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Graduating Fellow's Presentation

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Clinical Informatics Fellow (Class of 2022)

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Capstone projects

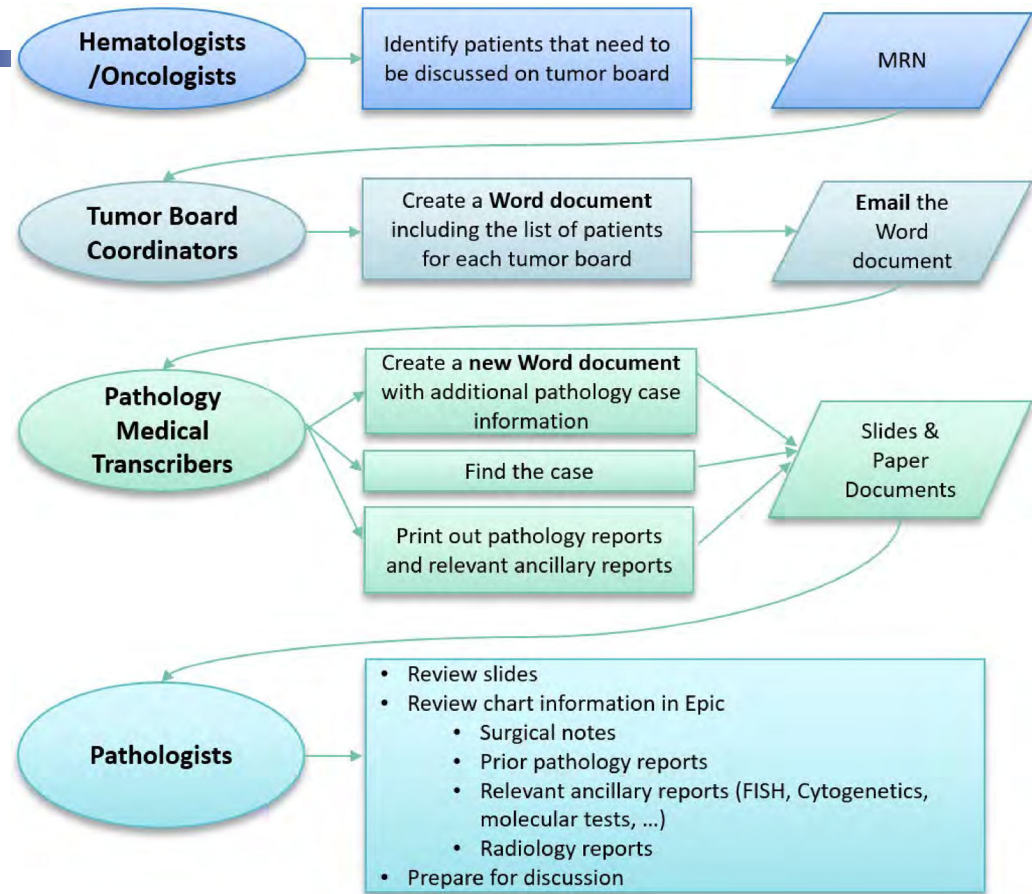- Epic solution to streamline tumor board workflow
- BPA intervention for hemoglobin A1c testing

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Epic solution to streamline tumor board workflow
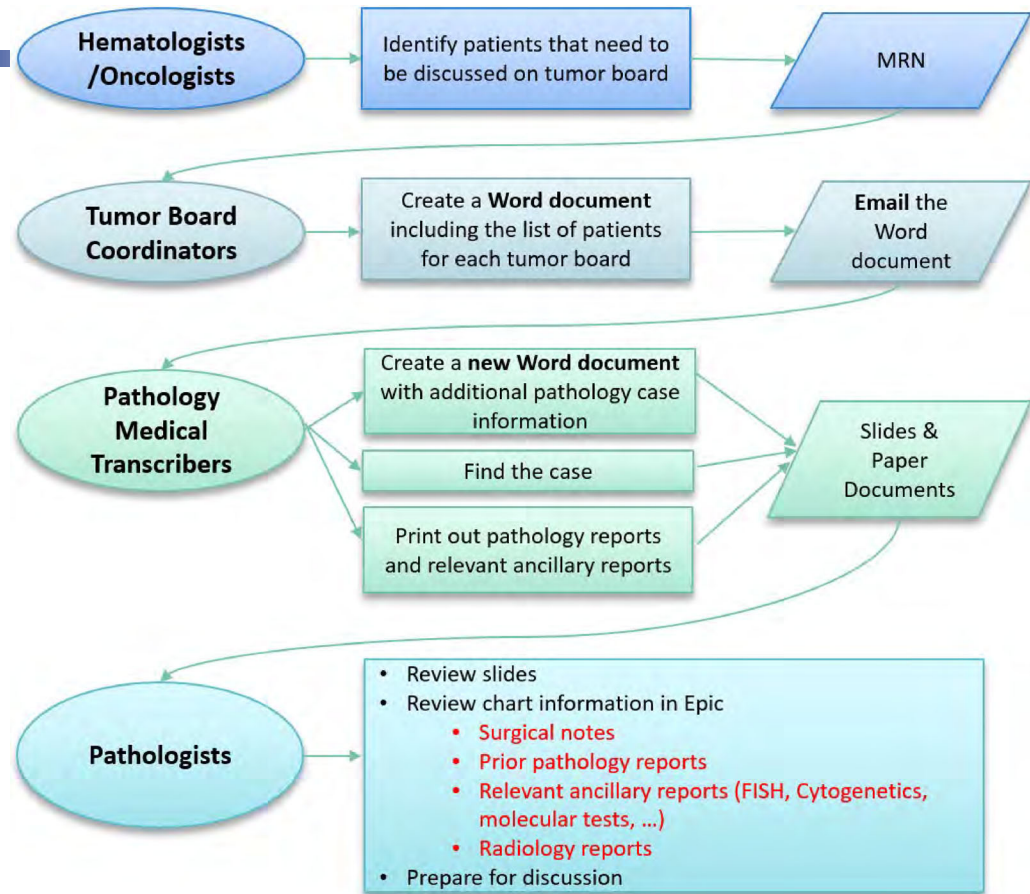
Background

- Current tumor board workflow from a pathologist's view

Epic solution to streamline tumor board workflow

Background

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Epic solution to streamline tumor board workflow

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- Current tumor board workflow from a pathologist's view
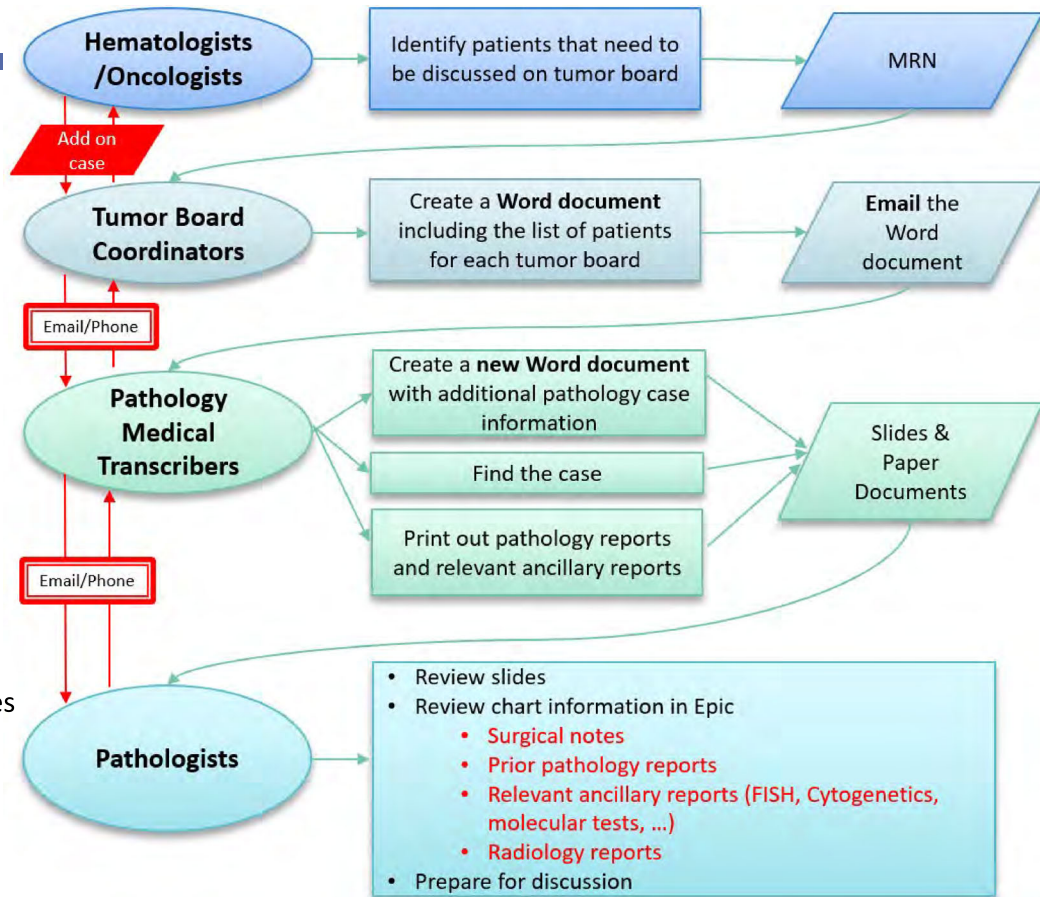
Tumor board request process

- Is not an electronic request process
- Involves communication between many people
- Communication tools (email, phone call, word documents) are not efficient
- Lack of consensus regarding the number of cases can be discussed during each tumor board conference
- Lack of consensus regarding the deadlines for requesting add on cases

Various tumor board conferences

- Currently there are 13 active tumor board conferences that include pathologists

### Information required for tumor board preparation

- Reside in many places within Epic
- Takes time to look for useful information

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Epic solution to streamline tumor board workflow

Goals

1. To streamline the tumor board request process so that pathologists can have a timely/automatic access to the list of patients who will be discussed on the tumor board.
2. To create a place where pathologists can find all the relevant/useful information while reviewing slides during tumor board preparation.
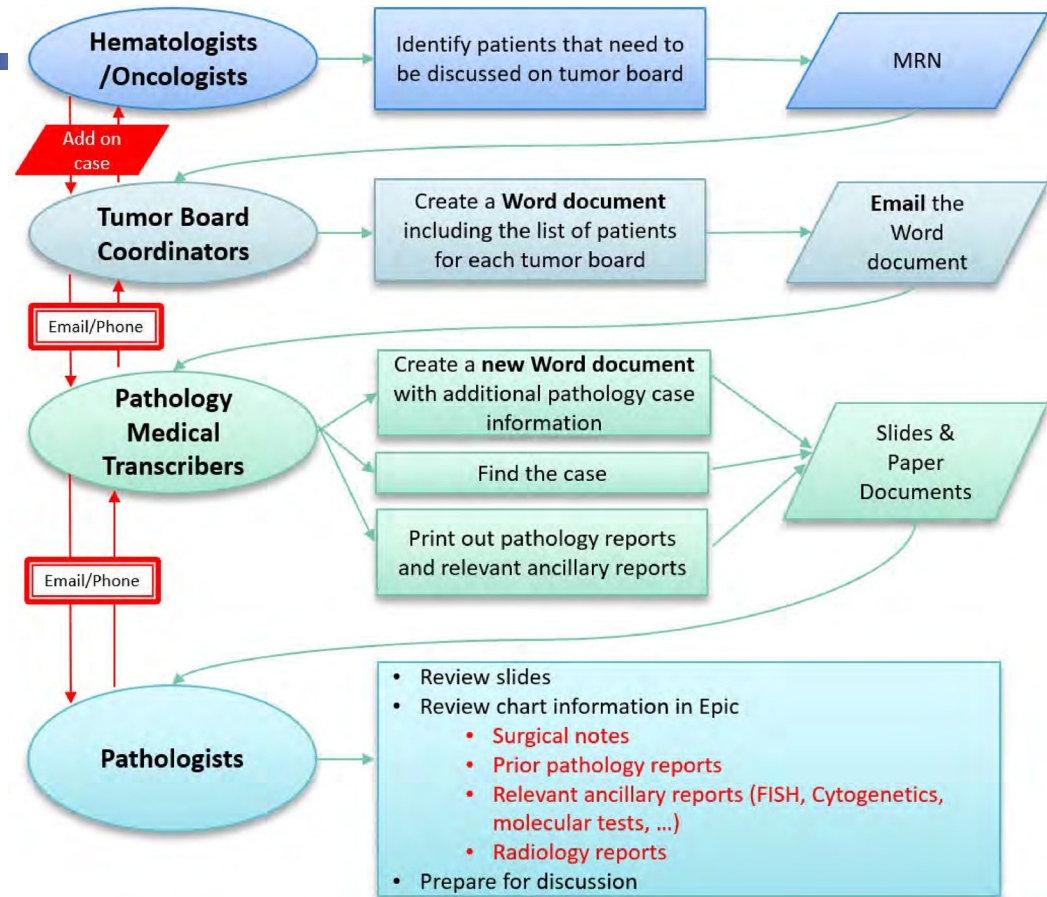
Epic solution to streamline tumor board workflow

Solutions

- Streamline tumor board request process
  - **Epic Beacon Tumor Board Function**

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Epic solution to streamline tumor board workflow

Solutions

- Create a common place to host all the relevant/useful information for tumor board preparation
    - **Epic Beaker Outstanding List**

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Epic solution to streamline tumor board workflow

Current stage

- **Implementation of Epic Beacon tumor board function**
    - Pilot with heme malignancy tumor board
    - Build is in progress
    - Testing, training and go-live (TBD)

- **Implementation of Epic Beaker tumor board outstanding lists**
    - **Completed**
        - Currently total of **13 tumor board outstanding lists** have been built.
        - Within pathology department, tumor board outstanding lists become the **main communication tool/worklist for all the tumor boards**.
        - Pathologists can review relevant chart information directly through OL **without paperwork** previously prepared by the front desk staff.

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Epic solution to streamline tumor board workflow

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Capstone projects

- Epic solution to streamline tumor board workflow

- BPA intervention for hemoglobin A1c testing

Background

Hemoglobin A1c (A1C)

- A1C testing provides an index of average blood glucose levels over the past 2 to 4 months.
- A1C testing is the preferred test to access the glycemic control.

6. Glycemic Targets: *Standards of Medical Care in Diabetes—2022*

American Diabetes Association Professional Practice Committee*

Diabetes Care 2022;45(Suppl. 1):S83–S96 | https://doi.org/10.2337/dc22-S006

Glycemic Assessment

Recommendations

6.1 Assess glycemic status (A1C or other glycemic measurement such as time in range or glucose management indicator) *at least* two times a year in patients who are meeting treatment goals (and who have stable glycemic control). E

6.2 Assess glycemic status at least quarterly and as needed in patients whose therapy has recently changed and/or who are not meeting glycemic goals. E

A1C testing frequency at the MetroHealth System

- Between June 1, 2020 and July 30, 2021
  - 973 patients had two or more than two A1C tests resulted within 30 days
  - 1165 patients had two or more than two A1C tests resulted within 60 days
  - 2568 patients had two or more than two A1C tests resulted within 90 days

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Aims

Aim 1:
- Implement a BPA in the electronic health record (EHR) with a hope to decrease the proportion of too frequent A1C testing at the MetroHealth System

Aim 2:
- Access effects of A1C BPA implementation
  - Does the implementation of A1C BPA effectively decrease too frequent A1C orders placed by providers?
  - Does the implementation of A1C BPA
    - reduce unnecessary A1C testing for patients?
    - reduce laboratory costs related to A1C testing?

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Methods

A BPA was created within the EHR to inform providers when there is an A1C result within 90 days for the patient.

- Display

- Triggers:
  - Enter order
  - Sign order
- Procedure:
  - Hemoglobin A1C
  - POCT Hemoglobin A1C
- Order status:
  - Normal

Methods

Randomize cohort

- Providers were randomized to control group or intervention group based on the last digit of their SER provider record as recorded in Epic.

Data collection

- Reports for BPA performance were generated by Epic Reporting Workbench.
- Reports for A1C testing frequency were generated by SQL query.

Statistics

- All calculations were performed in Excel Pivot table or RStudio
- Chi-Square test was used to compare differences of counts between groups

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Results

Count of HBA1C BPA Alert Instant From 12/9/2021 To 3/9/2022

	Intervention Group (BPA Shown)	Control Group (BPA Silent)	Grand Total
HEMOGLOBIN A1C	920	1040	1960
Enter order *(p=0.1647)*	754	701	1455
Sign Orders *(p = 1.378e-14)*	166	339	505
POCT HEMOGLOBIN A1C	20	34	54
Enter order *(p=0.057)*	14	17	31
Sign Orders *(p=0.022)*	6	17	23
Grand Total *(p=0.003)*	**940**	**1074**	**2014**

Intervention group has less BPA firing at the sign order point in comparison to the control group.
→ Less number of too frequent A1C orders signed (placed) by providers within the intervention group.

Count of HBA1C BPA Alert Instant From 12/9/2021 To 3/9/2022

	Enter order — HEMOGLOBIN A1C	Sign Orders — HEMOGLOBIN A1C	Enter order — POCT HEMOGLOBIN A1C	Sign Orders — POCT HEMOGLOBIN A1C
Intervention Group (BPA Shown)	754	166	14	6
Control Group (BPA Silent)	701	339	17	17

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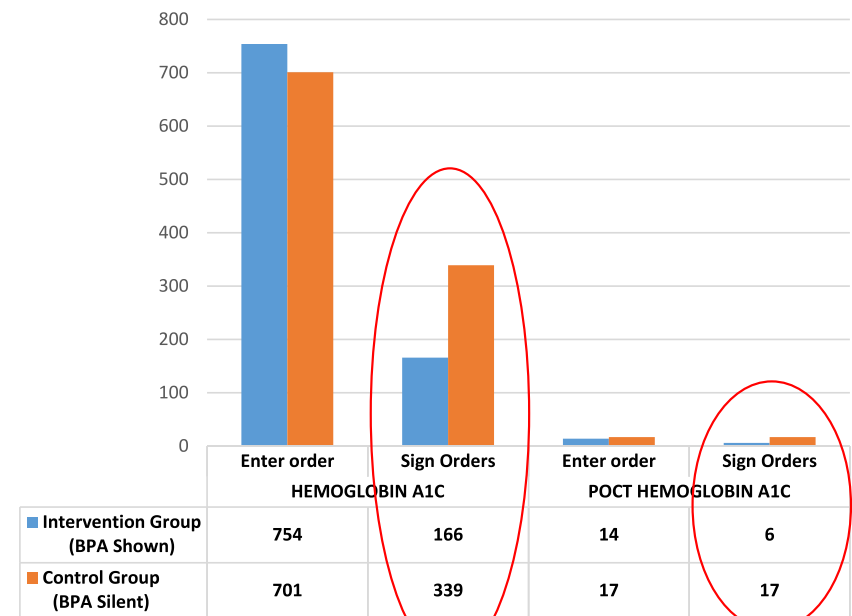
Results

User follow-up action to HBA1C BPA

1. **Accept BPA (No action taken)**
   BPA fires at sign the order, the user keeps the order and does not give a reason

2. **Acknowledge/Override warning**
   BPA fires at enter order, the user keeps the order and gives a reason

3. **Cancel BPA**
   BPA fires at either enter or sign order, the user keeps the order, does not give a reason, and click "cancel"

4. **Remove EAP single order**
   BPA fires at either enter or sign order, the user clicks Accept without changing the default action of REMOVE

   user agrees with the BPA suggestions

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Results

Summary of user follow-up action to HBA1C BPA

User Follow-up Action	Intervention Group (BPA Shown) Count (%)	Control Group (BPA Silent) Count (%)
Accept BPA (No Action Taken)	112 (11.9%)	
Acknowledge/Override Warning	210 (22.3%)	
Activity Link Accept BPA (No Action Taken) Cancel BPA	3 (0.3%)	
Cancel BPA	353 (37.6%)	
Remove EAP single order	**259 (27.6%)**	
Remove EAP single order Acknowledge/Override Warning	**2 (0.2%)**	
(blank)	1 (0.1%)	1074 (100%)
Grand Total	**940 (100%)**	**1074 (100%)**

Results

Summary of **override reason** for HBA1C BPA

Override Reason	Intervention Group (BPA Shown)		Total
	Enter order	Sign Orders	
Other (comment required)	204 (26.6%)	8 (4.7%)	212 (22.6%)
(blank)	564 (73.4%)	164 (95.3%)	728 (77.4%)
Grand Total	768	172	940

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Results

## Summary of override reason for HBA1C BPA

Override Comment

.
?false elevated reading
3 months ago
3 months since last check
A1c
almost 3 months
before next appt
change in diet
clinically indicated
clinician
close enough
completed outstide clinic
COVID induced DM
d/c
Dr. wanted
due
due jan 25, 2021
elevated a1c
elevated, new dosages
error
eval
foll
follow up

for confirmation of dx
for future
for future labs
fruture
furture lab
futre
future
future in 3 months
future lab
future labs
future order
future test
HbA1 C was 14.
high readings
high risk
high risk medication
hodp D/C

hx of prediabetes 2 years ago, family hx of diabetes
if I don't do it today
in 3 months
in 6 months
insulin regimen changed 2 months ago.

Last done 2.5 months ago, multiple medication changes at that time, lab ordered now for future

management
medically indicated
near due
need
need to know to adjust meds
need to verify DM dx
needs another a1c before next vusit
needs future order
needs repeated
needs updated
new diabetic
next visit
not done
ok
order
ordered as future
ordered for future

orders placed to be done 3 mos from now
other
pancreas transplant

per Dr. Senthilkumar prior to April appt.

placing future order for 6 mos from now
polyuria
poor control

predibaa
previous test released in error
pt preference
putting in a s future lab to be done at 3 months in January
q3mo
repeat
Repeat
repeat in 2 month
repeat needed
screening per hx
standing
started new meds
surgery
test due next week, will complete in office today
to see how sugars are after COVID
travel
uncontroled, future order
uncontrolled
uncontrolled. Future order
weight change
will do in 3 mos
will do later
will order for future

your alert is bogus. I'm trying to place a FUTURE order for HbA1c in 3 months.

Results

Summary of HBA1C testing frequency between control group and intervention group from 03/09/2022 to 05/31/2022

Count of SECOND_ORDER_ID			
Time between results (days)	Control Group (BPA silent)	Intervention Group (BPA shown)	Grand Total
<30 (p=7.346e-05)	136 (43.6%)	78 (25.0%)	214 (68.6%)
<60 (p=0.4913)	41 (13.1%)	35(11.2%)	76 (24.4%)
<90 (p=1)	11 (3.5%)	11 (3.5%)	22 (7.1%)
Grand Total (p=0.0003)	188 (60.3%)	124 (39.7%)	312 (100%)
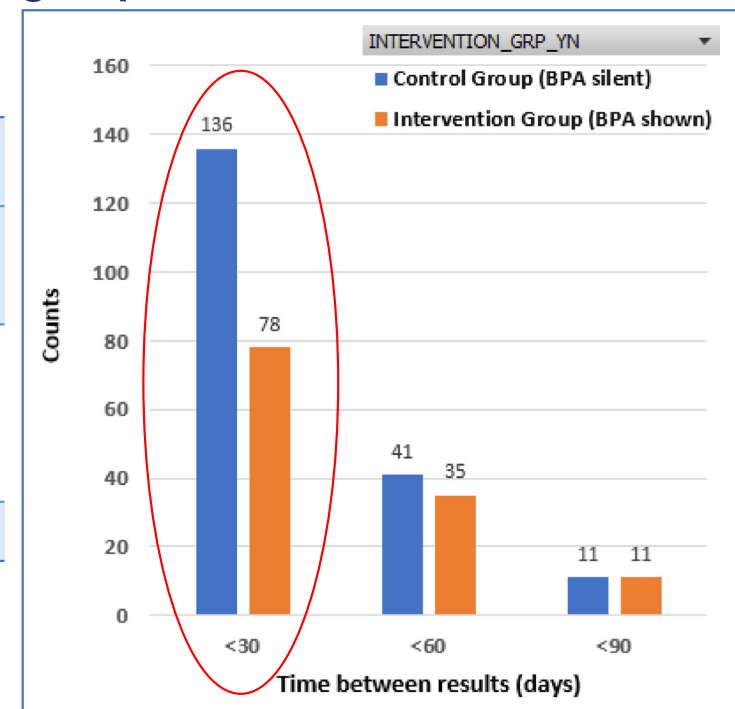
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Results

Summary of HBA1C testing frequency between control group and intervention group from 03/09/2022 to 05/31/2022

Time between results (days)	Control group				Intervention group			
	Future order	Normal order	Standing order	Total	Future order	Normal order	Standing order	Total
<30	83	4	49	**136**	45	6	27	**78**
<60	18	7	16	**41**	8	13	14	**35**
<90	2	5	4	**11**	3	3	5	**11**
Grand Total	103 (54.8%)	16 (8.5%)	69 (36.7%)	**188 (100%)**	56 (45.2%)	22 (17.7%)	46 (37.1%)	**124 (100%)**

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Results

Laboratory costs related to A1C testing between control group and intervention group from 03/09/2022 to 05/31/2022

- Pathology Cost perA1C test - **$10.14** (includes Reagent/QC and labor)

Count of SECOND_ORDER_ID			
Time between results (days)	**Control Group (BPA silent)**	**Intervention Group (BPA shown)**	**Grand Total**
<30	136	78	214
<60	41	35	76
<90	11	11	22
Grand Total	**188**	**124**	**312**
Laboratory Costs	**$1906.32**	**$1257.36**	

Δ= **$1906.32** - **$1257.36** = **$648.96**

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Summary

- HBA1C BPA can effectively alert providers when patients have an A1C result within 90 days.
- Less number of too frequent A1C orders placed by providers within the intervention group in comparison to those within the control group.
- **However,**
    - Our current data does not support A1C BPA could effectively reduce too frequent A1C testing for patients.
    - Laboratory cost savings related to A1C testing were little.

Decision

Cons
- Increase alert fatigue

Implementation of A1C BPA

Pros
- Improve guideline adherence
- Decrease too frequent A1C orders placed by providers

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