Chapter 9
An Example of Defining Patient Compliance

Christiana Petrou
University of Louisville, USA

ABSTRACT
This case examines the issue of compliance by patients at the University of Louisville School of Dentistry (ULSD). The focus is defining compliance and constructing a measurement scale. Confidence interval estimation and bootstrapping were explored to assist with the allocation of patients to compliance levels. Patients who were within the 95% confidence interval of the median for visit intervals at least 80% of the time were defined as fully compliant, with decreasing levels of compliance as the percentage decreases. Research on compliance has developed over the past few years, but a lot of work still needs to be done. A new measure of compliance could assist in understanding the patients’ needs and concerns other than the obvious financial, fear and psychological reasons as well as shedding some light on the way dentists operate and how that affects compliance. A new way of defining and measuring compliance is proposed in this research study.

BACKGROUND
Formally, compliance is defined to be “either a state of being in accordance with established guidelines, specifications, or legislation, or the process of becoming so” (Data Management, 2005). In 1980, 30 practicing orthodontists were asked to list specific behaviors of patients (mostly adolescents) that they viewed as indicative of compliance or noncompliance. The result was a list of 10 patient behaviors that were frequently considered in evaluating patient cooperation:

1. arrives late and/or breaks appointments
2. has parents who are observed to be indifferent to treatment
3. acts withdrawn; shows no interest in treatment
4. has poor oral hygiene

DOI: 10.4018/978-1-61520-723-7.ch009
5. if patient has braces and the wires are distorted or has loose bands
6. complaints about treatment procedure
7. fails to cooperate in the use of headgear and/or elastics
8. demonstrates behavior that is hostile or rude
9. speaks of family problems or poor relationship with family; and
10. complains about mouth pieces for restorative purposes (Robertson and Maddux, 1986)

Although the above list pertains primarily to orthodontic treatment, it captures the essentials for a patient to be compliant. In a general aspect, the major variables that associate with compliance are age, sex, family, personality, attitude and education.

To define compliance is challenging; to measure it is even more challenging. Placing an evaluation number on how compliant a patient is requires a deep analysis of behavioral factors and unbiased attitudes. The more traditional approach to measuring compliance has been, as described by Demetriou, Tsami-Pandi and Parashis (Demetriou et al., 1995), to classify patients into groups (mainly four). The first group consists of patients who fail to return for a treatment or annual/semiannual checkup, the second group consists of patients who were in complete compliance based upon attendance for more than 80% of the recommended appointments, the third group includes erratic attendees; that is, they presented themselves less than 80% of the time for appointments. The fourth group consists of patients who showed up at least once, but then discontinued attendance.

Several groups can be added, if necessary, to increase the thoroughness of a study; for example, groups can be refined to examine patients’ compliance if they attended 60%, 40% and 20% of the scheduled appointments. Degree of compliance is estimated by adding the total number of appointments during the total time frame of a study and dividing by the number of scheduled visits the patient should have attended over the time period (Demetriou et al., 1995). There are also some general definitions that can be utilized. For example, patients who missed less than 30% of all prescribed maintenance visits were classified as complete compliers. Another definition is patients who went less than 2 years without a maintenance visit who are classified as complete compliers (Miyahoto et al., 2006).

A measure of compliance has been developed through the use of several questionnaires that are answered by patients. For example, Albrecht and Hoogstraten, (Albrecht and Hoogstraten, 1998) measured compliance at the general level and the dental level. General compliance, that is, the general tendency to adhere to medical recommendations, was determined with the General Adherence Scale, which is a five item questionnaire. Compliance on the dental level was measured by a questionnaire on oral health behavior (Albrecht and Hoogstraten, 1998). Research studies have also used a measure of compliance by which the dentists rate the patients on a scale with typically 1 being a poor complier and 9 being a very good complier (Robertson and Maddux, 1986). This definition; however, does not offer an objective definition since the compliance measure relies solely on the opinion of a dentist and not on behavioral data. This chapter will attempt to define a new definition of compliance that eliminates the factor of personal biasness.

**SETTING THE STAGE**

In most statistics studies, the central theme is to learn new information from the data. Data are generated daily in many fields such as healthcare and manufacturing, and they are in the form of numbers or text that can be useful in statistical analysis projects. What the statistician is interested in are the patterns, associations and relationships that exist within the data in order to make new statements regarding unknown facts and to pro-