Conceptualization and Measurement of Physiologic Health for Adults

Acne

Robert H. Brook, Kathleen N. Lohr,
George A. Goldberg, Daniel M. Berman,
Kenneth H. Applegate, Caren J. Kamberg

Rand

HEALTH INSURANCE EXPERIMENT SERIES

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Volume 2: Acne

Robert H. Brook, Kathleen N. Lohr,
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Rand

PREFACE

The Rand Health Insurance Study (HIS), funded by a grant from the U.S. Department of Health and Human Services, is a large-scale social experiment designed to assess how varying the patient's cost of health services affects his or her use of services, quality of care, patient satisfaction, and health status. It is also designed to study how the provision of services in either the fee-for-service system or a pre-paid group practice affects those same variables.

Nearly 8000 people in 2750 families were enrolled in the experiment in six sites across the United States: Dayton, Ohio; Seattle, Washington; Fitchburg, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina; and Georgetown County, South Carolina. The sites were chosen to represent the four Census regions of the country and an urban-rural mix, and to reflect variation in the amount of stress on the ambulatory medical care system (in terms of long or short delay for new and return appointments).

Families were enrolled in the HIS for either 3 or 5 years (approximately 70 and 30 percent, respectively). Low-income families were oversampled. Eligibility for participation in the HIS was broad; ineligible persons were mainly heads of households 61 years of age and older at the time of enrollment, members of the military, people confined to various institutions, and people eligible for Medicare. When families were enrolled, they agreed to assign their own health insurance benefits (if they were previously covered) to the HIS for the duration of their enrollment. Their policies were held in escrow and returned at the end of their participation. For persons who had not been previously insured, some coverage was obtained during the HIS and made available at the end of enrollment.

The families were assigned to one of 16 different insurance plans. For this purpose, a complex, unbiased allocation model was used to ensure that the assortment of families in each plan closely resembled that in every other plan in terms of 24 different demographic and socioeconomic variables. The 16 experimental plans were as follows:

One plan in which care is free to the family (i.e., 0-percent coinsurance).

Three plans with 25-percent coinsurance (i.e., the family pays 25 percent of its medical bills).

Three plans with 50-percent coinsurance.

Three plans with 50-percent coinsurance for dental and outpatient mental health services and 25-percent coinsurance for all other services.

Three plans with 95-percent coinsurance.

One plan with 95-percent coinsurance on outpatient expenditures up to a maximum out-of-pocket expenditure of \$150 per individual (\$450 per family) per year and no coinsurance above that; all hospital care is free on this plan.

One plan that assigns some Seattle participants to a prepaid group practice (Group Health Cooperative of Puget Sound).

One plan (a control group) that consists of a random sample of people already enrolled in the Seattle prepaid group practice who also meet the HIS eligibility requirements.

All plans except the first one and the last three have a ceiling on annual out-of-pocket expenditures by the family amounting to 5, 10, or 15 percent of annual family income. The maximum out-of-pocket expenditure per year per family is \$1000 for the 50- and 95-percent coinsurance plans and \$750 for the 25-percent plans. All plans have an identical, very comprehensive benefits package that covers ambulatory and hospital care, preventive services, all dental services except orthodontia, prescription drugs, certain over-the-counter drugs, most supplies and durable medical equipment, psychiatric and psychological services, and almost all other personal medical services, including those delivered by chiropractors and Christian Science healers.

Over the life of the HIS, data are collected on demographic and socioeconomic variables, health status, use of health services, satisfaction with and attitudes toward health care, and types of providers seen. The sources of health data include baseline interviews before enrollment, self-administered (or parent-completed) Medical History Questionnaires, biweekly Health Reports, annual Health Questionnaires, medical screening examinations, and claims submitted (chiefly by providers) for reimbursement for services rendered.

Comprehensive assessment of each person's health status occurs upon enrolling in the experiment, annually during the enrollment period, and upon leaving. As noted, a major HIS objective is to assess the effects of varying the cost of health services on the health status of individuals sampled from a general population. To this end, reliable, valid, and understandable measures are being specially developed or

adapted that will detect small but meaningful changes in the health status of enrollees.

HIS enrollment began in 1974. At the time of writing this Rand report series (R-2262-HHS), the HIS is still in progress. Enrollment data from all six sites are available and reported herein, but longitudinal (experimental) data are not yet available.

The volumes that constitute Rand report R-2262-HHS, which has the series title *Conceptualization and Measurement of Physiologic Health for Adults*, cover a wide variety of diseases and organ system defects, such as eyesight and hearing problems, cardiovascular and bronchopulmonary diseases (e.g., hypertension, chronic obstructive pulmonary disease), and surgery-related conditions (e.g., hernia, varicose veins). These are used to measure physiologic health, one of four conceptually distinct dimensions of health status defined for the HIS. The other three are physical, mental, and social health.

Volume 1 of this series is an overview of the HIS design. It includes a more detailed description of insurance plans and sites; a discussion of the health model adopted for the HIS, with particular emphasis on physiologic health; and notes on the statistical methods used to estimate the prevalence and level of effect of the various diseases and conditions in the HIS sample. The other, disease-specific, volumes of R-2262-HHS detail the suitability of these conditions as health status measures for the HIS, discuss important measurement issues, describe HIS techniques for determining the prevalence and personal impact of the conditions, give HIS enrollment results, and outline the disease-specific criteria for quality-of-care analyses for the HIS. These volumes report on enrollees aged 14 years and older. A companion series on the measurement of physiologic health among children under 14 years of age will also be published.

Different conditions have been selected for use in different age groups in the HIS population (see the list at the end of the Preface). For this reason, and because a few conditions have a relatively low prevalence in the general population under age 61, some findings and conclusions reported in the R-2262-HHS series are based on comparatively small numbers. Such conclusions should be generalized with caution.

Three other dimensions of health status—physical, mental, and social health—have been defined for the HIS, as has an integrative measure—general health perceptions. These measures are described in the eight volumes of R-1987-HEW, which has the series title *Conceptualization and Measurement of Health for Adults in the Health Insurance Study* and is a companion series to R-2262-HHS.

Detailed descriptive information about the Health Insurance

Study, including site and sample selection methods, can be found in *Vol. I, Model of Health and Methodology*, of the R-1987-HEW series, by John E. Ware, Jr., Robert H. Brook, Allyson Davies-Avery, Kathleen N. Williams, Anita L. Stewart, William H. Rogers, Cathy A. Donald, and Shawn A. Johnston. A synopsis of the health measurement strategy and enrollment results for these three health dimensions from the first site (Dayton, Ohio) appears in *Volume VIII, Overview*, by Robert H. Brook, John E. Ware, Jr., Allyson Davies-Avery, Anita L. Stewart, Cathy A. Donald, William H. Rogers, Kathleen N. Williams, and Shawn A. Johnston; this is also published as a Supplement to *Medical Care*, July 1979. Other volumes give more detailed methods and enrollment results for physical health in terms of functioning (Volume II), mental health (Volume III), social health (Volume IV), and general health perceptions (Volume V). More specialized analyses are covered in Volumes VI and VII on relations among health status measures and power analysis of the measures, respectively.

Measurement of these same health status dimensions for children under age 14 enrolled in the experiment is discussed in Marvin Eisen, Cathy A. Donald, John E. Ware, Jr., and Robert H. Brook, *Conceptualization and Measurement of Health for Children in the Health Insurance Study*, R-2313-HEW, May 1980.

Another Rand report series, *Conceptualization and Measurement of Health Habits for Adults in the Health Insurance Study*, contains information on two health habits being used by the HIS as proxy measures of future health status: smoking and overweight. These habits could conceivably be influenced by personal medical care, and the evidence strongly suggests that they have a serious effect on future morbidity and premature death. The series comprises two volumes, both by Anita L. Stewart, Robert H. Brook, and Robert L. Kane: Volume I, *Smoking*, R-2374/1-HEW, June 1979, and Volume II, *Overweight*, R-2374/2-HEW, July 1980.

A number of other Rand reports and publications discuss design and measurement issues related to the experiment. Currently the most up-to-date listing of HIS publications is given by Joseph P. Newhouse and Rae W. Archibald, *Overview of Health Insurance Study Publications*, P-6221, November 1978. The experimental design for estimating the effects of financing on demand for care is described in Joseph P. Newhouse, "A Design for a Health Insurance Experiment," *Inquiry*, 11:5-27, 1974; and in Joseph P. Newhouse, *The Health Insurance Study: A Summary*, R-965-1-OEO, March 1974. The structure of the experiment is reported in Lorraine Clasquin and Marie E. Brown, *Rules of Operation for the Rand Health Insurance Study*, R-1602-HEW, May 1977. Carl Morris describes the unbiased allocation model

for assigning families to insurance plans in "A Finite Selection Model for Experimental Design of the Health Insurance Study," *Journal of Econometrics*, 11:43-61, 1979. *The Health Insurance Study Screening Examination Procedures Manual*, R-2101-HEW, September 1978, by Lisa H. Smith, George A. Goldberg, Robert H. Brook, Laura Tosi, and Rae W. Archibald, presents a detailed description of all aspects of tests and procedures carried out in the enrollment and exit screening examinations.

DISEASES AND CONDITIONS FOR HEALTH STATUS
AND QUALITY OF CARE MEASUREMENT

Diseases and Conditions	Applicable Age Group		
	0-4 Years	5-13 Years	14+ Years
Acne			X
Anemia	X	X	X
Angina pectoris and selected electrocardiographic abnormalities			X
Asthma		X	
Cancer	X	X	X
Chronic airway obstruction and shortness of breath			X
Colds	X		
Congestive heart failure			X
Convulsions	X	X	
Dental conditions	X	X	X
Diabetes mellitus			X
Eczema	X	X	
Enuresis (bedwetting)		X	
Growth and development disorders	X		
Hay fever		X	X
Hearing disorders		X	X
Hemorrhoids			X
Hernia			X
Hypercholesterolemia (high cholesterol)			X
Hypertension			X
Hyperthyroidism and hypothyroidism			X
Joint disorders			X
Lead poisoning	X	X	
Otitis media (middle ear infection)	X	X	
Stomach pain and peptic ulcer disease			X
Urinary tract infection		X	X
Varicose veins			X
Vision disorders		X	X

SUMMARY

The Rand Health Insurance Study (HIS) will use data on the presence and disease impact of acne vulgaris to study the effect of different levels of insurance on health status and quality of care. This condition was selected for three reasons: widespread prevalence, especially among teenagers; potentially serious complications; and amenability to treatment.

The clinical lesions of acne include blackheads, whiteheads, papules, pustules, nodules, and cysts, all of which usually appear on the nose and cheeks but may also appear on the back, chest, and shoulders. The precise reason why some people have acne and others do not is not well understood. The numbers and types of lesions needed to constitute a definitive case of acne have not been agreed upon. Attempts have been made to grade acne, generally on the basis of the number, appearance, and severity of lesions (usually on the face). The major deficiency in all classification systems is that the duration of lesions has not been taken into consideration.

PREVALENCE AND EFFECT OF DISEASE

According to National Center for Health Statistics (NCHS) surveys, acne is widely prevalent, especially among youths 12 to 17 years of age (among whom prevalence rises with age). In this age group, acne is slightly more prevalent among girls than boys, among whites than blacks, in the southern and western parts of the country than in the northeastern and midwestern sections, and among youths with parents of lower educational levels. In general, about 40 percent of the acne cases reported or observed by physicians in NCHS surveys were mild and involved little or no inflammation.

Acne is not normally associated with severe morbidity, disability, or death, but it can substantially affect a young person's life by causing appearance-related problems during puberty and adolescence. The effect can be even more long-lasting if the lesions lead to scarring. Available evidence suggests that the major effect is the short-term mental distress that acne causes. No overall association between acne and social participation, scholastic achievement, or leadership in school has been demonstrated. The use of treatments and medications

for acne, especially self-prescribed, over-the-counter therapies, may be quite widespread.

Most medical care for acne is intended to prevent appearance-related psychological problems and scarring. Therapy typically consists of (a) controlling the inflammatory process by modifying the bacterial flora around the sebaceous glands (where lesions occur) with topical or oral antibiotics, and (b) reducing obstruction of the sebaceous ducts in the skin (which is the initial cause of the formation of acne lesions) through the use of retinoic or salicylic acid, abrasive agents, and blackhead removers, and by aspirating the cysts. Severe inflammatory lesions are often treated with intralesional injections of corticosteroids. General measures differ in their efficacy; dietary restriction and elimination of stress rarely contribute much to the abatement of acne. The elimination of both moisturizers and low-estrogen birth control pills may be of help.

Available literature on the effectiveness of medical treatment for acne is inconclusive. However, at least some forms of medical care are sufficiently effective to justify using acne as a condition by which to gauge the influence of health insurance on health status.

HEALTH INSURANCE STUDY METHODS

At enrollment, the HIS used two data sources to estimate the prevalence of acne among adult enrollees (14 years and older). The first was a Medical History Questionnaire (MHQ), on which information was collected on each enrollee's history of pimples within the previous year, physician diagnosis of acne, and several other acne-related topics. The second was a medical screening examination administered to a randomly selected subsample of participants. During the examination, two photographs were taken of the worst acne areas on the cheek and forehead of each person who claimed to have acne or who had acne in the opinion of the examining technician. The photographs were interpreted by a board-certified dermatologist; if he judged acne to be present in either photograph, the enrollee was so classified.

At exit from the HIS, all enrollees are given the MHQ and a screening examination. Two facial photographs are taken of those participants who claim to have acne or who are judged to have it by the technician at the exit examination.

A person is defined as having had acne at some time during participation in the HIS if at least one of the following criteria is met:

1. Evidence of acne on either facial photograph at enrollment.
2. Evidence of acne on either facial photograph at exit.

3. Physician diagnosis of acne on at least two claim forms during the Study.

The HIS assesses the effects of acne through three MHQ items that deal with (1) the amount of pain caused by acne, (2) the amount of worry or concern it has caused, and (3) whether the physical appearance of acne has resulted in avoidance of social contact. Generally, the hypotheses are that technical medical care may improve as insurance generosity rises, which may alter the natural history of the disease. Similarly, more frequent contact with and reassurance from physicians, especially for people with severe acne, may reduce self-imposed restrictions on social interaction and impairment of mental health because of worry.

HEALTH INSURANCE STUDY ENROLLMENT RESULTS

Based on the MHQ responses, about 24 percent of the adult population in the HIS was classified as having acne; of these, about 11 percent had been under a doctor's care within the previous year. On average, the group with acne currently used three different therapies (often self-prescribed); the few who had consulted a physician about their condition within the previous year used more than two physician-prescribed therapies.

As a result of the screening examination photographs, more than 15 percent of the HIS population was diagnosed as having acne. Age-specific rates were highest for enrollees aged 14 to 17 years (45 percent had acne); rates declined dramatically after age 34.

Of those whose acne condition was identified by photograph, 76 percent reported worry or concern; 43 percent, pain; and 28 percent, some avoidance of social interaction. As many as 13 percent of the respondents reported a great deal of worry. Hence, mental and social health effects were fairly common. Persons with definite acne reported more statistically significant adverse effects from the condition than those who believed they had acne but did not.

Using the screening examination photographs as "truth," the sensitivity of the MHQ in identifying people who really had acne was 86 percent. The specificity of the MHQ was also high: 89 percent of those who did not have acne confirmed by photograph were so classified by the MHQ. These values were obtained even though the MHQ covered the entire previous year and the screening examination only one point in time.

QUALITY OF CARE

Quality of care criteria relate to patient outcomes and medical care system processes such as use of physicians and appropriate therapies. With respect to outcomes, they specify little or no avoidance of social interaction, disability and pain, or worry or concern. In terms of process, the criteria indicate appropriate antibiotic and steroid medications and doses and note inappropriate therapies. For persons with severe acne, they indicate a minimum level of physician contact.

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Chapter 1

INTRODUCTION

Acne vulgaris is caused by malfunction of the sebaceous follicles of the skin, particularly the skin that covers the face and neck. The Health Insurance Study (HIS) will use the presence of this disease and its mental and social repercussions as measures of the effect of differing levels of insurance on health status and quality of care. Acne was selected for three reasons. First, its prevalence is widespread, especially among adolescents and young adults. Second, it has potentially serious social and physical complications: social interaction may be affected because of changes in appearance, and painful facial cysts may necessitate hospitalization. Third, the natural history of the disease can be partially controlled or altered.

This volume presents the HIS conceptualization of acne vulgaris, details its suitability as a health status measure, discusses important measurement issues, and describes HIS methods for assessing the presence and the effects of the condition among HIS participants. The volume also presents HIS enrollment results for all six sites of the study (Dayton, Ohio; Seattle, Washington; Fitchburg and Franklin County, Massachusetts; and Charleston and Georgetown County, South Carolina). Finally, it gives HIS quality of care criteria for this disease. Readers are referred to the accompanying Preface and to Volume I of this series for more information regarding the design of the HIS and the overall strategy used to measure disease-specific effects on health as a function of level of insurance.

Chapter 2

DEFINITION AND MEASUREMENT ISSUES

Acne vulgaris involves the sebaceous glands within hair follicles; the skin openings of these glands (called the skin pores) are especially visible on the nose and cheeks. Acne occurs primarily on the face, but it can also appear on the back, chest, and shoulders. Four factors seem to contribute to the development of acne: (1) the sebum excretion rate, (2) sebaceous lipid composition, (3) bacteriology of the pilosebaceous duct, and (4) obstruction of the pilosebaceous duct. Generally, people with acne appear to have larger sebaceous glands and produce more sebum than people without it. In individuals susceptible to acne, a reaction may occur between bacteria endogenous to the skin and lipids produced in the sebaceous glands, liberating excessive quantities of free fatty acids. Normal skin may be irritated by these acids, and this reaction may help to produce some of the clinical lesions of acne. Acne appears only if circulating androgens are present. Genetic factors are also important, especially in severe inflammatory acne (Strauss, 1971). The exact etiology of acne is not well understood because persons with and without acne can have similar patterns or values of these factors.

Acne lesions are extremely varied, including open or closed comedones (blackheads or whiteheads), pustules, papules, nodules, large fluctuant cysts, and draining sinuses. Depending on disease severity, thick scars or pits may result (Schachter et al., 1971; Cunliffe, 1973; Whiting, 1979).

Although there are some theories of the pathogenesis of acne lesions, a precise pathologic mechanism explaining why some people have severe acne and others go through puberty and young adulthood with almost no lesions characteristic of acne has not been developed. Because almost everyone who reaches adulthood has had at least one blackhead or one whitehead, in theory everybody could be labeled at some point in his life as having acne. Thus, measuring the presence of acne depends acutely on the definition of the disease—a certain minimum number of lesions versus just having pimples or a few whiteheads or blackheads.

There is no consensus in the literature as to whether one, five, or ten blackheads, whiteheads, or pustules make a case of acne. Schachter et al. (1971) stated that anyone who has more than five comedones on the face at any one time should be classified as having acne. Burton

et al. (1971) defined a subclinical case as the presence of a few insignificant comedones, often in the crease line; whether the physician or the patient is better able to find these lesions is unclear. Thus, some epidemiologic studies or some clinicians may classify a person as having at least mild or "subclinical" acne if one blackhead, whitehead, or inflammatory cyst is present on the face. This means, of course, that the prevalence of acne would be extremely high, especially in adolescence and early adulthood.

Various attempts have been made to grade acne, often on the basis of the number of comedones present either on one side of the face or on the entire face (as, for example, Witkowski and Simons, 1966). One scale of this type classified acne as mild if 5 to 10 lesions were present on the face, moderate if 10 to 15 lesions were present, and severe if more than 15 lesions were present (Schachter et al., 1971). Another classified acne as follows: Grade 1, fewer than 10 lesions on one side of the face; Grade 2, 10 to 25 lesions; Grade 3, 25 to 50; and Grade 4, more than 50 (Kligman and Plewig, 1976).

Other attempts to classify acne have been based on the appearance of the lesions—whether they are noninflammatory (blackheads or whiteheads) or inflammatory—rather than on their number. One such classification enumerated five grades of acne: Grade 1, a few insignificant comedones, often in the crease lines (subclinical acne); Grade 2, mild acne, with a few comedones and a few small papules or pustules; Grade 3, moderate acne (ill-defined but definitely between Grades 2 and 4); Grade 4, severe acne, often with cysts; and Grade 5, extremely severe acne, with widespread inflammatory lesions and many large pustules or cysts (Burton et al., 1971).

The most widely used classification system for acne is probably the one included in National Center for Health Statistics (NCHS) surveys (NCHS, 1976), based on the system developed by Pillsbury et al. (1961). It has five levels: Grade 0, no acne; Grade 1, sparse to profuse comedones with little or no inflammatory reaction; Grade 2, acne consisting of comedones and superficial small pustular and inflammatory lesions at the follicular orifice; Grade 3, acne characterized by comedones, small pustules, and a tendency to deeper inflamed lesions (in which the inflammatory nodules are not definitely related to the follicular pore); and Grade 4, extensive secondary infected cystic acne (coalescence of lesions occurs, with production of boggy canalized sinuses).

Determining the overall severity of acne (in terms of either present condition or prognosis) depends on integrating at least three types of information: number of lesions, types of lesions, and severity of lesions. Neither Burton et al. nor the NCHS scales use an explicitly stated algorithm to integrate such information into an overall index, but they can apparently distinguish acne accompanied only by ob-

struction from acne with both obstruction and inflammation. (The latter is more serious, leads to more scarring, and often requires the use of oral and topical antibiotics.) Little or no evidence is available regarding the reliability of these scales.

Cook et al. (1979) have recently developed an acne severity grading technique composed of a grading scale for comedones, papules, and macules, an overall severity scale, and facial photograph reference standards. Their 0-to-8 severity scale combines a count of lesions, amount of face covered, and evaluation of the level of inflammation. Photographs illustrate every other point in the severity scale. The reliability of this technique was tested by grader/grader correlations and was found to be quite high; outside investigators have also found the method to be a reliable clinical tool for large-scale clinical trials.

None of the above classification schemes deals with the presence of such lesions over time. Thus, duration of lesions has not been used in grading acne severity, and this may be the major deficiency in all acne classification systems.

Chapter 3

JUSTIFICATION FOR SELECTING ACNE FOR HEALTH INSURANCE STUDY ANALYSES

PREVALENCE OF ACNE

The NCHS Health Examination Survey of 1966-1970 provides the best data on the prevalence of acne in the United States (NCHS, 1976). In this survey, a national probability sample of youths 12 to 17 years of age was examined for the presence of various diseases, including acne. A physician inspected the skin and graded the presence of acne from 0 to 4, according to the Pillsbury scale. In addition, questionnaires inquiring about the effects of acne were administered to the youths and their parents.

Based on examination findings, the prevalence of facial acne rose with age from 39 per 100 youths at age 12 to 86 per 100 at age 17. The prevalence among youths 14 to 17 years of age was 79 percent and among youths 12 to 17, 68 percent. Acne was slightly more prevalent among teenage girls (70 per 100) than among boys (66 per 100). White youths had slightly more moderate to severe cases of facial acne than black youths. Acne was found to be more prevalent in the South and West than in the Northeast and Midwest. Prevalence rates decreased consistently with increasing educational level of parents. The prevalence rates of the various grades of acne for youths 12 to 17 were as follows: Grade 1, 40 per 100; Grade 2, 26 per 100; Grade 3, 2.4 per 100; and Grade 4, 0.2 per 100. Of all youths with acne, 60 percent were Grade 1. Thus, most acne was mild and involved little or no inflammation.

Based on self-report questionnaire findings, the acne prevalence rate for youths between 12 and 17 years of age was 49 per 100. Among youths reporting acne, the disease was confirmed by a physician in 88 percent of the cases. Because this condition varies in intensity over even short periods, this finding is not unexpected; some youths may well have had acne in the past. Among the 51 percent of the youths 12 to 17 years of age who did not report having acne, the disease was nonetheless diagnosed in 49 percent; in this group, however, acne was mild (Grade 1) 80 percent of the time. This underreporting of acne may reflect differing definitions between physicians and patients of what

constitutes acne—a few pimples may mean acne to a physician but not to a patient.

NCHS has released preliminary results on the prevalence of acne based on examination of 20,749 persons aged 1 through 74 from 1971 to 1974 (NCHS, 1977). For individuals 12 to 17 years of age, the rate was 23 per 100, which is about one-third the rate reported in the earlier study. In all likelihood, this difference is a result of the criteria used to label persons with acne. In the first study (NCHS, 1976), acne was considered present simply if a physician believed it to be present on examination; in the second study, people classified as having acne were required to have acne (by the same criteria used before) *and* to need medical treatment (in the opinion of the examining physician). The prevalence of acne dropped markedly from age 18 onward. For people 18 to 24 years old, the rate was 17.2 per 100; for 25 to 34 years, 8.3; for 35 to 44 years, 2.5; for 45 to 54 years, 0.8; for 55 to 64 years, 0.2; and for 65 to 74 years, 0.07 per 100. (The final report of the second NCHS study was not available at the time this report was written.)

MORBIDITY AND MORTALITY

Acne is a self-limited disease, although untreated acne may have an unpredictable course. It is not usually associated with severe morbidity, disability, or death, but its effects on a person's life can be deleterious. Acne strikes at puberty and adolescence; by altering facial appearance at this time, it may well produce critical psychological problems. Prevention of such appearance-related problems and of scars has been the major goal of therapy for acne.

Evidence supporting the notion that acne has a long-lasting influence on a person's life is not very substantial. The NCHS study demonstrated short-term effects; 87 percent of youths aged 12 to 17 who acknowledged that they had acne indicated that the condition bothered or worried them (NCHS, 1976). In particular, 15 percent felt that acne bothered them a lot; 37 percent, some; and 35 percent, a little. Only 58 percent were using any treatment for their acne; only 11 percent had been seen by a doctor.

Acne can affect the social and physical health of adolescents in a number of ways. For example, adolescents with acne may avoid social situations and athletic activities; they may become absorbed with their acne problems, frequently excoriating lesions, removing comedones, squeezing pustules, and aggravating the already existing acne.

Schachter et al. (1971) studied these effects in 1254 suburban New York high school students and found less difference than expected between those with and without acne. Acne, defined as the presence

of more than five comedones, was present in 69 percent of the boys and 58 percent of the girls; 32 percent of the boys and 29 percent of the girls did nothing to improve their skin condition. Most medication was self-administered, and only 11 percent of the boys and 10 percent of the girls sought a doctor's advice.

In the Schachter study, students both with and without acne were asked to respond to 46 statements such as "The opposite sex likes me," "My friends often ask me to participate in games or go to the movies with them," and "My skin condition makes life much harder." For 37 of the 46 statements, there were no significant differences between students who had acne and those who did not. For the remaining 9 statements, no overall trend in social acceptance was apparent. Students with acne were statistically different from those without it in that they did not believe that they received enough invitations to parties, did not have a good time at parties, did not like to be with people, and felt that people sometimes stared at them. The group without acne, however, was less comfortable at school than the group with acne. Furthermore, the presence of acne did not appear to affect scholastic achievement or leadership roles within the school. The authors concluded that no difference in social acceptance existed between youngsters with and without acne, and that the students with acne did not think that their appearance made life more difficult.

In summary, no substantial body of evidence suggests that acne is a primary force in the social health of adolescents. However, people with acne are clearly bothered by it, some to a great degree. One merely has to observe the sale of over-the-counter medications for acne to appreciate the level of distress that acne causes. Thus, a worthwhile goal of medical care seemingly would be to reduce the immediate amount of worry or concern associated with acne and to improve facial appearance, even if that reduction does not translate into a long-term alteration in a person's mental or social health.

EFFECTS OF MEDICAL CARE

At present, no definite cure for acne is known (Whiting, 1979). Current acne therapy has two main purposes. The first is to control the inflammatory process in the more severe stages of acne, especially if scarring is very likely to occur. In particular, medical treatment is directed toward modifying the bacterial flora around the sebaceous gland with topical or oral antibiotic preparations. Use of oral antibiotics, chiefly tetracycline and erythromycin, apparently resolves the acne faster than if no treatment is used. Benzoyl peroxide prepara-

tions also have antimicrobial effects. The second is to eliminate or decrease obstruction of pilosebaceous ducts (which results in the formation of comedones). Mechanical and abrasive techniques that are often tried include retinoic acid, salicylic acid, sulfur, benzoyl peroxide, abrasive agents, blackhead removers, x-rays, and ultraviolet light. Aspiration of cysts is sometimes effective. When used correctly, these approaches can decrease the severity of acne.

Some general measures, such as dietary restriction and elimination of stress, usually have no effect; only rarely does acne respond to such steps. Other general measures, such as eliminating certain oils or moisturizers used on the skin or eliminating low-estrogen birth control pills, may have a beneficial effect. A few persons with severe inflammatory lesions such as cysts respond to intralesional injections of corticosteroids. The resulting regression of the lesions may eliminate the need to lance or aspirate these cysts and thus prevent acne scarring. Surgical procedures may be beneficial in treating scarring once the acne process is completely controlled.

Given the extensive array of over-the-counter soaps and other substances available to treat acne, the complex medical regimens used by physicians for acne, and the fact that 10 percent of all tetracycline and 2 percent of all erythromycin prescribed in the United States is for acne, it would be useful to know if the severity and duration of the disease is affected by this mix of numerous medical therapies. Unfortunately, as much of the literature indicates,¹ the effects of medical therapy on acne are not precisely known. Some reports claim that 85 percent of acne cases can be successfully treated if medications sometimes used in combination are selected carefully; others indicate that many forms of therapy when tested individually are ineffective in altering the natural history of acne. Melski and Arndt (1980) noted that a "wide range of effective topical agents" (p. 505) is available for acne and that the condition can almost always be managed successfully with such measures.

Currently, acne cannot be prevented. As people mature sexually, their hormonal balances change, increasing sebum excretion rates and changing the biochemical makeup of the sebaceous gland. In women, this process can be altered somewhat by using the birth control pill that contains a large estrogen dose, which may reduce the sebum excretion rate. Because of its side effects, however, its use is probably justified only in selected females who have severe acne.

In summary, medication when judiciously chosen can apparently

¹See Witkowski and Simons, 1966; Cunliffe, 1973; Ad hoc Committee Report, 1975; British Medical Journal, 1976a,b; Reisner, 1976; Frank, 1977; Waisman, 1977; Whiting, 1979; and Melski and Arndt, 1980.

affect the course of inflammatory acne and reduce the likelihood of scarring. Furthermore, obstructive lesions can be relieved by using proper mechanical devices or abrasive agents. Such techniques may produce a better cosmetic appearance, but both the benefit achieved with a combination of these techniques and the effects of multiple types of therapy versus no therapy at all on the natural history of acne are largely unknown. Nevertheless, the efficacy of medical care in treating acne is sufficiently high to warrant the use of this condition as a means of gauging the influence of health insurance on health. Because acne is generally a self-limited disease, overaggressive therapy, such as use of high-dosage estrogen, oral corticosteroids, and x-rays in an effort to improve cosmetic appearance slightly, is usually not warranted and may have serious side effects. Thus, the effect of medical care on health for people with this disease depends on the prudent selection of agents with high therapeutic potential, so that more good than harm occurs.

Chapter 4

HEALTH INSURANCE STUDY METHODS

PREVALENCE OF ACNE

To estimate the prevalence of acne vulgaris among its adult participants, the Health Insurance Study (HIS) used two data sources. The first was a self-administered Medical History Questionnaire (MHQ), through which information was collected about trouble with pimples in the last year, a history of physician diagnosis of and care for acne, and use of antiacne therapeutic agents. Items pertaining to pain from and worry about acne or pimples and restricted association with other people because of acne were also included.

The MHQ had two parts. In all sites except Dayton, both Forms A and B were completed by all adults 14 years of age or older 1 to 3 weeks before the screening examination. In Dayton, Form B was completed by a randomly selected subsample of enrollees. All participants receive both parts of the MHQ at exit.

The Pimples and Acne battery, which was included in Form B in all sites, is reproduced in Appendix A. Two forms of the battery are contained in Appendix A; one was used at enrollment in Dayton and the other at enrollment in all other HIS sites and at exit in all sites. Revisions and additions incorporated in the non-Dayton battery were based on field experience with the Dayton battery at enrollment and on the need to obtain more detailed information about the timing of medical care for this condition and the use of additional therapies.

The battery is introduced by a "skip" question ("In the last 12 months, have you had trouble with pimples on your face?"). Persons who responded "yes" continued on to complete the battery and those who responded "no" typically "skipped" to the next disease-specific battery. Selected items within the battery were also preceded by a similar skip item, so that persons to whom the item might not apply were not required to respond. Answers to such items from persons who should not have responded were excluded from analyses reported in Chapter 5.

The second information source was a medical screening examination given at enrollment to a random sample of the total enrollment sample, generally between 50 and 75 percent of participants enrolled

(depending on site).¹ In Dayton, 204 adults who completed Form B at home did not receive a screening examination because of enrollment schedule constraints. Smith et al. (1978) describe screening examination procedures in detail.

At the examination, two Polaroid photographs were taken of all adult enrollees who met one of two criteria: (1) a positive response to one of two questions asked at the screening examination about whether they thought they had acne or had recently been told by a doctor that they had it, or (2) a judgment by the examination technician that the person had at least one clinical lesion characteristic of acne. These lesions included comedones (blackheads, whiteheads), pustules, papules, cysts, and scars. The photographs were of either the left or right cheek (whichever was worse in the technician's opinion) and of the right, left, or center part of the forehead (again, whichever was worse).

A board-certified dermatologist interpreted each photograph; if he judged that acne was present according to either photograph, the person was assumed to have acne. He did not grade acne by severity. Thus, at the beginning of the study, acne was defined only as present or absent and only for those people who had received a screening examination.

At the end of enrollment in the HIS, each participant receives an exit screening examination. If one of the above criteria is met, two photographs of the face are taken. The photographs of all enrollees, taken at both entrance and exit examinations, will be read together, in a random order, without distinguishing the examination at which they were taken. At this reading, both the presence or absence of acne and its severity will be recorded. A modified version of either the NCHS (Pillsbury) scale or the Cook et al. scale may be used for this purpose. To determine the reliability of the reading, a 10-percent sample of all photographs will be reread independently by another board-certified dermatologist.

A person is defined as having had acne at some time during the HIS if at least one of the following criteria is met:

1. Evidence of acne on either facial photograph at enrollment in the Study.
2. Evidence of acne on either facial photograph at exit.
3. Physician diagnosis of acne on at least two claim forms during the HIS.

¹This random sample of participants will be used to study the effect of the screening examination on use of medical services and on health status.

DISEASE IMPACT

The effects of acne are basically psychological and social. Three MHQ questions dealt with the amount of pain and worry or concern suffered by the respondent and whether the physical appearance of acne or pimples caused the respondent to avoid social contact (conversation). Responses could range from "none" to "a great deal" (or equivalent wording, depending on the item). They were asked of all respondents who gave a positive answer to the first question in the Acne battery and so went on to complete the battery.

To compare disease impact for persons in several acne status categories, we calculated the percentages of responses at each level from "none" to "a great deal." A composite item called "any impact" was also constructed: an individual was assigned a positive response to "any impact" if he or she gave a positive response to at least one disease impact question.

Disease impact was assessed for those persons who actually responded to the individual items on pain, worry, and conversation avoidance and for those who did not. The latter group did not complete the Acne battery because they answered "no" to the first question and thus skipped the rest of the battery; for them, scores equal to no impact were assigned. The rationale for this scoring rule is that respondents who report no trouble with pimples in the past 12 months should (if asked) logically report no impact from the condition.

These questions will be used to assess the effects of differing levels of health insurance on the mental and social health of people with acne. Generous health insurance might affect these health measures positively in two ways. First, technical aspects of medical care may improve as generosity of insurance rises, and this improvement may alter the natural history of the disease. Second, a person with severe acne and better insurance may have more frequent contact with physicians, possibly resulting in more frequent reassurance about the self-limited nature of the disease and the ability of medicine to improve the person's appearance. This, in turn, may result in less impairment of the person's social functioning. Conversely, more frequent physician contact, fostered by more generous insurance, could lead to greater worry about the condition without any concomitant improvement in appearance.

Chapter 5

HEALTH INSURANCE STUDY ENROLLMENT RESULTS

The HIS enrolled a total of 5835 adults (14 years and older) in six sites. Slightly more than 50 percent were women, and about 15 percent were nonwhite. The mean number of years of schooling completed by those 18 and older was 12, and the average family income (in 1973-74 dollars) was about \$13,000. All of the experimental population was under age 62 at enrollment, so that no individual would reach age 65 during the course of the experiment.¹ (The Preface and Volume 1 contain additional information about the HIS sample and enrolled population.)

Of the 5835 adults enrolled, 5715 (98 percent) completed Form A of the Medical History Questionnaire (MHQ). They include all adults enrolled in any of the experimental HIS plans, or in the Dayton control group, or in a "preenrollment group" in South Carolina. Of the 5715 adults who completed Form A, 5350 (94 percent) received and completed Form B of the MHQ. As noted in Chapter 4, only in Dayton was a random sample of enrollees asked to complete Form B; in all other sites, all adults were expected to complete Form B. Of the 5835 adults enrolled in the HIS, 5472 were eligible to complete Form B (363 people in Dayton were not asked to complete Form B); thus, the true completion rate was 98 percent (5350 of 5472).

For MHQ items that were nearly identical in all sites, the tables in this chapter list them as they (or the response patterns) were phrased for the version of the MHQ administered at enrollment in all sites but Dayton. Items that were new or distinctly different are listed separately. Questions that appeared only in the non-Dayton version of the MHQ are denoted by an asterisk (*); those that appeared only in the Dayton version are denoted by a dagger (†). Total numbers of persons responding to those questions will, of course, be lower than for questions to which the entire sample (from all six sites) could respond.²

¹The control population included 2 individuals over 61 years old.

²Percentages reported in the text may differ slightly from those given in tables, because the former are based only on respondents with usable responses or data. Because the missing data rate was very low, the figures are identical in most instances. As noted in Chapter 4, the analyses exclude responses from persons who should not have responded to selected items because of skip patterns in the Acne battery.

Appendix A gives the full battery of questions in both Dayton and non-Dayton formats.

PREVALENCE OF ACNE ACCORDING TO THE MEDICAL HISTORY QUESTIONNAIRE

Responses to MHQ questions concerning the presence of acne and diagnosis by a physician are listed in Table 1. If a person answered "yes" to the first question in the battery ("In the last 12 months, have you had trouble with pimples on your face?") he or she was classified by the MHQ as having acne. Based on an affirmative response to this question, 1258 of the 5346 respondents (23.5 percent) were judged to have acne (see Table 1). Four of the 5350 people eligible to respond did not answer this question.

Of the 1258 persons classified as having acne, 136 (11 percent) had seen a doctor about their condition in the past 12 months (see Table 1). Of this number, 100 (74 percent) reported that within the past 12 months a doctor had said that they had acne. Both the Schachter (1971) and NCHS (1976) studies also reported that about 11 percent of youths with acne had been seen by a doctor, and, in the NCHS study, 88 percent of those reporting acne had had it confirmed by a doctor.

PREVALENCE OF ACNE ACCORDING TO SCREENING EXAMINATION FINDINGS

The enrollment screening examination was administered to 3321 persons in the six sites; by design, those who received the examination represented a random subsample of about 62 percent of the sample who completed Form B of the MHQ.³ As part of the examination, two additional questions were asked: (1) Did the enrollee think that he or she had facial acne or pimples? (2) Had a doctor recently said that he or she had acne? The first question was answered positively by 452 people, the second by 77. The examination technician was asked to judge whether the enrollee showed evidence of facial acne or pimples, and 226 persons were positively identified.

The technician photographed all enrollees who met one of two criteria: (1) a positive response to one of the two questions just noted or (2) a judgment by the technician that facial acne was present. Of the 3321 persons screened, 2727 did not qualify for the photograph. Of the 594 remaining, 567 persons (95 percent) successfully completed their

³Of the 5350 people who completed Form B, 3319 were screened; in addition, 2 people were screened who failed to complete Form B.

Table 1
DISTRIBUTION OF RESPONSES TO ACNE QUESTIONS FROM THE
MHQ: PRESENCE, DOCTOR CONFIRMATION

Question ^a	Response	Number	Percent ^b
<i>In the past 12 months, have you had trouble with pimples on your face?</i>	Yes	1258 ^c	24
	No	4088 ^d	76
	Missing	4	(e)
		<u>5350</u>	<u>100</u>
	No Questionnaire	365	
		<u>5715</u>	
<i>†In the last 12 months, have you seen a doctor about the pimples?</i>	Yes	22	11
	No	187	89
		<u>209</u>	<u>100</u>
<i>†Are you currently under a doctor's care or supervision for your acne or pimples?</i>	Yes	17	8
	No	192	92
		<u>209</u>	<u>100</u>
<i>*When was the last time you saw a doctor about the pimples?</i>	Within the past 3 months	47	4
	3-6 months ago	34	3
	7-12 months ago	33	3
	More than 1 year ago	158	15
	Never	775	74
	Missing	2	(e)
		<u>1049</u>	<u>99</u>
<i>In the past 12 months, has a doctor said that you had acne?</i>	Yes	100	74
	No	36	26
		<u>136</u>	<u>100</u>

^aItems marked with an asterisk (*) appeared on the version of the MHQ used after Dayton enrollment. Items marked with a dagger (†) appeared only in Dayton.

^bPercentages may not sum to 100 because of rounding.

^cThe remainder of the table refers only to 1258 persons who answered "yes" to the initial question and did not skip out of the battery.

^dThese respondents skipped the remainder of the battery.

^eLess than 0.5 percent.

photographs and 27 (5 percent) did not (usually because of camera failure or administrative error) (see Table 2).

The 567 sets of photographs were read by the board-certified dermatologist. Of these, 513 (90 percent) were judged indicative of acne, 52 (9 percent) were judged negative, and 2 (less than 1 percent) were questionable. For further analytic work, the questionables were grouped with the negatives. Disregarding the 27 persons who did not complete their photographs, these data imply an overall prevalence

Table 2
DISTRIBUTION OF FINDINGS FROM ACNE SKIN PHOTOGRAPHS
TAKEN AT THE SCREENING EXAMINATION

Acne Status	Number	Percent
Acne present in at least one photograph	513	15
Acne not present in either photograph	54	2
Acne not present and no photograph taken	2727	82
Unknown (photograph not taken or not read because of error)	27	1
Total	3321	100

rate of 15.6 percent (513 of 3294 persons). This is somewhat lower than the overall rate based on the MHQ.

The prevalence rates of acne, as defined by the facial photographs and by responses to the MHQ, are shown in Table 3 according to age. The MHQ definition produced higher age-specific rates than did the screening-photograph definition for all age groups except those 14 to 17 years old; for this youngest group, rates were nearly identical. This difference in rates may reflect the different time frames inherent in the two definitions—12 months for the MHQ, and the present day for the screening examination. For both definitions, nonetheless, the prevalence rate declined as expected after age 24, and markedly so after age 34.

The "true prevalence" rate of acne in the HIS at enrollment was calculated from the number of people whose photographs showed a positive acne condition (see columns 1 and 2 of Table 3). It was highest for adolescents and young adults and decreased rapidly with age. In comparison with the first NCHS (1976) figure for people 14 to 17 years old (79 per 100 persons), the HIS figure of 45 per 100 was quite low. The minimum level of disease necessary to label a person as having acne may account for the differences in prevalence between the NCHS and the HIS. The HIS dermatologist categorized persons with "possible" active acne as positive and those with "old acne scars" as negative; the latter step may have reduced the prevalence rate in the HIS compared with that of the NCHS. Furthermore, the second NCHS survey (1977), which used more stringent criteria for defining acne (namely, need for medical treatment), reported a prevalence level only one-third as high as that of the previous one. The HIS rate falls between these two values.

Table 3
PREVALENCE RATE OF ACNE PER 100 PERSONS, BY AGE,
ACCORDING TO FACIAL PHOTOGRAPHS OR THE MHQ

Age Group (years)	Photograph		MHQ	
	(1) Cases per Sample	(2) Rate	(3) Cases per Sample	(4) Rate
14-17	198/441	44.9	318/701	45.4
18-24	168/548	30.7	363/959	37.9
25-34	115/1002	11.5	403/1634	24.7
35-44	26/611	4.3	126/920	13.7
45-54	6/439	1.4	36/731	4.9
55 and over	0/253	0.0	12/401	3.0
14-74	513/3294 ^a	15.6	1258/5346 ^b	23.5

^aSkin photograph data are missing for 27 of the 3321 participants who received a screening examination.

^bAcne history information is missing for 4 of the 5350 participants who completed Form B of the MHQ.

USE OF ACNE THERAPIES

Because of additions to the MHQ after Dayton enrollment, several questions about specific acne therapies do not apply to the Dayton sample (see Tables 4 and 5). Among the 136 respondents who had consulted a doctor about their acne in the previous year (Table 4), an average of 2.2 therapies (prescribed by their doctors) was reported in the non-Dayton sites and 2.8 in Dayton. These involved mainly antibiotics (68 percent; non-Dayton only), other medications (57 percent), and special soaps (53 percent). Among the entire group of 1258 in all sites (Table 5) who simply reported having acne within the previous year (nearly 90 percent of whom had not consulted a doctor during that period), current use of 3.0 different therapies was recorded, chiefly special soaps (33 percent), popping pimples (28 percent), and other medications (23 percent).

DISEASE IMPACT

Three MHQ questions to assess the individual's reaction to acne (in terms of pain, worry, and avoidance of conversation in the past 3

Table 4

DISTRIBUTION OF RESPONSES TO ACNE QUESTIONS FROM
THE MHQ: TREATMENTS PRESCRIBED BY PHYSICIAN

Question ^a	Response	Number	Percent
<i>In the past 12 months, did the doctor prescribe any of these treatments for pimples?</i>			
X-ray treatments	Yes	2	1
	No	130	96
	Missing	4	3
		136	100
Ultraviolet light treatment	Yes	23	17
	No	109	80
	Missing	4	3
		136	100
Special soaps	Yes	72	53
	No	62	46
	Missing	2	1
		136	100
Special diet	Yes	29	21
	No	103	76
	Missing	4	3
		136	100
Having pimples popped	Yes	21	15
	No	111	82
	Missing	4	3
		136	100
*Antibiotics, such as tetracycline	Yes	78	68
	No	36	32
		114	100
*Injections into pimple cysts	Yes	5	4
	No	105	92
	Missing	4	4
		114	100
Other medicines	Yes	77	57
	No	56	41
	Missing	3	2
		136	100

^aItems marked with an asterisk (*) appeared only on the version of the MHQ used after Dayton enrollment.

Table 5
DISTRIBUTION OF RESPONSES TO ACNE QUESTIONS FROM THE MHQ:
TREATMENTS CURRENTLY USED

Question ^a	Response	Number	Percent ^b
<i>Whether or not the doctor prescribed them, do you currently use any of these treatments for pimples?</i> X-ray treatments	Yes	3	(c)
	No	1239	98
	Missing	16	1
		1258	99
Ultraviolet light treatment	Yes	29	2
	No	1212	96
	Missing	17	1
		1258	99
Special soaps	Yes	417	33
	No	829	66
	Missing	12	1
		1258	100
*Special diet	Yes	89	8
	No	941	90
	Missing	19	2
		1049	100
Having pimples popped	Yes	355	28
	No	890	71
	Missing	13	1
		1258	100
*Antibiotics, such as tetracycline	Yes	83	8
	No	954	91
	Missing	12	1
		1049	100
*Injections into pimple cysts	Yes	4	(c)
	No	1028	98
	Missing	17	2
		1049	100
Other medicines	Yes	291	23
	No	957	76
	Missing	10	1
		1258	100

^aItems marked with an asterisk (*) appeared only on the version of the MHQ used after Dayton enrollment.

^bPercentages may not sum to 100 because of rounding.

^cLess than 0.5 percent.

months) were asked of the 1258 persons who had responded positively to the first question in the Acne battery. As shown in Table 6, among those who claimed to have had acne within the previous year (regardless of whether it was confirmed by a physician or by the screening examination photographs), 63 percent reported worry or concern about their condition, 34 percent, pain, and 19 percent, avoiding conversation. Most enrollees giving a positive response reported only "a little" impact.

Of the 513 whose acne was verified by a screening examination photograph, 440 had also answered the MHQ disease impact questions. Of these 440, the percentages reporting "none" to "a great deal" of pain, worry, or avoidance of conversation are shown in Fig. 1.

Worry about the condition was considerably greater than any other type of impact for these respondents. For example, more than 13 percent reported "a great deal" of worry, compared with 1 and 2 percent, respectively, who reported "a great deal" of pain or avoidance of conversation with others "most of the time." The majority of respondents reported no limitation on social participation (avoidance of conversation), and a somewhat lesser majority reported no pain. Only 19 percent reported no impact of any sort.

Tables 7 and 8 emphasize the adverse effects of acne on those enrollees who actually reported experiencing some impact. Table 7 shows the impact as percentages of the 1258 enrollees who indicated trouble with acne in the past 12 months and therefore completed the Acne battery, including the disease impact questions. In other words, this group believed they had acne, whether or not they actually did. Table 8 shows the impact as percentages of the broader population of 5350 enrollees who were screened or had completed Form B of the MHQ, whether or not they answered the questions in the Acne battery.⁴ For this table, the 4092 enrollees who did not complete the battery were assigned scores equal to no impact, as described in Chapter 4. Tables B.1 and B.2 present the data from which Tables 7 and 8 (respectively) were constructed.

In both tables, values are reported for people who (a) had skin photographs positive for acne (row 1); (b) claimed or were thought by the technician at the screening examination to have acne but whose photographs were negative (row 2a); (c) said at the examination that they did not have acne, that none was observed by the technician, and that they did not have a photograph taken (row 2b); (d) were given the photographic examination but whose acne status was not determined,

⁴MHQ data are missing for two participants who received the screening examination. The examination technician judged them free of acne and they did not receive a skin photograph.

Table 6
DISTRIBUTION OF RESPONSES TO ACNE QUESTIONS FROM THE MHQ:
DISEASE IMPACT

Question	Response	Number	Percent ^a
<i>During the past 3 months, how much pain has your acne or pimples caused you?</i>	A great deal	10	1
	Some	61	5
	A little	354	28
	None at all	827	66
	Missing	6	(b)
		1258	100
<i>During the past 3 months, how much has your acne or pimples worried or concerned you?</i>	A great deal	104	8
	Somewhat	194	15
	A little	499	40
	Not at all	458	36
	Missing	3	(b)
		1258	99
<i>During the past 3 months, how much of the time have problems with the way your pimples or acne look caused you to avoid conversation with people?</i>	Most of the time	14	1
	Some of the time	49	4
	A little of the time	181	14
	None of the time	1011	80
	Missing	3	(b)
		1258	99

^aPercentages may not sum to 100 because of rounding.

^bLess than 0.5 percent.

Fig. 1—Percentage distribution of disease impact among enrollees who had acne confirmed at the screening examination

Table 7

PERCENTAGE OF ENROLLEES REPORTING PAIN, WORRY, AND AVOIDANCE OF CONVERSATION,
BY ACNE STATUS: ENROLLEES WHO COMPLETED ACNE BATTERY

Acne Status	Number of Enrollees Completing Battery	Percentage Reporting Pain ^a	Percentage Reporting Worry ^a	Percentage Reporting Avoidance of Conversation ^a	Percentage Reporting Any Impact ^a
1. Acne present in at least one photograph	440	43	76	28	81
2. Acne not present	299	27	50	8	57
2a. Not present in any photograph	40	43	65	10	75
2b. Not present; no photograph taken	259	25	48	7	54
3. Acne status unknown; photograph not taken/read	13	23	69	0	69
4. Acne status unknown; answered Form B but not screened	506	30	60	19	65
Total	1258	34	63	19	69

^aThe distribution of responses to the disease impact questions is given in Appendix B, Table B.1.

Table 8

PERCENTAGE OF ENROLLEES REPORTING PAIN, WORRY, AND AVOIDANCE OF CONVERSATION,
BY ACNE STATUS: ENROLLEES WHO COMPLETED MHQ^a

Acne Status	Number of Enrollees Completing MHQ	Percentage Reporting Pain ^b	Percentage Reporting Worry ^b	Percentage Reporting Avoidance of Conversation ^b	Percentage Reporting ^b Any Impact ^b
1. Acne present in at least one photograph	513	36	65	24	69
2. Acne not present	2779	3	5	1	6
2a. Not present in any photograph	54	31	48	7	56
2b. Not present; no photograph taken	2725	2	5	1	5
3. Acne status unknown; photograph not taken/read	27	11	33	0	33
4. Acne status unknown; answered Form B but not screened	2031	8	15	5	16
Total	5350	8	15	5	16

^aThose who completed or should have completed Form B of the MHQ, irrespective of whether they completed the Acne battery.

^bThe distribution of responses to the disease impact questions is given in Appendix B, Table B.2.

usually because of administrative or equipment failure (row 3); and (e) answered Form B of the MHQ but were not given the examination (row 4). (Row 2 is a total of rows 2a and 2b and comprises all those in whom acne was definitely not present.)

Of the persons who answered the disease impact questions and also had a positive identification of acne in at least one photograph (row 1 of Table 7), 76 percent stated they worried about their acne, 43 percent claimed that their acne gave them pain, and 28 percent indicated that they avoided conversation at least a little of the time because of their appearance. The summary index of "any impact" showed that 81 percent of those people with acne reported at least one form of impact.

The 40 persons who answered the disease impact questions but whose photograph showed no acne (row 2a of Table 7) reported slightly less impact than those with acne. Some of this lesser impact may have been reported by people who had had acne in the past or who were worried about old scars that were not labeled as active acne by the dermatologist who read the HIS photographs. The 259 persons who did not have a photograph taken because acne was not judged to be present by the technician (row 2b) reported, not surprisingly, the lowest impact. The 506 persons who completed the MHQ but did not receive a screening examination (row 4) gave intermediate responses to these questions, indicating, as anticipated, that this group contained people with and without active acne.

Results in Table 8 are similar to those reported in Table 7 with the following two qualifications: (1) For identical row and column entries, scores in Table 8 were lower than those in Table 7. (2) Differences between rows representing people with and without acne were greater in Table 8 than in Table 7. These differences arose because people who indicated no trouble with acne or pimples and therefore did not answer the disease impact questions (a higher proportion of whom were in the no-acne categories) were assigned a score of "no impact." Of the 513 people with acne confirmed by the screening examination (row 1 of Table 8), 65 percent worried about it at least a little of the time, 36 percent reported pain, and 24 percent avoided conversation. By contrast, for the 2779 persons who did not have acne (row 2), the respective percentages were 3, 5, and 1.

Table 9 presents the median categories of response to the disease impact questions among *only* those persons who actually gave a positive answer to the items on the Acne battery—namely, 425 respondents reporting pain, 797 reporting worry, and 244 reporting conversation avoidance. Worry was reported by more respondents than the other two impact measures (see Table 7), and a greater proportion of respondents reported higher levels of impact for worry than

for the other measures. Nevertheless the median level of worry, as for pain and conversation avoidance, was still relatively slight among all the acne status categories. By this very simple summary measure, no important differences in level of disease impact were detected between those who believed they had acne and did in fact have it and those who believed they had it but in fact did not.

Table 9
MEDIAN CATEGORIES OF PAIN, WORRY, AND AVOIDANCE OF
CONVERSATION, BY ACNE STATUS^a

Acne Status	Pain ^b (N = 425)	Worry ^b (N = 797)	Avoidance of Conversation ^b (N = 244)
Acne present in at least one photograph	Little	Little	Little
Acne not present	Little	Little	Little
Not present in any photograph	Little	Little	Little/some
Not present; no photograph taken	Little	Little	Little
Acne status unknown; photograph not taken/read	Little	Little	(c)
Acne status unknown; answered Form B but not screened	Little	Little	Little
Total	Little	Little	Little

^aAmong those who completed the Acne battery and had a positive response to the disease impact item under consideration.

^bSee Appendix B for the actual response categories and the distribution of responses on which medians are based.

^cNo enrollees in this category responded positively to this item.

This median summary measure, however, masks a substantial difference between those with and without acne when the number of persons reporting impact and the amount of impact are simultaneously taken into account. Statistical tests (Wilcoxon Two-sample Test of the differences between two groups⁵) showed that the 440 participants with acne (Table 7) who answered the disease impact items reported

⁵This procedure compares answers to a question between two groups by ranking responses from lowest to highest among all members of the population and then summing the ranks for each group. It is equivalent to a Mann-Whitney U Test.

significantly ($p < 0.01$) more pain, worry, conversation avoidance, and any impact than did the 299 participants without acne.

RELIABILITY AND VALIDITY OF HIS MEASURES

Reliability refers to the ability of a measure to produce the same results when the same object is measured. As noted in Chapter 4, reliability of the readings of screening examination photographs will be tested by having a 10-percent sample of all photographs read by a second dermatologist after the participants have completed their enrollment period in the HIS and have exited from the study. For Dayton enrollment, however, all photographs were read by two board-certified dermatologists, who agreed on the diagnosis (acne present or absent) in 83 percent of the cases (Smith et al., 1978).

Validity refers to the extent to which a measure assesses what it purports to assess. One measure of MHQ validity is how well response patterns to MHQ items corresponded to acne status classification based on the screening examination photographs. This is a less than perfect measure of validity because the screening examination is a measure at one point in time (namely, the day of the examination), whereas the MHQ is a measure spanning the previous 12 months. Thus, differences between the two measures may reflect these differences in time frames, rather than problems with the validity of the MHQ.

Of the 513 people who had positive readings on the facial photographs, 440 gave a positive response to the first question in the Acne battery of the MHQ ("In the past 12 months, have you had trouble with pimples on your face?") (Table 10). Thus, taking the photographic readings as "truth," the sensitivity of that initial question in identifying people with acne was 0.86 (440 of 513 persons); 73 participants with acne were not identified by this question. Of 2776 individuals who did not have acne according to the examination photograph criteria, 2477 had responded negatively to that initial question, for a specificity of 0.89. This left 299 persons who evidently believed they had acne even though they showed no evidence of the condition at the examination. Among enrollees with usable data from both sources, those who reported acne on the MHQ had a 60-percent chance of having it confirmed by photograph—i.e., 440 of 739 persons who indicated that they had acne within the past year had it confirmed at the examination.

These findings are consistent with the time-frame argument raised above, namely, that the MHQ covered a much longer period in which acne may have been present than did the examination photograph. Of the 372 persons misclassified by the two methods, four times

Table 10
NUMBERS OF PEOPLE WITH AND WITHOUT ACNE,
ACCORDING TO FACIAL PHOTOGRAPHS
OR THE MHQ

Acne Status by Facial Photograph	Acne Status by MHQ ^a		
	Present	Absent	Total
Present	440	73	513
Absent	299	2477	2776
Total	739	2550	3289 ^b

^aBased on the first question in the Acne battery.

^bExcludes 27 persons lacking photographic data and 5 persons lacking MHQ data.

as many were identified as positive by the MHQ as by the photographs. Despite this difference, the sensitivity and specificity of the MHQ in identifying people with acne appear reasonably good.

For HIS analytic purposes, use of the screening examination criteria to identify enrollees with acne will produce a smaller but probably more homogeneous sample (in the sense that active disease is confirmed by a physician's interpretation of a facial photograph) than might be true if only the MHQ data were used. However, in longitudinal analyses in the HIS, which involve persons who did not receive a screening examination at enrollment, consideration will be given to using their MHQ responses as indicators of the presence or absence of acne. For other studies in which examinations or photographs are not possible, a medical history may be sufficiently sensitive and specific to be used in identifying people with acne.

PREVALENCE OF ACNE ACCORDING TO THE HIS INSURANCE PLANS

The distribution of persons with acne according to HIS experimental insurance plans is shown in Table 11. The 16 plans (described in the Preface) have been aggregated into four fee-for-service plans (in all six

sites), depending on level of coinsurance or maximum deductible expenditure, and two prepaid group practice plans (Group Health Cooperative of Puget Sound, or GHC, which is located in Seattle, Washington). Only the 2888 persons who were assigned to one of these plans, and who could be classified according to the presence or absence of acne on the basis of facial photographic data (i.e., those who received an examination), are included in the analyses.⁶ The number and percentage with acne include only those persons definitely identified as having acne according to the criteria given in Chapter 4.

Table 11
PREVALENCE OF ACNE, BY HIS INSURANCE PLAN

HIS Experimental Insurance Plan ^a	Number of Persons Classifiable ^b	Number of Persons with Acne	Percent with Acne
Fee-for-service (all sites)			
Free care	778	136	17
25 or 50 percent coinsurance	564	102	18
95 percent coinsurance	432	68	16
Individual/family deductible	507	74	15
Prepaid group practice ^c			
Experimental	367	39	11
Control	240	20	8
Total ^d	2888	439	15

^aSee Preface for definitions.

^bIncludes only those who received a screening examination at enrollment.

^cSeattle only. For a comparison of the prepaid group practice and Seattle-only fee-for-service plans, see text.

^dIncludes only persons who were assigned to an experimental insurance plan.

Differences in the prevalence of acne among the four types of fee-for-service plans (aggregated across sites) were not statistically

⁶Of the original 3321 enrollees who were given the screening examination, 406 were not assigned to an HIS experimental plan; they were left over from a large pool of possible HIS participants from which the unbiased assignments were made. (For more information on the process of assigning families to plans, see Morris, 1979.) The acne status of an additional 27 enrollees was not classifiable because of missing photographic data.

significant. This is as expected, and reflects the unbiased assignment of people to these plans at the time of enrollment in the HIS, before data from the MHQ or screening examination were collected. Prevalence of acne in the fee-for-service plans in Seattle was 11 percent (47 of 411 persons); thus, prevalence between those plans (taken together) and the *experimental* GHC plan was also not significantly different. The control GHC plan is not strictly comparable to any other HIS plan, even in Seattle, because it comprises people who were enrolled in the prepaid group practice before the HIS began in that site. In this case, however, the difference in prevalence between the experimental and control GHC plans was also not significant. These findings support the contention that HIS insurance plans were not biased at enrollment with respect to the presence of acne. Thus, the HIS should be able to determine whether the course of the disease—among those who definitely have acne—differs as a function of differences in the amount or type of care associated with the various levels of insurance coverage.

SUMMARY

Based on the MHQ definition (trouble with pimples in the past 12 months), about 24 percent of the population had acne. Most therapies used by these individuals (especially those not under medical care) were over-the-counter, not physician-prescribed, medications. Very few people with acne were actively under the care of a physician; not surprisingly, those who were under care reported a greater use of physician-related therapies. The HIS results were similar to national figures, indicating that only about 10 percent of people with acne are under a physician's care.

HIS screening examination procedures determined that more than 15 percent of the population 14 years and older had acne. The prevalence of acne in the HIS varied appropriately with age, with the highest rate (45 per 100 persons) observed among those 14 to 17 years old.

The disease impact questions did reflect an individual's personal reaction to the (real or perceived) presence of acne in the very recent past. The mental and social effects of acne were seen to be fairly widespread; as many as 76 percent of respondents with acne reported that the condition caused them worry. The degree of impact varied in predicted ways for persons in different acne status classifications, and statistically significant differences were observed between those with and without the disease. These findings suggest that the HIS will be able to estimate changes in the disease impact of acne as a function of levels of health insurance.

Chapter 6

QUALITY OF CARE

Criteria for good quality of care are sparse for acne vulgaris, yet this disease might well deserve to be called "serious" for the following reasons: Acne is a common disease; it causes a great deal of expense and concern; and its presence may adversely affect one's behavior and self-image. The few existing criteria focus on the acceptability of certain laboratory tests and treatment procedures and on the designation of a reasonable number of physician visits.

In compiling quality of care criteria for acne, the HIS is limited by not having access to information in office medical records. The HIS does have, however, objective information on the presence and severity of acne in the form of facial photographs from screening examinations. In addition, claim forms and the MHQ provide information on various treatments. Specific MHQ questions are directed toward personal reactions to the disease. Thus, a reasonably broad set of data is available by which quality of care can be judged.

The criteria listed in Appendix C will be used to test hypotheses regarding the relationship between insurance level and quality of care. The criteria are directed at patient outcomes and medical care processes, such as the use of physicians and appropriate therapies. With respect to outcomes, they specify little or no avoidance of social interaction, disability or pain, or worry or concern. In terms of process, appropriate antibiotic medications and doses are noted and inappropriate therapies are identified. For persons with severe acne, a minimum amount of physician contact is indicated. The criteria are expressed in a form that assumes a high level of quality of care.

Appendix A

PIMPLES AND ACNE BATTERY FROM THE MEDICAL HISTORY QUESTIONNAIRE

ENROLLMENT MEDICAL HISTORY QUESTIONNAIRE¹

PIMPLES OR ACNE

48. IN THE PAST 12 MONTHS, HAVE YOU HAD TROUBLE WITH PIMPLES
ON YOUR FACE?

Yes 1 —Answer 49
No 2 —Go to 56,
page 16

49. WHEN WAS THE LAST TIME YOU SAW A DOCTOR ABOUT THE
PIMPLES?

(Circle one)

Within the past 3 months 1 }
3 - 6 months ago 2 } —Answer 50-51
7 - 12 months ago 3 }
More than 1 year ago 4 } —Go to 52,
Never saw a doctor for pimples 5 } next page

50. IN THE PAST 12 MONTHS, HAS A DOCTOR SAID THAT YOU HAD
ACNE?

Yes 1
No 2

51. IN THE PAST 12 MONTHS, DID A DOCTOR PRESCRIBE ANY OF
THESE TREATMENTS FOR PIMPLES OR ACNE? (Circle one number on
each line.)

	Yes	No
A. X-ray treatments	1	2
B. Ultra-violet light treatments	1	2
C. Special soaps	1	2
D. Special diet	1	2
E. Having pimples popped	1	2
F. Antibiotics, such as Tetracycline (TET-ra-SY-clean)	1	2
G. Injections into pimple cysts	1	2
H. Other medicines	1	2

DO NOT
WRITE IN
THIS SPACE

18/

19/

20/

21/

22/

23/

24/

25/

26/

27/

28/

¹ Used at all HIS sites except Dayton at enrollment and in all sites upon exit. Revisions incorporated in this version were based on experience with the initial Dayton battery.

52. WHETHER OR NOT A DOCTOR PRESCRIBED THEM, DO YOU CURRENTLY USE ANY OF THESE TREATMENTS FOR PIMPLES?
(Circle one number on each line.)

Yes	No
-----	----

A. X-ray treatments	1	2
B. Ultra-violet light treatments	1	2
C. Special soaps	1	2
D. Special diet	1	2
E. Having pimples popped	1	2
F. Antibiotics, such as Tetracycline (TET-ra-SY-clean)	1	2
G. Injections into pimple cysts	1	2
H. Other medicines	1	2

DO NOT
WRITE IN
THIS SPACE

29/

30/

31/

32/

33/

34/

35/

36/

53. DURING THE PAST 3 MONTHS, HOW MUCH PAIN HAS YOUR ACNE OR PIMPLES CAUSED YOU?

(Circle one)

A great deal of pain	1
Some pain	2
A little pain	3
No pain at all	4

37/

54. DURING THE PAST 3 MONTHS, HOW MUCH HAS YOUR ACNE OR PIMPLES WORRIED OR CONCERNED YOU?

(Circle one)

A great deal	1
Somewhat	2
A little	3
Not at all	4

38/

55. DURING THE PAST 3 MONTHS, HOW MUCH OF THE TIME HAVE PROBLEMS WITH THE WAY YOUR PIMPLES OR ACNE LOOK CAUSED YOU TO AVOID CONVERSATION WITH PEOPLE?

(Circle one)

Most of the time	1
Some of the time	2
A little of the time	3
None of the time	4

39/

PIMPLES OR ACNE

123. IN THE LAST 12 MONTHS, HAVE YOU HAD TROUBLE WITH PIMPLES ON YOUR FACE? 4394
- NO 2 — (GO to q. 132, page 29)
- YES 1 — (GO to q. 124)
124. In the last 12 months, has a doctor said that you had acne? 4395
- Yes 1
- No 2
125. In the last 12 months, have you seen a doctor about the pimples? 4396
- No 2 — (GO to q. 127)
- Yes 1 — (GO to q. 126)
126. In the last 12 months, did the doctor prescribe any of these treatments for pimples? CIRCLE YES OR NO FOR EACH.
X-ray treatments	Yes 1	4397
	No 2	
Ultra-violet light treatment	Yes 1	4398
	No 2	
Special soaps	Yes 1	4399
	No 2	
Special diet	Yes 1	4400
	No 2	
Having pimples popped
by doctor	Yes 1	4401
	No 2	
Other medicines	Yes 1	4402
	No 2	
127. Are you currently under a doctor's care or supervision for your acne or pimples? 4403
- Yes 1
- No 2

128. Whether or not the doctor prescribed them, do you currently use any of these treatments for pimples? CIRCLE YES OR NO FOR EACH.

X-ray treatments	Yes 1	4404
	No 2	
Ultra-violet light treatment	Yes 1	4405
	No 2	
Special soaps	Yes 1	4406
	No 2	
Having pimples popped	Yes 1	4407
	No 2	
Other medicines	Yes 1	4408
	No 2	

129. During the past 3 months, how much pain has your acne or have your pimples caused you? 4409

(Circle one.)

A lot 1
 Some 2
 A little 3
 None at all 4

130. During the past 3 months, how much has your acne or have your pimples worried or concerned you? 4410

(Circle one.)

A lot 1
 Somewhat 2
 A little 3
 Not at all 4

131. In the past 3 months, did problems with the way your acne or pimples look cause you to miss or avoid conversation with people? 4411

(Circle one.)

Most of the time 1
 Some of the time 2
 A little of the time 3
 None of the time 4

Appendix B

DISTRIBUTION OF RESPONSES TO DISEASE IMPACT QUESTIONS

The following two tables present the number and percentage of responses to the MHQ disease impact questions in the Acne battery for the same acne status classifications that were used in Tables 7 and 8 of Chapter 5. Table B.1 gives the responses of the 1258 enrollees who actually completed the Acne battery. Table B.2 gives the responses of all 5350 persons who completed Form B of the MHQ, irrespective of whether they completed the battery. Responses equivalent to no impact were assigned to those who did not answer the questions because they skipped out of the battery at an earlier point (see Chapter 4).

In both tables, the number of enrollees in each classification is given in parentheses. The numbers shown for each response category may not add to the totals for each classification because missing responses from persons who should have provided answers to the specific questions are not shown on the tables. Missing data amounted to less than 1 percent of all responses.

The entries in the "level of impact" columns are denoted in abbreviated form only. See Appendix A for the complete wording of the questions and responses.

Table B.1

DISTRIBUTION OF RESPONSES TO DISEASE IMPACT QUESTIONS, BY ACNE STATUS:
ENROLLEES WHO COMPLETED ACNE BATTERY

Acne Status ^a	Pain			Worry			Avoidance of Conversation		
	Level of Impact	No.	Percent	Level of Impact	No.	Percent	Level of Impact	No.	Percent
Acne present in at least one photograph (440)	None	250	57	None	103	23	None	315	72
	Little	141	32	Little	177	40	Little	84	19
	Some	42	10	Some	101	23	Some	30	7
	Great	4	1	Great	58	13	Most	10	2
Acne not present (299)	None	216	72	None	149	50	None	275	92
	Little	75	25	Little	116	39	Little	18	6
	Some	7	2	Some	22	7	Some	5	2
	Great	0	0	Great	11	4	Most	0	0
Not present in any photograph (40)	None	23	58	None	14	35	None	36	90
	Little	15	38	Little	19	48	Little	2	5
	Some	2	5	Some	5	13	Some	2	5
	Great	0	0	Great	2	5	Most	0	0
Not present; no photograph taken (259)	None	193	75	None	135	52	None	239	92
	Little	60	23	Little	97	37	Little	16	6
	Some	5	2	Some	17	7	Some	3	1
	Great	0	0	Great	9	3	Most	0	0
Acne status unknown; photograph not taken/read (13)	None	10	77	None	4	31	None	13	100
	Little	3	23	Little	8	62	Little	0	0
	Some	0	0	Some	1	8	Some	0	0
	Great	0	0	Great	0	0	Most	0	0
Acne status unknown; answered Form B but not screened (506)	None	351	69	None	202	40	None	408	81
	Little	135	27	Little	198	39	Little	79	16
	Some	12	2	Some	70	14	Some	14	3
	Great	6	1	Great	35	7	Most	4	1
Total (1258)	None	827	66	None	458	36	None	1011	80
	Little	354	28	Little	499	40	Little	181	14
	Some	61	5	Some	194	15	Some	49	4
	Great	10	1	Great	104	8	Most	14	1

^aNumber of enrollees is shown in parentheses. Missing responses are not shown.

Table B.2

DISTRIBUTION OF RESPONSES TO DISEASE IMPACT QUESTIONS, BY ACNE STATUS:
ENROLLEES WHO COMPLETED MHQ^a

Acne Status ^a	Pain			Worry			Avoidance of Conversation		
	Level of Impact	No.	Percent	Level of Impact	No.	Percent	Level of Impact	No.	Percent
Acne present in at least one photograph (513)	None	323	63	None	176	34	None	388	76
	Little	141	27	Little	177	35	Little	84	16
	Some	42	8	Some	101	20	Some	30	6
	Great	4	1	Great	58	11	Most	10	2
Acne not present (2779)	None	2696	97	None	2629	95	None	2755	99
	Little	75	3	Little	116	4	Little	18	1
	Some	7	(b)	Some	22	1	Some	5	(b)
	Great	0	0	Great	11	(b)	Most	0	0
Not present in any photograph (54)	None	37	69	None	28	52	None	50	93
	Little	15	28	Little	19	35	Little	2	4
	Some	2	4	Some	5	9	Some	2	4
	Great	0	0	Great	2	4	Most	0	0
Not present; no photograph taken (2725)	None	2659	98	None	2601	95	None	2705	99
	Little	60	2	Little	97	4	Little	16	1
	Some	5	(b)	Some	17	1	Some	3	(b)
	Great	0	0	Great	9	(b)	Most	0	0
Acne status unknown; photograph not taken/read (27)	None	24	89	None	18	67	None	27	100
	Little	3	11	Little	8	30	Little	0	0
	Some	0	0	Some	1	4	Some	0	0
	Great	0	0	Great	0	0	Most	0	0
Acne status unknown; answered Form B but not screened (2031)	None	1876	92	None	1727	85	None	1933	95
	Little	135	7	Little	198	10	Little	79	4
	Some	12	1	Some	70	3	Some	14	1
	Great	6	(b)	Great	35	2	Most	4	(b)
Total (5350)	None	4919	92	None	4550	85	None	5103	95
	Little	354	7	Little	499	9	Little	181	3
	Some	61	1	Some	194	4	Some	49	1
	Great	10	(b)	Great	104	2	Most	14	(b)

^aNumber of enrollees is shown in parentheses. Missing responses are not shown.

^bLess than 0.5 percent.

APPENDIX C

ACNE QUALITY OF CARE CRITERIA

All criteria listed below, unless otherwise specified, refer only to enrollees who have acne vulgaris according to the HIS definition (see Chapter 4). Alternative forms of some criteria are stated below. They may be tested to see if the insurance plan effects differ for slight variations in the threshold value of the criterion. "He" refers to both men and women.

PATIENT OUTCOMES

1. If the enrollee had acne at the time of the enrollment screening examination, then the acne is improved at the time of the exit screening examination.
2. The enrollee with acne reports no higher number of acute disability days than enrollees in the same age group without acne.
3. The enrollee reports "no pain at all" when asked about pain caused by acne on the exit Medical History Questionnaire (MHQ).
4. The enrollee reports "not at all" or "a little" when asked about worry or concern related to acne on the exit MHQ.
5. The enrollee reports "none of the time" or "a little of the time" when asked on the MHQ about avoiding conversation with people because of acne.

PROCESS—THERAPY

1. If the enrollee has had at least two visits during the HIS for a primary diagnosis of acne, then, on at least one visit for which the diagnosis of acne is listed, the enrollee has written "acne" as the reason for the visit.
2. If the enrollee receives an antibiotic for acne, that antibiotic is either a tetracycline (or minocycline) or an erythromycin.
3. If the enrollee receives either a tetracycline or an erythromycin for acne for more than 8 weeks, the prescribed dosage after the 8-week period is 1 g daily or less. If the enrollee receives minocycline

for acne for more than 8 weeks, the prescribed dosage after the 8-week period is 200 mg daily or less.

4. The enrollee does not receive a penicillin, a cephalosporin, a sulfa drug, or systemic clindamycin for acne.

5. If the enrollee has inflammatory changes at the screening examination, then he is either currently receiving an antibiotic for acne or has received antibiotics in the past.

6. The enrollee has not received oral steroid therapy for longer than 14 days.

7. The enrollee has not received vitamin injections for acne.

8. The enrollee has not received unknown injections for acne.

9. The enrollee has not received x-ray skin treatments.

10. The enrollee has not received bacterial skin antigen injections.

11. The enrollee has not received ACTH, androgens, iodides, or bromides.

PROCESS—UTILIZATION

1. If the enrollee had moderate to severe acne at the enrollment screening examination, then he had at least one visit during the first 4 months of enrollment in the HIS in which acne (or rule-out acne) was one of the diagnoses.

2. If the enrollee had severe acne at the exit screening examination, then he is under the care of a physician for acne (four or more visits for acne during the past year). Alternatively, if the enrollee had moderate to severe acne at the exit screening examination, then he is under the care of a physician for acne (two or more visits for acne during the past year).

3. If the enrollee is taking antibiotics for acne, then he has at least one visit for acne every 6 months (no more than 7 months between visits) while on the antibiotic.

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