Partnership HealthPlan Patient Matching Protocol

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Data Workgroup Presentation, April 13, 2021

REDWOOD HEALTH COMMUNITY COALITION

Agenda

- Introduction and Explanation of Objectives
- Issues Facing Health Centers
- Presentations
- Discussion and questions

We will be focusing today mostly on obtaining data for the QIP Quality Measures

Introduction and Explanation of Objectives

This Data Workgroup presentation will be a little different than others

Partnership Patient Lists

- Partnership HealthPlan provides monthly lists of patients who are enrolled in their insurance

- They also provide denominator lists of patients for the QIP Quality Measures

- In the past, we have not really been able to take full advantage of this data. But now we have Relevant, a database of our patients and a location where we can store and use external data such as lists of patients from Partnership HealthPlan

Typical Health Center Partnership Data Uses

- Contact new Partnership HealthPlan patients for an initial visit and services

- Contact established patients who require screenings or other services relevant to the QIP Quality Measures

- Relay information back to Partnership (through billing or eReports) on patient status
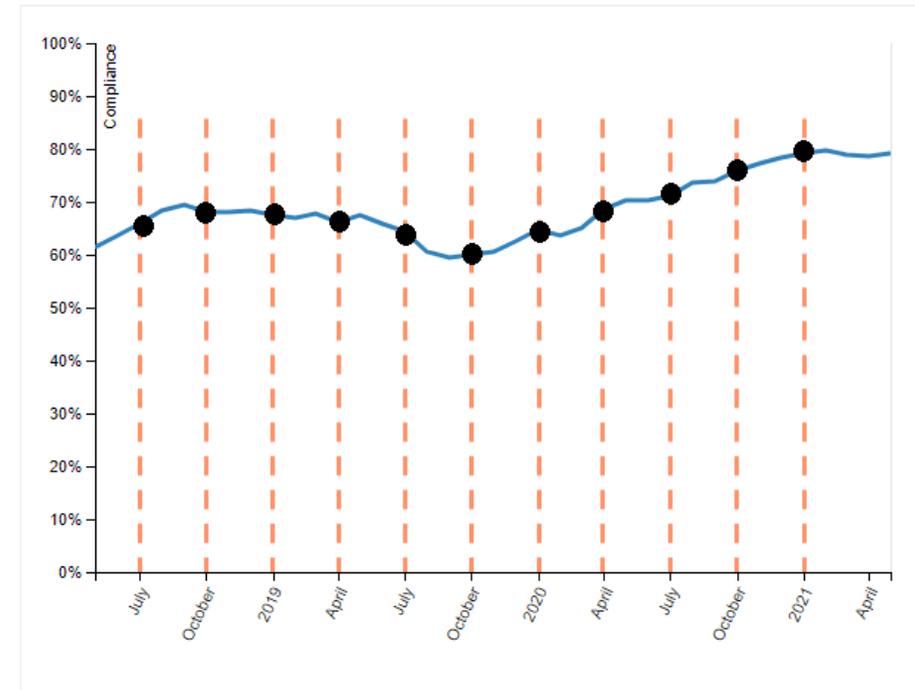
Complexities

- For case management at any point in time, you need to know the patients **currently** enrolled in Partnership

- For **historical** measure trend analysis, you need to know the patients who comprised the denominator at several past points of time

Typical Quality Measure Analysis
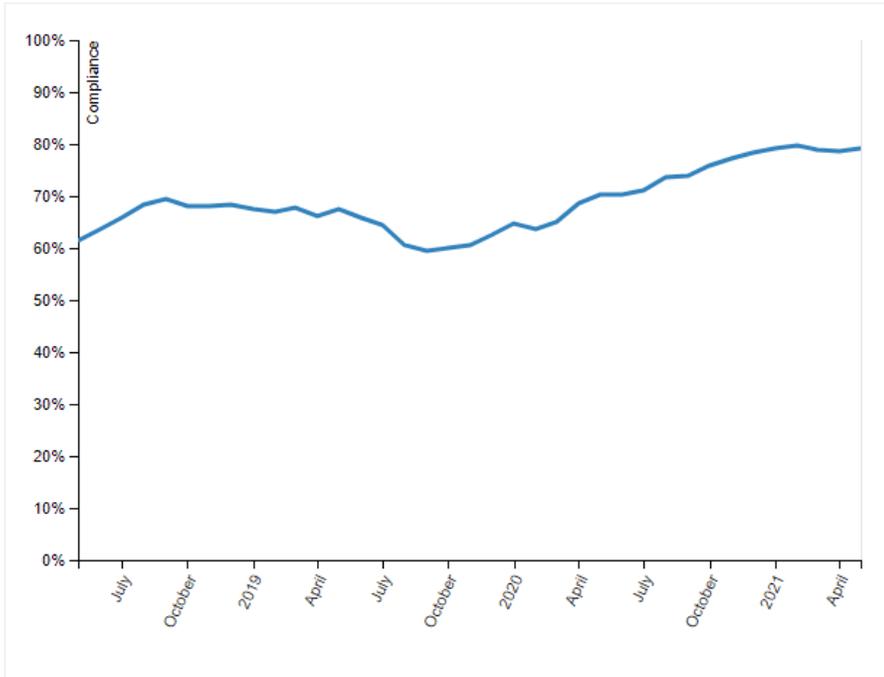
The compliance trend is a series of measures taken one month apart. Each point on the graph uses a measurement period of one year ending in the month indicated

UDS vs QIP Quality Measures

- UDS: patient had to have at least one medical visit in the 12-month measurement period

- QIP: patient had to be continuously enrolled for 9 months out of the 12-month measurement period

- Note that the QIP denominator list might contain patients not seen at the health center during the past year

- QIP patients may also fall out of the measure denominator if they are no longer enrolled
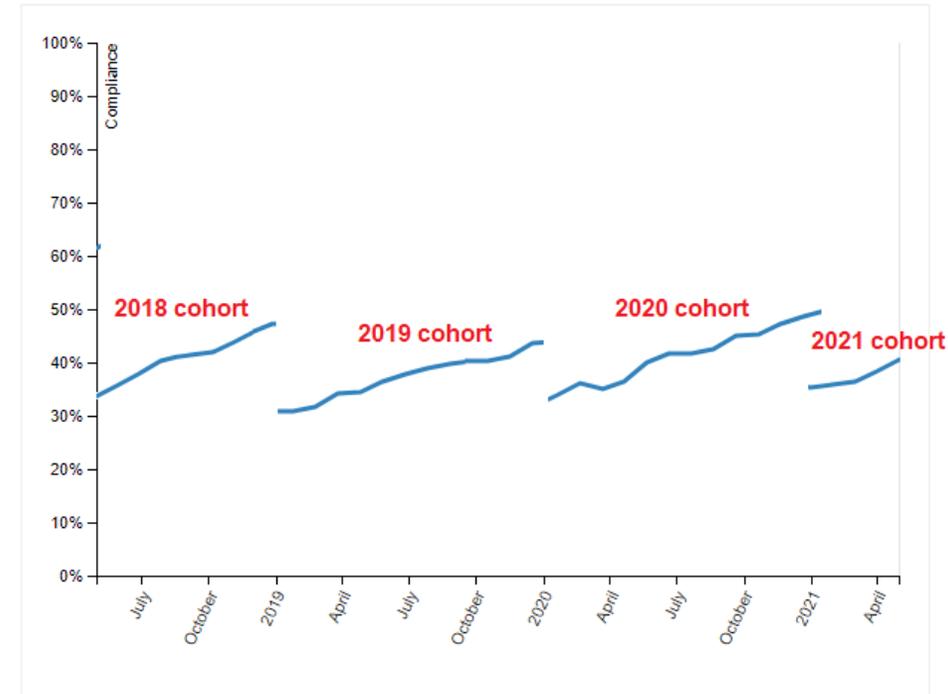
Potential Concerns With QIP Quality Measures
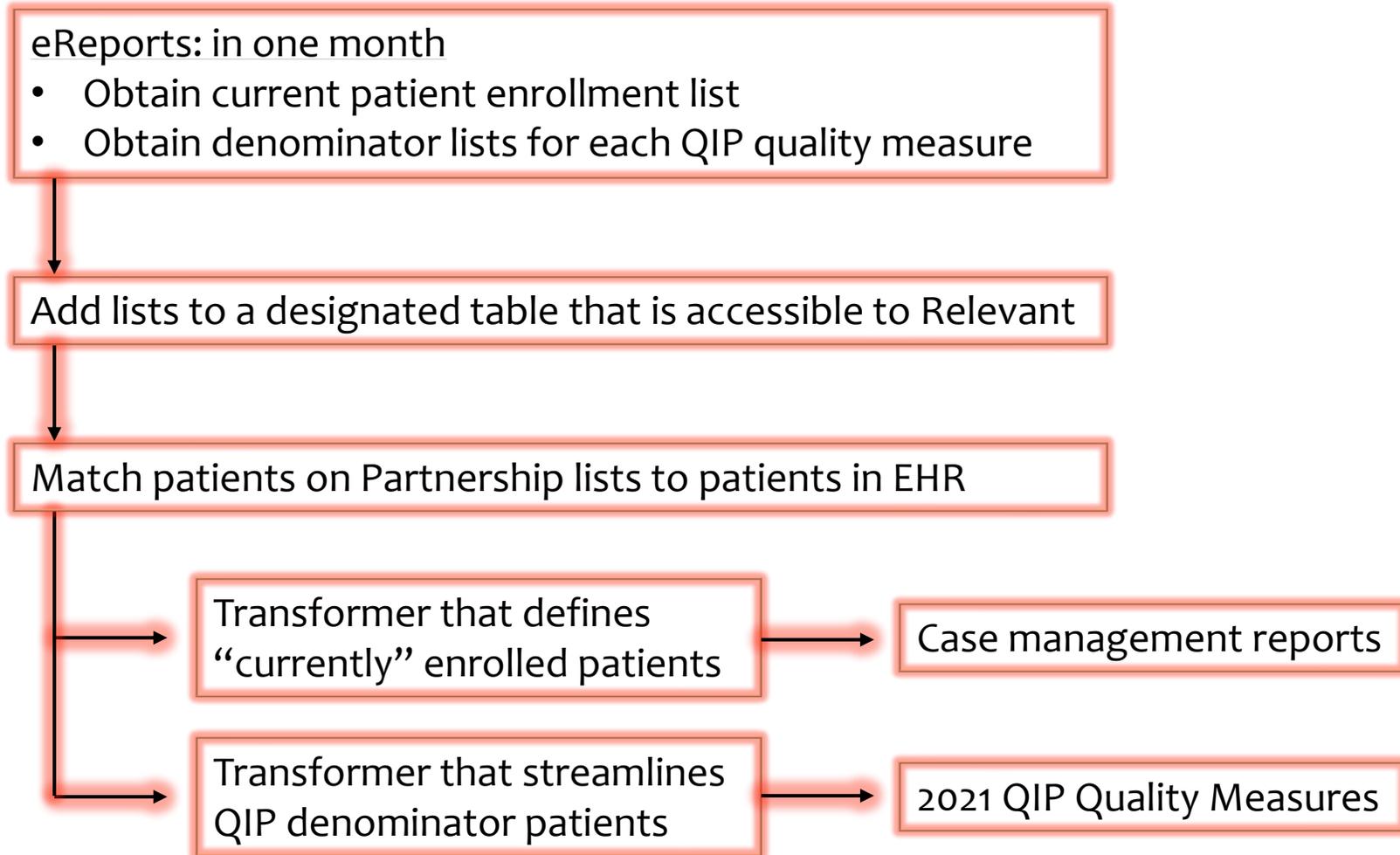

Compliance trend
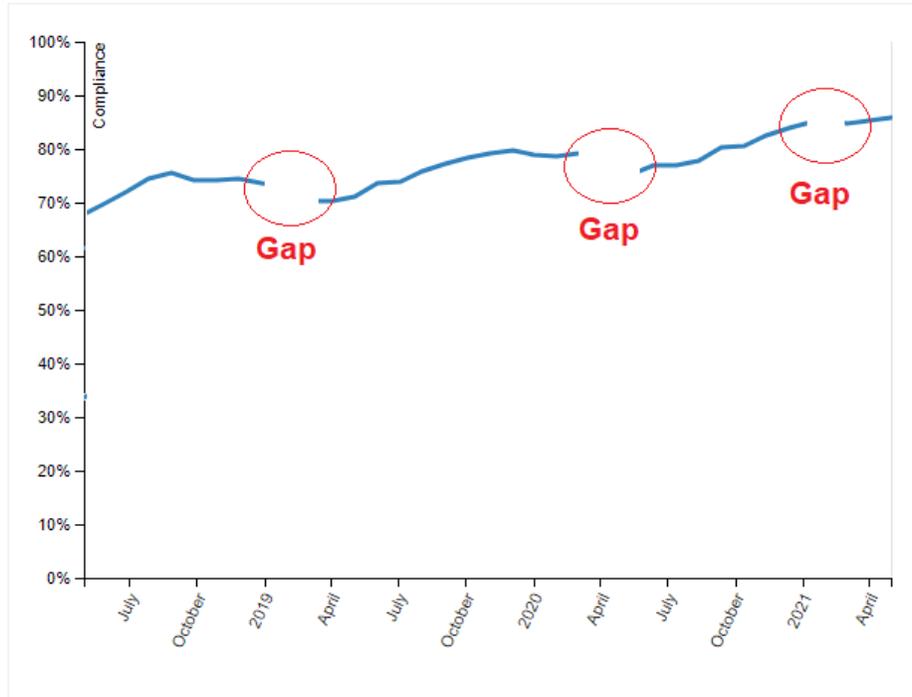
Will gaps appear if you miss a month downloading the Partnership denominator data?

Compliance trend

Will the childhood and adolescent immunization measures look like cohorts?

Example of a Basic Data Workflow

eReports: in one month
- Obtain current patient enrollment list
- Obtain denominator lists for each QIP quality measure

Add lists to a designated table that is accessible to Relevant

Match patients on Partnership lists to patients in EHR

Transformer that defines "currently" enrolled patients

Case management reports

Transformer that streamlines QIP denominator patients

2021 QIP Quality Measures

Potential Concerns

eReports: in one month
- Obtain current patient enrollment list
- Obtain denominator lists for each QIP quality measure

Add lists to a designated table that is accessible to Relevant

Match patients on Partnership lists to patients in EHR

Transformer that defines "currently" enrolled patients → Case management reports

Transformer that streamlines QIP denominator patients → 2021 QIP Quality Measures

Who downloads the reports and when is the download performed?

How are the files added to the table (i.e., manually or automated)?

How is the match done and what quality control is performed?

Is there a mechanism for data users to report patients who seem to be wrongly matched?

Another Example of Data Integration

- Health centers should know which of their patients have received a COVID vaccine and then outreach to those who need one

- The CAIR database allows you to download ad hoc reports of vaccines from your patients

- These need to be integrated in the EHR or in Relevant
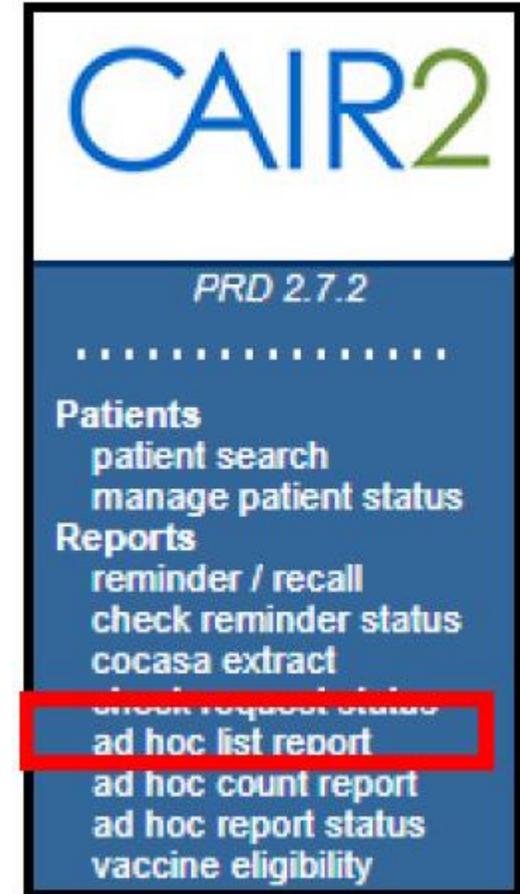
Issues Facing Health Centers

What do you need to think about when planning to handle the data?

Summary of Challenges

1. How to efficiently organize and store the eReport files

2. How to maximize the accuracy and number of patients matched

3. How to evaluate the quality of the matching and how to make sure there are no duplicates (e.g., one EHR patient matched to two Partnership patients, or one Partnership patient matched to two EHR patients)

4. What are some of the applications of the matched data? For example, reporting QIP data, identifying patients who may have mis-typed CIN numbers, billing, etc.

Where Do You Start?

- All of this is new and there is not one stand-alone solution for everybody

- Health centers have the same goal (i.e., data integration) and some of the same data uses, but also have unique perspectives

- So, let's gather some ideas from health centers who have begun thinking about these issues…
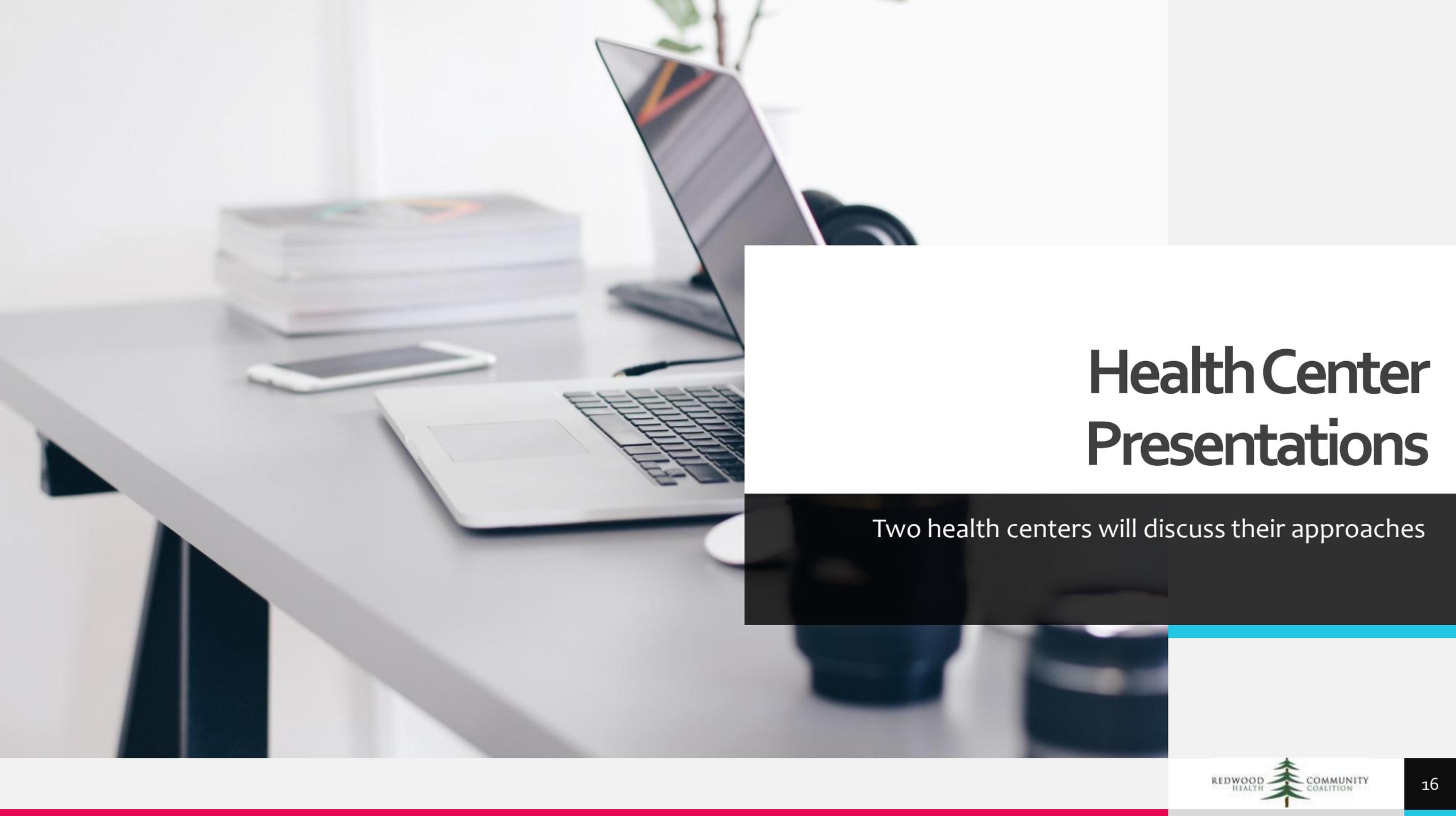
Health Center Presentations

Two health centers will discuss their approaches

Today's Speakers

Today's Discussion Features Experiences From Three Health Centers

1. CommuniCare: Nicholas Alonzo, Anthony Hu and Brian Fogarty
2. Ole Health: Kevin Carmody
3. West County: Michael Heinle

The following slides were presented by the CommuniCare and Ole Health speakers

Partnership ETL Process

COMMUNICARE: ANTHONY HU, BRIAN FOGARTY, NICHOLAS ALONZO

&

OLE: KEVIN CARMODY

Organizing & Storing eReports Data: The Process

Step 1: File is downloaded to a folder labeled "Unprocessed"

~ \ Unprocessed \ ereports_file.xls

Step 2: Data is manipulated and loaded into a database table in the following format

bic_hik	adolescentiz	adolescentwellcare	asthmaratio	childcombo	colorectal	hba1c	highbp	mammograms	pap	retinaleye	wellchild15mo	lastupdated
<null>		Denominator	<null>	<null>	<null>	<null>	<null>	<null>	<null>	<null>	<null>	2021-04-02
<null>	<null>	<null>	<null>	<null>	Denominator	<null>	Denominator	<null>	<null>	<null>	<null>	2021-04-02
<null>	<null>	<null>	<null>	<null>	Numerator	<null>	Denominator	Numerator	Denominator	<null>	<null>	2021-04-02

Step 3: File is then moved to a folder labeled "Processed" and categorized by Year and Month of the date downloaded

~ \ Processed \ Year \ Month \ ereports_file.xls

Organizing & Storing eReports Data: Technologies & Tools Used

Python: Programming language used for coding the download logic and process.

Selenium: Python package for automating web browser interactions. Used for logging into eReports and mimic clicking.

XPath: Language used to navigate and identify elements on a web page. Used with Selenium to identify web element IDs in eReports for clicking.

SQL Server: Database management system used to load eReports data into.

SQLAlchemy: Python package for connecting to databases like SQL Server and Postgres.

Pandas: Python package for reading in, manipulating, and exporting out data. Used for reading in eReports file and with SQLAlchemy to connect and update eReports data in SQL Server.

Matching Partnership Members: Multiple Run Throughs

Data sources: Partnership Monthly Eligibility Download (MEDO) data file & EHR / Relevant Database

Run 1: **Match exactly on first name, last name, and dob**. Remove duplicates. Flag patient is matched and to be excluded in the next run.

Run 2: **Match exactly by switching first name to last name and dob**. Remove duplicates. Flag patient is matched and to be excluded in the next run.

Run 3: **Match exactly on DOB and phone number, and partial first and last name (first 3 letters).** Remove duplicates. Manually review which patients matched in your EHR. Flag only patients that matched and to be excluded in the next run.

Run 4: **Match on DOB, phone number area code, and first and last name up to the first space**. Remove duplicates. Manually review which patients matched in your EHR. Flag only patients that matched and to be excluded in the next run.

Run 5: Flag everyone else as not matched. Repeat Run 1 – 4 to try and match again in the future.

Try and test matching with other data points

Matching Partnership Members: Multiple Run Throughs

To account for Partnership patients that matched to the same patient in our EHR we use DISTINCT ON (). We use the date the member was last updated (tracked by us internally) and the *EffDate* column in the monthly eligibility download list to prioritize the Partnership member.

```
SELECT DISTINCT ON (ehr_patients.id)

    . . .

FROM ehr_patients

    LEFT JOIN partnership_members . . .

ORDER BY ehr_patients.id, partnership_members.last_updated DESC, partnership_members.effdate DESC;
```

Matching Partnership Members: FuzzyWuzzy Algorithm

The Python FuzzyWuzzy package allows for easy string matching. The partial ratio function returns a score of how similar two strings are.

```
>>> fuzz.ratio("this is a test", "this is a test!")
97
```

FuzzyWuzzy uses an algorithm called "Levenshtein Distance" to calculate string similarity scores. We can use this process to match patient names that are alike.

Full list of FuzzyWuzzy Functions: https://github.com/seatgeek/fuzzywuzzy
Levenshtein Distance: https://en.wikipedia.org/wiki/Levenshtein_distance

Matching Partnership Members: FuzzyWuzzy Process

Step 1: Join Partnership patient list onto EHR list by DOB.

Step 2: Lowercase patient names (From both the Partnership list and HER list).

Step 3: Perform FuzzyWuzzy on name columns.

Step 4: Select the highest match greater than score threshold.

php_name	ecw_name	partial_ratio
seth williams	sean williams	85
dalaney levya	dalaney leyva	92
william appel	william appell	100
zara vasquez jaime	zara vazquez jaime	94
jerry strickland	jerry stickland	93
...	...	...
aidan hobbs	aiden hobbes	82
gerardo lagunas rodrig	gerardo lagunas	100
manuel ortega	manuel ortega	100
ayden burns	ayden burns	100
pablo melendrez lope	pablo melendez	93

Matching Partnership Members: Process 3 (Kevin)

- Using a C# made program, I run through the list of PHP Members against the existing ECW Patient list that don't have a php member assigned to it and compare records against the following variables:
Last Name, First Name, DOB, Address, Male or Female, phone number and Zip Code.

```csharp
foreach (var patient user in patientList)
{
    var objPatient = new patientOrder
    {
        BIC_HIK = currentMember.BIC_HIK,
        uid = patient.uid
    };

    var prox = 0.0;

    //runs through the string similarity scores to determine the proximity to the records in ECW.  Checks lastname, firstname, Date of birth always.

    prox += jw.Similarity(patient.ulname, currentMember.LastName);
    prox += jw.Similarity(patient.ufname, currentMember.FirstName);
    prox += jw.Similarity(patient.dob, currentMember.DOB.ToString(format:"MM/dd/yyyy"));
    var checkAmt = 3;

    //if php member has an address and the ecw record has an address, then it compares
    if (!string.IsNullOrEmpty(patient.upaddress) && !string.IsNullOrEmpty(currentMember.Address))
    {
        prox += jw.Similarity(patient.upaddress, currentMember.Address);
        checkAmt += 1;
    }

    //if php member has sex in their record and the ecw record has a sex, then it compares
    if (!string.IsNullOrEmpty(patient.sex) && !string.IsNullOrEmpty(currentMember.Sex))
    {
        prox += jw.Similarity(patient.sex.Substring(1), currentMember.Sex.Substring(1));
        checkAmt += 1;
    }

    //if php member has a phone number then it compares it to the main phone number in ECW
    if (!string.IsNullOrEmpty(patient.upPhone) && !string.IsNullOrEmpty(currentMember.PhoneNumber))
    {
        prox += jw.Similarity(patient.upPhone, currentMember.PhoneNumber);
        checkAmt += 1;
    }

    //Compares zip codes
    if (!string.IsNullOrEmpty(patient.zipcode) && !string.IsNullOrEmpty(currentMember.ZipCode))
    {
        prox += jw.Similarity(patient.zipcode, currentMember.ZipCode);
        checkAmt += 1;
    }

    //Calculates average score and gives a value
    objPatient.pexscore = prox / checkAmt;
    objOrder.Add(objPatient);
}
```

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Matching Partnership Members: Process 3 (Kevin)

- I then sort the list by which record matches the greatest, and then make a comparison to the top record to see if matches 80% or above. If it does, then add patient Id to PHP record.

- If not, then put it into database table called 'ECWSimilarMatchings' and then review records manually.

```csharp
//Takes score from each comparison and orders them in decenting order (greatest first, smallest last)
var sortedList = objOrder.OrderByDescending(keySelector: o :patientOrder -> o.pexscore).ToList();

//Due to the large amount of records compared to, the program cuts amount of records to a top 10 list.
var count :int = sortedList.Count > 10 ? 10 : sortedList.Count;

//If the top record has a pexscore of 80% or above, it allows the record to be automatically updated.
if (sortedList[0].pexscore >= .8000000)
    currentMember.PatientID = sortedList[0].uid.ToString();
//else the records are added to the 'ECWSimilarMatching' table to be reviewed visually by someone
else
{
    //first step is to see if PHP member already has records in 'ECWSimilarMatching' and find the current maximum score
    var simScores :List<double> = php.ECWSimilarMatchings.Where(x :ECWSimilarMatching => x.BIC_HIK == currentMember.BIC_HIK) // IQueryable<ECWSimilarMatching>
        .Select(x :ECWSimilarMatching => x.SimScore).ToList();

    //if there are no records in 'ECWSimilarMatching'
    var maxScore :double = simScores.Count == 0 ? 0 : simScores.Max();

    for (var i = 0; i < count; i++)
    {
        var objFound :user = patientList.FirstOrDefault( predicate: x :user => x.uid == sortedList[i].uid);
        if (objFound == null || sortedList[i].pexscore <= maxScore) continue;
        var objSimilar = new ECWSimilarMatching
        {
            BIC_HIK = sortedList[i].BIC_HIK,
            ecwId = objFound.uid,
            SimScore = sortedList[i].pexscore,
            ufname = objFound.ufname,
            ulname = objFound.ulname,
            dob = objFound.dob,
            sex = objFound.sex,
            upaddress = objFound.upaddress,
            upPhone = objFound.upPhone,
            zipcode = objFound.zipcode
        };
        php.ECWSimilarMatchings.AddOrUpdate( identifierExpression: p :ECWSimilarMatching => new {p.BIC_HIK, p.ecwId}, objSimilar);
    }
}

php.SaveChanges();
```

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Reporting with Partnership Data: Quality Measures

Diabetes – HbA1C Good Control (QIP Measure 7)

*Currently only QIP Eligible patients appear as a denominator result and are recalculated every month

Non-Compliant Patients with **Msrmt Value: Compliant** means we have data that Partnership does not. We use this information to upload to eReports.

Reporting with Partnership Data: Reports

QIP Upload List Report Set

Name ▲
QIP Upload List: Breast Cancer Screening
QIP Upload List: Cervical Cancer Screening
QIP Upload List: Child and Adolescent Well-Care Visits
QIP Upload List: Childhood Immunization Status
QIP Upload List: Colorectal Cancer Screening
QIP Upload List: Controlling High Blood Pressure
QIP Upload List: Diabetes - HbA1c Good Control
QIP Upload List: Immunizations for Adolescents
QIP Upload List: Retinal Eye Exam
QIP Upload List: Well-Child Visits in the First 15 Months of Life

QIP Upload List: Diabetes – HbA1c Good Control

Clinic ⇕	CIN ⇕	Patient ⇕	Last Collection Date ⇕	Value ⇕	QIP Eligible ⇕
Davis			02/22/2021	8.3	Yes
Davis			02/01/2021	6.8	Yes
Davis			03/02/2021	8.1	Yes
Davis			02/19/2021	8.9	Yes

QIP Upload List: Controlling High Blood Pressure

Clinic ⇕	CIN ⇕	Patient ⇕	BP Date ⇕	Systolic ⇕	Diastolic ⇕	QIP Eligible ⇕
Davis			02/18/2021	136	88	Yes
Davis			03/26/2021	129	78	Yes
Davis			02/12/2021	123	75	Yes
Davis			02/24/2021	122	83	Yes
Davis			03/04/2021	126	78	Yes

Reporting with Partnership Data: Reports

Applications: Actionable intel! (Brian)

One of the most frequent questions asked is, "How are we doing for QIP?"

Using the QIP transformers, Nick has programmed in a few triggers to calculate our compliance rate at a specific point in time.

|	clinic	year	measure	qipnumerator	qiptotal	numerator	total	lastupdated
1	Davis	2021	Pap	496	967	496	967	2021-03-31
2	Davis	2021	Pap	496	968	496	968	2021-03-29
3	Davis	2021	Pap	499	973	499	973	2021-03-18
4	Davis	2021	Pap	496	975	496	975	2021-03-04

We use this data to:

- See our compliance rate over time

- Compare our compliance rate year over year

QIP Measure Summary Dashboard

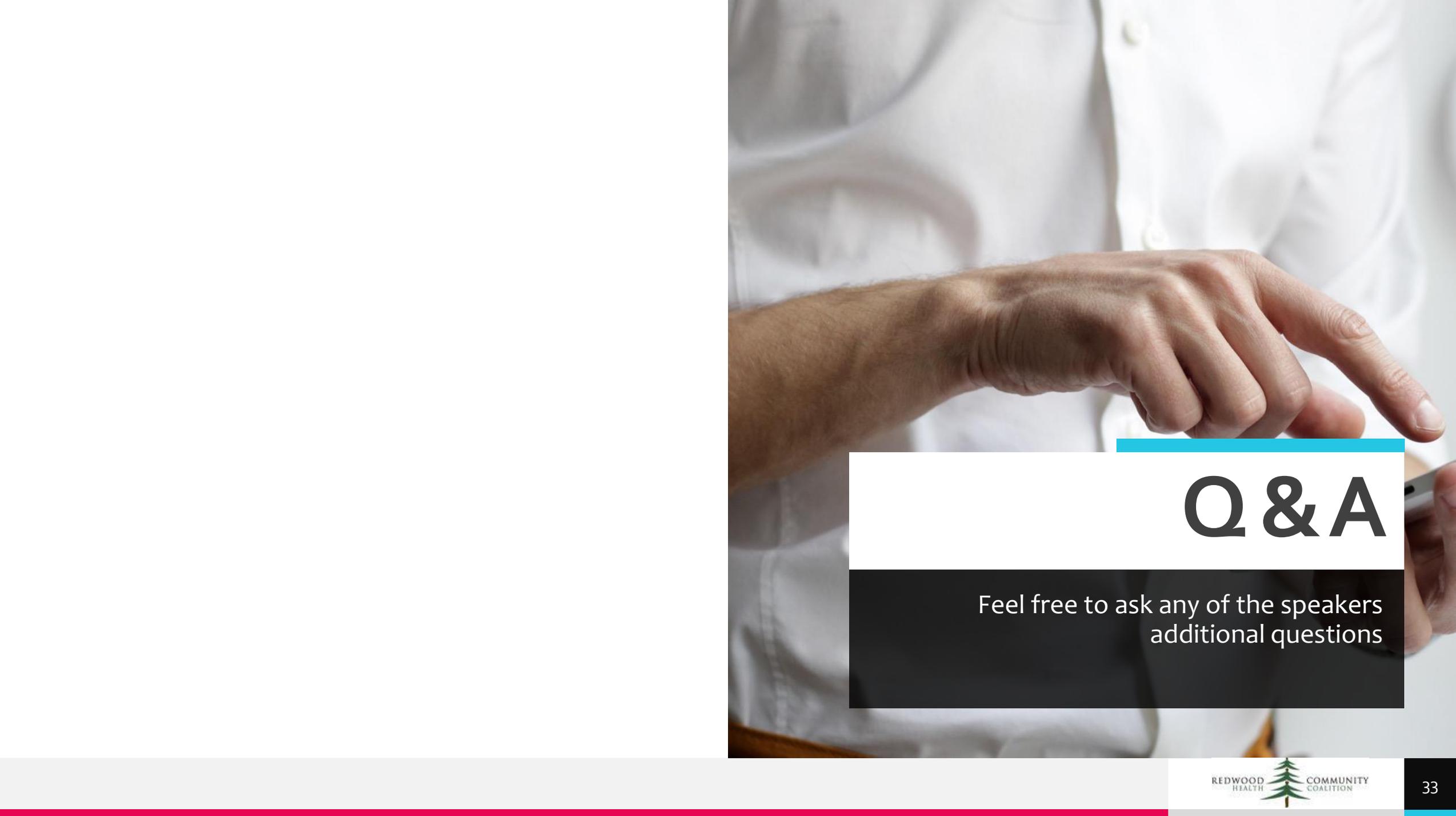Core QIP Measure Summary - Updated 12/18/2020
Clinic: Salud
Measure: Colorectal
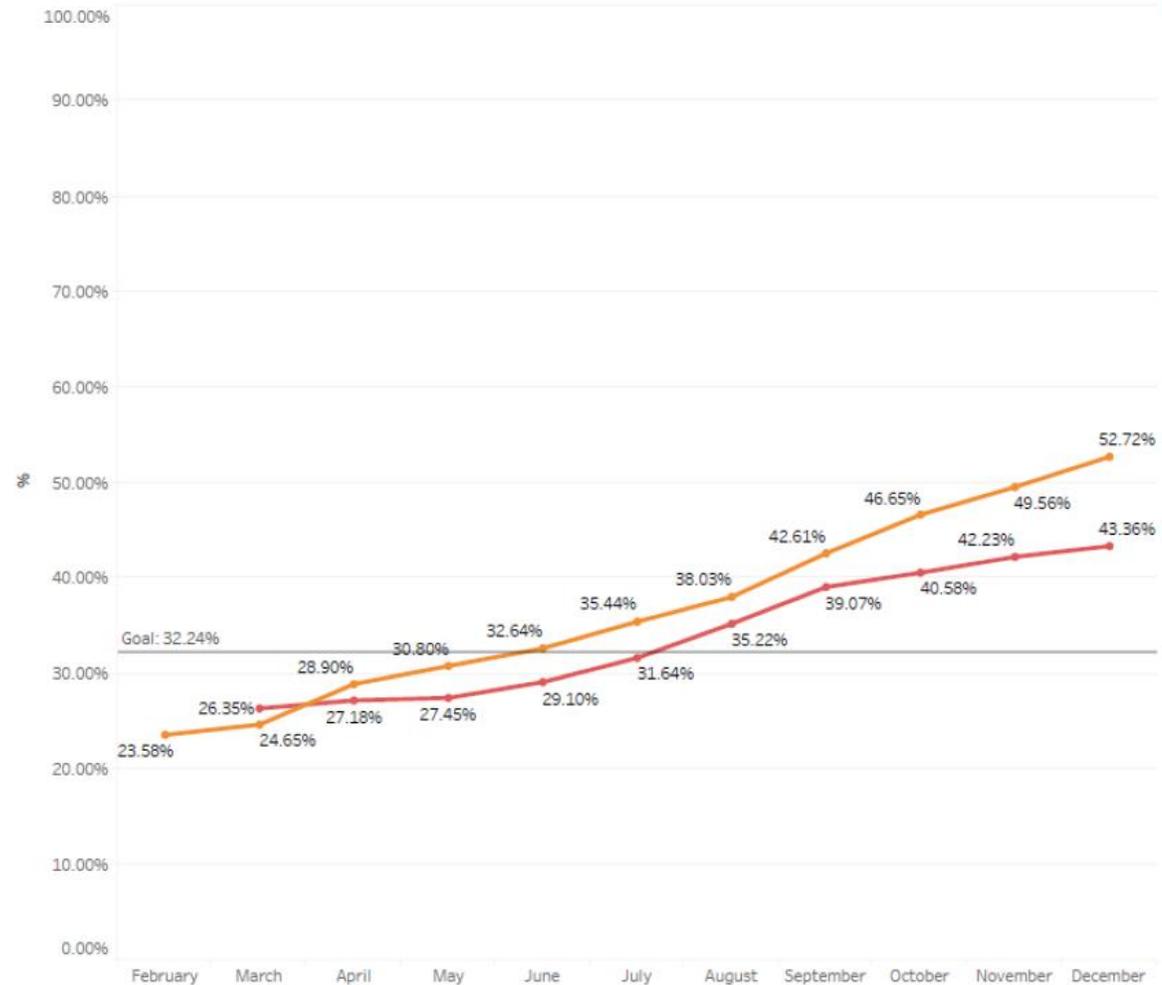
Additional Comments

Has your health center started developing any other strategies?

- Or anything else that would be helpful to the discussion?

- Are there other issues that you are facing that were not covered here?

Q & A

Feel free to ask any of the speakers additional questions

Thank You

Ben Fouts 👤

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