

Brief Report**Using Electronic Health Records to Identify Participants for a Multicenter COPD Clinical Trial**

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Running Head: Identifying COPD Study Participants Using EHR Data

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Abbreviations: electronic health records (EHRs); Roflumilast or Azithromycin to Prevent COPD Exacerbations (RELIANCE) study; chronic obstructive pulmonary disease (COPD); International Classification of Diseases (ICD); long-acting muscarinic antagonist (LAMA); long-acting beta-2-agonist (LABA); inhaled corticosteroids (ICS); 95% confidence interval (95% CI)

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This article has an online supplement.

Pre-proof

INTRODUCTION

Randomized clinical trials are essential for establishing the benefits and risks of medical interventions but are slowed by inefficient methods for identification and recruitment of eligible participants. Electronic health records (EHRs) include structured clinical data stored in predefined, discrete fields with constrained values (e.g., ICD-10 diagnosis codes) and unstructured data (free-text or non-tabular content with no predefined schema, e.g., symptoms documented in a clinic note). Computer-executed queries using structured and unstructured data in EHRs (computable phenotypes [1]) represent an opportunity to accelerate the identification of potentially eligible patients as they could supplement or replace manual review of the same information. However, limited data exist about the utility of computable phenotypes across diverse research use cases.

The Roflumilast or Azithromycin to Prevent COPD Exacerbations (RELIANCE) phase 3 multi-center clinical trial (ClinicalTrials.gov NCT04069312) was designed to compare the harms and benefits of long-term use of roflumilast versus azithromycin in patients with chronic obstructive pulmonary disease (COPD) recently hospitalized for an exacerbation.[2,3] During the start-up phase of the RELIANCE clinical trial, the study funder (Patient-Centered Outcomes Research Institute), requested an evaluation of the feasibility of an EHR-derived computable phenotype to identify potentially eligible participants. To inform the development of a candidate computable phenotype that would incorporate inclusion and exclusion criteria for the RELIANCE trial, a pragmatic clinical trial conducted within real-world clinical infrastructure, we conducted a study to estimate the number of inpatient and outpatient encounters in patients with COPD across enrolling sites. Then, in a random sample of inpatient and outpatient encounters at each enrolling site, manual review of the EHR was performed to assess the adequacy of documentation to

evaluate each of the inclusion and exclusion criteria. Preliminary results were presented in the form of an abstract.[4]

METHODS

We conducted a cross-sectional study across 33 U.S. clinical sites during the start-up phase of the RELIANCE trial, including 31 academic health centers, 1 integrated managed care organization, and 1 private practice. All four US Census regions were represented by the various clinical sites (West, 7 sites; South, 8 sites; Midwest, 13 sites; Northeast, 5 sites). This study was reviewed by the institutional review board (IRB) at the University of Illinois Chicago (IRB # 17102001) and was conducted with a waiver of consent. Each participating site obtained local IRB approval to conduct the data collection activities.

Each site used its local EHR to identify adults aged ≥ 40 years with COPD, defined by International Classification of Diseases (ICD-10; [Table](#)) codes consistent with the Centers for Medicare & Medicaid Services (CMS) Hospital Readmissions Reduction Program COPD definition. EHR queries were applied to the inpatient and outpatient clinical settings:

1. Inpatient setting: adults ≥ 40 years hospitalized for COPD exacerbation in the prior 12 months.
2. Outpatient setting: adults ≥ 40 years with at least one outpatient COPD encounter in the prior 12 months.

A random sample of 15 inpatient encounters and 15 outpatient encounters identified by the EHR queries was selected at each site (30 per site, total $n=990$ encounters) for manual chart abstraction to assess whether patients met the following key eligibility criteria for the RELIANCE trial: (1) age ≥ 40 years; (2) ≥ 10 pack-years smoking; (3) chronic bronchitis; (4) hospitalization for COPD exacerbation within 12 months; (5) prescription for inhaled

maintenance therapy (long-acting muscarinic antagonist [LAMA], long-acting beta-2-agonist [LABA], dual LABA and LAMA, inhaled corticosteroids (ICS) plus LABA, or triple therapy (LABA, LAMA, and ICS); (6) English or Spanish language; (7) not pregnant, (8) no long-term (>30 days) azithromycin or roflumilast use, and (9) no contraindications to either drug (e.g., documented allergy). A criterion was considered “indeterminate” if there was insufficient documentation in the EHR to support the criterion being met or not met (e.g., documentation of hospitalization at outside hospital, but inadequate information about dates of hospitalization). We did not assess eligibility criteria that would require a conversation with the potential study participant (i.e., willingness to provide [1] informed consent, [2] contact telephone number, and [3] social security or other health insurance claims number to study staff). The chart abstraction tool is included as Supplemental Content. We calculated the proportion of records meeting all criteria (“potentially eligible”) and those that were indeterminate for ≥ 1 criteria. Binomial 95% confidence intervals (CIs) were computed for proportions.

RESULTS

Across all 33 sites, we identified 104,097 inpatient encounters for COPD exacerbations and 160,290 outpatient encounters for patients with COPD over 12 months. In the random sample of 990 manually abstracted records, EHR documentation was insufficient to evaluate ≥ 1 eligibility criterion in 28% (95% CI, 19–40%) and 27% (95% CI, 19–37%) of inpatient and outpatient encounters, respectively ([Figure](#)). The mean proportion of potentially eligible patients was 36% (95% confidence interval [95% CI], 27–45%) in the inpatient setting and 7% (95% CI, 5–11%) in the outpatient setting.

The three criteria most frequently considered indeterminate in inpatient and outpatient encounters were: (1) chronic bronchitis (18% and 14%, respectively); (2) smoking history ≥ 10

pack-years (13% and 10%, respectively); and (3) prior COPD hospitalization within 12 months (6% and 10%, respectively).

DISCUSSION

Across 33 clinical sites that participated in the start-up phase of the RELIANCE clinical trial, we identified over 100,000 inpatient encounters and over 160,000 outpatient encounters in patients with COPD. Manual review of the EHR in a random sample of nearly 1,000 of these encounters suggests that approximately one in three inpatients with COPD exacerbations met all RELIANCE trial criteria. Far fewer outpatients with COPD met trial eligibility criteria. We also observed variability in the completeness of documentation relevant to assessing study eligibility, with missing information most common for the number of pack-years smoked and a diagnosis of chronic bronchitis.

These findings build on our previous work that indicates poor agreement between patient-reported physician diagnosis of COPD and a COPD reference standard based on smoking exposure and confirmation of post-bronchodilator airflow limitation.[5] The current study, which is focused on the RELIANCE clinical trial, highlights the importance of reviewing structured and unstructured data in the EHR as well as addressing gaps in clinical documentation when developing a computable phenotype to identify trial-eligible patients. Variation in data completeness across eligibility criteria for the RELIANCE clinical trial, especially information to identify patients with chronic bronchitis and ≥ 10 pack-years smoking history, highlights the current limitations of EHR data. The potential to further improve computable phenotype performance using natural language processing or artificial intelligence (AI)-enabled data extraction tools warrants further study.[6,7]

From a translational science perspective,[8] this study illustrates the potential and gaps in EHR-based screening to improve the efficiency of multicenter clinical trials compared to manually searching through all encounters each day. Investments by the NIH's National Center for Advancing Translational Sciences and PCORI in health data infrastructure (e.g., PCORnet,[9] N3C RECOVER[10]) provide an opportunity to refine and scale these methods in other conditions, including clinical trials in interstitial lung disease where more efficient approaches to identifying patients eligible for clinical trials are needed. We do, however, acknowledge study limitations. The study was not designed to evaluate the accuracy of COPD diagnosis at clinical trial sites. Nearly all clinical sites that contributed to the study were academic health centers; findings in this report may or may not apply to non-academic health centers. The documentation in the EHR for a modest number of encounters per study site was examined (15 in the inpatient setting, 15 in the outpatient setting), precluding a meaningful analysis of site-level differences. In addition, the study was not designed to examine if documentation in the EHR varied according to the type of EHR vendor (e.g., Allscripts, Epic, Oracle Cerner). Also, the study was performed immediately prior to the launch of the trial in 2020. The results may or may not generalize to studies conducted in the post-pandemic period. However, our approach to developing and evaluating a computable phenotype can inform future efforts to address these additional questions.

This study is innovative in that it evaluated the real-world use of a computable EHR phenotype across 33 heterogeneous U.S. clinical sites to test how it might be used for recruitment for a live, multicenter comparative effectiveness trial. Rather than describing a theoretical phenotype, we reviewed both structured and unstructured EHR data relevant to a clinical trial's eligibility criteria, thereby generating empirical estimates of enrichment yield and documentation

completeness. The finding that patients hospitalized for COPD exacerbations were five-fold more likely to be eligible for the RELIANCE clinical trial compared to patients with an outpatient encounter with a COPD diagnosis demonstrates the practical efficiency gains achievable through hospitalization-triggered (rather than outpatient visit-triggered) EHR pre-screening. Our study also points out the need to develop and test advanced methods to address documentation gaps in EHRs. Based on these findings, we would advocate for developing and testing a candidate computable phenotype using queries of age and ICD-10 diagnosis codes in structured EHR data from inpatient encounters combined with natural language processing or AI-enabled data extraction of structured and unstructured data for other eligibility criteria.

In conclusion, results from our study indicate that multi-site implementation of EHR-facilitated recruitment using computable phenotypes will require review of structured and unstructured data and novel strategies to overcome gaps in clinical documentation specific to each clinical trial's eligibility criteria.

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Author Contributions:

Dr. Prasad: interpretation of the data, drafting the work, final approval, accountable for all relevant parts of the work; Dr. LaBedz: conception/design of work, analysis and interpretation, drafting the work, final approval, accountable for all relevant parts of the work; Dr. Holbrook: critical review, design of work, interpretation of data, final approval, accountable for all relevant parts of the work; Dr. Mularski: critical review, design of work, interpretation of data, final approval, accountable for all relevant parts of the work; Dr. Rennard: critical review, design of work, interpretation of data, final approval, accountable for all relevant parts of the work; Dr. Sugar: critical review, design of work, interpretation of data, final approval, accountable for all relevant parts of the work; Dr. Wise: critical review, design of work, interpretation of data, final approval, accountable for all relevant parts of the work; Ms. Bracken: conception/design of work, analysis and interpretation, drafting the work, final approval, accountable for all relevant parts of the work; Dr. Auerbach: critical review, interpretation of data, final approval, accountable for all relevant parts of the work; Dr. Krishnan: conception/design of work, analysis and interpretation, drafting the work, final approval, accountable for all relevant parts of the work.

DECLARATION OF INTERESTS

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REFERENCES

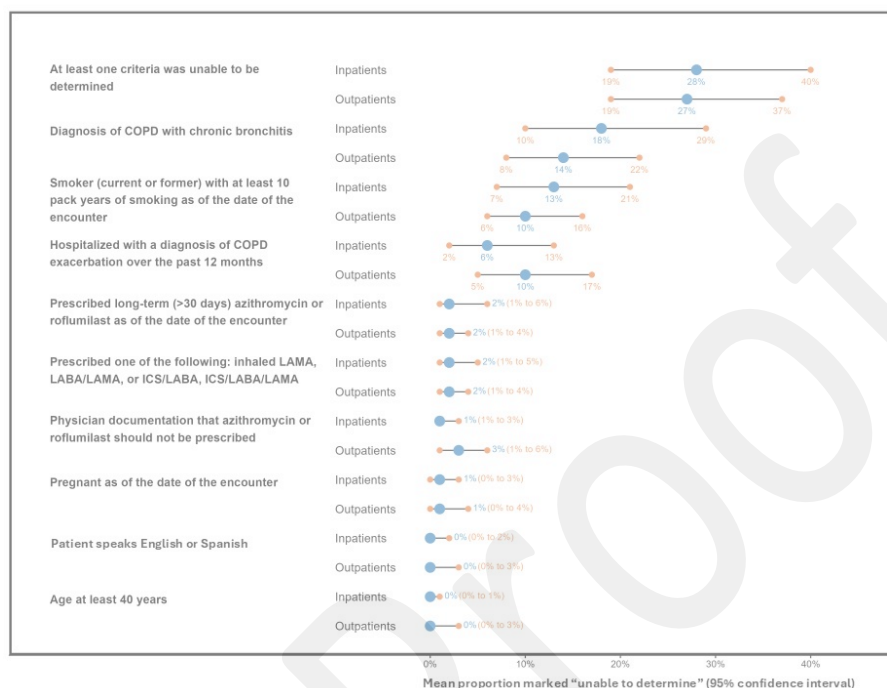
1. Electronic health records-based phenotyping. NIH Pragmatic Trials Collaboratory.
<https://rethinkingclinicaltrials.org/chapters/conduct/electronic-health-records-based-phenotyping/definitions/> (accessed October 26, 2025).
2. Krishnan JA, Holbrook JT, Sugar EA, Albert R, Rennard S, Bracken N, He J, Bradley M, Coughlin K, Fuller CC, Hammill B, Malanga E, Malanga VM, Mannino D, Mularski RA, Musick H, Rommes J, DeLisa J, Toh S, Wise RA. Rationale and Design of the Roflumilast or Azithromycin to Prevent COPD Exacerbations Clinical Trial. *Chronic Obstr Pulm Dis*. 2026 Jan 30;13(1):17-28. doi: 10.15326/jcopdf.2025.0669. PMID: 41524622; PMCID: PMC12927259.
3. Krishnan JA, Albert RK, Rennard SI; RELIANCE study. Waiting for Actionable Evidence: Roflumilast or Azithromycin? *Chronic Obstr Pulm Dis*. 2022 Jan 27;9(1):1-3. doi: 10.15326/jcopdf.2021.0272. PMID: 34783231; PMCID: PMC8893970.
4. LaBedz S, Albert RJ, Avdalovic MV, Bellam SK, Bracken N, Castex J, David SE, Dixon AE, Drummond MB, Erwin K, Flores J, Folz RJ, Gallardo R, Gerald LB, Hanley ME, Hart M, Hatipoglu US, Henderson R, Holbrook JT, Illendula S, Malanga E, Mannino DM, Meldrum CA, Millard MW, Mularski RA, Ouellette DR, Pinto-Plata VM, Prieto-Centurion V, Putcha N, Rennard S, Rommes J, Roy G, Seoane L, Sugar E, Wise RA, Krishnan JA, on behalf of the RELIANCE Investigators. Feasibility of screening electronic health records to identify participants for a multicenter clinical effectiveness trial in COPD (abstract). American Thoracic Society International Conference Abstracts. https://academic.oup.com/ajrccm/article/199/Supplement_1/A3289/8579484 (accessed 27 July, 2026).
5. Prieto-Centurion V, Rolle AJ, Au DH, Carson SS, Henderson AG, Lee TA, Lindenauer PK, McBurnie MA, Mularski RA, Naureckas ET, Vollmer WM, Joese BJ, Krishnan JA; CONCERT

- Consortium. Multicenter study comparing case definitions used to identify patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2014 Nov 1;190(9):989-95. doi: 10.1164/rccm.201406-1166OC. PMID: 25192554; PMCID: PMC4299587.
6. Patel AK. The Marriage of Computable Phenotypes With Machine Learning-A Pathway to Evidence-Based Care for Critically Ill Children. *JAMA Netw Open*. 2025 Feb 3;8(2):e2457422. doi: 10.1001/jamanetworkopen.2024.57422. PMID: 39903469.
7. Afshar M, Joyce C, Oakey A, Formanek P, Yang P, Churpek MM, Cooper RS, Zelisko S, Price R, Dligach D. A Computable Phenotype for Acute Respiratory Distress Syndrome Using Natural Language Processing and Machine Learning. *AMIA Annu Symp Proc*. 2018 Dec 5;2018:157-165. PMID: 30815053; PMCID: PMC6371271.
8. US Department of Health & Human Services. National Institutes of Health, National Center for Advancing Translational Sciences. <https://ncats.nih.gov/about/about-translational-science> (accessed October 26, 2025).
9. Forrest CB, McTigue KM, Hernandez AF, Cohen LW, Cruz H, Haynes K, Kaushal R, Kho AN, Marsolo KA, Nair VP, Platt R, Puro JE, Rothman RL, Shenkman EA, Waitman LR, Williams NA, Carton TW. PCORnet® 2020: current state, accomplishments, and future directions. *J Clin Epidemiol*. 2021 Jan;129:60-67. doi: 10.1016/j.jclinepi.2020.09.036. Epub 2020 Sep 28. PMID: 33002635; PMCID: PMC7521354.
10. Hadley E, Yoo YJ, Patel S, Zhou A, Laraway B, Wong R, Preiss A, Chew R, Davis H, Brannock MD, Chute CG, Pfaff ER, Loomba J, Haendel M, Hill E; N3C and RECOVER consortia; Moffitt R. Insights from an N3C RECOVER EHR-based cohort study characterizing SARS-CoV-2 reinfections and Long COVID. *Commun Med (Lond)*. 2024 Jul 11;4(1):129. doi: 10.1038/s43856-024-00539-2. PMID: 38992084; PMCID: PMC11239932

Table 1. ICD-10 codes used to identify patients with COPD

Principal diagnosis of COPD (ICD-10-CM codes):	J41.8 Mixed simple and mucopurulent chronic bronchitis J42 Unspecified chronic bronchitis J43.0 Unilateral pulmonary emphysema (MacLeod's syndrome) J43.1 Panlobular emphysema J43.2 Centrilobular emphysema J43.8 Other emphysema J43.9 Emphysema, unspecified J44.0 Chronic obstructive pulmonary disease with acute lower respiratory infection J44.1 Chronic obstructive pulmonary disease with (acute) exacerbation J44.9 Chronic obstructive pulmonary disease, unspecified	Source: 2017 Condition-Specific Readmission Measure Updates and Specifications Report: AMI, HF, Pneumonia, COPD, and Stroke (Appendix D.2, page 81) https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 .
OR Principal diagnosis of respiratory failure	J96.00 Acute respiratory failure, unspecified whether with hypoxia or hypercapnia J96.01 Acute respiratory failure with hypoxia J96.02 Acute respiratory failure with hypercapnia J96.20 Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia J96.21 Acute and chronic respiratory failure with hypoxia J96.22 Acute and chronic respiratory failure with hypercapnia J96.90 Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia J96.91 Respiratory failure, unspecified with hypoxia J96.92 Respiratory failure, unspecified with hypercapnia R09.2 Respiratory Arrest PLUS 2. A secondary diagnosis in any position (either): J44.0 Chronic obstructive pulmonary disease with acute lower respiratory infection J44.1 Chronic obstructive pulmonary disease with (acute) exacerbation	Source: 2017 Condition-Specific Readmission Measure Updates and Specifications Report: AMI, HF, Pneumonia, COPD, and Stroke (Appendix D.2, page 81) https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 .
PLUS a secondary diagnosis of J44.0 or J44.1:		

Figure. Proportion of patients with indeterminate eligibility using a computable phenotype developed for the RELIANCE clinical trial



Legend: In a random sample of 990 encounters, manual review of EHR (both structured and unstructured data) identified gaps in documentation relevant to evaluating 1 or more eligibility criteria for the RELIANCE trial in a mean of 28% of encounters in the inpatient stratum and 27% of encounters in the outpatient stratum. Gaps in documentation were most common for a diagnosis of chronic bronchitis and pack-years smoked.

Online Supplement



Audit of Query Results, Milestone O

Instructions, Mar 20 2018

When:	Audit data entry will be accepted by the Clinical Coordinating Center (CCC) until June 15, 2018
Estimated time to complete:	We anticipate chart audits will take between 3 minutes and 7 minutes each (total time 1.5-3.5 hours) based on previous audits conducted by the prime.
Purpose:	One objective of Phase 1 is to estimate the number of patients at each site eligible for the RELIANCE Trial (Phase 2). The audit requires your site review a random sample of patient records to evaluate the accuracy of the query for identifying potentially eligible patients for the RELIANCE Trial. We expect that not all records identified in the query will meet all eligibility criteria on further inspection. These results will help the RELIANCE Executive Committee customize recruitment strategies for Phase 2.
Completed by:	Site Coordinator, site Principal Investigator (PI), or site Co-Investigator (Co-I)
Steps for Audit:	1. Using the list of Audit IDs assigned by the CCC, your site will locate the corresponding patient record in the site survey database, the match should be made based on the records numerical order in the database, e.g., an Audit ID of X0007 corresponds to the 7th record in the database. 2. Your site will complete the Audit of Query Results (AQ) form based on review of all available data in the patients Electronic Health Record (EHR). The site should complete a new AQ form for each record audited. The site will keep a local record linking AQ form data to the local patient ID. 3. Each form should be reviewed by your site PI prior to data entry. 4. Each paper form should then be keyed into the Audit database hosted at the CCC using the assigned Audit ID. Your site PI will be provided a password to access the Audit database and complete data entry. Your site can access the Audit database from your RELIANCE landing page. Please contact reliance.team@reliance-study.org if you need your link reset.
What to collect:	Please see case report form <i>Audit of Query Results</i> (AQ), Milestone O, V1, Mar 20 2018
Definitions for AQ:	Please refer to the following definitions during your audit: <u>Site ID:</u> a number assigned by the CCC to each participating clinical site. <u>Database ID:</u> a number assigned by the Clinical Coordinating Center (CCC) to each internal (i.e. site-level) database queried as part of the site survey. <u>Audit ID:</u> a random number that corresponds to the record of a patient report identified as eligible in the data query. For example, if you are assigned Audit ID 007, you will find the 7th record in your site survey database and review that patient's electronic health record (EHR).

Guidelines: *Data audit, audit of query records and chart audit* are used synonymously in Phase 1, they refer to the same process.

Please refer to the eligibility criteria in the *Phase 2 Protocol*, also pasted below for convenience, as the definitive reference as you complete your audit.

Inclusion criteria

- Patient and treating clinician considering treatment intensification options to reduce the risk of COPD exacerbations;
- Age $\geq$ 40 years;
- Current or past smoker of at least 10 pack years;
- Diagnosis of severe COPD and associated chronic bronchitis;
- Hospitalized with a diagnosis of COPD exacerbation in the past 12 mos.;
- Current medications include inhaled LAMA, LABA/LAMA, or ICS/LABA;
- English or Spanish-speaking.

Exclusion criteria (any of the criteria below)

- Unable or declines to provide informed consent to be randomized to long-term therapy with azithromycin or roflumilast;
- History of intolerance to azithromycin or roflumilast that the patient or patient's treating clinician considers sufficiently serious to avoid either treatment option;
- Current treatment with long-term (more than 30 days) roflumilast or azithromycin; previous treatment with 1 or more doses of azithromycin or roflumilast is not an exclusion criterion, as long as the patient and clinician are seeking treatment intensification options and would be willing to use azithromycin or roflumilast, as per randomized treatment assignment;
- Known hypersensitivity to azithromycin, erythromycin, any macrolide or ketolide antibiotic;
- History of cholestatic jaundice/hepatic dysfunction associated with prior use of azithromycin;
- Moderate to severe liver impairment (Child-Pugh B or C);
- Current pregnancy;
- Any other clinician-determined exclusion as per their clinical practice. The clinicians will be provided the FDA-approved prescribing information for roflumilast and azithromycin (Appendices 7.1 and 7.2). The prescribing information includes a list of "warnings and precautions" that identifies the potential for adverse effects and is intended to support clinical decision-making that takes into account the risks and benefits of roflumilast and azithromycin for each patient. More information about the Warnings and Precautions are presented in Section 2.3.

Auditors should review the names of maintenance medications for each patient record with their site PI or Co-I to ensure correct documentation.

For any questions, please contact the RELIANCE Team at reliance.team@reliance-study.org



Audit of Query Results

A. Audit ID

1. Site ID: _____ (provided by CCC)
2. Database ID: _____ (provided by CCC)
3. This audit was performed on (check only one):
 Patient record from Hospital/In-patient database... (1)
 Patient record from Clinic/Outpatient database..... (2)
4. Audit ID: _____ (provided by CCC)
5. Audit date: _____ (ex. 02-18-2018)
 _____ month _____ day _____ year
6. Auditor name (print): _____
7. Auditor signature: _____

B. Eligibility criteria for participant in RELIANCE trial

Inclusion criteria	Yes	No	Unable to determine
8. Age at least 40 years	(1)	(2)	(3)
9. Current smoker with at least 10 pack years of smoking (defined as currently smoking every day or some days; Source: BRFSS) as of the date of the encounter	(1)	(2)	(3)
10. Former smoker with at least 10 pack years of smoking (defined as having quit smoking); Source: BRFSS) as of the date of the encounter	(1)	(2)	(3)
11. Diagnosis of chronic obstructive pulmonary disease (COPD) with chronic bronchitis (defined as a physician diagnosis of "COPD" and one of the following: physician diagnosis of "chronic bronchitis" OR documentation of chronic cough and sputum production)	(1)	(2)	(3)
12. Hospitalized with a diagnosis of COPD exacerbation over the past 12 months	(1)	(2)	(3)
13. Prescribed one of the following maintenance regimens: inhaled LAMA, LABA/LAMA, or ICS/LABA, ICS/LABA/LAMA (see instruction page for medication names)	(1)	(2)	(3)
14. Patient speaks English or Spanish	(1)	(2)	(3)
Exclusion criteria			
15. Prescribed long-term (>30 days) azithromycin or roflumilast as of the date of the encounter	(1)	(2)	(3)
16. Pregnant as of the date of the encounter	(1)	(2)	(3)
17. Physician documentation that azithromycin or roflumilast should not be prescribed; 17s. If "yes", specify: _____	(1)	(2)	(3)
18. In the assessment of the site PI or Co-I, would this patient be eligible for the RELIANCE Study based on available documentation?	(1)	(2)	(3)

C. Administrative information

19. Name of Principal Investigator (print): _____
20. Signature of Principal Investigator: _____
21. Date of PI signature: _____ (ex. 02-18-2018)
 _____ month _____ day _____ year