

# SEMIOTICS OF 'NONCOMPLIANT' PATIENT

Charulata Ramaprasad

*University of Chicago, 5841 S. Maryland Avenue, Chicago, IL 60637, U.S.A.*

Arkalgud Ramaprasad

*University of Illinois at Chicago, 601 S Morgan Street (MC 294), Chicago, IL 60607, U.S.A.*

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**Abstract:** 'Noncompliant' (NC) patient is a common label in medical records. While it encapsulates many dimensions of undesired patient behavior, the semiotics by which it is generated and applied is unclear: What data indicate noncompliance? How are the data analyzed and interpreted to label a patient as noncompliant? How does the label frame the physician's thinking? How does it affect the physician's diagnosis, treatment, instructions and actions? How does it affect medical outcomes? This lack of semiotic clarity can result in medical errors. We provide a framework (a) for conceptualizing the semiotics of NC, and (b) to understand the sources of potential medical errors. We illustrate the framework with a case study. The framework can be used to manage noncompliance effectively and reduce medical errors, especially with EMRs.

## 1 INTRODUCTION

'Noncompliant' (NC) patient is a common label in medical records. Noncompliance, from which the NC label is derived, is of major concern in medical care. It "is a value-laden term, heavily weighted against the patient who, by definition, refuses to yield or conform to doctor's advice." (Hill, 2004, p. 2004) It can diminish the effectiveness of the most efficacious course of treatment, and the efficiency of medical care delivery (Cleemput & Kesteloot, 2002; Reach, 2008). It is a pervasive problem affecting almost all types of care and populations (Rosner, 2006). This paper explores the translation (a) of noncompliant behavior to the NC label in a medical record, and (b) of the effect of NC label in medical practice.

Labeling a patient NC almost invariably implies that the patient does not have a good reason for his/her behavior – that the behavior is irrational and difficult to manage. In contrast, recognition that a patient has been noncompliant occasionally but for 'good reason' – he stopped his anti-hypertensives because he lost his insurance coverage for medications, she does not exercise because her neighborhood is unsafe, he does not follow instructions for his colonoscopy because he is illiterate – allows one to attempt to fix the problem.

Noncompliance encapsulates many dimensions of patient behavior which can be summarized in a simple ontology (Figure 1) constructed from the literature. The ontology has six dimensions of noncompliance: (a) Visits, (b) Medications, (c) Tests, (d) Procedures, (e) Lifestyle, and (f) Administration. Each dimension has a list of possible categories of noncompliance. In visits, for example, a patient may be noncompliant in one or more of the component categories: preparation for the visit, interaction during the visit, follow-up actions, and scheduling. A patient's noncompliance profile would be the aggregate of his or her noncompliance on the categories within all the dimensions. The aggregation is indicated by the [+]  
sign between the columns in the ontology.

Patients may have different noncompliance profiles. Some may be simply noncompliant in taking the right medication dose. Some, on the other hand, may be noncompliant on many categories of many dimensions. Thus, a patient may be noncompliant in visit preparation, medication refills, test follow up, and diet lifestyle. The ontology encapsulates a very large number of possible profiles. It is likely that only some will result in the patient being labeled NC. This paper addresses the process by which the noncompliance profiles are translated into the NC label for a patient. Patient noncompliance has to be

		Noncompliance Dimensions						
		Visits	Medications	Tests	Procedures	Lifestyle	Administration	Explanatory Factors
[Noncompliance in]		Preparation	[+] Administration	[+] Preparation	[+] Preparation	Diet	[+] Payments	[due to]
		Interaction	Dosage	Conduct	Interaction	Exercise	Paper work	
		Follow up	Refill	Follow up	Follow up	Tobacco		
		Schedule	Schedule	Schedule	Schedule	Alcohol Monitoring		
								Patient factors Treatment factors Lifestyle factors Demographic factors Sociodemographic factors Psychosocial factors

Figure 1: Ontology of Patient Noncompliance.

understood in the context in which it occurs. Sometimes there may be good reasons for a patient’s noncompliance as mentioned earlier. The explanatory factors for noncompliance are listed as a separate dimension with six categories based on Rosner (2006). They are (a) Patient factors, (b) Treatment factors, (c) Lifestyle factors, (d) Demographic factors, (e) Sociodemographic factors, and (f) Psychosocial factors. This dimension is connected to the others by the phrase ‘due to’, as shown in Figure 1. A detailed list of the subcategories of explanatory factors is given by Rosner (2006).

The ontology can be extended and refined by modifying the dimensions and the categories within them. Some dimensions in the ontology may not fit some contexts – the Procedures dimension may not fit a non-surgical context. Or, a specific subcategory of explanation such as lack of transportation may be required for rural patients. Once the ontology has been adapted to a context it can be used to profile a patient’s noncompliance and the factors which explain it. It can also be used to modify physician and patient behavior in a way that satisfies both parties.

We will use the ontology as a framework for discussing the semiotics of labeling a patient NC.

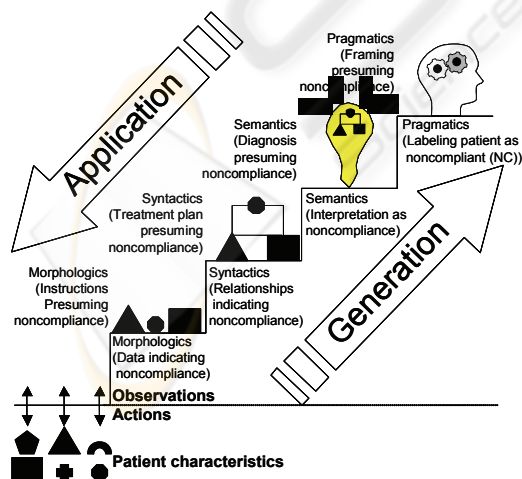


Figure 2: Semiotics of ‘Noncompliant’ Patient.

The paper is focused on two questions: How is a patient labeled NC? How can the label affect his or her medical care and hence medical outcome?

## 2 SEMIOTICS OF ‘NONCOMPLIANT’ PATIENT

Semiotics has a long history in medicine (Hess, 1998). It is the study of how information is generated about objects and applied to actions on them. This paper focuses on how noncompliance information is generated about patients and applied to their medical care. Generation and application are the two phases of the semiotic cycle as shown in Figure 2. Each phase is sequential and has four steps – morphologies, syntactics, semantics, and pragmatics. The sequence of these steps in application is the opposite of that in generation as shown in Figure 2 (Ramaprasad & Ambrose, 1999; Ramaprasad & Kashyap, 2008; Ramaprasad & Rai, 1996; Stamper, 1973).

In generating the label NC for a patient, morphologies is the process of obtaining data indicating noncompliance; syntactics is the process of discovering relationships within the data indicating noncompliance; semantics is the process of interpreting the relationships as noncompliance; and pragmatics is the process of labeling the patient as NC. In application of patient’s NC label, pragmatics is framing the problem presuming noncompliance; semantics is the diagnosis presuming noncompliance; syntactics is the treatment plan presuming noncompliance; and morphologies is the instructions presuming noncompliance.

Consider, for example, a young male unemployed patient who has missed a few follow up visits over five years, has not refilled his medication intermittently during an unknown period, continues to smoke, and is delinquent on payments. Is he a NC patient or simply a patient who has been noncompliant occasionally?

One cannot answer the questions without collecting data from a number of sources, in different locations, on different media, in varying

formats, over a long period of time – corresponding to the dimensions and categories in the ontology (Figure 1). Even then, the data may neither be complete nor accurate (Smith et al., 2005). It may be difficult, time consuming and costly for a person to systematically analyze the data to generate a profile, interpret the profile, seek explanations, and make a reasoned judgment whether he is NC or not. A comprehensive EMR could reduce the time, effort, and cost it takes to document reasons for noncompliance and disseminate that information to other members of the medical team to whom it is relevant (social workers, for instance). In its absence, the health care provider will likely make an intuitive judgment based on limited data about noncompliance behavior, its analysis, interpretation, and possible explanations. Even with an EMR, if it lacks the prompts necessary for an investigation into the reasons that underlie noncompliance, the NC label will be generated and recorded and is likely to be applied without further validation or investigation. It is no more ‘as if’ the patient is noncompliant, the patient ‘is’ NC. The label is attributed to the patient – the patient becomes NC (Ramaprasad, 1987). Any nuances in the patient’s noncompliance and possible explanations for such behavior are also lost in the shadow of the NC label.

It creates a prospective expectation of noncompliance. Further, the label is propagated in the records without question or revalidation. EMRs render the propagation easy and efficient with their ability to ‘copy-and-paste’ (Hirschtick, 2006). The incorrect labeling may be an unintended error, but an error nonetheless (Ash, Berg, & Coiera, 2004).

Once labeled NC, future interactions with the patient will likely be framed with the presumption of general noncompliance, not necessarily of a specific type or for a particular reason. As a consequence, the diagnosis, treatment plan, and instructions will likely presume noncompliance too. This presumption can lead to medical errors in a number of ways – less attention may be paid to the diagnosis, treatment plan, and instructions due to lower expectations of the desired outcome or a less than optimal path of action may be chosen to accommodate the prospective noncompliance. These may be preventable rational errors (Federspil & Vettor, 2008).

In the following we illustrate the semiotics of NC patient with a case study conducted by the primary author in a major urban hospital. Subsequently, we analyze the case using the above framework and suggest how similar errors can be avoided in the

future. In conclusion, we discuss how EMRs can incorporate semiotics to avoid incorrect and inappropriate NC labeling and its consequent errors.

### 3 CASE STUDY

A 19 year old male with a three-year history of Crohn’s Disease (CD) was hospitalized in July 2005 with abdominal pain and pneumaturia (Figure 3, Hospitalization #1). He had visited the emergency room (ER) once and the outpatient clinic twice before his hospitalization. In the intake history for the hospitalization he was noted to be NC. The patient was diagnosed with a fistula, treated and released with specific follow-up appointments scheduled and a documented treatment plan. He kept the follow-up appointments with the pharmacy (1 visit) and the outpatient clinics (3 visits).

About one month later he was readmitted to the hospital (Hospitalization #2) with back, flank and abdominal pain. He was again labeled NC. Physical examination revealed fever, high heart rate and low blood pressure. Imaging of the abdomen demonstrated multiple abscesses in the muscles of the abdomen and back as well as in the kidney. The hospital course was complicated by a staphylococcal blood stream infection. Despite the findings, which typically require weeks to months of intravenous therapy, the patient was discharged with seven days of oral antibiotics and no scheduled follow-up appointments.

Two months later the patient was admitted for the third time (Hospitalization #3) with abdominal pain and frank bleeding from the gastrointestinal tract. He was again labeled NC. Abdominal imaging revealed enlargement of the previously noted abscesses and multiple new abscesses. Surgical intervention was discussed but due to a family emergency the patient requested discharge and readmission. Three days of antibiotics were provided to the patient, as were readmission papers for the following week. No follow-up appointments were arranged.

Again two months later the patient was admitted for the fourth time (Hospitalization #4) with severe abdominal pain, nausea, vomiting, and inability to

walk. In the two months he had (a) come to the ER once and left before being treated, (b) been turned away by the admitting office, and (c) been treated once as a urology outpatient. The previously demonstrated abscesses were larger and several new

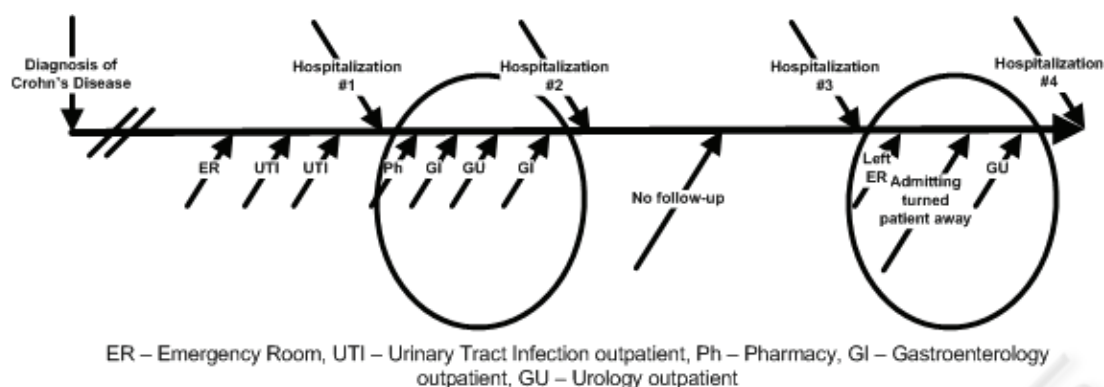


Figure 3: Schematic Timeline.

ones were present. Surgery was planned, but the patient expired suddenly prior to surgical intervention. The cause of death was sepsis due to persistent abdominal abscesses.

The patient's social history had been recorded during Hospitalization #3. He had no relationship with his parents, lived with his sister 14 miles from the hospital, and was the primary caregiver for his niece. He had 7<sup>th</sup> grade education, was unemployed, and had no insurance. He was noted as suffering from depression but had not received psychiatric care or medication.

#### 4 ANALYSIS

Three critical questions arise in assessing the effect of NC on this case. First, why was this patient repeatedly labeled NC? Second, what factors contributing to noncompliance could have been addressed, had they been recognized? Third, what impact did the NC label have on the care provided to this patient?

Ascertaining the specific reason the patient was labeled NC during his initial hospitalization for CD is difficult. The patient was young and often emotional, which may have contributed to the labeling – but was there data to indicate noncompliance?

Prior to the patient's Hospitalization #1 he was seen three times (in the ER or ambulatory care setting). After the Hospitalization #1, he presented to the pharmacy to fill prescriptions and to all of his scheduled clinic appointments (circled in Figure 3). After the Hospitalization #2 he did not follow-up in the outpatient clinic. Recall, however, that no follow-up appointments were provided. After Hospitalization #3 (during which he was discharged

early due to a family emergency), he attempted to get care in the ER but left due to a long wait; he returned to admitting with his admission papers and was turned away; he was seen in follow-up clinic with abnormal vital signs but was sent home (circled in Figure 3).

Why, given the above data, was this patient persistently labeled NC? Follow-up care is only one aspect of compliance. A strong suspicion of medication noncompliance was noted in the patient's chart. Assuming this was the reason for the NC label, what explanatory factors related to noncompliance could have been addressed?

Could the demographic and lifestyle factors, noted during Hospitalization #3, have contributed? It is known that family structure leads to improved medication compliance in adolescents (Mackner, Crandall, & Szigethy, 2006). Furthermore, patients with CD have a higher lifetime prevalence of depression than those without CD and depression is a risk factor for medication NC (DiMatteo, Lepper, & Croghan, 2000; Kurina, Goldacre, Yeates, & Gill, 2001).

Did the label of NC affect the quality of care this patient received? The most obvious ways in which the NC label affected this patient's care relate to the suboptimal treatment plans developed for this patient. Lack of appropriate instruction to this patient is its corollary. Surveys administered to CD patients indicate that almost all CD patients desire more information about their disease (Jones, Gallacher, Lobo, & Axon, 1993; Scholmerich, Sedlak, Hoppeseyler, & Gerok, 1987). However age and grade appropriate information was not provided to this patient.

The semiotic process appears to have failed the patient at almost every step:

- Generation morphologies – There is no evidence of noncompliance data being collected

systematically prior to labeling the patient NC. These data and potential explanatory factors were available.

- Generation syntactics – There is no evidence of the noncompliance data being systematically analyzed to profile the patient's noncompliance and its relation to patient's social history.
- Generation semantics – There is no evidence of the interpretation of the profile logically as indicating NC.
- Application pragmatics – The label NC was applied and propagated without investigation. There were enough data to raise doubts about the patient's NC label.
- Application semantics – It is doubtful that the NC label affected the pre-existing diagnosis in this case.
- Application syntactics – The shortcomings of the treatment plan cannot be unequivocally attributed to the NC label. It is a possibility.
- Application morphologies – The shortcomings of the follow-up instructions cannot be unequivocally attributed to the NC label. It is a possibility.

In the concluding section we discuss briefly how the semiotics of 'Noncompliant' patient can be managed more effectively and efficiently.

## 5 CONCLUSIONS

The semiotics of NC is as important to analyzing the case as the failure of the systems which supported it. It was an avoidable error which instead of being corrected by available accumulating evidence to the contrary, persisted on paper and in the EMR. The evidence, apparently, was not analyzed and interpreted – the clinicians along the chain were neither alerted nor possibly motivated to do so.

Noncompliance was not seen as a hypothesis to be tested, among many other clinical hypotheses, at each stage; it was seen as a conclusion. The label NC became a reality instead of the noncompliant behavior remaining simply a possibility with explanation. While framing the patient as NC could have affected his treatment and instructions the effects of such framing are yet to be established (McGettigan, Sly, O'Connell, Hill, & Henry, 1999).

The permanence of a patient's health information is a key strength of the EMR – ideally it should be available and accessible every time everywhere. Information not only persists in these records for ever but can also be propagated everywhere. For

'good' information these properties are extremely desirable; for 'bad' information they can be extremely dysfunctional. Unless the systems have the cognitive (Patel & Bates, 2003) ability to recognize and correct the errors, and expunge them from everywhere the record has been propagated, these errors can cumulate over a person's lifetime.

This requires the system to be semiotically self-reflective and thereby self-corrective, but also to be available to the patients or their designees to focus their cognitive faculties upon the problem to allow them to question and correct it. They could provide a profile of noncompliance instead of propagating the NC label.

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