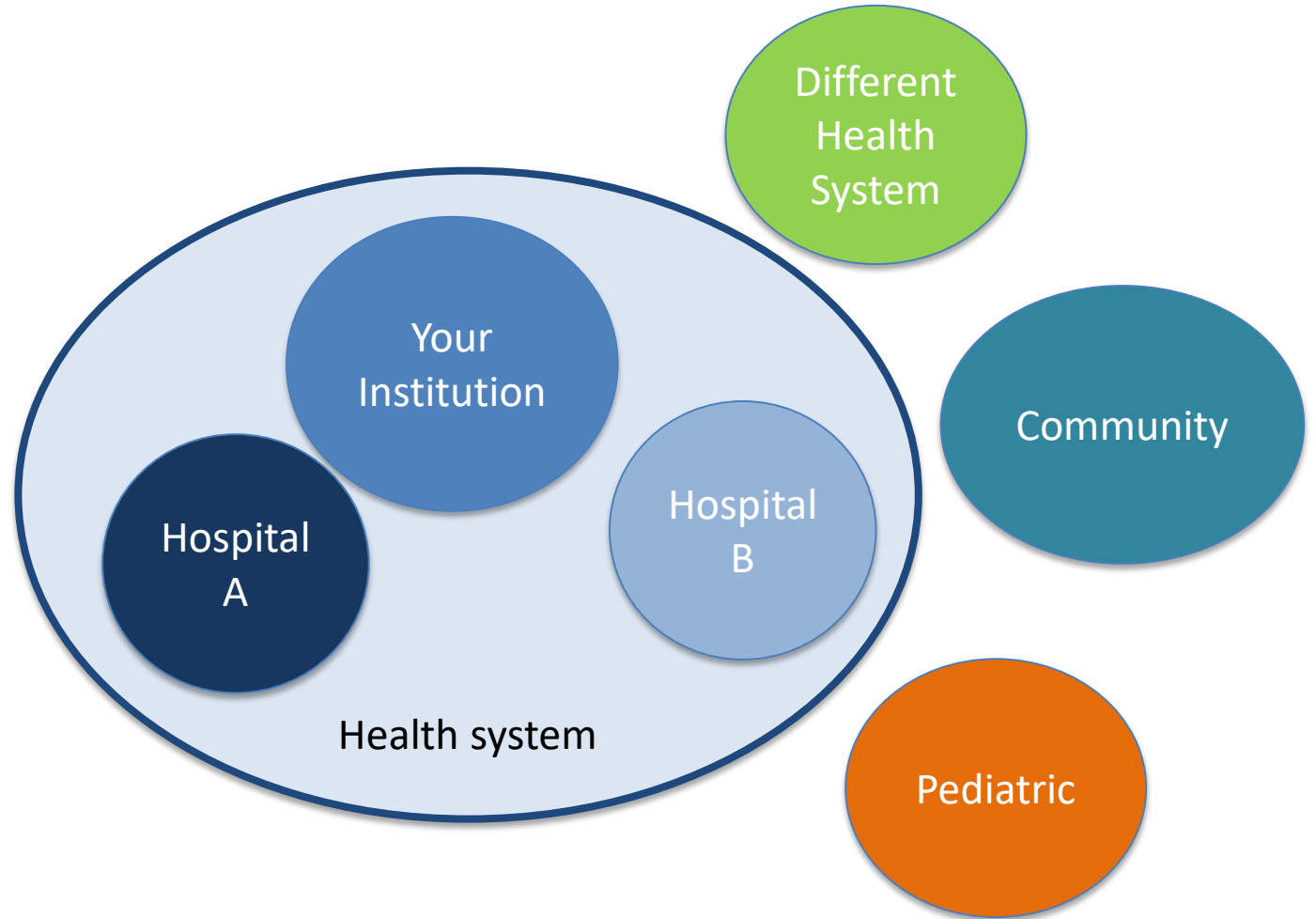
Define Your Patient Population

- Principal *or* Secondary Diagnosis of SCD

- Age: Adult, age $\geq$ 18 yo

- Sites of Service – within your institution
  - ➢ Selected Campus/ Department
  - ➢ Inpatient: Selected Nursing Units
  - ➢ Outpatient: ED, Observation, Clinic, Infusion Center, Other

Michalik DE et al. *Acad Pediatr*. 2017;17:283-287

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ICD-10 Diagnosis Codes for Sickle Cell Disease

- D57.00 - Hb-SS disease with crisis, unspecified
- D57.01 - Hb-SS disease with acute chest syndrome
- D57.02 - Hb-SS disease with splenic sequestration
- D57.1 - Sickle-cell disease without crisis
- D57.20 - Sickle-cell/Hb-C disease without crisis
- D57.211 - Sickle-cell/Hb-C disease with acute chest syndrome
- D57.212 - Sickle-cell/Hb-C disease with splenic sequestration
- D57.219 - Sickle-cell/Hb-C disease with crisis, unspecified
- D57.40 - Sickle-cell thalassemia without crisis
- D57.411 - Sickle-cell thalassemia with acute chest syndrome
- D57.412 - Sickle-cell thalassemia with splenic sequestration
- D57.419 - Sickle-cell thalassemia with crisis, unspecified
- D57.80 - Other sickle-cell disorders without crisis
- D57.811 - Other sickle-cell disorders with acute chest syndrome
- D57.812 - Other sickle-cell disorders with splenic sequestration
- D57.819 - Other sickle-cell disorders with crisis, unspecified

Exclude:
D57.3
Sickle Cell Trait

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Gather Data from Your Institution

- Retrospectively examine all visits within a specified timeframe

Patient population
- Number of unique patients
- Demographics
  - gender, age, race, ethnicity, zip code, payer

Utilization metrics
- Distribution of visits by location
  - ED, hospitalization, and outpatient
- Care continuity
  - Hematology, other specialists
- Preventative vs acute care visits
- Admissions
  - length of stay
  - 30-day readmission rates

Quality indicators
- % on hydroxyurea
- % influenza vaccination
- % retinopathy examination
- % TCD, if indicated

Use the Data to Guide Business Planning:

- How much is the program going to cost?
  - Physician expenses
  - Staff costs (salary and fringe)
  - Costs associated with infrastructure development
  - Data collection resources – quality metrics

- Identify a few quality-of-care improvements that may align with potential financial improvements

Gather Other Data to Justify Your Business Plan….

- Institutional data
  - Institution
  - Health system or network

- Data from other programs similar to what you are aspiring to build
  - Published
  - Non-published: contacts, network

- Guidelines, ASH recommendations, etc

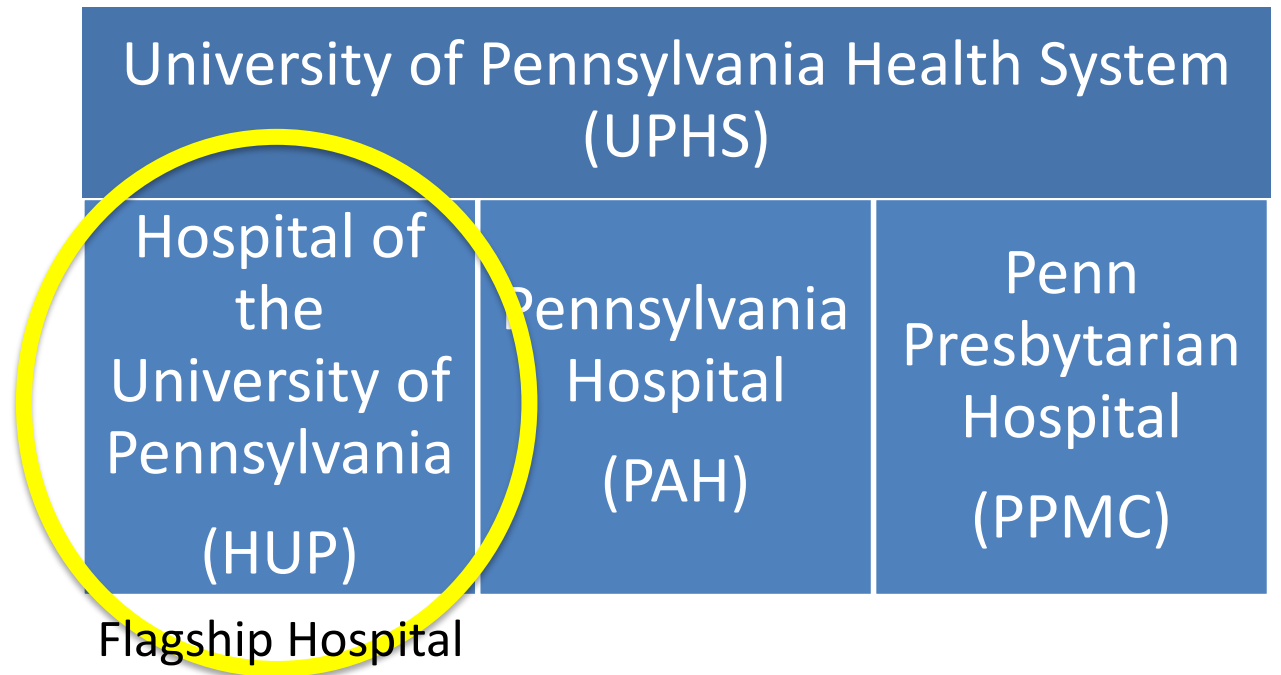# Establishing the Penn Comprehensive Sickle Cell Program
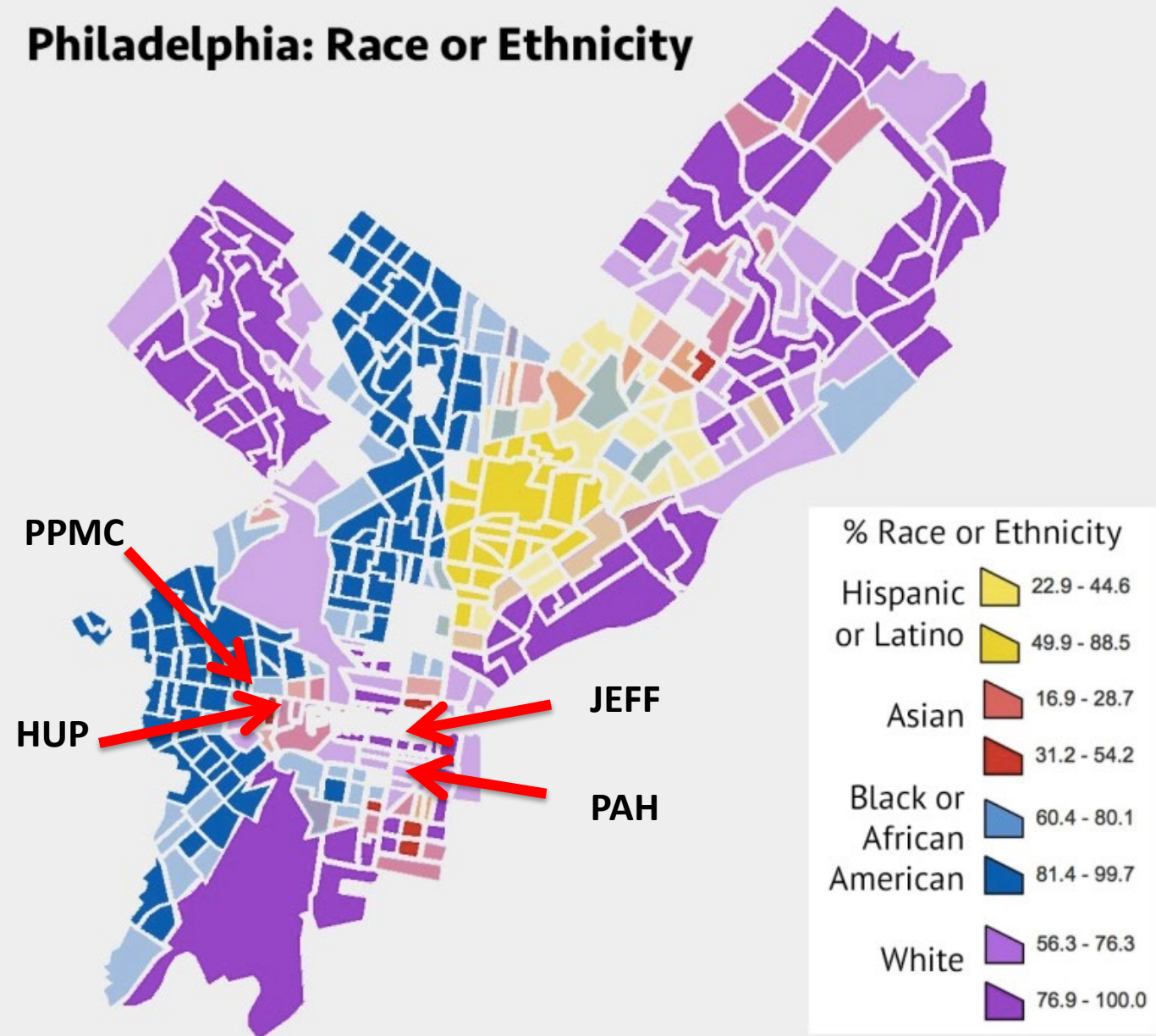
Penn Medicine

Hospital of Univ of Pennsylvania (HUP) Story
Building a SCD Program Proposal 2017

- Why should we care?
- Who are we serving?
- What are the problems?
- How do we prioritize?

University of Pennsylvania Health System (UPHS)		
Hospital of the University of Pennsylvania (HUP)	Pennsylvania Hospital (PAH)	Penn Presbytarian Hospital (PPMC)

Flagship Hospital

Philadelphia: Race or Ethnicity

% Race or Ethnicity

Hispanic or Latino: 22.9 - 44.6, 49.9 - 88.5
Asian: 16.9 - 28.7, 31.2 - 54.2
Black or African American: 60.4 - 80.1, 81.4 - 99.7
White: 56.3 - 76.3, 76.9 - 100.0

PPMC
HUP
JEFF
PAH

Who are we serving? (2017)

Adult SCD Care, Philadelphia	Estimates	Comments
Total adult patients	**1500**	True number unknown
Penn Medicine (UPHS)	**420**	
- Hospital of Univ of Penn (HUP)	70	No program
- Pennsylvania Hospital (PAH)	200	Max capacity
- Penn Presbyterian (PPMC)	150	Single private practitioner
Jefferson University Hospital	**250**	Program at capacity
Other: Temple, Einstein	?	Small numbers
Adults without specialized care	500-1000	

Pediatric SCD Care, Philadelphia	Total Number	Adults > 18 yo
Children's Hospital of Philadelphia (CHOP)	968	136
St Christopher's Hospital for Sick Children	394	65
TOTAL	1362	201

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Building an SCD Program Proposal 2017-2018
Developing a business plan

Pressure from:
SCD Providers
Penn Blood Center
Childrens Hosp
Adult Patients

WINS
- Business Administrator
- Infusion Center 1 bed

Division Hematology/Oncology

2017   2017   2018

Presentations to and engagement of institutional leadership

Educate   Educate   Educate

Building an SCD Program Proposal 2017-2018
Developing a business plan

WINS
- CEO
- CFO
- Help develop a business plan

WINS
- Business Administrator
- Infusion Center 1 bed

Department of Medicine

Division Hematology/Oncology

2017   2017   2018

Presentations to and engagement of institutional leadership

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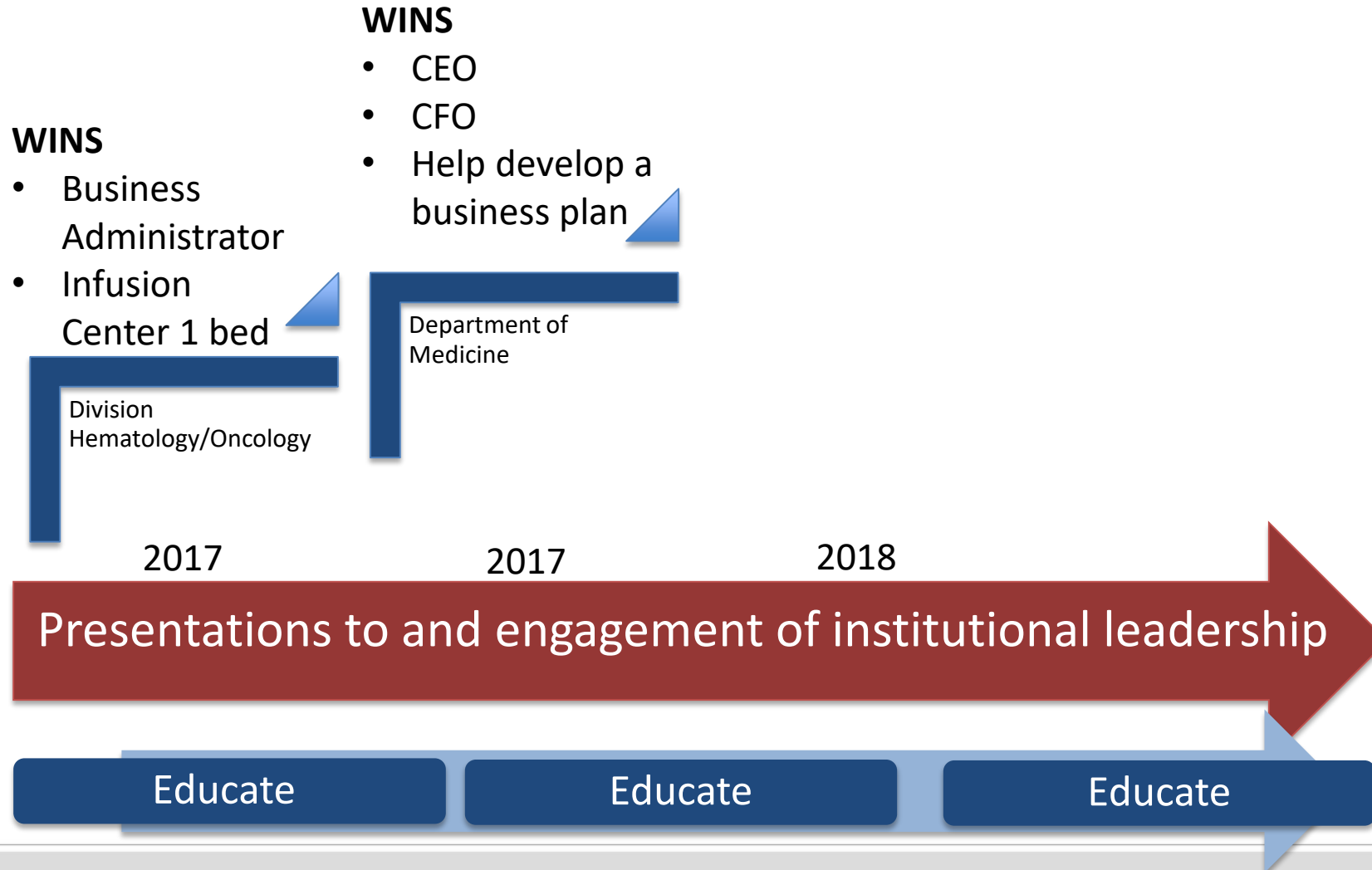
HUP: Business Plan in Development – 2018
Role of the physician….

- Current status – Defined patient population and estimates of growth
  - HUP – 70 currently
  - Community – estimated 5 yr growth to 180 patients
  - CHOP - transition 50 over 5 yrs
- Presented data from SCD programs at cohort institutions
  - 20-50% decrease in inpatient utilization

HUP: Business Plan in Development – 2018 Input from physician…

Create an academic clinical program that:

- Occupies a dedicated space for outpatient activities

- Staffed by existing hematologists

- Provides advanced practice and program nursing, social work, and pain psychology services

- Facilitates coordination of care after inpatient activity

- Future expansion to include dedicated space for day hospital/infusion center

HUP: Business Plan in Development – 2018
Role for Financial Teams: Chief Financial Officer, Business Administrators

- Define the opportunity – HUP
  - Total inpatient admissions at HUP
  - Average contribution margin per admission
  - Opportunity costs: 30% reduction in inpatient days would create a backfill opportunity worth 127,000 annually.
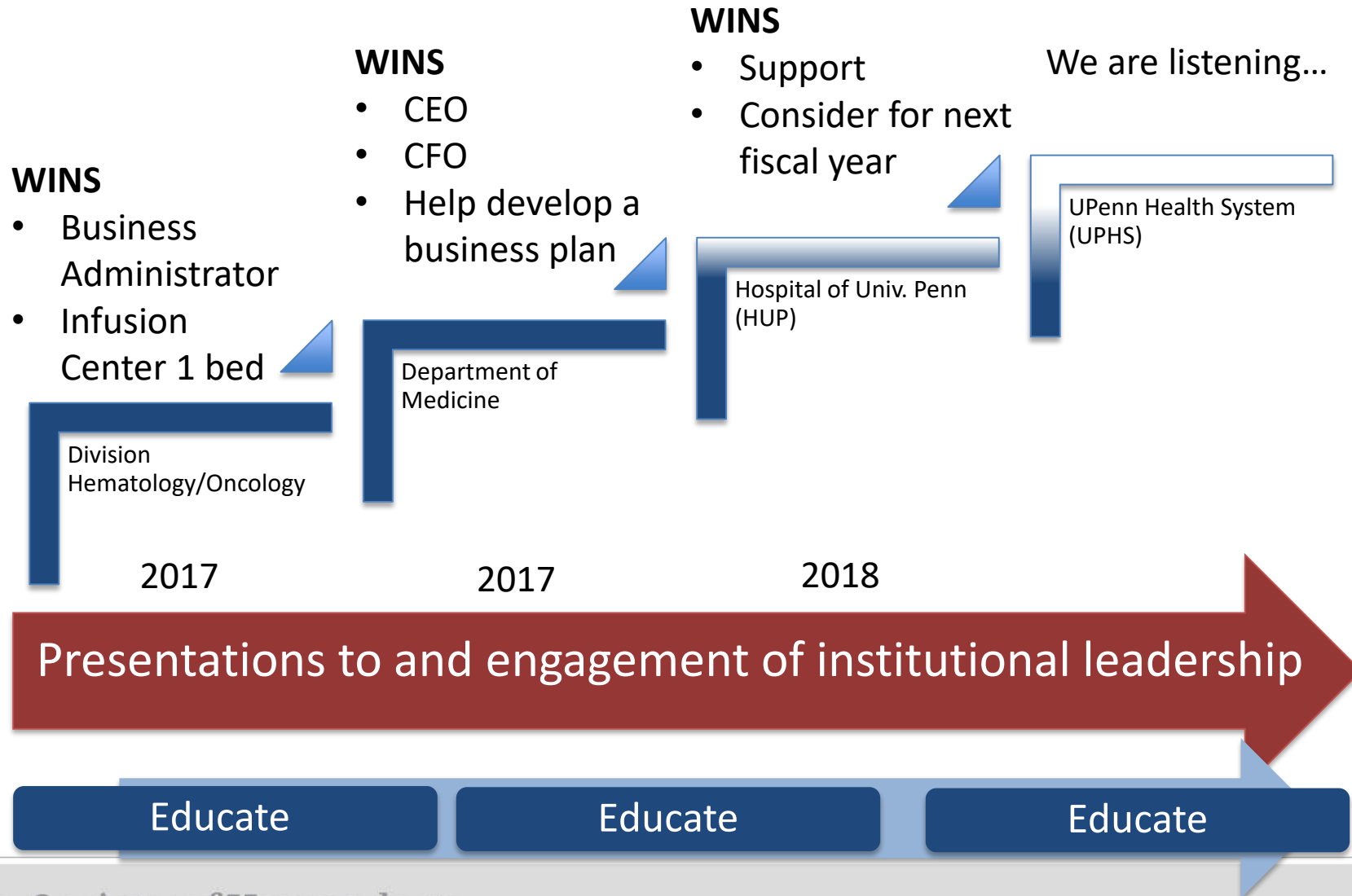
  REALIZE BACKFILL OPPORTUNITY

- Financial Analysis
  - Patients, Revenue per patient
  - Programmatic support
  - Physician expenses
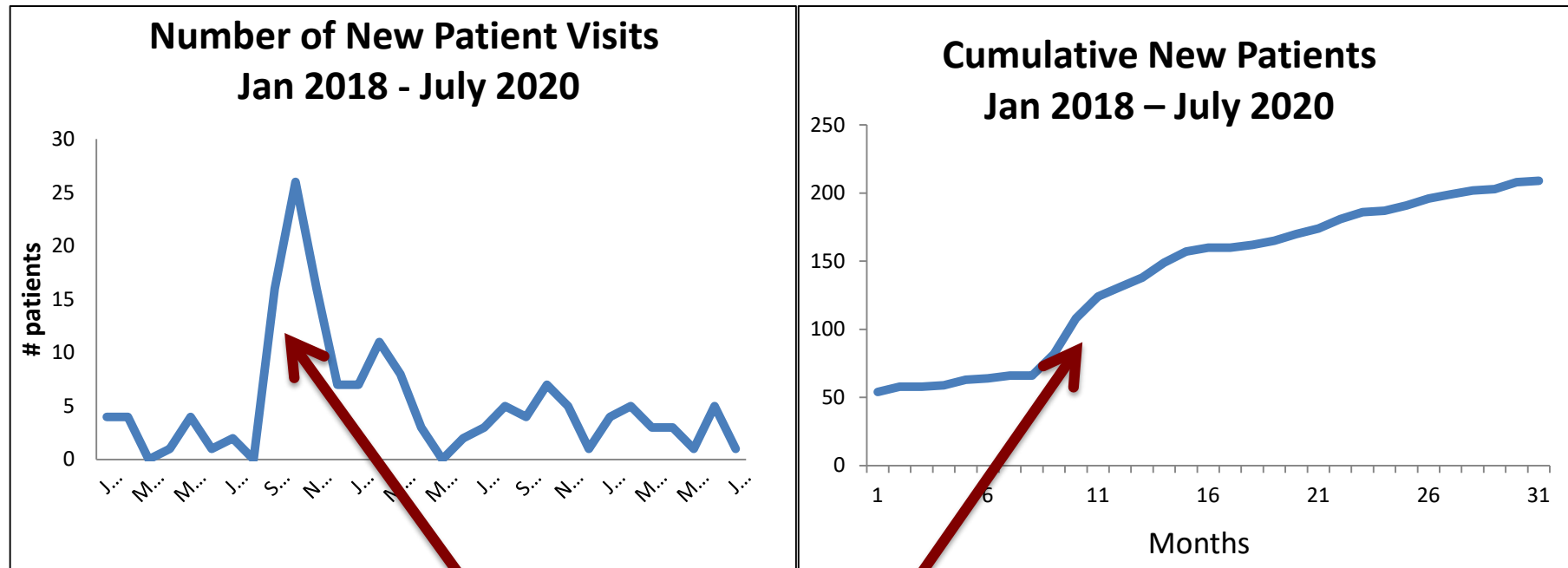 - Existing staff and incremental staff
  - Infrastructure - space

Building an SCD Program Proposal 2017-2018
Developing a business plan

WINS
- Business Administrator
- Infusion Center 1 bed

Division Hematology/Oncology

2017

WINS
- CEO
- CFO
- Help develop a business plan

Department of Medicine

2017

WINS
- Support
- Consider for next fiscal year

Hospital of Univ. Penn (HUP)

2018

We are listening…

UPenn Health System (UPHS)

Presentations to and engagement of institutional leadership

Educate   Educate   Educate

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Penn Comprehensive SCD Program Growth
Jan 2018 – July 2020

"Never let a crisis go to waste"

- Sudden closure of private practice caring for ~150 SCD patients at Penn Presbyterian Hospital – August 2018
  - No list of patients
  - No outpatient records in electronic health record or paper

- Office of UPHS CMO emergently engaged
  - Pain management and family medicine, ED leadership, "C-suites"
  - System wide plan developed to re-assign patients
    - Led by F. Sayani, Hematologist, SCD
    - Engagement of system resources and strategists eg, call center, triaging algorithms
    - Approximately 101 patients captured with transfer of care in first 7 weeks

Back to the drawing board!
Business plan modified to reflect changing patient population and institutional priorities – 2018.

Patient Population
- Present HUP 70
- **Closed practice 101**
- Pediatric Transition

Utilization Data
- Over 2016, 17, 18
- Increasing inpatient utilization across UPHS
- ED visits : UPHS hospital numbers

Goals
- Centralize new patient intake
- Ambulatory care pathways – system wide nurse navigation
- **30% decrease in ED visits and admissions by end FY2020 !!**

New Institutional Priorities on SCD: UPHS

Change in patient population and system needs led to institutional prioritization and system-wide goals.

1. Identify sites where SCD patients will be seen in West Philly
2. Prioritize Inpatient vs Outpatient? – OUTPATIENT
3. Identify the ambulatory resources needed to prevent admission and readmission
4. Assign a finance resource

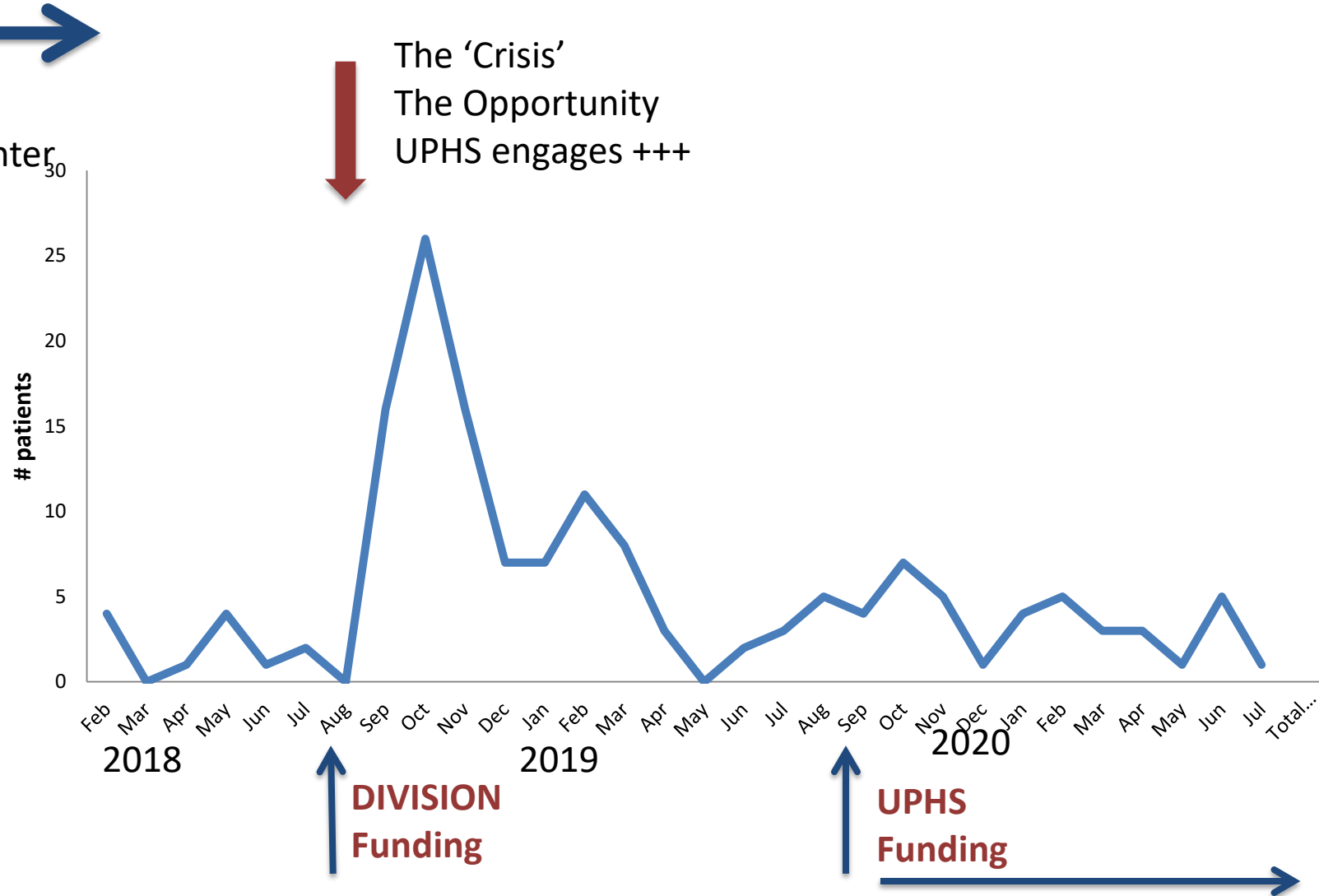# HUP – Revised plan
2019 Business Plan

- Goals: By FY 2021
  - Reduce average length of stay by 10%
  - Reduce hospitalizations by 10%

- How: Increase outpatient resources
  - Hire new staff
    - 1 Nurse Practitioner
    - 1 RN – Program coordinator
    - 1 LPN – Nurse navigator
    - 2 social workers
    - 0.5 FTE psychologist
  - ~ $ 500,000 investment in salary/benefits

We have funding for our program!!

What next ?

Penn Comprehensive SCD Program Growth
July 2018 – Feb 2022
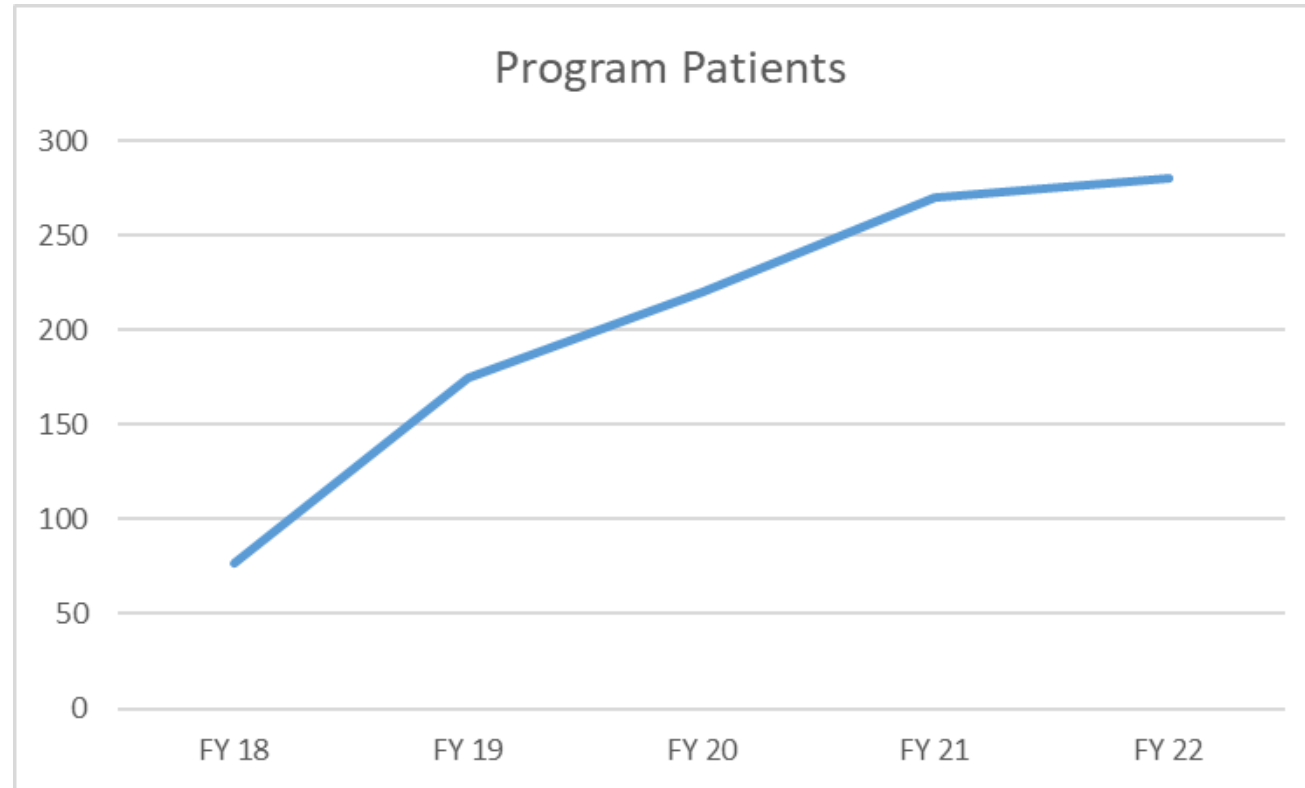
FY 18	FY 19	FY 20	FY 21	FY 22
77	175	220	270	280

Total Completed Outpatient Visits
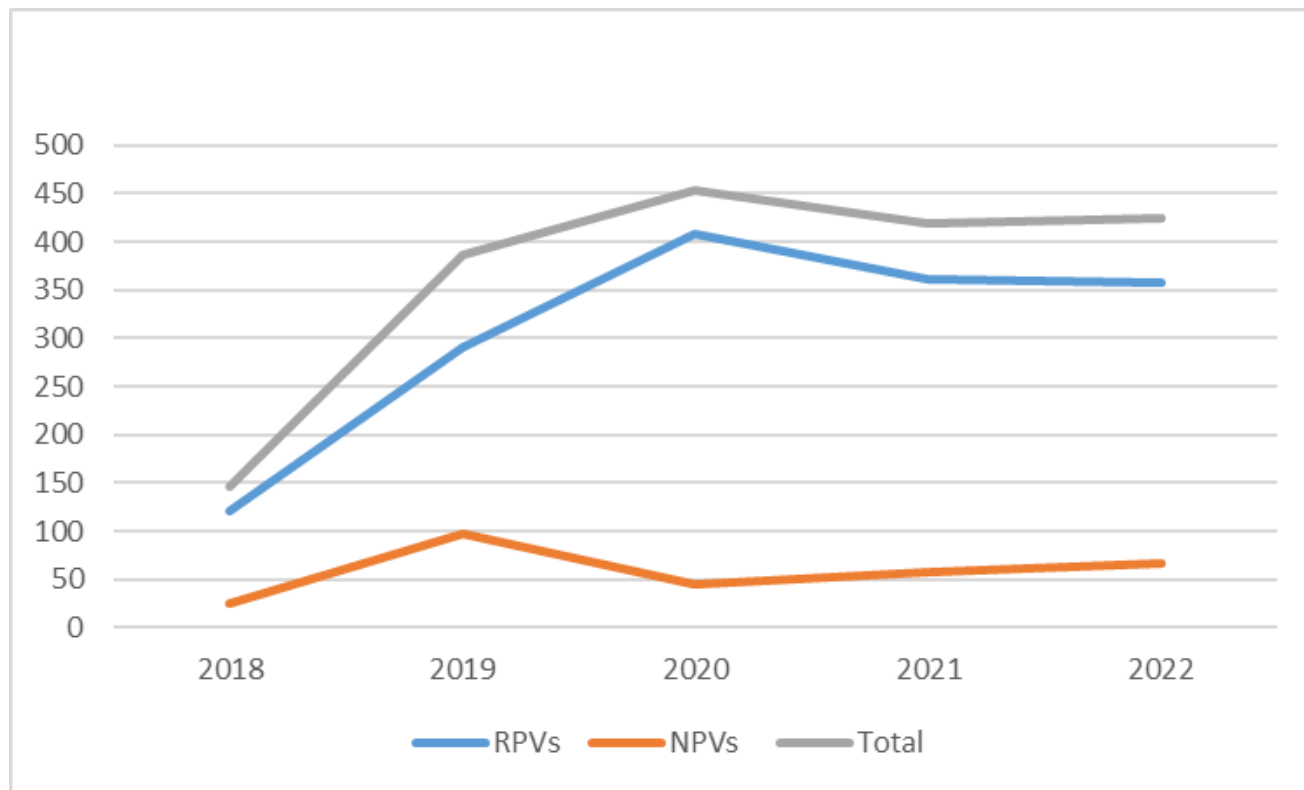
Fiscal Year	RPVs	NPVs	Total
2018	121	26	147
2019	290	97	387
2020	409	45	454
2021	361	58	419
2022	358	67	425

RPV, return patient visit; NPV, new patient visit

*2022 is extrapolated from January

Use the Data to Guide Program Development

Illustrative examples:

If data demonstrate:	Develop this:
Long treatment waiting times in the ED	Vertical triaging, SCD Management Pathways, Pain plans
Long waits in ED for a "bed"	'Forward flow' patient algorithm
Long ALOS	Individualized pain treatment plans PCA utilization, inspiratory spirometry, and VTE prophylaxis Dedicated social worker Inpatient provider/nursing education Enhanced outpatient care team Hematology consultation
Sub-optimal transition	Transition pathway
Pregnancies	Multi-disciplinary pathway of care
Transfusion needs	Antigen matching Allo-ab identification standardization Apheresis program (includes transfusion and vascular medicine)

Improving Care in the Emergency Department (ED)

- Patient Experience
- Number of ED admissions

2018: Lack of guidance on the care of patients with SCD in ED
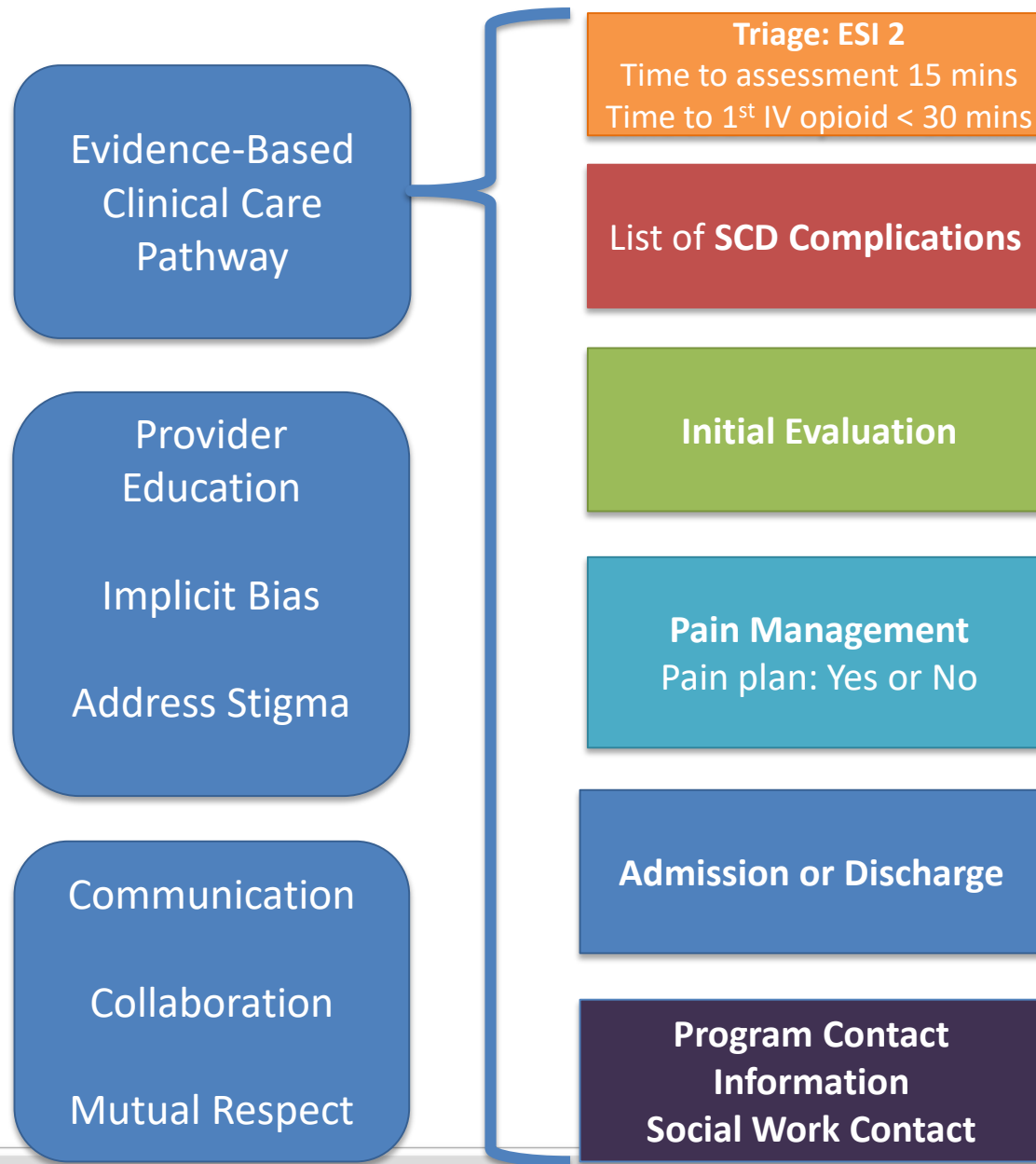
- UPHS 3 downtown hospitals see approx. 1,500 SCD ED visits/year
- HUP: Approx. 300-500 ED visits/year

Patients	ED Providers	Hematologists
• Bias and stigma • Long wait times • Poor pain management • Missed diagnoses	• No treatment plans • Lack of education/experience • Poor communication	• Poor communication • Long wait times • Missed diagnoses

Everyone was frustrated!

Improving Care in the ED with development of a SCD care pathway.

Evidence-Based Clinical Care Pathway

Provider Education

Implicit Bias

Address Stigma

Communication

Collaboration

Mutual Respect

Triage: ESI 2
Time to assessment 15 mins
Time to 1st IV opioid < 30 mins

List of **SCD Complications**

Initial Evaluation

Pain Management
Pain plan: Yes or No

Admission or Discharge

Program Contact Information
Social Work Contact

ED Champion + SCD Team Collaboration

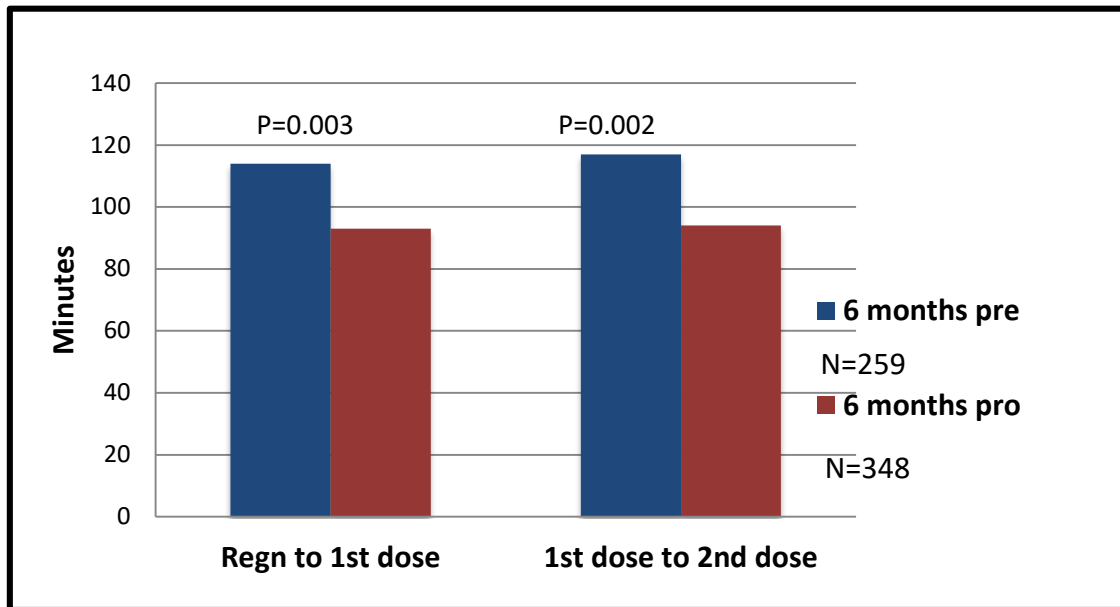**Initial ED Management of Adults With Sickle Cell Vasoocclusive Episode (VOE)**

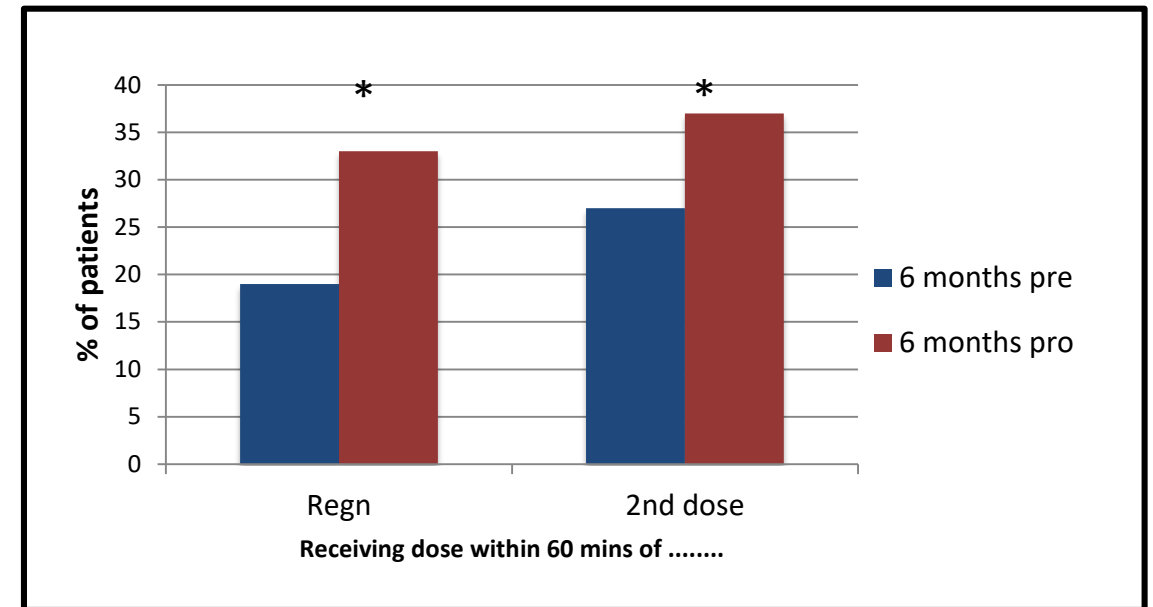Launched at HUP/PPMC ED Dec 2018

Implementation of an SCD care pathway and provider education in the ED reduced time to 1st and 2nd opioid dose.

Reduced time to first and second opioid dose

Increased percentage of patients receiving doses within 60 mins

No change in the rate of patients admitted, return visits to the ED within 7 days, or length of stay within the ED

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But…..limitations in the ED

2019

October 2021

Patient Voices
CBO metwith UPHS CEO

Pediatric Transition deficits
HUP CMO

ED Challenges
Wait for new ED pavilion, will be better

OLD ED
Small, crowded
Long wait times
SCD patients often in hallways

NEW ED
- 61 patient exam rooms
- 36 acute care rooms
- 12 forward flow rooms
- Vertical care model

Persistent SCD team engagement with the ED is paying off….
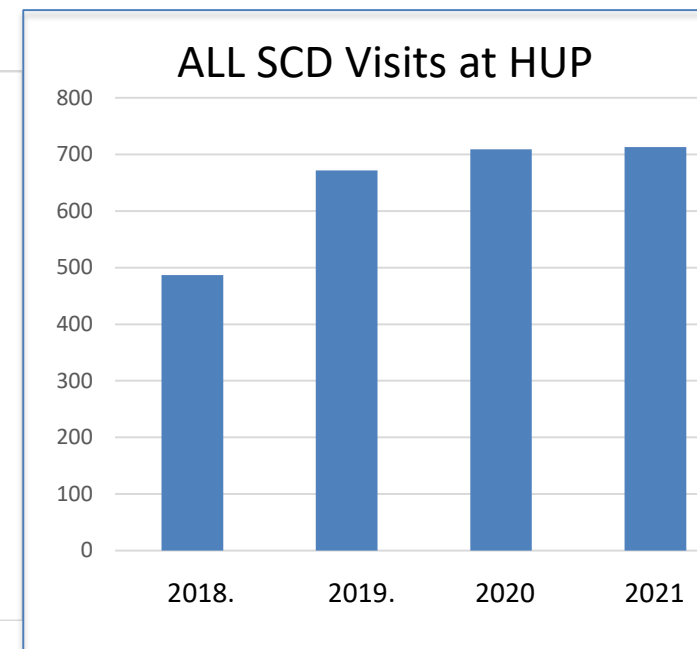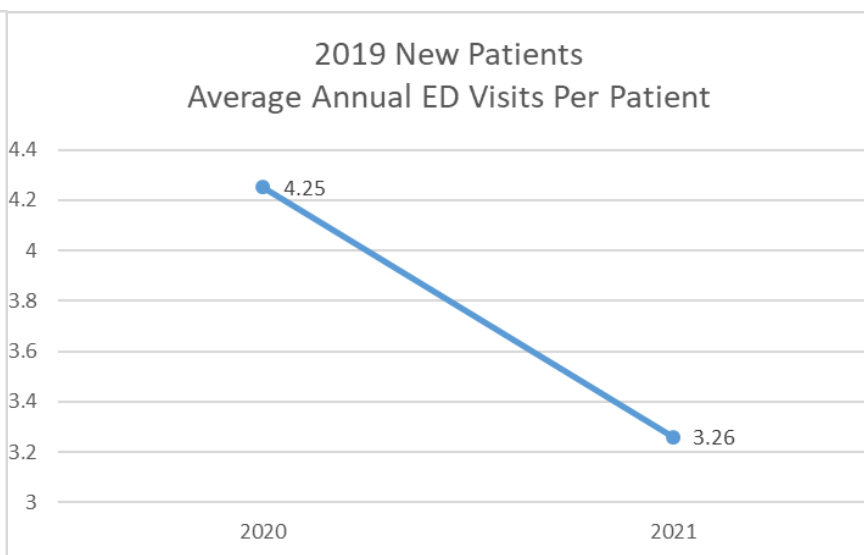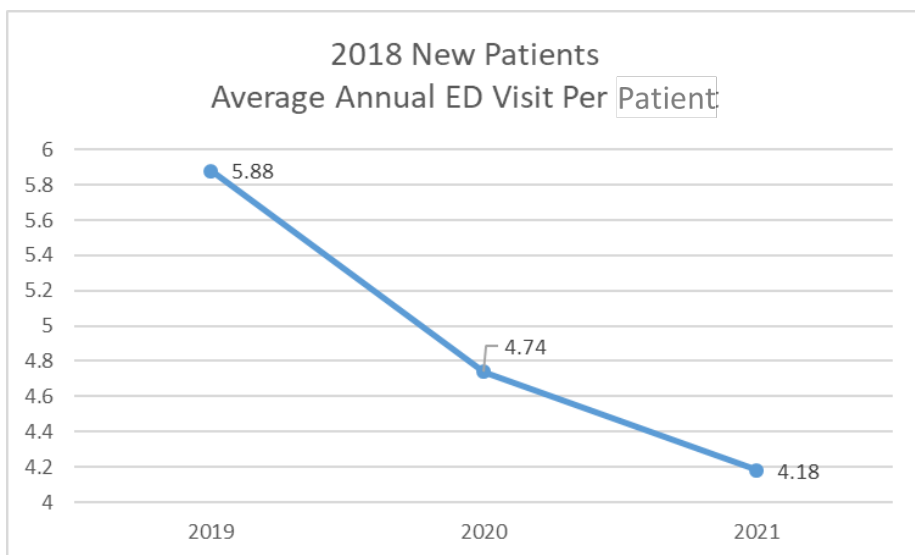
October 2021

- Positive patient and provider feedback on pain plans and pathway.
- Multiple ED driven initiatives to improve SCD care
  - Using 'forward flow rooms' to improve SCD access to care
  - Nursing education
- More than 1 ED champion!
- SCD social worker engagement
  - Connected with ED Quality and Safety Officer
  - Invited to ED Clinical Effectiveness Team Meetings

ED is now driving change!

ED visits decreased in patients receiving comprehensive care

2018 New Patients Average Annual ED Visit Per Patient
- 2019: 5.88
- 2020: 4.74
- 2021: 4.18

2019 New Patients Average Annual ED Visits Per Patient
- 2020: 4.25
- 2021: 3.26

ALL SCD Visits at HUP
- 2018
- 2019
- 2020
- 2021

Among patients enrolled in the Penn SCD Program at HUP: **24% decrease in ED visits**

Establishing an SCD Infusion Center

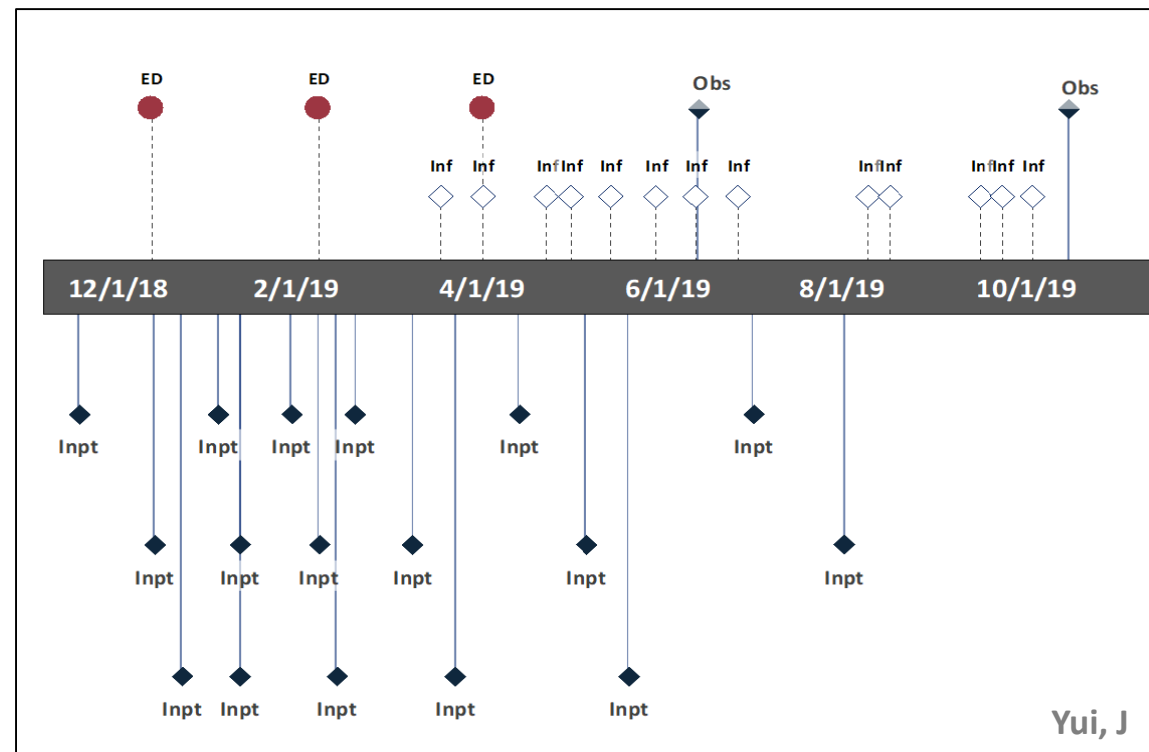# SCD Infusion Center at the Oncology Evaluation Center (OEC)

Example of significant benefit in 1 patient.

Jan 2019

- 1 bed
- Have to call before 10 am
- NPs with ED and inpatient experiences

Limited access to Infusion Center for management of vaso-occlusive episodes

Yui, J

Use your local data to show the impact of an infusion center

SCD Infusion Center at the Oncology Evaluation Center (OEC)

Jan 2019
- 1 bed
- Have to call before 10 am
- NPs with ED and inpatient experiences

Jan 2022
- 3 beds
- Can call up to 2 pm
- 2 trained, engaged Oncology NPs
- Pharmacist - educator

SCD and OEC Teams Collaboration and Engagement

- 61 patients
- 400 visits
- Quality Improvement Projects

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Improving Inpatient Care

Inpatient Admissions - HUP

	FY 2018	FY2019	FY2020*	% Increase by:
Program patient panel	72	187	207	187.5
Inpatient Admissions	230	285	389	69.1
Average length of stay	4.75	5.12	4.68	

*7 months (pre-COVID)

- In 7 months of FY2020 (Pre-COVID)
  - 21% of SCD program patients were admitted
  - 20 patients account for 71% of all SCD admissions at HUP

Hospital Admissions decreased in patients receiving comprehensive care.
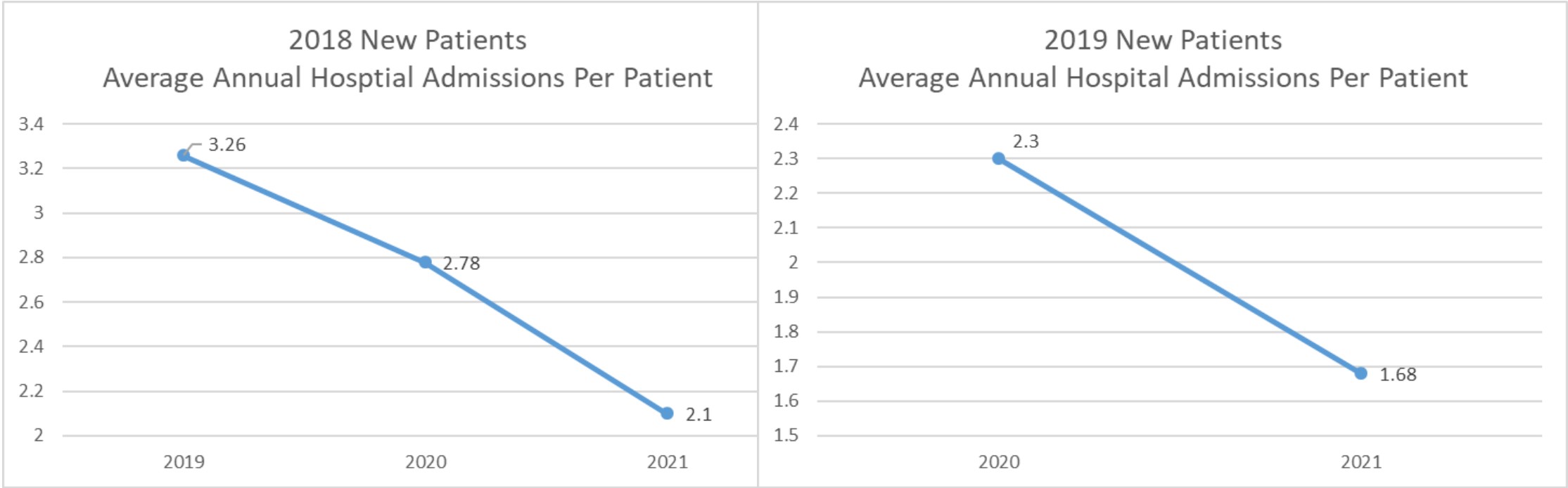
Among patients enrolled in the Penn SCD Program at HUP:
26% decrease in hospital admissions

Inpatient Pain Plans - Collaborative Impact

Day 1 (First 24 hours of admission)
• Hydromorphone PCA 0 mg/hr; 0.2 mg demand, **15-min lockout**; loading dose 0.4 mg; 4-hr max: 2.4 mg
• If pain is intolerable, increase demand dose 50-100%
• Acetaminophen 1000 mg PO q6h
• Scheduled Ketorolac 15 mg IV q6h (if no contraindications)
• Naloxone 0.04 mg IV x 1 PRN

Day 2 (24-48 hours into admission)
• Hydromorphone PCA – **30-min lockout;** 4-hr max: 2.4 mg
• Hydromorphone 2 mg PO q4h
• Acetaminophen 1000 mg PO q6h
• Ketorolac 15 mg IV q6h

Etc…

Improving Inpatient Care: Collaboration With Hospitalists

Increased engagement of other stakeholders – Div of Hospital Medicine, Center for Evidence Based Practice, CBO

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Establishing a Pediatric to Adult Transition Program

Pediatric to Adult Transition Program

**QoL, Improved Survival
Respect, Dignity, Equity…**

- Implemented Fall 2019
- Multidisciplinary collaborative approach
- Monthly transition meetings
- Transition age: 18-25 yo
- Key to seamless transition for patient
  - Early engagement
  - Increased communication

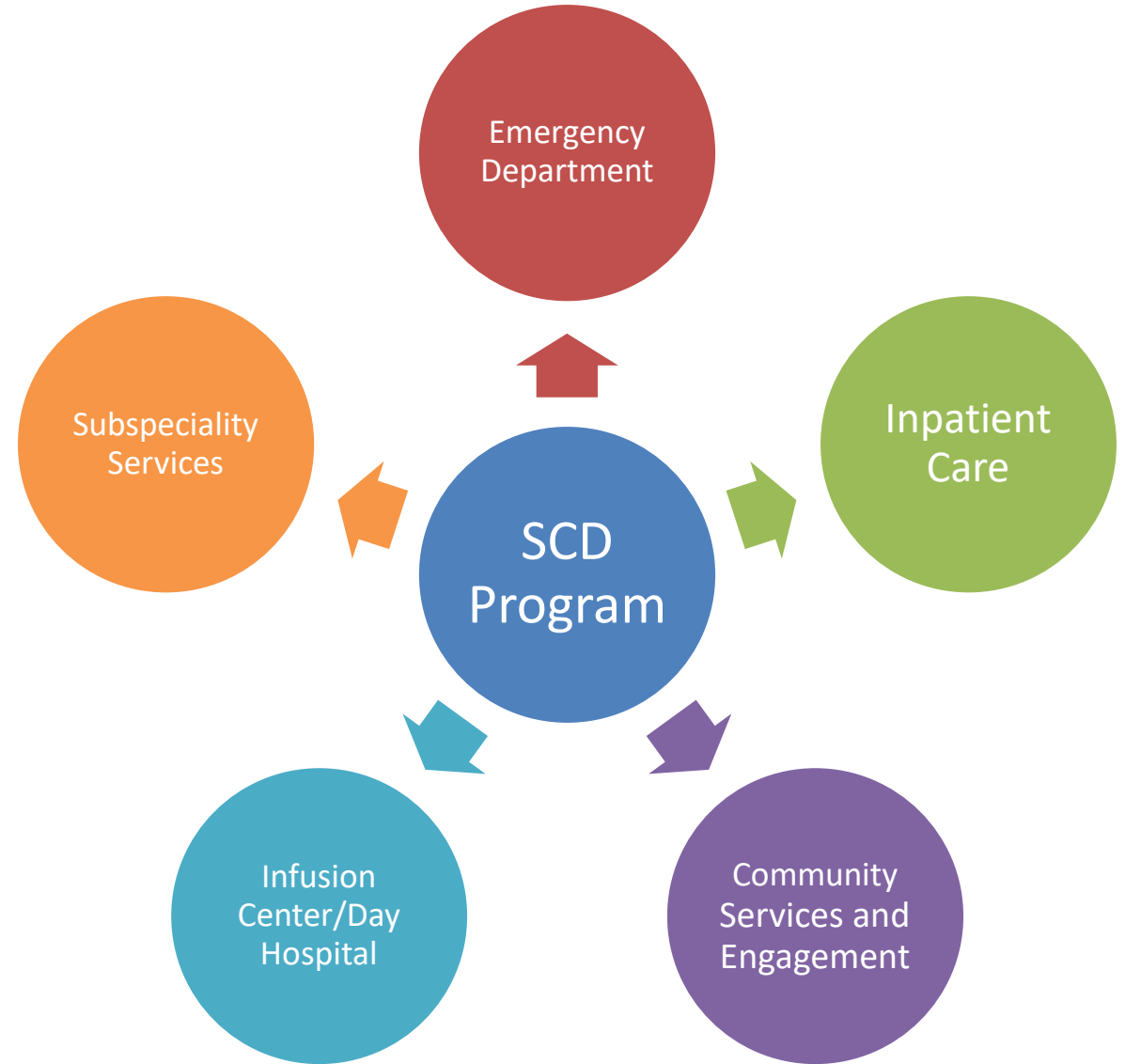| New Patient Visits	FY20	FY21	FY22*
CHOP (Transition)	12	24	12
Community	31	37	30

Pediatric – Adult Program Collaboration

*As of Feb 2022

Building a Comprehensive Care Team

Emergency Department

Subspeciality Services

Inpatient Care

SCD Program

Infusion Center/Day Hospital

Community Services and Engagement

Penn Comprehensive Sickle Cell Program Jan 2022
Infrastructure and Staff

Infrastructure	
Clinic space, growth	+
SCD day hospital/infusion	+
Infusion/transfusion services	+
Apheresis	+

Staff	
Physicians CFTE	1.25
Nurse practitioner	1
Nurse coordinator	1
Nurse navigator (LPN)	1
Social worker	2
Psychologist	0.5
Staff office/computers	+
Program Manager	+/-

Other personnel	
Business Administrator	+
Data analytics	+/-

Ongoing needs

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Penn Comprehensive Sickle Cell Program Jan 2022
Clinical Care

Subspecialist Care	
Pharmacy - Pain	+/-
Pain specialist	+/-
Behavioral health	-
Opioid Use Disorder	+/-
Transfusion Medicine	+
Stroke Neurology	+
Pulmonary hypertension	+
Cardiology	+

| Subspecialist Care	
Renal	+
Renal transplant	+
Maternal Fetal Medicine	+
Family planning	+
Orthopedics	+
Ophthalmology	+
Urology	+
Wound care	+

Other resources	
MRI – Iron burden	+
Penn Home in-fusion	+
Penn Home Care	+
Community health workers	+

Ongoing needs

Increasing Patient Access to SCD Care Beyond Your Institution

Different Health System

Community

Pediatric

Your Institution

Hospital A

Hospital B
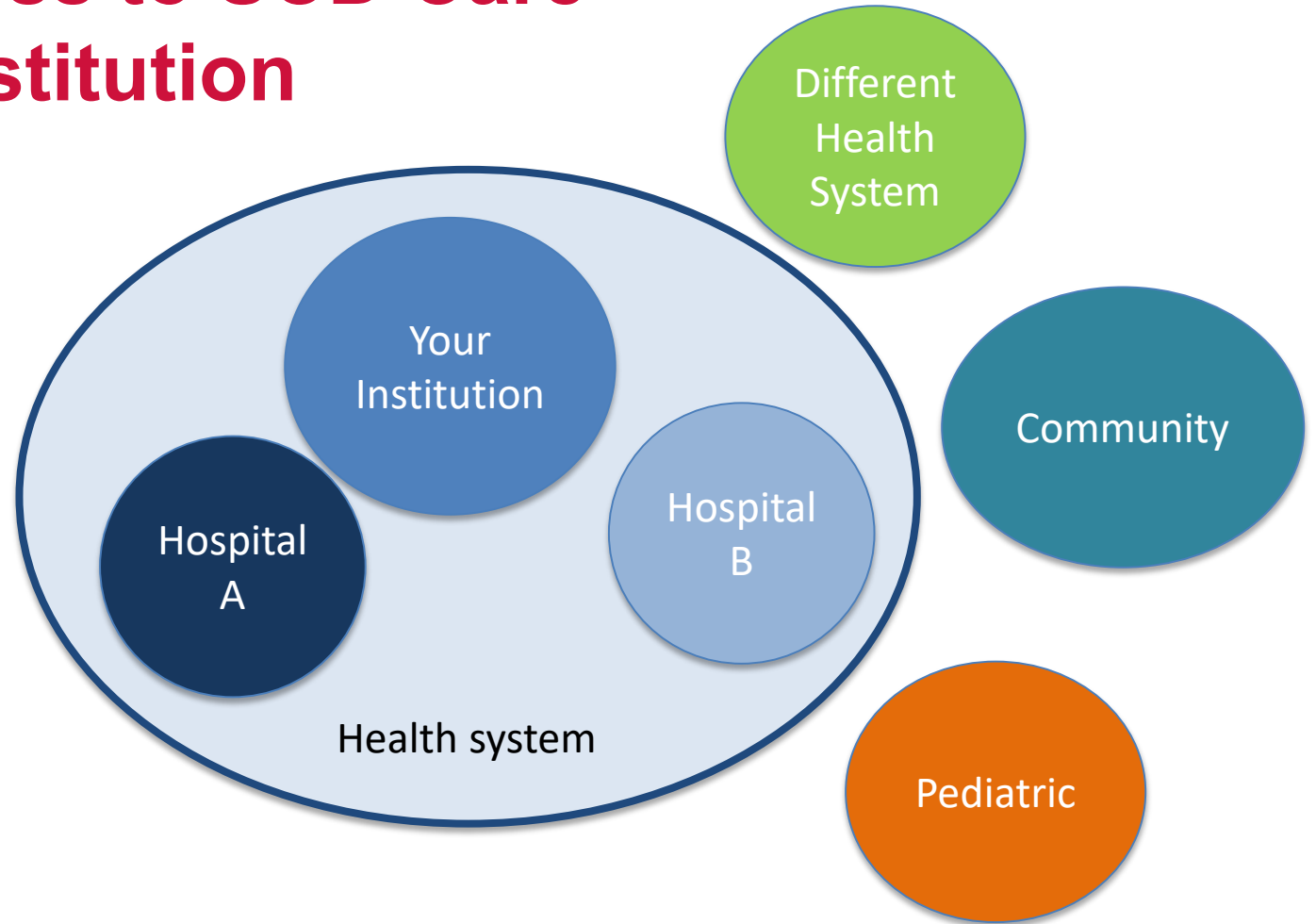
Health system

Define SCD Population Outside of Your Institution

Patient Population	Sources of Data
Acute care settings	Health system State hospital association State Medicaid Rotating trainees and medical students
Continuity of care	State Medicaid State professional societies Other practices (academic and private)
Pediatric specialty care	Pediatric Centers
Not in care	Community-based organizations Schools and universities Places of worship Civic groups

The Penn Story: Beyond HUP

Community Collaboration

- Penn Cares Community Engagement
  - Local health fairs
- Collaboration and engagement with local SCD CBO
  - CRESCENT Foundation
  - SCDAA: Philadelphia Chapter
- Local media presence
- American Red Cross Blood Donation Drives
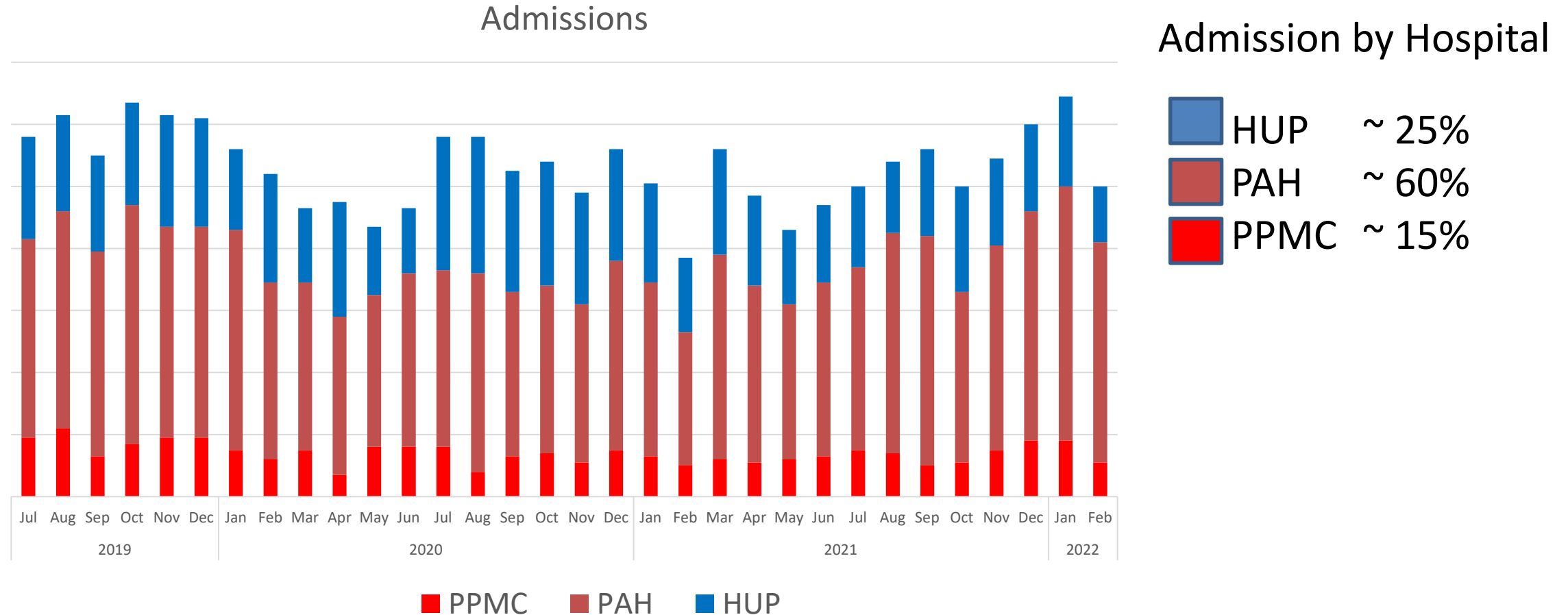
CBO, community-based organization.

Challenge: Care Disparities Between Hospitals

Problem: Lack of standardization of care across the health system

University of Pennsylvania Health System (UPHS)		
Hospital of the University of Pennsylvania (HUP)	Pennsylvania Hospital (PAH)	Penn Presbytarian Hospital (PPMC)

SCD Admissions Across UPHS Downtown Hospitals

Challenge: Care Disparities Between Hospitals

Problem: Lack of standardization of care across the health system

Goal: Standardize inpatient care of patients with SCD care across 3 downtown hospitals

Action item:

> Develop SCD retreat of all stakeholders from 3 downtown hospitals
> Supported by UPHS
> Supported by Division of Hem/Onc
> Assigned strategist/consulting specialists (Penn Medicine Academy)
> Focus groups under way
> Retreat planned : June 29, 2022!

What we have learned over the last 4 years...

- Use the data to form the basis of your 'asks' and business plan.

- As your program grows, use the evolving data to demonstrate wins and to set priorities.

- Use data to engage stakeholders, to secure support.

- Look for resources that can be shared towards the common goal.

- Find an institutional leader who will be your advocate.

- Find champions in the ED, inpatient, etc. Look beyond physicians.

- Engage, engage, engage patients.

Back to Business: A Work in Progress…..

- **Secure institutional support for your program**
  - Network with hospital-based colleagues to find data/data analysis resources
  - Appeal to hospital leadership for financial and other support
  - Show the value of your program to the hospital
    - Cost reduction overall
    - Revenue enhancement
    - Patient and staff satisfaction
    - Community satisfaction and endorsement

Janis Bozzo

Last few thoughts…..

Start with a small proposal that is likely to be successful.

Show success to build institutional support.

Modify your goals and strategies as you move along.

You are not alone!

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In conclusion….

- Use existing data to understand your target patient population
- Analyze and display utilization, financial, and quality metrics
- Develop target outcomes to include in a business plan
- Use the data to drive your programmatic priorities and financial planning
- Develop realistic care quality and financial goals
- Find friends and collaborators
- Recognize challenges and re-evaluate goals and approach regularly

Acknowledgements

- Penn Medicine Leadership
  - Kevin Mahoney, CEO UPHS
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  - PJ Brennan, CMO UPHS
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- All our SCD program patients for believing and trusting in us.

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