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Toolkit for Clinical Quality Metric Extraction



Healthy Hearts Northwest is a collaboration between the MacColl Center for Health Care Innovation, the Oregon Rural-based Practice Research Network, and Comagine Health.



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ABOUT THIS TOOLKIT

Recognizing the importance of primary care to the U.S. health care system, the Agency for Health Care Research & Quality established the EvidenceNOW network of seven regional cooperatives to provide support services to smaller primary care practices to help them integrate evidence-based approaches into clinical care more quickly and effectively.

As the Pacific Northwest cooperative, Healthy Hearts Northwest provided health care practices in Washington, Oregon, and Idaho an extension program model utilizing external practice facilitators and shared learning to enable transformation during 2015-2019. Our project recruited 250 practices with the goal of helping level the playing field for smaller clinics by providing a supportive 15-month practice coaching and quality improvement intervention.

It is our hope that this health information technology guide may be useful to professional practice coaches, as well as anyone needing guidance and inspiration for collecting clinical quality measures.

INTRODUCTION

The EvidenceNOW Healthy Hearts Northwest (H2N) team created this toolkit to guide practice facilitators and primary care clinic staff in using health information technology (HIT) to support quality improvement (QI).

H2N was a quality improvement (QI) study to build capabilities and infrastructure in smaller primary care practices in the Northwest. H2N focused on four Clinical Quality Metrics (CQMs) for heart disease prevention: ABCS—Aspirin use, Blood pressure, Cholesterol, and Smoking. Many primary care practices that participated in H2N used CQMs that measured additional clinical outcomes.

This toolkit can be used as a step-by-step guide for QI reporting *any* CQM.

This guide includes the following topics:

- (1) [Understanding CQM basics](#)
- (2) [Choosing a data-extraction approach](#)
- (3) [Self-assessing a practice's ability to report](#)
- (4) [Validating aggregate-level data](#)
- (5) [Creating data visualizations](#)
- (6) [Getting Buy-in to Use Health Information Technology \(HIT\)](#)

Additional resources:

- Appendix A: [Example reporting tools for CQMs](#)
- Appendix B: [Manual chart-abstraction example](#)
- Appendix C: [Data locations for ABCS measures in electronic health records \(EHRs\)](#)
- Appendix D: [Example ABCS data visualization](#)
- Appendix E: [Healthy Hearts Northwest ABCS CQM definitions](#)
- Appendix F: [Glossary/Acronyms](#)

TOPIC 1: UNDERSTANDING CLINICAL QUALITY METRICS (CQMS) BASICS

“We believe we provide exceptional care, however we do not have a consistent method of tracking and reporting the care we provide. We are excited to work...to improve the care we provide and the methods with which we gather and report that data.” - Primary Care Clinic Coordinator

Quality Improvement (QI) reporting projects are generally centered around CQMs you choose to extract from your Electronic Health Record (EHR). Understanding basic facts about CQMs will help you have a successful and meaningful QI project. Common CQMs have a Center for Medicare and Medicaid Services (CMS) and National Quality Forum (NQF) reference number, type (proportion or continuous variable), and specificity (patient or episode).

The CQMs we refer to here require a numerator and denominator to be reported to create a proportion. The reporting specifications also often include exceptions and exclusion criteria. Here are common descriptions of these CQM terms:

- **Denominator:** patients impacted by conditions of the CQM, or inclusion criteria.
- **Numerator:** patients who experienced the intervention described by the CQM.
- **Exclusions/Exceptions:** criteria to exclude patients from numerator and/or denominator.

“My biggest takeaway [from visiting an exemplary practice] was knowing every organization, no matter the size, faces similar difficulties which I can now call opportunities. I also know that we can start small by identifying one or two areas where we can make change to improve quality. Quality is not just better patient care but improved lives for all involved in providing care.”
- Practice Manager

Example: CMS 2 Screening for depression with follow up

- **Denominator:** patients who are 12 years or older who had an appointment or encounter during the measurement period.
- **Numerator:** patients in the denominator screened for depression on the date of their encounter who have a documented follow up plan if they screened positive.
- **Exclusions:** patients with an established diagnosis of depression or bipolar disorder.

See [Appendix E](#) for Healthy Hearts Northwest ABCS CQM definitions

Numerous resources are available to educate and assist users in planning for CQM extraction from an EHR:

- [Certified Health IT Product List \(CHPL\)](#): The Office of the National Coordinator for Health Information Technology (ONC), Department of Health and Human Services, creates a list of health information technology (HIT) that has been tested and certified by the ONC Health IT Certification program. CHPL provides information on EHR versions, EHR vendors' certification of electronic CQMs (eCQMs), criteria met for certification, and more information for a practice to understand the capabilities of their system.

[Electronic Clinical Quality Improvement \(eCQI\) Resource Center](#): The CMS and ONC created the eCQI Resource Center to provide users with information about HIT tools, eCQMs, common standards, and more. Among the resources provided is information about measure definitions of the eCQMs. The measure definitions include background supporting information, the logic of measures (what defines the numerator/denominator of a measure and how it is calculated), and implementation guides.

“[After visiting an exemplar practice,] we took away an attitude of hope that we can make a difference in the lives of our patients by being focused in a team approach we haven't had before. The side benefit will be improved quality measures.” – Practice Manager

- [Online specifications for CQMs](#) for CMS and NQF

TOPIC 2: CHOOSING A DATA EXTRACTION APPROACH

“The only way we can generate reports around cardiovascular measures is to manually input diagnostic data from cardiology offices. It takes a lot of effort to calculate ASCVD [atherosclerotic cardiovascular disease] risk. I estimate that it has added 15 minutes to my day and it makes me dread lipid panels. It would be great to have this built in, but it is too complex for our team to implement.” –Physician

Several options exist for extracting your clinic’s data for CQM reporting. Below are brief approaches, in order of functionality. [Appendix A](#) contains expanded information on options for CQM data extraction.

- **Canned CQM reports identified in the EHR:** Most EHRs have some built-in reporting functionality, though it is often limited to the past year. This functionality may be limited in scope as canned CQM reports are typically designed to meet reporting requirements for incentive programs, such as Quality Payment Programs [QPP], Meaningful Use, and NQF. However, you may find that the right report for your needs has already been built.
- **Data registry services:** Some practices use data registry services that extract clinical data in an automated fashion and then produce CQMs and calculate performances. These data registries may be offered as an add-on feature to current EHR systems or as an external system. Data registries typically are more flexible in their reporting capability, as the registry service can map data elements from the EHR to pull relevant data for CQMs. (See [Appendix A.](#))
- **Approximating CQMs through patient lists:** If they are unable to create a CQM report, practices may approximate CQM performance through patient lists. Patient list functionality in an EHR allows creating a list of patients using a selected set of diagnosis codes on a problem list (for example, hypertension). Usually, the user can display information about each patient value related to the diagnosis. For example, a patient list for hypertension would include a column for each patient showing the date and value of the most recent blood pressure measurement. Patient list functionality is designed to assist care teams in identifying patients who need to be contacted.

The lists are generally not designed with any analytic capability, but they can usually be exported into a spreadsheet such as Excel. A person with basic spreadsheet skills can use a simple "sort" function to quickly determine the denominator and numerator for metrics such as the percent of people with hypertension who have not had a blood pressure measurement documented within the past 12 months or the percent of people with hypertension whose most recent blood pressure measurement was elevated. In this way, patient lists can be used to provide QI data.

- **Manual chart abstraction:** This time-intensive option might work for practices with limited or no CQM-reporting functionality. It requires manually reviewing a sample of patient charts and following the decision tree of the given CQM. Some considerations:
 - a. Ideally, the abstractor receives a list of patients who potentially meet denominator criteria. The abstractor reviews the medical record to determine which patients meet numerator criteria (for example, all patients with a diagnosis of hypertension.)
 - b. If a list of eligible patients cannot be generated, manual chart extraction is even more time intensive because the abstractor must find eligible patients.

- c. Manual chart extraction should be viewed as a last-resort approach given the resources needed but is preferable to no extraction. An example manual chart extraction form is in [Appendix B](#).

TOPIC 3: SELF-ASSESSING ABILITY TO REPORT DATA

“I’ve watched the senior administrative staff struggle and spend huge quantities of time trying to understand new regulations and reporting requirements to receive enough reimbursement to allow us to provide excellent patient care. So far, I have seen a very tiny improvement in patient care with huge quantities of resources being dumped into the process. Both money and hours are just being poured down the drain.” – Clinic Administrative Leader

Practices come to QI with different experience levels, EHR vendors, organizational structures, and goals.

Therefore, self-assessment at the outset is critical to understanding current capacity, resources, and goals. To assess your practice's ability to report data, review the list of considerations and the table of challenges, solutions, and limitations (**Table 1**). With this assessment and your practice's choice of data extraction approach from Topic 2, use the resource-estimates table (**Table 2**) to determine the potential time required to generate CQM reports.

Considerations while assessing your practice’s ability to report include:

- a. Experience/relationship with EHR vendor
- b. Participation in other reporting initiatives (Quality Payment Programs [QPP], Meaningful Use, Health Effectiveness Data and Information Set [HEDIS], etc.)
- c. Knowledge of workflow documentation for reporting/generating CQM reports
- d. EHR reporting functionality (custom reports, filtering options)
- e. Clinic IT support and capacity
- f. EHR challenges
- g. Ability to pull pre-baseline data for reporting measures
- h. Ability to report aggregate clinic-level data

Table 1: Challenges, solutions and limitations of reporting

Challenges	Potential Solution	Limitations
The EHR has no reporting capacity other than enough canned reports to minimally qualify for certification	Contract with an analytic service or registry	<ul style="list-style-type: none"> - Possible lack of interface between a low-tier EHR and any available registry - Possible per-provider cost for the registry/analytic service - Cost may be prohibitive
EHR has ability to create custom reports but requires additional software or a reporting module that the practice doesn’t have	Purchase reporting module	Cost of purchasing reporting module may be prohibitive
EHR has ability to create reports, but no one on staff knows how to use the software to produce the reports	<ul style="list-style-type: none"> - Vendor may offer support - If hosted, a technical service organization (TSO), may be able to produce reports for the practice site - Practice facilitator can show someone in the clinic how to build the report 	<ul style="list-style-type: none"> - Vendor support may be inadequate - TSO fee for a single report may be prohibitive, even if provided at cost - EHR upgrades may make previous and new reports incompatible

EHR has technical capability and staff have skills to produce reports, but competing priorities mean no one has time for this work	<ul style="list-style-type: none"> - Delay creating reports - Work with leadership to prioritize the report 	<ul style="list-style-type: none"> - QI project leader may not be able to wait for reports. - The report may simply be lower priority than other work
EHR has technical capability and staff have skills to produce reports, but no one understands the nuances of the metrics required for the QI project or how to present the data	Practice facilitator can show someone in the clinic how to build and present the report	The cost of practice facilitators may be prohibitive, and no third party may be willing to fund work that involves facilitators or coaches

Table 2: Resource estimates for data extraction approaches

Starting point for data extraction approach	End Goal	Challenges	Estimated hours
EHR or registry will report CQMs	Reporting more CQMs using an existing process	CQM complexity and identification of data elements, collection workflow	5
EHR or registry will report CQMs	Reporting CQMs with EHR	Potential additional software cost	10
CQM reports will come from patient-list approximation or manual chart extraction	Reporting CQMs with EHR or registry	Potential additional software cost, CQM complexity and identification of data elements, collection workflow	30
EHR does not report CQMs	Reporting CQMs with EHR	Potential additional software cost, CQM complexity and identification of data elements, collection workflow	30
EHR does not report CQMs	Reporting CQMs with a registry	Potential additional software cost	30
EHR does not report CQMs	Reporting CQMs through patient-list approximation	Time for extraction process	50+
EHR does not report CQMs	Reporting CQMs through manual chart extraction	Time for extraction process	50+

TOPIC 4: VALIDATING AGGREGATE-LEVEL DATA

"The burnout I felt was because we weren't able to do the things we need to do to provide quality care and much of our time was spent measuring data that may not even be calculating properly. My burnout improved with my confidence in the data." – Physician

Following basic validation principles can help a practice understand and verify the accuracy of CQM data. Data validation can be time-intensive but is important to ensure that CQM data accurately reflects the patient population and current clinical care.

We recommend following four validation steps to verify and improve CQM data quality:

1. Determine face validity
2. Assess longitudinal validity
3. Benchmark against national standards
4. Conduct prevalence assessment

- 1. Face validity:** Are the numerator and denominator values of the CQM reasonable?
 - a. Are you missing or have a zero value for denominator, exclusion criteria?

Hypothetically, no patients may meet the criteria, smaller practices; however, missing values are most likely error or data-exporting error. Practices should exclude submissions that are blank, as opposed to entering a zero.

"If I don't have faith that the data obtained is meaningful and accurate, it doesn't make me want to put time into it."
– Clinic Manager
 - b. Do you have very low patient numbers in the denominator or numerator?

Depending on clinic type and type of CQM, a low patient population may be accurate. The best practice is to compare the denominator to the expected clinic population, noting the characteristics of patients seen in the clinic for the selected time period.
 - c. Do your clinic's performance rates exceed 100%?

Measure rates for CQMs are required to be between 0 and 100%. Typically, performances that exceed 100% are due to incorrect interpretations of the exclusion/exception criteria for CQMs. Revisit the CQM measure logic for descriptions of exclusions/exceptions as a first troubleshooting step.
 - d. Does your clinic have very low performance rates for CQMs?

The rates may be accurate but require consideration of data mapping and reporting issues. Consider reviewing data elements of the CQM to identify where information is recorded. Data elements include the diagnosis codes, characteristics, visit types, demographics, and other information needed to calculate the numerator, denominator, and any applicable exceptions or exclusions. For an example of a data table from H2N, refer to [Appendix C](#).
- 2. Longitudinal validity:** Do the numerator and denominator change over time?
 - a. Do you have missing or zero values for denominator, numerator, exclusion criteria where data existed for a previous reporting period or vice versa?

This is a clear indication that something has gone wrong because data should be present for all periods if there is data for any of them.

- b. Does your practice have more than 10% change in the denominator, numerator, or performance rates between reporting periods?

This may be an indication that something is incorrect with your reporting, unless you have a concrete reason. These changes may be the result of clinical quality specification changes because of a new provider or some other influx of patients. Unreasonable changes do not necessarily indicate an error but rather indicate a need to dig deeper.

- 3. Benchmarking performance rates of clinics:** Comparing practices' CQM performance rates to established benchmarks can help identify errors by flagging values that are more than 25% out of range of state or national averages. An individual practice may be very different from the norm or out-of-range values may indicate something is incorrectly coded.

- 4. Prevalence assessment of clinic populations:** Many unique patient populations may exist, so a quick assessment of the prevalence of a specific condition may help identify significant issues with CQM implementation.

- a. To calculate prevalence for a clinic, take the number of patients with a specific condition (e.g., adults with hypertension) and divide this number by the total number of active patients (e.g., active adults) in the practice.
- b. Comparing prevalence for the clinic to county, state and/or national prevalence may be useful. If clinic numbers fall above or below these benchmarks, further investigation may be warranted to determine if patients are being accurately coded.

TOPIC 5: CREATING DATA VISUALIZATIONS

“I will be looking into how we can format quality data in a meaningful way that can be regularly posted for staff/provider consumption.” – Clinic Manager

Data visualization is a powerful way to make your CQM information meaningful and accessible to your organization. **Using charts and bar graphs to track CQM performance over time makes it easier to compare CQMs with national benchmarks, past performance, and the performance of peer practices.** Additionally, data visualization makes conducting the data-validation steps discussed in the previous section easier, especially if programming capability exists to automate the process. Charts or graphs of CQMs can help illustrate where there are issues with current reporting such as:

- Zero numerator/denominator
- Low denominator (N < 20)
- Extreme performance value greater than 100%
- Low performance rate
- Denominator values for two most recent submitted quarters differ by $\geq 25\%$
- Numerator values for two most recent submitted quarters differ by $\geq 25\%$
- Baseline data missing

For examples of data visualization from H2N, refer to [Appendix D](#). For ideas on how to generate run charts, you can view [AHRQs PF Handbook](#).

“While working on H2N, our clinic team implemented a change that was adapted by all four hospital clinic locations. Their EHR software was not designed to readily supply necessities for patient exams, so the team added white boards to every exam room with that information. This freed up more time for the providers to spend with patients, face-to-face. If a patient’s initial blood pressure was elevated, they followed the 5-minute protocol and re-took the patient’s blood pressure. If it was still elevated, they marked blood pressure in red on the white board. Today, all four hospital clinics have implemented the white boards in all patient rooms. This innovation not only improved patient-provider communications, but the white boards served to visualize this clinical quality measure information.”

TOPIC 6: BUY-IN TO USE HEALTH INFORMATION TECHNOLOGY (HIT)

“Our staff worked well together and gave 100%. I think our office would be more successful if providers were open to change and were more approachable and worked better as a team to accomplish a goal.”

– Practice Manager

From leadership allocating appropriate resources, to teammates responsible for extracting and validating the data, to clinicians and patient-facing teammates recording patient data correctly, everyone participates in the CQM life cycle. Everyone participates in the journey to a culture of continuous quality improvement and team-based care. The work helps ensure no patients slip through the cracks and the team focuses on meeting patient’ goals utilizing a data-driven improvement strategy.

Getting buy-in from the full team is crucial to QI initiatives. Below are some ideas for understanding team needs, challenges and motivations when seeking to gain their support:

- 1. Complete a stakeholder analysis.** This process assesses the change the clinic is trying to make and how the change affects relevant stakeholders. Think broadly and consider all groups who may have an interest in or may be affected by changes. A [stakeholders matrix](#) is a good way to figure out how best to manage different groups in your practice.
- 2. Align QI efforts with existing priorities.** improvement efforts to the strategic plan or existing goals and initiatives makes them likely to be successful and get buy-in. Connecting the work staff are already doing work to their duties by only adding relevant their current workload. Alignment is important for leadership, so they are more be interested in and supportive of the work.

“Over the course of the project, the clinic bolstered their QI committee to include multidisciplinary staff, patients, and community members. One of their big takeaways from the PDSAs (“Plan-Do-Study-Act cycle”) was that incorporating more voices, rather than deferring to a single authority, often led to the most effective protocols and designs.”

- Practice Facilitator

Tying to more adds less tasks to especially likely to analysis members,
- 3. Identify champions.** Through a stakeholder or by talking to leadership and staff identify champions in each stakeholder group. Ideally, champions are influential among their peer group and/or leaders. However, if a champion emerges in any area of the practice, fully embrace their interest and include them as much as possible, *because there is no substitute for passion.* Provide champions with information and tools to share their passion with others and to help move the work forward.
- 4. Provide rationale.** Nobody likes to do something if they don’t understand the reason. Explain not just why the clinic is doing the initiative, but why now and in the way your practice has chosen. Answering the question “why now?” is just as important as answering the question “why?” in busy clinics with multiple competing priorities.
- 5. Make it easy.** Provide education and tools to staff and leadership so that they easily understand, promote and implement the work. Provide leadership with simple and clear talking points that they can share at staff meetings. Provide staff with workflow job aids and other tools to remove and lessen barriers where ever possible.

CONCLUSION

“These efforts helped to remind us of the QI process improvement, but more importantly helped us to change and deliver better care to our patients. We need to continue to replicate this process for so many things at our clinic!” –Clinician





We realize that work to extract CQMs requires significant investments in time and resources and may feel impossible to accomplish. However, these investments can absolutely pay off down the road in improved healthcare and practice efficiencies that will last for years.




APPENDIX A: EXAMPLE REPORTING TOOLS FOR CQMS

Recommendations, preference, services, and prices may have changed since the guide was produced in April, 2019. We are not recommending any of the services below, and there may be others of which we are unaware.

Clinical Quality Measure Data Extraction Options for Practices

Every practice in Healthy Hearts Northwest (H2N) is asked to report quarterly practice-level data on the “ABCS” clinical quality measures*. There are several options for extracting clinical quality measure data from electronic health records (EHRs). The table below lists the options and costs, in order of preference by the H2N team. Your practice facilitators can help you think through the options.

Preference	Data Option	Notes	Price
Most Preferred	Using your EHR EHR vendors have some functionality to calculate clinical quality measure data or generate custom reports	Varies by EHR: <u>athenaHealth</u> : Certified for MU <u>Allscripts</u> : MU cloud-based reporting <u>Abraxas</u> : iconnect Network <u>Centricity</u> : Certified for MU <u>eClinicalWorks</u> : custom queries with eBO / MAQ <u>Epic</u> : custom queries with access to Clarity <u>Greenway</u> : PopHealth instance <u>Mckesson</u> : Certified for MU <u>Next Gen</u> : Healthy Quality Measures <u>Greenway/ Vitera Intergy</u> : custom queries with Practice Analytics	Varies per EHR. May not be available from all vendors.
Preferred	Identify a registry that will calculate all four measures. <i>We do not endorse any individual registry product.</i>    	Please find some data extraction registry options below, listed in alphabetical order. If you know of other options, please let us know. <u>Acuere</u> – OCHIN-based registry to report on all four ABCS measures. http://www.acueregol.com/ <u>DARTNet</u> – Data encryption system encrypts and moves all EHR data to a secure and encrypted cloud location. Will only be available to selected EHR vendors. http://www.dartnet.info/ <u>ICCS (Integrated Care Coordination Information System)</u> – Includes capacity to report on all four ABCS measures. Interfaces with most EHRs. <i>Contact your practice facilitator for details.</i> <u>PRIME</u> – New registry affiliated with ABFM; ready for enrollment. Reports for PQRS, MU, MOC, research, TCPI. Will report on 44 e-certified QMs. <i>Contact your practice facilitator for details.</i>	<u>OCHIN practices</u> : no additional fee. <u>Non-OCHIN practices</u> \$7500 + 0.50 per patient per for year 1; 0.09 per patient for year 2 \$2000 licensing fee + \$2500 mapping fee per clinical organization (not per practice). \$2000 annual fee. Scholarships available at no cost to practice. With no scholarship, one time cost of \$4,000. \$295 per year for ABFM board certified family physicians, \$360 per year for all other clinicians.

Preference	Data Option	Notes	Price
Preferred (continued)	Identify a registry that will calculate all four measures. <i>We do not endorse any individual registry product.</i>   	Please find some CMS Qualified registry options below, listed in alphabetical order. If you know of other options, please let us know. <i>These options are pending evaluation by H2N staff.</i> <u>American Health IT</u> – CMS PQRS Qualified registry. Can report and convert data for several popular EHRs. http://www.amhitech.com/ <u>ICLOPS Clinical Data Registry</u> – CMS PQRS Qualified data registry for improving population health. www.iclops.com <u>KPN Health</u> – CMS PQRS Qualified registry capable of reporting on several measures and measure groups. www.kpnhealth.com	\$350 annual fee per provider \$500 per provider + \$2,500 per data source for data collection (may vary). Offers a virtual demo upon request. \$499 per EP if KPN extracts the data; otherwise \$599 per EP if client sends a flat file. <u>Price not confirmed.</u>
Less Preferred	Patient lists and internal reporting	EHRs may offer patient list creation that can be configured to generate some of the measure specifications; may need manual review and configuration.	Depends on experience with EHR and need for manual review and configuration of data.
Less Preferred	3rd party application	e.g., KPN Quality Suite – interfaces with most EMRs; includes robust data validation capacity. Can generate reports at patient, provider, and practice levels.	Varies

APPENDIX B: MANUAL CHART-ABSTRACTION EXAMPLE

This is an example of the Healthy Hearts Northwest (H2N) study's manual chart-abstraction approach that was developed from the measure logic for the Controlling High Blood Pressure CQM (CMS 165). During H2N, HIT practice facilitators performed several manual chart extractions for practices that were unable to report CQMs in other ways.

Patients who met criteria for Blood Pressure (CMS 165) denominator

Part 1: Were you able to obtain a list of eligible patients from the EHR?

- No – Continue to Part 2
- Yes – record denominator=1 and go to part 3

Part 2: Manually determine whether individual meets eligibility criteria.

Review charts until *90 eligible people* are identified for each time point (check summary page for totals)

1. Did this patient have a face to face visit with an enrolled provider in the year prior to measurement date?
 - No – **Exclude from review** record denominator = 0 and begin review of next chart
 - Yes - **Continue**

2. Is patient ≥ 18 1 year prior to measurement date AND ≤ 85 as of 1 year prior to measurement date?
 - No – **Exclude from review** record denominator = 0 and begin review of next chart
 - Yes - **Continue**

3. Was the patient diagnosed with essential hypertension* on the active problem list by 6 months prior to the measurement date or has an office visit diagnosis code by 6 months prior to measurement date?
 - No – **Exclude from review** and begin review of next chart
 - Yes – **Record as Denominator = 1 and continue**

Patients who met criteria for Blood Pressure (CMS 165) numerator:

Part 3: Determine if this chart meets numerator criteria.

1. Find most recent *office recorded* BP in a standard EHR field within 1 year prior to measurement date.
 - Is the systolic BP < 140 and diastolic BP < 90 ?
 - Yes – **Meets criteria for Numerator**, record = 1 and begin review of next chart
 - No – **Blood pressure is higher**. Continue to determine if exception (X) exists
 - No – **Blood pressure is not measured** record numerator = 2 and begin review of next chart

Patients who met criteria for Blood Pressure (CMS 165) exceptions:

Part 4: Determine if chart meets exception criteria

1. Is there a dx code on the active problem list (on or before MeasDate) or an office visit dx code (on or within 1 year before MeasDate) indicating pregnancy*?
 - Yes – Meets criteria for Exception, record numerator=2 and move to next chart
 - No – Continue with review to determine if another exception exists

2. Is there a dx code on the active problem list (on or before MeasDate) or an office visit dx code (on or within 1 year before MeasDate) indicating end stage renal disease (ESRD)*?
 - Yes – Meets criteria for Exception, record numerator=2 and move to next chart
 - No – Continue with review to determine if another exception exists

3. Does the chart indicate that the goals of care are palliative?
 - Yes – Meets criteria for Exception, record numerator=2 and move to next chart
 - No – Doesn't meet exceptions, record numerator = 0 (uncontrolled BP) and move to next chart

Sample template for tracking manual chart abstraction data:

Q4 2015: Measurement date: 12/31/2015									
denominator eligibility if all 3=1, status = 1; else 0					Numerator Eligibility				
Patient MRN	FINAL Denominator status	in person visit?	age 18- 85?	HTN dx 6 mo prior?	FINAL Numerator	BP 140/90?	pregnant?	ESRD?	Palliative care?
	1= eligible 0=ineligible	0=no inelig 1=yes cont	0=no inelig 1=yes cont	0=no inelig 1=yes cont	0=uncontrolled BP 1=controlled BP 2=uncontrolled, exception met	0=no cont.. 1=yes done	0=no cont.. 1=yes done	0=no cont.. 1=yes done	0=no done 1=yes done

APPENDIX C: DATA ELEMENT LOCATIONS FOR ABCS MEASURES IN EHRS

Over the course of H2N, HIT practice facilitators assembled a table of data elements that were used for the ABCS measures and where they are likely to be found in an EHR.

Data Elements Table:

EHR Data Element	Examples of Data Element	EHR Data Source	Quality Measure*
Assessment	Tobacco screening	Flowsheet or social history or visit documentation	S
Diagnosis, active	Diabetes, ASCVD and IVD (include multiple conditions),	Billing diagnoses or (possibly) problem list	A, B, C
Intervention	Smoking cessation counseling	Visit documentation or order history or flowsheet	B, S
Labs	LDL-C	Laboratory results or results review or chart review	C
Medication	Statin medication	Medications list or medication history	A, C, S
Medication allergy	Statin allergy	Allergies/contraindications/adverse reactions	C
Tobacco use status	Tobacco user	Social history, past medical history, problem list	S
Procedures	Coronary Artery Bypass Graft	Procedures or order history	A, C
Vitals	Blood pressure	Flowsheet/vitals	B

***A** = Aspirin (NQF 0068), **B** = Blood Pressure (NQF 0018), **C** = Cholesterol (NQF in progress), **S** = Smoking (NQF 0028). ASCVD, atherosclerotic cardiovascular disease; IVD, ischemic vascular disease; LDL-C, low-density lipoprotein cholesterol

APPENDIX D: EXAMPLE ABCS DATA VISUALIZATION

Below is an example of the types of data visualization generated for H2N via an online platform called “the Pulse”.

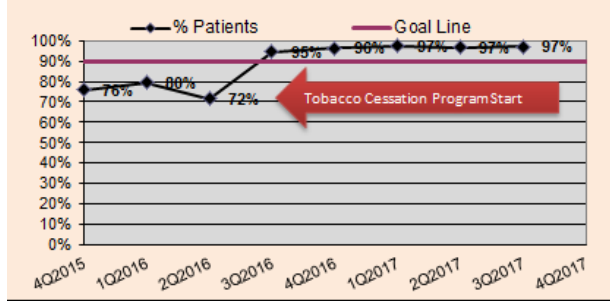
T

Aim Statement

To adequately screen patients for tobacco use and cessation for all patients to 90% by 12/31/2016

Measure: Tobacco Use AND Cessation Counseling

Percent 18 + years of age screened AND counseled for tobacco use
CMS 138b NQF 0028



Time Period	Num	Den	Exc	Rate	Goal:	# pts to goal↑
4Q2015	148	195	0	76%	90%	28
1Q2016	35	44	0	80%	90%	5
2Q2016	104	145	0	72%	90%	27
3Q2016	125	132	0	95%	90%	-6
4Q2016	234	243	0	96%	90%	-15
1Q2017	74	76	0	97%	90%	-6
2Q2017	217	224	0	97%	90%	-15
3Q2017	228	235	0	97%	90%	
4Q2017					90%	

APPENDIX E: HEALTHY HEARTS NORTHWEST ABCS CQM DEFINITIONS

H2N focused on heart-health CQMs called **ABCS**: Use of **A**spirin (for high-risk patients), **B**lood pressure control, **C**holesterol management and **S**moking cessation. Below is a CQM definition chart for ABCS developed in 2016.

Measure Title	Denominator Statements	Numerator Statement
NQF 0068/CMS 164v3/QPP 204 - Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic	Patients 18 years of age and older with a visit during the measurement period, and an active diagnosis of ischemic vascular disease (IVD) or who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous coronary interventions (PCI) in the 12 months prior to the start of the measurement period.	Patients in the denominator who have documentation of use of aspirin or another antithrombotic during the measurement period.
NQF 0018/CMS 165v3/QPP 236 - Controlling High Blood Pressure	Patients 18-85 years of age who had a diagnosis of essential hypertension within the first six months of the measurement period or any time prior to the measurement period.	Patients in the denominator whose blood pressure at the most recent visit is adequately controlled (systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg) during the measurement period.
NQF in process /CMS 347v0 - Statin Therapy for the Prevention and Treatment of Cardiovascular Disease	<p>1. Denominator Population 1: Patients ages >= 21 years at the beginning of the measurement period with clinical ASCVD * diagnosis.</p> <p>2. Denominator Population 2: Patients ages >= 21 years at the beginning of the measurement period who have ever had a fasting or direct laboratory result of LDL-C >= 190 mg/dL.</p> <p>3. Denominator Population 3: Patients ages 40 to 75 years at the beginning of the measurement period with Type 1 or Type 2 diabetes and with an LDL-C result of 70-189 mg/dL recorded as the highest fasting or direct laboratory test result in the measurement year or during the two years prior to the beginning of the measurement period.</p>	Patients in the denominator who are statin therapy users during the measurement period or who receive an order (prescription) to receive statin therapy at any point during the measurement period.
NQF 0028/CMS 138v3/QPP 226 - Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	All patients aged 18 years and older seen for at least two visits or at least one preventive visit during the measurement period.	Patients in the denominator who were screened for tobacco use at least once within 24 months AND who received tobacco cessation counseling intervention if identified as a tobacco user.
<p>* ASCVD (Clinical atherosclerotic cardiovascular disease) includes the following:</p> <ul style="list-style-type: none"> Acute coronary syndromes History of myocardial infarction Stable or unstable angina Coronary or other arterial revascularization Stroke or transient ischemic attack (TIA) Peripheral arterial disease of atherosclerotic origin 		

APPENDIX F: GLOSSARY OF TERMS AND ACRONYMS

ABCS	Aspirin use, Blood pressure, Cholesterol, and Smoking; the four CQMs used by the H2N study
Abstraction	Pulling data from medical records, either manually or automated
ABFM	American Board of Family Medicine
ASCVD	Atherosclerotic cardiovascular disease
CHPL	Certified Health IT Product List of tech that's been tested and certified
CMS	Centers for Medicare and Medicaid Services
CQM	Clinical Quality Measure (aspirin for high risk, hypertension control, etc.)
Data visualization	Displaying data in non-word format, with graphics/tables
eBO	Extended Business Office
EHR	Electronic health record
EMP	Electronic medical record
EP	Evidence practice
H2N	Healthy Hearts Northwest, a program to help small practices report CQMs
HEDIS	Healthcare Effectiveness Data and Information Set
HIT	Health information technology
MAQ	Maximum allowable quantity
MOC	Maintenance of Certification
MU	Meaningful Use
NQF	National Quality Forum
OCHIN	Our Community Health Information Network
PQRS	Physician Quality Reporting System
QI	Quality improvement
QMS	Quality management systems
QPP	Quality improvement payment programs
TCPI	Transforming Clinical Practice Initiative
TSO	Technical Service Organization