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Acid-Base Disorders: Evaluation and Instruction by Minicomputer

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ACID-BASE DISORDERS: EVALUATION AND INSTRUCTION BY MINICOMPUTER

by

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ABSTRACT

DEBORAH LIKINS ATKINSON. Acid-Base Disorders: Evaluation and Instruction By Minicomputer. (Under the direction of CHAN F. LAM.)

A computerized system for instruction and diagnosis of clinical electrolyte and acid-base disorders has been implemented on a PDP-8/e minicomputer at the Medical University of South Carolina. The program is designed for use by persons at various stages of medical training: student, house staff, and clinician. This system not only aids the physician in making his diagnosis, but also serves as a means of educational instruction in acid-base physiology for the student.

A patient file has been established in conjunction with the program. The file enables a physician to follow a patient's course over time. Several auxiliary computer programs have been written to retrieve information from the file selectively.

The patient file also provides a data base for a future analysis of the program. In addition, a subjective evaluation will be conducted by the clinicians in charge of the system in the Department of Medicine.

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CHAPTER I. INTRODUCTION AND BACKGROUND

INTRODUCTION

Within the past ten to fifteen years, electronic digital computers have come to play increasingly important roles of consultation, decision-making and instruction in the medical sciences. According to Schwartz, rapid advances in the information sciences, coupled with the political commitment to broad extensions of medical care, are largely responsible for the recent innovations in the realm of biomedical computing (29). Schwartz also made implications about future uses of computers when he stated that

> "if conventional remedies will not meet the demands imposed by society's broad commitment to extensions of health care, it is clear that new, even heretical, strategies must be devised. One such strategy will almost certainly involve exploitation of the computer as an 'intellectual,' 'deductive' instrument - a consultant that is built into the very structure of the medical-care system and that automates or replaces many traditional activities of the physician. Already, several interesting steps have been taken in an attempt to extend the computer's role into this realm - the automated interpretation of the electrocardiogram (9,24,25) and the automation of history-taking (18,22,32) being the most familiar examples. But, well beyond these first steps in concept and impact are experimental efforts to use the computer on a 'real-time' basis to assist in diagnosis and management" (5,14,17,29).

In recent years, two important developments have made it practical to use the computer to assist the physician

with medical decisions. One is the development of programming languages which can manipulate strings of text according to rules of syntax, just as the more widely used languages manipulate numbers according to rules of arithmetic. The other is the advent of interactive or conversational computer programs that communicate with the user not through a batch of punched cards, but via a suitable terminal such as a teletypewriter or cathode-ray tube display that exchanges messages with the computer over ordinary telephone lines (6).

If medical decision-making is to be adaptable to computer programming, it must be possible either to measure or to verbalize the data on which each decision is based. The data need not be numerical; it is possible, for example, to program answers to YES-NO or multiple-choice questions, but not alterations of facial expression, unless the changes can be measured or described in words (6).

Instructional uses of computers have been under investigation for more than ten years, and the field continues to change rapidly from year to year. At the present time, projects of all sizes and levels are being conducted on research, development, and actual use of interactive computer systems (27).

Teaching by computer is most commonly known as Computer-Assisted Instruction or CAI. The student can interact with the computer in three different ways. The machine can be used for drill and practice which would supplement the regular teaching process. A second application for the student

is the tutorial system. Here, the main responsibility of the system is to help the student understand a concept and develop a skill in using it. The aim is to approximate the interaction a patient tutor would have with an individual student. The final computer-student system is the dialogue system. In these systems, the student can conduct a genuine dialogue with the computer (27).

FEASIBILITY OF ACID-BASE COMPUTER SYSTEMS

Electrolyte and acid-base equilibrium has proven to be a successful subject for computer-based consultation and instruction programs. Virtually all the required data can be measured or verbalized (6). The complete blood-gas data are derived from nomograms (Figure 1.2) based on physiochemical equations. These equations are readily adaptable to computer programming (11). Furthermore, clinical problems in this area are relatively common, and numerical calculations required to solve these problems manually usually prove cumbersome (6).

An overview of acid-base physiology will now be presented. It is hoped that this discussion will illustrate the adaptability of this subject to computer-based analysis. The discussion has been taken from the Syllabus for the Renal Acid-Base Elective, Division of Nephrology, Department of Medicine, Medical University of South Carolina (35).

ACID-BASE REGULATION

INTRODUCTION

The subject of acid-base balance concerns the relationships between weak acids and the hydrogen ion (10). The H^+ concentration of pure water is 10^{-7} Equivalents/Liter (Eq/L), or 100 nano Eq/L (where nano = 10^{-9}) or 7.00 pH units, where pH is defined as $\log_{10}(1/H^+)$. In the extracellular fluid, however, H^+ concentration is normally slightly alkaline, i.e., 40 nano Eq/L or 7.40 pH units. In a healthy person, H^+ concentration seldom differs from this value by more than a few nano Eq/L, although for short periods of time, the body may tolerate concentrations as low as 10 nano Eq/L (pH = 8.0) or as high as 120 nano Eq/L (pH = 6.8). The normal concentration of other plasma ions and pCO_2 are listed in Table 1.1 for reference (35).

TABLE 1.1

Normal Plasma Concentrations

Na^+	140 mEq/L
K^+	4.0 mEq/L
Cl^-	103 mEq/L
HCO_3^-	25 mEq/L
$Na - (Cl^- + HCO_3^-)$ (unmeasured anions)	12 mEq/L
pCO_2	40 mm Hg (1.2 mEq/L)

An illustration of acid-base homeostasis is given in Figure 1.1. Under normal circumstances, the human organism is confronted with a hydrogen ion load derived from the ingestion of neutral foodstuffs and from the metabolism of body cells (steps 1 and 2 in Figure 1.1) (28). "Fixed acid" or H^+ derived from these sources (about 1 mEq per kilogram of body weight per day) must be buffered (a buffer may be defined as a pair of substances that can donate or accept H^+ in a way that blunts changes in H^+ concentration) (step 3), and approximately 15,000 mEq of "volatile acid" or CO_2 is removed via the lungs (step 4). Renal mechanisms in the tubules of the nephrons serve both to regenerate buffer (bicarbonate) (step 7), and excrete the hydrogen ion (steps 8 and 9) (35).

MECHANISMS PRESERVING BODY FLUID pH

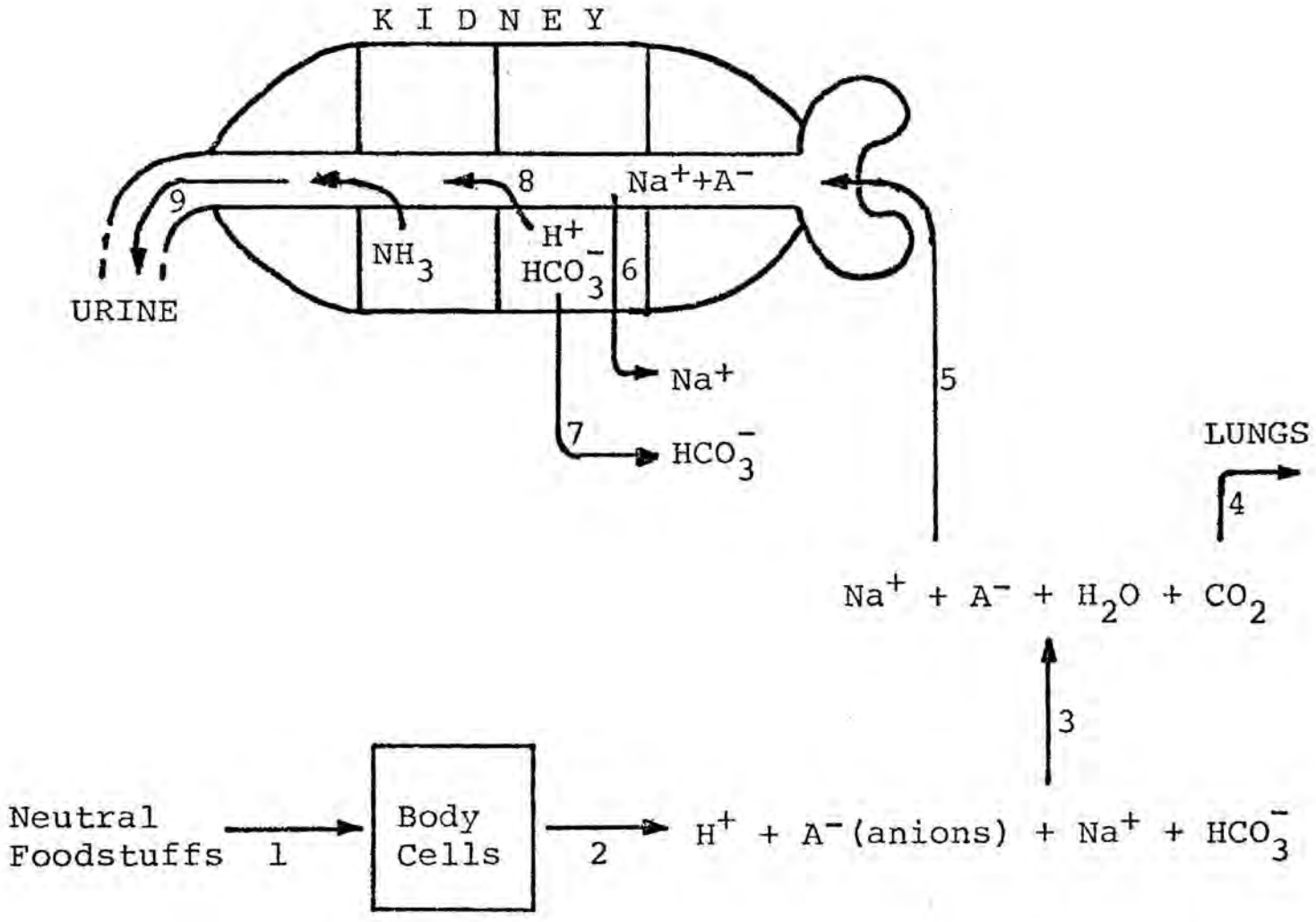
There are two principal mechanisms which protect the H^+ concentration of body fluids. These are: 1) buffering and 2) renal excretion of the hydrogen ion (35).

Buffering of Hydrogen Ion

Although each of the body fluids contains many different buffers, only a few of them are known to be quantitatively important. Extracellular fluid is buffered (against the addition of H^+) principally by bicarbonate; urine by ammonia, phosphate, and bicarbonate; and intracellular fluid by protein (e.g., hemoglobin), bicarbonate, phosphate, and other unidentified substances. Although a buffer may blunt changes

FIGURE 1.1

Acid-Base Homeostasis



in H^+ concentration, the amount of buffer available is finite; ultimately, the offending acid or base must be removed if acid-base equilibrium is to be restored (35).

Fats and carbohydrates are normally metabolized to become CO_2 and water. The simplest of such metabolic reactions, the oxidation of glucose, is given in Equation 1.1.

$$C_6H_{12}O_6 + 6O_2 \xrightarrow[\text{ENZYMES}]{\text{METABOLISM}} 6CO_2 + 6H_2O \qquad (1.1)$$

Carbon dioxide is moderately soluble in water, freely diffusable across biological membranes, and since 15,000 mEq are produced each day, huge quantities are readily available throughout the body. Normal respiration maintains pCO_2 at approximately 40 mm Hg, but a few moments of deep or rapid breathing can quickly reduce alveolar pCO_2 to 20 mm Hg or below (35).

Because CO_2 is freely diffusable, the tension of CO_2 in the alveolae of the lungs establishes CO_2 tension throughout the body. Furthermore, CO_2 can be reversibly hydrated to H_2CO_3, a reaction that achieves equilibrium more rapidly in the presence of the enzyme carbonic anhydrase. This reaction is shown in Equation 1.2.

$$\begin{array}{l} pCO_2 \\ \downarrow \\ CO_2 + H_2O \end{array} \xrightleftharpoons[\text{CARBONIC ANHYDRASE}]{} H_2CO_3 \rightleftharpoons H^+ + HCO_3^- \qquad (1.2)$$

Once equilibrium has been reached, H_2CO_3 concentration is proportional to CO_2 tension (35).

If the lungs have difficulty giving off carbon dioxide, the partial pressure of CO_2 (and the concentration of H_2CO_3) will increase, and hemoglobin, phosphate, and other cellular buffers will remove H^+ from H_2CO_3 and generate HCO_3^-. Furthermore, over a period of three to five days, the kidneys will excrete extra H^+ (also obtained from H_2CO_3), and additional HCO_3^- will be supplied and reabsorbed into the bloodstream. When a new equilibrium is established, plasma pCO_2, H^+, and HCO_3^- concentrations will have increased, but the lungs, aided by the higher pCO_2, will again give off the entire pCO_2 load. This adaptation occurs over a limited range; CO_2 tension cannot increase indefinitely, because of its toxicity, and there is no way for the kidneys to excrete a significant fraction of the huge amount of CO_2 produced each day (3,35).

In contrast to fats and carbohydrates, proteins cannot be entirely metabolized to CO_2 and water. Sulfur-containing amino acids, such as cystine and methionine, yield sulfuric acid; phospholipids decompose into phosphoric acid; and a small quantity of organic acid is formed endogenously, but not metabolized. For a person eating an average American diet, these processes yield approximately 60 mEq of acid each day, all destined for renal excretion (35).

Since the H^+ concentration of extracellular fluid is maintained at very low levels (10^{-7} Eq/L - 10^{-4} Eq/L) as

compared to other solutes, continual delivery of H^+ requires immediate buffering if the concentration is to remain within the range compatible with life. Furthermore, since the only quantitatively significant buffer pair in the extracellular fluid is bicarbonate-carbonic acid ($HCO_3^- - H_2CO_3$), the addition of H^+ to the extracellular fluid is physiologically equivalent to the destruction of an equivalent quantity of HCO_3^-. This reaction is illustrated in Equation 1.3.

$$H^+ + HCO_3^- \longrightarrow H_2O + CO_2 \qquad (1.3)$$

In the above equation, the CO_2 that results from the addition of H^+ is quantitatively negligible when compared with the huge amounts produced metabolically (i.e., 60 mEq vs. 15,000 mEq), and can easily be removed in a few dozen deep breaths. However, if it were not for renal acid excretion, the continual release of endogenously-produced H^+ would soon deplete the supply of HCO_3^- (35).

Renal Acid Excretion

There are three distinct mechanisms which account for acid excretion by the kidney. These are: 1) reabsorption of filtered bicarbonate; 2) excretion of titratable acid (primarily $H_2SO_4^-$); and 3) excretion of ammonium (NH_4^+). Each of these mechanisms is based upon the pumping of H^+ from the tubular cells of the kidney nephron into the tubular lumen (35).

Before the kidney can excrete H^+, and thus regenerate the HCO_3^- that was removed when H^+ was added to the extracellular fluid, it must first return to the blood HCO_3^- that was filtered at the glomerulus of the kidney. The recovery of filtered bicarbonate by the secretion of H^+ from the renal tubular cells into the tubular lumen occurs via steps involving active transport (largely of sodium) of substances against an electrochemical gradient (35).

Once filtered HCO_3^- has been returned to the blood, further H^+ secretion by the nephron tubular cells results in net acid excretion. Excretion of unbuffered H^+ accounts for only a minute fraction of the daily acid excretion. Phosphate (i.e., titratable acid) and ammonium are the quantitatively important urinary buffers (35).

If $H_2PO_4^-$ is ingested or endogenously produced by the breakdown of protein, it is presented to the extracellular fluid, where most of it is immediately buffered by bicarbonate. When the filtrate from the glomerulus reaches the nephron tubule, the amount of Na^+ in the filtrate that was originally present as $NaHCO_3$ is restored to the blood, and H^+ is extruded from the cells into the tubular lumen, where it reacts with $HPO_4^=$ and is excreted as $H_2PO_4^-$. As before, HCO_3^- is returned to the blood by secretion of H^+. Excretion of $H_2PO_4^-$ accounts for perhaps 20 mEq of acid per day (35).

Creatinine, organic acids, and other urinary buffers also participate in the formation of titratable acid, but

their quantitative importance is negligible, especially in comparison with phosphate (35).

If H_2SO_4 is added to the extracellular fluid, it removes bicarbonate, and leaves $SO_4^=$ in its place. In the renal tubule, H^+ is transported into the urine, where it combines with NH_3 and is then trapped as NH_4^+. The ammonium may be excreted as $(NH_4^+)_2SO_4^=$, and HCO_3^- returned to the blood. Cellular NH_3 is then replenished largely by deamination of glutamine. Cell membranes are freely permeable to NH_3 but highly impermeable to such ions as NH_4^+. When H^+ is trapped by conversion to NH_4^+, additional H^+ is excreted at an acceptable H^+ concentration (35).

Since metabolism of the dietary intake usually produces an acid load, under most circumstances, the kidney reabsorbs filtered bicarbonate almost completely and then excretes the acid in the form of NH_4^+ and titratable acid ($H_2PO_4^-$) (35).

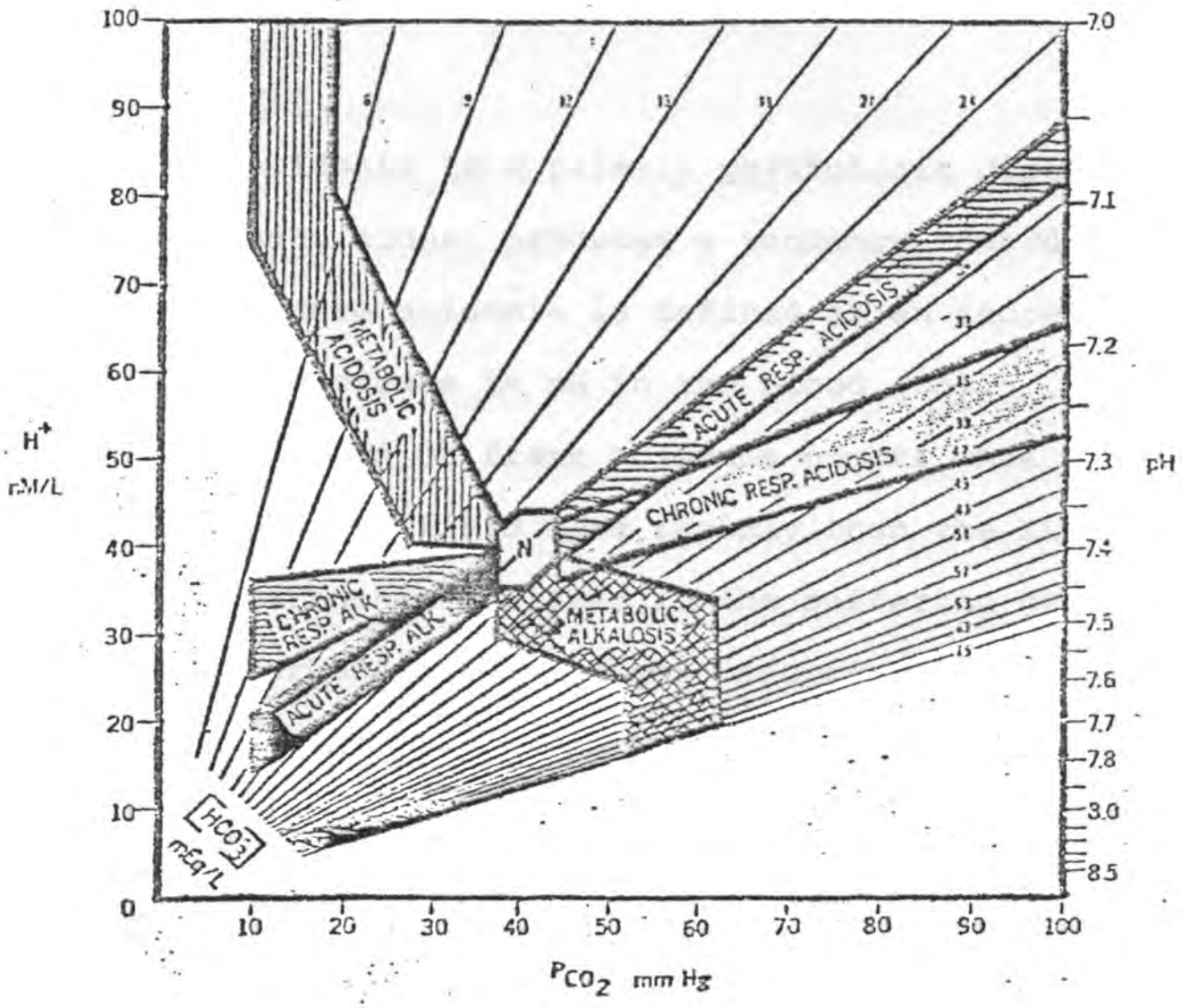
CLINICAL DISTURBANCES OF ACID-BASE BALANCE

There are six primary acid-base disorders: metabolic acidosis, metabolic alkalosis, acute respiratory acidosis, chronic respiratory acidosis, acute respiratory alkalosis, and chronic respiratory alkalosis. The physiologic responses of the body to these six disturbances are illustrated in Figure 1.2.

The map shown in Figure 1.2 (1,2,7,8,13,15,16,20,21,23, 26,30,35,36), when combined with clinical data about a patient, provides a direct approach to diagnosis and management

FIGURE 1.2

In Vivo Acid-Base Nomogram



of patients with acid-base disorders (35). The map also provides a basis for acid-base diagnosis by computer.

A brief discussion of the primary disorders of acid-base balance follows.

Metabolic Acidosis

Metabolic acidosis is a primary physiologic disturbance, which, when present alone, produces a tendency toward or frank acidemia, where acidemia is defined as an increased H^+ concentration or decrease in pH in the blood (35).

A tendency toward or frank acidemia occurs when H^+ enters the extracellular fluid more rapidly than the kidney can generate the bicarbonate utilized in the buffering process. This loss of bicarbonate reduces the concentration of HCO_3^- and shifts the equilibrium given in Equation 1.4 in the direction of a higher H^+ concentration (Equation 1.5) (35).

$$[H^+] = K \cdot \frac{[H_2CO_3]}{[HCO_3^-]} \tag{1.4}$$

$$\uparrow[H^+] \overset{\leftarrow}{=} K \cdot \frac{[H_2CO_3]}{\downarrow[HCO_3^-]} \tag{1.5}$$

Metabolic acidosis will result whenever: 1) HCO_3^- is lost or destroyed, whether from massive acid ingestion, or from endogenous acid production; 2) an impairment of renal function occurs which reduces the excretion of an acid load, or the reabsorption of filtered bicarbonate; or 3) massive

losses of bicarbonate-rich solutions, such as diarrheal fluid, pancreatic juice, or duodenal drainage, take place (35).

Metabolic Alkalosis

Metabolic alkalosis is defined as a tendency toward or frank alkalemia (a decrease in H^+ concentration or increase in pH) in the blood, resulting from a primary increase in HCO_3^- concentration (35).

Although acute and temporary increases in plasma bicarbonate may occur if large amounts of HCO_3^- are administered (or endogenously generated, e.g., by vomiting or gastric juice removal by suction), chronic sustained metabolic alkalosis requires an increase in the "renal threshold" for bicarbonate excretion (that is the level of plasma HCO_3^- at which the kidneys' reabsorptive capacity for bicarbonate under existing conditions is exceeded). Several factors influence this "threshold." They include: 1) carbon dioxide tension (pCO_2) - the effect of HCO_3^- reabsorption is directly proportional over a wide range of pCO_2; 2) the availability of permeant anion, primarily chloride - chloride deficiency increases bicarbonate absorption; 3) potassium deficiency increases the absorption of bicarbonate; 4) carbonic anhydrase activity; 5) hormonal factors (aldosterone or other mineralocorticoids); and 6) volume contraction (31,35).

The administration of alkali causes alkalosis only if it proceeds at a rate which exceeds the ability of the kidney

(threshold) to excrete HCO_3^- (35).

Respiratory Acidosis

Acute respiratory acidosis is a tendency toward or or frank acidemia, caused by acute hypercapnia. Hypercapnia may be defined as a primary increase in pCO_2, usually the result of a decrease in ventilation in the alveolae of the lungs (may be physiologically, pathologically, or mechanically induced). The condition is said to be acute when secondary renal responses have not had time to act, usually four to six hours after the onset of hypercapnia (35).

The preservation of pH during acute respiratory acidosis is dependent on the generation of bicarbonate by body buffers. As pCO_2 increases, carbonic acid increases proportionately in the blood, and ionizes to H^+ and HCO_3^-. This reaction is expressed by Henderson and Hasselbalch in Equations 1.6 - 1.8 (12).

$$\frac{[H^+] \cdot [HCO_3^-]}{[H_2CO_3^-]} = K \qquad (1.6)$$

or

$$[H^+] = K \cdot \frac{a \cdot pCO_2}{[HCO_3^-]} \qquad (1.7)$$

After applying the log transformation to Equation 1.1, one gets:

$$pH = 6.1 + \log \frac{[HCO_3^-]}{.0301 \cdot pCO_2} \qquad (1.8)$$

The increase in H^+ is buffered to a great extent by hemoglobin and by the shift of chloride into and bicarbonate out of the red blood cell (12). As a result, plasma bicarbonate increases, and, according to the Henderson-Hasselbalch equation, blood pH is defended (35).

Chronic respiratory acidosis is a tendency toward or frank acidemia, caused by chronic hypercapnia, where chronic hypercapnia is an increase in pCO_2 of sufficient duration to allow the integrated responses of body buffers and renal mechanisms to produce a compensated chronic state (35).

Sustained increases in pCO_2 may occur with any condition that impairs alveolar ventilation. The generation of HCO_3^- first by the quick-acting body buffers establishes an acute steady-state. Then, the subsequent generation of HCO_3^- by the kidney, which occurs over three to five days, establishes the chronic steady-state, and arterial pH is defended to the maximal degree (35).

Conditions which may be associated with respiratory acidosis are listed in Table 1.2. Metabolic alkalosis is listed parenthetically since pCO_2 levels consistent with acute or chronic respiratory acidosis may be observed as compensation for severe metabolic alkalosis (35).

TABLE 1.2

Conditions Associated With Respiratory Acidosis

1. Lung Disease
2. Chest Wall (Muscle) Injury
3. CNS Depression
4. Ventilatory Obstruction
5. (Metabolic Alkalosis)

Respiratory Alkalosis

Respiratory alkalosis is a tendency toward or frank alkalemia, caused by hypocapnia, where hypocapnia is defined as an acute or chronic reduction in pCO_2, resulting from increased alveolar ventilation (35).

Just as increases in carbonic acid, proportional to arterial pCO_2, occur in hypercapnia, decreases in carbonic acid and its conjugate base bicarbonate occur when increases in alveolar ventilation lower carbon dioxide tension. In an extreme degree of hyperventilation with resulting pCO_2 of 15 mm Hg., the plasma bicarbonate reduction usually does not fall below 15 mEq/L. Acutely (a matter of minutes to several hours), the renal compensatory effort (e.g., excretion of bicarbonate as pCO_2 decreases) is relatively small, and respiratory alkalosis of a severe degree develops (35).

There are several clinical causes of respiratory alkalosis. Hypoxia from any cause other than chest wall disease

or paralysis (more likely associated with hypoxia and hypercapnia) may be associated with increased ventilation and primary respiratory alkalosis. Central nervous system disease, including trauma, encephalitis, vascular accidents and meningeal leukemia may result in hyperventilation, because of a pathologically stimulated respiratory center. Certain drugs, notably salicylates, and cirrhosis of the liver may be associated with respiratory alkalosis, as is the normal pregnancy in later stages. A decrease in carbon dioxide tension, resulting from a physiologic response to metabolic acidosis, also causes hypocapnia (35).

EXISTING ACID-BASE COMPUTER SYSTEMS

Several different computer-based acid-base programs have been developed during the last six years (4,5,11,15,34). Among the most notable of these are programs designed by M.L. Cohen in 1968 (11), Howard L. Bleich in 1968 (5), and Martin Goldberg, et al, in 1972 (15).

Acid-base programs have been developed to assist physicians in managing patients with electrolyte and acid-base disorders. However, since the computer printouts of such programs include diagnostic conclusions and therapeutic suggestions, together with the rationale for each, they can also serve as continual sources of instruction for both medical students and practitioners. In many cases, users study the printout from a particular patient and then experiment with assumed data concerning related disorders until they

are satisfied that they can predict the output. Since the computer performs the arithmetic, the user can concentrate on the pathophysiology. Rather than tempting the clinician to rely passively on the computer, use of such programs appear to encourage him to consider broad areas of acid-base physiology (5).

PROGRAM BY COHEN

Cohen's program was originally written in Fortran IV for the IBM System Model 75, in operation at the UCLA Center for Health Sciences. It was adapted to the IBM 1800 Time-Sharing Executive System in operation at St. Joseph's Hospital, Phoenix, Arizona (11).

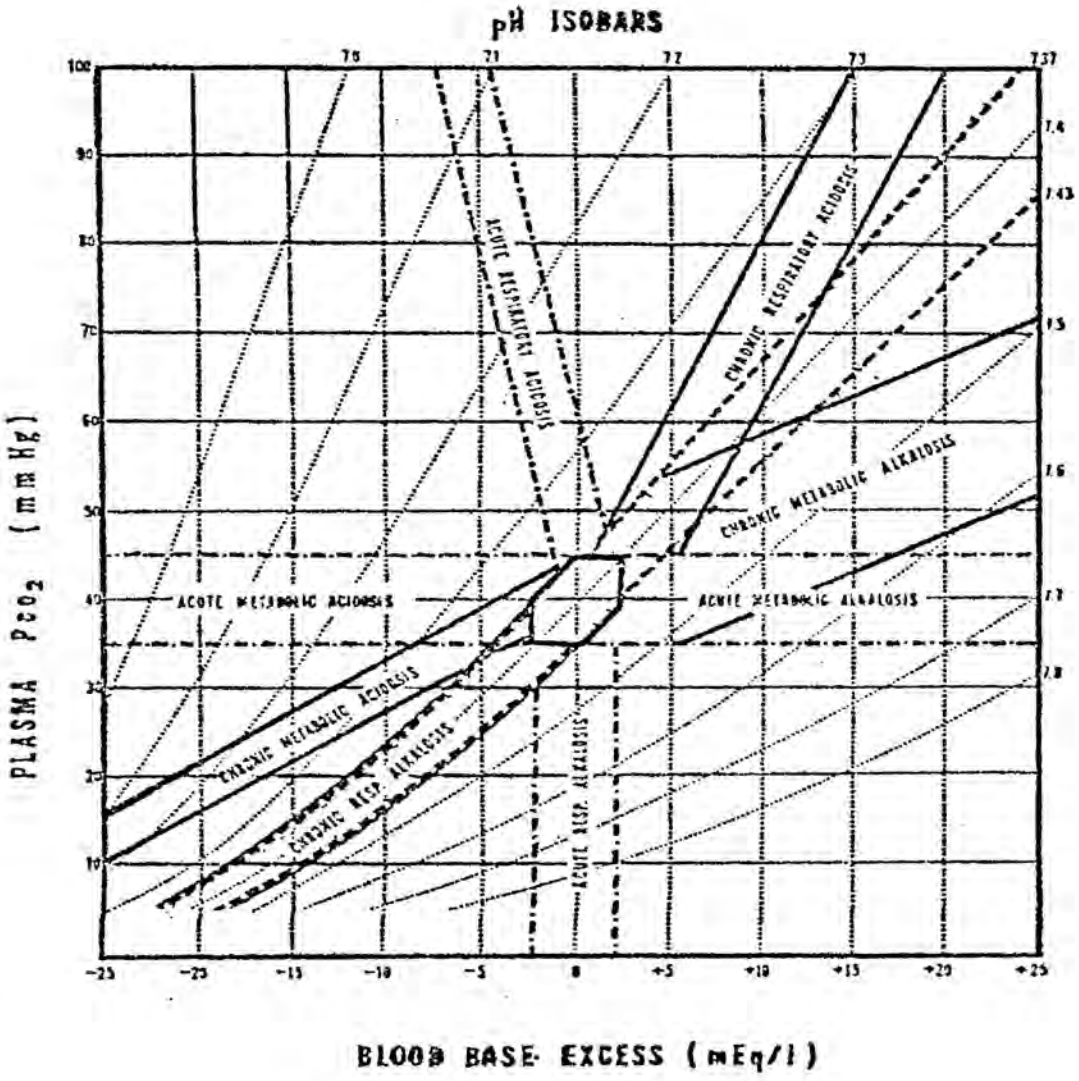
The program accepts blood pH, bicarbonate, pCO_2, base excess, pO_2, and O_2 saturation, and analyzes the data to within the 95 percent confidence limits established by reliable investigation (Figure 1.3). It defines the primary single or mixed disturbance, and estimates the degree of compensation. Although it is written as a subroutine, the program can be readily adapted to existing programs which read raw data and compute the acid-base parameters, thus automating blood-gas analysis from the laboratory machine through complete interpretation (11).

PROGRAM BY BLEICH

Howard L. Bleich designed his program at Harvard Medical School, Beth Israel Hospital, Boston, Massachusetts.

FIGURE 1.3

Ninety-five Percent Confidence Limits
Of Respiratory Or Metabolic Compensation



The original program was written for a PDP-1D computer, with rapid access memory totaling 60 million characters. Memory required by the program is less than 0.1 percent of this capacity. The computer is programmed for time-sharing. The program was written in Stringcomp, a high-level interpretive language, with provisions for string manipulation and for numerical computation (5).

The program begins by requesting appropriate input data, such as serum sodium concentration, blood pH, etc., to which the physician responds with the information available to him. Using relationships such as the Henderson-Hasselbalch equation, the program requests resolution of any inconsistencies in the data, and where possible, calculates values which are not supplied. It then requests any additional information needed to characterize the etiology and severity of the acid-base abnormality. Finally, by interposing derived and given data among appropriate excerpts from a bank of English text, it assembles an evaluation note designed for use either by the physician in managing the patient or by student in learning the pathophysiology (5).

Bleich's program does not replace the physician; rather, its purpose is to provide him with specific information which focuses on the problem under consideration. The program was not originally intended to make a final diagnosis; instead, a differential list is offered, the purpose of which is to broaden the basis for the physician's decision (5).

Bleich's original program was designed to analyze only acid-base disorders. For this reason, its clinical utility was limited; when multiple disturbances of electrolyte balance and osmolality are found in association with acid-base disorders, the proper evaluation of each of these abnormalities may influence treatment of the others (4).

The advent of MUMPS, a special, text-manipulating computer language, made it practicable for Bleich to write a new program suitable for widespread clinical use (4).

This program was written in 1972 for a PDP-9 computer with time-sharing capability. It collects and analyzes data concerning electrolyte as well as acid-base abnormalities, either alone or in various combinations, and synthesizes this information into a unified evaluation note that considers the interrelationships among the disorders (4).

Bleich's program may be used for teaching as well as patient care. It is used in hospitals along the eastern seaboard of the United States, and has been adapted to a variety of computers in distant locations (4).

PROGRAM BY GOLDBERG

In 1972, Goldberg, Green, Moss, Marbach, and Garfinkel established a computer-based approach for instruction and diagnosis of clinical acid-base disorders at the University of Pennsylvania Medical School, Philadelphia. The program, written in Fortran IV, has been developed and, thus far, operated on a time-sharing PDP-6 computer. The program is

based on a systematic analysis of the map illustrated in Figure 1.2 (15).

Goldberg's program provides a differential diagnosis list, and uses auxiliary clinical and laboratory information to arrive at the most likely diagnosis from the list (15). A detailed description of this program is found in Chapter II.

RATIONALE BEHIND THE ACID-BASE PROGRAM AT THE MEDICAL UNIVERSITY OF SOUTH CAROLINA

All the programs described have one important limitation. Each was written for a computer with large core memory. When and where money is available for such computer memory, these programs can be used. Unfortunately, a small hospital with limited funds for computer equipment could not operate any of these programs. However, implementation of the program on a small computer would increase the program's usefulness and economic feasibility. Thus, one of the objectives of this research was to adapt the acid-base program devised by Goldberg and his colleagues on a small, time-sharing computer, so that many users could share the same facility.

The program was designed so that it is adaptable to a variety of different types of users, such as clinicians, house officers, and students. The system will provide an important consultation tool for clinicians and house staff at the Medical University of South Carolina. The program is

also valuable as a teaching tool for students. This program will demonstrate the capability of Computer-Assisted Instruction (CAI) to the health profession in the state of South Carolina. The acceptability of CAI by the health profession in the state can then be monitored.

The second objective of this study was to establish a patient file. This file not only enables the physician to follow a patient's course over time, but also provides a means of recording how often and by whom the program is being used. This file also serves as a data base for a future analysis of the program.

The patient file contains pertinent information on each patient who receives an acid-base diagnosis from the program. Information on each patient includes: 1) name; 2) user type (clinician, house staff, student); 3) date and time of day; 4) values of electrolytes and blood gases; and 5) patient's status or disease system(s) (e.g., chronic renal failure, post-operative). Accessibility to the file is provided both to clinicians, who desire patient information, and to statisticians, who desire data concerning program usage. A set of programs have been written to extract information from the patient file.

CHAPTER II. ACID-BASE PROGRAM - MEDICAL UNIVERSITY OF SOUTH CAROLINA

OPERATING SYSTEM OF COMPUTER

To adapt the acid-base program of Goldberg, et al, to the Medical University of South Carolina, the PDP-8/e digital computer of the Department of Biometry has been equipped with a TSS/8 time-sharing system.

TSS/8 is a general purpose, time-sharing system for PDP-8/e computers that offers up to 16 users (24 in certain applications) a comprehensive library of system programs. These programs have facilities for editing, assembling, compiling, debugging, loading, saving, calling and executing user programs on-line. An extended BASIC language provides users with the ability to use strings, files, and program chaining. Two higher-level languages, Focal and Fortran, are also provided. All languages and utilities may be used concurrently. One group of users may be using BASIC, while another is working in assembly language. TSS/8 serves all levels of users simultaneously (33).

The heart of TSS/8 is a complex of subprograms called the Monitor. The Monitor coordinates the operations of the various programs and user consoles, which guarantees that the user is always in contact with his program. The TSS/8 Monitor allocates the time and services of the computer to

various users; it grants a slice of processing time to each job, and schedules jobs in sequential order to make most efficient use of the system. The Monitor handles user requests for hardware operations (line printer, tape, etc.), swaps programs between memory and disk, and manages the user's private files (33).

The basic configuration of the PDP-8/e computer at the Medical University of South Carolina includes 24K core, one RS08 disk (256K words), and two DECtapes. Peripheral equipment includes two teletypewriters, two alphanumeric cathode-ray tubes (CRTs), a portable Teleterm terminal, and a medium-speed line printer. The teletypes and portable terminal provide the user with "hard" (paper) copies.

Two of the terminals are located in the Department of Medicine. All remote terminals are connected to the computer through ordinary telephone lines (data phones), via acoustic couplers. A MODEM (MOdulator-DEModulator) at the computer site converts the sound waves into binary signals understood by the computer.

PROGRAM TRANSLATION

Goldberg's Fortran IV program is approximately 3000 cards long and requires 120K of core memory. In order for the program to be adapted to a 4K machine, it was divided into subprograms.

To facilitate this division into subprograms, Goldberg's program was flow charted, via AUTOFLOW, an automatic

flow chart system available on the IBM 370/145 computer at the Medical University of South Carolina.

The TSS/8 version of Fortran is a version of Fortran II, called Fortran-D. Fortran-D does not have the capability to chain from one 4K subprogram to another. Hence, Goldberg's acid-base Fortran IV program was translated into BASIC (Beginner's All-Purpose Symbolic Instruction Code) language, for which overlay capacity in TSS/8 is available.

BASIC is a conversational computer language which enables a human to carry on a "dialogue" with the computer. TSS/8 BASIC is a time-sharing version of the BASIC language. It allows even the beginning user to write and run meaningful programs. In addition, TSS/8 BASIC has advanced language aspects, such as strings, files, and program chaining (33).

The acid-base program, Department of Biometry, Medical University of South Carolina, is a chained program composed of 52 segments or subprograms. Each segment requires no more than 4K of core memory during execution. Each part of the chained program is saved on the disk, as a separate file, in compiled form (33). Table 2.1 lists and describes the 52 subprograms. Figure 2.1 illustrates program flow.

DATA FILES

Most chained programs require that information from one subprogram be passed to others. This passing of information is accomplished by means of a data file (33).

TABLE 2.1

List of Acid-Base Subprograms

Program	Description
AB1	Entry of pH; entry of pCO_2, TCO_2, or HCO_3; records date, user type, and patient's disease system; determines parameters HCO_3, pCO_2, and TCO_2 from Henderson-Hasselbalch equation.
AB2	IF statements for Areas 1-10 and 30 (normal).
AB3	IF statements for Areas 11-22.
AB4	IF statements for Areas 23-29, 31-34 (conclusion of IF series); error trap to spot areas not covered by IF statements.
VALUE	Requests blood chemistry values and determines delta.
DRUGS	Asks about drugs and assisted respiration.
AB106	Branches to appropriate area of graph (Areas 1-34) for patient's values.
DIAG1	This program begins the "Diagnosis" series.
DIAG3	Continuation of DIAG1.
DIAG4	Continuation of DIAG3.
DIAG5	Continuation of DIAG4; end of "Diagnosis" series.
DIAG10	Branch of "Diagnosis" series; Differential Diagnosis List (Part 1).
DIAG20	Branch of "Diagnosis" series; Summary of Values (Part 2).

TABLE 2.1 (Continued)

DIAG30	Branch of "Diagnosis" series; The Most Probable Diagnosis (Part 3).
DIAG40	Branch of "Diagnosis" series; Hypothetical Alternate Diagnoses (Part 4).
DIAG50	Branch of "Diagnosis" series; Discussion of Component of Probable Diagnosis - Respiratory Alkalosis.
DIAG60	Branch of "Diagnosis" series; Discussion of Component of Probable Diagnosis - Respiratory Acidosis.
DIAG70	Branch of "Diagnosis" series; Discussion of Component of Probable Diagnosis - Metabolic Alkalosis.
DIAG80	Branch of "Diagnosis" series; Discussion of Component of Probable Diagnosis - Metabolic Acidosis.
MACID2	Continuation of DIAG80.
NINDEX	Branch of "Diagnosis" series; Special Index For Area 30 (Normal Area).
AREA1	Logic for Area 1 (3 diagnoses).
AREA2	Logic for Areas 2,3,4 (3 diagnoses).
AREA5	Logic for Area 5 (2 diagnoses).
AREA6	Logic for Area 6 (3 diagnoses).
AREA7	Logic for Area 7 (2 diagnoses).
AREA8	Logic for Area 8 (2 diagnoses).
AREA9	Logic for Area 9 (3 diagnoses).
AREA10	Logic for Area 10 (3 diagnoses).
AREA11	Logic for Area 11 (4 diagnoses).
AREA12	Logic for Area 12 (2 diagnoses).
AREA13	Logic for Area 13 (3 diagnoses).

TABLE 2.1 (Continued)

AREA14	Logic for Area 14 (2 diagnoses).
AREA15	Logic for Area 15 (3 diagnoses).
AREA16	Logic for Areas 16,23 (2 diagnoses).
AREA17	Logic for Area 17 (3 diagnoses).
AREA18	Logic for Area 18 (4 diagnoses).
AREA19	Logic for Area 19 (2 diagnoses).
AREA20	Logic for Area 20 (3 diagnoses).
AREA21	Logic for Areas 21,22 (3 diagnoses).
AREA24	Logic for Area 24 (2 diagnoses).
AREA25	Logic for Area 25 (3 diagnoses).
AREA26	Logic for Area 26 (3 diagnoses).
AREA27	Logic for Area 27 (4 diagnoses).
AREA28	Logic for Area 28 (4 diagnoses).
AREA29	Logic for Area 29 (3 diagnoses).
AREA30	Logic for Area 30 (Normal Area).
AREA31	Logic for Area 31 (4 diagnoses).
AREA32	Logic for Area 32 (3 diagnoses).
AREA33	Logic for Area 33 (2 diagnoses).
AREA34	Logic for Area 34 (2 diagnoses).
AB5000	Concludes acid-base program; records time and patient's name; stores information in patient file.

FIGURE 2.1

Program Flow - Acid-Base Program

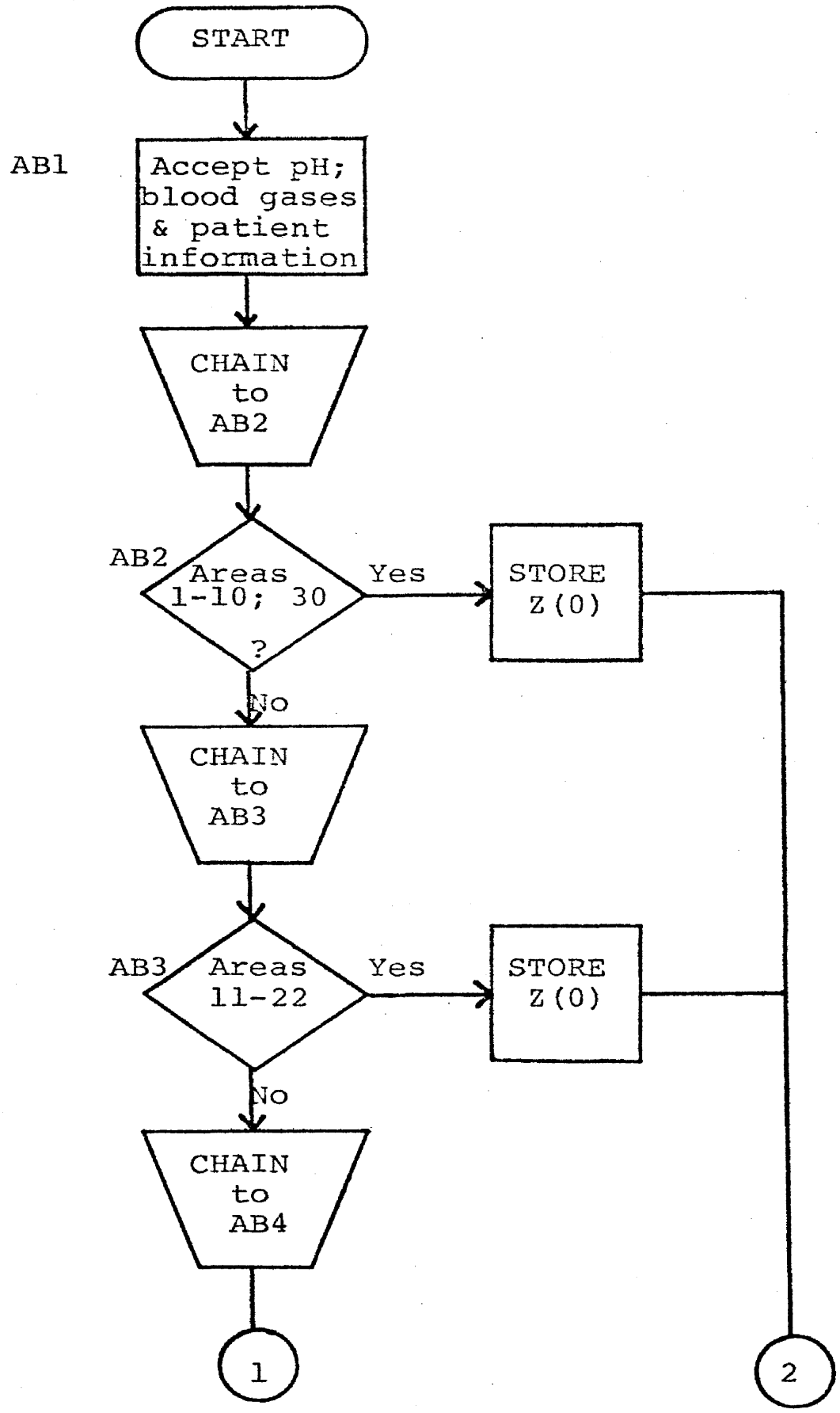


FIGURE 2.1 (Continued)

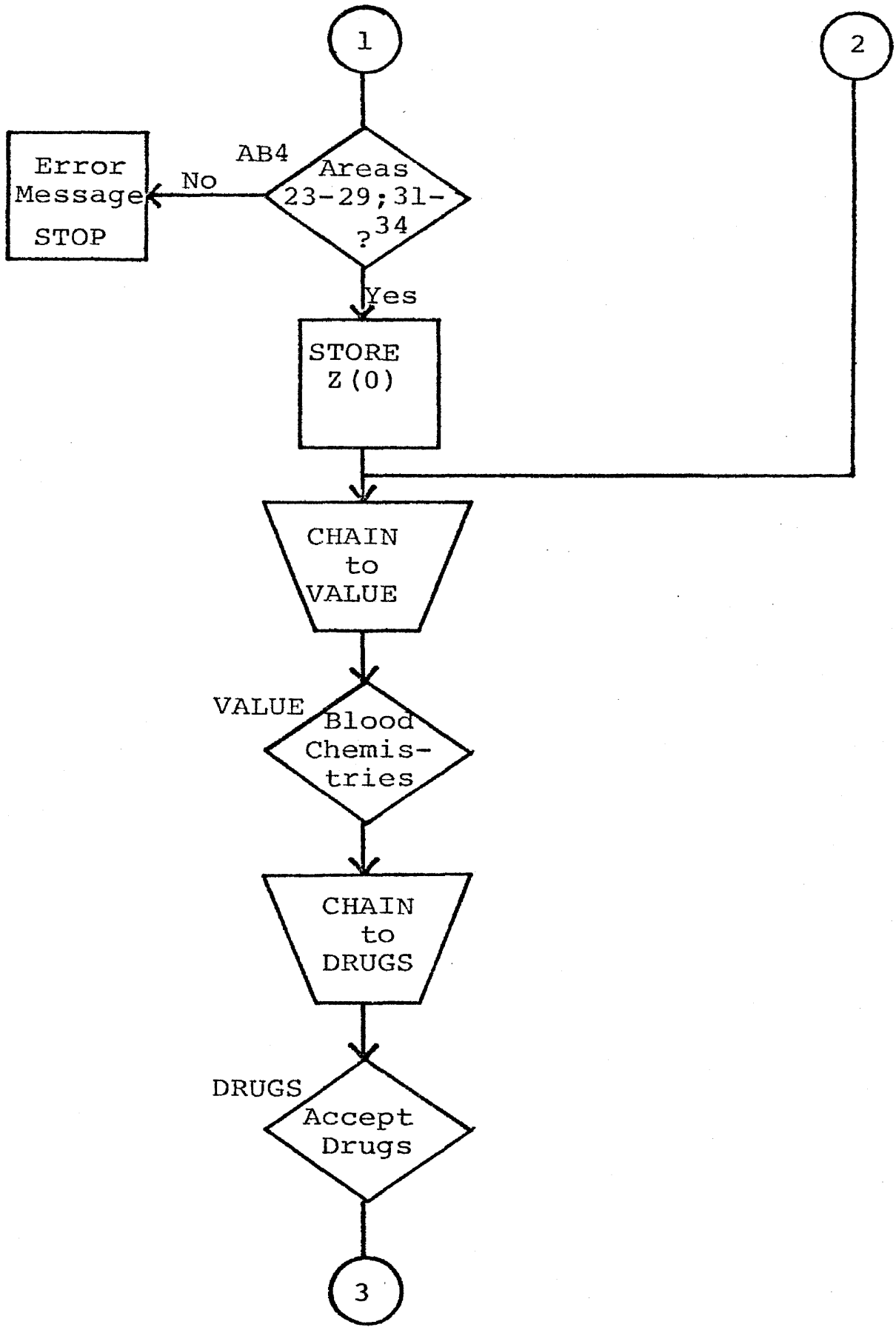
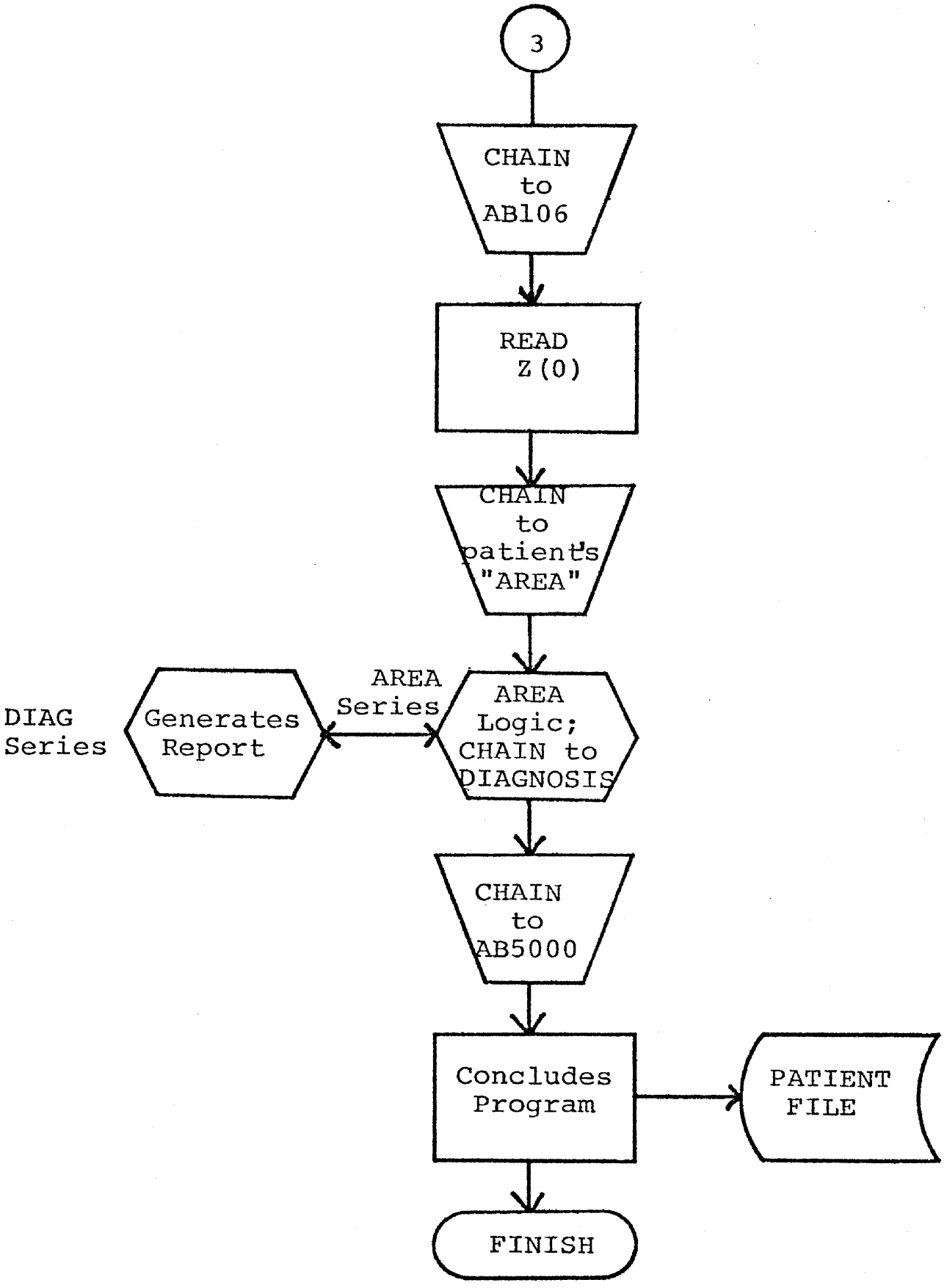


FIGURE 2.1 (Continued)



A data file is separate from the program or programs which use it. It is a disk file, resembling a saved program, but it contains numbers or strings rather than program statements. This information may be read or written by a BASIC program (33).

A data file is made up of logical units called records. A record may be as small as a single numeric or string variable. However, it is more characteristically a group of variables or arrays. The design of the program usually dictates the most efficient size of the record (33).

The acid-base program at the Medical University of South Carolina requires one data file for the program variables. This file is labeled "STORE1." "STORE1" contains four records. Table 2.2 lists and describes these variables.

GENERAL DESCRIPTION OF THE PROGRAM

A detailed acount of the computer program has been presented before (15). However, for completeness, a description follows.

This program is designed for use by medical students, house staff, and clinicians in their academic program, as well as in their care of patients.

The user logs in at his terminal, loads the program, and begins his dialogue with the computer. The user first inputs data for the patient file. Blood pH of the patient is then requested, along with one of the following three values: serum bicarbonate concentration (HCO_3^-), partial

TABLE 2.2

Program Variables

Fortran Variable	Basic Variable	Description	File	Record #
PH	P	pH	STORE1	1
PCO2	P1	pCO_2	STORE1	1
HCO3	H	HCO_3^-	STORE1	1
H	H1	H^+ concentration	STORE1	1
TCO2	T	TCO_2	STORE1	1
IND	I1$	H, P, or T	-	-
COVAL	C	value of I1$	-	-
IND1	I2$	A or V	-	-
SODIUM	N	sodium	STORE1	2
CL	C1	chloride	STORE1	2
DELTA	D2	delta (anion gap)	STORE1	2
POT	P2	potassium	STORE1	2
GLU	G	glucose	STORE1	2
K	K	ketones	STORE1	2
CREAT	C2	creatinine	STORE1	2
NAR	Z(0)	area of map (1-34)	STORE1	3
A	Z(1)	acidifying agents	STORE1	3
B	Z(2)	alkalinizing agents	STORE1	3
D	Z(3)	diuretics	STORE1	3
RS	Z(4)	respirator	STORE1	3

TABLE 2.2 (Continued)

RST	Z(5)	respiratory stimulants	STORE1	3
RD	Z(6)	respiratory depressants	STORE1	3
ALRE	Z(7)	respiratory alkalosis	STORE1	3
ACRE	Z(8)	respiratory acidosis	STORE1	3
ALME	Z(9)	metabolic alkalosis	STORE1	3
ACME	Z(10)	metabolic acidosis	STORE1	3
ACIDR	Z(11)		STORE1	3
ALKR	Z(12)		STORE1	3
ALKM	Z(13)		STORE1	3
ACIDM	Z(14)		STORE1	3
NCONF	Z(15)		STORE1	3
N	Z(16)	diagnosis # (1-4)	STORE1	3
NDIAG	Z(17)		STORE1	3
NAREA	Z(18)	area of map (1-34)	STORE1	3
KSWTCH	Z(19)		STORE1	3
	Z(20)	counter	STORE1	3
SAL	Z(21)	salicylate level	STORE1	3
	R	# report sections desired	-	-
ITAB	I		STORE1	4
ILST	L	report part numbers	STORE1	4
J	J		STORE1	4
IL	M		STORE1	4
I	Q		STORE1	4
IDUMY	I3		STORE1	4

pressure of carbon dioxide (pCO_2), or serum carbon dioxide content (TCO_2). Only one of the above three quantities is entered; the other two are calculated by the Henderson-Hasselbalch equations. Goldberg gives these equations in his program as:

$$HCO_3^- = (.03) \cdot (pCO_2) \cdot \left(10^{\{pH-6.1\}}\right) \tag{2.1}$$

$$TCO_2 = HCO_3^- + \left((.03) \cdot (pCO_2)\right) \tag{2.2}$$

$$pCO_2 = \frac{TCO_2}{(.0301) \cdot \left(10^{\{pH-6.1\}} + 1\right)} \tag{2.3}$$

Given these values, the computer then determines the differential diagnosis by using the acid-base map, which is illustrated in Figure 1.2 (15).

This acid-base map was created by combining published data on the various simple disturbances (metabolic acidosis (1), metabolic alkalosis (16,20,36), acute respiratory acidosis (7), acute respiratory alkalosis (2), chronic respiratory acidosis (30), and chronic respiratory alkalosis (36)) with the published and unpublished pooled experience of the members of the Renal-Electrolyte Section of the Hospital of the University of Pennsylvania (13). Their modifications or additions were most apparent in the areas of metabolic alkalosis and chronic respiratory alkalosis, since available detailed systemic data on these particular disturbances is meager. The 95 percent confidence bands for the above simple

disturbances, along with the normal values, have been plotted on the map illustrated in Figure 1.2. The limits of these confidence bands were approximated linearly, except the band for metabolic alkalosis, for which a straight line approximation was not satisfactory. For programming purposes, the map was further divided into 34 discrete, non-overlapping areas. A differential diagnosis was determined for each area, consisting of the possible single or mixed disturbances which could bring the patient within that particular area. Special stress was given to diagnosis of multiple disturbances, because they are common and frequently unrecognized (15).

After the computer has determined the possibilities in the differential diagnosis, it requests additional information to select the one most probable diagnosis for the patient. For example, it asks for supplementary blood chemistry values (if available), including serum electrolyte, blood glucose and creatinine concentrations, and ketones. The electrolyte values are used to calculate the unmeasured anions (delta or anion gap). If an unusual or impossible value is entered, the computer prints an appropriate error message. Next, it requests information regarding drug therapy and assisted respiration. An optional list of possible drugs in each category, i.e., acidifying agents, alkalinizing agents, respiratory stimulants, and respiratory depressants, is provided to help students answer the questions (15).

Up to this point in the user-computer dialogue, the logic has been the same for all patients. Now, however, the

program resorts to a unique logic for the specific area of the acid-base map, to determine which of the possible diagnoses is most applicable to the patients. In some cases, enough information will already have been collected to make this decision. When the answer is still uncertain, the computer will inquire about the presence of conditions which are capable of producing a specific primary acid-base disorder. The user may request a list of such clinical entities to help him with his answer (15).

An example of a computer dialogue is shown in Figure 2.2. This example illustrates the long form of the dialogue, since all optional lists were requested.

After the computer has gathered sufficient information, it presents a report of the patient. An index appears first, so that the user may select those parts of the report which are of most interest to him (15). An example of the index is given in Figure 2.3.

The complete report includes the following: 1) A summary of the blood chemistry values of the patient, compared with normal values. This summary includes data calculated with the Henderson-Hasselbalch equation, as well as the calculated anion gap; 2) A discussion of the most probable diagnosis. The computer presents the most likely diagnosis (either a simple or mixed disturbance), which is based on the clinical and laboratory information. Modifying statements may interpret the pathophysiology of the disorder, and may point out the possible etiologic significance of previous

FIGURE 2.2

Computer Dialogue

```
HELLO. THIS IS THE ACID-BASE PROGRAM, COLLEGE OF MEDICINE,
MUSC. THIS PROGRAM WAS ORIGINALLY WRITTEN BY MARTIN GOLDBERG,
M.D., SYLVAN B. GREEN, M.D., MORTON L. MOSS, M.D., CARL B.
MARBACH, M.S., AND DAVID GARFINKEL, PH.D., AT THE RENAL-ELEC-
TROLYTE SECTION, UNIVERSITY OF PENNSYLVANIA MEDICAL SCHOOL,
PHILADELPHIA. THE PROGRAM WAS REWRITTEN FOR USE AT MUSC BY
MRS. DEBORAH G. ATKINSON, DEPARTMENT OF BIOMETRY.

IF YOU DO NOT HAVE A PARTICULAR BLOOD CHEMISTRY VALUE
REQUESTED BY THE COMPUTER (OTHER THAN PH, WHICH MUST BE EN-
TERED), PLEASE ENTER THE CODE NUMBER 5000 (THE COMPUTER IS
PROGRAMMED TO ASSUME A NORMAL VALUE WHEN 5000 IS ENTERED).

YOU ARE NOW ABOUT TO CONSIDER A NEW PATIENT

ENTER YOUR USER STATUS:
C=CLINICIAN, H=HOUSE STAFF, S=STUDENT
? S

ENTER TODAY'S DATE, USING THE FOLLOWING FORMAT:
MONTH, DAY, YEAR (E.G., 040874)
? 081474

ENTER CODE(S) OF PATIENT'S STATUS OR DISEASE SYSTEM(S).
IF MORE THAN ONE CODE IS APPLICABLE, ENTER THE APPROPRIATE
NUMBERS ON ONE LINE, SEPARATED BY COMMAS. THE CODES ARE AS
FOLLOWS: 0=ACUTE RENAL FAILURE, 1=CHRONIC RENAL FAILURE,
2=POST-OPERATIVE, 3=PULMONARY FAILURE, 4=HEART FAILURE,
5=GASTRO-INTESTINAL FLUID LOSS, 6=HEMODIALYSIS, 7=PERITONEAL
DIALYSIS, 8=HYPERTENSION, 9=HEPATIC FAILURE, 10=NEPHROTIC
SYNDROME.
? 3,8

ENTER ARTERIAL PH (ADD 0.03 IF VENOUS)
? 7.47

TYPE H, P, OR T TO INDICATE IF YOU ARE ENTERING
H-HCO3(M.MOLES/L), P-PCO2(MM HG), OR T-TCO2(M.MOLES/L),
PRESS RETURN, THEN TYPE THE NUMERICAL VALUE
? P
? 42

WAS THAT VALUE ARTERIAL OR VENOUS (A OR V)?
? A

ENTER SERUM SODIUM, MEQ/L
? 142
```

FIGURE 2.2 (Continued)

```
ENTER SERUM CHLORIDE, MEQ/L
? 101

ENTER SERUM POTASSIUM, MEQ/L
? 3.5

ENTER BLOOD GLUCOSE, MG
? 131

ENTER SERUM KETONES, TITER (INVERSE OF DILUTION),
(NORMAL=0).
? 0

ENTER SERUM CREATININE, MG
? 2

HAS THE PATIENT RECEIVED SUSTAINED TREATMENT WITH A RESPIR-
ATOR? (1=YES, 0=NO)
? 0

HAS THE PATIENT RECEIVED SUSTAINED OR INTENSIVE DIURETIC
THERAPY WITH MERCURIALS, THIAZIDES, ETHACRYNIC ACID, OR
FUROSEMIDE? (1=YES, 0=NO)
? 0

ANSWER THE FOLLOWING DRUG QUESTIONS WITH
==== 0 IF NONE HAS BEEN TAKEN
==== 1 IF A SIGNIFICANT AMOUNT HAS BEEN TAKEN
==== 2 IF A SMALL OR UNDETERMINED AMOUNT HAS BEEN TAKEN
==== 3 FOR LIST TO HELP IN DECIDING

ACIDIFYING AGENTS (3 FOR LIST)
? 3

CONCERNING ACIDIFYING AGENTS SUCH AS AMMONIUM CHLORIDE,
ARGININE-HCL, LYSINE-HCL, HAS THE PATIENT TAKEN
0=NONE
1=SIGNIFICANT AMOUNT
2=SMALLER OR UNDETERMINED AMOUNT
? 1

ALKALINIZING AGENTS (3 FOR LIST)
? 3
```

FIGURE 2.2 (Continued)

```
CONCERNING ALKALINIZING AGENTS SUCH AS BICARBONATE,
LACTATE, CITRATE, GLUCONATE, ACETATE, HAS THE PATIENT TAKEN
Ø=NONE
1=SIGNIFICANT AMOUNT
2=SMALLER OR UNDETERMINED AMOUNT
? Ø

RESPIRATORY DEPRESSANTS (3 FOR LIST)
? 3

CONCERNING RESPIRATORY DEPRESSANT DRUGS SUCH AS MORPHINE,
BARBITUATES, HAS THE PATIENT TAKEN
Ø=NONE
1=SIGNIFICANT AMOUNT (TO CAUSE CLINICAL HYPOVENTILATION)
2=SMALLER OR UNDETERMINED AMOUNT
? Ø

RESPIRATORY STIMULANTS (3 FOR LIST)
? 3

CONCERNING RESPIRATORY STIMULANTS SUCH AS SALICYLATES IN
HIGH DOSAGES, AMINOPHYLLINE IN DOSAGES=1.5-2.Ø GMS/24 HRS,
ANALEPTIC AGENTS, PHENOL, HAS THE PATIENT TAKEN
Ø=NONE
1=SIGNIFICANT AMOUNT (TO CAUSE CLINICAL HYPERVENTILATION)
2=SMALLER OR UNDETERMINED AMOUNT
? Ø

DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH
PRODUCES METABOLIC ALKALOSIS?
(Ø=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)
? 2

COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:
A. EXCESSIVE PRODUCTION OF BICARBONATE
   1. LOSS OF GASTRIC HCL
      A. VOMITING
      B. EXCESSIVE SUCTION
      C. PYLORIC OBSTRUCTION
B. EXCESSIVE RENAL RETENTION OF BICARBONATE
   1. POTASSIUM DEPLETION
      A. GI LOSSES
   2. ADRENOCORTICAL EXCESS
      A. HYPERALDOSTERONISM
      B. CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE
                            STEROID RX)
DOES THE PATIENT FIT ANY OF THESE CATEGORIES (Ø=NO, 1=YES)?
? Ø
```

FIGURE 2.3

Report Index

```
INDEX OF COMPUTER GENERATED REPORT FOR YOUR PATIENT:
(NOTE: ESSENTIAL PARTS ARE MARKED WITH *)

 PART 1 : DIFFERENTIAL DIAGNOSIS LIST
          (FROM ACID-BASE MAP)
*PART 2 : SUMMARY OF VALUES (INCL. CALCULATED VALUES)
*PART 3 : THE MOST PROBABLE DIAGNOSIS
 PART 4 : HYPOTHETICAL ALTERNATE DIAGNOSES
          (FROM ACID-BASE MAP)
 PART 5 : DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:
          RESPIRATORY ALKALOSIS
 PART 6 : DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:
          RESPIRATORY ACIDOSIS
TYPE TOTAL NUMBER OF REPORT SECTIONS DESIRED;
FOR COMPLETE REPORT (BEGINNING WITH PART 2), TYPE 9.
? 9
```

therapy that the patient has received. In addition, there are several possibilities for indicating a triple disturbance, (i.e., the coincidental occurrence of three primary disorders). For example, a significantly elevated delta value suggests the presence of metabolic acidosis, in addition to any other primary disturbance which may be present. Likewise, a low serum chloride level (and possible low potassium level), coupled with a history of intensive diuretic therapy, suggests the presence of metabolic alkalosis; 3) A discussion of alternate diagnoses (i.e., the remaining items in the differential diagnosis list). This discussion is of the same format as that described in 2) above, and is included to illustrate to the student the other means by which the patient could have arrived at the same point on the acid-base map; and 4) A detailed discussion, in turn, of the one, two, or three primary disturbances which make up the most probable diagnosis. If the user wishes to see this part of the report, he is presented with a discussion of the causes of the disturbance being studied. Again, modifying statements may indicate the significance of particular items that have been entered for the patient (15).

Figure 2.4 illustrates an example of the complete report.

INSTRUCTIONS FOR USERS

A "User's Manual" has been written to instruct users about the various aspects of the program. Topics covered in

FIGURE 2.4

Complete Report

```
*PART 2 : SUMMARY OF VALUES (INCL. CALCULATED VALUES)

ARTERIAL VALUES (INCLUDING THOSE CALCULATED FROM
     THE HENDERSON-HASSELBALCH EQUATION):
     PH (NL 7.35-7.45)                    7.47
     PCO2 (NL 37-44)                      42 MM HG
     HCO3 (NL 21-27)                      29.53728 M.MOLES/L
BLOOD CHEMISTRIES:
     VENOUS TCO2 (NL 24.1-30.3)           32.79728 M.MOLES/L
     NA (NL 135-145)                      142 MEQ/L
     CL (NL 97-108)                       101 MEQ/L
     DELTA (NL 4-14)                      8.202717
       DELTA (ANION GAP) IS THE DIFFERENCE BETWEEN THE
       MEASURED CATIONS (NA) AND MEASURED ANIONS (CL

       AND VENOUS TCO2)
     K (NL 3.5-5.0)                       3.5 MEQ/L
     GLUCOSE (NL 80-120)                  131 MG
     KETONES (NL=0)                       0
     CREATININE (NL 0.4-1.4)              2 MG

====TYPE C TO CONTINUE REPORT, E TO END
? C

*PART 3 : THE MOST PROBABLE DIAGNOSIS

>>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC
RESPIRATORY ACIDOSIS<<

====TYPE C TO CONTINUE REPORT, E TO END
? C

 PART 4 : HYPOTHETICAL ALTERNATE DIAGNOSES
          (FROM ACID-BASE MAP)

>>MILD METABOLIC ALKALOSIS<<

====TYPE C TO CONTINUE REPORT, E TO END
? C
```

FIGURE 2.4 (Continued)

PART 5 : DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS

COMMON CAUSES OF RESPIRATORY ALKALOSIS ARE:

A. PRIMARY CNS DISEASE
   1. MENINGITIS
   2. ENCEPHALITIS
   3. HEAD TRAUMA
B. PULMONARY DISEASES PRODUCING HYPOXEMIA
   1. PULMONARY FIBROSIS
   2. STATUS ASTHMATICUS
   3. PNEUMONIA
C. DRUGS OR POISONS
   1. SALICYLATES
   2. AMINOPHYLLINE
   3. ANALEPTIC AGENTS
   4. PHENOL
D. PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)
E. HIGH FEVER
F. GRAM NEGATIVE SEPTICEMIA
G. HEPATIC COMA
H. MECHANICAL HYPERVENTILATION (RESPIRATOR)

PART 6 : DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS

COMMON CAUSES OF RESPIRATORY ACIDOSIS ARE:

A. PULMONARY DISEASE
   1. EMPHYSEMA
   2. SEVERE STATUS ASTHMATICUS
   3. BRONCHIECTASIS
   4. FULMINANT DIFFUSE PNEUMONIA
   5. PNEUMOTHORAX
   6. HYDROTHORAX (MASSIVE PLEURAL EFFUSION)
   7. MUCOVISCIDOSIS
   8. CHEST WALL INJURY
B. RESPIRATORY CENTER DEPRESSION
   1. CNS DISEASE
   2. HEAD TRAUMA
   3. MORPHINE
   4. BARBITUATES
C. NEUROMUSCULAR DISEASE
   1. MYASTHENIA GRAVIS
   2. AMYOTROPHIC LATERAL SCLEROSIS
   3. POLIO
D. AIRWAY OBSTRUCTION
E. PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN SYNDROME)
F. SEVERE PULMONARY EDEMA

FIGURE 2.4 (Continued)

```
DID YOU USE THIS PROGRAM FOR DEMONSTRATION ONLY? (Y OR N)
? N

ENTER THE TIME, USING THE FOLLOWING FORMAT:
HOUR:MINUTES A.M. OR P.M. (E.G., 11:30 P.M.)
? 3:19 P.M.

ENTER THE PATIENT'S NAME, USING THE FOLLOWING FORMAT:
LAST NAME, FIRST NAME, MIDDLE INITIAL (E.G. DOE JOHN M.)
IF YOU ARE USING THE PROGRAM FOR SELF-INSTRUCTIONAL PURPOSES
ONLY, JUST PRESS RETURN.
? MARTIN NAPOLEON H. JR.

**************************************************

DO YOU WISH TO CONSIDER A NEW PATIENT? (Y OR N)
? Y

**************************************************
```

the manual include: 1) General Description; 2) Instructions for Use; 3) Program Listing and Documentation; 4) Program Variables; and 5) Patient File Variables.

CHAPTER III. PATIENT FILE

RATIONALE

In many cases, an individual patient might receive more than one diagnosis from the acid-base program at the Medical University of South Carolina. Goldberg cites the following example, in which a patient was referred to his computer program twice (15).

> "A 53-year-old miner had chronic cough with dyspnea on exertion for a number of years. On a visit to his daughter, in Philadelphia, he caught a 'cold' and, over the next three days, had a marked increase in sputnum production and dyspnea. Fever developed on the fourth day, and by the next day, he was so confused that he did not recognize his grandchildren. On admission to the hospital, he was febrile (38.9° C. or 102° F.), very cyanotic, and semistuporous. In addition, his expirations were markedly prolonged and musical wheezes throughout both lung fields were audible. The typical findings of chronic obstructive emphysema were present. Arterial pH was 7.27 and venous total CO_2 content was 47 millimoles/liter" (15).

The laboratory values were presented to the computer. Since significant alkali had not been given, and the patient clinically manifested no condition which produced metabolic alkalosis, the most probable diagnosis was given as "Chronic Respiratory Acidosis" (15).

> "A tracheostomy was done, and a respirator was attached. In addition, fluids (five percent glucose in water, isotonic saline solution with potassium chloride) were given intravenously, as were antibiotics, aminophylline, and isuprel inhalation. The patient received no alkali or

> diuretics. A history of duodenal ulcer was known, so steroids had not been considered either. After one day in the hospital, arterial pH was 7.48 and arterial pCO_2 was 53 mm Hg" (15).

These lab values were then presented to the computer program. Since a condition causing respiratory acidosis was present, along with sustained mechanical respiration, the most probable diagnosis was given as "Acute Respiratory Alkalosis Superimposed On Chronic Respiratory Acidosis" (15).

In the situation just discussed, and in many similar cases, the attending physician would probably desire a copy of the patient's particular lab values, for each time the patient's case was referred to the computer. This would be an easy task if a teletypewriter was being used, for the physician could request a "Summary of Values" as part of the computer-generated report. Since the teletypewriter furnishes a hard (paper) copy, this sheet could then be inserted into the patient's record. Additional sheets could be added as more computer consultations were required.

Frequently, a physician might desire to review a case, after an elapsed time of several weeks. He might also wish to compare cases of two or more former patients. This would require searching for needed information in patients' records, a task which also could require a lot of time.

To assist the physician in following a patient's course over time, a patient file for the acid-base program at the Medical University of South Carolina has been established. This file also provides the basis for an objective evaluation of the program in the future.

DESCRIPTION AND METHODS

FILE CREATION

Computer-user dialogue for patient information is conducted in two of the subprograms of the acid-base program. These subprograms, AB1 and AB5000, are described in Table 2.1 of Chapter II.

Information requested by AB1 includes date, user type (student, clinician, or house staff), and patient's status/disease system. A list of eleven clinical disturbances are listed by the program to assist the user in determining the patient's status. The program provides a self-check on user type. The user is also provided with the opportunity to type more than one disease code for the patient, since many patients fall into more than one of the eleven categories.

An example of the patient file dialogue in subprogram AB1 is shown in Figure 3.1. This dialogue is conducted before any blood gas values are requested.

Patient information obtained by subprogram AB1 is stored in the data file, "STORE1," along with the values of blood gases, blood chemistries, and other program parameters.

The remainder of the patient file information is requested at the end of the program. At the outset of this project, it was planned to place all patient file dialogue in one subprogram of the acid-base program, preferably at the beginning of the program in AB1. However, serious difficulties were encountered when strings of alphanumeric variables, such as names and times, were stored in the data file

FIGURE 3.1

Dialogue for Patient File Information - Subprogram AB1

```
HELLO. THIS IS THE ACID-BASE PROGRAM, COLLEGE OF MEDICINE,
MUSC. THIS PROGRAM WAS ORIGINALLY WRITTEN BY MARTIN GOLDBERG,
M.D., SYLVAN B. GREEN, M.D., MORTON L. MOSS, M.D., CARL B.
MARBACH, M.S., AND DAVID GARFINKEL, PH.D., AT THE RENAL-ELEC-
TROLYTE SECTION, UNIVERSITY OF PENNSYLVANIA MEDICAL SCHOOL,
PHILADELPHIA. THE PROGRAM WAS REWRITTEN FOR USE AT MUSC BY
MRS. DEBORAH G. ATKINSON, DEPARTMENT OF BIOMETRY.

IF YOU DO NOT HAVE A PARTICULAR BLOOD CHEMISTRY VALUE
REQUESTED BY THE COMPUTER (OTHER THAN PH, WHICH MUST BE EN-
TERED), PLEASE ENTER THE CODE NUMBER 5000 (THE COMPUTER IS
PROGRAMMED TO ASSUME A NORMAL VALUE WHEN 5000 IS ENTERED).

YOU ARE NOW ABOUT TO CONSIDER A NEW PATIENT

ENTER YOUR USER STATUS:
C=CLINICIAN, H=HOUSE STAFF, S=STUDENT
? C

ENTER TODAY'S DATE, USING THE FOLLOWING FORMAT:
MONTH, DAY, YEAR (E.G., 040874)
? 081474

ENTER CODE(S) OF PATIENT'S STATUS OR DISEASE SYSTEM(S).
IF MORE THAN ONE CODE IS APPLICABLE, ENTER THE APPROPRIATE
NUMBERS ON ONE LINE, SEPARATED BY COMMAS. THE CODES ARE AS
FOLLOWS: 0=ACUTE RENAL FAILURE, 1=CHRONIC RENAL FAILURE,
2=POST-OPERATIVE, 3=PULMONARY FAILURE, 4=HEART FAILURE,
5=GASTRO-INTESTINAL FLUID LOSS, 6=HEMODIALYSIS, 7=PERITONEAL
D
 IALYSIS, 8=HYPERTENSION, 9=HEPATIC FAILURE, 10=NEPHROTIC
SYNDROME.
? 3,8
```

"STORE1." Hence, some dialogue for the file was placed at the end of the program, namely in AB5000, to avoid loss of pertinent data.

Patient information requested by AB5000 includes time of day and patient's name. If the program is used for demonstration only, the dialogue is omitted, and control passes to the end of the subprogram.

An example of the patient file dialogue in subprogram AB5000 is shown in Figure 3.2.

After the dialogue has been completed in AB5000, the subprogram creates a disk file, named "PAFILE," for the patient records. The program then forms a record on the patient file for the patient. All pertinent variables are renamed for storage on "PAFILE." The record on each patient includes date, user type, time, patient's name, patient's status/disease system, pH, pCO_2 (mm Hg), HCO_3^- (m.moles/L), H+ concentration (nano Eq/L), venous TCO_2 (m.moles/L); sodium, chloride, and potassium concentrations (mEq/L); glucose (mg), ketones, creatinine (mg), and delta (anion gap). A missing value for sodium, delta, potassium, glucose, ketones and creatinine is stored in the patient file as "-1". A missing value for chloride is stored as "102".

The structure of the patient file is shown in Table 3.1.

INFORMATION RETRIEVAL

Four general BASIC programs, ABRTV, ABDATE, ABFREQ, and ABNAME, have been written to retrieve information from the

FIGURE 3.2

Dialogue for Patient File Information - Subprogram AB5000

```
DID YOU USE THIS PROGRAM FOR DEMONSTRATION ONLY? (Y OR N)
? N

ENTER THE TIME, USING THE FOLLOWING FORMAT:
HOUR:MINUTES A.M. OR P.M. (E.G., 11:30 P.M.)
? 3:35 P.M.

ENTER THE PATIENT'S NAME, USING THE FOLLOWING FORMAT:
LAST NAME, FIRST NAME, MIDDLE INITIAL (E.G. DOE JOHN M.)
IF YOU ARE USING THE PROGRAM FOR SELF-INSTRUCTIONAL PURPOSES
ONLY, JUST PRESS RETURN.
? MARTIN NAPOLEON H. JR.

**************************************************

DO YOU WISH TO CONSIDER A NEW PATIENT? (Y OR N)
? N

GOODBYE AND THANK YOU. HAVE A NICE DAY.
```

TABLE 3.1

Patient File Variables

Description	STORE1 Variable	PAFILE Variable
Date	D1	V(0)
User Type	C$(0)	B$(0)
Time	C$(1),C$(2)	B$(1),B$(2)
Patient's Name	C$(3) - C$(7)	B$(3) - B$(7)
Patient's Status/ Disease System	C$(8),C$(9)	B$(8),B$(9)
pH	P	V(1)
pCO_2	P1	V(2)
HCO_3^-	H	V(3)
H^+	H1	V(4)
TCO_2	T	V(5)
Sodium	N	V(6)
Chloride	C1	V(7)
Delta	D2	V(8)
Potassium	P2	V(9)
Glucose	G	V(10)
Ketones	K	V(11)
Creatinine	C2	V(12)

patient file. A description and a sample execution of each program, with test data, follows.

Program ABRTV

The program ABRTV lists the complete patient file. Figure 3.3 illustrates a sample run of the program.

Program ABDATE

The program ABDATE counts the number of patients referred to the acid-base program during any month. It also calculates the percentage of records which that month represents. The month number is typed in by the user. The program includes an optional loop, if information for more than one month is desired.

An example of program execution is illustrated in Figure 3.4.

Program ABFREQ

The purpose of the program ABFREQ is to tabulate frequencies of user types - clinicians, house staff, and students - in the patient file. A sample run of the program is given in Figure 3.5.

Program ABNAME

The program ABNAME is designed to print the records for a particular patient. The patient's name is input by the user. The program also includes an optional loop, if

FIGURE 3.3

Sample Execution of Program ABRTV

```
******** PATIENT FILE RECORDS - ACID-BASE PROGRAM ********

##########################################################

RECORD # :  1
DATE :  81474
USER TYPE : S
TIME : 4:13 P.M.
PATIENT'S NAME : MARTIN NAPOLEON H. JR.
PATIENT'S STATUS/DISEASE SYSTEM : 3,8
PH= 7.47  PCO2= 42  HCO3= 29.53728  H+= 33.88442
TCO2= 32.79728  NA= 142  CL= 101  DELTA= 8.202717
POT= 3.5  GLU= 131  KET= 0  CREAT= 2

##########################################################

RECORD # :  2
DATE :  81474
USER TYPE : C
TIME : 4:38 P.M.
PATIENT'S NAME : MARTIN NAPOLEON H. JR.
PATIENT'S STATUS/DISEASE SYSTEM : 3,8
PH= 7.47  PCO2= 42  HCO3= 29.53728  H+= 33.88442
TCO2= 32.79728  NA= 142  CL= 98  DELTA= 11.20272
POT= 3.4  GLU= 138  KET= 0  CREAT= 2

##########################################################

RECORD # :  3
DATE :  81474
USER TYPE : C
TIME : 4:43 P.M.
PATIENT'S NAME : JOHNSON DEBORAH J.
PATIENT'S STATUS/DISEASE SYSTEM : 1,6
PH= 7.44  PCO2= 32  HCO3= 21.00251  H+= 36.3078
TCO2= 23.96251  NA= 141  CL= 98  DELTA= 19.03749
POT= 5.2  GLU=-1  KET=-1  CREAT= 10.3
```

FIGURE 3.3 (Continued)

```
##########################################################

RECORD # :  4
DATE :  81574.
USER TYPE : S
TIME : 9:14 A.M.
PATIENT'S NAME : JOHNSON DEBORAH J.
PATIENT'S STATUS/DISEASE SYSTEM : 1,6
PH= 7.44  PCO2= 32  HCO3= 21.00251  H+= 36.3078
TCO2= 23.96251  NA= 135  CL= 102  DELTA= 9.037487
POT=-1  GLU=-1  KET=-1  CREAT= 2.3

##########################################################

RECORD # :  5
DATE :  81574
USER TYPE : C
TIME : 9:39 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.32  PCO2= 26.51262  HCO3= 13.2  H+= 47.86301
TCO2= 15.99538  NA= 125  CL= 81  DELTA= 28.00462
POT= 6.2  GLU= 81  KET= 0  CREAT=-1

##########################################################

RECORD # :  6
DATE :  81574
USER TYPE : H
TIME : 9:45 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.42  PCO2= 35  HCO3= 21.93761  H+= 38.01895
TCO2= 24.98761  NA= 142  CL= 93  DELTA= 24.01239
POT= 3.3  GLU= 123  KET= 0  CREAT=-1
```

FIGURE 3.3 (Continued)

```
##########################################################

RECORD # :  7
DATE :  81574
USER TYPE : H
TIME : 9:55 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.51  PCO2= 40.20133  HCO3= 31  H+= 30.90296
TCO2= 34.20604  NA= 144  CL= 100  DELTA= 9.793961
POT= 4  GLU= 120  KET=-1  CREAT=-1

##########################################################

RECORD # :  8
DATE :  81574
USER TYPE : S
TIME : 10:01 A.M.
PATIENT'S NAME : ELLIS FRAMPTON LEROY
PATIENT'S STATUS/DISEASE SYSTEM : 4
P
 H= 7.32  PCO2= 29.12371  HCO3= 14.5  H+= 47.86301
TCO2= 17.37371  NA=-1  CL= 102  DELTA=-1
POT=-1  GLU=-1  KET=-1  CREAT=-1

##########################################################

RECORD # :  9
DATE :  81574
USER TYPE : C
TIME : 10:29 A.M.
PATIENT'S NAME : MINER JOHN
PATIENT'S STATUS/DISEASE SYSTEM : 3
PH= 7.27  PCO2= 94.67473  HCO3= 42.15976  H+= 53.70318
TCO2= 47  NA= 140  CL= 81  DELTA= 12
POT= 4.9  GLU=-1  KET=-1  CREAT=-1
```

FIGURE 3.3 (Continued)

```
##########################################################

RECORD # :  10
DATE :  81574
USER TYPE : C
TIME : 10:37 A.M.
PATIENT'S NAME : MINER JOHN
PATIENT'S STATUS/DISEASE SYSTEM : 3
PH= 7.48  PCO2= 53  HCO3= 38.14144  H+= 33.11312
TCO2= 41.73144  NA= 139  CL= 88  DELTA= 9.268559
POT= 4.1  GLU=-1  KET=-1  CREAT=-1


TO DATE, THERE SHOULD BE 10 RECORDS IN THE PATIENT FILE
```

FIGURE 3.4

Sample Execution of Program ABDATE

```
********** MONTHLY TOTALS - ACID-BASE PROGRAM **********


FOR WHICH MONTH (1-12) DO YOU DESIRE A CUMULATIVE FIGURE?
? 7


THERE ARE Ø RECORDS SUBMITTED DURING MONTH # 7 , 1974.
THIS ACCOUNTS FOR Ø % OF THE 1Ø RECORDS IN THE FILE.


DO YOU WISH TO CONSIDER ANOTHER MONTH? (Y OR N)
? Y


FOR WHICH MONTH (1-12) DO YOU DESIRE A CUMULATIVE FIGURE?
? 8


THERE ARE 1Ø RECORDS SUBMITTED DURING MONTH # 8 , 1974.
THIS ACCOUNTS FOR 1ØØ % OF THE 1Ø RECORDS IN THE FILE.


DO YOU WISH TO CONSIDER ANOTHER MONTH? (Y OR N)
? N
```

FIGURE 3.5

Sample Execution of Program ABFREQ

```
********** USER FREQUENCIES - ACID-BASE PROGRAM **********

THERE ARE 10 RECORDS IN THE PATIENT FILE AT THIS TIME.
OF THESE,
 5 HAVE CLINICIAN USERS
 2 HAVE HOUSE STAFF USERS
 3 HAVE STUDENT USERS

FREQUENCIES:
 50 % ARE CLINICIAN USERS
 20 % ARE HOUSE STAFF USERS
 30 % ARE STUDENT USERS
```

records for more than one patient are desired. An example of program execution is given in Figure 3.6.

The user must remember to type the patient's name exactly as it is stored on the record in the file; otherwise, that record will not be printed. The name "Reid Rosalee" and "Reid,Rosalee" are not the same. Therefore, if the user does not know how the name is stored in the file, he may have to input several versions of the name before he receives all the records. The uniform methods of inputting names, when they are requested by the acid-base program, is last name, first name, middle initial. One space (no commas) should separate each word, with a period (.) following the middle initial. Instructions to this effect have been given in AB5000.

Future Retrieval Programs

The previously described programs are the only retrieval programs in operation at this time. However, these are general programs, and their underlying methods could be expanded in the future. For example, a physician might wish to examine pH trends in a particular patient. A revision of the program ABNAME would accomplish this objective. Also, additional information could be included in the patient file.

EVALUATION

One of the purposes for establishing the patient file was to provide a data base for evaluation of the acid-base

FIGURE 3.6

Sample Execution of Program ABNAME

```
********** PATIENT RECORDS - BY NAME **********


PLEASE TYPE NAME OF PATIENT FOR WHICH YOU DESIRE RECORDS.
FORMAT IS LAST NAME FIRST NAME MIDDLE INITIAL (FOR EXAMPLE,
DOE JOHN G.)
? MARTIN NAPOLEON H. JR.


RECORD # :  1
DATE :  81474
USER TYPE : S
TIME : 4:13 P.M.
PATIENT'S NAME : MARTIN NAPOLEON H. JR.
PATIENT'S STATUS/DISEASE SYSTEM : 3,8
PH= 7.47  PCO2= 42  HCO3= 29.53728  H+= 33.88442
TCO2= 32.79728  NA= 142  CL= 101  DELTA= 8.202717
POT= 3.5  GLU= 131  KET= Ø  CREAT= 2


RECORD # :  2
DATE :  81474
USER TYPE : C
TIME : 4:38 P.M.
PATIENT'S NAME : MARTIN NAPOLEON H. JR.
PATIENT'S STATUS/DISEASE SYSTEM : 3,8
PH= 7.47  PCO2= 42  HCO3= 29.53728  H+= 33.88442
TCO2= 32.79728  NA= 142  CL= 98  DELTA= 11.20272
POT= 3.4  GLU= 138  KET= Ø  CREAT= 2


DO YOU WISH TO CONSIDER ANOTHER PATIENT ? (Y OR N)
? Y


PLEASE TYPE NAME OF PATIENT FOR WHICH YOU DESIRE RECORDS.
FORMAT IS LAST NAME FIRST NAME MIDDLE INITIAL (FOR EXAMPLE,
DOE JOHN G.)
? REID ROSALEE
```

FIGURE 3.6 (Continued)

```
RECORD # :  5
DATE :  81574
USER TYPE : C
TIME : 9:39 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.32  PCO2= 26.51262  HCO3= 13.2  H+= 47.86301
TCO2= 15.99538  NA= 125  CL= 81  DELTA= 28.00462
POT= 6.2  GLU= 81  KET= 0  CREAT=-1


RECORD # :  6
DATE :  81574
USER TYPE : H
TIME : 9:45 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.42  PCO2= 35  HCO3= 21.93761  H+= 38.01895
TCO2= 24.98761  NA= 142  CL= 93  DELTA= 24.01239
POT= 3.3  GLU= 123  KET= 0  CREAT=-1


RECORD # :  7
DATE :  81574
USER TYPE : H
TIME : 9:55 A.M.
PATIENT'S NAME : REID ROSALEE
PATIENT'S STATUS/DISEASE SYSTEM : 1,8
PH= 7.51  PCO2= 40.20133  HCO3= 31  H+= 30.90296
TCO2= 34.20604  NA= 144  CL= 100  DELTA= 9.793961
POT= 4  GLU= 120  KET=-1  CREAT=-1


DO YOU WISH TO CONSIDER ANOTHER PATIENT ? (Y OR N)
? N
```

program at the Medical University of South Carolina. At this date, the program has been in operation for such a short time that very few patients are listed on the patient file. Hence, no analyses have been completed.

However, future plans are to evaluate the program, both from users' and patients' standpoints. In evaluating the system, interest will be focused on various distributions, such as time of day used, disease/status of patient (e.g., chronic renal failure, hypertension), types of users, and amount of use. The program will also be evaluated subjectively by the clinicians in charge of the program in the Department of Medicine. It is hoped that this evaluation will demonstrate the effectiveness of the program, both economically and otherwise.

CHAPTER IV. PROJECT CONCLUSIONS

SUMMARY

At its outset, this project had two objectives: 1) to incorporate Goldberg's acid-base program on a PDP-8/e minicomputer at the Medical University of South Carolina; and 2) to establish a file on the computer, containing patient information. The file enables a physician to follow a patient's course over time. In addition, it provides a data base for an analysis of the program.

Goldberg's Fortran IV program was translated into BASIC language, and was programmed into the PDP-8/e time-sharing computer as a series of 52 subprograms. The programming has been completed.

The patient file was also organized and established as a disk file on the computer. Since only a few patients were referred to the computer for diagnosis during the study period, very few records were formed on the patient file.

Because of the paucity of patient information, an analysis of the program has only been partially performed. It is expected that enough patients will have been referred to the acid-base program at the Medical University of South Carolina by the end of 1974 to conduct this evaluation.

However, the patient file was designed to store

information so that the following questions could be answered: 1) Does the program actually assist the physician in making his diagnosis? 2) Does the program benefit the patient? 3) Is the program effective as a teaching exercise? 4) Has the program proven to feasible monetarily, in terms of new equipment purchased for the computer?

The details of the analysis have been outlined in Chapter III. For the system evaluation, interest will be focused on various distributions, such as time of day used, patient's status/disease system, types of users, and amount of use. The program will also be subjectively evaluated by the physicians in charge of the program in the Department of Medicine. The data base for the objective analysis will be provided by the patient file.

IMPLICATIONS FOR THE FUTURE

The significance of this project extends beyond the fact that this acid-base program provides an important diagnostic tool for the health professionals at the Medical University of South Carolina. The program and the patient file will be involved in future educational and health care programs.

The role of the acid-base program at the Medical University of South Carolina can be understood in terms of its diagnostic and educational capabilities.

The program serves as a consulting tool. It aids the physician in making an acid-base diagnosis about a particular

patient, and provides the degree of assistance which the clinician needs. It also frees the physician from making long, cumbersome, numerical calculations. Finally, it presents the clinician with a concise report of his patient.

The other important goal of this program is an educational one. Students may wish to select optional lists to assist them in answering questions posed by the program. In addition, computer output may be studied by the student during his study of acid-base physiology. In this respect, the program demonstrates its role of Computer-Assisted Instruction.

This program demonstrates an application of a minicomputer in the biomedical environment. Such applications are usually dedicated to specific areas. Other applications include clinical laboratories, patient monitoring, automated EKGs, EEGs, and pulmonary function analyses, acquisition of medical history data, medical consulting systems, image processing (such as reading X-rays), and automated multiphasic health testing (AMHT) (19). As medical technology continues to increase, more and more heretofore manual tasks are being adapted to computers.

The patient file, with its accompanying analysis, will hopefully justify the time and costs which have been input into the acid-base program at the Medical University of South Carolina. This program should then pave the way for similar projects in the future.

APPENDICES

APPENDIX I

ACID-BASE SUBPROGRAMS

AB1

```
 10 REM 1
 15 REM PLEASE MAKE SURE THE FOLLOWING PRINT STATEMENTS ARE THE FIRST
 20 REM EXECUTABLE ONES IN THE PROGRAM
 21 PRINT\PRINT
 22 PRINT "HELLO.  THIS IS THE ACID-BASE PROGRAM, COLLEGE OF MEDICINE,"
 23 PRINT "MUSC.  THIS PROGRAM WAS ORIGINALLY WRITTEN BY MARTIN GOLDBERG,"
 24 PRINT "M.D., SYLVAN B.  GREEN, M.D., MORTON L.  MOSS, M.D., CARL B."
 25 PRINT "MARBACH, M.S., AND DAVID GARFINKEL, PH.D., AT THE RENAL-ELEC-"
 26 PRINT "TROLYTE SECTION, UNIVERSITY OF PENNSYLVANIA MEDICAL SCHOOL,"
 27 PRINT "PHILADELPHIA.  THE PROGRAM WAS REWRITTEN FOR USE AT MUSC BY"
 30 PRINT "MRS.  DEBORAH G.  ATKINSON, DEPARTMENT OF BIOMETRY."
 35 PRINT\PRINT "IF YOU DO NOT HAVE A PARTICULAR BLOOD CHEMISTRY VALUE"
 40 PRINT "REQUESTED BY THE COMPUTER (OTHER THAN PH, WHICH MUST BE EN-"
 45 PRINT "TERED), PLEASE ENTER THE CODE NUMBER 5000 (THE COMPUTER IS"
 50 PRINT "PROGRAMMED TO ASSUME A NORMAL VALUE WHEN 5000 IS ENTERED)."
 51 REM 2
 52 RECORD P,P1,H,H1,T,D1,C$(11)
 53 RECORD N,C1,D2,P2,G,K,C2
 54 RECORD Z(21)
 55 RECORD I(8),L(8),J,M,Q,I3
 60 FOR I=0 TO 21
 65 LET Z(I)=0
 70 NEXT I
 75 LET N=0\LET C1=0\LET D2=0\LET P2=0\LET G=0\LET K=0\LET C2=0
 80 FOR M=0 TO 8
 85 LET I(M)=0\LET L(M)=0
 90 NEXT M
 95 LET J=0\LET M=0\LET Q=0\LET I3=0
100 PRINT\PRINT "YOU ARE NOW ABOUT TO CONSIDER A NEW PATIENT"
101 PRINT\PRINT "ENTER YOUR USER STATUS:"
102 PRINT "C=CLINICIAN, H=HOUSE STAFF, S=STUDENT"
103 INPUT C$(0)
104 IF C$(0)="C" GO TO 110
105 IF C$(0)="H" GO TO 110
106 IF C$(0)="S" GO TO 110
107 PRINT "****ERROR - YOU MUST ENTER ONE LETTER - C, H, OR S"
108 GO TO 101
110 PRINT\PRINT "ENTER TODAY'S DATE, USING THE FOLLOWING FORMAT:"
113 PRINT "MONTH, DAY, YEAR (E.G., 040874)"
114 INPUT D1
133 PRINT
135 PRINT "ENTER CODE(S) OF PATIENT'S STATUS OR DISEASE SYSTEM(S)."
138 PRINT "IF MORE THAN ONE CODE IS APPLICABLE, ENTER THE APPROPRIATE"
140 PRINT "NUMBERS ON ONE LINE, SEPARATED BY COMMAS.  THE CODES ARE AS"
145 PRINT "FOLLOWS:  0=ACUTE RENAL FAILURE, 1=CHRONIC RENAL FAILURE,"
150 PRINT "2=POST-OPERATIVE, 3=PULMONARY FAILURE, 4=HEART FAILURE,"
155 PRINT "5=GASTRO-INTESTINAL FLUID LOSS, 6=HEMODIALYSIS, 7=PERITONEAL"
160 PRINT "DIALYSIS, 8=HYPERTENSION, 9=HEPATIC FAILURE, 10=NEPHROTIC"
165 PRINT "SYNDROME."
170 LINPUT C$(9),C$(10)
```

```
175 PRINT
180 PRINT "ENTER ARTERIAL PH (ADD 0.03 IF VENOUS)"
185 INPUT P
190 IF P<=6.89 GO TO 200
195 IF P<=7.705 GO TO 265
200 IF P<=6.595 GO TO 210
205 IF P<=8.50 GO TO 230
210 PRINT
215 PRINT "IMPOSSIBLE PH - PLEASE BEGIN AGAIN!"
220 GO TO 180
225 PRINT
230 PRINT "THIS PH IS OUTSIDE THE RANGE USUALLY ENCOUNTERED CLINICALLY"
235 PRINT "AND MAY REPRESENT A LABORATORY ERROR.  TYPE IN PH AGAIN,"
240 PRINT "USING SAME VALUE (TO CONFIRM), .OTHERWISE USE NEW VALUE(ADD"
245 PRINT "0.03 IF VENOUS)"
250 INPUT P
255 IF P<=6.595 GO TO 210
260 IF P>8.50 GO TO 210
265 PRINT
270 PRINT "TYPE H, P, OR T TO INDICATE IF YOU ARE ENTERING"
275 PRINT "H-HCO3(M.MOLES/L), P-PCO2(MM HG), OR T-TCO2(M.MOLES/L),"
280 PRINT "PRESS RETURN, THEN TYPE THE NUMERICAL VALUE"
285 INPUT I1$
286 INPUT C
290 IF I1$="T" GO TO 310
295 IF I1$="P" GO TO 310
300 IF I1$="H" GO TO 310
305 GO TO 315
310 IF C>0 GO TO 335
315 PRINT
320 PRINT "****ERROR-YOU MUST ENTER ONE LETTER - H,P, OR T,"
325 PRINT "THEN A VALUE GREATER THAN ZERO"
330 GO TO 265
335 PRINT
340 PRINT "WAS THAT VALUE ARTERIAL OR VENOUS (A OR V)?"
345 INPUT I2$
350 IF I2$="A" GO TO 360
355 IF I2$="V" GO TO 360
356 GO TO 335
357 REM 3
360 IF I1$="P" GO TO 400
365 IF I1$="T" GO TO 430
370 LET H=C
375 IF I2$<>"V" GO TO 385
380 LET H=H-2.0
385 LET P1=H/(.03*(10^(P-6.1)))
390 LET T=H+(.03*P1)
393 GO TO 460
400 LET P1=C
405 IF I2$<>"V" GO TO 415
410 LET P1=P1-6.0
415 LET H=.03*P1*(10^(P-6.1))
420 LET T=H+(.03*P1)
425 GO TO 460
430 LET T=C
435 IF I2$<>"V" GO TO 445
440 LET T=T-2.0
445 LET X=.0301*((10^(P-6.1))+1)
450 LET P1=T/X
455 LET H=T-(.03*P1)
460 LET H1=(10^(-P))*(10^9)
465 IF P1<10 GO TO 475
470 IF P1<=180 GO TO 500
```

```
475 PRINT
480 PRINT "THE VALUES ENTERED INDICATE AN ARTERIAL PCO2 OF";P1
485 PRINT "THIS PROBABLY REPRESENTS A LABORATORY ERROR SINCE VALUES"
490 PRINT "SUCH AS THIS HAVE NOT BEEN REPORTED.  PLEASE BEGIN AGAIN."
495 GO TO 175
500 IF HC=75 GO TO 520
505 PRINT
510 PRINT "THE VALUES ENTERED INDICATE AN ARTERIAL HCO3 OF";H
515 GO TO 485
520 LET T=T+2.0
525 REM 4
530 OPEN 8, "STORE1"
535 LET I=0
540 PUT 8,52,I
545 PUT 8,53,I
550 PUT 8,54,I
555 PUT 8,55,I
560 CHAIN "AB2"
```

AB2

```
565 END
  5 REM 1
  7 RECORD P,P1,H,H1,T,D1,C(10)
  9 RECORD Z(21)
 10 LET I=0
 11 GET 8,7,I
 15 IF P<7.35 GO TO 50
 20 IF P>7.45 GO TO 50
 25 IF P1<37 GO TO 50
 30 IF P1>44 GO TO 50
 35 IF H<21 GO TO 50
 40 IF H>27 GO TO 50
 44 LET Z(0)=30
 45 GOSUB 450
 50 IF H1<40 GO TO 70
 55 IF H1>=94.86-2*P1 GO TO 70
 60 IF H<6.6 GO TO 70
 64 LET Z(0)=1
 65 GOSUB 450
 70 IF H1>=40 GO TO 95
 75 IF H<6.6 GO TO 95
 80 IF H1<=0.13*P1+35 GO TO 95
 85 IF H1<=0.74*P1+13.5 GO TO 95
 89 LET Z(0)=1
 90 GOSUB 450
 95 IF H1<94.86-2*P1 GO TO 120
100 IF H1>116.94-2*P1 GO TO 120
105 IF H>=12 GO TO 120
110 IF H<6.6 GO TO 120
114 LET Z(0)=2
115 GOSUB 450
120 IF H<12 GO TO 150
125 IF H>=18 GO TO 150
130 IF H1<94.86-2*P1 GO TO 150
135 IF H1>116.94-2*P1 GO TO 150
140 IF H1<40 GO TO 150
144 LET Z(0)=3
145 GOSUB 450
150 IF H<18 GO TO 180
155 IF H1<40 GO TO 180
160 IF H1<=0.74*P1+13.5 GO TO 180
165 IF P1>=37 GO TO 180
170 IF H>116.94-2*P1 GO TO 180
174 LET Z(0)=4
175 GOSUB 450
180 IF H1<=116.94-2*P1 GO TO 205
185 IF P1>=37 GO TO 205
190 IF P<6.59 GO TO 205
195 IF P1<=18.47 GO TO 205
199 LET Z(0)=5
200 GOSUB 450
205 IF P<6.59 GO TO 230
210 IF H>=21 GO TO 230
215 IF P1<37 GO TO 230
220 IF P1>62 GO TO 230
224 LET Z(0)=6
225 GOSUB 450
230 IF P>=7.35 GO TO 255
235 IF H<21 GO TO 255
240 IF P1>62 GO TO 255
245 IF H1<=0.77*P1+11.0 GO TO 255
249 LET Z(0)=6
250 GOSUB 450
255 IF P1>180 GO TO 280
260 IF P<6.59 GO TO 280
```

```
265 IF P1<=62 GO TO 280
270 IF H1<=0.77*P1+11.0 GO TO 280
274 LET Z(0)=7
275 GOSUB 450
280 IF P1>180 GO TO 305
285 IF P1<=62 GO TO 305
290 IF H1>0.77*P1+11.0 GO TO 305
295 IF H1<0.77*P1+4.6 GO TO 305
299 LET Z(0)=8
300 GOSUB 450
305 IF P1>62 GO TO 335
310 IF H1>0.77*P1+11.0 GO TO 335
315 IF H1<0.77*P1+4.6 GO TO 335
320 IF P1<=44 GO TO 335
325 IF H1<=0.345*P1+28.2 GO TO 335
329 LET Z(0)=8
330 GOSUB 450
335 IF H1>0.77*P1+11.0 GO TO 355
340 IF P1>44 GO TO 355
345 IF P>=7.35 GO TO 355
349 LET Z(0)=9
350 GOSUB 450
355 IF P1>180 GO TO 380
360 IF P1<=69 GO TO 380
365 IF H1>=0.77*P1+4.6 GO TO 380
370 IF H1<=0.429*P1+22.4 GO TO 380
374 LET Z(0)=10
375 GOSUB 450
380 IF P1<=62 GO TO 405
385 IF P1>69 GO TO 405
390 IF H1<=0.345*P1+28.2 GO TO 405
395 IF H1>=0.77*P1+4.6 GO TO 405
399 LET Z(0)=10
400 GOSUB 450
405 CHAIN "AB3"
450 LET I=2
455 PUT 8,9,I
460 CHAIN "VALUE"
465 RETURN
```

AB3

```
470 END
  5 REM 1
  7 RECORD P,P1,H,H1,T,D1,C$(11)
  9 RECORD Z(21)
 10 LET I=0
 11 GET 8,7,I
 15 IF P1>62 GO TO 35
 20 IF H1<=0.345*P1+28.2 GO TO 35
 25 IF H1>=0.77*P1+4.6 GO TO 35
 29 LET Z(0)=11
 30 GOSUB 450
 35 IF P1<=69 GO TO 60
 40 IF P1>180 GO TO 60
 45 IF H1>0.429*P1+22.4 GO TO 60
 50 IF H1<0.25*P1+27.7 GO TO 60
 54 LET Z(0)=12
 55 GOSUB 450
 60 IF P1<=62 GO TO 85
 65 IF P1>69 GO TO 85
 70 IF H1>0.345*P1+28.2 GO TO 85
 75 IF H1<0.351*P1+20.8 GO TO 85
 79 LET Z(0)=12
 80 GOSUB 450
 85 IF P1>62 GO TO 115
 90 IF H1>0.345*P1+28.2 GO TO 115
 95 IF H1<0.351*P1+20.8 GO TO 115
100 IF H1>=0.77*P1+4.6 GO TO 115
105 IF H<=-0.26*P1+50.55 GO TO 115
109 LET Z(0)=13
110 GOSUB 450
115 IF P1<=44 GO TO 140
120 IF H1>0.345*P1+28.2 GO TO 140
125 IF H1<0.77*P1+4.6 GO TO 140
130 IF H1<=-0.26*P1+50.55 GO TO 140
134 LET Z(0)=14
135 GOSUB 450
140 IF H1>-0.26*P1+50.55 GO TO 165
145 IF H1<0.351*P1+20.8 GO TO 165
150 IF P1<=44 GO TO 165
155 IF H1>=0.77*P1+4.6 GO TO 165
159 LET Z(0)=15
160 GOSUB 450
165 IF H<=27 GO TO 185
170 IF P1>44 GO TO 185
175 IF H1<0.351*P1+20.8 GO TO 185
179 LET Z(0)=16
180 GOSUB 450
185 IF H>27 GO TO 210
190 IF H1<0.351*P1+20.8 GO TO 210
195 IF P1<37 GO TO 210
200 IF P<=7.45 GO TO 210
204 LET Z(0)=16
205 GOSUB 450
210 IF H1>0.74*P1+13.5 GO TO 235
215 IF H1>0.13*P1+35 GO TO 235
220 IF H1<0.53*P1+20 GO TO 235
225 IF P1>=37 GO TO 235
229 LET Z(0)=17
230 GOSUB 450
235 IF P1>=37 GO TO 260
240 IF H1<=0.13*P1+35 GO TO 260
245 IF H1>0.74*P1+13.5 GO TO 260
250 IF H1>=40 GO TO 260
254 LET Z(0)=18
255 GOSUB 450
```

```
260 IF P1<=69 GO TO 285
265 IF H1>=0.25*P1+27.7 GO TO 285
270 IF P1>180 GO TO 280
275 IF P>8.5 GO TO 285
279 LET Z(0)=19
280 GOSUB 450
285 IF P1<=62 GO TO 310
290 IF P1>69 GO TO 310
295 IF H1>=0.351*P1+20.8 GO TO 310
300 IF P>8.5 GO TO 310
304 LET Z(0)=19
305 GOSUB 450
310 IF P1>62 GO TO 330
315 IF H1>=0.351*P1+20.8 GO TO 330
320 IF H1<=-0.26*P1+50.55 GO TO 330
324 LET Z(0)=20
325 GOSUB 450
330 IF P1>62 GO TO 360
335 IF P1<52 GO TO 360
340 IF P>8.5 GO TO 360
345 IF H1>-0.26*P1+50.55 GO TO 360
350 IF H<=35 GO TO 360
354 LET Z(0)=21
355 GOSUB 450
360 IF P1>=52 GO TO 380
365 IF H1<17.4*P1/(P1-15.7) GO TO 380
370 IF H<=35 GO TO 380
374 LET Z(0)=21
375 GOSUB 450
380 IF H>35 GO TO 410
385 IF H<=30 GO TO 410
390 IF H1>-0.26*P1+50.55 GO TO 410
395 IF H<17.4*P1/(P1-15.7) GO TO 410
400 IF H>=0.351*P1+20.8 GO TO 410
404 LET Z(0)=22
405 GOSUB 450
410 CHAIN "AB4"
450 LET I=2
455 PUT 8,9,I
460 CHAIN "VALUE"
465 RETURN
```

AB4

```
470 END
  5 REM 1
  7 RECORD P,P1,H,H1,T,D1,C$(11)
  9 RECORD Z(21)
 10 LET I=0
 11 GET 8,7,I
 15 IF H>30 GO TO 40
 20 IF H1<17.4*P1/(P1-15.7) GO TO 40
 25 IF P1<37 GO TO 40
 30 IF H1>=0.351*P1+20.8 GO TO 40
 34 LET Z(0)=16
 35 GOSUB 450
 40 IF P1>=52 GO TO 65
 45 IF P>8.5 GO TO 65
 50 IF P1<37 GO TO 65
 55 IF H1>=17.4*P1/(P1-15.7) GO TO 65
 59 LET Z(0)=24
 60 GOSUB 450
 65 IF P>8.5  GO TO 90
 70 IF P1>=37 GO TO 90
 75 IF P1<10 GO TO 90
 80 IF H1>=0.74*P1+7.2 GO TO 90
 84 LET Z(0)=25
 85 GOSUB 450
 90 IF P1>=37 GO TO 115
 95 IF H<=21 GO TO 115
100 IF H1<0.74*P1+7.2 GO TO 115
105 IF H1>=0.53*P1+20 GO TO 115
109 LET Z(0)=26
110 GOSUB 450
115 IF P1<10 GO TO 145
120 IF H>21 GO TO 145
125 IF H1>0.74*P1+13.5 GO TO 145
130 IF H1<0.74*P1+7.2 GO TO 145
135 IF H1>=0.53*P1+20 GO TO 145
139 LET Z(0)=27
140 GOSUB 450
145 IF H1>=0.53*P1+20 GO TO 165
150 IF P1<10 GO TO 165
155 IF H1<=0.74*P1+13.5 GO TO 165
159 LET Z(0)=28
160 GOSUB 450
165 IF P1<10 GO TO 190
170 IF H1<0.53*P1+20 GO TO 190
175 IF H1>0.13*P1+35 GO TO 190
180 IF H1<=0.74*P1+13.5 GO TO 190
184 LET Z(0)=29
185 GOSUB 450
190 IF P1>=37 GO TO 210
195 IF H1<40 GO TO 210
200 IF H1>0.74*P1+13.5 GO TO 210
204 LET Z(0)=31
205 GOSUB 450
210 IF H1<0.77*P1+4.6 GO TO 230
215 IF H1>-0.26*P1+50.55 GO TO 230
220 IF P1<=44 GO TO 230
224 LET Z(0)=32
225 GOSUB 450
230 IF P1<10 GO TO 255
235 IF H1>=94.86-2*P1 GO TO 255
240 IF H>=6.6 GO TO 255
245 IF H1<=0.13*P1+35 GO TO 255
249 LET Z(0)=33
250 GOSUB 450
255 IF H1>80 GO TO 285
```

```
260 IF H1<94.86-2*P1 GO TO 285
265 IF H1>116.94-2*P1 GO TO 285
270 IF P1<10 GO TO 285
275 IF H>=6.6 GO TO 285
279 LET Z(0)=34
280 GOSUB 450
285 IF H1<=80 GO TO 315
290 IF P<6.59 GO TO 315
295 IF P1<10 GO TO 315
300 IF P1>18.47 GO TO 315
304 LET Z(0)=34
305 GOSUB 450
310 REM 2
315 PRINT
320 PRINT "AN ERROR HAS OCCURRED IN THE PROGRAM.  PLEASE REMEMBER THE"
325 PRINT "VALUES YOU ENTERED AND REPORT THEM TO DR.  CHAN LAM,  PH.D,"
328 PRINT "DEPARTMENT OF BIOMETRY."
330 GO TO 470
450 LET I=2
455 PUT 8,9,I
460 CHAIN "VALUE"
465 RETURN
```

VALUE

```
470 END
  5 REM 1
  6 RECORD P,P1,H,H1,T,D1,C$(11)
  7 RECORD N,C1,D2,P2,G,K,C2
  8 RECORD Z(21)
 10 LET I=0
 11 GET 8,6,I
 12 GET 8,7,I
 13 GET 8,8,I
 15 PRINT\PRINT "ENTER SERUM SODIUM, MEQ/L"
 20 LET N1=0
 25 INPUT N
 30 IF N<>5000 GO TO 55
 35 PRINT\PRINT "SERUM ELECTROLYTES MAY BE USEFUL.  TRY TO GET THEM FOR"
 40 PRINT "FUTURE PATIENTS"
 45 LET D2=-1\LET N=-1\LET C1=102\LET P2=-1
 50 GO TO 335
 55 IF N<120 GO TO 65
 60 IF N<=160 GO TO 110
 65 IF N<80 GO TO 75
 70 IF N<=220 GO TO 85
 75 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN. "
 80 GO TO 15
 85 IF N1=1 GO TO 110
 90 PRINT\PRINT "THIS VALUE IS UNUSUAL AND MAY REPRESENT AN ERROR.  REEN-"
 95 PRINT "TER SAME SERUM SODIUM, MEQ/L (TO CONFIRM) OR TYPE NEW VALUE. "
100 LET N1=1
105 GO TO 25
110 PRINT\PRINT "ENTER SERUM CHLORIDE, MEQ/L"
115 LET N1=0
120 INPUT C1
125 IF C1<>5000 GO TO 150
130 PRINT\PRINT "SERUM ELECTROLYTES MAY BE USEFUL.  TRY TO GET THEM FOR"
135 PRINT "FUTURE PATIENTS. "
140 LET D2=-1\LET C1=102\LET P2=-1
145 GO TO 335
150 IF C1<80 GO TO 160
155 IF C1<=120 GO TO 225
160 IF C1<30 GO TO 170
165 IF C1<=200 GO TO 180
170 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN. "
175 GO TO 110
180 IF N1=1 GO TO 225
185 PRINT\PRINT "THIS VALUE IS UNUSUAL AND MAY REPRESENT AN ERROR.  RE-"
190 PRINT "ENTER SAME SERUM CHLORIDE, MEQ/L (TO CONFIRM), OR TYPE NEW"
195 PRINT "VALUE. "
200 LET N1=1
205 GO TO 120
225 LET D2=N-(C1+T)
230 IF D2<=14 GO TO 240
235 LET Z(10)=1
240 IF D2>0 GO TO 260
245 PRINT\PRINT "THE DELTA (ANION GAP) IS NEGATIVE.  THIS IS IMPOSSIBLE. "
250 PRINT "PLEASE RECHECK VALUES AND REENTER NA AND CL. "
255 GO TO 15
260 PRINT\PRINT "ENTER SERUM POTASSIUM, MEQ/L"
265 INPUT P2
270 IF P2<>5000 GO TO 285
275 LET P2=-1
280 GO TO 335
285 IF P2>10 GO TO 295
290 IF P2>0 GO TO 305
295 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN. "
300 GO TO 260
305 IF P2<7 GO TO 320
```

```
310 PRINT\PRINT "THIS POTASSIUM IS SUFFICIENTLY ELEVATED TO INDICATE A"
315 PRINT "NEED FOR ALKALINIZATION AND/OR ION EXCHANGE RESIN."
320 IF P2>1.49 GO TO 335
325 PRINT\PRINT "A POTASSIUM THIS LOW IS LIFE THREATENING AND K+ THER-"
330 PRINT "APY SHOULD BE CONSIDERED IMMEDIATELY."
335 PRINT\PRINT "ENTER BLOOD GLUCOSE, MG"
340 LET N1=0
345 INPUT G
350 IF G<>5000 GO TO 365
355 LET G=-1
360 GO TO 420
365 IF G<60 GO TO 375
370 IF G<=1500 GO TO 420
375 IF G<10 GO TO 385
380 IF G<=2000 GO TO 395
385 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN."
390 GO TO 335
395 IF N1=1 GO TO 420
400 PRINT\PRINT "UNUSUAL VALUE.  REENTER SAME GLUCOSE, MG (TO CONFIRM),"
405 PRINT "OR TYPE NEW VALUE."
410 LET N1=1
415 GO TO 345
420 PRINT\PRINT "ENTER SERUM KETONES, TITER (INVERSE OF DILUTION),"
425 PRINT "(NORMAL=0)."
430 INPUT K
435 IF K<>5000 GO TO 450
440 LET K=-1
445 GO TO 465
450 IF K<=32 GO TO 465
455 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN."
460 GO TO 420
465 PRINT\PRINT "ENTER SERUM CREATININE, MG"
470 INPUT C2
475 IF C2<>5000 GO TO 490
480 LET C2=-1
485 GO TO 505
490 IF C2<=40 GO TO 505
495 PRINT\PRINT "IMPOSSIBLE VALUE.  TRY AGAIN."
500 GO TO 465
505 LET I=1
510 PUT 8,7,I
515 PUT 8,8,I
520 CHAIN "DRUGS"
```

DRUGS

```
525 END
  5 REM 1
  7 RECORD Z(21)
 10 LET I=2
 12 GET 8,7,I
 15 PRINT
 20 PRINT "HAS THE PATIENT RECEIVED SUSTAINED TREATMENT WITH A RESPIR-"
 25 PRINT "ATOR? (1=YES, 0=NO)"
 30 INPUT Z(4)
 35 IF Z(4)=1 GO TO 45
 40 IF Z(4)<>0 GO TO 15
 45 PRINT
 50 PRINT "HAS THE PATIENT RECEIVED SUSTAINED OR INTENSIVE DIURETIC"
 55 PRINT "THERAPY WITH MERCURIALS, THIAZIDES, ETHACRYNIC ACID, OR"
 60 PRINT "FUROSEMIDE? (1=YES, 0=NO)"
 65 INPUT Z(3)
 70 IF Z(3)=1 GO TO 80
 75 IF Z(3)<>0 GO TO 45
 80 PRINT
 85 PRINT "ANSWER THE FOLLOWING DRUG QUESTIONS WITH"
 90 PRINT "==== 0 IF NONE HAS BEEN TAKEN"
 95 PRINT "==== 1 IF A SIGNIFICANT AMOUNT HAS BEEN TAKEN"
100 PRINT "==== 2 IF A SMALL OR UNDETERMINED AMOUNT HAS BEEN TAKEN"
105 PRINT "==== 3 FOR LIST TO HELP IN DECIDING"
110 PRINT
115 PRINT "ACIDIFYING AGENTS (3 FOR LIST)"
120 GO TO 155
125 PRINT
130 PRINT "CONCERNING ACIDIFYING AGENTS SUCH AS AMMONIUM CHLORIDE,"
135 PRINT "ARGININE-HCL, LYSINE-HCL, HAS THE PATIENT TAKEN"
140 PRINT "0=NONE"
145 PRINT "1=SIGNIFICANT AMOUNT"
150 PRINT "2=SMALLER OR UNDETERMINED AMOUNT"
155 INPUT Z(1)
160 IF Z(1)=3 GO TO 125
165 IF Z(1)=0 GO TO 180
170 IF Z(1)=1 GO TO 180
175 IF Z(1)<>2 GO TO 110
180 PRINT
185 PRINT "ALKALINIZING AGENTS (3 FOR LIST)"
190 GO TO 225
195 PRINT
200 PRINT "CONCERNING ALKALINIZING AGENTS SUCH AS BICARBONATE,"
205 PRINT "LACTATE, CITRATE, GLUCONATE, ACETATE, HAS THE PATIENT TAKEN"
210 PRINT "0=NONE"
215 PRINT "1=SIGNIFICANT AMOUNT"
220 PRINT "2=SMALLER OR UNDETERMINED AMOUNT"
225 INPUT Z(2)
230 IF Z(2)=3 GO TO 195
235 IF Z(2)=0 GO TO 250
240 IF Z(2)=1 GO TO 250
245 IF Z(2)<>2 GO TO 180
250 PRINT
255 PRINT "RESPIRATORY DEPRESSANTS (3 FOR LIST)"
260 GO TO 295
265 PRINT
270 PRINT "CONCERNING RESPIRATORY DEPRESSANT DRUGS SUCH AS MORPHINE,"
275 PRINT "BARBITUATES, HAS THE PATIENT TAKEN"
280 PRINT "0=NONE"
285 PRINT "1=SIGNIFICANT AMOUNT (TO CAUSE CLINICAL HYPOVENTILATION)"
290 PRINT "2=SMALLER OR UNDETERMINED AMOUNT"
295 INPUT Z(6)
300 IF Z(6)=3 GO TO 265
305 IF Z(6)=0 GO TO 320
310 IF Z(6)=1 GO TO 320
```

```
315 IF Z(6)<>2 GO TO 250
320 PRINT
325 PRINT "RESPIRATORY STIMULANTS (3 FOR LIST)"
330 GO TO 370
335 PRINT
340 PRINT "CONCERNING RESPIRATORY STIMULANTS SUCH AS SALICYLATES IN"
345 PRINT "HIGH DOSAGES, AMINOPHYLLINE IN DOSAGES=1.5-2.0 GMS/24 HRS,"
350 PRINT "ANALEPTIC AGENTS, PHENOL, HAS THE PATIENT TAKEN"
355 PRINT "0=NONE"
360 PRINT "1=SIGNIFICANT AMOUNT (TO CAUSE CLINICAL HYPERVENTILATION)"
365 PRINT "2=SMALLER OR UNDETERMINED AMOUNT"
370 INPUT Z(5)
375 IF Z(5)=3 GO TO 335
380 IF Z(5)=0 GO TO 400
385 IF Z(5)=1 GO TO 400
390 IF Z(5)<>2 GO TO 320
400 LET I=2
405 PUT 8,7,I
410 CHAIN "AB106"
```

AB106

```
415 END
 10 RECORD Z(21)
 15 LET I=Z
 20 GET 8,10,I
 25 IF Z(0)<=5 GO TO 60
 30 IF Z(0)<=10 GO TO 65
 35 IF Z(0)<=15 GO TO 70
 40 IF Z(0)<=20 GO TO 75
 45 IF Z(0)<=25 GO TO 80
 50 IF Z(0)<=30 GO TO 85
 55 IF Z(0)<=34 GO TO 90
 60 ON Z(0) GOTO 95,100,100,100,105
 65 ON Z(0)-5 GOTO 110,115,120,125,130
 70 ON Z(0)-10 GOTO 135,140,145,150,155
 75 ON Z(0)-15 GOTO 160,165,170,175,180
 80 ON Z(0)-20 GOTO 185,185,160,195,200
 85 ON Z(0)-25 GOTO 205,210,215,220,225
 90 ON Z(0)-30 GOTO 230,235,240,245
 95 CHAIN "AREA1"
100 CHAIN "AREA2"
105 CHAIN "AREA5"
110 CHAIN "AREA6"
115 CHAIN "AREA7"
120 CHAIN "AREA8"
125 CHAIN "AREA9"
130 CHAIN "AREA10"
135 CHAIN "AREA11"
140 CHAIN "AREA12"
145 CHAIN "AREA13"
150 CHAIN "AREA14"
155 CHAIN "AREA15"
160 CHAIN "AREA16"
165 CHAIN "AREA17"
170 CHAIN "AREA18"
175 CHAIN "AREA19"
180 CHAIN "AREA20"
185 CHAIN "AREA21"
190 CHAIN "AB2210"
195 CHAIN "AREA24"
200 CHAIN "AREA25"
205 CHAIN "AREA26"
210 CHAIN "AREA27"
215 CHAIN "AREA28"
220 CHAIN "AREA29"
225 CHAIN "AREA30"
230 CHAIN "AREA31"
235 CHAIN "AREA32"
240 CHAIN "AREA33"
245 CHAIN "AREA34"
```

DIAG1

```
250 END
 80 REM 1
 85 RECORD Z(21)
 90 RECORD I(8),L(8),J,M,Q,I3
 95 LET I=2
100 GET 8,85,I
105 GET 8,90,I
106 LET Z(20)=1
107 LET I=2\PUT 8,85,I
110 IF Z(16)<>0 GO TO 120
115 CHAIN "DIAG4"
120 LET Z(17)=Z(16)+1
122 LET I=2
123 PUT 8,85,I
125 IF Z(18)<>30 GO TO 135
130 CHAIN "NINDEX"
135 REM 2
140 LET I(1)=-1
145 LET I(2)=-2
150 LET I(3)=-3
155 LET I(4)=-4
160 PRINT\PRINT "INDEX OF COMPUTER GENERATED REPORT FOR YOUR PATIENT:"
165 PRINT "(NOTE: ESSENTIAL PARTS ARE MARKED WITH *)"
170 PRINT\PRINT " PART 1 : DIFFERENTIAL DIAGNOSIS LIST"
175 PRINT "           (FROM ACID-BASE MAP)"
180 PRINT "*PART 2 : SUMMARY OF VALUES (INCL. CALCULATED VALUES)"
185 PRINT "*PART 3 : THE MOST PROBABLE DIAGNOSIS"
190 PRINT " PART 4 : HYPOTHETICAL ALTERNATE DIAGNOSES"
195 PRINT "           (FROM ACID-BASE MAP)"
200 LET J=5
205 IF Z(7)<>1 GO TO 230
210 LET I(J)=-5
215 PRINT " PART";J;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:"
220 PRINT "           RESPIRATORY ALKALOSIS"
225 LET J=J+1
230 IF Z(8)<>1 GO TO 255
235 LET I(J)=-6
240 PRINT " PART";J;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:"
245 PRINT "           RESPIRATORY ACIDOSIS"
250 LET J=J+1
255 IF Z(9)<>1 GO TO 280
260 LET I(J)=-7
265 PRINT " PART";J;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:"
270 PRINT "           METABOLIC ALKALOSIS"
275 LET J=J+1
280 IF Z(10)<>1 GO TO 300
285 LET I(J)=-8
290 PRINT " PART";J;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS:"
295 PRINT "           METABOLIC ACIDOSIS"
298 LET J=J+1
300 LET J=J-1
305 LET N=0\LET Q=0\LET I3=0
310 PRINT "TYPE TOTAL NUMBER OF REPORT SECTIONS DESIRED;"
315 PRINT "FOR COMPLETE REPORT (BEGINNING WITH PART 2), TYPE 9."
320 INPUT R
325 LET R=INT(R)
330 IF R<=0 GO TO 310
335 IF R>9 GO TO 310
337 IF R=8 GO TO 310
340 IF R=9 GO TO 390
345 PRINT "TYPE DESIRED PART NUMBERS NOW, ONE PER LINE."
350 FOR I=1 TO R
355 INPUT L(I)
360 NEXT I
365 FOR I=1 TO R
```

```
370 LET M=L(I)
375 LET I(M)=ABS(I(M))
380 NEXT I
385 GO TO 405
390 FOR Q=2 TO J
395 LET I(Q)=ABS(I(Q))
400 NEXT Q
405 LET Q=0
410 LET I=3
415 PUT 8,90,I
420 CHAIN "DIAG3"
```

DIAG3

```
425 END
 25 RECORD I(8),L(8),J,M,Q,I3
 30 LET I=3
 35 GET 8,25,I
 50 LET Q=Q+1
 55 LET I3=I(Q)
 60 IF I3<=0 GO TO 70
 65 IF I3<=8 GO TO 80
 70 GOSUB 210
 75 CHAIN "DIAG5"
 80 IF I3<>1 GO TO 95
 85 GOSUB 210
 90 CHAIN "DIAG10"
 95 IF I3<>2 GO TO 110
100 GOSUB 210
105 CHAIN "DIAG20"
110 IF I3<>3 GO TO 125
115 GOSUB 210
120 CHAIN "DIAG30"
125 IF I3<>4 GO TO 140
130 GOSUB 210
135 CHAIN "DIAG40"
140 IF I3<>5 GO TO 155
145 GOSUB 210
150 CHAIN "DIAG50"
155 IF I3<>6 GO TO 170
160 GOSUB 210
165 CHAIN "DIAG60"
170 IF I3<>7 GO TO 185
175 GOSUB 210
180 CHAIN "DIAG70"
185 IF I3<>8 GO TO 200
190 GOSUB 210
195 CHAIN "DIAG80"
200 GOSUB 210
205 CHAIN "DIAG4"
210 LET I=3
215 PUT 8,25,I
220 RETURN
```

DIAG4

```
225 END
 15 RECORD N,C1,D2,P2,G,K,C2
 20 RECORD Z(21)
 25 RECORD I(8),L(8),J,M,O,I3
 30 LET I=1
 35 GET 8,15,I
 40 GET 8,20,I
 45 GET 8,25,I
 50 IF I(0)<>4 GO TO 60
 55 GOSUB 200
 60 IF I(0)=3 GO TO 70
 65 CHAIN "DIAG5"
 70 IF K<=4 GO TO 80
 75 PRINT\PRINT " *** THE PATIENT HAS A SIGNIFICANT KETOSIS"
 80 IF C2<8 GO TO 95
 85 PRINT\PRINT " *** THE HIGH CREATININE IN THIS PATIENT INDICATES"
 90 PRINT "A SEVERE IMPAIRMENT OF RENAL FUNCTION"
 95 IF K>4 GO TO 99
 96 IF C2>=8 GO TO 99
 97 GO TO 145
 99 IF D2<=14 GO TO 110
100 PRINT "THIS IS CONSISTENT WITH THE ELEVATED DELTA. "
105 GO TO 145
110 IF D2<0 GO TO 130
115 PRINT\PRINT "THIS IS INCONSISTENT WITH A NORMAL DELTA AND SUG-"
120 PRINT "GESTS A LAB ERROR. "
125 GO TO 145
128 PRINT
130 PRINT "THIS SUGGESTS THAT, IF ELECTROLYTES WERE OBTAINED, AN ELE-"
135 PRINT "VATED DELTA WOULD BE FOUND, INDICATING THE PRESENCE OF"
140 PRINT "METABOLIC ACIDOSIS. "
145 CHAIN "DIAG5"
200 LET Z(19)=Z(19)+1
205 LET I=2
210 PUT 8,20,I
215 IF Z(19)<=5 GO TO 235
220 CHAIN "DIAG5"
235 IF Z(19)=Z(17) GO TO 200
240 IF Z(0)<=5 GO TO 275
245 IF Z(0)<=10 GO TO 280
250 IF Z(0)<=15 GO TO 285
255 IF Z(0)<=20 GO TO 290
260 IF Z(0)<=25 GO TO 295
265 IF Z(0)<=30 GO TO 300
270 IF Z(0)<=34 GO TO 305
275 ON Z(0) GOTO 310,315,315,315,320
280 ON Z(0)-5 GOTO 325,330,335,340,345
285 ON Z(0)-10 GOTO 350,355,360,365,370
290 ON Z(0)-15 GOTO 375,380,385,390,395
295 ON Z(0)-20 GOTO 400,400,375,410,415
300 ON Z(0)-25 GOTO 420,425,430,435,440
305 ON Z(0)-30 GOTO 445,450,455,460
310 CHAIN "AREA1"
315 CHAIN "AREA2"
320 CHAIN "AREA5"
325 CHAIN "AREA6"
330 CHAIN "AREA7"
335 CHAIN "AREA8"
340 CHAIN "AREA9"
345 CHAIN "AREA10"
350 CHAIN "AREA11"
355 CHAIN "AREA12"
360 CHAIN "AREA13"
365 CHAIN "AREA14"
370 CHAIN "AREA15"
```

```
375 CHAIN "AREA16"
380 CHAIN "AREA17"
385 CHAIN "AREA18"
390 CHAIN "AREA19"
395 CHAIN "AREA20"
400 CHAIN "AREA21"
410 CHAIN "AREA24"
415 CHAIN "AREA25"
420 CHAIN "AREA26"
425 CHAIN "AREA27"
430 CHAIN "AREA28"
435 CHAIN "AREA29"
440 CHAIN "AREA30"
445 CHAIN "AREA31"
450 CHAIN "AREA32"
455 CHAIN "AREA33"
460 CHAIN "AREA34"
465 RETURN
```

DIAG5

```
470 END
 20 RECORD Z(21)
 25 RECORD I(8),L(8),J,M,Q,I3
 30 LET I=2
 35 GET 8,20,I
 40 GET 8,25,I
 50 IF I3<=0 GO TO 85
 55 IF I3>8 GO TO 85
 65 PRINT\PRINT "====TYPE C TO CONTINUE REPORT, E TO END"
 70 INPUT S1$
 75 IF S1$="E" GO TO 95
 80 IF S1$<>"C" GO TO 65
 85 IF Q>=J GO TO 95
 90 CHAIN "DIAG3"
 95 LET Z(19)=0
100 LET I=2
103 PUT 8,20,I
240 IF Z(0)<=5 GO TO 275
245 IF Z(0)<=10 GO TO 280
250 IF Z(0)<=15 GO TO 285
255 IF Z(0)<=20 GO TO 290
260 IF Z(0)<=25 GO TO 295
265 IF Z(0)<=30 GO TO 300
270 IF Z(0)<=34 GO TO 305
275 ON Z(0) GOTO 310,315,315,315,320
280 ON Z(0)-5 GOTO 325,330,335,340,345
285 ON Z(0)-10 GOTO 350,355,360,365,370
290 ON Z(0)-15 GOTO 375,380,385,390,395
295 ON Z(0)-20 GOTO 400,400,375,410,415
300 ON Z(0)-25 GOTO 420,425,430,435,440
305 ON Z(0)-30 GOTO 445,450,455,460
310 CHAIN "AREA1"
315 CHAIN "AREA2"
320 CHAIN "AREA5"
325 CHAIN "AREA6"
330 CHAIN "AREA7"
335 CHAIN "AREA8"
340 CHAIN "AREA9"
345 CHAIN "AREA10"
350 CHAIN "AREA11"
355 CHAIN "AREA12"
360 CHAIN "AREA13"
365 CHAIN "AREA14"
370 CHAIN "AREA15"
375 CHAIN "AREA16"
380 CHAIN "AREA17"
385 CHAIN "AREA18"
390 CHAIN "AREA19"
395 CHAIN "AREA20"
400 CHAIN "AREA21"
410 CHAIN "AREA24"
415 CHAIN "AREA25"
420 CHAIN "AREA26"
425 CHAIN "AREA27"
430 CHAIN "AREA28"
435 CHAIN "AREA29"
440 CHAIN "AREA30"
445 CHAIN "AREA31"
450 CHAIN "AREA32"
455 CHAIN "AREA33"
460 CHAIN "AREA34"
```

DIAG10

```
465 END
 15 RECORD Z(21)
 25 LET I=2
 30 GET 8,15,I
 35 PRINT\PRINT " PART 1 : DIFFERENTIAL DIAGNOSIS LIST"
 40 PRINT "              (FROM ACID-BASE MAP)"
 45 LET Z(19)=1
 50 LET I=2
 55 PUT 8,15,I
240 IF Z(0)<=5 GO TO 275
245 IF Z(0)<=10 GO TO 280
250 IF Z(0)<=15 GO TO 285
255 IF Z(0)<=20 GO TO 290
260 IF Z(0)<=25 GO TO 295
265 IF Z(0)<=30 GO TO 300
270 IF Z(0)<=34 GO TO 305
275 ON Z(0) GOTO 310,315,315,315,320
280 ON Z(0)-5 GOTO 325,330,335,340,345
285 ON Z(0)-10 GOTO 350,355,360,365,370
290 ON Z(0)-15 GOTO 375,380,385,390,395
295 ON Z(0)-20 GOTO 400,400,375,410,415
300 ON Z(0)-25 GOTO 420,425,430,435,440
305 ON Z(0)-30 GOTO 445,450,455,460
310 CHAIN "AREA1"
315 CHAIN "AREA2"
320 CHAIN "AREA5"
325 CHAIN "AREA6"
330 CHAIN "AREA7"
335 CHAIN "AREA8"
340 CHAIN "AREA9"
345 CHAIN "AREA10"
350 CHAIN "AREA11"
355 CHAIN "AREA12"
360 CHAIN "AREA13"
365 CHAIN "AREA14"
370 CHAIN "AREA15"
375 CHAIN "AREA16"
380 CHAIN "AREA17"
385 CHAIN "AREA18"
390 CHAIN "AREA19"
395 CHAIN "AREA20"
400 CHAIN "AREA21"
410 CHAIN "AREA24"
415 CHAIN "AREA25"
420 CHAIN "AREA26"
425 CHAIN "AREA27"
430 CHAIN "AREA28"
435 CHAIN "AREA29"
440 CHAIN "AREA30"
445 CHAIN "AREA31"
450 CHAIN "AREA32"
455 CHAIN "AREA33"
460 CHAIN "AREA34"
```

DIAG20

```
470 END
  5 REM 1
 10 RECORD P,P1,H,H1,T,D1,C$(11)
 15 RECORD N,C1,D2,P2,G,K,C2
 20 RECORD Z(21)
 30 LET I=0
 35 GET 8,10,I
 40 GET 8,15,I
 45 GET 8,20,I
 65 IF Z(18)=30 GO TO 75
 70 PRINT\PRINT "*PART 2 : SUMMARY OF VALUES (INCL. CALCULATED VALUES)"
 75 PRINT\PRINT "ARTERIAL VALUES (INCLUDING THOSE CALCULATED FROM"
 80 PRINT "      THE HENDERSON-HASSELBALCH EQUATION):"
 85 PRINT "      PH (NL 7.35-7.45)              ";P
 90 PRINT "      PCO2 (NL 37-44)                ";P1;"MM HG"
 95 PRINT "      HCO3 (NL 21-27)                ";H;"M. MOLES/L"
100 PRINT "BLOOD CHEMISTRIES:"
105 PRINT "      VENOUS TCO2 (NL 24.1-30.3)     ";T;"M. MOLES/L"
110 IF N<0 GO TO 120
115 PRINT "      NA (NL 135-145)                ";N;"MEQ/L"
120 IF D2<0 GO TO 150
125 PRINT "      CL (NL 97-108)                 ";C1;"MEQ/L"
130 PRINT "      DELTA (NL 4-14)                ";D2
135 PRINT "        DELTA (ANION GAP) IS THE DIFFERENCE BETWEEN THE"
140 PRINT "        MEASURED CATIONS (NA) AND MEASURED ANIONS (CL"
145 PRINT "        AND VENOUS TCO2)"
150 IF P2<0 GO TO 160
155 PRINT "      K (NL 3.5-5.0)                 ";P2;"MEQ/L"
160 IF G<0 GO TO 170
165 PRINT "      GLUCOSE (NL 80-120)            ";G;"MG"
170 IF K<0 GO TO 180
175 PRINT "      KETONES (NL=0)                 ";K
180 IF C2<0 GO TO 190
185 PRINT "      CREATININE (NL 0.4-1.4)        ";C2;"MG"
190 CHAIN "DIAG5"
```

DIAG30

```
195 END
 15 RECORD Z(21)
 25 LET I=2
 30 GET 8,15,I
 35 IF Z(18)=30 GO TO 45
 40 PRINT\PRINT "*PART 3 : THE MOST PROBABLE DIAGNOSIS"
 45 LET Z(19)=Z(17)
 50 LET I=2
 55 PUT 8,15,I
240 IF Z(0)<=5 GO TO 275
245 IF Z(0)<=10 GO TO 280
250 IF Z(0)<=15 GO TO 285
255 IF Z(0)<=20 GO TO 290
260 IF Z(0)<=25 GO TO 295
265 IF Z(0)<=30 GO TO 300
270 IF Z(0)<=34 GO TO 305
275 ON Z(0) GOTO 310,315,315,315,320
280 ON Z(0)-5 GOTO 325,330,335,340,345
285 ON Z(0)-10 GOTO 350,355,360,365,370
290 ON Z(0)-15 GOTO 375,380,385,390,395
295 ON Z(0)-20 GOTO 400,400,375,410,415
300 ON Z(0)-25 GOTO 420,425,430,435,440
305 ON Z(0)-30 GOTO 445,450,455,460
310 CHAIN "AREA1"
315 CHAIN "AREA2"
320 CHAIN "AREA5"
325 CHAIN "AREA6"
330 CHAIN "AREA7"
335 CHAIN "AREA8"
340 CHAIN "AREA9"
345 CHAIN "AREA10"
350 CHAIN "AREA11"
355 CHAIN "AREA12"
360 CHAIN "AREA13"
365 CHAIN "AREA14"
370 CHAIN "AREA15"
375 CHAIN "AREA16"
380 CHAIN "AREA17"
385 CHAIN "AREA18"
390 CHAIN "AREA19"
395 CHAIN "AREA20"
400 CHAIN "AREA21"
410 CHAIN "AREA24"
415 CHAIN "AREA25"
420 CHAIN "AREA26"
425 CHAIN "AREA27"
430 CHAIN "AREA28"
435 CHAIN "AREA29"
440 CHAIN "AREA30"
445 CHAIN "AREA31"
450 CHAIN "AREA32"
455 CHAIN "AREA33"
460 CHAIN "AREA34"
```

DIAG40

```
465 END
 20 RECORD Z(21)
 30 LET I=Z
 35 GET 8,20,I
 55 PRINT\PRINT " PART 4 : HYPOTHETICAL ALTERNATE DIAGNOSES"
 60 PRINT "           (FROM ACID-BASE MAP)"
 65 LET Z(19)=1
 70 LET Z(19)=Z(19)+1
 75 LET I=2
 80 PUT 8,20,I
100 IF Z(19)<=5 GO TO 110
105 CHAIN "DIAG5"
110 IF Z(19)=Z(17) GO TO 70
240 IF Z(0)<=5 GO TO 275
245 IF Z(0)<=10 GO TO 280
250 IF Z(0)<=15 GO TO 285
255 IF Z(0)<=20 GO TO 290
260 IF Z(0)<=25 GO TO 295
265 IF Z(0)<=30 GO TO 300
270 IF Z(0)<=34 GO TO 305
275 ON Z(0) GOTO 310,315,315,315,320
280 ON Z(0)-5 GOTO 325,330,335,340,345
285 ON Z(0)-10 GOTO 350,355,360,365,370
290 ON Z(0)-15 GOTO 375,380,385,390,395
295 ON Z(0)-20 GOTO 400,400,375,410,415
300 ON Z(0)-25 GOTO 420,425,430,435,440
305 ON Z(0)-30 GOTO 445,450,455,460
310 CHAIN "AREA1"
315 CHAIN "AREA2"
320 CHAIN "AREA5"
325 CHAIN "AREA6"
330 CHAIN "AREA7"
335 CHAIN "AREA8"
340 CHAIN "AREA9"
345 CHAIN "AREA10"
350 CHAIN "AREA11"
355 CHAIN "AREA12"
360 CHAIN "AREA13"
365 CHAIN "AREA14"
370 CHAIN "AREA15"
375 CHAIN "AREA16"
380 CHAIN "AREA17"
385 CHAIN "AREA18"
390 CHAIN "AREA19"
395 CHAIN "AREA20"
400 CHAIN "AREA21"
410 CHAIN "AREA24"
415 CHAIN "AREA25"
420 CHAIN "AREA26"
425 CHAIN "AREA27"
430 CHAIN "AREA28"
435 CHAIN "AREA29"
440 CHAIN "AREA30"
445 CHAIN "AREA31"
450 CHAIN "AREA32"
455 CHAIN "AREA33"
460 CHAIN "AREA34"
```

DIAG50

```
465 END
 15 RECORD Z(21)
 20 RECORD I(8),L(8),J,M,Q,I3
 25 LET I=2
 30 GET 8,15,I
 35 GET 8,20,I
 50 IF Z(18)=30 GO TO 65
 54 PRINT
 55 PRINT " PART";Q;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS"
 60 REM 1
 65 PRINT
 70 PRINT "COMMON CAUSES OF RESPIRATORY ALKALOSIS ARE:"
 75 PRINT "A.  PRIMARY CNS DISEASE"
 80 PRINT "    1.  MENINGITIS"
 85 PRINT "    2.  ENCEPHALITIS"
 90 PRINT "    3.  HEAD TRAUMA"
 95 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
100 PRINT "    1.  PULMONARY FIBROSIS"
105 PRINT "    2.  STATUS ASTHMATICUS"
110 PRINT "    3.  PNEUMONIA"
115 PRINT "C.  DRUGS OR POISONS"
120 PRINT "    1.  SALICYLATES"
125 PRINT "    2.  AMINOPHYLLINE"
130 PRINT "    3.  ANALEPTIC AGENTS"
135 PRINT "    4.  PHENOL"
140 PRINT "D.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
145 PRINT "E.  HIGH FEVER"
150 PRINT "F.  GRAM NEGATIVE SEPTICEMIA"
155 PRINT "G.  HEPATIC COMA"
160 PRINT "H.  MECHANICAL HYPERVENTILATION (RESPIRATOR)"
165 IF Z(5)=0 GO TO 185
170 PRINT
175 PRINT "SINCE THE PATIENT HAS RECEIVED A RESPIRATORY STIMULATING"
180 PRINT "DRUG, THIS FACTOR SHOULD BE CONSIDERED"
185 IF Z(4)<>1 GO TO 205
190 PRINT
195 PRINT "THE MECHANICAL RESPIRATOR USED FOR THIS PATIENT IS AN"
200 PRINT "IMPORTANT ETIOLOGIC FACTOR"
205 CHAIN "DIAG3"
```

DIAG60

```
210 END
 15 RECORD Z(21)
 20 RECORD I(8),L(8),J,M,Q,I3
 25 LET I=2
 30 GET 8,15,I
 35 GET 8,20,I
 50 IF Z(18)=30 GO TO 65
 55 PRINT
 60 PRINT " PART";Q;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS"
 65 REM 1
 70 PRINT\PRINT "COMMON CAUSES OF RESPIRATORY ACIDOSIS ARE:"
 75 PRINT "A.  PULMONARY DISEASE"
 80 PRINT "    1.  EMPHYSEMA"
 85 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
 90 PRINT "    3.  BRONCHIECTASIS"
 95 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
100 PRINT "    5.  PNEUMOTHORAX"
105 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
110 PRINT "    7.  MUCOVISCIDOSIS"
115 PRINT "    8.  CHEST WALL INJURY"
120 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
125 PRINT "    1.  CNS DISEASE"
130 PRINT "    2.  HEAD TRAUMA"
135 PRINT "    3.  MORPHINE"
140 PRINT "    4.  BARBITUATES"
145 PRINT "C.  NEUROMUSCULAR DISEASE"
150 PRINT "    1.  MYASTHENIA GRAVIS"
155 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
160 PRINT "    3.  POLIO"
165 PRINT "D.  AIRWAY OBSTRUCTION"
170 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
175 PRINT "                                      SYNDROME)"
180 PRINT "F.  SEVERE PULMONARY EDEMA"
185 IF Z(6)=0 GO TO 205
190 PRINT
195 PRINT "THE RESPIRATORY DEPRESSANT DRUG WHICH THIS PATIENT HAS AL-"
200 PRINT "READY RECEIVED MAY BE AN IMPORTANT FACTOR"
205 CHAIN "DIAG3"
```

DIAG70

```
210 END
 15 RECORD N,C1,D2,P2,G,K,C2
 20 RECORD Z(21)
 25 RECORD I(8),L(8),J,N,O,I3
 30 LET I=1
 35 GET 8,15,I
 40 GET 8,20,I
 45 GET 8,25,I
 50 IF Z(18)=30 GO TO 65
 55 PRINT
 60 PRINT " PART";Q;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS"
 65 REM 1
 70 PRINT\PRINT "COMMON CAUSES OF METABOLIC ALKALOSIS ARE:"
 75 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
 80 PRINT "    1.  LOSS OF GASTRIC HCL"
 85 PRINT "        A.  VOMITING"
 90 PRINT "        B.  EXCESSIVE SUCTION"
 95 PRINT "        C.  PYLORIC OBSTRUCTION"
100 PRINT "    2.  ALKALI ADMINISTRATION"
105 PRINT "        A.  HCO3"
110 PRINT "        B.  LACTATE"
115 PRINT "        C.  CITRATE"
120 PRINT "        D.  GLUCONATE"
125 PRINT "        E.  ACETATE, ETC."
130 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
135 PRINT "    1.  DIURETIC THERAPY"
140 PRINT "        A.  MERCURIALS"
145 PRINT "        B.  THIAZIDES"
150 PRINT "        C.  ETHACRYNIC ACID"
155 PRINT "        D.  FUROSEMIDE"
160 PRINT "    2.  POTASSIUM DEPLETION"
165 PRINT "        A.  DIURETICS"
170 PRINT "        B.  GI LOSSES"
175 PRINT "    3.  ADRENOCORTICAL EXCESS"
180 PRINT "        A.  HYPERALDOSTERONISM"
185 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM"
190 PRINT "                               INTENSIVE STEROID RX)"
195 IF Z(2)=0 GO TO 215
200 PRINT
205 PRINT "THE ALKALINIZING AGENT WHICH WAS ADMINISTERED MAY BE AN"
210 PRINT "IMPORTANT FACTOR".
215 IF C1>=100 GO TO 240
220 IF Z(3)<>1 GO TO 240
225 PRINT
230 PRINT "THE DIURETIC WHICH THIS PATIENT HAS RECEIVED SHOULD"
235 PRINT "BE CONSIDERED A LIKELY ETIOLOGY OF METABOLIC ALKALOSIS"
240 CHAIN "DIAG3"
```

```
245 END
 15 RECORD N,C1,D2,P2,G,K,C2
 20 RECORD Z(21)
 25 RECORD I(8),L(8),J,M,Q,I3
 30 LET I=1
 35 GET 8,15,I
 40 GET 8,20,I
 45 GET 8,25,I
 65 IF D2<=14 GO TO 95
 70 PRINT\PRINT "ENTER SALICYLATE LEVEL, MG, IF YOU HAVE IT (NORMAL=0)"
 75 PRINT "DON'T FORGET TO ENTER 5000 IF YOU HAVE NO READING"
 80 INPUT Z(21)
 85 IF Z(21)<>5000 GO TO 95
 90 LET Z(21)=-1
 95 IF Z(18)=30 GO TO 110
100 PRINT
105 PRINT " PART";Q;": DISCUSSION OF COMPONENT OF PROBABLE DIAGNOSIS"
110 REM 1
115 IF D2>14 GO TO 380
118 PRINT
120 PRINT "METABOLIC ACIDOSIS WITH A NORMAL ANION GAP OCCURS WITH: "
125 PRINT "1.  DIARRHEA"
130 PRINT "2.  NH4CL INGESTION"
135 PRINT "3.  RENAL TUBULAR ACIDOSIS"
140 PRINT "4.  DRAINAGE OF PANCREATIC JUICE"
145 PRINT "5.  USE OF CARBONIC ANHYDRASE INHIBITORS"
150 PRINT "6.  URETEROSIGMOIDOSTOMY"
155 PRINT "7.  OBSTRUCTIVE UROPATHY"
160 PRINT "8.  PYELONEPHRITIS (WHEN RENAL FUNCTION AT OR NEAR NORMAL)"
165 PRINT
170 PRINT "DO YOU WANT A DETAILED DISCUSSION OF THE PATHOPHYSIOLOGY"
175 PRINT "OF METABOLIC ACIDOSIS? (N=NO, Y=YES)"
180 INPUT A1$
185 IF A1$="N" GO TO 300
190 IF A1$<>"Y" GO TO 165
195 PRINT
200 PRINT "ANION GAP IS DEFINED AS THE DIFFERENCE BETWEEN MEASURED"
205 PRINT "CATIONS (NA) AND MEASURED ANIONS (CL AND VENOUS TCO2). "
210 PRINT
215 PRINT "METABOLIC ACIDOSIS WITH A NORMAL ANION GAP OCCURS WHEN"
220 PRINT "THERE IS A FALL IN BICARBONATE CONCENTRATION ACCOMPANIED"
225 PRINT "BY A PROPORTIONATE INCREASE IN THE CHLORIDE CONCENTRATION. "
230 PRINT "A.  DUE TO A BICARBONATE LOSS WITH EQUIVALENT AMOUNTS OF"
235 PRINT "    CATION; LEAVING A RELATIVE SURFEIT OF CHLORIDE (DIARR-"
240 PRINT "    HEA, PANCREATIC DRAINAGE)"
245 PRINT "B.  DUE TO THE ADDITION OF HYDROGEN AND CHLORIDE IN EQUAL"
250 PRINT "    PROPORTIONS"
255 PRINT "    1.  EXOGENEOUSLY (NH4CL INGESTION)"
260 PRINT "    2.  ENDOGENEOUSLY"
265 PRINT "        A.  DUE TO A RENAL TUBULAR DEFECT IN H+ SECRETION"
270 PRINT "            WITH INCREASED REABSORPTION OF CHLORIDE (RENAL TU-"
275 PRINT "            BULAR ACIDOSIS, PYELONEPHRITIS, OBSTRUCTION)"
280 PRINT "        B.  DUE TO CARBONIC ANHYDRASE INHIBITION (E.G.  ACETA-"
285 PRINT "            ZOLAMIDE)"
290 PRINT "        C.  ABSORPTION OF NH4CL FROM GI TRACT (URETERO-"
295 PRINT "            SIGMOIDOSTOMY)"
300 IF K<=4 GO TO 315
305 PRINT
310 PRINT "THE KETONES IN YOUR PATIENT ARE SIGNIFICANTLY ELEVATED"
315 IF C2<8 GO TO 330
320 PRINT
325 PRINT "THE CREATININE IN YOUR PATIENT IS SIGNIFICANTLY ELEVATED"
330 IF K>4 GO TO 340
335 IF C2>=8 GO TO 340
336 GO TO 366
```

```
340 PRINT
345 PRINT "THIS IS INCONSISTENT WITH THE NORMAL DELTA, AND SUGGESTS"
350 PRINT "A LAB ERROR.  DO YOU WISH TO DISCUSS METABOLIC ACIDOSIS ON"
355 PRINT "THE BASIS OF A HIGH DELTA? (N=NO, Y=YES)"
360 INPUT A1$
365 IF A1$<>"N" GO TO 374
366 LET I=2
370 PUT 8,20,I
372 CHAIN "DIAG3"
374 IF A1$<>"Y" GO TO 300
375 LET Z(21)=-1
380 PRINT
385 PRINT "METABOLIC ACIDOSIS WITH AN INCREASED ANION GAP IS SEEN IN"
390 PRINT "1.  RENAL FAILURE"
395 PRINT "2.  DIABETIC KETOACIDOSIS"
400 PRINT "3.  LACTIC ACIDOSIS"
405 PRINT "4.  SALICYLATE POISONING"
410 PRINT "5.  ETHYLENE GLYCOL POISONING"
415 PRINT "6.  METHANOL POISONING"
420 PRINT "7.  PARALDEHYDE (RARELY)"
425 PRINT "IT IS NOT UNCOMMON TO FIND MORE THAN ONE SOURCE FOR A "
430 PRINT "METABOLIC ACIDOSIS WITH A WIDENED ANION GAP IN THE SAME"
435 PRINT "PATIENT"
440 PRINT
445 PRINT "DO YOU WANT A DETAILED DISCUSSION OF THE PATHOPHYSIOLOGY"
450 PRINT "OF METABOLIC ACIDOSIS? (N=NO, Y=YES)"
455 INPUT A1$
460 IF A1$="N" GO TO 590
465 IF A1$<>"Y" GO TO 440
470 PRINT
475 PRINT "ANION GAP IS DEFINED AS THE DIFFERENCE BETWEEN MEASURED"
480 PRINT "CATIONS (NA) AND MEASURED ANIONS (CL AND VENOUS TCO2). "
485 PRINT
490 PRINT "METABOLIC ACIDOSIS WITH WIDENED ANION GAP OCCURS WHEN BI-"
495 PRINT "CARBONATE CONCENTRATION IS DECREASED BY ADDITION OF AN ACID"
500 PRINT "LOAD, WITHOUT PROPORTIONATE INCREASE IN CHLORIDE CONCEN-"
505 PRINT "TRATION"
510 PRINT "1.  WHEN THE DISSOCIATED PRODUCTS OF THE ACID ARE H+ AND"
515 PRINT "    ANION OTHER THAN CHLORIDE"
520 PRINT "    A.  KETOACIDS (DIABETIC KETOACIDOSIS)"
525 PRINT "    B.  LACTIC (LACTIC ACIDOSIS)"
530 PRINT "    C.  UNKNOWN ORGANIC ACIDS (SALICYLATE POISONING, METHYL"
535 PRINT "        ALCOHOL, ETHYLENE GLYCOL, PARALDEHYDE)"
540 PRINT "2.  WHEN HCO3 CONCENTRATION IS REDUCED BY FAILURE OF EXCRE-"
545 PRINT "    TION OF HYDROGEN ION BUT THERE IS NO ACCOMPANYING IN-"
550 PRINT "    CREASE IN CHLORIDE REABSORPTION (RENAL FAILURE)"
555 PRINT
560 PRINT "N. B. THE TENDENCY FOR BICARBONATE CONCENTRATION TO VARY IN-"
565 PRINT "      VERSELY WITH THE ACCUMULATION OF SULFATE AND DIBASIC"
570 PRINT "      PHOSPHATE IONS IN RENAL FAILURE IS FORTUITOUS AND"
575 PRINT "      SHOULD NOT IMPLY THAT THESE ARE ACID ANIONS.  THIS PROB-"
580 PRINT "      ABLY OCCURS AS A CONSEQUENCE OF PARALLEL PROGRESSION"
586 PRINT "      IN THE REDUCTION OF GLOMERULAR AND TUBULAR FUNCTION. "
590 PRINT
595 PRINT "IN YOUR PATIENT: "
600 IF G<=170 GO TO 635
605 IF K>4 GO TO 635
610 PRINT "THE BLOOD SUGAR IS ELEVATED, BUT WITHOUT SUFFICIENT ELEVA-"
615 PRINT "TION OF SERUM KETONES TO ACCOUNT FOR METABOLIC ACIDOSIS; "
620 PRINT "OTHER SOURCES OF METABOLIC ACIDOSIS, KNOWN TO BE COMMON IN"
625 PRINT "DIABETICS (LACTIC ACIDOSIS, RENAL FAILURE), SHOULD BE"
630 PRINT "SOUGHT. "
635 IF Z(21)<=0 GO TO 660
640 IF Z(21)>9 GO TO 660
645 PRINT "SALICYLATE LEVELS IN THIS RANGE ARE BELOW THE THERAPEUTIC"
650 PRINT "RANGE, AND THEREFORE ARE DEFINITELY NOT ASSOCIATED WITH"
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655 PRINT "METABOLIC ACIDOSIS."
660 IF Z(21)<=9 GO TO 685
665 IF Z(21)>25 GO TO 685
670 PRINT "SALICYLATE LEVELS OF THIS MAGNITUDE ARE IN THE THERAPEUTIC"
675 PRINT "RANGE, AND IT IS QUITE UNLIKELY THAT SALICYLATE POISONING"
680 PRINT "IS THE SOURCE OF THE METABOLIC ACIDOSIS."
685 IF Z(21)<=25 GO TO 715
690 IF Z(21)>40 GO TO 715
695 PRINT "SALICYLATE LEVELS IN THIS RANGE ARE FOUND IN SALICYLATE"
700 PRINT "POISONING, AND MAY BE ASSOCIATED WITH METABOLIC ACIDOSIS"
705 PRINT "IN CHILDREN; ADULTS USUALLY DO NOT DEVELOP METABOLIC ACIDO-"
710 PRINT "SIS WITH SALICYLATE INTOXICATION."
715 IF Z(21)<=40 GO TO 730
720 PRINT "SALICYLATE LEVELS OF THIS MAGNITUDE ARE TOXIC, AND FRE-"
725 PRINT "QUENTLY ARE FOUND TO BE THE SOURCE OF METABOLIC ACIDOSIS."
730 IF K<=4 GO TO 755
735 IF G<=170 GO TO 755
740 PRINT "ONE OF THE SOURCES OF METABOLIC ACIDOSIS IN THIS PATIENT"
745 PRINT "APPEARS TO BE DIABETIC KETOACIDOSIS; TREATMENT, THEREFORE,"
750 PRINT "WILL HAVE TO INCLUDE INSULIN THERAPY."
755 IF K<=0 GO TO 785
760 IF K>4 GO TO 785
765 IF G>170 GO TO 785
770 PRINT "THE DEGREE OF KETOSIS IS SO SLIGHT THAT IT IS EXTREMELY UN-"
775 PRINT "LIKELY TO BE THE SOURCE OF ANY SIGNIFICANT METABOLIC"
780 PRINT "ACIDOSIS."
785 CHAIN "MACID2"
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MACID2

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790 END
 15 RECORD N,C1,D2,P2,G,K,C2
 20 RECORD Z(21)
 30 LET I=1
 35 GET 8,15,I
 40 GET 8,20,I
 50 IF K<=4 GO TO 100
 55 IF G>170 GO TO 100
 60 PRINT "THE KETOSIS PRESENT IN THE PATIENT IS OF SUFFICIENT MAGNI-"
 65 PRINT "TUDE TO ACCOUNT FOR A SIGNIFICANT METABOLIC ACIDOSIS.  IT"
 70 PRINT "WOULD SEEM UNLIKELY THAT THE KETOSIS WAS OF DIABETIC ORI-"
 75 PRINT "GIN.  THE FACT THAT THE BLOOD SUGAR IS NOT SIGNIFICANTLY EL-"
 80 PRINT "EVATED AT PRESENT MAY BE EXPLAINED BY THE POSSIBILITY THAT"
 85 PRINT "SOME INSULIN HAD BEEN GIVEN AFTER THE KETOSIS DEVELOPED. "
 90 PRINT "THERAPY WITH GLUCOSE AND INSULIN MAY BE NECESSARY TO COR-"
 95 PRINT "RECT THE ACIDOSIS. "
100 IF C2<1.5 GO TO 130
105 IF C2>=6.0 GO TO 130
110 PRINT "ALTHOUGH THERE IS RENAL INSUFFICIENCY, IT ALONE IS NOT OF"
115 PRINT "THE MAGNITUDE ASSOCIATED WITH SIGNIFICANT METABOLIC ACIDO-"
120 PRINT "SIS.  IN A MIXED DISTURBANCE IT CERTAINLY MAY BE CONTRI-"
125 PRINT "BUTORY. "
130 IF C2<6.0 GO TO 150
135 PRINT "METABOLIC ACIDOSIS IS COMMON IN PATIENTS WITH THIS DEGREE"
140 PRINT "OF RENAL INSUFFICIENCY, BUT OTHER POTENTIAL SOURCES OF MET-"
145 PRINT "ABOLIC ACIDOSIS SHOULD NOT BE OVERLOOKED. "
150 IF K>=4 GO TO 190
155 IF Z(21)>=25 GO TO 190
160 IF C2>=6 GO TO 190
165 PRINT "SINCE YOU HAVE NOT REPORTED A SUFFICIENTLY ELEVATED LEVEL"
170 PRINT "(ASSOCIATED WITH SIGNIFICANT ACIDOSIS) FOR KETONES, SALICY-"
175 PRINT "LATES OR CREATININE, LACTIC ACIDOSIS OR TOXIC INGESTION"
180 PRINT "(METHYL ALCOHOL, ETHYLENE GLYCOL, PARALDEHYDE) MUST BE RULED"
185 PRINT "OUT.  CHECK BLOOD LACTATE AND REVIEW HISTORY. "
190 IF P2<=5 GO TO 210
195 PRINT "THE ELEVATED SERUM K+ IS COMMON IN METABOLIC ACIDOSIS BE-"
200 PRINT "CAUSE OF K+ EFFLUX FROM CELLS AND DECREASED RENAL EXCRE-"
205 PRINT "TION. "
210 CHAIN "DIAG3"
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NINDEX

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215 END
 25 RECORD I(8),L(8),J,M,Q,I3
 30 LET I=3
 35 GET 8,25,I
 46 REM 1
 49 PRINT
 50 PRINT "THE COMPUTER WILL NOW DISCUSS ACID-BASE DISTURBANCES."
 55 PRINT "INDEX:       (NOTE: ESSENTIAL PARTS ARE MARKED WITH *)"
 60 PRINT " PART 1 :  SUMMARY OF VALUES IN YOUR PATIENT"
 65 PRINT "           (INCLUDING CALCULATED VALUES)"
 70 PRINT "*PART 2 :  DISCUSSION OF YOUR PATIENT"
 75 PRINT " PART 3 :  GENERAL DISCUSSION OF RESPIRATORY ALKALOSIS"
 80 PRINT " PART 4 :  GENERAL DISCUSSION OF RESPIRATORY ACIDOSIS"
 85 PRINT " PART 5 :  GENERAL DISCUSSION OF METABOLIC ALKALOSIS"
 90 PRINT " PART 6 :  GENERAL DISCUSSION OF METABOLIC ACIDOSIS"
 95 LET I(1)=-2
100 LET I(2)=-3
105 LET I(3)=-5
110 LET I(4)=-6
115 LET I(5)=-7
120 LET I(6)=-8
125 LET J=6
135 LET M=0\LET Q=0\LET I3=0
140 PRINT "TYPE TOTAL NUMBER OF REPORT SECTIONS DESIRED;"
145 PRINT "FOR COMPLETE REPORT (BEGINNING WITH PART 2), TYPE 9."
150 INPUT R
155 LET R=INT(R)
160 IF R<=0 GO TO 140
165 IF R>9 GO TO 140
170 IF R=8 GO TO 140
175 IF R=9 GO TO 225
180 PRINT "TYPE DESIRED PART NUMBERS NOW, ONE PER LINE."
185 FOR I=1 TO R
190 INPUT L(I)
195 NEXT I
200 FOR I=1 TO R
205 LET M=L(I)
210 LET I(M)=ABS(I(M))
215 NEXT I
220 GO TO 240
225 FOR Q=2 TO J
230 LET I(Q)=ABS(I(Q))
235 NEXT Q
240 LET Q=0
245 LET I=3
250 PUT 8,25,I
255 CHAIN "DIAG3"
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AREA1

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260 END
  5 RECORD N,C1,D2,P2,G,K,C2
 10 RECORD Z(21)
 15 LET I=1\GET 8,5,I\GET 8,10,I
 20 IF Z(20)=0 GO TO 115
 25 GO TO 460
 30 PRINT\PRINT "MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS"
 35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
 45 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF ACUTE"
 50 PRINT "RESPIRATORY ACIDOSIS"
 55 GO TO 450
 60 LET Z(16)=1\LET Z(18)=1
 63 LET I=2\PUT 8,10,I
 65 CHAIN "DIAG1"
 75 LET Z(9)=1
 80 LET Z(18)=1\LET Z(16)=2
 83 LET I=2\PUT 8,10,I
 85 CHAIN "DIAG1"
 95 LET Z(7)=1\LET Z(8)=1
100 LET Z(18)=1\LET Z(16)=3
103 LET I=2\PUT 8,10,I
105 CHAIN "DIAG1"
115 GOSUB 1000
120 IF Z(14)=1 GO TO 250
125 IF D2<=14 GO TO 95
130 GOSUB 1200
135 IF Z(12)=0 GO TO 75
140 GOSUB 1400
145 IF Z(11)=0 GO TO 60
150 GO TO 95
180 PRINT
185 PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS<<"
190 IF Z(4)<>0 GO TO 200
195 IF Z(5)=0 GO TO 220
200 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
205 PRINT "IN METABOLIC ACIDOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
210 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
215 PRINT "SIMPLE METABOLIC ACIDOSIS)"
220 IF Z(1)=0 GO TO 245
225 PRINT "THERAPY OF RESPIRATORY ALKALOSIS WITH ACIDIFYING AGENTS"
230 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
235 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY"
240 PRINT "ALKALOSIS)"
245 GO TO 385
250 GOSUB 1200
255 IF Z(12)=1 GO TO 60
260 GO TO 75
268 PRINT
270 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
275 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
280 PRINT "(IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
285 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A PHYSI-"
290 PRINT "OLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN INCREASE"
295 PRINT "IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL INCREASE IN"
300 PRINT "PCO2)"
305 IF Z(2)=0 GO TO 320
310 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
315 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
320 GO TO 385
325 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF"
330 PRINT "ACUTE RESPIRATORY ACIDOSIS<<"
335 IF Z(4)<>1 GO TO 360
340 PRINT "THIS IMPLIES THAT THE PATIENT'S RESPIRATOR IS NOW INADE-"
345 PRINT "QUATELY FUNCTIONING OR STOPPED. OTHERWISE, IF THE RESPIRATOR"
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 350 PRINT "IS STILL FUNCTIONAL.  THE LIKELY DIAGNOSIS IS MIXED METABOLIC"
 355 PRINT "ACIDOSIS AND RESPIRATORY ALKALOSIS"
 356 IF Z(6)=0 GO TO 385
 360 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS"
 365 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS IN-"
 370 PRINT "INCREASED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO CONSERVE"
 375 PRINT "HCO3)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,180,268,325
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
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1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
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1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
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AREA2

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1
  20 GET 8,5,I\GET 8,10,I\IF Z(20)=0 GO TO 140
  23 GO TO 425
  25 IF Z(0)<>2 GO TO 40
  30 PRINT\PRINT "SEVERE METABOLIC ACIDOSIS"
  35 GO TO 60
  40 IF Z(0)<>3 GO TO 55
  45 PRINT\PRINT "MODERATE METABOLIC ACIDOSIS"
  50 GO TO 60
  55 PRINT\PRINT "MILD METABOLIC ACIDOSIS"\PRINT
  60 PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON RESPIRATORY ALKALOSIS"
  65 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF ACUTE"
  70 PRINT "RESPIRATORY ACIDOSIS"
  75 GO TO 415
  80 LET Z(10)=1
  85 LET Z(18)=Z(0)\LET Z(16)=1
  90 LET I=2\PUT 8,10,I
  95 CHAIN "DIAG1"
 100 LET Z(10)=1
 105 LET Z(18)=Z(0)\LET Z(16)=2
 110 LET I=2\PUT 8,10,I
 115 CHAIN "DIAG1"
 120 LET Z(7)=1
 125 LET Z(8)=1
 130 LET Z(18)=Z(0)\LET Z(16)=3
 135 LET I=2\PUT 8,10,I
 138 CHAIN "DIAG1"
 140 GOSUB 1000
 145 IF Z(14)=1 GO TO 250
 150 IF D2<=14 GO TO 120
 155 GOSUB 1200
 160 IF Z(12)=0 GO TO 80
 165 GOSUB 1400
 170 IF Z(11)=0 GO TO 100
 175 GO TO 120
 190 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF"
 195 PRINT "ACUTE RESPIRATORY ACIDOSIS<<"
 200 IF Z(4)<>1 GO TO 225
 205 PRINT "THIS IMPLIES THAT THE PATIENT'S RESPIRATOR IS NOW"
 210 PRINT "INADEQUATELY FUNCTIONING OR STOPPED.  OTHERWISE, IF THE"
 215 PRINT "RESPIRATOR IS STILL FUNCTIONAL, THE LIKELY DIAGNOSIS IS"
 220 PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON RESPIRATORY ALKALOSIS"
 225 IF Z(6)=0 GO TO 245
 230 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS"
 235 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 240 PRINT "INCREASED MORE RAPIDLY THAN THE KIDNEYS CAN ACT TO CON-"
 242 PRINT "SERVE HCO3)"
 245 GO TO 400
 250 GOSUB 1200
 255 IF Z(12)=1 GO TO 100
 260 GO TO 80
 270 IF Z(0)<>2 GO TO 285
 275 PRINT\PRINT ">>SEVERE METABOLIC ACIDOSIS<<"
 280 GO TO 305
 285 IF Z(0)<>3 GO TO 300
 290 PRINT\PRINT ">>MODERATE METABOLIC ACIDOSIS<<"
 295 GO TO 305
 300 PRINT\PRINT ">>MILD METABOLIC ACIDOSIS<<"
 305 IF Z(1)=0 GO TO 320
 310 PRINT "THE ACIDIFYING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 315 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 320 GO TO 400
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 325 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON RESPIRATORY ALKA-"
 330 PRINT "LOSIS<<"
 335 PRINT "THE PATIENT FALLS WITHIN THE 95 CONFIDENCE BAND OF META-"
 340 PRINT "BOLIC ACIDOSIS.  HOWEVER, RESPIRATORY ALKALOSIS MAY ALSO BE"
 345 PRINT "CONTRIBUTORY TO THE ACID-BASE DISORDER."
 350 IF Z(4)=0 GO TO 365
 355 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN"
 360 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 365 IF Z(5)=0 GO TO 380
 370 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 375 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 380 IF Z(1)=0 GO TO 400
 385 PRINT "THERAPY OF RESPIRATORY ALKALOSIS WITH ACIDIFYING AGENTS"
 390 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 395 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY"
 397 PRINT "ALKALOSIS)"
 400 IF DZ<=14 GO TO 415
 405 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 410 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 415 LET Z(18)=0\LET Z(16)=0
 420 LET I=Z\PUT 8,10,I
 423 CHAIN "DIAG1"
 425 IF Z(19)>4 GO TO 415
 435 IF Z(19)>0 GO TO 445
 440 CHAIN "AB5000"
 445 ON Z(19) GOTO 25,270,325,190
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 LET Z(18)=Z(20)\LET Z(16)=3
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                              (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
```

```
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1555
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
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```
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
```

AREA5

```
2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 100
  25 GO TO 260
  30 PRINT "METABOLIC ACIDOSIS WITH A SUPERIMPOSED RESPIRATORY"
  35 PRINT "ACIDOSIS"
  40 PRINT "CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE RESPIRATORY"
  45 PRINT "ACIDOSIS"
  50 GO TO 245
  55 LET Z(8)=1
  60 LET Z(18)=5\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(8)=1
  80 LET Z(7)=1
  85 LET Z(18)=5\LET Z(16)=2
  90 LET I=2\PUT 8,10,I
  95 CHAIN "DIAG1"
 100 GOSUB 1000
 105 IF Z(14)=0 GO TO 165
 110 GO TO 55
 115 PRINT\PRINT ">>METABOLIC ACIDOSIS WITH A SUPERIMPOSED RESPIRATORY"
 120 PRINT "ACIDOSIS<<"
 125 IF Z(1)=0 GO TO 140
 130 PRINT "THE ACIDIFYING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 135 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 140 IF Z(6)=0 GO TO 160
 145 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ACIDOSIS COULD"
 150 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
 155 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ACIDOSIS)"
 160 GO TO 230
 165 IF D2<=14 GO TO 75
 170 GOSUB 1200
 175 IF Z(12)=0 GO TO 55
 180 GO TO 75
 185 PRINT ">>CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE RES-"
 190 PRINT "PIRATORY ACIDOSIS<<"
 195 IF H>=6.6 GO TO 210
 200 PRINT "THE VERY LOW HCO3 IN THIS PATIENT IMPLIES THAT SOME DEGREE"
 205 PRINT "OF METABOLIC ACIDOSIS IS ALSO PRESENT"
 210 IF Z(6)=0 GO TO 230
 215 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS"
 220 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS IN-"
 225 PRINT "CREASED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO CONSERVE"
 226 PRINT "HCO3)"
 230 IF D2<=14 GO TO 245
 235 PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC ACIDOSIS"
 240 PRINT "IS A COMPONENT OF THE DISTURBANCE"
 245 LET Z(16)=0\LET Z(18)=0
 250 LET I=2\PUT 8,10,I
 255 CHAIN "DIAG1"
 260 IF Z(19)>3 GO TO 245
 265 IF Z(19)>0 GO TO 275
 270 CHAIN "AB5000"
 275 ON Z(19) GOTO 30,115,185
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
```

```
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
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AREA6

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7000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 125
  25 GO TO 460
  30 PRINT\PRINT "MIXED METABOLIC ACIDOSIS AND RESPIRATORY ACIDOSIS"
  35 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE RES-"
  40 PRINT "PIRATORY ACIDOSIS"
  45 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
  50 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  55 GO TO 450
  60 LET Z(8)=1
  65 LET Z(18)=6\LET Z(16)=1
  70 LET I=2\PUT 8,10,I
  75 CHAIN "DIAG1"
  77 LET Z(8)=1
  80 LET Z(7)=1
  85 LET Z(18)=6\LET Z(16)=2
  90 LET I=2\PUT 8,10,I
  95 CHAIN "DIAG1"
 100 LET Z(10)=1
 105 LET Z(9)=1
 110 LET Z(18)=6\LET Z(16)=3
 115 LET I=2\PUT 8,10,I
 120 CHAIN "DIAG1"
 125 GOSUB 1400
 130 IF Z(11)=0 GO TO 100
 135 GOSUB 1000
 140 IF Z(14)=0 GO TO 200
 145 GO TO 60
 150 PRINT\PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ASCIDOSIS<<"
 155 IF Z(1)=0 GO TO 175
 160 PRINT "USE OF ACIDIFYING AGENTS IN RESPIRATORY ACIDOSIS COULD EX-"
 165 PRINT "PLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN PCO2, THE"
 170 PRINT "HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY ACIDOSIS)"
 175 IF Z(6)=0 GO TO 195
 180 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ACIDOSIS COULD"
 185 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
 190 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ACIDOSIS"
 195 GO TO 385
 200 IF D2<=14 GO TO 77
 205 GOSUB 1200
 210 IF Z(12)=0 GO TO 60
 215 GO TO 77
 220 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE"
 225 PRINT "RESPIRATORY ACIDOSIS<<"
 230 IF H>=6.6 GO TO 245
 235 PRINT "THE VERY LOW HCO3 IN THIS IMPLIES THAT SOME DEGREE OF"
 240 PRINT "METABOLIC ACIDOSIS IS ALSO PRESENT"
 245 IF Z(6)=0 GO TO 265
 250 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS "
 255 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS IN-"
 260 PRINT "CREASED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO CONSERVE"
 262 PRINT "HCO3)"
 265 GO TO 385
 270 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC "
 275 PRINT "ALKALOSIS, WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 280 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
 285 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2 BECAUSE OF A"
 290 PRINT "LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
 295 IF Z(1)=0 GO TO 385
 300 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS IS"
 305 PRINT "CONSISTENT WITH THIS EXPLANATION OF THE LAB VALUES"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
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 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GO TO 30,150,220,270
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1. DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2. HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3. GI LOSSES"
1085 PRINT "       A. DIARRHEA"
1090 PRINT "       B. FISTULA"
1095 PRINT "    4. POISONS"
1100 PRINT "       A. METHANOL"
1105 PRINT "       B. ETHYLENE GLYCOL"
1110 LET Z(18)=6\LET Z(16)=3
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1. RENAL FAILURE - UREMIA"
1125 PRINT "    2. SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                        ACIDOSIS"
1135 PRINT "    3. CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                          (DIAMOX)"
1145 PRINT "    4. ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
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1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
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AREA7

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 100
  25 GO TO 260
  30 PRINT\PRINT "MIXED METABOLIC ACIDOSIS AND RESPIRATORY ACIDOSIS, "
  35 PRINT "WITH THE GREATER COMPONENT RESPIRATORY ACIDOSIS"
  40 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE RES-"
  45 PRINT "PIRATORY ACIDOSIS"
  50 GO TO 245
  55 LET Z(8)=1
  60 LET Z(18)=7\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(7)=1
  80 LET Z(8)=1
  85 LET Z(18)=7\LET Z(16)=2
  90 LET I=2\PUT 8,10,I
  95 CHAIN "DIAG1"
 100 GOSUB 1000
 105 IF Z(14)=0 GO TO 165
 110 GO TO 55
 115 PRINT\PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ACIDOSIS, "
 120 PRINT "WITH THE GREATER COMPONENT RESPIRATORY ACIDOSIS<<"
 125 IF Z(1)=0 GO TO 145
 130 PRINT "USE OF ACIDIFYING AGENTS IN RESPIRATORY ACIDOSIS COULD EX-"
 135 PRINT "PLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN PCO2, THE"
 140 PRINT "HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY ACIDOSIS)"
 145 IF Z(6)=0 GO TO 163
 150 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ACIDOSIS COULD"
 155 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, "
 160 PRINT "THE PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ACIDOSIS)"
 163 GO TO 230
 165 IF D2<=14 GO TO 75
 170 GOSUB 1200
 175 IF Z(12)=0 GO TO 55
 180 GO TO 75
 185 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS THAT DEVELOPS ACUTE"
 190 PRINT " RESPIRATORY ACIDOSIS<<"
 200 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS "
 205 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS IN-"
 210 PRINT "CREASED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO CONSERVE "
 212 PRINT "HCO3)"
 230 IF D2<=14 GO TO 245
 235 PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC ACIDOSIS"
 240 PRINT "IS A COMPONENT OF THE DISTURBANCE"
 245 LET Z(16)=0\LET Z(18)=0
 250 LET I=2\PUT 8,10,I
 255 CHAIN "DIAG1"
 260 IF Z(19)>3 GO TO 245
 265 IF Z(19)>0 GO TO 275
 270 CHAIN "AB5000"
 275 ON Z(19) GOTO 30,115,185
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
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1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1. DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2. HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3. GI LOSSES"
1085 PRINT "       A. DIARRHEA"
1090 PRINT "       B. FISTULA"
1095 PRINT "    4. POISONS"
1100 PRINT "       A. METHANOL"
1105 PRINT "       B. ETHYLENE GLYCOL"
1110 PRINT "       C. SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1. RENAL FAILURE - UREMIA"
1125 PRINT "    2. SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                        ACIDOSIS"
1140 PRINT "                                            (DIAMOX)"
1145 PRINT "    4. ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1035
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1. MENINGITIS"
1270 PRINT "    2. ENCEPHALITIS"
1275 PRINT "    3. HEAD TRAUMA"
1280 PRINT "    4. CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1. PULMONARY FIBROSIS"
1295 PRINT "    2. STATUS ASTHMATICUS"
1300 PRINT "    3. PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
```

AREA8

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 90
  25 GO TO 260
  30 PRINT\PRINT "ACUTE RESPIRATORY ACIDOSIS"
  35 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RESPIRATORY"
  40 PRINT "ACIDOSIS"
  45 GO TO 245
  50 LET Z(8)=1
  55 LET Z(18)=8\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(8)=1
  75 LET Z(18)=8\LET Z(16)=2
  80 LET I=2\PUT 8,10,I
  85 CHAIN "DIAG1"
  90 GOSUB 1000
  95 IF Z(14)=1 GO TO 70
 100 GO TO 50
 105 PRINT\PRINT ">>ACUTE RESPIRATORY ACIDOSIS<<"
 110 IF Z(6)=0 GO TO 125
 115 PRINT "THE RESPIRATORY DEPRESSANTS WHICH THIS PATIENT HAS RECEIVED"
 120 PRINT "ARE AN IMPORTANT ETIOLOGIC CONSIDERATION"
 125 GO TO 230
 130 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RES-"
 135 PRINT "PIRATORY ACIDOSIS<<"
 140 IF Z(1)=0 GO TO 230
 145 PRINT "USE OF ACIDIFYING AGENTS IN CHRONIC RESPIRATORY ACIDOSIS"
 150 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 155 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE CHRONIC"
 160 PRINT "RESPIRATORY ACIDOSIS)"
 230 IF D2<=14 GO TO 245
 235 PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC ACIDOSIS"
 240 PRINT "IS A COMPONENT OF THE DISTURBANCE"
 245 LET Z(16)=0\LET Z(18)=0
 250 LET I=2\PUT 8,10,I
 255 CHAIN "DIAG1"
 260 IF Z(19)>3 GO TO 245
 265 IF Z(19)>0 GO TO 275
 270 CHAIN "AB5000"
 275 ON Z(19) GOTO 30,105,130
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
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1110 PRINT "       C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                          ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                            (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
```

AREA9

```
2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 115
  25 GO TO 460
  30 PRINT\PRINT "ACUTE RESPIRATORY ACIDOSIS"
  35 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RES-"
  40 PRINT "PIRATORY ACIDOSIS"
  45 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
  50 PRINT "WITH A DELAY IN RESPIRATORY ADJUSTMENTS"
  55 GO TO 450
  60 LET Z(18)=9\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(18)=9\LET Z(16)=2
  80 LET I=2\PUT 8,10,I
  85 CHAIN "DIAG1"
  90 LET Z(9)=1
  95 LET Z(10)=1
 100 LET Z(18)=9\LET Z(16)=3
 105 LET I=2\PUT 8,10,I
 110 CHAIN "DIAG1"
 115 GOSUB 1400
 120 IF Z(11)=0 GO TO 90
 125 GOSUB 1000
 130 IF Z(14)=1 GO TO 75
 135 GO TO 60
 140 PRINT\PRINT ">>ACUTE RESPIRATORY ACIDOSIS<<"
 145 IF Z(6)=0 GO TO 160
 150 PRINT "THE RESPIRATORY DEPRESSANTS WHICH THIS PATIENT HAS RECEIVED"
 155 PRINT "ARE AN IMPORTANT ETIOLOGIC CONSIDERATION"
 160 GO TO 385
 165 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RES-"
 170 PRINT "PIRATORY ACIDOSIS<<"
 175 IF Z(1)=0 GO TO 200
 180 PRINT "USE OF ACIDIFYING AGENTS IN CHRONIC RESPIRATORY ACIDOSIS"
 185 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 190 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE CHRONIC "
 195 PRINT "RESPIRATORY ACIDOSIS)"
 200 GO TO 385
 210 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC"
 215 PRINT "ALKALOSIS, WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 220 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
 225 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2 BECAUSE OF A"
 230 PRINT "LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
 235 IF Z(1)=0 GO TO 385
 240 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS"
 245 PRINT "IS CONSISTANT WITH THIS EXPLANATION OF THE LAB VALUES"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
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 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "ABS000"
 480 ON Z(19) GOTO 30,140,165,210
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
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1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
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AREA10

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 130
  25 GO TO 460
  30 PRINT\PRINT "RESPIRATORY ACIDOSIS WITH INCOMPLETE RENAL COMPENSATION"
  35 PRINT "(USUALLY COMPLETE BY 2-3 DAYS), OR ACUTE RESPIRATORY ACIDOSIS"
  40 PRINT "SUPERIMPOSED ON CHRONIC RESPIRATORY ACIDOSIS"
  45 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RESPIRATORY"
  50 PRINT "ACIDOSIS"
  55 PRINT\PRINT "MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY"
  60 PRINT "ACIDOSIS"
  65 GO TO 450
  70 LET Z(8)=1
  75 LET Z(13)=10\LET Z(16)=1
  80 LET I=2\PUT 8,10,I
  85 CHAIN "DIAG1"
  90 LET Z(8)=1
  95 LET Z(13)=10\LET Z(16)=2
 100 LET I=2\PUT 8,10,I
 105 CHAIN "DIAG1"
 110 LET Z(8)=1
 115 LET Z(13)=10\LET Z(16)=3
 120 LET I=2\PUT 8,10,I
 125 CHAIN "DIAG1"
 130 GOSUB 1600
 135 IF Z(13)=1 GO TO 110
 140 IF D2>14 GO TO 90
 145 GOSUB 1000
 150 IF Z(14)=1 GO TO 90
 155 GO TO 70
 160 PRINT
 163 PRINT ">>RESPIRATORY ACIDOSIS WITH INCOMPLETE RENAL COMPENSATION"
 165 PRINT "(USUALLY COMPLETE BY 2-3 DAYS), OR ACUTE RESPIRATORY"
 170 PRINT "ACIDOSIS SUPERIMPOSED ON CHRONIC RESPIRATORY ACIDOSIS<<"
 175 IF Z(13)=0 GO TO 190
 180 PRINT "THE RESPIRATORY DEPRESSANT WHICH THIS PATIENT HAS RECEIVED"
 185 PRINT "IS AN IMPORTANT ETIOLOGIC CONSIDERATION"
 190 GO TO 385
 195 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RES-"
 200 PRINT "PIRATORY ACIDOSIS<<"
 205 IF Z(1)=0 GO TO 230
 210 PRINT "USE OF ACIDIFYING AGENTS IN CHRONIC RESPIRATORY ACIDOSIS"
 215 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 220 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE CHRONIC RES-"
 225 PRINT "PIRATORY ACIDOSIS)"
 230 GO TO 385
 235 PRINT\PRINT ">>MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY"
 240 PRINT "ACIDOSIS<<"
 245 IF Z(2)=0 GO TO 270
 250 PRINT "THERAPY OF ACUTE RESPIRATORY ACIDOSIS WITH ALKALINIZING A-"
 255 PRINT "GENTS COULD EXPLAIN THE VALUES IN THE PATIENT (FOR THE"
 260 PRINT "GIVEN PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE ACUTE"
 265 PRINT "RESPIRATORY ACIDOSIS)"
 270 IF Z(6)=0 GO TO 385
 275 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS COULD"
 280 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
 285 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ALKALOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
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 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,160,195,235
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
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1675 PRINT "       C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                                  STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO, 1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA11

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2000 END
   5 RECORD N,C1,D2,P2,G,K,CZ
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 120
  25 GO TO 460
  30 PRINT\PRINT "RESPIRATORY ACIDOSIS WITH INCOMPLETE RENAL COMPENSATION"
  35 PRINT "(USUALLY COMPLETE BY 2-3 DAYS), OR ACUTE RESPIRATORY ACIDOSIS"
  40 PRINT "SUPERIMPOSED ON CHRONIC RESPIRATORY ACIDOSIS"
  45 PRINT\PRINT "MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY ACIDO-"
  50 PRINT "SIS"
  55 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RESPIRATORY"
  60 PRINT "ACIDOSIS"
  65 PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS, WITH"
  70 PRINT "DELAY IN RESPIRATORY ADJUSTMENTS"
  75 GO TO 450
  80 LET Z(18)=11\LET Z(16)=1
  83 LET I=2\PUT 8,10,I
  85 CHAIN "DIAG1"
  90 LET Z(18)=11\LET Z(16)=2
  95 GO TO 83
 100 LET Z(18)=11\LET Z(16)=3
 105 GO TO 83
 110 LET Z(10)=1\LET Z(9)=1
 111 LET Z(18)=11\LET Z(16)=4
 115 GO TO 83
 120 GOSUB 1400
 125 IF Z(11)=1 GO TO 220
 130 GO TO 110
 135 PRINT
 136 PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
 140 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 145 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
 150 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2 BECAUSE OF A"
 155 PRINT "LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
 160 IF Z(1)=0 GO TO 175
 165 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS IS"
 170 PRINT "CONSISTENT WITH THIS EXPLANATION OF THE LAB VALUES"
 175 GO TO 385
 180 PRINT\PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON CHRONIC RES-"
 185 PRINT "PIRATORY ACIDOSIS<<"
 190 IF Z(1)=0 GO TO 215
 195 PRINT "USE OF ACIDIFYING AGENTS IN CHRONIC RESPIRATORY ACIDOSIS"
 200 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 205 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE CHRONIC RES-"
 210 PRINT "PIRATORY ACIDOSIS)"
 215 GO TO 385
 220 GOSUB 1600
 225 IF Z(13)=1 GO TO 90
 230 IF D2>14 GO TO 100
 235 GOSUB 1000
 240 IF Z(14)=1 GO TO 100
 245 GO TO 80
 250 PRINT
 251 PRINT ">>RESPIRATORY ACIDOSIS WITH INCOMPLETE RENAL COMPENSATION"
 255 PRINT "(USUALLY COMPLETE BY 2-3 DAYS), OR ACUTE RESPIRATORY"
 260 PRINT "ACIDOSIS, SUPERIMPOSED ON CHRONIC RESPIRATORY ACIDOSIS<<"
 265 IF Z(6)=0 GO TO 280
 270 PRINT "THE RESPIRATORY DEPRESSANTS WHICH THIS PATIENT HAS RECEIVED"
 275 PRINT "ARE AN IMPORTANT ETIOLOGIC CONSIDERATION"
 280 GO TO 385
 285 PRINT\PRINT ">>MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY"
 290 PRINT "ACIDOSIS"
 295 IF Z(2)=0 GO TO 320
 300 PRINT "THERAPY OF ACUTE RESPIRATORY ACIDOSIS WITH ALKALINIZING A-"
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 305 PRINT "GENTS COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE "
 310 PRINT "GIVEN PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE ACUTE"
 315 PRINT "RESPIRATORY ACIDOSIS)"
 320 IF Z(6)=0 GO TO 335
 325 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS COULD"
 330 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
 335 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ALKALOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>5 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,250,285,180,135
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                              (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
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1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
```

AREA12

```
2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 85
  25 GO TO 460
  30 PRINT\PRINT "CHRONIC RESPIRATORY ACIDOSIS"
  35 PRINT\PRINT "MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY"
  40 PRINT "ACIDOSIS"
  45 GO TO 450
  50 LET Z(8)=1
  55 LET Z(18)=12\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(8)=1
  75 LET Z(18)=12\LET Z(16)=2
  80 GO TO 60
  85 GOSUB 1600
  90 IF Z(13)=1 GO TO 70
  95 GO TO 50
 100 PRINT\PRINT ">>CHRONIC RESPIRATORY ACIDOSIS<<"
 105 GO TO 385
 110 PRINT\PRINT ">>MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY"
 115 PRINT "ACIDOSIS<<"
 120 IF Z(2)=0 GO TO 145
 125 PRINT "THERAPY OF ACUTE RESPIRATORY ACIDOSIS WITH ALKALINIZING"
 130 PRINT "AGENTS COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE"
 135 PRINT "GIVEN HCO3, THE PCO2 IS HIGHER THAN SEEN IN SIMPLE ACUTE"
 140 PRINT "RESPIRATORY ACIDOSIS)"
 145 IF Z(6)=0 GO TO 385
 150 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS"
 155 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 160 PRINT "HCO3, THE PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC"
 162 PRINT "ALKALOSIS)"
 385 IF DZ<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,100,110
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
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1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                                STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1685
1740 LET Z(9)=1.0
1745 RETURN
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AREA13

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 105
  25 GO TO 460
  30 PRINT\PRINT "CHRONIC RESPIRATORY ACIDOSIS"
  35 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 PRINT
  50 PRINT "MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY ACIDOSIS"
  55 GO TO 450
  60 LET Z(18)=13\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(9)=1
  80 LET Z(10)=1
  85 LET Z(18)=13\LET Z(16)=2
  90 GO TO 65
  95 LET Z(18)=13\LET Z(16)=3
 100 GO TO 65
 105 GOSUB 1400
 110 IF Z(11)=0 GO TO 75
 115 GOSUB 1600
 120 IF Z(13)=1 GO TO 95
 125 GO TO 60
 130 PRINT\PRINT ">>CHRONIC RESPIRATORY ACIDOSIS<<"
 135 GO TO 385
 138 PRINT
 140 PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
 145 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 150 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
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155 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2 BECAUSE OF"
160 PRINT "A LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
165 IF Z(1)=0 GO TO 180
170 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS"
175 PRINT "IS CONSISTENT WITH THIS EXPLANATION OF THE LAB VALUES"
180 GO TO 385
185 PRINT
190 PRINT ">>MIXED METABOLIC ALKALOSIS AND ACUTE RESPIRATORY ACIDOSIS<<"
195 IF Z(2)=0 GO TO 220
200 PRINT "THERAPY OF ACUTE RESPIRATORY ACIDOSIS WITH ALKALINIZING"
205 PRINT "AGENTS COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE"
210 PRINT "GIVEN PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE ACUTE"
215 PRINT "PIRATORY ACIDOSIS)"
220 IF Z(6)=0 GO TO 385
225 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS COULD"
230 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
235 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ALKALOSIS)"
385 IF D2<=14 GO TO 400
390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
400 IF C1>=100 GO TO 425
405 IF P2>=4 GO TO 425
410 IF Z(3)<>1 GO TO 425
415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
425 IF C1>=100 GO TO 450
430 IF P2<4 GO TO 450
435 IF Z(3)<>1 GO TO 450
440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
450 LET Z(18)=0\LET Z(16)=0
453 LET I=Z\PUT 8,10,I
455 CHAIN "DIAG1"
460 IF Z(19)>4 GO TO 450
470 IF Z(19)>0 GO TO 480
475 CHAIN "AB5000"
480 ON Z(19) GOTO 30,130,138,185
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
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1545 PRINT "                                                SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                                STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA14

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 85
  25 GO TO 460
  30 PRINT\PRINT "RESPIRATORY ACIDOSIS - ACUTE OR CHRONIC"
  35 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 GO TO 450
  50 LET Z(18)=14\LET Z(16)=1
  55 LET I=2\PUT 8,10,I
  60 CHAIN "DIAG1"
  65 LET Z(9)=1
  70 LET Z(10)=1
  75 LET Z(18)=14\LET Z(16)=2
  80 GO TO 55
  85 GOSUB 1400
  90 IF Z(11)=0 GO TO 65
  95 GO TO 50
 100 PRINT\PRINT ">>RESPIRATORY ACIDOSIS - ACUTE OR CHRONIC<<"
 105 IF Z(6)=0 GO TO 120
 110 PRINT "THE RESPIRATORY DEPRESSANTS WHICH THIS PATIENT HAS RECEIVED"
 115 PRINT "ARE AN IMPORTANT ETIOLOGIC CONSIDERATION"
 120 GO TO 385
 125 PRINT
 126 PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
 130 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 135 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
 140 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2 BECAUSE OF A"
 145 PRINT "LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
 150 IF Z(1)=0 GO TO 385
 155 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS IS"
 160 PRINT "CONSISTENT WITH THIS EXPLANATION OF THE LAB VALUES"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,100,125
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
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1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
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AREA15

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 90
  25 GO TO 460
  30 PRINT\PRINT "MILD METABOLIC ALKALOSIS"
  35 PRINT\PRINT "MILD CHRONIC RESPIRATORY ACIDOSIS"
  40 PRINT\PRINT "MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS"
  45 GO TO 450
  50 LET Z(9)=1
  55 LET Z(18)=15\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(18)=15\LET Z(16)=2
  75 GO TO 60
  80 LET Z(18)=15\LET Z(16)=3
  85 GO TO 60
  90 GOSUB 1400
  95 IF Z(11)=0 GO TO 50
 100 GOSUB 1600
 105 IF Z(13)=1 GO TO 80
 110 GO TO 70
 115 PRINT\PRINT ">>MILD CHRONIC RESPIRATORY ACIDOSIS<<"
 120 GO TO 385
 125 PRINT\PRINT ">>MILD METABOLIC ALKALOSIS<<"
 130 IF Z(2)=0 GO TO 145
 135 PRINT "THE ALKALINIZING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 140 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 145 GO TO 385
 150 PRINT\PRINT ">>MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS<<"
 155 IF Z(2)=0 GO TO 170
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 160 PRINT "THERAPY OF RESPIRATORY ACIDOSIS WITH ALKALINIZING AGENTS IS"
 165 PRINT "POSSIBLE IN THIS PATIENT"
 170 IF Z(6)=0 GO TO 385
 175 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS IS"
 180 PRINT "POSSIBLE IN THIS PATIENT"
 385 IF DZ<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF PZ>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF PZ<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,125,115,150
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
```

```
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                              STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
```

AREA16

```
2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 90
  25 GO TO 460
  30 PRINT\PRINT "MILD METABOLIC ALKALOSIS"
  35 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
  40 PRINT "RESPIRATORY ACIDOSIS"
  45 GO TO 450
  50 LET Z(9)=1
  55 LET Z(18)=16\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(7)=1
  75 LET Z(8)=1
  80 LET Z(18)=16\LET Z(16)=2
  85 GO TO 60
  90 IF Z(4)=1 GO TO 70
  95 IF Z(3)=1 GO TO 50
 100 GOSUB 1600
 105 IF Z(13)=1 GO TO 50
 110 GO TO 70
 115 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
 120 PRINT "RESPIRATORY ACIDOSIS<<"
 125 IF Z(4)=0 GO TO 155
 130 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIRA-"
 135 PRINT "TOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
 140 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 145 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO DECREASE"
 150 PRINT "HCO3)"
 155 GO TO 385
```

```
 160 PRINT\PRINT ">>MILD METABOLIC ALKALOSIS<<"
 165 IF Z(2)=0 GO TO 385
 170 PRINT "THE ALKALINIZING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 175 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,160,115
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
```

AREA17

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 110
  25 GO TO 460
  30 PRINT\PRINT "MILD RESPIRATORY ALKALOSIS - ACUTE OR CHRONIC"
  35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 PRINT\PRINT "RESPIRATORY ALKALOSIS SUPERIMPOSED ON MILD METABOLIC"
  50 PRINT "ACIDOSIS"
  60 GO TO 450
  65 LET Z(18)=17\LET Z(16)=1
  70 LET I=2\PUT 8,10,I
  75 CHAIN "DIAG1"
  80 LET Z(9)=1
  85 LET Z(10)=1
  90 LET Z(18)=17\LET Z(16)=2
  95 GO TO 70
 100 LET Z(18)=17\LET Z(16)=3
 105 GO TO 70
 110 GOSUB 1200
 115 IF Z(12)=0 GO TO 80
 120 GOSUB 1000
 125 IF Z(14)=1 GO TO 100
 130 GO TO 65
 135 PRINT\PRINT ">>MILD RESPIRATORY ALKALOSIS - ACUTE OR CHRONIC<<"
 140 IF Z(4)=0 GO TO 155
 145 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN IM-"
 150 PRINT "PORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 155 IF Z(5)=0 GO TO 170
 160 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 165 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 170 GO TO 385
 175 PRINT
 176 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 180 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 185 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 190 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A PHYSIO-"
 195 PRINT "LOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN INCREASE IN"
 200 PRINT "SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL INCREASE IN PCO2"
 205 IF Z(2)=0 GO TO 220
 210 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 215 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 220 GO TO 385
 225 PRINT\PRINT ">>RESPIRATORY ALKALOSIS SUPERIMPOSED ON MILD METABOLIC"
 230 PRINT "ACIDOSIS<<"
 235 IF Z(5)<>0 GO TO 245
 240 IF Z(4)=0 GO TO 385
 245 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 250 PRINT "IN METABOLIC ACIDOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
 255 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
 260 PRINT "SIMPLE METABOLIC ACIDOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
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 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,135,175,225
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF CZ<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE -- UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                              (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
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1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
```

AREA18

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 120
  25 GO TO 460
  30 PRINT\PRINT "MILD ACUTE RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS"
  40 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  45 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  50 PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF ACUTE"
  55 PRINT ""RESPIRATORY ACIDOSIS"
  60 GO TO 450
  65 LET Z(18)=18\LET Z(16)=1
  70 LET I=2\PUT 8,10,I
  75 CHAIN "DIAG1"
  80 LET Z(18)=18\LET Z(16)=2
  85 GO TO 70
  90 LET Z(9)=1
  95 LET Z(10)=1
 100 LET Z(18)=18\LET Z(16)=3
 105 GO TO 70
 110 LET Z(18)=18\LET Z(16)=4
 115 GO TO 70
 120 GOSUB 1200
 125 IF Z(12)=1 GO TO 190
 130 GO TO 90
 135 PRINT
 136 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 140 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 145 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINI-"
 150 PRINT "STRATION OF ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED"
 155 PRINT "BY A PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN"
 160 PRINT "INCREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONATE IN-"
 165 PRINT "CREASE IN PCO2"
 170 IF Z(2)=0 GO TO 185
 175 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 180 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 185 GO TO 385
 190 GOSUB 1000
 195 IF Z(14)=1 GO TO 80
 200 GOSUB 1400
 205 IF Z(11)=1 GO TO 110
 210 GO TO 65
 215 PRINT\PRINT ">>MILD ACUTE RESPIRATORY ALKALOSIS<<"
 220 IF Z(4)=0 GO TO 235
 225 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN IM-"
 230 PRINT "PORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 235 IF Z(5)=0 GO TO 250
 240 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 245 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 250 GO TO 385
 255 PRINT\PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS<<"
 260 IF Z(5)<>0 GO TO 270
 265 IF Z(4)=0 GO TO 290
 270 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 275 PRINT "IN METABOLIC ACIDOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
 280 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
 285 PRINT "SIMPLE METABOLIC ACIDOSIS)"
 290 IF Z(1)=0 GO TO 305
 295 PRINT "THERAPY OF RESPIRATORY ALKALOSIS WITH ACIDIFYING AGENTS IS "
 300 PRINT "POSSIBLE IN THIS PATIENT"
 305 GO TO 385
 310 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF"
 315 PRINT "ACUTE RESPIRATORY ACIDOSIS<<"
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 320 IF Z(4)<>1 GO TO 345
 325 PRINT "THIS IMPLIES THAT THE PATIENT'S RESPIRATOR IS NOW INADE-"
 330 PRINT "QUATELY FUNCTIONING OR STOPPED. OTHERWISE, IF THE RESPIRATOR"
 335 PRINT "STILL FUNCTIONAL, THE LIKELY DIAGNOSIS IS MILD ACUTE RES-"
 340 PRINT "PIRATORY ALKALOSIS"
 345 IF Z(6)=0 GO TO 385
 350 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS"
 355 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS IN-"
 360 PRINT "MORE RAPIDLY THAN THE KIDNEY CAN ACT TO CONSERVE HCO3)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>5 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,215,255,135,310
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
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1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
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```
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
```

AREA19

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 95
  25 GO TO 460
  30 PRINT\PRINT "MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS"
  35 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
  40 PRINT "RESPIRATORY ACIDOSIS"
  45 GO TO 450
  50 LET Z(9)=1
  55 LET Z(8)=1
  60 LET Z(18)=19\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(7)=1
  80 LET Z(8)=1
  85 LET Z(18)=19\LET Z(16)=2
  90 GO TO 65
  95 IF Z(4)=1 GO TO 75
 100 IF Z(3)=1 GO TO 50
 105 GOSUB 1600
 110 IF Z(13)=1 GO TO 50
 115 GO TO 75
 120 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
 125 PRINT "RESPIRATORY ACIDOSIS<<"
 130 IF Z(4)=0 GO TO 160
 135 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIRA-"
 140 PRINT "TOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
 145 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 150 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO DECREASE"
 155 PRINT "HCO3)"
 160 GO TO 385
 165 PRINT\PRINT ">>MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS<<"
 170 IF Z(2)=0 GO TO 190
 175 PRINT "THERAPY OF RESPIRATORY ACIDOSIS WITH ALKALINIZING AGENTS"
 180 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 185 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE RESPIRATORY"
 186 PRINT "ACIDOSIS)"
 190 IF Z(6)=0 GO TO 385
 195 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS COULD"
 200 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
 205 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ALKALOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "ABS000"
 480 ON Z(19) GOTO 30,165,120
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
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```
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
```

AREA20

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 115
  25 GO TO 460
  30 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
  35 PRINT "RESPIRATORY ACIDOSIS"
  40 PRINT\PRINT "MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS"
  45 PRINT\PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
  50 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  55 GO TO 450
  60 LET Z(7)=1
  65 LET Z(18)=20\LET Z(16)=1
  70 LET I=2\PUT 8,10,I
  75 CHAIN "DIAG1"
  80 LET Z(9)=1
  85 LET Z(18)=20\LET Z(16)=2
  90 GO TO 70
  95 LET Z(10)=1
 100 LET Z(9)=1
 105 LET Z(18)=20\LET Z(16)=3
 110 GO TO 70
 115 GOSUB 1400
 120 IF Z(11)=0 GO TO 95
 125 IF Z(4)=1 GO TO 60
 130 IF Z(3)=1 GO TO 80
 135 GOSUB 1600
 140 IF Z(13)=0 GO TO 60
 145 GO TO 80
 150 PRINT\PRINT ">>MIXED RESPIRATORY ACIDOSIS AND METABOLIC ALKALOSIS<<"
 155 IF Z(2)=0 GO TO 175
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160 PRINT "THERAPY OF RESPIRATORY ACIDOSIS WITH ALKALINIZING AGENTS"
165 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
170 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE RESPIRATORY"
171 PRINT "ACIDOSIS)"
175 IF Z(16)=0 GO TO 195
180 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS COULD"
185 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN HCO3, THE"
190 PRINT "PCO2 IS HIGHER THAN SEEN IN SIMPLE METABOLIC ALKALOSIS)"
195 GO TO 385
200 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
205 PRINT "RESPIRATORY ACIDOSIS<<"
210 IF Z(4)=0 GO TO 235
215 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIR-"
220 PRINT "ATOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
225 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
230 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO REDUCE HCO3)"
235 GO TO 385
240 PRINT
241 PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON METABOLIC ALKALOSIS,"
245 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
250 PRINT "IN METABOLIC ALKALOSIS, ACIDIFICATION MAY ACUTELY LOWER THE"
255 PRINT "HCO3 WITHOUT PROPORTIONATELY LOWERING THE PCO2, BECAUSE OF"
260 PRINT "A LAG IN THE RESPIRATORY CENTER RESPONSE TIME"
265 IF Z(1)=0 GO TO 385
270 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ACIDIFYING AGENTS"
275 PRINT "IS CONSISTENT WITH THIS EXPLANATION OF THE LAB VALUES"
385 IF D2<=14 GO TO 400
390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
400 IF C1>=100 GO TO 425
405 IF P2>=4 GO TO 425
410 IF Z(3)<>1 GO TO 425
415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
425 IF C1>=100 GO TO 450
430 IF P2<4 GO TO 450
435 IF Z(3)<>1 GO TO 450
440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
450 LET Z(18)=0\LET Z(16)=0
453 LET I=2\PUT 8,10,I
455 CHAIN "DIAG1"
460 IF Z(19)>4 GO TO 450
470 IF Z(19)>0 GO TO 480
475 CHAIN "AB5000"
480 ON Z(19) GOTO 30,200,150,240
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
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1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA21

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 125
  25 GO TO 460
  30 IF Z(0)<>21 GO TO 45
  35 PRINT\PRINT "SEVERE METABOLIC ALKALOSIS"
  40 GO TO 50
  45 PRINT\PRINT "MODERATE METABOLIC ALKALOSIS"
  50 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON MODERATE"
  55 PRINT "RESPIRATORY ACIDOSIS"
  60 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON MODERATE RESPIRA-"
  65 PRINT "TORY ACIDOSIS"
  70 GO TO 450
  75 LET Z(9)=1
  80 LET Z(18)=21\LET Z(16)=1
  85 LET I=2\PUT 8,10,I
  90 CHAIN "DIAG1"
  95 LET Z(7)=1
 100 LET Z(18)=21\LET Z(16)=2
 105 GO TO 85
 110 LET Z(9)=1
 115 LET Z(18)=21\LET Z(16)=3
 120 GO TO 85
 125 GOSUB 1400
 130 IF Z(11)=0 GO TO 75
 135 IF Z(4)=1 GO TO 95
 140 IF Z(3)=1 GO TO 110
 145 GOSUB 1600
 150 IF Z(13)=1 GO TO 110
 155 GO TO 95
 160 IF Z(0)=22 GO TO 175
 165 PRINT\PRINT ">>SEVERE METABOLIC ALKALOSIS<<"
 170 GO TO 180
 175 PRINT\PRINT ">>MODERATE METABOLIC ALKALOSIS<<"
 180 IF Z(2)=0 GO TO 195
 185 PRINT "THE ALKALINIZING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 190 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 195 GO TO 385
 200 PRINT\PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON MODERATE "
 205 PRINT "RESPIRATORY ACIDOSIS<<"
 210 PRINT "THE PATIENT FALLS WITHIN THE 95 CONFIDENCE BAND OF METABOLIC"
 215 PRINT "ALKALOSIS. HOWEVER, THE RESPIRATORY ACIDOSIS MAY ALSO BE "
 220 PRINT "CONTRIBUTORY TO THE ACID-BASE DISORDER."
 225 IF Z(2)=0 GO TO 245
 230 PRINT "THERAPY OF RESPIRATORY ACIDOSIS WITH ALKALINIZING AGENTS"
 235 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 240 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE RESPIRATORY"
 241 PRINT "ACIDOSIS)"
 245 IF Z(6)=0 GO TO 260
 250 PRINT "THE RESPIRATORY DEPRESSANT WHICH THIS PATIENT HAS RECEIVED"
 255 PRINT "IS AN IMPORTANT ETIOLOGIC CONSIDERATION"
 260 GO TO 385
 265 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
 270 PRINT "RESPIRATORY ACIDOSIS<<"
 275 IF Z(4)=0 GO TO 385
 280 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIRA-"
 285 PRINT "TOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
 290 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 295 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO DECREASE"
 300 PRINT "HCO3)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
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 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,160,265,200
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
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1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA24

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 105
  25 GO TO 460
  30 PRINT\PRINT "METABOLIC ALKALOSIS WITH A SUPERIMPOSED RESPIRATORY"
  35 PRINT "ALKALOSIS, OR ACUTE METABOLIC ALKALOSIS WITH DELAY IN RES-"
  40 PRINT "PIRATORY ADJUSTMENTS"
  45 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
  50 PRINT "RESPIRATORY ACIDOSIS"
  55 GO TO 450
  60 LET Z(7)=1
  65 LET Z(9)=1
  70 LET Z(18)=24\LET Z(16)=1
  75 LET I=2\PUT 8,10,I
  80 CHAIN "DIAG1"
  85 LET Z(7)=1
  90 LET Z(8)=1
  95 LET Z(18)=24\LET Z(16)=2
 100 GO TO 75
 105 IF Z(4)=1 GO TO 130
 110 IF Z(3)=1 GO TO 60
 115 GOSUB 1600
 120 IF Z(13)=0 GO TO 85
 125 GO TO 60
 130 GOSUB 1400
 135 IF Z(11)=1 GO TO 85
 140 GO TO 60
 145 PRINT
 150 PRINT ">>METABOLIC ALKALOSIS WITH A SUPERIMPOSED RESPIRATORY"
 151 PRINT "ALKALOSIS<<"
 155 IF Z(5)<>0 GO TO 175
 160 IF Z(6)<>0 GO TO 175
 165 PRINT ">>OR ACUTE METABOLIC ALKALOSIS WITH DELAY IN RESPIRATORY"
 170 PRINT "ADJUSTMENTS<<"
 175 IF Z(2)=0 GO TO 190
 180 PRINT "THE ALKALINIZING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 185 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 190 IF Z(4)<>0 GO TO 200
 195 IF Z(5)=0 GO TO 220
 200 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 205 PRINT "IN METABOLIC ALKALOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
 210 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
 215 PRINT "SIMPLE METABOLIC ALKALOSIS)"
 220 GO TO 385
 225 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
 230 PRINT "RESPIRATORY ACIDOSIS<<"
 235 IF Z(4)=0 GO TO 385
 240 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIRA-"
 245 PRINT "TOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
 250 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 255 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO DECREASE"
 260 PRINT "HCO3)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
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 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,145,225
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEURONUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
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1690 PRINT "       A. GI LOSSES"
1695 PRINT "    2. ADRENOCORTICAL EXCESS"
1700 PRINT "       A. HYPERALDOSTERONISM"
1705 PRINT "       B. CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                             STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA25

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2000 END
   5 RECORD N,C1,D2,PZ,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 125
  25 GO TO 460
  30 PRINT\PRINT "MIXED METABOLIC ALKALOSIS AND RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
  40 PRINT "RESPIRATORY ACIDOSIS"
  45 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  50 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  55 GO TO 450
  60 LET Z(7)=1
  65 LET Z(9)=1
  70 LET Z(18)=25\LET Z(16)=1
  75 LET I=2\PUT 8,10,I
  80 CHAIN "DIAG1"
  85 LET Z(7)=1
  90 LET Z(8)=1
  95 LET Z(18)=25\LET Z(16)=2
 100 GO TO 75
 105 LET Z(9)=1
 110 LET Z(10)=1
 115 LET Z(18)=25\LET Z(16)=3
 120 GO TO 75
 125 IF Z(4)=1 GO TO 160
 130 GOSUB 1200
 135 IF Z(12)=0 GO TO 105
 140 IF Z(3)=1 GO TO 60
 145 GOSUB 1600
 150 IF Z(13)=1 GO TO 60
 155 GO TO 60
 160 GOSUB 1400
 165 IF Z(11)=1 GO TO 85
 170 GO TO 60
 175 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON CHRONIC"
 180 PRINT "RESPIRATORY ACIDOSIS<<"
 185 IF Z(4)=0 GO TO 215
 190 PRINT "TREATMENT OF RESPIRATORY ACIDOSIS WITH A MECHANICAL RESPIRA-"
 195 PRINT "TOR, THUS PRODUCING A RELATIVELY ACUTE INCREASE IN VENTILA-"
 200 PRINT "TION, COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 205 PRINT "REDUCED MORE RAPIDLY THAN THE KIDNEY CAN ACT TO DECREASE"
 210 PRINT "HCO3)"
 215 GO TO 385
 220 PRINT
 221 PRINT ">>MIXED METABOLIC ALKALOSIS AND RESPIRATORY ALKALOSIS<<"
 225 IF Z(4)<>0 GO TO 235
 230 IF Z(5)=0 GO TO 255
 235 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 240 PRINT "IN METABOLIC ALKALOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
 245 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
 250 PRINT "SIMPLE METABOLIC ALKALOSIS)"
 255 IF Z(2)=0 GO TO 275
 260 PRINT "USE OF ALKALINIZING AGENTS IN RESPIRATORY ALKALOSIS COULD"
 265 PRINT "EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN PCO2, THE"
 270 PRINT "HCO3 IS HIGHER THAN SEEN IN SIMPLE RESPIRATORY ALKALOSIS)"
 275 GO TO 385
 280 PRINT
 281 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 285 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 290 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 295 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A"
 300 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN IN-"
 305 PRINT "CREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL INCREASE"
 306 PRINT "IN PCO2"
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 310 IF Z(2)=0 GO TO 385
 315 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 320 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,220,175,280
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1355
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
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1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA26

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 105
  25 GO TO 460
  30 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED"
  50 PRINT "METABOLIC ALKALOSIS"
  55 GO TO 450
  60 LET Z(18)=26\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(9)=1
  80 LET Z(10)=1
  85 LET Z(18)=26\LET Z(16)=2
  90 GO TO 65
  95 LET Z(18)=26\LET Z(16)=3
 100 GO TO 65
 105 GOSUB 1200
 110 IF Z(12)=0 GO TO 75
 115 GOSUB 1600
 120 IF Z(13)=0 GO TO 60
 125 GO TO 95
 130 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED"
 135 PRINT "METABOLIC ALKALOSIS<<"
 140 IF Z(2)=0 GO TO 165
 145 PRINT "USE OF ALKALINIZING AGENTS IN CHRONIC RESPIRATORY ALKALOSIS"
 150 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 155 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE CHRONIC"
 160 PRINT "RESPIRATORY ALKALOSIS)"
 165 GO TO 385
 170 PRINT\PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC "
 175 PRINT "ACIDOSIS, WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 180 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 185 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A"
 190 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN IN-"
 195 PRINT "CREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL INCREASE"
 197 PRINT "IN PCO2"
 200 IF Z(2)=0 GO TO 215
 205 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 210 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 215 GO TO 385
 220 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS<<"
 225 IF Z(4)=0 GO TO 240
 230 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN"
 235 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 240 IF Z(5)=0 GO TO 385
 245 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 250 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
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 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=Z\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,220,170,130
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
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1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA27

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(Z1)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 120
  25 GO TO 460
  30 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED META-"
  50 PRINT "BOLIC ALKALOSIS"
  55 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON METABOLIC"
  60 PRINT "ACIDOSIS"
  63 GO TO 450
  65 LET Z(18)=27\LET Z(16)=1
  70 LET I=Z\PUT 8,10,I
  75 CHAIN "DIAG1"
  80 LET Z(9)=1
  85 LET Z(10)=1
  90 LET Z(18)=27\LET Z(16)=2
  95 GO TO 70
 100 LET Z(18)=27\LET Z(16)=3
 105 GO TO 70
 110 LET Z(18)=27\LET Z(16)=4
 115 GO TO 70
 120 GOSUB 1200
 125 IF Z(12)=0 GO TO 80
 130 GOSUB 1600
 135 IF Z(13)=1 GO TO 100
 140 IF D2>14 GO TO 110
 145 GOSUB 1000
 150 IF Z(14)=1 GO TO 110
 155 GO TO 65
 160 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS<<"
 165 IF Z(4)=0 GO TO 180
 170 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN"
 175 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 180 IF Z(5)=0 GO TO 195
 185 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 190 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 195 GO TO 385
 200 PRINT
 201 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 205 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 215 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 220 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A"
 225 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN"
 230 PRINT "INCREASE IN HCO3 OCCURS WITHOUT A PROPORTIONAL INCREASE"
 231 PRINT "IN PCO2"
 235 IF Z(2)=0 GO TO 250
 240 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 245 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 250 GO TO 385
 255 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED"
 260 PRINT "METABOLIC ALKALOSIS<<"
 265 IF Z(2)=0 GO TO 290
 270 PRINT "USE OF ALKALINIZING AGENTS IN CHRONIC RESPIRATORY ALKALOSIS"
 275 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 280 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE CHRONIC "
 285 PRINT "RESPIRATORY ALKALOSIS)"
 290 GO TO 385
 295 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS SUPERIMPOSED ON"
 300 PRINT "METABOLIC ACIDOSIS<<"
 305 PRINT "THE PATIENT FALLS WITHIN THE 95 CONFIDENCE BAND OF ACUTE"
 310 PRINT "RESPIRATORY ALKALOSIS.  HOWEVER, METABOLIC ACIDOSIS MAY ALSO"
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315 PRINT "BE CONTRIBUTORY TO THE DISORDER"
320 IF Z(1)=0 GO TO 335
325 PRINT "THE ACIDIFYING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
330 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
335 IF Z(4)<>0 GO TO 345
340 IF Z(5)=0 GO TO 385
345 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
350 PRINT "IN METABOLIC ACIDOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
355 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
360 PRINT "SIMPLE METABOLIC ACIDOSIS)"
385 IF DZ<=14 GO TO 400
390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
400 IF C1>=100 GO TO 425
405 IF P2>=4 GO TO 425
410 IF Z(3)<>1 GO TO 425
415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
425 IF C1>=100 GO TO 450
430 IF P2<4 GO TO 450
435 IF Z(3)<>1 GO TO 450
440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
450 LET Z(18)=0\LET Z(16)=0
453 LET I=2\PUT 8,10,I
455 CHAIN "DIAG1"
460 IF Z(19)>5 GO TO 450
470 IF Z(19)>0 GO TO 480
475 CHAIN "AB5000"
480 ON Z(19) GOTO 30,160,200,255,295
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                              (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
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1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1335
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                              STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA28

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 125
  25 GO TO 460
  30 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  35 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"\PRINT
  40 PRINT "MIXED METABOLIC ACIDOSIS AND ACUTE RESPIRATORY ALKALOSIS"
  45 PRINT\PRINT "ACUTE RESPIRATORY ALKALOSIS WITH INCOMPLETE RENAL"
  50 PRINT "COMPOENSATION"\PRINT
  55 PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED METABOLIC"
  60 PRINT "ALKALOSIS"
  65 GO TO 450
  70 LET Z(9)=1
  75 LET Z(10)=1
  80 LET Z(18)=28\LET Z(16)=1
  85 LET I=2\PUT 8,10,I
  90 CHAIN "DIAG1"
  95 LET Z(18)=28\LET Z(16)=2
 100 GO TO 85
 105 LET Z(18)=28\LET Z(16)=3
 110 GO TO 85
 115 LET Z(18)=28\LET Z(16)=4
 120 GO TO 85
 125 GOSUB 1200
 130 IF Z(12)=0 GO TO 70
 135 GOSUB 1600
 140 IF Z(13)=0 GO TO 195
 145 GO TO 115
 150 PRINT
 155 PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH A SUPERIMPOSED "
 160 PRINT "METABOLIC ALKALOSIS<<"
 165 IF Z(2)=0 GO TO 195
 170 PRINT "USE OF ALKALINIZING AGENTS IN CHRONIC RESPIRATORY ALKALOSIS"
 175 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 180 PRINT "PCO2, THE HCO3 IS HIGHER THAN SEEN IN SIMPLE CHRONIC RES-"
 185 PRINT "PIRATORY ALKALOSIS)"
 195 IF D2>14 GO TO 95
 200 GOSUB 1000
 205 IF Z(14)=1 GO TO 95
 210 GO TO 105
 215 PRINT\PRINT ">>ACUTE RESPIRATORY ALKALOSIS WITH INCOMPLETE RENAL"
 220 PRINT "COMPENSATION<<"
 225 IF Z(4)=0 GO TO 240
 230 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN "
 235 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 240 IF Z(5)=0 GO TO 255
 245 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 250 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 255 GO TO 385
 260 PRINT
 265 PRINT ">>MIXED METABOLIC ACIDOSIS AND ACUTE RESPIRATORY ALKALOSIS<<"
 270 IF Z(1)=0 GO TO 295
 275 PRINT "THERAPY OF ACUTE RESPIRATORY ALKALOSIS WITH ACIDIFYING"
 280 PRINT "AGENTS COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE"
 285 PRINT "GIVEN PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE ACUTE"
 290 PRINT "RESPIRATORY ALKALOSIS)"
 295 IF Z(4)<>0 GO TO 305
 300 IF Z(5)=0 GO TO 325
 305 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 310 PRINT "IN METABOLIC ACIDOSIS COULD EXPLAIN THE VALUES IN THIS PA-"
 315 PRINT "TIENT (FOR THE GIVEN HCO3, THE PCO2 IS LOWER THAN SEEN IN"
 320 PRINT "SIMPLE METABOLIC ACIDOSIS)"
 325 GO TO 385
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330 PRINT
331 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
335 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
340 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
345 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A"
350 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN"
355 PRINT "INCREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL IN-"
356 PRINT "CREASE IN PCO2"
360 IF Z(2)=0 GO TO 65
365 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
370 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
385 IF DZ<=14 GO TO 400
390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
400 IF C1>=100 GO TO 425
405 IF P2>=4 GO TO 425
410 IF Z(3)<>1 GO TO 425
415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
425 IF C1>=100 GO TO 450
430 IF P2<4 GO TO 450
435 IF Z(3)<>1 GO TO 450
440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
450 LET Z(18)=0\LET Z(16)=0
453 LET I=2\PUT 8,10,I
455 CHAIN "DIAG1"
460 IF Z(19)>5 GO TO 450
470 IF Z(19)>0 GO TO 480
475 CHAIN "AB5000"
480 ON Z(19) GOTO 30,330,260,215,150
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                          (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
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1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                              STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA29

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 100
  25 GO TO 460
  30 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 PRINT "MIXED METABOLIC ACIDOSIS AND ACUTE RESPIRATORY ALKALOSIS"
  50 GO TO 450
  55 LET Z(18)=29\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(9)=1
  75 LET Z(10)=1
  80 LET Z(18)=29\LET Z(16)=2
  85 GO TO 60
  90 LET Z(18)=29\LET Z(16)=3
  95 GO TO 60
 100 GOSUB 1200
 105 IF Z(12)=0 GO TO 70
 110 GOSUB 1000
 115 IF Z(14)=1 GO TO 90
 120 GO TO 55
 125 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS<<"
 130 GO TO 385
 135 PRINT
 136 PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
 140 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 145 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 150 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A "
 155 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN"
 160 PRINT "INCREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL IN-"
 161 PRINT "CREASE IN PCO2"
 165 IF Z(2)=0 GO TO 180
 170 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 175 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 180 GO TO 385
 185 PRINT
 190 PRINT ">>MIXED METABOLIC ACIDOSIS AND ACUTE RESPIRATORY ALKALOSIS<<"
 195 IF Z(1)=0 GO TO 220
 200 PRINT "THERAPY OF ACUTE RESPIRATORY ALKALOSIS WITH ACIDIFYING A-"
 205 PRINT "GENTS COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE"
 210 PRINT "GIVEN PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE ACUTE"
 215 PRINT "RESPIRATORY ALKALOSIS)"
 220 IF Z(4)<>0 GO TO 230
 225 IF Z(5)=0 GO TO 385
 230 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 235 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 240 PRINT "HCO3, THE PCO2 IS LOWER THAN SEEN IN SIMPLE METABOLIC"
 241 PRINT "ACIDOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
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 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "ABS000"
 480 ON Z(19) GOTO 30,125,135,185
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1105 PRINT "        B.  ETHYLENE GLYCOL"
1110 PRINT "        C.  SALICYLATES"
1115 PRINT "B.  IMPAIRED RENAL EXCRETION OF FIXED ACID"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                          (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
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1310 PRINT "D. HIGH FEVER"
1315 PRINT "E. GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F. HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
```

AREA30

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)<>0 GO TO 240
  25 IF D2<=14 GO TO 45
  30 IF C1>=100 GO TO 40
  35 IF Z(3)=1 GO TO 45
  40 GOSUB 1600
  45 LET Z(18)=30\LET Z(16)=1
  50 LET I=2\PUT 8,10,I
  55 CHAIN "DIAG1"
  60 PRINT\PRINT "THE PH, PCO2, AND HCO3 ARE ALL IN THE NORMAL RANGE. "
  65 PRINT "HOWEVER, MANY POSSIBLE COMBINATIONS OF MIXED DISTURBANCES"
  70 PRINT "CAN BE PRESENT. "
  75 IF D2<=14 GO TO 90\PRINT
  80 PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC ACIDOSIS"
  85 PRINT "IS A COMPONENT OF THE DISTURBANCE"
  90 IF C2>=100 GO TO 115
  95 IF P2>=4 GO TO 115
 100 IF Z(3)<>1 GO TO 115
 105 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 110 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 115 IF C1>=100 GO TO 140
 120 IF P2<4 GO TO 140
 125 IF Z(3)<>1 GO TO 140
 130 PRINT "TREATMENT WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 135 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 140 IF D2<=14 GO TO 225
 150 IF Z(13)<>1 GO TO 160
 155 IF Z(2)<>1 GO TO 170
 160 IF C1>=100 GO TO 180
 165 IF Z(3)<>1 GO TO 180
 170 PRINT "THE BALANCE OF METABOLIC ACIDOSIS AND METABOLIC ALKALOSIS"
 175 PRINT "COULD EXPLAIN THE NORMAL VALUES IN THIS PATIENT"
 180 IF Z(2)=0 GO TO 195
 185 PRINT "TREATMENT OF METABOLIC ACIDOSIS WITH ALKALI COULD ACCOUNT"
 190 PRINT "FOR THE NORMAL VALUES IN THIS PATIENT"
 195 IF Z(13)=1 GO TO 225
 200 IF C1>=100 GO TO 175
 205 IF Z(3)=1 GO TO 225
 210 IF Z(2)<>0 GO TO 225
 215 PRINT "IT IS LIKELY THAT THE METABOLIC ACIDOSIS WAS NOT SUFFICIENT"
 220 PRINT "TO TITRATE THE PATIENT OUT OF THE NORMAL RANGE"
 225 LET Z(18)=30\LET Z(16)=0
 230 LET I=2\PUT 8,10,I
 235 CHAIN "DIAG1"
 240 IF Z(19)>0 GO TO 60
 245 CHAIN "AB5000"
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "          A.  VOMITING"
1670 PRINT "          B.  EXCESSIVE SUCTION"
1675 PRINT "          C.  PYLORIC OBSTRUCTION"
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1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                                STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA31

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 110
  25 GO TO 460
  30 PRINT\PRINT "VERY MILD ACUTE RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "VERY MILD METABOLIC ACIDOSIS"\PRINT
  40 PRINT "MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS"
  45 PRINT\PRINT "CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF"
  50 PRINT "ACUTE RESPIRATORY ACIDOSIS"
  55 GO TO 450
  60 LET Z(18)=31\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(10)=1
  80 LET Z(18)=31\LET Z(16)=2
  85 GO TO 65
  90 LET Z(18)=31\LET Z(16)=3
  95 GO TO 65
 100 LET Z(18)=31\LET Z(16)=4
 105 GO TO 65
 110 GOSUB 1200
 115 IF Z(12)=1 GO TO 150
 120 GO TO 75
 125 PRINT\PRINT ">>VERY MILD METABOLIC ACIDOSIS<<"
 130 IF Z(1)=0 GO TO 145
 135 PRINT "THE ACIDIFYING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 140 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 145 GO TO 385
 150 GOSUB 1000
 155 IF Z(14)=1 GO TO 90
 160 GOSUB 1400
 165 IF Z(11)=1 GO TO 100
 170 GO TO 60
 175 PRINT\PRINT ">>VERY MILD ACUTE RESPIRATORY ALKALOSIS<<"
 180 IF Z(4)=0 GO TO 195
 185 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL RESPIRATOR IS AN"
 190 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 195 IF Z(5)=0 GO TO 210
 200 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED IS"
 205 PRINT "AN IMPORTANT ETIOLOGIC CONSIDERATION"
 210 GO TO 385
 215 PRINT\PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS<<"
 220 IF Z(4)<>0 GO TO 230
 225 IF Z(5)=0 GO TO 240
 230 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 235 PRINT "IS POSSIBLE IN THIS PATIENT"
 240 IF Z(1)=0 GO TO 255
 245 PRINT "THERAPY OF RESPIRATORY ALKALOSIS WITH ACIDIFYING AGENTS IS"
 250 PRINT "POSSIBLE IN THIS PATIENT"
 255 GO TO 385
 260 PRINT\PRINT ">>CHRONIC RESPIRATORY ALKALOSIS WITH DEVELOPMENT OF"
 265 PRINT "ACUTE RESPIRATORY ACIDOSIS<<"
 270 IF Z(4)=0 GO TO 295
 275 PRINT "THIS IMPLIES THAT THE PATIENT'S RESPIRATOR IS NOW"
 280 PRINT "INADEQUATELY FUNCTIONING OR STOPPED. OTHERWISE, IF THE RES-"
 285 PRINT "PIRATOR IS STILL FUNCTIONAL, THE LIKELY DIAGNOSIS IS VERY"
 290 PRINT "MILD ACUTE RESPIRATORY ALKALOSIS"
 295 IF Z(6)=0 GO TO 385
 300 PRINT "USE OF RESPIRATORY DEPRESSANTS IN RESPIRATORY ALKALOSIS"
 305 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (THE PCO2 IS"
 310 PRINT "INCREASED MORE RAPIDLY THAN THE KIDNEY CAN CONSERVE HCO3)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
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 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>5 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,175,125,215,260
1000 REM 1
1005 IF Z(1)=1 GO TO 1020
1010 IF K>4 GO TO 1020
1015 IF C2<6.0 GO TO 1030
1020 LET Z(14)=1
1025 GO TO 1175
1030 PRINT
1035 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1040 PRINT "PRODUCES METABOLIC ACIDOSIS?"
1045 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ACIDOSIS)"
1050 GO TO 1155
1055 PRINT
1060 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ACIDOSIS INCLUDE:"
1065 PRINT "A.  INCREASED PRODUCTION OF FIXED ACID"
1070 PRINT "    1.  DIABETES MELLITUS - STARVATION (KETOACIDOSIS)"
1075 PRINT "    2.  HYPOXIA - LACTIC ACIDOSIS"
1080 PRINT "    3.  GI LOSSES"
1085 PRINT "        A.  DIARRHEA"
1090 PRINT "        B.  FISTULA"
1095 PRINT "    4.  POISONS"
1100 PRINT "        A.  METHANOL"
1110 PRINT "        C.  SALICYLATES"
1120 PRINT "    1.  RENAL FAILURE - UREMIA"
1125 PRINT "    2.  SPECIFIC RENAL TUBULAR DEFECTS - RENAL TUBULAR"
1130 PRINT "                                         ACIDOSIS"
1135 PRINT "    3.  CARBONIC ANHYDRASE INHIBITORS - E.G.  ACETAZOLAMIDE"
1140 PRINT "                                           (DIAMOX)"
1145 PRINT "    4.  ADRENOCORTICAL INSUFFICIENCY"
1150 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES? (0=NO, 1=YES)"
1155 INPUT Z(14)
1160 IF Z(14)=2 GO TO 1055
1165 IF Z(14)=0 GO TO 1180
1170 IF Z(14)<>1 GO TO 1045
1175 LET Z(10)=1
1180 RETURN
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
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1265 PRINT "    1. MENINGITIS"
1270 PRINT "    2. ENCEPHALITIS"
1275 PRINT "    3. HEAD TRAUMA"
1280 PRINT "    4. CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1. PULMONARY FIBROSIS"
1295 PRINT "    2. STATUS ASTHMATICUS"
1300 PRINT "    3. PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
1410 LET Z(11)=1
1415 GO TO 1565
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1. EMPHYSEMA"
1465 PRINT "    2. SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3. BRONCHIECTASIS"
1475 PRINT "    4. FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5. PNEUMOTHORAX"
1485 PRINT "    6. HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7. MUCOVISCIDOSIS"
1495 PRINT "    8. CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1. CNS DISEASE"
1510 PRINT "    2. HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1. MYASTHENIA GRAVIS"
1525 PRINT "    2. AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3. POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
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AREA32

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 95
  25 GO TO 460
  30 PRINT\PRINT "VERY MILD METABOLIC ALKALOSIS"
  35 PRINT\PRINT "VERY MILD RESPIRATORY ACIDOSIS - ACUTE OR CHRONIC"
  40 PRINT
  45 PRINT "MIXED MILD METABOLIC ALKALOSIS AND MILD RESPIRATORY ACIDOSIS"
  50 GO TO 450
  55 LET Z(9)=1
  60 LET Z(18)=32\LET Z(16)=1
  65 LET I=2\PUT 8,10,I
  70 CHAIN "DIAG1"
  75 LET Z(18)=32\LET Z(16)=2
  80 GO TO 65
  85 LET Z(18)=32\LET Z(16)=3
  90 GO TO 65
  95 GOSUB 1400
 100 IF Z(11)=0 GO TO 55
 105 GOSUB 1600
 110 IF Z(13)=1 GO TO 85
 115 GO TO 75
 120 PRINT
 125 PRINT ">>MIXED MILD METABOLIC ALKALOSIS AND MILD RESPIRATORY"
 127 PRINT "ACIDOSIS<<"
 130 IF Z(2)=0 GO TO 145
 135 PRINT "THERAPY OF RESPIRATORY ACIDOSIS WIHT ALKALIZING AGENTS IS"
 140 PRINT "POSSIBLE IN THIS PATIENT"
 145 IF Z(6)=0 GO TO 160
 150 PRINT "USE OF RESPIRATORY DEPRESSANTS IN METABOLIC ALKALOSIS IS"
 155 PRINT "POSSIBLE IN THIS PATIENT"
 160 GO TO 385
 165 PRINT\PRINT ">>VERY MILD RESPIRATORY ACIDOSIS -'ACUTE OR CHRONIC<<"
 170 IF Z(6)=0 GO TO 40
 175 PRINT "THE RESPIRATORY DEPRESSANTS WHICH THIS PATIENT HAS RECEIVED"
 180 PRINT "ARE AN IMPORTANT ETIOLOGIC CONSIDERATION"
 185 GO TO 385
 190 PRINT\PRINT ">>VERY MILD METABOLIC ALKALOSIS<<"
 195 IF Z(2)=0 GO TO 385
 200 PRINT "THE ALKALINIZING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 205 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC",
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>4 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "ABS000"
 480 ON Z(19) GOTO 30,190,165,120
1400 REM 1
1405 IF Z(6)<>1 GO TO 1420
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1410 LET Z(11)=1
1415 GO TO 1585
1420 PRINT
1425 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1430 PRINT "PRODUCES HYPOVENTILATION AND RESPIRATORY ACIDOSIS"
1435 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ACIDOSIS)"
1440 GO TO 1565
1445 PRINT
1450 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ACIDOSIS INCLUDE:"
1455 PRINT "A.  PULMONARY DISEASE"
1460 PRINT "    1.  EMPHYSEMA"
1465 PRINT "    2.  SEVERE STATUS ASTHMATICUS"
1470 PRINT "    3.  BRONCHIECTASIS"
1475 PRINT "    4.  FULMINANT DIFFUSE PNEUMONIA"
1480 PRINT "    5.  PNEUMOTHORAX"
1485 PRINT "    6.  HYDROTHORAX (MASSIVE PLEURAL EFFUSION)"
1490 PRINT "    7.  MUCOVISCIDOSIS"
1495 PRINT "    8.  CHEST WALL INJURY"
1500 PRINT "B.  RESPIRATORY CENTER DEPRESSION"
1505 PRINT "    1.  CNS DISEASE"
1510 PRINT "    2.  HEAD TRAUMA"
1515 PRINT "C.  NEUROMUSCULAR DISEASE"
1520 PRINT "    1.  MYASTHENIA GRAVIS"
1525 PRINT "    2.  AMYOTROPHIC LATERAL SCLEROSIS"
1530 PRINT "    3.  POLIO"
1535 PRINT "D.  AIRWAY OBSTRUCTION"
1540 PRINT "E.  PRIMARY ALVEOLAR HYPOVENTILATION (INCLUDING PICKWICKIAN"
1545 PRINT "                                      SYNDROME)"
1550 PRINT "F.  SEVERE PULMONARY EDEMA"
1555 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1560 PRINT "HYPOVENTILATION? (0=NO, 1=YES)"
1565 INPUT Z(11)
1570 IF Z(11)=2 GO TO 1445
1575 IF Z(11)=0 GO TO 1590
1580 IF Z(11)<>1 GO TO 1435
1585 LET Z(8)=1
1590 RETURN
1600 REM 1
1605 IF Z(2)<>1 GO TO 1620
1610 LET Z(13)=1
1615 GO TO 1740
1620 PRINT
1625 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1630 PRINT "PRODUCES METABOLIC ALKALOSIS?"
1635 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF METABOLIC ALKALOSIS)"
1640 GO TO 1720
1645 PRINT
1650 PRINT "COMMON DISEASE ETIOLOGIES OF METABOLIC ALKALOSIS INCLUDE:"
1655 PRINT "A.  EXCESSIVE PRODUCTION OF BICARBONATE"
1660 PRINT "    1.  LOSS OF GASTRIC HCL"
1665 PRINT "        A.  VOMITING"
1670 PRINT "        B.  EXCESSIVE SUCTION"
1675 PRINT "        C.  PYLORIC OBSTRUCTION"
1680 PRINT "B.  EXCESSIVE RENAL RETENTION OF BICARBONATE"
1685 PRINT "    1.  POTASSIUM DEPLETION"
1690 PRINT "        A.  GI LOSSES"
1695 PRINT "    2.  ADRENOCORTICAL EXCESS"
1700 PRINT "        A.  HYPERALDOSTERONISM"
1705 PRINT "        B.  CUSHINGS SYNDROME (ENDOGENEOUS OR FROM INTENSIVE"
1710 PRINT "                               STEROID RX)"
1715 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES (0=NO,1=YES)?"
1720 INPUT Z(13)
1725 IF Z(13)=2 GO TO 1645
1730 IF Z(13)=0 GO TO 1745
1735 IF Z(13)<>1 GO TO 1635
1740 LET Z(9)=1.0
1745 RETURN
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AREA33

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2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 90
  25 GO TO 460
  30 PRINT\PRINT "MIXED METABOLIC ACIDOSIS WITH RESPIRATORY ALKALOSIS"
  35 PRINT\PRINT "METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC ACIDOSIS,"
  40 PRINT "WITH DELAY IN RESPIRATORY ADJUSTMENTS"
  45 GO TO 450
  50 LET Z(10)=1
  55 LET Z(18)=33\LET Z(16)=1
  60 LET I=2\PUT 8,10,I
  65 CHAIN "DIAG1"
  70 LET Z(9)=1
  75 LET Z(10)=1
  80 LET Z(18)=33\LET Z(16)=2
  85 GO TO 60
  90 GOSUB 1200
  95 IF Z(12)=1 GO TO 50
 100 GO TO 70
 105 PRINT\PRINT ">>METABOLIC ALKALOSIS SUPERIMPOSED ON METABOLIC"
 110 PRINT "ACIDOSIS, WITH DELAY IN RESPIRATORY ADJUSTMENTS<<"
 115 PRINT "IN METABOLIC ACIDOSIS, ALKALINIZATION BY ADMINISTRATION OF"
 120 PRINT "ALKALI OR LOSS OF GASTRIC HCL CAN BE ACCOMPANIED BY A"
 125 PRINT "PHYSIOLOGIC DELAY IN RESPIRATORY ADJUSTMENT, SO THAT AN"
 130 PRINT "INCREASE IN SERUM HCO3 OCCURS WITHOUT A PROPORTIONAL"
 133 PRINT "INCREASE IN PCO2"
 135 IF Z(2)=0 GO TO 150
 140 PRINT "THE FACT THAT THIS PATIENT HAS RECEIVED ALKALI IS CONSISTENT"
 145 PRINT "WITH THIS EXPLANATION OF THE LAB VALUES"
 150 GO TO 385
 155 PRINT\PRINT ">>MIXED METABOLIC ACIDOSIS AND RESPIRATORY ALKALOSIS<<"
 160 IF Z(4)<>0 GO TO 170
 165 IF Z(5)=0 GO TO 185
 170 PRINT "USE OF RESPIRATORY STIMULANTS AND/OR A MECHANICAL RESPIRATOR"
 175 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 180 PRINT "HCO3, THE PCO2 IS LOWER THAN SEEN IN SIMPLE METABOLIC "
 183 PRINT "ACIDOSIS)"
 185 IF Z(1)=0 GO TO 385
 190 PRINT "THERAPY OF RESPIATORY ALKALOSIS WITH ACIDIFYING AGENTS"
 195 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN"
 200 PRINT "PCO2, THE HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY"
 202 PRINT "ALKALOSIS)"
 385 IF D2<=14 GO TO 400
 390 PRINT\PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC"
 395 PRINT "ACIDOSIS IS A COMPONENT OF THE DISTURBANCE"
 400 IF C1>=100 GO TO 425
 405 IF P2>=4 GO TO 425
 410 IF Z(3)<>1 GO TO 425
 415 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT A DEPLETION OF"
 420 PRINT "POTASSIUM AND CHLORIDE TO GIVE METABOLIC ALKALOSIS"
 425 IF C1>=100 GO TO 450
 430 IF P2<4 GO TO 450
 435 IF Z(3)<>1 GO TO 450
 440 PRINT "THERAPY WITH DIURETICS MAY HAVE BROUGHT ABOUT METABOLIC"
 445 PRINT "ALKALOSIS THROUGH CHLORIDE DEPLETION"
 450 LET Z(18)=0\LET Z(16)=0
 453 LET I=2\PUT 8,10,I
 455 CHAIN "DIAG1"
 460 IF Z(19)>3 GO TO 450
 470 IF Z(19)>0 GO TO 480
 475 CHAIN "AB5000"
 480 ON Z(19) GOTO 30,155,105
1200 REM 1
```

```
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO, 1=YES, 2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
1280 PRINT "    4.  CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1.  PULMONARY FIBROSIS"
1295 PRINT "    2.  STATUS ASTHMATICUS"
1300 PRINT "    3.  PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO, 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
```

AREA34

```
2000 END
   5 RECORD N,C1,D2,P2,G,K,C2
  10 RECORD Z(21)
  15 LET I=1\GET 8,5,I\GET 8,10,I
  20 IF Z(20)=0 GO TO 30
  25 GO TO 260
  30 PRINT\PRINT "SEVERE METABOLIC ACIDOSIS"\PRINT
  35 PRINT "METABOLIC ACIDOSIS SUPERIMPOSED ON RESPIRATORY ALKALOSIS"
  40 GO TO 245
  45 LET Z(10)=1
  50 LET Z(18)=34\LET Z(16)=1
  55 LET I=2\PUT 8,10,I
  60 CHAIN "DIAG1"
  65 LET Z(10)=1
  70 LET Z(18)=34\LET Z(16)=2
  75 GO TO 55
  80 GOSUB 1200
  85 IF Z(12)=1 GO TO 65
  90 GO TO 45
  95 PRINT\PRINT ">>SEVERE METABOLIC ACIDOSIS<<"
 100 IF Z(1)=0 GO TO 115
 105 PRINT "THE ACIDIFYING AGENT WHICH THIS PATIENT HAS RECEIVED IS AN"
 110 PRINT "IMPORTANT ETIOLOGIC CONSIDERATION"
 115 GO TO 230
 120 PRINT
 125 PRINT ">>METABOLIC ACIDOSIS SUPERIMPOSED ON RESPIRATORY ALKALOSIS<<"
 130 PRINT "THE PATIENT FALLS WITHIN THE 95 CONFIDENCE BAND OF METABOLIC"
 135 PRINT "ACIDOSIS.  HOWEVER,RESPIRATORY ALKALOSIS MAY ALSO BE CONTRI-"
 140 PRINT "BUTORY TO THE ACID-BASE DISORDER"
 145 IF Z(4)=0 GO TO 160
 150 PRINT "HYPERVENTILATION CAUSED BY A MECHANICAL REPIRATOR IS AN IM-"
 155 PRINT "PORTANT ETIOLOGIC CONSIDERATION IN THIS PATIENT"
 160 IF Z(5)=0 GO TO 175
 165 PRINT "THE RESPIRATORY STIMULANT WHICH THIS PATIENT HAS RECEIVED"
 170 PRINT "IS AN IMPORTANT ETIOLOGIC CONSIDERATION"
 175 IF Z(1)=0 GO TO 230
 180 PRINT "THERAPY OF RESPIRATORY ALKALOSIS WITH ACIDIFYING AGENTS"
 185 PRINT "COULD EXPLAIN THE VALUES IN THIS PATIENT (FOR THE GIVEN PCO2,"
 190 PRINT "THE HCO3 IS LOWER THAN SEEN IN SIMPLE RESPIRATORY ALKALOSIS)"
 230 IF D2<=14 GO TO 245
 235 PRINT "SINCE THE PATIENT HAS AN ELEVATED DELTA, METABOLIC ACIDOSIS"
 240 PRINT "IS A COMPONENT OF THE DISTURBANCE"
 245 LET Z(16)=0\LET Z(18)=0
 250 LET I=2\PUT 8,10,I
 255 CHAIN "DIAG1"
 260 IF Z(19)>3 GO TO 245
 265 IF Z(19)>0 GO TO 275
 270 CHAIN "AB5000"
 275 ON Z(19) GOTO 30,115,185
1200 REM 1
1205 IF Z(4)=1 GO TO 1215
1210 IF Z(5)<>1 GO TO 1225
1215 LET Z(12)=1
1220 GO TO 1355
1225 PRINT
1230 PRINT "DOES THE PATIENT CLINICALLY MANIFEST A CONDITION WHICH"
1235 PRINT "PRODUCES HYPERVENTILATION AND RESPIRATORY ALKALOSIS?"
1240 PRINT "(0=NO,  1=YES,  2=LIST ETIOLOGIES OF RESPIRATORY ALKALOSIS)"
1245 GO TO 1335
1250 PRINT
1255 PRINT "COMMON DISEASE ETIOLOGIES OF RESPIRATORY ALKALOSIS INCLUDE:"
1260 PRINT "A.  PRIMARY CNS DISEASE"
1265 PRINT "    1.  MENINGITIS"
1270 PRINT "    2.  ENCEPHALITIS"
1275 PRINT "    3.  HEAD TRAUMA"
```

```
1280 PRINT "    4. CVA"
1285 PRINT "B.  PULMONARY DISEASES PRODUCING HYPOXEMIA"
1290 PRINT "    1. PULMONARY FIBROSIS"
1295 PRINT "    2. STATUS ASTHMATICUS"
1300 PRINT "    3. PNEUMONIA"
1305 PRINT "C.  PSYCHOGENIC HYPERVENTILATION (HYPERVENTILATION SYNDROME)"
1310 PRINT "D.  HIGH FEVER"
1315 PRINT "E.  GRAM NEGATIVE SEPTICEMIA"
1320 PRINT "F.  HEPATIC COMA"
1325 PRINT "DOES THE PATIENT FIT ANY OF THESE CATEGORIES WITH CLINICAL"
1330 PRINT "HYPERVENTILATION? (0=NO. 1=YES)"
1335 INPUT Z(12)
1340 IF Z(12)=2 GO TO 1250
1345 IF Z(12)=0 GO TO 1360
1350 IF Z(12)<>1 GO TO 1240
1355 LET Z(7)=1
1360 RETURN
```

AB5000

```
2000 END
  10 RECORD P,P1,H,H1,T,D1,C$(11)
  15 RECORD N,C1,D2,P2,G,K,C2
  20 LET I=0\GET 8,10,I\GET 8,15,I\PRINT
  21 PRINT "DID YOU USE THIS PROGRAM FOR DEMONSTRATION ONLY? (Y OR N)"
  22 INPUT F$
  23 IF F$<>"Y" GO TO 25
  24 UNSAVE 8\GO TO 135
  25 IF F$<>"N" GO TO 21
  26 PRINT\PRINT "ENTER THE TIME, USING THE FOLLOWING FORMAT:"
  30 PRINT "HOUR:MINUTES A.M. OR P.M. (E.G., 11:30 P.M.)"
  35 LINPUT C$(1),C$(2)
  40 PRINT\PRINT "ENTER THE PATIENT'S NAME, USING THE FOLLOWING FORMAT:"
  45 PRINT "LAST NAME, FIRST NAME, MIDDLE INITIAL (E.G. DOE JOHN M.)"
  50 PRINT "IF YOU ARE USING THE PROGRAM FOR SELF-INSTRUCTIONAL PURPOSES"
  55 PRINT "ONLY, JUST PRESS RETURN."
  60 LINPUT C$(3),C$(4),C$(5),C$(6),C$(7),C$(8)
  65 UNSAVE 8
  70 RECORD J
  75 RECORD V(12),B$(10)
  80 V(0)=D1\V(1)=P\V(2)=P1\V(3)=H\V(4)=H1\V(5)=T
  85 V(6)=N\V(7)=C1\V(8)=D2\V(9)=P2\V(10)=G\V(11)=K\V(12)=C2
  90 FOR I=0 TO 9
  95 LET B$(I)=C$(I)
 100 NEXT I
 105 OPEN 9,"PAFILE"
 110 LET I=0\GET 9,70,I
 115 IF J=0 GO TO 117
 116 GO TO 120
 117 LET J=J+1
 120 PUT 9,75,J
 125 LET I=0
 130 PUT 9,70,I
 135 PRINT\PRINT\PRINT\PRINT\PRINT
 140 PRINT "*************************************************"
 145 PRINT\PRINT\PRINT\PRINT\PRINT
 150 PRINT "DO YOU WISH TO CONSIDER A NEW PATIENT? (Y OR N)"
 155 INPUT A1$
 160 IF A1$<>"Y" GO TO 180
 165 PRINT\PRINT\PRINT\PRINT\PRINT
 170 PRINT "*************************************************"
 175 CHAIN "AB1"
 180 IF A1$<>"N" GO TO 150
 185 PRINT\PRINT\PRINT "GOODBYE AND THANK YOU. HAVE A NICE DAY."
 190 CLOSE 9
```

APPENDIX II

PATIENT FILE RETRIEVAL PROGRAMS

ABRTV

```
195 END
 10 REM THIS PROGRAM PRINTS THE RECORDS IN THE PATIENT FILE
 12 PRINT\PRINT\PRINT
 13 PRINT "******** PATIENT FILE RECORDS - ACID-BASE PROGRAM ********"
 15 OPEN 9, "PAFILE"
 20 RECORD J
 25 RECORD V(12),B$(10)
 30 LET I=0\GET 9,20,I
 35 FOR L=1 TO J-1
 40 GET 9,25,L
 43 LET L=L-1
 45 PRINT\PRINT\PRINT
 50 PRINT "##################################################"
 55 PRINT\PRINT\PRINT
 60 PRINT "RECORD # : ";L
 65 PRINT "DATE : ";V(0)
 70 PRINT "USER TYPE : ";B$(0)
 75 PRINT "TIME : "; B$(1);B$(2)
 80 PRINT "PATIENT'S NAME : ";B$(3);B$(4);B$(5);B$(6);B$(7)
 85 PRINT "PATIENT'S STATUS/DISEASE SYSTEM : "B$(8);B$(9)
 90 PRINT "PH=";V(1);" PCO2=";V(2);" HCO3=";V(3);" H+=";V(4)
 95 PRINT "TCO2=";V(5);" NA=";V(6);" CL=";V(7);" DELTA=";V(8)
100 PRINT "POT=";V(9);" GLU=";V(10);" KET=";V(11);" CREAT=";V(12)
105 NEXT L
107 PRINT\PRINT\PRINT
110 PRINT "TO DATE, THERE SHOULD BE";J-1;"RECORDS IN THE PATIENT FILE"
115 CLOSE 9
```

ABNAME

```
230 END
 10 REM THIS PROGRAM PRINTS RECORDS FOR A PARTICULAR PATIENT.  PATIENT'S
 15 REM NAME IS INPUT BY USER.
 20 OPEN 9,"PAFILE"
 25 RECORD J
 30 RECORD V(12),B$(10)
 35 LET I=0\GET 9,25,I
 40 PRINT\PRINT\PRINT
 45 PRINT "********** PATIENT RECORDS - BY NAME **********"
 50 PRINT\PRINT\PRINT
 55 PRINT "PLEASE TYPE NAME OF PATIENT FOR WHICH YOU DESIRE RECORDS."
 60 PRINT "FORMAT IS LAST NAME FIRST NAME MIDDLE INITIAL (FOR EXAMPLE,"
 65 PRINT "DOE JOHN G. )"
 70 DIM Q$(7)
 75 LINPUT Q$(3),Q$(4),Q$(5),Q$(6),Q$(7)
 77 LET K=0
 80 FOR L=1 TO J-1
 85 GET 9,30,L
 90 LET L=L-1
 95 IF B$(3)<>Q$(3) GO TO 175
100 IF B$(4)<>Q$(4) GO TO 175
105 IF B$(5)<>Q$(5) GO TO 175
110 IF B$(6)<>Q$(6) GO TO 175
115 IF B$(7)<>Q$(7) GO TO 175
120 PRINT\PRINT\PRINT
125 PRINT "RECORD # : ";L
130 PRINT "DATE : ";V(0)
135 PRINT "USER TYPE : ";B$(0)
140 PRINT "TIME : ";B$(1);B$(2)
145 PRINT "PATIENT'S NAME : ";B$(3);B$(4);B$(5);B$(6);B$(7)
150 PRINT "PATIENT'S STATUS/DISEASE SYSTEM : ";B$(8);B$(9)
155 PRINT "PH=";V(1);" PCO2=";V(2);" HCO3=";V(3);" H+=";V(4)
160 PRINT "TCO2=";V(5);" NA=";V(6);" CL=";V(7);" DELTA=";V(8)
165 PRINT "POT=";V(9);" GLU=";V(10);" KET=";V(11);" CREAT=";V(12)
170 GO TO 180
175 LET K=K+1
180 NEXT L
185 IF K<>J-1 GO TO 205
190 PRINT\PRINT\PRINT
195 PRINT "THERE ARE NO RECORDS FOR THE FOLLOWING PATIENT IN THE"
200 PRINT "ACID-BASE PATIENT FILE : ";Q$(3);Q$(4);Q$(5);Q$(6);Q$(7)
205 PRINT\PRINT\PRINT
210 PRINT "DO YOU WISH TO CONSIDER ANOTHER PATIENT ? (Y OR N)"
215 INPUT A$
220 IF A$="Y" GO TO 50
225 IF A$<>"N" GO TO 210
230 CLOSE 9
```

ABFREQ

```
155 END
 10 REM THIS PROGRAM COMPUTES FREQUENCIES OF USER TYPES-CLINICIANS, HOUSE
 15 REM STAFF, AND STUDENTS
 20 OPEN 9,"PAFILE"
 25 RECORD J
 30 RECORD V(12),B$(10)
 35 LET I=0\GET 9,25,I
 40 LET C1=0\LET H1=0\LET S1=0\LET X=0
 45 FOR L=1 TO J-1
 50 GET 9,30,L
 53 LET L=L-1
 55 IF B$(0)<>"C" GO TO 70
 60 LET C1=C1+1
 65 GO TO 105
 70 IF B$(0)<>"H" GO TO 85
 75 LET H1=H1+1
 80 GO TO 105
 85 IF B$(0)<>"S" GO TO 100
 90 LET S1=S1+1
 95 GO TO 105
100 LET X=X+1
105 NEXT L
110 LET C2=(C1/(J-1))*100
115 LET H2=(H1/(J-1))*100
120 LET S2=(S1/(J-1))*100
125 LET X1=(X/(J-1))*100
130 PRINT\PRINT\PRINT
135 PRINT "********** USER FREQUENCIES - ACID-BASE PROGRAM **********"
145 PRINT\PRINT
150 PRINT "THERE ARE";J-1;"RECORDS IN THE PATIENT FILE AT THIS TIME."
155 PRINT "OF THESE,"
160 PRINT C1;"HAVE CLINICIAN USERS"
165 PRINT H1;"HAVE HOUSE STAFF USERS"
170 PRINT S1;"HAVE STUDENT USERS"
175 IF X=0 GO TO 190\PRINT
180 PRINT "THE REMAINDER,";X;", HAVE AN ERROR IN INPUT, SO THAT USER"
185 PRINT "TYPE IS NOT KNOWN FOR THEM."
190 PRINT\PRINT
195 PRINT "FREQUENCIES:"
200 PRINT C2;"% ARE CLINICIAN USERS"
205 PRINT H2;"% ARE HOUSE STAFF USERS"
210 PRINT S2;"% ARE STUDENT USERS"
215 IF X1=0 GO TO 225
220 PRINT X1;"% HAVE INPUT ERROR"
225 CLOSE 9
```

ABDATE

```
120 END
 10 REM THIS PROGRAM COUNTS THE NUMBER OF PATIENTS REFERRED TO THE ACID-
 15 REM BASE PROGRAM DURING ANY MONTH.  THE MONTH NUMBER IS TYPED IN BY
 20 REM THE USER.
 25 OPEN 9,"PAFILE"
 30 RECORD J
 35 RECORD V(12),B$(10)
 40 LET I=0\GET 9,30,I
 42 PRINT\PRINT\PRINT
 43 PRINT "********** MONTHLY TOTALS - ACID-BASE PROGRAM **********"
 45 PRINT\PRINT\PRINT
 50 PRINT "FOR WHICH MONTH (1-12) DO YOU DESIRE A CUMULATIVE FIGURE?"
 55 INPUT M
 60 LET N=M*10000\LET M1=0.0
 65 FOR L=1 TO J-1
 70 GET 9,35,L
 75 LET L=L-1
 80 LET V(0)=V(0)-N
 85 IF V(0)<174 GO TO 100
 90 IF V(0)>3174 GO TO 100
 95 LET M1=M1+1
100 NEXT L
105 LET M2=(M1/(J-1))*100
110 PRINT\PRINT\PRINT
115 PRINT "THERE ARE";M1;"RECORDS SUBMITTED DURING MONTH #";M;", 1974."
120 PRINT "THIS ACCOUNTS FOR";M2;"% OF THE";J-1;"RECORDS IN THE FILE."
125 PRINT\PRINT\PRINT
130 PRINT "DO YOU WISH TO CONSIDER ANOTHER MONTH? (Y OR N)"
135 INPUT A$
140 IF A$="Y" GO TO 45
145 IF A$<>"N" GO TO 130
150 CLOSE 9
```

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