erations removed from the hemophilic patient, was at risk of being affected but was apparently normal. This family therefore appears to represent concealment of the hemophilic gene by its passage in female members of the family through several generations until it was expressed in the "new case." In other families, however, we have obtained evidence that mutation to the abnormal gene occurs and is detectable by laboratory methods. In the family shown in Figure 4, mutation to the abnormal gene appears to have occurred on the X chromosome from which the affected individual arose, since his mother and both his sisters had normal results in the tests. In contrast, in the family shown in Figure 5, the mutation presumably occurred in one of the gametes or the zygote from which the patient’s mother developed, for she tested as a carrier whereas her mother, aunt and cousin were normal; similar conclusions may be drawn in the other two families described but not shown in the figures.

Our findings therefore provide evidence that comparison of the plasma levels of antihemophilic-factor procoagulant and antigen represents a useful method of establishing the presence or absence of the carrier state in female relatives of hemophilic patients before they have male children. Use of these technics has produced new evidence that mutation to the hemophilic gene occurs and that this mutation may occur in an X chromosome from which the hemophilic patient or his mother has arisen, or in a female of an earlier generation. As of January 11, 1973, 34 daughters of carriers had been tested, of whom 17 had evidence of the carrier state by the criteria described.

We are indebted to Miss Helen Opaskar for assistance in the performance of these studies, and to Miss Nancy A. Symon for help in the analysis of the data.

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SPECIAL ARTICLE

HIDDEN CONCEPTUAL MODELS IN CLINICAL PSYCHIATRY

Aaron Lazare, M.D.

Abstract Clinical psychiatry commonly makes use of four conceptual models — the medical, psychologic, behavioral, and social — in evaluating and treating patients. The test of clinical skill is the assemblage of an appropriate mix for a particular case. In practice, the choice of a model (or models) is implicitly determined by several variables, which include diagnosis, the effectiveness of available treatments, the immediacy of the social situation, the social class of the patient, and the ideology of the therapist.

The complexity of the decision-making process resulting from the use of several models may unnecessarily limit the treatment options of the psychiatrist and may bewilder the nonpsychiatrist. If the conceptual models and their use in clinical psychiatry are made explicit, a broader range of treatment modalities should be made available, and communication between physicians should be enhanced.

Many physicians find it difficult to understand how a psychiatrist selects the clinical data that he considers relevant, how he formulates a case and how he chooses the treatment he prescribes. In the psychiatrically ill patient, is it the symptom complex, the "unconscious conflict" or the abnormality in family interactions that contains the key to clinical decision making? How is it that one psychiatrist will emphasize electroconvulsive therapy or tricyclic antidepressants, another individual therapy, and a third family therapy for apparently similar patients? Why is it apparently easier to formulate and implement a treatment plan for a patient suffering from a medical illness such as congestive heart failure?

One major reason for the difficulty in understanding psychiatric thinking is that several different conceptual

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models are implicitly used in the clinical formulation but rarely identified as such. The four most common models are the medical, the psychologic, the behavioral, and the social. When a patient is treated, the kind of history obtained, the meaning assigned to certain historical facts, and the treatment modalities most often chosen depend on what model or combination of models is employed. These points are illustrated by four case histories of the same middle-aged depressed female patient. Each history is formulated in terms of one of the four conceptual models.

**CASE HISTORY — MEDICAL MODEL**

Mrs. J., a 53-year-old widow, gave a history of a depressive syndrome. During the past few months she had lost 9.1 kg in weight, had early morning awakening, and had a diurnal variation in mood manifested by feeling better as the day went on. She described herself as feeling hopeless, helpless, and worthless. There was some retardation of speech. She denied suicidal intent and presented no evidence of delusions or paranoid ideation. Twenty-three years previously a similar episode of depression had remitted spontaneously. The patient had a sister who was hospitalized for a depressive illness that responded positively to electroconvulsive treatments.

**CASE HISTORY — PSYCHOLOGIC MODEL**

Mrs. J., a 53-year-old widow, had been depressed for a few months after the death of her husband. Although the marriage seemed happy at times, there were many stormy periods in their relation. There had been no visible signs of grief since his death. Since the funeral, she had been depressed and had lost interest in her surroundings. For no apparent reason she blamed herself for minor events of the past. Sometimes she criticized herself for traits that characterized her husband more than herself. She had had a similar reaction after the death of her mother 23 years previously, when she and her mother had lived together. From the family history, it could be inferred that the relation was characterized by hostile dependency. Six months after her mother’s death, the patient married. She seemed intelligent and motivated for treatment, and had considered psychotherapy in the past to gain a better understanding of herself.

**CASE HISTORY — BEHAVIORAL MODEL**

Mrs. J., a 53-year-old widow gave a history of depressive behaviors of anorexia, insomnia, feelings of hopelessness, helplessness, and worthlessness. These behaviors had begun shortly after the death of her husband. Throughout the marriage, he had been a continuous source of reinforcement to the patient. This quality of the husband’s interaction with his wife had been evident since the marriage, at a time when the patient was still depressed after her mother’s death. The family stated that the husband had always ignored the patient’s demands and pleas of helplessness while responding actively to the more positive aspects of her personality. After his death, she began to complain to her children about her loss of appetite and her sense of helplessness. They responded to these complaints with frequent visits and telephone calls, but the depressive behavior only worsened.

**CASE HISTORY — SOCIAL MODEL**

Mrs. J., a 53-year-old widow, had been depressed during the past few months since the death of her husband. He had been the major figure in her life, and his loss has left her feeling lonely and isolated. After his death, she moved to a small apartment, which was some distance from her old neighborhood. Although she was satisfied with her new quarters, she found the community strange. Furthermore, she did not have access to public transportation, which would have enabled her to visit her old friends, children, and grandchildren. Since her husband’s death, old strains between the patient and her children had been aggravated.

These four histories could each have been elicited from the same patient by four different clinicians, each employing a different conceptual model in formulating the case. This use by psychiatrists of different conceptual models often bewilders the nonpsychiatrist, who sees patients with similar symptoms diagnosed and treated differently. The psychiatrist himself, by using one model to the exclusion of others, unnecessarily limits his treatment options.

This paper will first describe the four most frequently employed conceptual models for the diagnosis of psychiatric illness by reference to the histories cited above. It will then attempt to show how in everyday practice the decision to use one or a combination of models is implicitly determined by the interplay of physician, patient and clinical situation. By making explicit the implicit, the decision-making process in clinical psychiatry can become more rational, a broader range of treatment modalities should be made available, and the communication between physicians should be enhanced.

**FOUR MAJOR MODELS**

**The Medical Model**

The medical model views psychiatric illnesses as diseases like any others. For each disease, it is supposed that there eventually will be found a specific cause related to the functional anatomy of the brain. The physician using the medical model concerns himself with etiology, pathogenesis, signs and symptoms, differential diagnosis, treatment and prognosis. Knowing the syndrome or disease determines the treatment. Although he addresses his patients with proper medical respect, he keeps his distance so as to maintain objectivity.

Consider the case history according to the medical model. The psychiatrist, in eliciting the history of the symptom picture, observes a group of symptoms consistent with the cluster of endogenous depression. The current syndrome, the earlier episode of depression, and the family history make the diagnosis of manic-depressive illness (depressed type) the most probable. The patient’s relation with her family, her ambivalence toward her husband and her motivation to understand her illness are interesting, are perhaps even relevant, but not central to the recognition of the illness. Antidepressant medications or electroconvulsive treatments will be the treatment of choice. The patient will be told that she is suffering from a depression, a psychiatric illness, which is not uncommon in her age group. The illness is time limited and, with proper treatment, has a favorable prognosis.

**The Psychologic Model**

According to the psychologic model, the developmental impasse, the early deprivation, the distortions in early relations, and the confused communication between parent and child lead to the adult neuroses and vulnerabilities to certain stresses. As a result of these psychologic determinants, we see patients who distort...
realistic, who are prone to depression, who avoid heterosexuality, or who fear success. The social setting may be changed, psychotropic drugs may be given, but the abnormality remains because the personality is abnormal.

Therapy consists of clarifying the psychologic meaning of events, feelings, and behaviors. The patient is taught how to experience appropriate feelings and how to bear “unbearable” feelings. Forgotten events may be remembered, re-experienced, and then put into perspective so that the patient can be freed to see current situations as they really are. As a result, growth and maturity are enhanced.

Most important to the therapeutic situation is the doctor-patient relation. It is the therapeutic alliance between the two that will enable the patient to remember what she has not wanted to remember and to abandon familiar but pathologic ways of coping. It is through the vehicle of the therapeutic relation — by experiencing these feelings toward the therapist — that the patient will recreate some of his previous pathologic relations to important others and have the opportunity for a “corrective emotional experience.”

Returning to the case history — the psychiatrist, using the psychologic model, first takes note of the problems in the marital relation. He pays special attention to the absence of grief, which has psychologic meaning and is related to her ambivalent feelings toward her husband. A similar reaction after her mother’s death suggests the possibility of a psychologic connection between her feelings toward both husband and mother. This is reinforced by the history that she married only six months after the death of her mother. The patient’s criticism of herself in terms that she had used to criticize her husband suggests Freud’s concept of introjection of the lost object. Since the primary modality of treatment is psychotherapy, it is a favorable sign that she is motivated to gain a better understanding of herself.

**The Behavioral Model**

According to the behavioral model, both neurosis and psychosis are examples of abnormal behavior that has been learned as a result of aversive events and are maintained either because they lead to positive effects or because they avoid deleterious ones. The overt symptoms are the ones that require treatment since they themselves are the problem and not secondary manifestations of disease or unconscious conflict. The typical therapeutic course includes: (1) determining the behavior to be modified; (2) establishing the conditions under which the behavior occurs; (3) determining the factors responsible for the persistence of the behavior; (4) selecting a set of treatment conditions; and (5) arranging a schedule of retraining. The conditions that precede the behavior may be modified by such technics as desensitization, reciprocal inhibition, and conditioned avoidance. The conditions that result from the behavior may be modified by positive reinforcement, negative reinforcement, aversive conditioning, and extinction.

Considering the case history according to the behavioral model, the psychiatrist first identifies the pathologic behaviors of anorexia, insomnia, and feelings of helplessness. He then determines the empirical relation between the depressive behaviors and the antecedent and consequent environmental events that precipitate and maintain the depression. The death of the husband, considering the history of the marriage, is interpreted as a sudden withholding of positive reinforcement of adaptive behavior. The attention received from family members inadvertently reinforces the depressive behaviors.

Treatment consists of reinforcing adaptive behaviors incompatible with depression and extinguishing depressive behaviors. The psychiatrist may accomplish these therapeutic goals by teaching the family to respond positively to the adaptive behavior instead of the depressive behavior or by purposefully encouraging the patient to express feelings incompatible with depression.

**The Social Model**

The social view of psychiatric illness focuses on the way in which the individual functions in social system. Symptoms are traced not to conflicts within the mind, not to manifestations of psychiatric disease, but to the “relationship of the individual to his manner of functioning in social situations — i.e., in the type and quality of his ‘connectedness’ to the groups which make up his life space.” Symptoms may therefore be regarded as an index of social disorder. Accordingly, when a socially disruptive event occurs such as a daughter’s leaving the home, a wife’s death, a geographic displacement by urban renewal, a war, or an economic depression, the resultant symptoms are seen as stemming from the social disorder.

Treatment consists of reorganizing the patient’s relation to the social system or reorganizing the social system. If others do not seem to care, how can she get them to care? If the patient’s behavior is irrational, how can she learn to stop acting irrationally, or how can her family better tolerate the behavior? If the therapist wants to restructure the “nuclear” social system, he may see the patient with her family. If the therapist wants to affect the broader social system, he may attempt to influence major social issues such as housing or education.

The psychiatrist, using the social model to study the case, notices that the patient’s social matrix has been altered in two ways. In the first place, she has permanently lost the one person to whom she has been closest. Secondly, by moving, she has placed herself in a situation where she has lost access to those with whom she had previously related. In individual or group therapy, one could temporarily substitute a transitional social system. Simultaneously, the therapist would attempt to re-establish a social field in which she could be com-
fortable after discharge. To this end, he might encourage her to move to a home where she could have better access to family and old friends. He might work with the family to repair any estrangement. He might suggest a return to work. Continued individual or group therapy might help her acquire social skills that she might never have developed in the marital situation.

**Choice of Conceptual Model**

The psychiatrist implicitly uses one or a combination of conceptual models in evaluating and treating the patient by the process referred to as clinical judgment. He may make the selection according to the results of outcome studies. He may select the conceptual model on practical grounds: “This is the only available treatment; let’s make the best of it.” Sometimes he decides on ideologic grounds. In this section, I will attempt to describe some of the variables that determine the choice of conceptual model in clinical practice.

**Ideology of the Therapist**

Studies of the attitudes of psychiatrists toward the understanding of mental illness have concluded that several ideologies exist. Ideology here refers to a coherent system of ideas subscribed to by a subgroup of the profession as a whole. Armor and Klerman point out that ideologic factions are most likely to occur when the codified knowledge base is markedly incomplete or ambiguous about the means to be used to attain a professional goal.19 This is precisely the position of psychiatry today.

Studies of psychiatric ideologies describe three basic orientations: medical (somatotherapeutic, directive, organic); psychologic (psychotherapeutic, analytic, psychologic); and social (sociotherapeutic).16–20 These studies do not explore the behavioral orientation, which, in contrast to the other three, has received its greatest impetus from psychologists. Of the ideologies described above, it must be remembered that only a small number of psychiatrists can be rigidly classified into a single ideology. More commonly, the psychiatrist is committed in various degrees to one or more ideologies.

**Diagnosis and the Effectiveness of Somatic Treatment**

Other things being equal, particular psychiatric syndromes are more apt to be viewed by one model in preference to another. The schizophrenic and manic-depressive psychoses are apt to be conceptualized primarily as medical illness. This is supported by the mounting evidence of genetic transmission of the schizophrenias21 and some of the depressive illnesses22 and by the clear-cut efficacy of phenothiazines for the treatment of schizophrenia, lithium for the treatment of manic-depressive illness, and the tricyclics, monoamine oxidase inhibitors, and electroconvulsive therapy for the treatment of the endogenous depressions. In current practice, social treatments, especially in inpatient settings, are combined with the medical approaches described above. The zeal for psychotherapeutic intervention in these syndromes has certainly lessened over the past decade, although that approach continues to enjoy considerable support.

The neuroses are more apt to be treated by the psychotherapeutic approach, although some psychiatrists maintain a medical model of neurotic behavior.23 For these disorders, syndromes are less clearly separable, there is no definite evidence of genetic transmission, and medication has less specific effects. Furthermore, the efficacy of psychotherapy in these disorders is gaining support from clinical research.24–26

Clinical phenomena currently thought by many psychiatrists to be more a social disorder than a psychologic or medical illness are drug abuse and many forms of violence. From the social perspective, changes in society, rather than massive psychotherapy programs or breakthroughs in psychopharmacology, will be necessary to effect change in these problems.

**Social Class and Other Attributes of the Patient**

A number of studies have demonstrated the importance of the patient’s social class in the application of psychotherapy.26–29 Patients of the middle and upper social classes are more apt to be accepted for, and to continue in, psychotherapy. Patients of the lower and lower-middle class, in contrast, have a poorer chance of being accepted for therapy and drop out of treatment at higher rates.30 Other patient characteristics that determine the use of psychotherapy include responsibility, verbal intelligence, psychologic mindedness, the capacity for forming a close personal relation, young adult age, history of effective adaptation before the current difficulty, likeability, and attractiveness.31 In addition, patients treated by psychotherapy are apt to continue in treatment when their expectations are congruent with those of the therapist.32

Such a patient population, presenting as they often do as relatively healthy people who want help in achieving personal fulfillment (greater psychologic strength, more satisfactory relationships, comfort with their sexual identity, etc.), may be rejected by the medical psychiatrist as “not mentally ill.”

Although a psychotherapeutically oriented psychiatrist may attempt to explain and understand most or all of pathologic and normal behavior by psychoanalytic theory, he is likely not to take patients into treatment if they want medication or advice, if they have had previous psychiatric hospitalization, if they are authoritarian in personality, if they are vulnerable to psychosis, if they are psychotic or older, or if they present a multitude of somatic complaints.31

**Available Services**

The available treatment resources are an important determinant of the choice of model. Psychotherapy clinics, especially when not overcrowded, attempt to apply psychotherapy in understanding of patients. Walk-in and emergency clinics, in responding to large numbers of patients, approach the patient from social
and medical perspectives that usually require less time from the psychiatrist but are effective for many clinical conditions.

There are many psychiatric hospitals that specialize in the application of electroconvulsive treatments. These facilities, in their application of the medical model, frequently overdiagnose syndromes as responsive to this form of therapy. In similar fashion, psychiatric hospitals that specialize in social (family therapy, therapeutic communities) or psychologic techniques (intensive individual psychotherapy) may regard medical treatments such as electroconvulsive treatments and psychotropic drugs as offering “only” symptomatic relief even when it is likely that such a treatment will produce marked clinical remission.

Immediacy of the Social Situation

Where the social cause is obvious, pressing, and immediate, first consideration is usually given to a social treatment. If a child is apathetic and withdrawn as a result of a continuous psychologic and physical assault at the hands of his parents, the child must initially be treated by a change in his social situation. Either the parents must change their behavior, or they must be separated from the child. If a soldier becomes psychotic in combat, the initial treatment must be his removal from the front line. Psychologic attempts at treatment during a social crisis are usually unsatisfactory.

DISCUSSION

The various conceptual models in clinical psychiatry may lead some to draw a comparison to the Tower of Babel, where confusion reigned because many languages were spoken. To the contrary, I believe the current positions of the medical, psychologic, behavioral and social models attest to the vitality of psychiatry as it attempts to understand the complex problems of abnormal behavior.

The medical model, after giving psychiatry its classification of mental illness in the late 19th century, has provided the conceptual foundations for (1) the development and use of the antipsychotic and antidepres- sant medications, (2) studies of the genetic transmission of mental illness, and (3) metabolic studies of psychiatric illness, especially the depressions. The most important events in all the above three areas have occurred since 1950.

The psychologic model has exerted considerable influence not only on American psychiatry but also on everyday thinking. Its derivative, psychotherapy, has become a commonly accepted treatment of choice, especially for the neuroses and personality disorders. Advocates of the psychologic model, especially since World War II, have been able to translate the clinical insights derived from classical psychoanalysis and more recent developments of ego psychology into concepts that residents in nearly all training centers in the United States can use in the understanding of most psychiatric patients.

The behavioral model, resting on theoretical foundations from the early 20th century, began its period of rapid growth in the late 1950’s. Its derivative, behavior therapy, has enjoyed considerable interest in the clinical field during the relatively brief period of its existence. Behavior therapists are hopeful of offering several possible advantages to other forms of treatment, including shorter duration of treatment and applicability to a broad range of patients.

The social model, like the medical, psychologic and behavioral, was reawakened in the 1950’s. Since that time the psychiatric ward has been viewed as a social system, the relation between social class and mental illness has been established, and federal legislation to provide psychiatric care for catchment areas in the community has been enacted. During these years, various treatment modalities have succeeded as treatment for the mentally ill patient with minimal separation from his social milieu.

It is unfortunate that the conceptual models have remained so separate from each other. To the degree that this occurs, communications between professionals are impaired, progress requiring a broad focus is slowed, and treatment options are unnecessarily limited. There are several forces, however, that are forging the various models into a multidimensional framework:

1. Mounting evidence for the effectiveness of particular treatment does in time overwhelm partisan advocacy of a theoretical position. For example, the success of lithium in the prevention of recurrences of manic-depressive illness has led to its more widespread use in preference to wholly psychodynamic approaches.

2. Over the last two decades, the almost monolithic influence exercised by psychoanalysis on American psychiatry has waned as evidenced by appointments of chairmen of academic departments of psychiatry with more eclectic interests and a greater competence in basic research.

3. Psychiatric residents, moved by the concern for the large number of patients excluded from psychiatric consideration by the limited use of models, have insisted on broader grounding in a wide variety of treatment approaches.

4. Theoretical bridges between models point the direction toward a unified theory of human behavior. For example, attempts have been made to demonstrate how behavioral technics are involved in dynamic psychotherapy, how the psychoanalytic approach to symptom formation can be understood as a social process, and how medical problems related to the autonomic nervous system can be approached by means of behavioral technics.

Conceptual Problems

Despite these favorable trends, serious conceptual difficulties remain. Whereas human beings are simultaneously biologic organisms, psychologic selves, behaving animals, and members of social systems, we lack a comprehensive set of general “laws” that include...
the models described here as medical, psychologic, behavioral and social. Failing that, we must come to terms with the following observations:

1. No model offers a complete explanation for the phenomena to which it addresses itself. Each model by its very definition ignores a universe of phenomena that are important in the patient's life and function. In limited cases, nevertheless, a single conceptual model will suffice to explain the disorder and provide treatment. The hallucination of a patient suffering from bromidism may indeed reflect prior personal experience, but the patient can be restored to health by detoxification with no attention paid to the psychologic content of his hallucinations.

2. Any two conceptual models may offer alternative explanations for the same behavioral events. For example, the psychodynamic psychiatrist may argue that the relief of phobias obtained by "reciprocal inhibition" is in fact a "transference cure" — that is, it is the relation between the therapist and patient, rather than the technics of relaxation and desensitization to fear, that accounts for the beneficial outcome. Contrariwise, the behaviorist may contend that the psychotherapist is employing reinforcement methods rather than psychodynamic principles in shaping the behavior of his patient.

3. In applying more than one conceptual model in treating a given patient, we must recognize the possibility of apparent contradictions. In other words, pieces borrowed from more than one theory for simultaneous use in a given case may be orthogonal to one another. As a result, we give our patient mixed messages. For example, a schizophrenic patient may simultaneously be given medication (which implies a biologic basis for his disorder), be offered psychotherapy (which implies that past experience accounts for present dysfunction), be a member of a therapeutic community (which implies that he must control the behavior that distresses others), and be subject to a "token economy" in which healthy behavior is rewarded by tokens that bring special privileges.

**Comparable Dilemmas in Medicine**

The importance of attention to each of the levels at which the patient functions is as important in other areas of medicine as it is in psychiatry. The patient with chronic rheumatoid arthritis suffers from a biologic disorder for which a number of nonspecific pharmacologic remedies exist. Whether the patient ends bedridden with ankylosed limbs may depend on how faithful he is in carrying out the prescribed exercises. This in turn will depend on his motivation, his relations to his physician and family, and the availability of facilities for physical therapy in the community. Disagreement between physicians about treatment is not unique to psychiatry. The patient with a bleeding peptic ulcer who consults a surgeon is more likely to have a gastrectomy than the one who consults an internist; a carcinoma of the breast will be treated by simple mastectomy in one hospital and by radical mastectomy in another.

The conceptual problems described in this paper reflect limitations in our understanding of human behavior. In good clinical practice, a psychiatrist will employ several conceptual models with the knowledge that all reflect some aspect of truth but all are incomplete versions of truth. The test of clinical skill is the assemblage of an appropriate mix for a particular case. To accomplish this best, the clinician should be explicit about the models that he employs in assessing a case and about the principles upon which he bases his treatment.

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**References**

MEDICAL INTELLIGENCE

BRIEF RECORDINGS

Screening for Thalassemia Trait by Electronic Measurement of Mean Corpuscular Volume

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Thalassemias are a group of hereditary blood conditions with clinical and genetic implications that occur frequently in Mediterranean ethnic groups. There have been few attempts to screen high-prevalence populations for thalassemia trait in the United States, and a major deterrent has been the lack of a reliable, inexpensive screening method. The studies described below indicate that electronic determination of red-cell mean corpuscular volume is a valid screening test for thalassemia trait.

A comprehensive pilot screening program for thalassemia trait was offered to members of two Greek Orthodox churches, and to families of persons known to have thalassemia; 300 subjects were tested. Venous blood was drawn into sodium edetate (Versene) anticoagulant and plain tubes. Serum was used for iron studies in selected cases. Anticoagulated blood was studied with the use of the Model S Coulter electronic counter, which directly measures red-cell count, hemoglobin and mean corpuscular volume, and automatically derives hematocrit, mean corpuscular hemoglobin and mean corpuscular hemoglobin concentration. Of the initial 200 persons tested, all had quantitation of hemoglobins A2 and F. In the next 100 tested, hemoglobins A2 and F were determined only if the mean corpuscular volume was less than 79 μL. All subjects with mean corpuscular volume less than 79 μL and hemoglobin A2 levels less than 3.5 per cent had iron studies. In those assumed to have α-thalassemia, family studies were done. Complete studies were also done on any definitely anemic person. Cellulose acetate hemoglobin electrophoresis was done on all specimens.

RESULTS

Of the first 200 subjects 46 had microcytosis, defined by a mean corpuscular volume less than 79 μL. A diagnosis of β-thalassemia trait, based on microcytosis and elevated hemoglobin A2, was made in 25 persons. The combination of microcytosis, normal hemoglobins A2 and F, and normal iron studies indicated α-thalassemia trait when the same findings were documented in a first-degree relative. Fourteen cases of α-thalassemia trait occurred in two unrelated families in which two cases of hemoglobin S α-thalassemia were also found. One patient with hemoglobin S β-thalassemia dis...