

ASCO's Quality Training Program

Reduction of invasive fungal infections in patients with acute myeloid leukemia undergoing induction or re-induction chemotherapy

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University of Virginia Health System

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Institutional Overview



- 585 bed academic medical center in Charlottesville, VA
- Emily Couric Clinical Cancer Center
 - National Cancer Institute (NCI)-designated cancer center
- Treats 50-70 patients/year for acute myeloid leukemia

Team Members



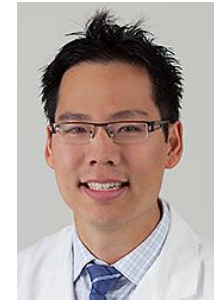
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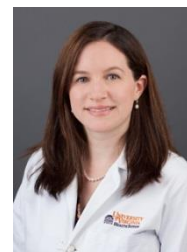
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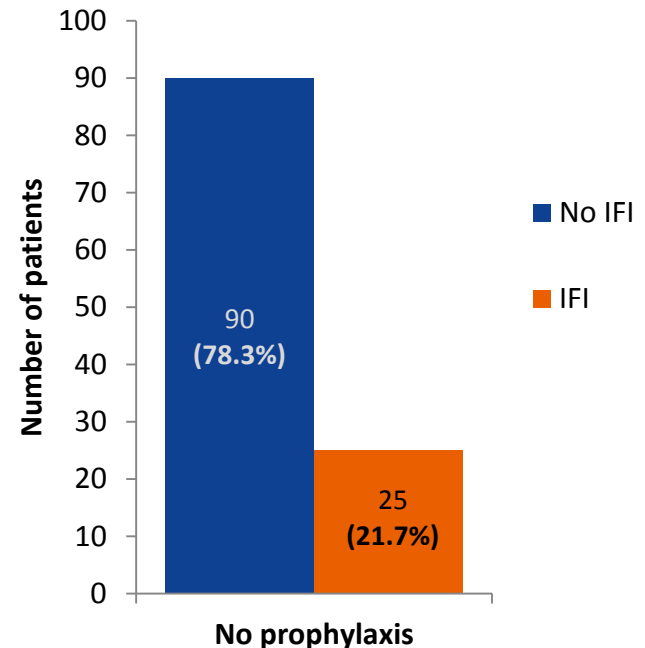
Problem Statement

- 21.7% of patients with AML undergoing induction or re-induction chemotherapy at UVA medical center had a proven/probable invasive fungal infection (IFI) leading to increased morbidity as evidenced by increased number of medical emergency team (MET) calls.

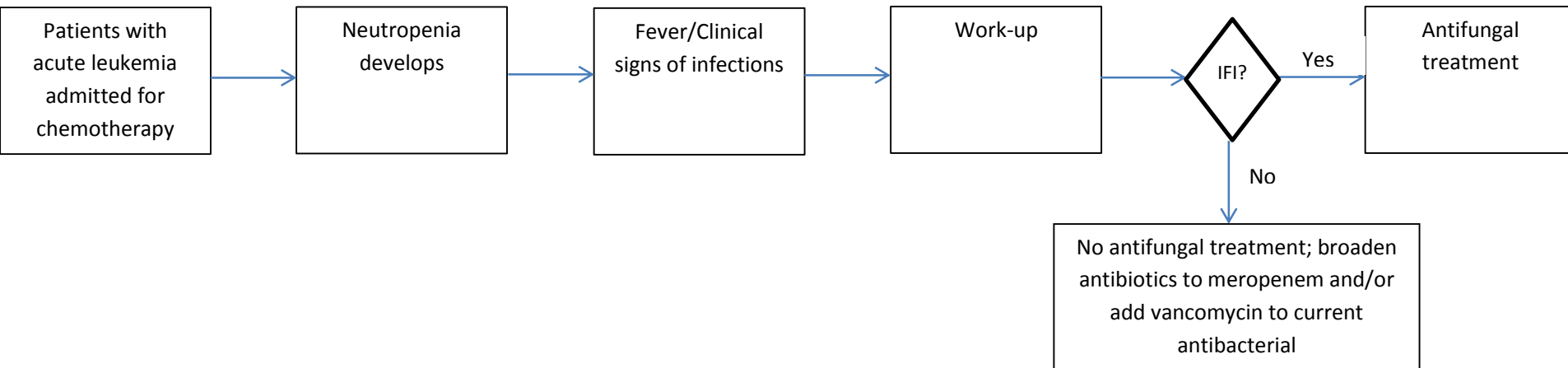
Baseline Data

- Inconsistent use of antifungal prophylaxis in acute leukemia patients
- Without antifungal prophylaxis, rate of IFI over 20% during induction chemotherapy for AML
 - National average 8-10%
- Increased # of MET calls in patients with **proven/probable** versus possible/none IFI
 - (**0.14/day** vs. 0.06/day)

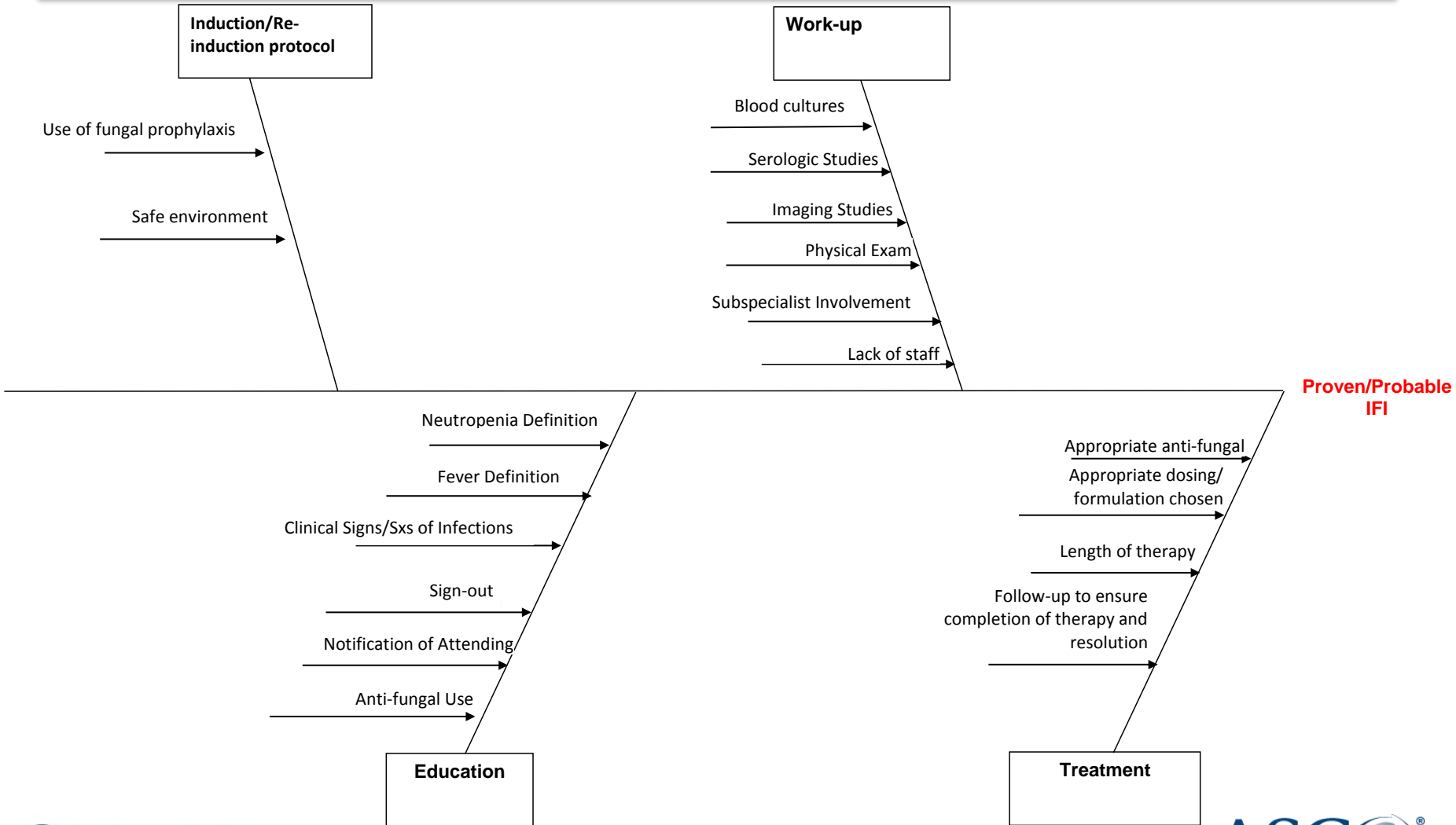
Rate of IFI in patients receiving induction chemotherapy for AML 2011-2015



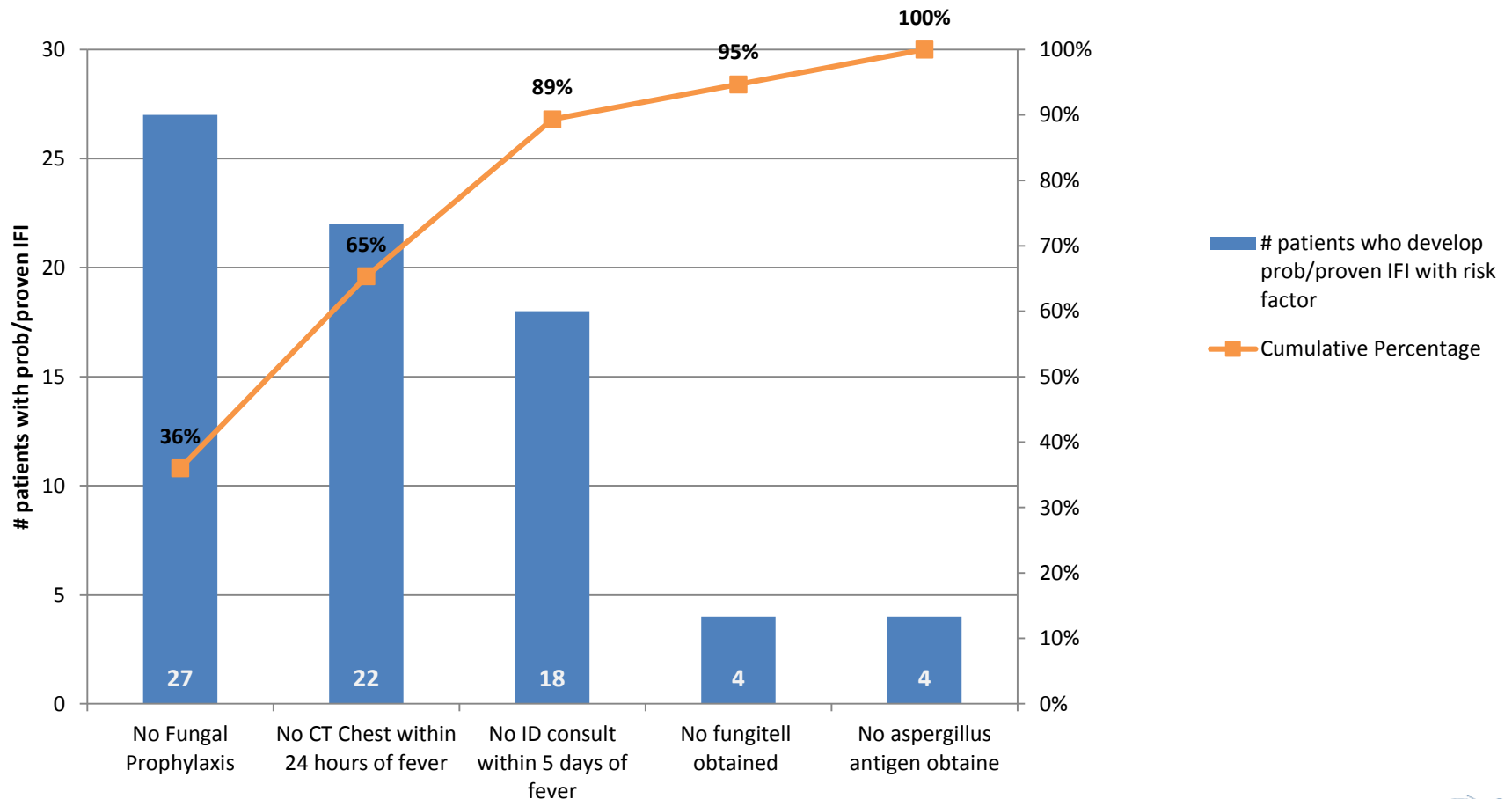
Process Map - Current



Cause & Effect Diagram



Diagnostic Data



Aim Statement

Reduce the percentage of proven/probable IFI in patients with acute myeloid leukemia undergoing induction or re-induction chemotherapy at the University of Virginia Health System to 10% or less by January 2017.

Measures

Primary outcome: Proven or probable IFI incidence

Patient population

- Patients with acute myeloid leukemia undergoing induction or reinduction chemotherapy
 - Exclusions: Patients with prior IFI, patients who cannot receive antifungal prophylaxis, patients who survive less than 90 days after induction

Calculation methodology

- $\% \text{ IFI} = \# \text{ patients with proven or probable IFI} / \# \text{ induction encounters}$

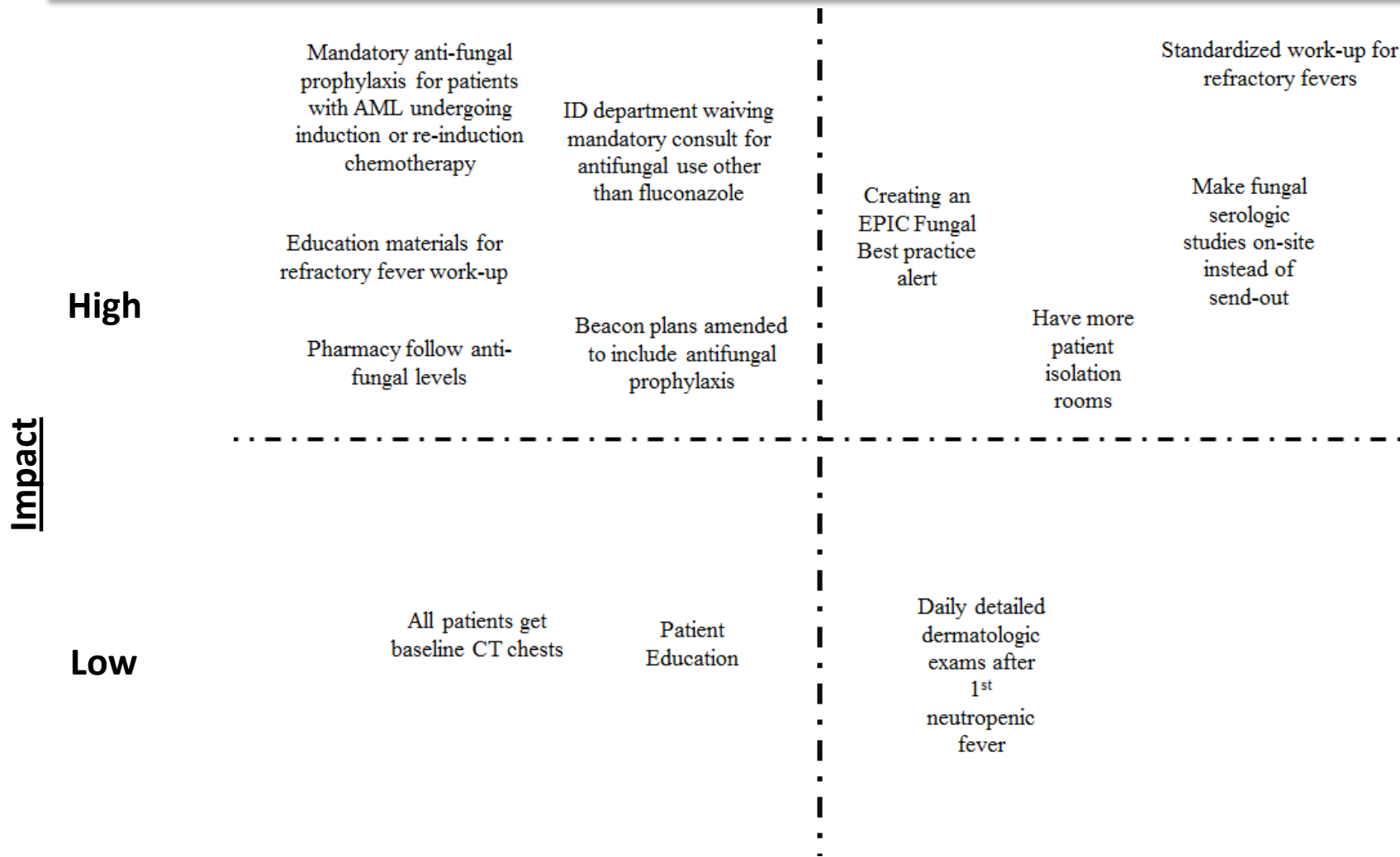
Data Source

- EPIC Beacon treatment plans, EMR

Data collection frequency

- Monthly

Priority Matrix



Standardized work-up for refractory fevers

Creating an EPIC Fungal Best practice alert

Make fungal serologic studies on-site instead of send-out

Have more patient isolation rooms

PDSA Plan (Test of Change)

Date of PDSA Cycle	Intervention	Results	Action Steps
July 31, 2014 – July 31, 2016	<ul style="list-style-type: none"> No planned intervention Attending specific fluconazole prophylaxis given to leukemic patients 	<ul style="list-style-type: none"> Anecdotal decrease in IFI rates, but used inappropriately in many patients 	<ul style="list-style-type: none"> Institute antifungal prophylaxis guideline for patients with AML during induction
August 1, 2016 – December 31, 2016	<ul style="list-style-type: none"> Guideline implementation Resident education 	<ul style="list-style-type: none"> Decreased rates of IFI “Missed” previous IFI in patient with reinduction 	<ul style="list-style-type: none"> Evaluation process for previous IFI Revise pharmacist documentation (iVent)

Antifungal Prophylaxis Guideline

- Antifungal prophylaxis guideline
 - Patients undergoing induction or reinduction chemotherapy for AML
 - Posaconazole po (alternatives if contraindicated)
 - Continue until count recovery

University of Virginia Medical Center
Clinical Decision Tool Template

TITLE: Acute Myeloid Leukemia Antifungal Prophylaxis Guideline

This is a:

- Guideline** (recommended best practice)
 Protocol (adherence expected; document any deviations)

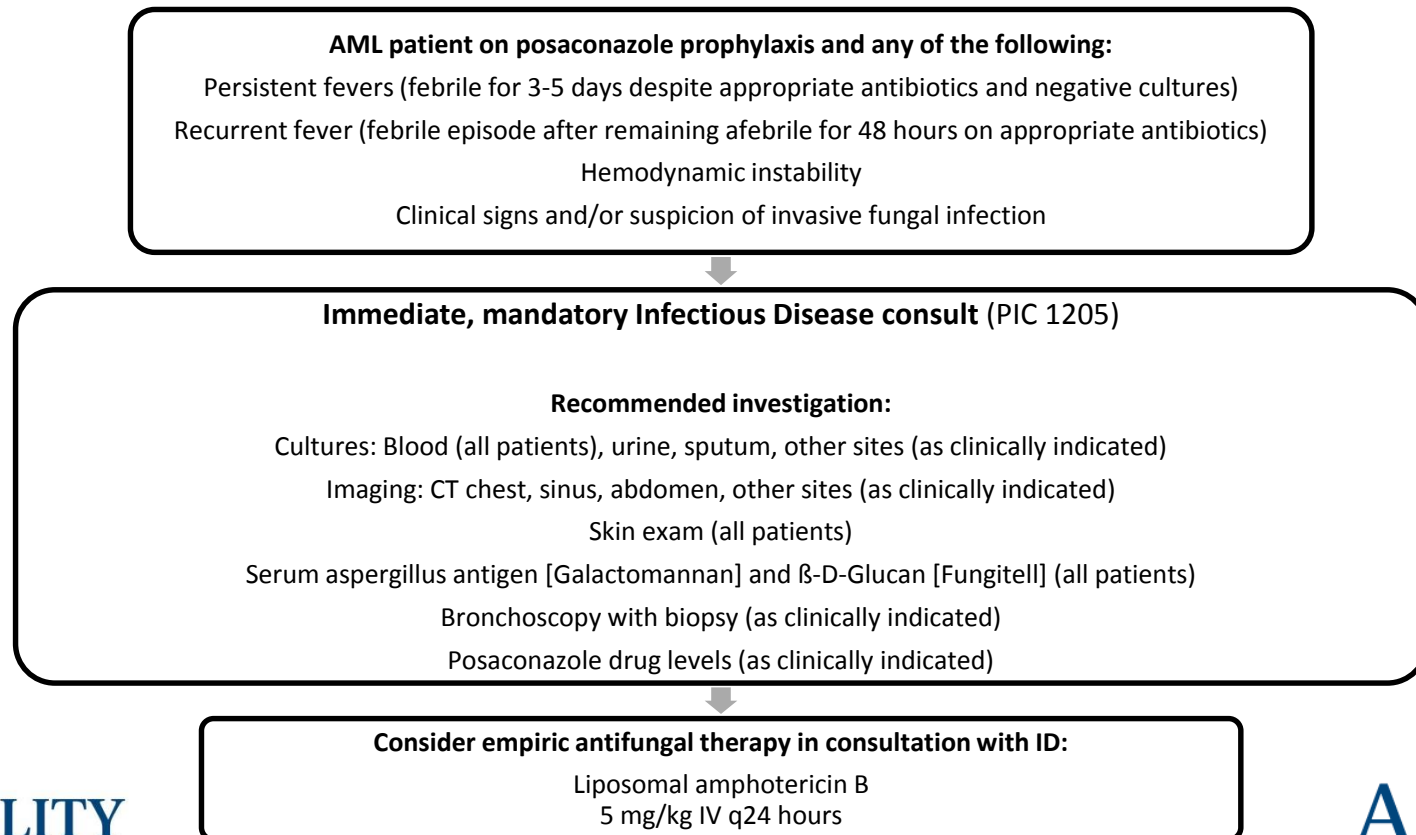
Its use is initiated: by an LIP via an electronic order
 by a non-LIP, based on pre-defined clinical criteria in protocol: Initiator is RN Other: _____

OBJECTIVE:

The purpose of this guideline is to institute antifungal prophylaxis in acute myeloid leukemia patients who are at high risk for fungal infection due to intensive induction chemotherapy regimens.

Clinical Pathway for Refractory Fevers

- Clinical pathway for refractory neutropenic fever and/or clinical signs of invasive fungal infection



Beacon Treatment Plan Update

Antifungal prophylaxis incorporated in Beacon Treatment plans

- Attending or fellow ordering
- Heme/onc clinical pharmacist review

The screenshot displays the Beacon Treatment Plan Manager interface for a patient named UVA EMILY COURIC CLINICAL C... The treatment plan is titled "InPt Idarubicin/Cytarabine (7 + 3) Induction for AML". The patient's weight is 59 kg (+0.0% change, 13d ago) and BSA is 1.67 m2 (+0.0% change, 13d ago). The interface shows a list of orders under the "Supportive Care" category:

- Pharmacy communication order:** UNTIL DISCONTINUED Starting when released Until Specified. - Posaconazole (oral or intravenous) should not be given in combination with anthracyclines (daunorubicin, idarubicin.) If patient is receiving an anthracycline for induction, begin posaconazole in the morning AFTER the anthracycline doses have completed.
- Physician communication order:** UNTIL DISCONTINUED Starting when released Until Specified. - If patient is unable to tolerate PO medications, posaconazole IV may be used. - If patient is unable to use posaconazole, substitute micafungin 50 mg for antifungal prophylaxis. - These IV medications are available to order as an advanced order group.
- posaconazole delayed release (NOXAFIL) tablet 300 mg:** 300 mg, Oral, 2 TIMES DAILY, 2 doses Starting S+3 at 0900. Use approved by AST member? Heather Cox-Hall. - AML prophylaxis. - Administer with food if possible and do not divide, crush, or chew. - Note to Pharmacy: Posaconazole should not be given in combination with anthracyclines.
- posaconazole delayed release (NOXAFIL) tablet 300 mg:** 300 mg, Oral, DAILY Starting S+4 at 0900. Use approved by AST member? Heather Cox-Hall. - AML prophylaxis. - Administer with food if possible and do not divide, crush, or chew. - Note to Pharmacy: Posaconazole should not be given in combination with anthracyclines.
- Posaconazole,S:** Timed, ONE TIME LAB Starting S+13 at 0800. - Trough to be drawn on Day 10 of posaconazole prophylaxis. - Draw trough BEFORE administering posaconazole.

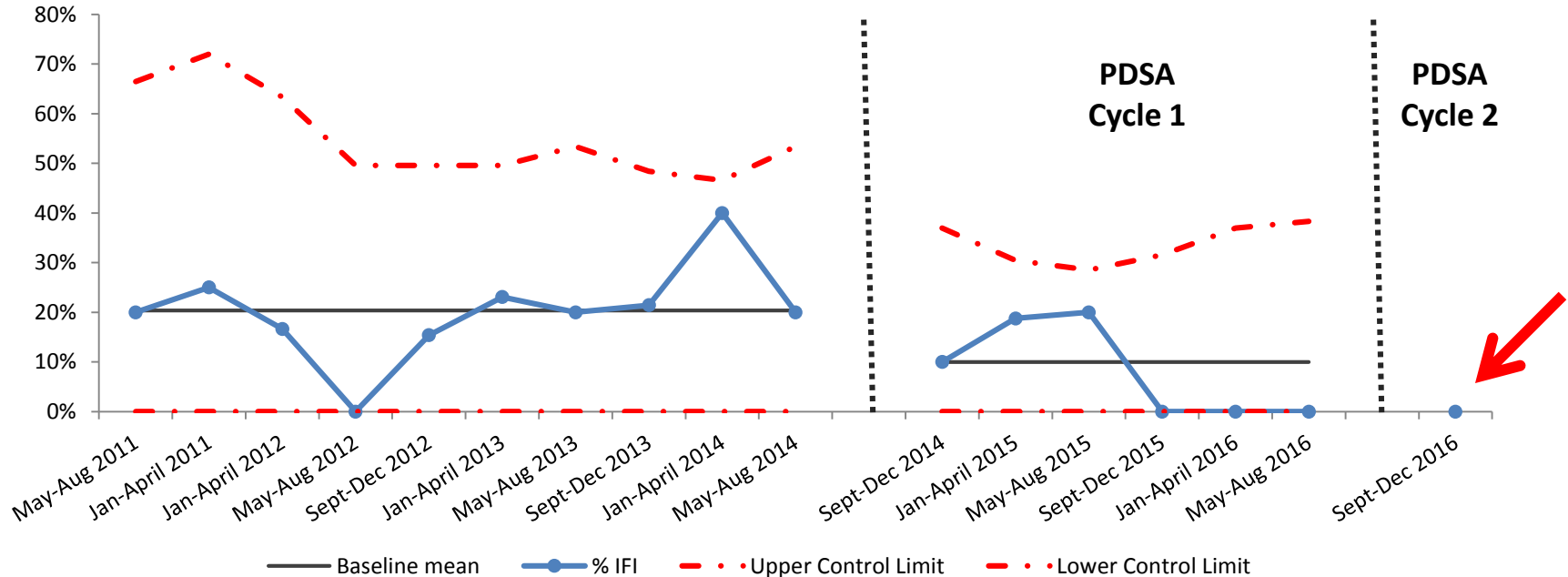
i-Vent and Cheat Sheet

- Resident “cheat sheet”
 - Rotation on/off service weekly
- Standardized pharmacist i-Vent
 - Previous IFI
 - Posaconazole trough level

The screenshot displays a software interface with a green header bar containing 'Summary' and 'Interventi...'. Below this is a 'General Information' section with fields for 'Type' (PK: Posaconazole), 'Subtype', 'Status' (Open), 'Significance', 'Value', 'Time spent' (minutes), 'Response' (Accepted), and 'Outcomes'. Below the general information are sections for 'Associated Orders' (with an 'Add' button), 'Associated Users', and 'Scratch Notes'. The 'Documentation' section features a rich text editor with a toolbar and contains the following text: 'Eight Testpatient [HAS/HAS NOT:22922] received treatment previously for invasive fungal infection. If patient has previously been treated for invasive fungal infection, please alert the LIP as an ID consult may be appropriate. Posaconazole trough level is scheduled on *** (Day 10 of prophylaxis). Goal is > 700 ng/mL'.

Change Data – p chart

Invasive Fungal Infection Rates in Patients with Acute Myeloid Leukemia (p-chart, 3 sigma)



Conclusions

- **Proven/Probable IFI rate at goal of $\leq 10\%$**
- Better working relationship with infectious disease
- Positive for stem cell transplant program

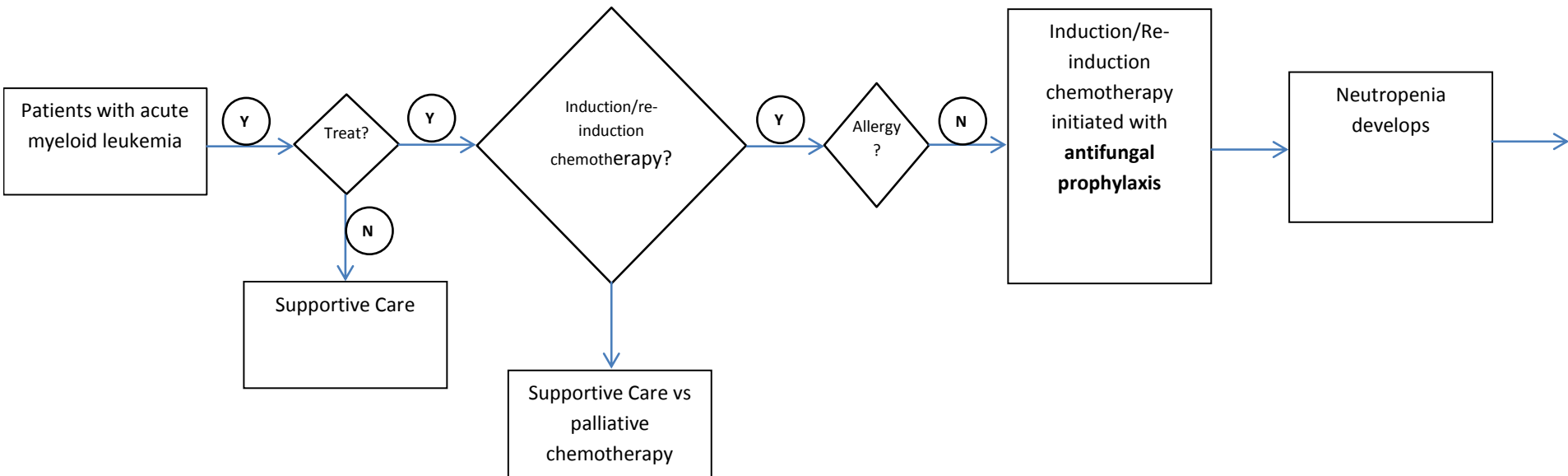
Next Steps/Plan for Sustainability

- On-going evaluation of any resistant fungal organisms
- Continued discussion with infectious disease regarding therapy and appropriate workup for refractory or recurrent fevers
- Potential roll out of protocol to stem cell transplant service
- Poster presentation – ASCO Quality Symposium

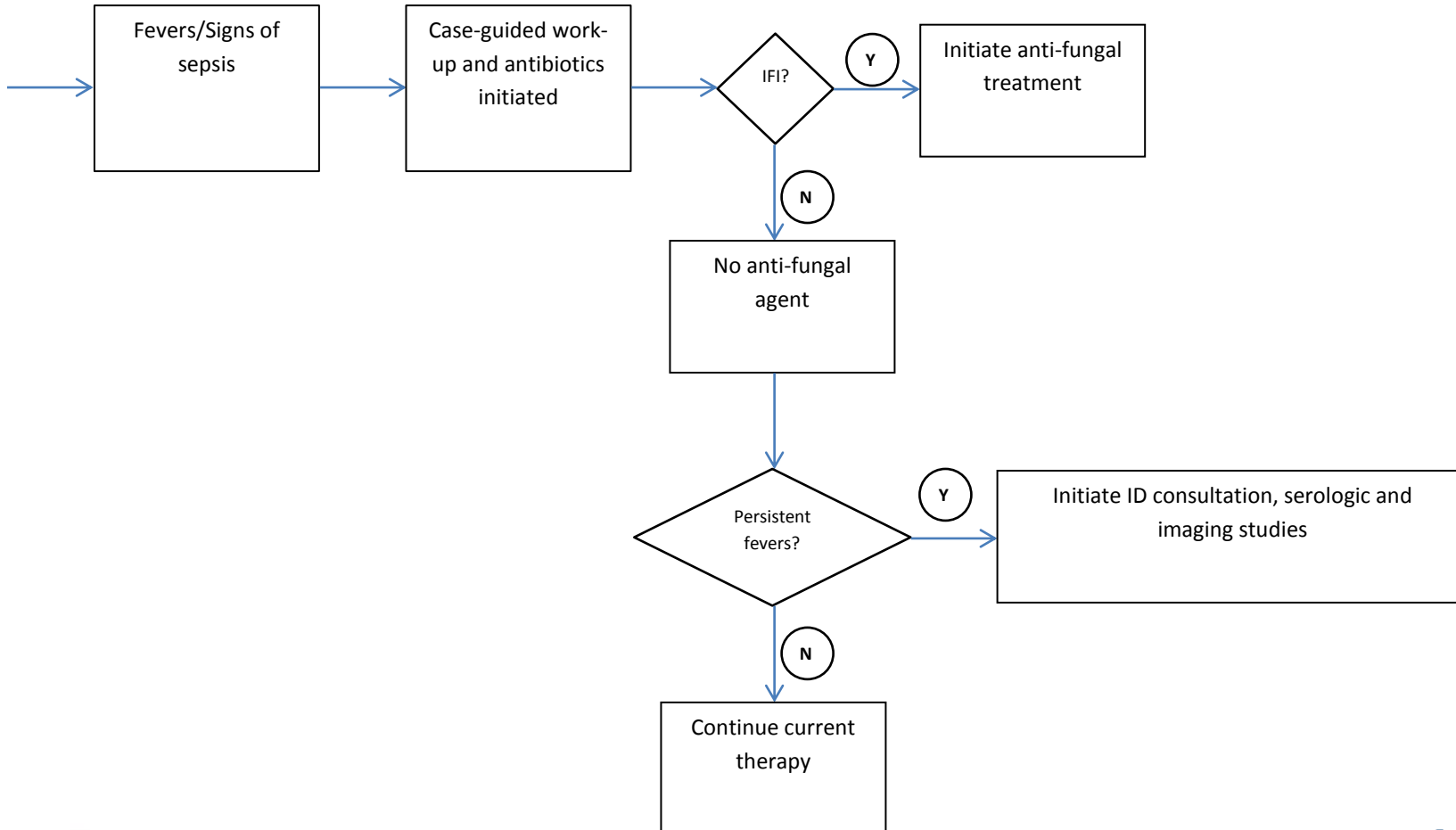
Thank You

- ASCO QTP faculty and staff, especially Amy Guthrie
- Michael Keng
 - Medical director of 8West and our quality champion/guru
- 8West nurses, pharmacists, and residents
- Hematologists
- Infectious disease service
- IT support
- **Our patients!**

Ideal Process Map



Ideal Process Map



Anti-fungal Prophylaxis – p chart

Fraction Patients receiving fungal prophylaxis

