Assessing the accuracy of patient report of the 5As (ask, assess, advise, assist, and arrange) for smoking cessation counseling

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Abstract

Objective: The 5As framework (ask, advise, assess, assist, arrange) is a recommended strategy for smoking cessation counseling in primary care. This study compares patient report with direct observation to assess the degree of recall bias for each of the 5As.

Methods: Primary care visits by 107 adult smokers and 16 physicians were audio-recorded. Within 48 hours after the visit, patients completed a survey assessing whether or not smoking was discussed and items specific to each of the 5As. The audio recordings were evaluated to assess the presence of each A. The sensitivity, specificity, positive predictive value, and negative predictive value of patient report versus direct observation were computed.

Results: The frequency of the 5As based on evaluation of the audio recording ranged from 13% (arrange) to 98% (ask). The sensitivity and specificity of patient report were 92% and not applicable for ask, 90% and 50% for assess, 94% and 33% for advise, 90% and 50% for assist, and 85% and 67% for arrange follow-up. Positive predictive values ranged from 28% to 98%; negative predictive values ranged from 0% to 97%.

Conclusion: Compared with the gold standard of direct observation, patient report of each of the 5As is reasonably sensitive but not specific. Patients overreport the occurrence of each of the 5As.

Keywords: 5As (ask, assess, advise, assist, arrange); smoking cessation; primary care

Introduction

Tobacco use continues to be one of the leading, preventable causes of premature morbidity and death in the United States [1, 2]. Smoking causes nearly 500,000 deaths per year in the United States, and is the leading cause of cancer [3]. The trend of annually declining prevalence of tobacco use has stalled in recent years [4]. A fourth of all US adults continue to smoke [4–6], with smoking prevalence highest among the most disadvantaged demographic groups [6, 7].

The clinical practice guideline for treating tobacco use and dependence is a highly regarded and frequently cited guide for smoking cessation treatment in clinical settings [8, 9]. The guideline specifically recommends the 5As framework (ask, advise, assess, assist, arrange) as the basis for brief smoking cessation counseling in the primary care context [10]. Evaluation of the actual implementation of the 5As in clinical practice and accurate assessment of their association with patient outcomes are important elements.
in determining the effectiveness of this approach and the efficient deployment of resources. However, assessment of provision of the 5As relies on patient report [11], physician report [12, 13], or medical record documentation [14], each of which is subject to limitations and biases [15].

Our team developed the 5As direct observation coding scheme (5A-DOC) [16]. This measure uses clinician–patient talk to determine the degree to which each of the As is accomplished. The 5A-DOC is reliable, valid, and evaluates delivery of each A so that patterns of advice can be classified with regard to completeness and appropriate sequencing of delivery of the elements. This measure is designed to serve as a gold standard to evaluate the delivery of the 5As in the primary care setting. While accurate, this method requires standardized coding of audio recordings. A less expensive method is to use patient report of the content of the smoking cessation discussion to evaluate the degree to which the 5As are delivered. However, the accuracy of patient report of the 5A elements compared with direct observation is not known. The goal of this study was to assess the accuracy of patient report of the 5A elements with use of the 5A-DOC as the gold standard.

Methods
This study is a cross-sectional multimethod study. Data for this study are drawn from a sample of audio-recorded patient visits to primary care physicians that were part of a group-randomized clinician-focused intervention, and the methods have been reported in detail elsewhere [17, 18]. Briefly, this report is focused on a subsample of 107 adults who reported smoking cigarettes or small cigars “some days” or “every day” and reported smoking, on average, at least one cigarette per day or one small cigar per week. Participants completed items reporting the occurrence of smoking discussion and activities specific to each of the 5As. These five items were based on self-report items in a previous study [19], and are dichotomously scored to represent if each counseling activity (ask, advise, assess, assist, arrange) happened. Patients were surveyed within 48 hours after a routine primary care visit. The university hospitals, MetroHealth Medical Center, and Cleveland Clinic institutional review boards approved the study procedures.

Patient visits were audio-recorded by research staff. The audio recordings were evaluated with the 5A-DOC for smoking cessation counseling, a reliable and valid tool to evaluate the 5As using patient–clinician talk. Each A was scored as having occurred or not occurred on the basis of the audio recording. Two trained coders applied the 5A-DOC to the audio data. Throughout the coding period of the overall study, a random 15% sample of audio recordings were assigned to both coders to assess the coding reliability. Coders were blind to which cases were reliability cases.

Analyses
Inter-rater coding reliability was assessed with kappa and evaluated with kappa greater than 0.80 as almost perfect agreement and 0.61–0.80 indicating substantial agreement [20]. The primary analyses for this report include the frequencies of each of the 5As for patient report and the 5A-DOC and computation of the sensitivity, specificity, positive negative predictive value, and negative predictive value with the 5A-DOC as the gold standard.

Results
The characteristics of the sample are shown in Table 1. Overall, 60% of patients were female, 44 years old on average, 26% black, and 21% reported having less than a high school degree. On average, patients smoked 11 cigarettes per day.

The reliability of the coding of the audio recording for each visit using the 5A-DOC is reported in Table 2. The inter-rater agreement is 90% or above for each 5A element evaluated with the 5A-DOC. Kappa statistics ranged from 0.78 to 1.0 and were evaluated as excellent for each of the 5A elements.

The frequency for each 5A element is reported in Table 3 for both the 5A-DOC and patient report. From comparison of patient report with the 5A-DOC, the sensitivity of patient report is good. Sensitivities ranged from 0.83 for arrange follow-up to 0.96 for assess readiness to quit. The specificity of patient report for the 5As, however, is poor, and ranged from 0.29 for advise to 0.65 for arrange follow-up. The positive predictive value for arrange was particularly low (0.23), indicating that among those cases where patients indicated that arrange occurred, only 29% were positive on the basis of direct observation. The negative predictive values for all but arrange are
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In this study we found that primary care patients asked to report about discussions of smoking cessation within a 48-hours period after a visit tended to overreport the occurrence of the 5As. Explicitly, compared with the gold standard of direct observation, patient report of each of the 5As is reasonably sensitive but not specific. Patient overreporting of discussion of tobacco cessation advice might in part be due to a phenomenon called telescoping [21], or the recalling of unpleasant events as having occurred more recently than they actually did. This type of recall bias can be counteracted by assessment of patient report in close proximity to the event, such as was accomplished in this study, where patient report was assessed within 48 hours of the visit. Another possible explanation is that patient overreporting may be influenced by repeated discussions of the topic of tobacco over time. When the topic of tobacco is addressed during most primary care visits, it may result in a patient reporting tobacco advice activities that happened at prior visits rather than the index visit with which the report is being compared. In addition to conducting the survey within 48 hours of the visit, the survey administrator oriented the patient to the visit for which the questions pertained, thus reducing the likelihood of the patient reporting about a different visit.

The implication of patient overreporting is that estimates of the frequency of the 5As relying on patient report is lower than might have been previously believed. Further, what patients recall as having been discussed seems to be less exact than our operational definition of each A, which suggests that efforts to refine the patient report items may be warranted. Research that clarifies patient ability to distinguish between offers of cessation assistance and arranging follow-up, for example, will be important if researchers and health systems need to rely on patient report of the 5As as a data source. Strategies in which patients are asked to listen to their own audio-recorded visits, are prompted to talk about what specifically happened at different points of the visit, and then reflect on ways to phrase survey questions that capture those specific activities could be a valuable approach to refine patient report measures of the 5As.

Conroy et al. [22] examined implementation of the 5As by patient report, clinician report, and medical record review, and found poor agreement between the three methods. They

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### Table 1. Sample characteristics (n=107)

| Variable                  | Value |
|---------------------------|-------|
| Female                    | 65 (61%) |
| Age (years)*              | 43.9 (12.5) |
| Race                      |       |
| White                     | 61 (59%) |
| Black                     | 27 (26%) |
| Other                     | 16 (15%) |
| Hispanic/Latino           | 20 (19%) |
| Education                 |       |
| Less than high school graduate | 22 (21%) |
| High school graduate or GED | 39 (37%) |
| Some college              | 29 (28%) |
| College graduate          | 15 (14%) |
| Self-reported health status |       |
| Excellent                 | 6 (6%) |
| Very good                 | 21 (20%) |
| Good                      | 36 (34%) |
| Fair                      | 27 (25%) |
| Poor                      | 17 (16%) |
| Cigarettes smoked per day | 11.8 (8.4) |
| Seeing regular clinician  | 87 (81%) |
| Reason for visit          |       |
| New illness or problem    | 25 (23%) |
| Continued care            | 47 (44%) |
| Well care, physical       | 28 (26%) |
| Other                     | 7 (7%) |

*The mean is given, with the standard deviation in parentheses.

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### Table 2. Inter-rater agreement and reliability

| Variable | Percent agreement | Kappa |
|----------|-------------------|-------|
| Ask      | 100               | 1     |
| Advise   | 90                | 0.78  |
| Assess   | 99                | 0.95  |
| Assist   | 95                | 0.89  |
| Arrange  | 97                | 0.84  |

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specifically found that the concordance between patient report and documentation in the medical record for specific 5A elements was very poor, with kappa ranging from 0.01 to 0.22, and patients reported 5A elements as occurring more frequently than documented in the medical record. However, this study does not clarify if the lack of concordance is overreporting on the part of the patient or lack of documentation in the medical record.

The low positive predictive value of arrange in this study is somewhat puzzling. This implies that when the physician does accomplish arrange, the patient has a low likelihood of reporting that it occurred. This is interesting because arrange is the only A that points to a concrete action to be taken in the future. It could be that patients are more attuned to the As that are discussion based and are selectively ignoring this action-based step.

This study is important because it provides evidence about the direction and magnitude of measurement error of relying on patient report of smoking cessation discussions. The study is unique in its use of audio recording, detailed assessment of the 5As, and patient report of the 5As, and it adds to the few other studies that have examined multiple methods to assess delivery of tobacco advice [22, 23]. However, a few study limitations are worth noting. The main limitation of the study is the sample size of 107, which inhibits our ability to examine patient and visit characteristics that are associated with the accuracy of patient reporting. Replication of this study with a larger sample, coupled with examination of patient and visit characteristics associated with inaccurate reporting, could inform future decisions about when patient report might be an acceptable method.

Further efforts to establish accurate methods to document the 5As or other indicators of the delivery of tobacco assessment and assistance advice are important, both to inform current performance and to evaluate interventions to improve tobacco cessation advice in the primary care setting. Studies have largely relied on patient report [24–29], clinician report [25–28, 30, 31], or medical record review [15, 25, 26, 32, 33]. Underreporting of tobacco cessation advice in the medical record has been identified as a limitation of this method [15, 22, 23]. Recent advances in the methods to comprehensively search the medical record to assess the delivery of the 5As for tobacco cessation were reported by Williams et al. [14]. The approach included assessment of the progress notes, patient education materials printed for the patient, and data linked to the encounter, including vital signs, diagnoses, procedures ordered, and medications [14]. While substantially more comprehensive in capturing the ways in which tobacco advice might be documented by clinicians versus relying on discrete fields to indicate completion of each of the 5As, this approach was time intensive to acquire and code the data. Additional research that compares this comprehensive electronic health record approach with other methods, including audio recording and patient report of the 5As, would greatly inform the accuracy of this medical record audit method and could inform a more streamlined and automated approach.

In conclusion, patient report of the 5As for smoking discussions is acceptably accurate for when the activity happens but is not sufficiently accurate for reporting when a 5A activity does not happen. Investigators should carefully consider

| 5As task | Direct observation | Patient report | Sensitivity (%) | Specificity (%) | PPV (%) | NPV (%) |
|----------|--------------------|----------------|----------------|----------------|---------|---------|
| Ask      | 99 93              | 99 93          | 93             | 92             |
| Advise   | 83 78              | 95 89          | 94             | 29 82 58      |
| Assess   | 95 89              | 92 90          | 96             | 50 93 60      |
| Assist   | 75 70              | 86 80          | 91             | 44 79 67      |
| Arrange  | 12 11              | 43 41          | 83             | 65 23 97      |

NPV, negative predictive value; PPV, positive predictive value.
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the reporting source when measuring the provision of tobacco cessation advice.

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Conflicts of interest
The authors declare no conflicts of interest.

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