



## Short communication

## A research coding method to evaluate a smoking cessation model for training residents—A preliminary report

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## ABSTRACT

**Objective:** Develop a reliable coding method of a cigarette cessation model used to train residents – a preliminary report.**Methods:** Two trained (30 h) undergraduates coded videotaped interviews from 161 resident-simulated patient (SP) interactions. To establish reliability, coders coded 33 (20%) of 161 study set tapes for the BHTM. Cohen's Kappa and percent of agreement were used to measure coders' reliability in unitizing and coding residents' skills for eliciting 5 variables: Educating, Informing, and Motivating (3 items); Commitment and Goals (3 items); Negotiate Plan (7 items); Patient-Centered Skills (9 items); Emotional Skills (6 items).**Results:** 50 items were dichotomized a priori from analysis of the training model and were reduced to 28 during training. Kappa ranged from 0.73 to 0.87 for the 5 variables and 28 individual items. The overall kappa was 0.84, and percent of agreement was 93%. Percent of agreement by item ranged from 82 to 100%.**Conclusions:** A highly reliable coding method, weighted (by no. of items) to highlight the key elements of the teaching, is recommended for investigators wishing to better focus on the partnership, emotions, and planning.**Practice implications:** This is a unique way to integrate patient-centered skills into motivational interviewing.

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## 1. Introduction

Although declining from 20.9% in 2005, the Center for Disease Control and Prevention reported that, in 2015, 15.1% of adults over 18 years of age currently smoked cigarettes. Smoking is the leading cause of preventable disease and death in the U.S., accounting for >480,000 deaths yearly, one of every five deaths, and >16 million Americans live with a smoking related disease [1]. Efforts to train clinicians to encourage patients to stop smoking have had variable results, several studies disappointing [2].

We are conducting a 5-year trial testing the training of residents in many facets of behavioral health, one of which is smoking cessation [3]. For this, we needed a measure to evaluate the success of residents' learning a method that integrates patient-centered and motivational interviewing principles [4,5]. The method, summarized in Table 1, provided greater emphasis on patient-

centered skills and on planning than most motivational interviewing approaches [4–pp. 147–151].

This paper reports our development of a coding procedure to evaluate this teaching method. We reviewed a number of existing measures of motivational interviewing, reviewed in Discussion, but we sought higher reliabilities and a method undergraduates could code. We also wanted to identify specific key behaviors, the presence or absence of which could be used in providing feedback to learners. These issues led us to dichotomize specific behaviors to be coded as present or absent. To avoid the loss of information that can attend yes/no responses, we weighted the key variables with greater numbers of items.

## 2. Methods

## 2.1. Design, setting, and participants

The research team videotaped residents once interviewing standardized patients (SP) in a modern simulation center. Residents (n=161) were primarily international graduates (n=89/161, 55%) and male (n=93, 58%). The ethnicity was Asian

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**Table 1**  
Smoking Cessation Model, Abbreviated (From Laminated Card Provided to Residents).

<b>INFORM AND MOTIVATE TO QUIT SMOKING</b>	
<p><b>Education</b></p> <ol style="list-style-type: none"> <li>1. <b>ASK</b> – “What’s Your Understanding”               <ol style="list-style-type: none"> <li>a. Is there a problem with smoking</li> <li>b. What is the problem</li> </ol> </li> <li>2. <b>TELL</b> –               <ul style="list-style-type: none"> <li>• “There are Bad Outcomes”                   <ol style="list-style-type: none"> <li>a. Cancer, COPD, CVD, premature death/disability</li> <li>b. Non-medical (cost, ostracism)</li> </ol> </li> <li>• “You need to quit”                   <ol style="list-style-type: none"> <li>c. Need to quit completely</li> <li>d. Help available (you, medications, groups)</li> <li>e. Treatment works</li> </ol> </li> <li>• “You can do it”                   <ol style="list-style-type: none"> <li>f. Capacity to change</li> <li>g. Past failures don’t mean anything</li> </ol> </li> </ul> </li> <li>3. <b>ASK</b> – “Please summarize what you’ve heard”</li> </ol> <p><b>Commitment</b></p> <ol style="list-style-type: none"> <li>1. <b>ASK</b> – “Are you committed to treatment”</li> <li>2. <b>TELL</b> – “You need to be active, I can’t do by myself”</li> <li>3. <b>ASK</b> – “Please summarize your commitment”</li> </ol> <p><b>Goals</b></p> <ol style="list-style-type: none"> <li>1. Obtain <i>long-term goals</i> → achieve via Plan (next)</li> </ol> <p><b>Negotiate Plan</b></p> <ol style="list-style-type: none"> <li>1. <i>Determine</i> present smoking behaviors in detail</li> <li>2. <i>Negotiate</i> <ol style="list-style-type: none"> <li>a. Changes in specific behaviors</li> <li>b. Bupropion, nicotine replacement, varenicline</li> <li>c. Group work</li> <li>d. Exercise &amp;/or relaxation program</li> <li>e. Follow-up visit with you</li> </ol> </li> <li>3. Have <i>patient summarize</i> treatment plan</li> <li>4. <i>Praise</i> patient for commitment</li> </ol>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>ASK for EMOTIONS and use NURS at each</b></p>

COPD = chronic obstructive pulmonary disease; CVD = cardiovascular disease; NURS = Naming the emotion; Understanding the emotion; Respecting the emotion; Supporting the emotion.

(n = 71, 44%), Caucasian (n = 57, 35%), Black (n = 5, 3%), Hispanic/Latino (n = 1, < 1%), and another race or ethnicity (n = 27, 17%). At the time of data collection, resident’s training level ranged from 0 to 3 years. There were 12 SPs: 8 female, 4 male; 11 Caucasian, 1 black. SPs ranged in age from 38 to 58 years. The present report is part of a larger study comprising three interviews [3]; only the smoking cessation interview is reported here. Training of SPs initially included 20 h, with approximately 6.5 additional hours of training/year to ensure fidelity. Scenarios, instructions, and scripts provided to SPs are available from the authors. The university Institutional Review Board approved this project.

## 2.2. Procedure

We constructed a scenario that SPs portrayed in a 15 min interaction to test 161 residents’ skills with a Smoking Cessation Model (Table 1). Each interview occurred in a modern simulation center and was allotted 15 min. The authors trained two undergraduate students, independent of the study, to rate resident-SP interactions. Over two months, the authors met two times per week with coders for a total of 30 h. Pilot videotapes were used to train coders. Videotapes were reviewed in person, and coding agreements were reached by discussing discrepancies in coders’ identification of the content and ratings until there was

clarity on definitions. Once trained, coders required approximately 30 min per, on average, 12 min videotapes (range 6–15 min). Coders first reviewed the tape in its entirety and then a second time to ensure quality ratings.

## 2.3. Instrumentation

We structured our coding procedure to reflect the Smoking Cessation Model in Table 1 [4–pp. 147–151]. It is derived from a rich literature in patient-centered interviewing and motivational interviewing [4,6]. The authors identified as many ways as possible that we might dichotomously depict the skills in the model. After several iterations and removal of confusing and redundant items, we identified 50 yes/no items. During rater training, we excluded 22 additional items, retaining the 28 items where coders consistently agreed with each other and with our conceptual and operational definitions; see Table 2 for the coding sheet.

We created five variables, and the 28 variable items were assigned in proportion to their importance in the basic Smoking Cessation Model (Table 1). The 5 coding variables were: 1) Educating, Informing, and Motivating (3 items); 2) Commitment and Goals (3 items); 3) Negotiate Plan (7 items); 4) Non-Emotion Patient-Centered Skills (9 items); and 5) Patient-Centered Emotional Skills (6 items). The first three variables contain items that

**Table 2**  
Coding Sheet for Cigarette Cessation.

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Educating/Informing/Motivating	
1.	Determines patient's understanding of importance of quitting (0 = No, 1 = Yes)
2.	Informs patient of harmful outcomes from smoking – can be Yes only if #1 is Yes (0 = No, 1 = Yes)
3.	Motivates by discussing capacity for change or that past failures do not bode poorly (0 = No, 1 = Yes)
Commitment and Goals	
4.	Determines readiness and/or commitment (0 = No, 1 = Yes)
5.	Asks patient to summarize decision to stop (0 = No, 1 = Yes)
6.	Asks for long-term goals (0 = No, 1 = Yes)
Negotiate Plan	
7.	Asks choice of treatment at some point, or gives patient option to think about different treatments option (0 = No, 1 = Yes)
8.	Applies some specific time element ("one month or less) to quitting or tapering (0 = No, 1 = Yes)
9.	Suggests changes in specific smoking behaviors (0 = No, 1 = Yes)
10.	Mentions medications: bupropion; nicotine replacement (gum; patch); varenicline; other (0 = No, 1 = Yes)
11.	Mentions group work, exercise program, relaxation program, or other types of treatment (such as psychotherapy) (0 = No, 1 = Yes)
12.	Arranges for an explicit contact in future, usually a follow-up visit, regarding cigarette cessation (0 = No, 1 = Yes)
13.	Summarizes treatment plan (patient or doctor) (0 = No, 1 = Yes)
Patient-centered Non-Emotion Related Skills (at start, middle, end)	
14.	Sets agenda in first 5 min, such as asking if there is "anything else" (0 = No, 1 = Yes)
15.	Open-ended beginning on items raised (0 = No, 1 = Yes)
16.	Uses open-ended skills to elicit personal issues around smoking or other personal, non-emotional, issues: Echoing (0 = No, 1 = Yes)
17.	Uses open-ended skills to elicit personal issues around smoking or other personal, non-emotional, issues: Requests (0 = No, 1 = Yes)
18.	Uses open-ended skills to elicit personal issues around smoking or other personal, non-emotional, issues: Summarizes (0 = No, 1 = Yes)
19.	Uses indirect skills: "impact on self" statement (0 = No, 1 = Yes)
20.	Uses indirect skills: "impact on others" statement (0 = No, 1 = Yes)
21.	Uses indirect skills: "beliefs/attributions" statement (0 = No, 1 = Yes)
22.	Uses indirect skills: "self-disclosure" statement (0 = No, 1 = Yes)
Patient-centered Emotion Related Skills	
23.	Asks "How does that make you feel?" type question (0 = No, 1 = Yes)
24.	Names an emotion (any mention of any emotion counts here) – can be Yes only if #23 is Yes (0 = No, 1 = Yes)
25.	Expresses understanding of difficulty stopping or of an emotion (0 = No, 1 = Yes)
26.	Acknowledges difficulty with treatment or of plight related to emotional problem (0 = No, 1 = Yes)
27.	Praises interest in smoking cessation problem or response to emotion (0 = No, 1 = Yes)
28.	Discusses support from any source (0 = No, 1 = Yes)

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reflect the standard components of motivational interviewing in our teaching model [6], although concerns have been expressed about how effective planning is done [7]. The last two variables and their items are parts of our model sometimes less emphasized in motivational interviewing, the patient-centered approach. *Educating, Informing, and Motivating* requires the interviewer to first inquire about the patient's understanding and only then provide information and motivating statements. *Commitment and Goals* require requesting that the patient actually verbalize both commitment to quit smoking and goals they have in doing this. *Negotiate Plan* addresses sharing decisions about treatment, evaluation of specific smoking behaviors, and arranging specific follow-up as well as providing specific treatment options. *Patient-Centered Non-Emotion-Based Skills* comprise agenda-setting, beginning open-ended, and using 7 different open-ended skills. *Patient-Centered Emotion-Based Skills* require specifically asking about an emotion, whether related to smoking or not, naming an elicited emotion, expressing understanding of it, acknowledging the patient's plight or praising them, and indicating support for the emotional issue from the interviewer or others. A codebook is available from the authors.

#### 2.4. Statistical analysis

Cohen's Kappa measures the inter-rater reliability coefficient that takes chance agreement into account [8]. To establish inter-rater reliability, newly trained coders independently rated 33 (20%) randomly selected videotapes from the study set of 161 total tapes. Once inter-rater reliability was established, coders discussed all disagreements and recoded. Percent of agreement was calculated for each item, variable, and overall.

### 3. Results

Kappas for each variable were: *Educating, Informing and Motivating* = 0.858; *Commitment and Goals* = 0.776; *Negotiate Plan* = 0.790; *Patient-Centered Skills* = 0.726; and *Patient-Centered Emotional Skills* = 0.868 (see Table 3). The overall percent of agreement for all items was 92.9%, and percent of agreement for each item ranged from 81.8–100%.

### 4. Discussion, conclusion, and practice implications

#### 4.1. Discussion

We describe a highly reliable coding method for evaluating medical residents' deployment of a teaching method to encourage smoking cessation. The method is based on motivational and patient-centered interviewing principles. Using a specific skills-based coding procedure, we sought to identify use/nonuse of skills using a dichotomous coding format, weighting key variables of the teaching method (patient-centered non-emotion- and emotion-based skills and negotiating a plan) by using greater numbers of items.

Our review considered several well-studied measures, but they did not fit the needs of this study because of uneven reliabilities [9–15] and their inability to capture fully the patient-centered and planning aspects of our method [7]. From early experiences with motivational interviewing [6], there has been considerable effort to accurately measure adherence to smoking cessation interventions [12,16]. The Motivational Interviewing Skills Code (MISC) differed from earlier measures by containing actual counts of behaviors used in motivating patients [17]. Moyers et al. then

**Table 3**  
Statistical Results for all Smoking Cessation Interview Variables and Items.

No.	Item	Percent of Agreement
Educating, Informing, and Motivating (Kappa = 0.858)		
1	Determines patient's understand of importance of quitting	90.9
2	Informs patient of harmful outcomes from smoking	100
3	Motivates by discussing capacity for change	87.9
Commitment and Goals (Kappa = 0.776)		
4	Determines readiness and/or commitment	84.8
5	Asks patient to summarize decision to stop	96.9
6	Asks for long-term goals	90.9
Negotiate Plan (Kappa = 0.790)		
7	Asks choice of treatment, or gives patient some treatment option	90.9
8	Applies some specific time element to quitting/tapering	81.8
9	Suggests changes in specific smoking behaviors	90.9
10	Mentions medications: bupropion; nicotine replacement; varenicline; other	96.9
11	Mentions group work/exercise program/relaxation program/other types of treatment (e.g. psychotherapy)	96.9
12	Arranges for an explicit contact in future	87.9
13	Summarizes treatment plan (patient or doctor)	81.8
Patient-Centered Non-Emotion-Based Skills (Kappa = 0.726)		
14	Sets agenda in first 5 min	93.9
15	Open-ended beginning on items raised	84.8
16	Uses "echoing" statement	93.9
17	Uses "request" statement	90.9
18	Uses "summarizing" statement	100
19	Uses "impact on self" statement	100
20	Uses "impact on others" statement	96.9
21	Uses "beliefs/attribution" statement	100
22	Uses "self-disclosure" statement	93.9
Patient-Centered Emotion-Based Skills (Kappa = 0.868)		
23	Asks about some type of feeling	93.9
24	Names an Emotion	93.9
25	Expresses understanding of difficulty stopping smoking or of another emotion	93.9
26	Acknowledges difficulty with treatment or of another emotional problem	90.9
27	Praises interest in smoking cessation problem or response to emotion	100
28	Discusses support from any source	93.9

developed a refinement of the MISC, The Motivational Interviewing Treatment Integrity (MITI) scale for practical use as well as research [18]. In addition to providing counts of behaviors it addressed empathy on a global scale; while they deemed reliabilities acceptable, they also acknowledged they were quite uneven [10,13,14,18]. The revised MITI 4 included counts of ten behavioral items but five of them had intraclass correlations <0.7 [9]. For our large study, we dichotomized items to ensure higher reliabilities, our kappas varying from 0.73 to 0.87. If our hypothesis that residents effectively learn the smoking cessation model is confirmed, we have some evidence our coding procedure also is valid. We also wanted a coding method with more than 10 items to capture the patient-centered/partnership and planning dimensions important to our training method. A further advantage of our method was its base in an evidence-based patient-centered interview [4,19–21].

As a new coding procedure, there are several limitations. With its very acceptable reliabilities, this does not mean it is valid. Validity testing is the next step. When the larger study is completed, data will be available to compare pre/post coding of residents' interactions with pre/post measures of residents' self-efficacy and with simulated patients' satisfaction [3]. Further, it is possible that better results can be obtained using professional coders. As well, only residents and simulated patients were studied, so that future study will want to employ other learners and real patients. Finally, it will be important to compare this yes/no coding method to other methods of evaluating motivational and patient-centered interviewing approaches to cigarette cessation.

#### 4.2. Conclusion

A highly reliable coding method of motivational interviewing is recommended if an additional focus on patient-centered and planning components is believed important.

#### 4.3. Practice implications

This is a unique way to better integrate patient-centered interviewing into motivational interviewing.

#### Conflict of interest

The authors have no actual or potential conflict of interest, including any financial, personal, or other relationships, with other people or organizations within three years of beginning the submitted work that could inappropriately influence or be perceived to influence this work.

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