# Approaches & Techniques

## A Disease Classification System for Analysis of Medical Care Utilization, with a Note on Symptom Classification

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### I. DISEASE CLASSIFICATION SYSTEM

The many disease classification systems that have been used in medicine and biomedical research have been based on various dimensions of disease, including etiology, pathology, pathophysiology, prognosis, and combinations of these. These systems have been developed to suit the needs of medical practitioners, biomedical scientists, and other groups of health workers, each group selecting the classification system that most nearly fits its needs.

The common disease classification systems in use today, including the *International Classification of Diseases, Adapted* (ICDA) [1], are not primarily designed for or particularly adaptable to the analysis of medical care utilization. These classification systems were developed for other biomedical uses, particularly the reporting of mortality statistics. Tyroler, in a recent review of disease classification, pointed out that the ICDA was useful in an era when death rates could be used as indicators of the need for and the effectiveness of general health services. He argued that classifications developed for purposes other than investigating health services utilization are not likely to be the most useful for analysis of utilization behavior; that there is no reasonable expectation that a universal system of disease classification, appropriate for all medical purposes, will be designed; and that the needs of health services utilization analysis vary with the purposes of analysis and require, at a minimum, the inclusion of the perspectives of both the population and the providers in the classification system [2, p. 50].

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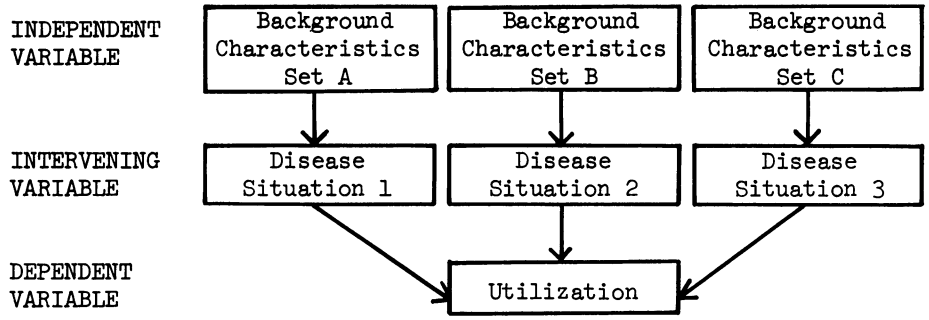
## Objective

The disease classification system reported here was developed for a medical care utilization study at the Health Services Research Center of the Kaiser Foundation Hospitals in Portland, Ore. [3]. The study seeks to identify significant determinants of medical care utilization by investigating the relationships among background characteristics of patient populations, disease patterns, and medical care utilization. It was posited that different sets of background characteristics are significant determinants of medical care utilization in different disease situations, as illustrated schematically in the following diagram:




The emphasis is on studying the full range of medical care services, including professional visits in the clinic, home, or emergency room, hospital services, telephone calls and letters, and laboratory and x-ray services. Since the vast bulk of morbidity in our society is treated outside of hospitals, the disease classification system was designed primarily to reflect this broad spectrum of conditions and does not provide a fine breakdown of diseases for which institutional care is required.

Since the general analytic framework of the study is based on the hypothesis that different sets of background characteristics are significant determinants of medical care utilization in different disease situations, it was necessary to design a disease classification system focusing on the impact of diseases on individuals' utilization behavior. Neither the ICDA, which groups diseases by anatomic or etiologic dimensions, nor any other reported classification system was appropriate for this purpose; what was needed was a classification system that would group those diseases likely to produce similar behavioral responses in persons with similar background characteristics.

### Structure of the Classification System

Such a classification system could be developed empirically by analysis of utilization data or could be specified on an a priori conceptual basis. The latter approach was chosen. The classification system, designated the Kaiser Clinical–Behavioral Classification System, reflects a clinical reality as viewed by the physicians involved in the project but also classifies disease in a manner consistent

with the project's analytic framework. Recognizing that flexibility is especially important in the early stages of health services utilization research, since the literature provides little conceptual basis for attacking the taxonomic problem, the analysis design calls for extensive testing of the classification system on an empirical basis.

While the classification system does not maintain the structure of the ICDA, every condition classified in the ICDA is directly convertible to the new system. An expanded and modified version of the ICDA is used for the basic morbidity coding, which is done by technicians working directly with the patient records. Certain ICDA classifications were expanded by adding terminal digits, so that, for example, iron deficiency due to different causes could be coded separately. The expansion also allows for instances in which, for example, a recorded treatment (e.g., prescription of an antibiotic) indicates the etiologic agent. Thus the code for pharyngitis (472 in the ICDA) was expanded to include 472.0 (no antibiotic prescribed, no etiology mentioned); 472.1 (pharyngitis specified as viral); 472.2 (pharyngitis specified as bacterial); and 472.3 (pharyngitis not specified, antibiotic prescribed). ICDA numbers 472.2 and 472.3 are both considered as bacterial in origin, but ICDA 472.0 and 472.1 are classified as viral.

Each code in this expanded ICDA system is converted to a code in the Kaiser Clinical–Behavioral Classification System by a computer program. With the ICDA as the basic morbidity coding system, diseases can be grouped according to the special needs of the investigators and the system can be adapted to solving both clinical and behavioral research questions. (An additional classification system that was devised but is not presented in this paper includes 33 disease categories based on anatomic, etiologic, or other characteristics of diseases similar to the 17 basic disease categories of the ICDA but adapted for ambulatory care data [3].)

The first step in construction of the classification system was to group the conditions listed in the ICDA into four major divisions: diseases; pregnancy and its complications; trauma and adverse effects of external causes; and nondisease, refractive error, and miscellaneous. These four divisions in turn were broken down into 46 clinical subgroups, which were then combined to form 10 classes relevant to the analysis of medical care utilization behavior.

The 10 behavioral classes, each of which includes conditions posited to produce a similar medical care utilization response among persons of similar background characteristics, are as follows:

1. Diseases generally requiring hospitalization
2. Diseases with high emotional component
3. Chronic disease with no symptoms or nontreatable symptoms
4. Chronic disease with treatable symptoms
5. Acute microorganism disease
6. Acute nonmicroorganism disease
7. Symptoms of undiagnosed disease

8. Pregnancy and complications of pregnancy
9. Trauma and adverse effects of external cause
0. Nondisease, refractive error, and miscellaneous

Each class is identified by the first digit of a two-digit code. Thus all the subgroups falling within the first class, diseases generally requiring hospitalization, are coded from 11 to 19 (only numbers 11 to 14 being used at present, with numbers 15 to 19 reserved for additional subgroups within this class that may be needed later); the subgroups within the second class, diseases with a high emotional component, are coded from 21 to 29; and so on.

The basic structure of the classification system is shown in Fig. 1, with numbers corresponding to those designating the 10 classes listed above. Fig. 2 shows the 46 subgroups in outline form, with the two-digit codes that key them to the 10 utilization behavior classes.

The conditions coded in the ICDA were assigned to the various subgroups by the physicians working on the project on the basis of clinical criteria specific to the Kaiser medical care system; physicians working in other medical care systems might assign diseases differently. The pattern of hospitalization in the Kaiser system, for example, differs markedly from the patterns of hospitalization in other systems [4], so Kaiser physicians' judgments as to diseases generally requiring hospitalization are likely to be different.

Further, many ICDA conditions could be classified in more than one of the 46 subgroups represented in the classification system. Each disease was first classified in all the possible subgroups that could apply, then an attempt was made to select the subgroup characteristic that was most relevant to medical care utilization for each ICDA disease code. Thus a condition that generally requires hospitalization (except psychiatric hospitalization, as explained below) was placed in that category even if it also had an emotional component or was caused by a microorganism; a disease with a significant emotional component was placed in that category even if it was also a chronic disease. (The other pertinent categories were retained for each disease, since it is possible that later analysis will require reassignment of some conditions on the basis of secondary dimensions.) These evaluations were made independently by two of the research physicians, and differences were jointly resolved to produce the final assignment of each ICDA condition to only one of the 46 subgroups.

The 10 behavioral classes do not represent a simple cluster of the 46 subgroups. Some of the classes include subgroups from different clinical groups. For example, the third class, "chronic disease with no symptoms or nontreatable symptoms," includes four subgroups from the 12 included under chronic disease in Fig. 2, and "chronic disease with treatable symptoms" includes eight subgroups from the same 12. This differentiation was made because chronic diseases appear to group differently on clinical dimensions than on behavioral dimensions. The same phenomenon is exhibited in the classification of acute diseases in the two systems.

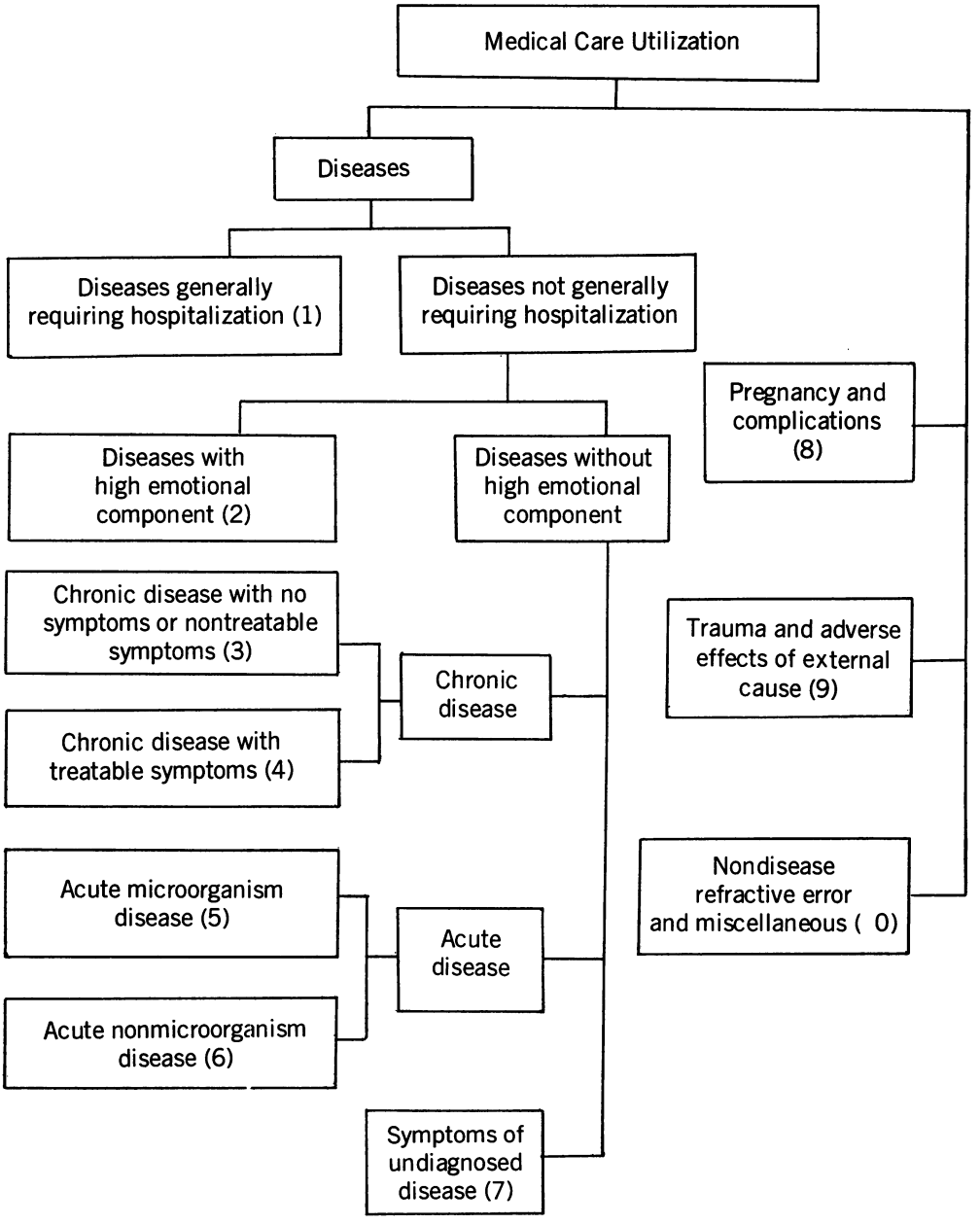



**Fig. 1. Basic structure of the Kaiser Clinical–Behavioral Classification System.**

DISEASES

- Diseases generally requiring hospitalization (except psychiatric hospitalization)
  - Requiring surgery
    - Usually emergency surgery (11)
    - Malignancy (14)
    - Usually nonemergency surgery (12)
  - Other (13)
- Diseases not generally requiring hospitalization
  - Diseases with high emotional component
    - Emotionally produced or aggravated diseases (21)
    - Diseases secondary to social or psychological disorganization (22)
    - Emotional disease (23)
  - Diseases without high emotional component
    - Chronic disease
      - With symptoms
        - Symptoms completely controlled under treatment (31)
        - Symptoms treatable, nonmalignant
          - Systemic or general (41)
          - Internal (CNS, intrathoracic, intraabdominal) (42)
          - Other (43)
          - Obesity (44)
        - Symptoms treatable, malignant
          - Systemic or general (46)
          - Internal (CNS, intrathoracic, intraabdominal) (47)
          - Other (48)
        - Symptoms nontreatable (32)
      - Without symptoms (33)
      - Birth injuries and congenital malformations (34)
      - Complications of other illnesses (45)
    - Acute disease
      - Microorganism-produced
        - Viral
          - Systemic or general (51)
          - Internal (CNS, intrathoracic, intraabdominal) (52)
          - Other (53)
        - Bacterial
          - Systemic or general (54)
          - Internal (CNS, intrathoracic, intraabdominal) (55)
          - Other (56)
        - Other
          - Systemic or general (57)
          - Internal (CNS, intrathoracic, intraabdominal) (58)
          - Other (59)
      - Non-microorganism-produced
        - Systemic or general (61)
        - Internal (CNS, intrathoracic, intraabdominal) (62)
        - Other (63)
      - Complications of other illnesses (64)
      - Complications of surgical and medical procedures (65)
    - Symptoms of undiagnosed disease (71)

PREGNANCY

- Prenatal and postnatal services (81)
- Complications (82)

TRAUMA AND ADVERSE EFFECTS OF EXTERNAL CAUSE

- Burns and traumatic injuries and adverse effects of chemicals and other external causes
  - Hospitalization usually required (91)
  - Hospitalization not usually required (92)
  - Late effect of trauma (94)
  - Hospitalization and surgery usually required (95)
- Adverse effects of drugs (93)

NONDISEASE, REFRACTIVE ERROR, AND MISCELLANEOUS

- Preventive services (01)
- No disease present (ICDA diagnosis) (02)
- Other (03)
- Refractions
  - Refractive error (04)
  - No refractive error (05)

Fig. 2. Clinical subgroups in the Kaiser Clinical–Behavioral Classification System.

## Assignment to Classification Categories

The clinical subgroups shown in Fig. 2 are largely self-explanatory. This section details some of the less obvious assignments of conditions to subgroups in the present study, on the basis of characteristics relevant to the study and to the system studied, with the reminder that the assignments may vary in different medical care systems.

As indicated earlier, because the research study is oriented primarily to the utilization of medical care services in nonhospital settings, the classification places less emphasis on fine subdivisions of inpatient hospital services. It will be seen from the outline in Fig. 2 that the system classifies diseases generally requiring hospitalization as requiring or not requiring surgery and, in the surgical group, differentiates emergency cases and those involving malignancy. The diseases in these subgroups are presumably considered more serious by patients and physicians. Diseases requiring emergency surgery are those in which surgery is necessary within a matter of hours after the onset of symptoms to alleviate the condition or to prevent significant deterioration. Malignancy is included as a separate subgroup because, although surgery is not generally of an emergency nature by this definition, it can be viewed by the patient as life-threatening and would appear to have a stronger impact than elective surgery on the patient's medical utilization behavior.

In the subgroups of diseases with a high emotional component, emotionally produced or aggravated diseases include those diseases which are characterized by a pathologic physical change and are apparently more likely than other diseases to be produced or aggravated by emotions. This subgroup includes the diseases sometimes designated as psychosomatic, such as neurodermatitis and duodenal ulcer. The second subgroup in this category includes those diseases produced in a context of social or psychological disorganization. Disorganization is not the primary etiological agent for these diseases, but rather provides an environment in which they are likely to develop. Included in this group are cirrhosis of the liver secondary to alcoholism, drug addiction, and venereal disease. The third category includes emotional disorders without organic manifestations, such as psychoses, neuroses, psychophysiologic disorders, and symptoms suggesting psychiatric disease.

In this classification system, diseases that would have a high likelihood of psychiatric hospitalization (which are not included in Class 1, diseases requiring hospitalization) are assigned to the appropriate subgroup of diseases with a high emotional component, not to a separate subgroup. It must be reemphasized that a disease classification system must be designed with specific objectives in mind; under other circumstances, diseases requiring psychiatric hospitalization might well require separate classification.

Both chronic and acute diseases are subdivided in the classification system to distinguish diseases with general manifestations or affecting internal organs from all others. It can be argued that these diseases have different significance for utilization, both to the patient and to the physician. Endocrine diseases were

classed as systemic when the morbidity involved the under- or overproduction of a hormone (e.g., thyrotoxicosis), rather than a local disturbance of endocrine tissue (e.g., pancreatitis).

Chronic disease includes all impairments or deviations from normal that are permanent, leave residual disability, are caused by nonreversible pathological alterations, require rehabilitative training of the patient, or may be expected to require a long period of supervision, observation, or care [5].

Chronic disease with symptoms completely controlled under treatment includes those conditions with a biological deficiency in which replacement eliminates the manifestation of the illness (e.g., pernicious anemia and myxedema). Obesity is included as a separate subgroup under chronic disease, symptoms treatable. This disease could have been included with diseases of high emotional component or with chronic disease, symptoms treatable, systemic, but since it accounts for a disproportionately large amount of service, its inclusion in either of these categories would prevent their appropriate analysis for conditions other than obesity.

Chronic disease with nontreatable symptoms or without symptoms includes defects in an organic structure (e.g., mental deficiency or benign goiter) as well as diseases that are residuals of earlier illness. Birth injuries and congenital malformations are included under chronic disease rather than in other possible subgroups because of the focus on outpatient services in this study: birth injuries in general, if followed on an outpatient basis, are usually considered chronic.

"Chronic complications of other illnesses" refers to new developments in a disease process that are not an inevitable part of the basic illness (e.g., retinopathy or neuropathy in diabetes).

Under trauma and adverse effects of external cause, the three subgroups 91, 92, and 95 are intended to represent an index of severity. Subgroup 94, late effects of trauma, could have been included in the area of chronic disease. For the present, however, it is included in this area, which combines those diseases essentially representing acute effects of trauma and external agents.

Subgroup 93 includes diseases that represent the adverse effects of drugs (medications). It is probable that this subgroup represents a different dimension of "adverse effect of external cause" and will require special handling in analysis. Combining of this subgroup with the subgroup "complications of surgical and medical procedures" (65) could provide an index of iatrogenic illness.

In the last main division of the outline, it should be noted that the subgroup "other" is rarely used and represents an insignificant part of outpatient services. Included in this subgroup are services for which the morbidity is not recorded in the chart and persons recorded as dead on arrival.

A catalog of assignments of all ICDA numbers is available from the authors, but to illustrate the system, the assignment of the ICDA codes for respiratory disease in the Clinical–Behavioral Classification System are presented in Table 1, which also illustrates the expansion of the ICDA codes previously noted.

**Table 1. Assignment of ICDA Codes for Respiratory Disease (ICDA 470–527) in Kaiser Clinical–Behavioral Classification System**

| ICDA number | ICDA name | Kaiser classification number |
|---|---|---|
| 470.0 | Acute nasopharyngitis (common cold) | 53 |
| 471.0 | Acute maxillary sinusitis | 59 |
| 471.1 | Acute frontal sinusitis | 59 |
| *471.4 | Acute sinusitis, not specified, no antibiotic given | 53 |
| *471.5 | Acute sinusitis, viral | 53 |
| *471.6 | Acute sinusitis, bacterial | 56 |
| *471.7 | Acute sinusitis, not specified, antibiotic given | 56 |
| 471.8 | Acute sinusitis, other specified sites | 59 |
| 471.9 | Acute sinusitis, unspecified, and pansinusitis | 59 |
| *472.0 | Acute pharyngitis, not specified, no antibiotic given | 53 |
| *472.1 | Acute pharyngitis, viral | 53 |
| *472.2 | Acute pharyngitis, bacterial | 56 |
| *472.3 | Acute pharyngitis, not specified, antibiotic given | 56 |
| 472.9 | Acute pharyngitis, other | 59 |
| *473.0 | Acute tonsillitis, not specified, no antibiotic given | 53 |
| *473.1 | Acute tonsillitis, viral | 53 |
| *473.2 | Acute tonsillitis, bacterial | 56 |
| *473.3 | Acute tonsillitis, not specified, antibiotic given | 56 |
| *474.0 | Acute laryngitis and tracheitis, not specified, no antibiotic given | 53 |
| *474.1 | Acute laryngitis and tracheitis, viral | 53 |
| *474.2 | Acute laryngitis and tracheitis, bacterial | 56 |
| *474.3 | Acute laryngitis and tracheitis, not specified, antibiotic given | 56 |
| 475.0 | Acute upper respiratory infection of multiple or unspecified sites | 56 |
| *476.0 | Unspecified respiratory infection, organism unspecified, no antibiotic given | 52 |
| *476.1 | Unspecified respiratory infection, viral | 52 |
| *476.2 | Unspecified respiratory infection, bacterial | 55 |
| *476.3 | Unspecified respiratory infection, organism unspecified, antibiotic given | 55 |
| 480.0 | Influenza with pneumonia | 52 |
| *481.0 | Influenza, unqualified | 51 |
| *481.1 | Influenza, respiratory | 52 |
| *481.2 | Influenza, respiratory and digestive system | 58 |
| 482.0 | Influenza with digestive symptoms but no respiratory symptoms | 52 |
| 483.0 | Influenza with nervous symptoms but no digestive or respiratory symptoms | 52 |
| *484.0 | Influenza syndrome with rash | 52 |
| *484.1 | Influenza syndrome manifested by arthritis and myositis | 52 |
| 490.0 | Lobar pneumonia, Friedlander's B | 13 |
| 490.1 | Lobar pneumonia, pneumococcus | 13 |
| 490.2 | Lobar pneumonia, staphylococcus | 13 |
| 490.3 | Lobar pneumonia, streptococcus | 13 |
| 490.8 | Lobar pneumonia, other specified organism or cause | 13 |
| 490.9 | Lobar pneumonia, unspecified organism or cause | 13 |
| 491.0 | Bronchopneumonia, Friedlander's B | 13 |
| 491.1 | Bronchopneumonia, pneumococcus | 13 |
| 491.2 | Bronchopneumonia, staphylococcus | 13 |
| 491.3 | Bronchopneumonia, streptococcus | 13 |
| 491.8 | Bronchopneumonia, other specified organism or cause | 13 |
| 491.9 | Bronchopneumonia, unspecified organism or cause | 13 |
| 492.0 | Primary atypical pneumonia | 13 |
| 493.0 | Other pneumonia, Friedlander's B | 13 |
| 493.1 | Other pneumonia, pneumococcus | 13 |

* Expanded ICDA classification.

*continued*

Table 1 (*cont.*)

| ICDA number | ICDA name | Kaiser classification number |
|---|---|---|
| 493.8 | Other pneumonia, other specified organism or cause | 13 |
| 493.9 | Other pneumonia, unspecified organism or cause | 13 |
| *500.0 | Acute bronchitis, not specified, no antibiotic given | 52 |
| *500.1 | Acute bronchitis, viral | 52 |
| *500.2 | Acute bronchitis, bacterial | 55 |
| *500.3 | Acute bronchitis, not specified, antibiotic given | 55 |
| 501.0 | Bronchitis, unqualified | 58 |
| 502.0 | Chronic bronchitis with emphysema | 42 |
| 502.9 | Chronic bronchitis, other (without emphysema) | 42 |
| *503.0 | Nonspecific respiratory disease secondary to smoking | 42 |
| 510.0 | Hypertrophy of tonsils and adenoids | 43 |
| 511.0 | Peritonsillar abscess (quinsy) | 56 |
| 512.0 | Chronic pharyngitis | 43 |
| 512.1 | Chronic nasopharyngitis | 43 |
| 513.0 | Chronic sinusitis, maxillary | 43 |
| 513.1 | Chronic sinusitis, frontal | 43 |
| 513.8 | Chronic sinusitis, other specified | 43 |
| 513.9 | Chronic sinusitis, unspecified, and pansinusitis | 43 |
| 514.0 | Deflected nasal septum | 43 |
| 515.0 | Nasal polyp | 43 |
| 516.0 | Chronic laryngitis | 43 |
| 517.0 | Paralysis of vocal cords or larynx | 35 |
| 517.1 | Polyp of vocal cords or larynx | 43 |
| *517.2 | Cricopharyngeal spasm | 43 |
| 517.3 | Other diseases of vocal cords not elsewhere classifiable | 43 |
| 517.4 | Spasm of larynx | 63 |
| 517.5 | Stenosis or edema of larynx | 63 |
| 517.6 | Turbinate hypertrophy | 43 |
| 517.9 | Other upper respiratory diseases | 63 |
| 518.0 | Empyema | 12 |
| 519.0 | Pleurisy without mention of effusion or tuberculosis | 55 |
| 519.1 | Pleurisy with effusion due to bacteria other than tuberculosis | 13 |
| *519.2 | Pleurisy with effusion of unknown etiology | 13 |
| 519.9 | Pleurisy with other specified forms of effusion except tuberculosis | 13 |
| 520.0 | Spontaneous pneumothorax | 11 |
| 521.0 | Abscess of lung | 12 |
| 522.0 | Pulmonary congestion and hypostasis | 35 |
| 523.0 | Silicosis | 42 |
| 523.1 | Anthracosilicosis | 42 |
| 523.2 | Asbestosis | 42 |
| 523.9 | Pneumoconiosis due to silica and silicates, other and unspecified | 42 |
| 524.0 | Other specified pneumoconiosis and pulmonary fibrosis due to occupation | 42 |
| 525.0 | Other chronic interstitial pneumonia | 42 |
| 526.0 | Bronchiectasis (with or without bronchitis) | 42 |
| 527.0 | Pulmonary collapse (1 year of age and older) | 13 |
| 527.1 | Emphysema without mention of bronchitis | 42 |
| 527.2 | Acute pulmonary edema, no mention of heart disease or failure | 13 |
| *527.3 | Lung shadow of unknown etiology | 62 |
| *527.4 | Scarring of lungs or pleura | 33 |
| 527.9 | Other diseases of lung and pleural cavity | 62 |

* Expanded ICDA classification.

## Uses of the Classification System

The Kaiser Clinical–Behavioral Classification System is useful for the analysis of medical care services treating the wide variety of illnesses found in a general population. For example, the amount of medical care resources required for the treatment of chronic ailments, pregnancies, and emotional disorders can be assessed by tabulating these services according to this classification system. Morbidity data have been collected for the utilization project since 1966. Tables 2–4 on the following pages, illustrating possible uses of the classification system, show the distribution of services for the study population in 1967 by presenting morbidity. (For a discussion of presenting morbidity, see Pope et al. [6].)

Table 2 shows the physicians' office visits and total services used by the population for each of the 46 subgroups of the Clinical–Behavioral Classification System as well as the total for the 10 behavioral classes. Physicians' office visits, both initial and continuing, are shown in Table 3 according to the 10 major classes of the system. To illustrate further the uses of such a classification system, age-specific utilization for the ten major classes is shown in Table 4. Similar tables could have been constructed using other demographic variables or other background characteristics available for the study population.

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## Table 2. Distribution of Physician Office Visits and Total Services by Clinical–Behavioral Disease Classification System

(Presenting morbidity only)

| Classification and code | Physician office visits | Total services* | |
|---|---|---|---|
| | | Number | Percent |
| All classifications | 11 111 | 19 458 | 100.0 |
| *Diseases requiring hospitalization* | *549* | *908* | *4.6* |
| Emergency surgery (11) | 32 | 56 | 0.3 |
| Malignancy surgery (14) | 124 | 205 | 1.0 |
| Nonemergency surgery (12) | 173 | 258 | 1.3 |
| Other (13) | 220 | 389 | 2.0 |
| *High emotional component* | *579* | *1 218* | *6.3* |
| Emotionally produced or aggravated diseases (21) | 185 | 298 | 1.5 |
| Diseases secondary to social or psychologic disorganization (22) | 53 | 111 | 0.6 |
| Emotional disease (23) | 341 | 809 | 4.2 |
| *Chronic (controlled, nontreatable or no symptoms)* | *151* | *238* | *1.2* |
| Symptoms controlled with treatment (31) | 23 | 49 | 0.2 |
| Symptoms nontreatable (32) | 14 | 30 | 0.2 |
| No symptoms (33) | 56 | 85 | 0.4 |
| Birth injuries and congenital malformations (34) | 58 | 74 | 0.4 |
| *Chronic (treatable symptoms)* | *2 826* | *4 501* | *23.3* |
| Nonmalignant: Systemic (41) | 227 | 424 | 2.2 |
| Internal (42) | 843 | 1 394 | 7.2 |
| Other (43) | 1 526 | 2 216 | 11.4 |
| Obesity (44) | 150 | 227 | 1.2 |
| Chronic complications of other illnesses (45) | 28 | 167 | 0.9 |
| Malignant: Systemic (46) | 22 | 31 | 0.2 |
| Internal (47) | 0 | 1 | † |
| Other (48) | 30 | 41 | 0.2 |
| *Acute microorganism-produced* | *2 356* | *3 608* | *18.5* |
| Viral: Systemic (51) | 117 | 253 | 1.3 |
| Internal (52) | 70 | 99 | 0.5 |
| Other (53) | 298 | 484 | 2.5 |
| Bacterial: Systemic (54) | 0 | 0 | – |
| Internal (55) | 274 | 437 | 2.2 |
| Other (56) | 930 | 1 444 | 7.4 |
| Other: Systemic (57) | 1 | 1 | † |
| Internal (58) | 81 | 170 | 0.9 |
| Other (59) | 585 | 720 | 3.7 |
| *Other acute and complications* | *277* | *448* | *2.3* |
| Nonmicroorganism: Systemic (61) | 1 | 4 | † |
| Internal (62) | 39 | 70 | 0.4 |
| Other (63) | 211 | 332 | 1.7 |
| Complications of other illnesses (64) | 6 | 14 | 0.1 |
| Complications of surgical and medical procedures (65) | 20 | 28 | 0.1 |
| *Symptoms of undiagnosed disease* (71) | *981* | *2 010* | *10.3* |
| *Pregnancy* | *628* | *754* | *3.9* |
| Prenatal and postnatal (81) | 605 | 641 | 3.3 |
| Complications (82) | 23 | 113 | 0.6 |

Table 2 (*cont.*)

| Classification and code | Physician office visits | Total services* | |
|---|---|---|---|
| | | Number | Percent |
| *Trauma, etc.* | *1 028* | *2 141* | *11.0* |
| Burns and traumatic injuries: Hospitalization required (91) | 32 | 66 | 0.3 |
| Hospitalization not required (92) | 876 | 1 808 | 9.3 |
| Hospitalization and surgery required (95) | 56 | 119 | 0.6 |
| Late effect of trauma or burns (94) | 11 | 13 | 0.1 |
| Adverse effects of drugs (93) | 53 | 135 | 0.7 |
| *Nondisease, etc.* | *1 736* | *3 632* | *18.6* |
| Preventive services (01) | 1 653 | 2 793 | 14.3 |
| No disease present (02) | 35 | 165 | 0.8 |
| Other (03) | 6 | 54 | 0.3 |
| Refractions (04–05)‡ | 42 | 620 | 3.2 |

* Any medical care service rendered in clinic, home, nursing home, emergency department, Kaiser inpatient or Kaiser extended care facility or by telephone call or letter; excludes laboratory, x-ray, EKG, and EEG services. Kaiser inpatient and Kaiser extended care facility count only one service per admission.

† Less than 0.05 percent.

‡ Subgroups 04 and 05 were not divided until after 1967.

## Table 3. Distribution of Physician Office Visits,* Initial and Continuing, By Clinical–Behavioral Classification System Major Classes

(Presenting morbidity only)

| Classification group | Initial visits | | Continuing visits | | Total visits | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| All classes | 3 878 | 100.0 | 5 698 | 100.0 | 9 576† | 100.0 |
| Diseases requiring hospitalization | 93 | 2.4 | 456 | 8.0 | 549 | 5.7 |
| High emotional component | 177 | 4.6 | 402 | 7.1 | 579 | 6.1 |
| Chronic (controlled, nontreatable or no symptoms) | 38 | 1.0 | 113 | 2.0 | 151 | 1.6 |
| Chronic (treatable symptoms) | 728 | 18.8 | 2 098 | 36.8 | 2 826 | 29.5 |
| Acute microorganism-produced | 1 402 | 36.2 | 954 | 16.7 | 2 356 | 24.6 |
| Other acute and complications | 141 | 3.6 | 136 | 2.4 | 277 | 2.9 |
| Symptoms | 661 | 17.0 | 320 | 5.6 | 981 | 10.2 |
| Pregnancy | 86 | 2.2 | 542 | 9.5 | 628 | 6.6 |
| Trauma, etc. | 430 | 11.1 | 598 | 10.5 | 1 028 | 10.7 |
| Nondisease, etc. | 122 | 3.1 | 79 | 1.4 | 201† | 2.1 |

* Excludes physician emergency department services.

† Excludes 1 535 visits for preventive services in which the initial–continuing classification is not applicable.

Table 4. Distribution of Physician Office Visits* for Age Groups by Clinical–Behavioral Classification System Major Classes

(Presenting morbidity only)

| Classification group | Total | | 0–4 yr | | 5–14 yr | | 15–24 yr | | 25–44 yr | | 45–64 yr | | 65–74 yr | | 75 yr + | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % |
| All classes | 11 105 | 100 | 1 016 | 100 | 1 759 | 100 | 1 320 | 100 | 2 754 | 100 | 2 775 | 100 | 1 008 | 100 | 473 | 100 |
| Diseases requiring hospitalization | 549 | 5 | 25 | 2 | 70 | 4 | 33 | 2 | 104 | 4 | 197 | 7 | 65 | 7 | 55 | 12 |
| High emotional component | 579 | 5 | 5 | 1 | 49 | 3 | 36 | 2 | 160 | 6 | 234 | 8 | 75 | 7 | 20 | 4 |
| Chronic (controlled, nontreatable or no symptoms) | 151 | 1 | 10 | 1 | 18 | 1 | 25 | 2 | 42 | 2 | 40 | 2 | 14 | 1 | 2 | † |
| Chronic (treatable symptoms) | 2 825 | 25 | 49 | 5 | 203 | 11 | 196 | 15 | 599 | 22 | 1 065 | 38 | 458 | 45 | 255 | 54 |
| Acute microorganism-produced | 2 356 | 21 | 408 | 40 | 647 | 37 | 274 | 21 | 507 | 18 | 354 | 13 | 114 | 11 | 52 | 11 |
| Other acute and complications | 277 | 3 | 13 | 1 | 33 | 2 | 48 | 4 | 65 | 2 | 76 | 3 | 30 | 3 | 12 | 2 |
| Symptoms | 981 | 9 | 72 | 7 | 185 | 10 | 104 | 8 | 284 | 10 | 227 | 8 | 77 | 8 | 32 | 7 |
| Pregnancy | 628 | 6 | 0 | – | 0 | – | 254 | 19 | 373 | 14 | 1 | † | 0 | – | 0 | – |
| Trauma, etc. | 1 028 | 9 | 68 | 7 | 225 | 13 | 154 | 12 | 250 | 9 | 250 | 9 | 59 | 6 | 22 | 5 |
| Nondisease, etc. | 1 731 | 16 | 366 | 36 | 329 | 19 | 196 | 15 | 370 | 13 | 331 | 12 | 116 | 12 | 23 | 5 |
| Population *N* | 4 010 | | 303 | | 874 | | 608 | | 990 | | 874 | | 264 | | 97 | |

* Excludes physician emergency department services.

† Less than 0.5 percent.

## II. A NOTE ON SYMPTOM CLASSIFICATION

In the utilization study for which the classification system described above was developed, it was found, as anticipated, that "symptoms" represented the final diagnosis for approximately 10 percent of patients utilizing outpatient services. This is typical of routine nonhospital medical practice, in which many self-limited conditions are not definitively diagnosed before patient care is terminated.

The limited ICDA symptom codes proved unsatisfactory for the purposes of the study. A single code may be used for a number of distinct symptoms; the ICDA categories combine disease numbers and symptom numbers; and since there is no logical grouping of these codes, they are difficult for coders to remember. The result is an inefficient symptom classification system with a high likelihood of coding error.

A new symptom classification system was therefore developed in which each organ system was assigned a unique block of numbers and additional groups of numbers were assigned for nonspecific and psychiatric symptoms. A letter before the number serves to avoid confusion in those situations where either the ICDA number or a symptom number might be used. The following categories were specified:

| *Symptom Code* | *Organ or System* |
|---|---|
| T 001–T 069 | Nonspecific |
| T 070–T 149 | Psychiatric |
| T 150–T 219 | Neurologic |
| T 220–T 259 | Eye |
| T 260–T 279 | Ear |
| T 280–T 299 | Nose |
| T 300–T 339 | Mouth and throat |
| T 340–T 349 | Blood-forming |
| T 350–T 399 | Circulatory |
| T 400–T 449 | Respiratory |
| T 450–T 529 | Digestive |
| T 530–T 549 | Breast |
| T 550–T 599 | Urinary and male genital |
| T 600–T 649 | Gynecologic |
| T 650–T 699 | Dermatologic |
| T 700–T 969 | Musculoskeletal |

The first two digits identify the organ or system to which symptoms are related; thus all neurologic symptoms are coded 15–21 and all symptoms of the respiratory system 40–44. The final digit identifies the specific type of symptom, as follows:

| *Terminal Digit* | *Type of Symptom* |
|---|---|
| 1 | Pain |
| 2 | Swelling or mass |
| 3 | Bleeding |
| 4 | Discharge |
| 0, 5–9 | Other |

Thus bleeding of the ear would be 263 and blood in the urine 553, the terminal digit representing bleeding.

The new symptom code number is not necessarily used to replace an ICDA number if that number represents a diagnosis; for example, a physician diagnosis of heartburn would be ICDA 784.3, whereas heartburn as a presenting symptom would have symptom code number T 451.

The entire list of symptom codes can be obtained from the authors on request. The section comprising symptoms of the mouth and throat (T 301–T 339) is appended in illustration. The many duplications in the applicable ICDA codes shown at the right of each of the new symptom classification codes point up the finer discrimination made possible by the new symptom classification, which has been in operation for five years in the utilization study.

Symptoms of Mouth and Throat (T 300–T 339)

| Symptom code | Symptom | ICDA code |
|---|---|---|
| T 301 | Sore mouth or tongue | 538.9 |
| T 302 | Swelling or mass of mouth or tongue | 230.0 |
| T 303 | Bleeding of mouth or tongue | 538.9 |
| T 304 | Excessive salivation | 784.6 |
| T 305 | Dry mouth | 537.9 |
| T 306 | Trismus | 781.4 |
| T 307 | Ulcer of mouth | 538.0 |
| T 308 | Bad breath | 788.9 |
| T 309 | Metallic taste | 788.9 |
| T 310 | Recurrent sore throat | 517.9 |
| T 311 | Sore throat | 472.0 |
| T 312 | Swelling or mass of tonsils or pharynx | 510.0 |
| T 313 | Bleeding of throat or tonsils | 538.9 |
| T 314 | Exudate or discharge of tonsils | 511.0, 517.9 |
| T 321 | Pain of jaw or teeth | 534.0 |
| T 322 | Swelling or mass of jaw | 230.0 |
| T 325 | Cracking or grinding sensation of jaw | 788.9 |
| T 327 | Locking of jaw | 788.9 |
| T 328 | Limitation of neck movement | 788.9 |
| T 331 | Soreness of neck | 788.9 |
| T 332 | Swelling or mass of neck | 239.9 |
| T 335 | Hoarseness | 783.5 |
| T 336 | Stridor | 783.6 |
| T 337 | Voice change | 783.5 |
| T 339 | Other mouth or throat symptoms | 788.9 |