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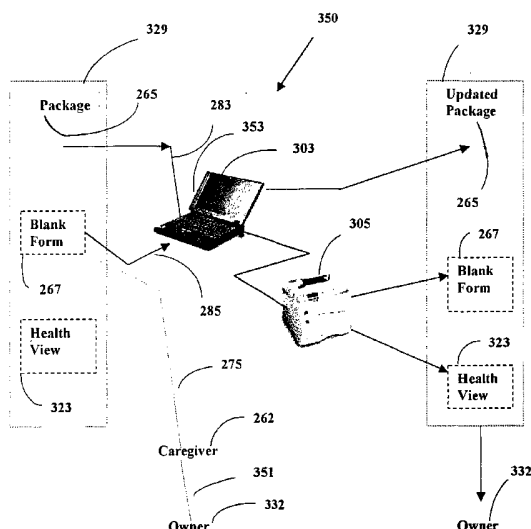
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(54) Title: PORTABLE PERSONAL HEALTH INFORMATION PACKAGE



(57) Abstract: A health information package that a person carries with him at all times with all his health data, and enables him to grant caregivers instant access to all or any part of his health data, whenever the information is needed, at all points of care anywhere in the world, in computer readable and eye readable forms. A database management software program is contained in a portable computer readable storage device of the package. A blank data recording form and an updated health overview, organized by body organ systems, problems, types and sub-types of data can be printed when desired. With the package, any standard personal computer can be used to record, update, link, integrate and display health data from birth to death. The owner has absolute control on the availability, completeness, accuracy, integrity, privacy, confidentiality, security, backups and access to his health data that are stored on the package. A computer-readable storage medium, such as a floppy disk may be used for the storage.



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Portable Personal Health Information Package

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BACKGROUND OF THE INVENTION

This application claims the benefit of U.S. Provisional Application No. 60/331,098, filed November 8, 2001.

1. Field of the Invention

The present invention relates, generally, to the field of collection, storage, transfer and display of health data, and more specifically, to the field of collection, storage, transfer and display of health data on portable devices.

2. The Problems

Immediate availability of accurate, reliable past medical history of a patient is important in most health care encounters. Caregivers need data from the past health history of a patient, in order to arrive at the correct diagnosis, institute the appropriate therapy and ensure the continuity of care. In emergency medical situations, incomplete information can lead to disastrous clinical results. Even in routine encounters immediate availability of up-to-date, accurate, and comprehensive health data at the point of care is often extremely important. A physician spends in an average clinic visit about 30% of his time on data collection. Usually, clinicians try to get the relevant data from the past health history of a person, mainly from one or more of the following sources: the patient himself, conventional paper based medical records, a variety of documents (letters, discharge summaries,

X-rays, ECGs, laboratory reports, consultants' reports, etc.), computer-stored medical records (on personal computers, traditional mainframe computers, computer based medical record systems, and web-based medical records) and directly from other health care providers. Unfortunately, in most cases there are problems, that prevent clinicians to get all the relevant data from the past health history of patients, at the point of care.

The main problem is that, the personal health records of a person are usually distributed amongst multiple health care providers. A patient may obtain the services of a number of providers when being treated for a single particular illness or injury. Over the course of a lifetime, a patient may receive the services of a large number of providers. Therefore, parts of the health data of one patient may be stored in paper based and/or computer based medical records of his primary care physician, one or more consultants, inpatient departments and outpatient clinics of hospitals, emergency departments, sports medicine clinics, public health clinics, dentists' and optometrists' charts, nursing homes and other institutions such as the armed forces, occupational health programs of employers, schools, colleges, universities etc. In addition, modern transportation for business or travel increases the possibility, that medical service or continuation of care will be needed and documented in medical records in one or more locations anywhere in the world. Therefore, linking, integrating and presenting all the data from the past medical history of a patient, that are stored on multiple paper based records and multiple computer based records, so that the caregiver at the point of care, will have an integrated view of all the data is usually impossible. At best, each one of these sources may be able to supply, only the part of the health information that is recorded and stored in its archives. Unfortunately, even the limited data that caregivers can get from each one of these sources are often incomplete and inaccurate.

Another universal problem that prevents clinicians to get all the relevant data from the past medical history of patients, at the point of care from all health records of a patient, is the fact that very often, one person has different names and/or identification numbers in different paper based and/or computer based medical records. Many countries do not have unique patient identifier systems. Therefore, in these countries, when a person is admitted to a hospital, he receives a patient ID that is used only within that hospital. If a patient is admitted to several hospitals, he will have several patient IDs. In the United States a Social Security Number is not always assigned at the time of birth and therefore, important data collected on newborn babies, are often stored in records that have different ID numbers than the permanent Social Security Numbers. When an unconscious person is admitted to an emergency department without his Social Security Number, data related to that event are recorded and stored in a medical record that is assigned a temporary Social Security Number, that is obviously different from his permanent Social Security Number. If the temporary and permanent Social Security Numbers are not merged in a timely fashion, it becomes very difficult or impossible to access, link and integrate the important health data that are stored on temporary medical records, with data that are documented and stored on permanent records. Also, the same patient may be registered under different names and ID numbers because of typing errors, marriage, divorce or use of pseudonyms. There are many documented cases in which one person has more than one permanent social security number (there are about 280 million Americans and about 360 million active social security numbers). There are also identified cases in which two people have the same Social Security Number. Thus, many people have more than one identifier. Master Patient Indexes cannot solve this problem. They are useful as internal aggregators in health institutions, but not as a way to identify and get

access to patient records externally. Therefore, at least part of the personal health data, that are recorded in some of the health records of a person cannot be linked, integrated and used, when these data are needed at the point of care.

Usually, the patients themselves cannot supply all the data that caregivers need at the point of care. Some patients simply do not know the details of their past medical history, because their physicians do not tell them important facts. Other, patients cannot supply the information, because they did not understand what was explained to them. Many caregivers prevent patients to view their own personal records, and patients rarely receive detailed information in written form about their treatment in hospital or specialist clinic. Thus, they must rely on their own understanding of what has happened to them. Therefore, often a significant disparity occurs between perceptions of physicians and patients regarding hospital discharge instructions (Calkins, 1997). In a study done at the Mayo Clinic, patients and physicians were asked to report on major health problems and other problems dealt with during an ambulatory-care encounter. Patients failed to report 68 percent of problems that their physicians listed as being addressed during a specific encounter (Scheitel, 1996). In addition, 54 percent of the "most important health problems" that physicians discussed during the encounter were not even listed among those, that patients recounted after the encounter. In emergency situations, the patient may be unconscious and not be able to provide information. Even if conscious, a patient may be incapable of providing complete, accurate, exact and comprehensive information, when he is tired or painful and can not concentrate. There are many cases in which patients supply unintentionally misleading information. For instance, nine out of ten patients who honestly believe they are seriously allergic to penicillin are mistaken (Saxon, 1987).

The memory of patients is not always reliable. A number of physiological and pathological conditions may be responsible for temporary or permanent loss of memory. Studies have shown, that a patient's ability to recall information presented by physicians in outpatient clinics, ranges from 50 percent at 5 minutes to 56 percent at 1-2 weeks. When patients are excited, tense or frightened in the examining room, they tend to forget to tell the physician the most important facts about their medical problems. In a study of patients' recall of medication information, 60 percent of patients did not know the names of their drugs and 20 percent did not know the purpose of their medications (Ley, 1982). In elderly patients distinct memory impairment is common (Welsh-Bohmer, 1999). Even young and healthy persons may be incapable of providing complete, accurate, exact and comprehensive information related to their past medical history. The recall of injury events, which resulted in seeking treatment from a doctor, nurse or dentist, or going to the hospital for treatment in the previous two years, was studied for a group of 631 thirteen year olds (Langley, 1989). This study showed that 39% of all visits to the accident and emergency department were not recalled. A poisoning study showed that one fifth of the entire previous year's poisoning experience was reported for a one-month period immediately preceding the interview (Wherle, 1960). There are many other studies that document human memory failures (Sharp, 1990). Thus it is clear that the data that patients can supply to caregivers about their past medical history at the point of care, are very often incomplete, inaccurate, or even false and misleading, and can lead to serious errors in diagnosis and therapy.

The paper based medical record, is often not one entity, even within one institution, because data related to accident and emergency visits are very often stored separately, and many other departments and services maintain separate and/or more detailed patient data files that are not part of the central

record. Some studies indicate that when scheduled and unscheduled appointments are considered together, the entire medical record is not available 30%-40% of the time. The high rate of unavailability of paper based medical records is attributed mainly to the following causes: patients being seen in two or more clinics on the same day, charts not being forwarded, physicians keeping records in their offices or removing them from their offices, and records being misfiled in the file room. Another reason for unavailability of paper based medical records is, that paper based medical records are usually stored for up to 25 years, depending on state laws. Then, because of limited storage space in their archives, some institutions destroy the old records, X-ray films and other documents, ignoring the fact that the data may be needed many years later for care of elderly patients.

Even in cases, in which a paper based medical record is available at the point of care, extraction of data from the record is usually difficult. The contents of a conventional paper based medical record is often a mixture of admission notes, follow-up reports, laboratory test results, ECG strips, administrative documents, consultants' notes and recommendations, therapy plans, medication records, informed consent forms, flow charts etc. Much of the information in the record is obsolete, redundant and duplicated. Significant parts of the data are handwritten and often illegible. In one study, the main finding was that 50 percent of handwritten emergency department charts could not be properly evaluated due to poor handwriting. Notes pertaining to a single problem may be pages apart, depending on the time intervals between visits. Therefore, dozens of pages must be thumbed through in a paper-based record, in order to find the desired information (Brancati, 1992; Brown, 1988). A study that was conducted in a university hospital clinic, to determine the success with which physicians find patient information using traditional hospital paper based medical records as a source of data,

showed that even though the medical records were present 95% of the time in their study, physicians could not find all the information they were looking for, in up to 81% of the visits (Tang, 1994). Therefore, it is not surprising that house officers frequently do not try to obtain previous paper based medical records (Fred, 1994).

Even in cases, in which a paper based medical record is available at the point of care and is easily legible, extraction of data from the record is usually difficult. Notes may be too ambiguous to allow proper interpretation, because data are recorded in narrative style that contains complex expressions. In these narrative expressions that are recorded in natural language, often (24%) two or more data elements are linked together. It is also common (39%) that in natural language one data element may be embedded in another. Studies have shown that these expressions increase the cognitive load and the reader may need more time and effort to extract from these expressions the data elements (Patel, 2000). In a sentence in which each word can have different meanings, the whole sentence may have more than 10 interpretations (van Bemmelen, 1997). In the time constraints of most points of care, this may lead to serious errors in interpretation of the meaning of complex notes, which in turn, may lead to errors in medical decisions and actions. Even when each sentence or paragraph is accurately understood, the scattered notes make it difficult to obtain an overview of the complete medical history of a patient, especially in cases of patients that are treated for more than one complaint or disease.

Although paper based medical records are technically transferable, it is a generally accepted principle that the patient record is maintained and owned by the health care institution or practitioner providing care. This principle, which is established by statutes and regulations in many states, grants the provider control over the physical document (CPRI, 1994). Therefore, the paper based medical records of a

patient that is treated in one institution, are usually not transferred for use by medical personnel in another institution, especially when the patient needs medical care in another city, country or continent. Theoretically, copies of medical documents carried by the patient, could supply at the point of care, all the data from the past medical history of a patient. Already in 1973 it was suggested, "that legislation be passed to require that a complete and unexpurgated copy of all the medical records, both inpatient and outpatient, be issued routinely and automatically to patients as soon as the services provided are recorded" (Shenkin, 1973). This suggestion is not practical, because it is very difficult to carry paper copies of complete medical records and also, because the fact that there are caregivers that prevent patients to view and copy their own personal records. Thus, most patients do not carry with them at all times, paper copies of all their medical records, discharge summaries, roentgenograms, electrocardiograms, letters, reports of laboratory tests and procedures.

Timely access to patient data that are stored on computers is very often prevented from caregivers that need fast access to the data at the point of care, mainly by one or more of the following reasons: absence of the necessary hardware or software at the point of care, lack of interoperability of hardware or software between multiple vendor systems from various sources that use different formats and standards (which also change over time), lack of access to a reliable communication network, data protection policies and lack of adequate skills required to use the system. Thus, for instance, a physician that is called to examine and treat a person in an emergency situation in the middle of the street, a paramedic in the field or a nurse visiting an elderly patient at his home, may not have immediate access to the relevant data, because of lack of access to the necessary hardware, even

if they are authorized to access the data of the relevant remote computer.

Many caregivers cannot use computer based medical record systems efficiently, mainly because these systems are often difficult to learn and difficult to use (Sittig, 1999). A typical screen in most electronic medical record systems contains dozens of icons and pull down menus, which the user is supposed to know well, in order to use them for many tasks, such as entry and retrieval of administrative, clinical, scientific, financial and statistical data, and also scheduling, typing letters, prescriptions and reports, sending and receiving e-mails, etc. Although vendors describe these programs as user-friendly, they are usually complex. Many studies have shown that computer based interactions take longer than paper based interactions (Krall, 1995) and that users sometimes avoid documentation of details, if they feel that it will take too much of their time and effort.

In most electronic medical records data are clustered in groups that are not oriented to clinical scenarios. In order to enter or retrieve data that they need, related to one problem, clinicians, need usually to use many screens. They have to know which one of the many screens show laboratory test results and which show reports of X-ray examination, which screens show diagnoses and which show treatments or procedures, etc. In order to get all the data that they need to review and deal with one problem, they must usually "jump" from one screen to another. Thus, most computer based medical records do not enable every user, at the point of care, to see in one view all the data that he needs, before he makes a decision. This may lead to delays and errors in medical decisions and actions.

Even in cases, in which those barriers do not exist, it may be difficult to get accurate data, mainly because of the methods of data entry in computer based health records. In most of them data are recorded and stored by selecting terms from one or more lists of a variety of classifications,

lexicons, data dictionaries, nomenclatures, and structured coded controlled vocabularies that are presented on the screen. Using coded data entry does not allow caregivers to express the complaints of their patients in the patients' own words. Using controlled terminologies from a list to enter data, do not allow caregivers to record exactly what they themselves want to express in their natural professional language. Also, very often clinicians cannot record important observations using coded data entry, because there are no codes to do it (Chute, 1998). Thus, data that are recorded using classifications, nomenclatures, and structured coded controlled vocabularies, are often not accurate and incomplete. Data entry by selecting an option from a list may also increase the risk of entering errors that are difficult or almost impossible to detect. For instance, it is very easy to click option 1 in a list (that stands for "yes") instead of option 2 (that stands for "no") or to click option 3 in a menu (that stands for "electrophoresis") instead of option 4 (that stands for "electrolytes"), which may have serious consequences when these erroneous data are used by clinicians, at the point of care, to make a diagnoses or decide on diagnostic procedures or treatments.

Use of predefined date-fields to record time in computer based systems, may result in confusion. For example, a calendar date is expressed in the United States in the MM/DD/YY format. In Europe the DD/MM/YY format is used. In other countries the YY/MM/DD, the DD/MM/YYYY or a variety of other formats are used to represent dates. Thus, 07/01/21 may mean "July 01, 1921", "January 07, 1921" and even "January 21, 1907", depending on the country and the format used. Use of predefined date-fields, does not allow accurate documentation of temporal uncertainty and multiple temporal granularities, and may result in entering inaccurate or even false information. For instance, when a patient does not know or does not remember the exact day and month of an event, clinicians try to document the event using the MM/DD/YY as 00/00/YY, or

even better as ??/??/YY. Unfortunately, very often the software does not allow to enter such "invalid" dates, ignoring the fact that in collecting data, we are often faced with answers from a patient, expressed in natural language, which cannot fit into any predefined date field. Therefore, the users are driven to enter a false day and month, to satisfy the system. Entering such inaccurate or false data may confuse a physician about the time sequence of events, from the past medical history of a patient, and may have serious consequences, when these data are used by clinicians, to make diagnoses or decide on diagnostic procedures or treatments.

The protection of privacy, confidentiality and access control to patient information in paper based and computer based medical records are often inadequate. Usually, a patient cannot maintain anonymity. In most cases, at the time of registration, a patient must provide personal identifying information such as name, date of birth, address, telephone number, marital status, occupation, ID number etc. Very often, patients have limited control or no control on the security, confidentiality and access to these personal health data, which are stored in patient records. Authorized users of health records, mainly those that have "role based access" to patient specific information, and who are not directly involved in patient care, may abuse their privileges by accessing information for inappropriate reasons or uses, whether to view records of friends, neighbors, or coworkers. There is also a pervasive use of compiled health information for marketing purposes, which constitutes a serious invasion of a person's privacy, and against which it is very difficult to fight. Many cases are reported in the media. These universal problems, of misuse and unauthorized disclosure of personal health data, that many people consider to be one of their most important secrets, has caused patients to withhold from recording in medical records clinically important, but sensitive personal information, because they think that if the information will be

known, it might threaten their employment, insurability or credit rating. Also, parents, under some conditions, may withhold information about a child from medical professionals for the same reasons (MacFarlane, 1992). Furthermore, physicians are being forced to censor essential chart information that might harm the patient. For example, a physician may hesitate to record that a prominent executive has become a sloppy dresser, although this might be a valuable clue to incipient dementia.

The security of patient information in paper based and in computer based medical records can be protected by a combination of policies, procedures, and a variety of technological measures. Implementation of the necessary measures is often complex and expensive. Therefore only a limited number of health care institutions are able to install all the necessary components and use them adequately. Protecting the privacy and security of sensitive patient information on remote computers requires that the digital identity of the patient, physician and clinic or hospital be authenticated before the patient's clinical information is released to the patient-approved physician. In institutions that install such methods and procedures, the protective measures themselves are often significant barriers to the timely access to patient data at the point of care (Overhage, 2002). This situation is very common. Caregivers that are not affiliated with a specific institute (that work in another institute, another city, country or continent) are usually not authorized in advance to access the data that are recorded and stored in computer systems of that institute, and therefore can not use patient specific data that are stored in that institute, when they need the data at the point of care.

Another serious problem with computer based medical record systems is that they have many secondary uses, ranging from billing and statistics to clinical research and national health policy development. The imposition of cost control and

reimbursement regulations, often force users to enter inaccurate, incomplete and even false clinical information into the personal medical records of their patients, because they require the information to be framed in arbitrarily unrealistic terms and classes. For instance, when a physician believes that a given patient should be hospitalized, and the admission criteria require a respiratory rate of 34 per minute and the treatment standards call for cardiac rhythm electronic monitoring and intravenous therapy, he may be tempted to enter false data, to satisfy the admission criteria (Burnum, 1989). After such inaccurate, incomplete or false data are recorded in medical records, and due to hiding of important data, it may be difficult or even impossible to detect that the data are unreliable. Obviously, using inaccurate, incomplete or false data at the point of care, may lead to serious errors in diagnosis and therapy.

Clinical reporting represents a major cost to the health care industry, in terms of both dollars and time. Writing detailed discharge summaries, referral letters and consultation reports by hand onto paper has two significant disadvantages: it is time consuming and may be illegible. Dictating, printing, reviewing, and approving printed medical documents are time-consuming processes. The transcription services used by many physicians as a mechanism for generating clinical documentation are also expensive and error-prone. While they fulfill the traditional purpose of documenting patient encounters, it is difficult or impossible to integrate them with other records of the (increasingly electronic) longitudinal patient record. In most cases, these documents contain only part of the data that caregivers need at the point of care.

Sending information such as referral letters, discharge summaries, and copies of documents to the point of care by regular mail is often very slow (Tulloch, 1975; Bado, 1984; Penney, 1988). A study that looked at all hospital discharge

communications concerned with acute admissions from one general practice, found that over half the patients contacted their general practitioners after discharge, before the general practitioner had received information about the hospitalization. The general practitioner received no information for 11% of the discharged patients (Mageean, 1986). Therefore, primary care physicians are frequently unaware of the discharge plans for their hospitalized patients. Specifically, because discharge summaries are not readily accessible, the primary care physician responsible for the post-discharge care of a patient has no quick and reliable access to information about a recent hospitalization. Information such as the reason for the hospitalization, test results, diagnosis, and discharge medications may have a profound impact on how the patient is managed in clinic post-discharge. Additionally, the inpatient physician has no reliable way of communicating requests, such as further testing needed, to the outpatient physician (Moore, 1997).

Transmitting documents to the point of care by standard fax machines is not secure. Faxes may be easily sent to the wrong place by an error in dialing (Genesen, 1994). Faxes may also be misdirected by pressing the wrong speed-dial button, and thus enable inadvertent disclosure of sensitive personal medical data of a person to his employers, coworkers and others, whose fax numbers are used often by the sender. These common problems with faxing may prevent timely arrival of important personal data of a person that are sent to the point of care. Interception and unauthorized capture of faxes during transmission on phone lines is extremely easy, and neither the senders nor the receivers, know when this happens. Faxes that are printed on thermal paper may fade and become illegible after a relatively short period. Because of these problems, it is not recommended to transmit personal health information, on standard fax machines. Secure fax devices can authenticate the sender and receiver, encrypt the faxes before transmission, and

store faxes in electronic mailboxes that can be opened by the user only by entering a user ID and PIN to get the faxes out. Unfortunately, these systems are expensive and enable to transmit faxes securely only within a closed network of fax machines, in which secure fax devices are installed. Therefore only a limited number of health care institutions are able to install and use them.

Internet access to patients' records, using PC based browsers, is not possible in many situations, mainly because of the absence of the necessary hardware or software at the point of care, lack of access to a reliable communication network and lack of adequate skills required to use the system. In addition, in order to be able to access the data, the person requesting the information must know his patient's web address (URL), and the system must confirm the requestor's "need to know" and the identify the patient (Schoenberg, 2000). If the requestor does not know the URL and cannot supply the relevant identifying data, he cannot gain access to the needed health data. Also, caregivers that need immediate access to important data at the point of care cannot rely on web-based transmission of patient specific data, because Internet paths consistently show large time-of-day and day-of-week variability. The effective transmission capacities of network pathways are generally reduced during the business day. This appears to be directly related to the much higher level of use during the day. The transmission capacities are the greatest during the night or early morning hours. Typically, for web sites tested in the United States and other G7 countries, the effective transmission capacities are reduced on the order of 40 to 95 percent during local business hours compared with weekend and other off-peak hours. The data suggest that even high-bandwidth (e.g., 10 to 45 Mbps) Internet pathways may suffer from significant capacity reductions because of traffic congestion during peak hours, probably reflecting a loaded

Internet infrastructure in some geographic regions (Wood, 1998).

E-mail messages are inherently insecure, and may suffer during transmission from unauthorized or accidental modification, destruction and disclosure. Unencrypted, unauthenticated e-mail messages may be corrupted or incomplete, or may incorrectly identify the sender. Currently, standard e-mail systems do not use encryption and strong authentication methods. Many standard e-mail systems use store-and-forward protocols, that leave copies of messages on various insecure servers and end-user hard drives. E-mail messages may be misdirected by mistakes such as clicking the e-mail address of another person or by selecting the "reply all" option, which sends e-mails to the sender's and also to one or more other e-mail addresses. These problems may enable inadvertent disclosure of sensitive personal medical data of a person to his employers, coworkers and others, whose e-mail addresses are used often by the sender. Patients or physicians who use e-mail for medical data interchange in the workplace are not assured confidentiality and may unintentionally expose sensitive details of illness or social circumstances to an employer because, legally e-mail systems allow the employer access to all messages generated and read by employees. Further, patients using family e-mail accounts at home may lack privacy from spouses, children, or parents.

Receiving the relevant past medical history of a patient by direct telephone communication from the point of care, with other clinicians, is often impossible. Most caregivers at the point of care do not have the time to find telephone numbers of the relevant clinicians and to contact them. The phone call interrupts workflow and requires the receiver to be available. Health information that caregivers receive by phone calls from patients is often not entered into the medical record and is therefore not available at the point of care. Also, information that is communicated by unprotected telephones, may

be heard by unauthorized people, on parallel connected lines and neither the senders nor the receivers, know when this happens. But, even if a caregiver at the point of care succeeds to contact another caregiver by protected telephone line and gets data from the past medical history of a patient, it might be extremely dangerous to rely on these data. Communication failures are a large contributor to adverse clinical events and outcomes (Coiera, 2000). In a retrospective review of 14,000 in-hospital deaths, communication errors were found to be the lead cause, twice as frequent as errors due to inadequate clinical skill (Wilson, 1995). Furthermore, about 50 percent of all adverse events detected in a study of primary care physicians were associated with communication difficulties (Bhasale, 1998).

Consumer health records are usually created and maintained by individual patients on the web. The documentation is based upon the patient's own understanding of his health conditions, medications, problems, allergies, vaccination history, etc. Although consumer health records may contain important data, most caregivers do not use them at the point of care. They cannot rely on data that are entered by laypersons, for decisions on diagnoses, procedures and therapy, because these data are usually inaccurate and incomplete (Kim, 2002). In addition, the protection of the privacy, confidentiality, security and access control to web based consumer health records is often inadequate (Marshall, 1999). In PC based consumer health record systems, the software and the data are stored on the hard disk of the personal computer at the patient's home (Denton, 1999). Therefore, these data cannot be easily accessed from remote sites.

Accessing, linking and presenting patient data that are distributed across multiple hospitals and health maintenance organizations, primary care physicians and specialists' clinics, pose very complex technical and non-technical problems. These include problems of interoperability between

multiple vendor systems from various sources that use different formats and standards (which also change over time), access control, routine maintenance of hardware and software, data protection laws, regulations and policies, downtime issues, training of the technical and clinical users, incompatible standards for linking and integrating patient data that are stored on multiple heterogeneous component systems and on paper based legacy systems. A variety of national and international organizations such as ISO 251, CEN 215, ASTM, HL7, CCOW, CORBA, and many others are developing standards that are supposed to enable the merger of the individual data elements stored in heterogeneous computer based systems and the provision of a patient view, rather than an organizational view of patient information. Unfortunately, the standards used in different local, regional and national organizations are often incompatible. Therefore timely access, to at least parts of the data that are stored on computer based medical records systems of large integrated health maintenance organizations, is often difficult or impossible, in many points of care.

Thus, although enormous amounts of personal health data are collected and stored for each patient in a variety of health record systems and documents, in most cases there are problems that prevent clinicians to get all the relevant data from the past health history of patients at the point of care, when the patient is seen by physicians and other health care professionals. These are very common universal problems and they have very serious consequences for patients, caregivers, insurers and society at large.

3. The Consequences

Absence of all the relevant data from the past medical history of patients at the point of care may cause critical delays in diagnosis and treatment and waste of time of the patient and caregivers. In the absence of these data, at the point of care, a patient must waste time in giving the same history time and time again, and a physician must spend during

an average clinic visit 30%-40% of his time on data collection. When a physician examines a new patient that suffers from a few chronic diseases, it may take from about 15 minutes to an hour or more to collect all the relevant data from the patient and from medical records and relevant documents.

In the absence of relevant data from the past medical history of patients at the point of care, the patient must submit to the same diagnostic tests and procedures repeatedly, and insurance companies waste enormous amounts of money on unnecessary and potentially dangerous tests. In 1987 it has been estimated, that of the approximately \$30 billion spent each year in the United States for medical tests, as much as 60% of that amount (\$18 billion) is wasted on unnecessary tests; i.e., those which, for a given patient, would not be needed if the physician had the benefit of a reliable medical history.

In the absence of all the relevant data from the past medical history of patients at the point of care, caregivers must make decisions with minimal, inaccurate, incomplete and imprecise information or even no data. Without information, dangerous treatments may be undertaken by caregivers on a balance of risk basis, allergies and sensitivities to certain foods and drugs may not be known, and previous test results may be ignored. Lack of information about the need of a patient to receive life maintaining drugs may cause abrupt discontinuation of essential drugs such as anti coagulants, anti epileptics, anti hypertensives, anti diabetics, anti arrhythmics and corticosteroids. This may result in erroneous and harmful treatment of the person allergic to some drug, and/or in need of some drug such as insulin for the diabetic person, or digitalis for a person of heart-failure indications and the like, and even cause life threatening situations, which may necessitate repeated hospitalizations.

In the absence of up-to-date, accurate, and comprehensive relevant health data from the past medical history of a

patient, at the point of care, caregivers may make fatal errors. A report from the National Academy of Sciences' Institute of Medicine, cited studies showing that between 44,000 and 98,000 people die each year in hospitals in the United States, because of mistakes by medical professionals. Even when using the lower estimate, more people die each year in the United States from medical errors than from motor vehicle accidents, breast cancer, or AIDS. Each day, more than 250 people die in the United States, because of mistakes - the equivalent of a major airplane crash each day and every day. Countless more people are injured, according to the Institute of Medicine, which ranked medical errors the eighth most common cause of death in the United States. The annual financial cost is enormous with estimates running as high as \$29 billion dollars a year just for preventable medical mistakes. In fact, it is clear that the magnitude of the problem is understated in the report of the Institute of Medicine, mainly because the study concentrated only on data from hospitals and did not collect data on medical errors that occur in other places in which Americans receive health care, such as nursing homes and ambulatory care centers. Extrapolation of these American data to the 6 billion people in the world gives frightening figures.

4. Prior Art Solutions

To solve these very common and very serious universal problems that are caused by unavailability of data from the past medical history of a patient at all points of care, enormous amounts of time, money, efforts and ingenuity were invested by innumerable commercial bodies, academic institutes, national and international organizations and individuals, over decades in developing devices and methods, by which health information could accompany a patient to all health care encounters. These prior art devices include a variety of eye readable paper based data cards, patient held paper based records and booklets, locket, pendants, necklaces, bracelets and wrist bands that carry paper based printed information,

microfilm devices, bar code cards, magnetic stripe cards, health watches, integrated circuit smart cards, optical memory cards, hybrid cards, PCMCIA cards, floppy disks, portable computers, personal digital assistants (PDAs), cellular telephones, devices that carry a personal ID number and a telephone number, which emergency medical personnel can use to call an emergency response center, in order to get information about a person's health problems, medical CD cards, implantable chips, and many other devices and methods.

Each one of these prior art portable personal health information devices and methods, can at best supply only part of the personal health data of a person - but no one of the them can provide instant access to a complete, accurate and up-to-date health information of a person, whenever the information is needed, at all times, at all points of care, anywhere in the world, for all health care professionals. Also, no one of these portable personal health information devices and methods, enable to record, link, integrate, display and print in a variety of clinically relevant organized forms, all the health data of a person from birth to death, collected from all paper based medical records, computer based medical records, and all other sources of information, including personal informal paper based notes, verbal communications, phone calls and e-mails.

SUMMARY OF THE INVENTION

The invention is a portable personal health information package owned by a person, which enables him to carry his complete health information in his pocket at all times, and grant his caregivers instant access to his health data whenever they are needed, at all points of care anywhere in the world.

The invention provides all the elements needed to use it instantly anywhere in the world with no exception: a database management software program and a personal database file, which

are contained in a portable computer readable storage device, a data recording form, and a printed health view.

OBJECTS AND ADVANTAGES

From reading the background of the invention, which describes the universal problems of access to patient data at the points of care, several advantages of my personal health information package become evident regarding collection, storage, transfer, retrieval and display of personal health data, access control, hardware, software, security, ease of use and cost - as summarized in the following paragraphs.

The invention provides a printed structured summary of the owner's health history ("health view") that is instantly eye readable and displays all the data that are stored on the computer readable storage device of the package, organized in clinically relevant clusters in a compact form. It enables all caregivers at all points of care to have instantly a clear integrated view of all the health problems of the owner.

The invention provides a data recording form, which enables caregivers to write by pen or pencil health data of the owner, in a structured form as an intermediate step, when they do not want or cannot use a personal computer due to any cause or reason, and in the absence of a personal computer at the point of care.

The invention enables to print new blank data recording forms and a new updated structured summary of the owner's health history, at any time anywhere in the world, with any standard printer connected to any standard personal computer. It can also, print any part of the data that are stored electronically on the portable computer readable storage device, organized by body organ systems and types and subtypes of data, in a compact manner that is instantaneously eye-readable.

The package provides a preprinted paper label already affixed to the surface of the computer readable storage device,

for sticking a picture of the owner and for recording personal identification data of the owner such as name, ID number, telephone number and signature, that can eliminate mistakes in identifying the owner.

The invention provides a software program that uses in all of its standard functions only the RAM of a PC, which cannot store information after the electricity has been turned off, even for a fraction of a second. Therefore, the system does not leave any personal data of the owner in the computer of the user of the system.

The invention does not demand to install the software before using the system. It contains the complete application software program on a portable computer readable storage device, ready for use instantly with any PC, anywhere in the world.

The invention does not demand investments in hardware to use the system anywhere. It is usable with any existing standard personal computer with a standard 3.5 inch floppy drive and a printer, which are available almost everywhere - without any additional hardware or communication infrastructure.

The new system works fast even with very old computers that have very slow processors, and do not have a hard disk, because both the database management software program and the owner's personal database file are resident on the portable computer readable storage device during the operation of the system.

The invention enables making one or more backup copies of all the components of the package at all points of care and anywhere else, ready for immediate use, and thus prevents the serious problems that are created when the original copy is lost, damaged, or stolen.

The invention enables direct entry of all data elements by all caregivers, in one uniform standard simple method, and thus can improve the accuracy of the information and reduce errors

and misinterpretations of data. The method enables to record each data element within seconds.

The invention works with data from all medical fields and specialties, with no exception. It eliminates the need to customize the methods of data recording and display to meet the needs of each department and individuals' needs and interests.

The invention enables to add, edit, update, re-organize, browse, search, display and print in an organized form all the personal health data of the owner, from birth to death, collected from all medical records, and all other sources of information, including personal informal paper based notes, verbal communications, phone calls and e-mails.

The invention enables every caregiver with no exception to record all findings, tests, diagnoses, therapies and any other health data, in his own professional language and all complaints of the owner and any other information provided by him, in the owner's own words. Thus, it eliminates the risks of errors in diagnoses and therapies associated with use of controlled vocabularies.

The invention enables every caregiver to record exact time, as well as temporal uncertainty and multiple temporal granularities, for each and every data element, even if it cannot fit into any standard "valid" date field. It prevents entering inaccurate and even false dates, which are often due to the use of predefined date-fields to record time in computer based systems.

The invention enables to link and integrate all health data of the owner from all sources, even if the owner is registered in each of them under a different name or ID number, due to typing errors, marriage, divorce or use of pseudonyms.

The system clusters, organizes and presents entered data elements instantly and automatically. It does not demand any order or sequence in data entry, in order to get the data presented in clinically relevant clusters. Well-defined data elements as well as puzzling unexplained data elements that are

related to each other, are displayed in clinically relevant groups, in a clear, concise layout.

The invention enables caregivers to quickly review all or any part of the data, from the past health history of the owner, before proceeding with the anamnesis and examination and prior to making any decision on further tests, procedures and treatments. It provides a simple and rapid searching method, which enables caregivers to find single and groups of data elements and to gain an overview of data by specialty, within seconds.

The invention enables caregivers selected by the owner, to view on a screen of a personal computer and/or print parts of the data that they need to perform their task, usually with one click of a button, in a clear, concise, clinically relevant organized layout, which can support their diagnostic and management decisions.

The invention can save caregivers enormous amounts of time by enabling them to see the owner without waiting for the paper medical record to be transported from either the paper record archive ("record room") or from any other location to the point of care. It can improve productivity of caregivers. It can save time and money by reducing number of paper chart pulls

The invention negates the dependency of caregivers on receiving discharge summaries from hospitals by regular mail or by fax. It precludes the loss of time, effort, cost and risks of getting the medical history of the owner by telephone. It precludes the risks of getting the medical history of the owner by E-mail.

The invention can save caregivers enormous amounts of time and effort by preventing re-collecting data from the patient and from multiple paper based records, computer based medical records and documents, in every health encounter and repeatedly organizing the same data.

The invention can prevent the need of caregivers to spend time and effort in comparing disparate, inconsistent and

contradictory data of the health history of the owner, collected from multiple paper based and computer based health records and documents, and trying to decide which are accurate and reliable.

The invention can prevent the loss of time, effort, inconvenience and waste of enormous amounts of money by patients and insurers on repetitions of unnecessary tests and procedures and on unnecessary hospitalizations, due to absence of all the relevant data from the past medical history of patients at the point of care.

The invention can prevent critical delays in diagnosis and treatment, abrupt discontinuation of essential drugs, adverse drug events and erroneous and harmful treatments, and even avoid the unnecessary loss of life due to unavailability of essential data in emergency situations.

The invention enables sharing all the health data of the owner among all caregivers that are directly involved in his care in primary, secondary and tertiary care facilities. This can improve the communication and cooperation among all caregivers of the owner anywhere and enables continuity of care in an uninterrupted and coordinated manner, at all points of care.

The invention can reduce or even eliminate the need to write detailed descriptions of the past medical history of the owner in discharge summaries and referral letters by attaching it's printouts to short letters. It can also, improve the quality and decrease effort and cost of writing and dictating letters and other documents.

The new invention gives the owner absolute control on the availability, completeness, accuracy, integrity, privacy, confidentiality, security, backups and access to his personal health data that are stored on the package, and on the security of the portable computer readable device and the software that is stored on it.

The invention enables the owner to allow caregivers that are directly involved in his care, instant access to all his health data that are stored on the package in computer readable and eye readable forms, while preventing access or restricting access of others only to specific data, based on their specific roles.

The invention enables the owner to have two or more packages. For example, one for his psychiatric and/or sexual problems, one for his heart problems and one or more additional packages for his other health problems. The owner can link and integrate data from two or more packages at any time.

The invention enables the owner to maintain absolute anonymity. One or all of the personally identifying data can be changed or removed completely by the owner on all or any one of the components of the package, whenever the owner wants, within seconds anywhere.

The invention enables the owner to view all his personal health data that are stored on the package, gain understanding of his own health status, enhance the owner's compliance with his caregivers' instructions and allow him to become a full participant in his care. It can improve the communication between the owner and his caregivers.

The invention enables the owner to ensure that his caregivers will correct inaccurate data and add missing data, but prevents him from unnoticed adding, changing or erasing data by himself. Only caregivers record data. This contributes to the reliability and trustworthiness of the data.

The invention enables the owner to make decisions about his health care. It gives the owner the freedom to change his caregiver or get a second opinion consultation or a specialist's advice anywhere in the world, for confirmation of a diagnosis or treatment, without the agreement of his primary caregivers.

The invention enables consultants in all medical fields and specialties, with no exception anywhere in the world, to

use all or any part of the data that are stored on the package to make timely, well-informed and efficient decisions about the owner's health problem(s).

The invention does not interfere with the communication and interactions between the caregiver and the patient during an encounter. It does not demand any change in the organization of documents in health records or in the organization of data layout in health documents and thus enables caregivers to focus on the health problems presented at the encounter.

The invention can function everywhere: in all hospitals, all primary care clinics, all private physicians' offices, all emergency sites (e.g. at the home of a person or at the point of an accident, in the middle of a street), all nursing homes and all other points of care, with no exception.

The cost of manufacturing a complete package, according to the preferred embodiment of the invention is very low, since the computer readable storage device is the regular low cost ubiquitous 3.5 inch floppy diskette and the reader/writer is the ubiquitous floppy disk drive. It is also, very simple and easy to manufacture the package anywhere, without any special equipment.

The invention is very easy to learn within few minutes anywhere with no exception. It enables caregivers to obtain hands-on self-training with blank packages, at their convenience during non-patient care hours. Few simple screens enable all caregivers to carry out all its functions.

The invention is very easy to use. The system boots up automatically and displays the main menu screen, when the computer readable device is inserted into the reader/writer and the user types a one-character command and presses the Enter key of the keyboard. It provides few straightforward options on each screen.

The invention does not demand local organizational change to use the system. It does not interfere with any local policies and procedures for protecting security, privacy and

confidentiality of health information It does not demand any change in the way caregivers work, and does not interfere with their routines.

The package carries the owner's health data, but is not a health or medical record, and thus is not bound by any regulations or laws relevant to health records. Therefore, it can be used by all health care professionals, at all points of care anywhere in the world without legal delays.

The invention can be used by clinicians to extract, organize, display and print health data collected from paper based and computer based textbooks and/or medical journals, in a clear, concise, clinically relevant organized layout, which can help studying the medical literature.

In addition, the system of the present invention includes the following further advantages:

It can convey instantly all relevant health information at all points of care to all caregivers, when the owner cannot do so.

It can quicken and improve the quality of triage decisions at all points of care anywhere in the world.

It enables to exploit the rich information contained in medical narratives extracted from text of health documents.

It can be used for organizing, searching, and displaying electronically data that are stored in conventional paper based health records.

It enables to make real the patient's ownership of his data, while allowing the caregiver keep the original health records and documents.

It gives the users immediate benefit, by instantly organizing and presenting entered data elements by problems in a clear, concise layout.

It can be used as a powerful teaching tool in all subspecialties of human and veterinary medicine for students and graduated clinicians alike.

These and further and other objects, features and advantages of the invention will become apparent from consideration of the disclosure, which includes the above and ongoing written description of the specification, with the claims and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an example of a main menu screen.

Figure 2 is an example of prompting during the "make a backup" process.

Figure 3 is an example of a first screen display of "browse-edit data" screen (with help).

Figure 3a is the same help tool bar as in Figure 3.

Figure 4 is an example of a first screen display of "browse-edit data" screen (without help).

Figure 5, as shown in Figure 4, further shows an example of options (Bottom selected).

Figure 6 is an example of a last screen display of "browse-edit data" screen (without help) and options (Top selected).

Figure 7, as shown in Figure 4, further shows an example of options (Lock selected).

Figure 8 is an example of a first screen display of "browse-edit data" screen (columns 1- 5 locked + column 10 after column 5).

Figure 9 is an example of a first screen display of "browse-edit data" screen (columns 1-4 locked + column 7-9 after column 4).

Figure 10, as shown in Figure 4, further shows an example of options (Record No. 19 selected).

Figure 11 is an example of a display of "browse-edit data" screen (with record 19 on top).

Figure 12, as shown in Figure 4, further shows an example of options (Freeze Date selected).

Figure 13, as shown in Figure 4, further shows an example of options (Find MET selected).

Figure 14 is an example of a display of "browse-edit data" screen (with first MET SYS on top).

Figure 15 is an example of a "display by systems" menu.

Figure 16 is an example of a screen display of the musculoskeletal system (option "13. MUS" was selected).

Figure 17 is an example of a screen display of the skin system (option "17. SKN" was selected).

Figure 18 is an example of a "display by topics" menu.

Figure 19 is an example of a screen display of family history (option "1. FAMILY HISTORY" was selected).

Figure 20 is an example of a screen display of signs and symptoms (option "2. SIGNS & SYMPTOMS" was selected).

Figure 21 is an example of a screen display of laboratory and other tests (option "3. LABS & TESTS" was selected).

Figure 22 is an example of a screen display of diagnoses (option "4. DIAGNOSES" was selected).

Figure 23 is an example of a screen display of all treatments (option "5. ALL TREATMENTS" was selected).

Figure 24 is an example of a screen display of tablets only (option "6. TABLETS (only)" was selected).

Figure 25 is an example of a screen display of blood tests (option "7. BLOOD TESTS" was selected).

Figure 26 is an example of a search & display screen for SUB=XRS.

Figure 27 is an example of a screen display of all X-ray examinations (SUB=XRS).

Figure 28 is an example of a "search & display" screen for SUB=PEX.

Figure 29 is an example of a screen display of all findings in physical examinations (SUB=PEX).

Figure 30 is an example of a "search & display" screen for DATA=CHEST PAIN.

Figure 31 is an example of a screen display of all chest pain events (DATA=CHEST PAIN).

Figure 32 is an example of a vertical ADD NEW DATA screen (with help).

Figure 33 is an example of a vertical ADD NEW DATA screen (without help).

Figure 34 is an example of a horizontal "add new records?" prompt at end of file.

Figure 35 is an example of a horizontal "add new records" screen at end of file.

Figure 36 is an example of a LINK DATA screen.

Figure 36a is an example of prompting during the "GLOBAL REPLACEMENT (bus)" process

Figure 37 is an example of a HEALTH VIEW of a patient for 1995-2000.

Figure 38 is an example of a HEALTH VIEW of the same patient for 1-6/2001.

Figure 39 is an example of a HEALTH VIEW of the same patient for 1995-6/2001.

Figure 40 is an example of a BLANK FORM.

Figure 41 is an example of a database structure.

Figure 42 is an example of data elements in order of recording (1,2,3...62).

Figure 43 is an example of data elements in organized order (63,61, 62, 57, 58.60, 8, 6...46).

Figure 43a is an example of data shown in Figure 43, presented as a printed HEALTH VIEW

Figures 44, 44a and 44b are examples of a chapter on Pellagra in a textbook.

Figures 45 and 45a show data extracted form the text of Figures 44, 44a and 44b organized by the present invention.

Figure 46 is a depiction of a computer readable device 251 with complete instructions for operation.

Figure 47 is a flow-chart describing use of the system.

Figure 48 schematically shows an example of using the new system.

Figure 49 is a schematic representation of the new system.

Figure 50 is a schematic representation of a computer using the new invention.

Figure 51 shows a computer readable device in a case with a seal.

Figure 52 is a schematic representation of use and input of information in the portable health information package by medical care professionals.

DETAILED DESCRIPTION OF THE INVENTION

The preferred portable personal health information package provides a method for handling personal health data, that enables instant access to the full, complete, accurate and up-to-date health information of the owner or any part of it, whenever the information is needed, at all times, at all points of care anywhere in the world, for all health care professionals, in computer readable and eye readable forms. The package comprises a database management software program and a personal database file, which are contained in a portable computer readable storage device, a data recording form, and a health view printout. The database management software program is resident on the portable computer readable storage device during its operation, and uses only the RAM of a PC, but does not use the hard disk in all of its standard functions. The database management software program enables the user of the system to record, update, link, integrate and display health data of the owner from birth to death, collected from all paper based medical records, computer based medical records, and all other sources of information, including personal informal paper based notes, verbal communications, phone calls and e-mails. It enables the system to record and store electronically each health data element directly onto the portable computer

readable storage device, as one record in the personal database file of the database management software program and also allows browsing, adding, editing, searching, displaying and printing in an orderly fashion all or any part of the health data of the owner, and the health view printout. The data recording form enables a user to write by hand onto paper each health data element in one compact, simple, universal, standard structure. This can be done as an intermediate step, when a caregiver does not want, or cannot use a personal computer at the point of care to record and store the data directly on the computer readable storage device. The health view printout is a structured summary of the owner's health history, and displays all the data that are stored electronically on the portable computer readable storage device, organized by body organ systems and types and subtypes of data, on paper in a compact manner that is instantaneously eye-readable. The package contains a preprinted paper label already affixed to the surface of the computer readable storage device, for holding a photographic image of the owner and for recording identification data of the owner such as name, ID number, telephone number and signature, that can eliminate mistakes in identifying the owner. The invention operates with any existing standard personal computer anywhere, and can use a variety of portable programmable detachable computer readable devices, that can store and carry the personal database file and the database management software program, including optical memory cards, floppy disks, flash memory cards, PCMCIA cards and other computer readable storage devices with comparable storage capacity. The preferred embodiment uses a conventional 3.5 inch floppy disk as a portable computer readable storage device, since it is ubiquitous, cheap and uses the ubiquitous 3.5 disk drive of any type of personal computer as a reader/writer. The cost of a complete package, in which the computer readable storage device is a 3.5 inch floppy disk, is minimal. The package is intended to be carried by a person at

all times, so as to be available for use to all health care providers at all points of care, and thus reduces the cost and improves the quality of health care. The owner has absolute control over the availability, completeness, accuracy, integrity, privacy, confidentiality, security and access to his health data that are stored on the package. While the preferred embodiment of the invention is recording, storing, organizing, displaying and printing health data of human beings, it can also be used for health data of animals. Alternative embodiments include variations of the invention for storage and retrieval of other types of data, such as machine maintenance data, and a variety of personal data such as, curriculum vitae, addresses and telephone numbers, birthdays, anniversaries etc. The cost of manufacturing a complete package, in which the computer readable storage device is a 3.5 inch floppy disk, is minimal.

A detailed description of the invention will be more readily understood by reference to the accompanying drawings.

Figure 1 shows a "MAIN MENU" screen 13, which appears after inserting the computer readable device into the appropriate reader/writer, typing a command and pressing the Return or Enter key of the keyboard. A main menu 11 is shown on a computer screen 13, with options 15 for selecting 16 from main menu. Keying in selecting position 16 a number associated with an option and pressing the Enter key of the keyboard selects that option.

Figure 2 shows a screen 17 with questions 18, 20, 21 to be answered and instructions 19 to follow, for making a backup copy of the device. This screen 17 also enables labeling the device electronically, and changing or deleting the electronic label at any time.

Figure 3 shows a screen 23 displayed after selecting 16 the option "2. BROWSE-EDIT DATA" from the main menu 11 in Figure 1. This screen 23 allows the user to scroll through the database horizontally and vertically, and edit and add records.

Use of this screen 23 also enables editing data elements and marking data elements for deletion. The help tool bar 25 is shown at the top. The first screen 23 of the owner's health history 27 is displayed. The data elements 29 are numbered according to numbers of problems 31 in human body systems 33. A specific label marks each body system 33. CVS 32 means cardiovascular system. Question marks ("??") 34 mean that the body system 33 to which the particular data element belongs is unknown. Data elements 35 of the health history are presented. In the column headings, SQ 37 stands for sequence of data elements within a topic. The dates of occurrence are listed in columns 41.

Figure 3a shows the help tool bar 25 shown at the top of Figure 3, which provides assistance on how to browse and navigate the cursor, move up and down in the database, mark for deletion individual fields and records and also set a variety of additional options.

Figure 4 shows the same screen 23 as Figure 3 without the help tool bar 25 (Figure 3) and with more data elements 29 displayed. The name, address and birth date of the owner are shown on the line 42 under the heading.

Figure 5 shows the same screen 23 as Figure 4 with an optional shortened control tool bar 43, which permits rapid locating of records or locking. Option 44 "Bottom" is selected, which switches to the last screen, as shown in Figure 6.

Figure 6 shows the last screen 23a of the owner's health history 27 of Figure 5 showing more data elements 29. The last record 29a of the owner's health history is shown at the bottom. Option "Top" 52 is selected, which switches the display back to the top screen, shown in Figure 5.

Figure 7 is the same screen 23 as Figure 5, with the option control tool bar 45 requesting a particular number of columns to lock to the left of the screen, even when the user

pans to the right using the appropriate navigation keys on his PC.

Figure 8 shows a screen 47 similar to screen 23 in Figure 5, with five left columns locked and sixth last column 49 indicating sources of data elements 29. Ten columns are provided. Less than ten are displayed at any time.

Figure 9 shows screen 50 similar to Figure 5, with the five left columns locked, and an additional seventh column 51 ("TIME") displaying time of day of occurrences.

Figure 10 shows a screen 23 with a box 53 for requesting a particular record number (19) entered in space 56.

Figure 11 shows a screen 55 displaying a selected record 57 and sequential records.

Figure 12 shows a screen 23 with the option control tool box 61 appearing by selecting freeze 59, requesting to freeze a particular field ("DATE"). A caregiver inserts what field to freeze, and the software locks the selected field for easier editing of the same field in all records.

Figure 13 shows the screen 23 with "Find" 63 selected to display the option control tool box 65, requesting to find and quickly move the highlighting to a particularly selected body system "MET" (metabolic) 64.

Figure 14 shows the screen 67 showing organized entries, starting with the first metabolic MET 66 data element. The MET (metabolic) data elements 29 are followed with data elements related to another body system MUS 68 (musculoskeletal).

Figure 15 is a "DISPLAY by SYSTEMS" menu screen 69, which shows the systems 71 available for selecting by inserting a number in space 70. Keying a number 72 associated with a system 71 selects and displays that system. The menu screen 69 was selected by keying 4 in space 16 on main screen 13, as shown in Figure 1.

Figure 16 shows screen 73 in which the caregiver has selected MUS 75 (musculoskeletal) by keying the number 13 in space 70 while screen 69 (Figure 15) is displayed.

Figure 17 shows a screen 77 in which SKN (skin) 79 has been selected from the screen shown in Figure 15.

Figure 18 shows a screen 81, which appears when option 4, "Display by Topics", is selected from the main menu 11 of screen 13 in Figure 1. Topics 82 are available for selection.

Figure 19 shows a screen 83, which appears when the option 1, Family History, is selected from the topics screen 81 shown in Figure 18. The letter "f" 84 in the third column denotes family history.

Figure 20 shows a screen 85, which appears when the option 2, Signs and Symptoms, is selected from the topics screen 81 shown in Figure 18. The letter "s" 86 in the third column denotes signs and symptoms.

Figure 21 shows a screen 87, which appears when option 3, Labs and Tests, is selected from the topics screen 81 shown in Figure 18. The letter "l" 88 in the third column denotes laboratory and test results.

Figure 22 shows a screen 89, which appears when option 4, Diagnoses, is selected from the topics screen 81 shown in Figure 18. The letter "d" 90 in the third column denotes diagnoses.

Figure 23 shows a screen 91, which appears when option 5, All Treatments, is selected from the topics screen 81 shown in Figure 18. The letter "t" 92 in the third column denotes all treatments.

Figure 24 shows a screen 93, which appears when option 6, Tablets (only), is selected from the topics screen 81 shown in Figure 18. The letters "tab" 94 in the sixth column denote tablets.

Figure 25 shows a screen 95, which appears when option 7, Blood Tests, is selected from the topics screen 81 shown in

Figure 18. The letters "bld" 102 in column 6 denote blood tests.

Figure 26 shows a screen 97 when option 8, "SEARCH & DISPLAY", is selected from the "DISPLAY by TOPICS" screen 81 shown in Figure 18. Screen 97 provides dialog prompts 97a for selecting specific data elements in specific fields, as shown on screen 97 in Figure 26a, in which the field SUB (subject) 96 and XRS (x-rays) 98 have been selected in response to the prompts 97a.

Figure 27 shows screen 99, which appears in response to the selections shown on screen 97 in Figure 26, which displays the findings in all XRS (x-rays) 98 in column 5, from all body systems 100 in the first column.

Figure 28 shows a screen 101 similar to that shown in Figure 26 and 26a in which the field SUB (subject) 103 and PEX (physical examination) 105 have been selected.

Figure 29 shows screen 107, which is displayed when SUB and PEX have been selected on screen 101. All entries of physical examinations 105 from all body systems 100 are shown grouped together.

Figure 30 is a screen 109 similar to those shown in Figures 26 and 28, in which the DATA field 111 and CHEST PAIN 113 have been selected.

Figure 31 shows a subsequent screen 115, which shows entries 117 of chest pain as selected by screen 109.

Figure 32 shows a screen 121, which is displayed when option 5, ("ADD NEW DATA"), has been selected from main menu 11 on screen 13 in Figure 1. Screen 121 has prompts 123 for filling in new data. The lines 125 provide the limit lengths of the new data entries. The help tool bar 127 is shown at the top. Once filled in completely, the new data on the screen 121 is entered by pressing the ENTER on the PC keyboard, and a new screen 121, is displayed for filling in more new data.

Figure 33 shows a screen 131, which is the same as Figure 32 without the help tool bar. The number of the entry "NO" 128 denotes number of problem in body system SYS 129.

Figure 34 shows a screen 133 with entries, which are displayed when the user browses down to the end of entries in Figure 4, by pressing the "down" arrow of the PC keyboard. This screen prompts the user "Add new records? (Y/N)". If the user answers "Y" in space 137, a screen 141 appears with a blank bottom line 143, as shown in Figure 35. The user adds a new record in the spaces 145 provided. As soon as the "ENTER" key of the keyboard is pressed, a new blank bottom line 143 appears for adding another record, and the cursor 135 jumps to a position at the beginning of the three-letter SYS field, column one, for labeling the system to which the new data element belongs.

Figure 36 shows screen 151, which appears when option "6. Link Data" is selected from the main menu 11 on screen 13 shown in Figure 1, and which is used to link and integrate data from two computer readable devices in cases in which one person has two (or more) computer readable devices. That may happen, for instance, when a patient is treated without having his old permanent device, and a caregiver gives him a new temporary personal health information package. The owner may also decide to have two (or more) computer readable devices and printed overviews - one computer readable device and health view for his very sensitive data, such as his psychiatric and/or sexual problems and another computer readable device and health view for his other health problems. In this way he can ensure that his dentist or ophthalmologist will not have access to information on his psychiatric or sexual problems, both in the computer readable display and on printouts. The owner may decide to link and integrate data from the two (or more) computer readable devices at any time. Screen 151 can also be used for browsing, adding and editing data elements on a bus file and on the permanent database file, for global replacement

of fields in all data elements on the "bus file", as well as for erasing individual data elements in the "bus file" and on the "permanent data file".

Linking and integrating data from an old device and a new device is performed in a few steps:

Step 1: One of the devices (the old or the new) is inserted into the slot of the PC reader/writer, followed by pressing the ENTER key on the PC keyboard.

Step 2: When the "MAIN MENU" screen 13 of Figure 1 appears, the option "LINK DATA" is selected by typing the appropriate number, 6, in space 16 and pressing the ENTER key.

Step 3: When the "LINK DATA" screen 151 (Figure 36) appears, the option "COPY CARD TO DISK" is selected by typing the appropriate number, 55, in space 153 and then pressing the ENTER key. That creates a temporary copy of the data file on the hard disk of the PC.

Step 4: From screen 151 of Figure 36, the option "MAIN MENU" is selected by typing the appropriate number, 0, on the keyboard and pressing the ENTER key, which causes the display of main menu 11 screen 13 of Figure 1.

Step 5: From the MAIN MENU screen 13 of Figure 1, the keying of option 0, "EXIT TO DOS", is selected, which is followed by the appearance of the DOS prompt.

Step 6: The computer readable storage device is ejected from the reader/writer by pressing the "device ejection" button of the reader/writer.

Step 7: Steps 1 and 2 are performed with the second device.

Step 8: When the "LINK DATA" screen 151 of Figure 36 appears, the option, 99, "COPY DISK TO BUS", is selected by typing the appropriate number, 99, and pressing the ENTER key. This initiates two consecutive actions: The temporary copy of the first data file that was created on the hard disk of the PC in Step 3, is copied from the hard disk of the PC to a temporary bus file on the second device. The copy of the data

file that was created on the hard disk of the PC in Step 3 is erased.

Step 9: The option, 8, "COPY BUS TO CARD" is selected by typing the appropriate number, 8, and pressing the ENTER key. This initiates instant linkage and integration of all the data elements from the old device and the new device into one data file.

Step 10: Selecting the option 6, ("BROWSE-MARK (card)"), shows that all the data from the two devices are integrated, so that data that are related to each other, that were originally recorded on two devices, are grouped together by body organ systems, problems, types and subtypes on the second device.

Step 11: Selecting option 1, ("1.USE BUS"), and then selecting option 10, "ERASE ALL", by typing the appropriate number and pressing the ENTER key, cleans the bus file from data.

Step 12: From screen 151 of Figure 36, the option 0, "MAIN MENU", is selected by typing the appropriate number, 0, and pressing the ENTER key, which causes the display of screen 13 of Figure 1.

Step 13: When the PC is connected to a printer, selecting the option 8, "PRINT HEALTH VIEW", from the main menu screen 13 of Figure 1, will print an updated integrated summary of all the data that were recorded on both the first device and the second device.

Step 14: Selecting the option 1, "MAKE A BACKUP", from the main menu screen 13 of Figure 1 initiates creating an identical copy of the integrated device. If the first device is inserted into the reader/writer during the backup process, it will become an identical copy of the second (integrated) device, and thus both the first device and the second device will contain all the data from the two devices.

Selecting the option 2, "BROWSE-MARK (bus)", or the option 6, "BROWSE-MARK (card)", by typing the appropriate number and pressing the ENTER key, cause the display of screen 23 of

Figure 3, which enables browsing, editing data elements and marking data elements for deletion on the bus file or on the permanent file respectively. The help tool bar 25 shown at the top of screen 23 of Figure 3 provides assistance on how to browse and navigate the cursor, move up and down in the database, mark for deletion individual fields and records and also set a variety of additional options. Browsing an editing the permanent file and the bus file is highly recommended immediately after step 8 and before step 9.

Selecting the option 4, "GLOBAL REPLACEMENT (Bus)", from screen 151 of Figure 36 causes the display of screen 152 of Figure 36a, which shows questions XX, YY and ZZ to be answered for replacement of the data content of a selected field in all records of the bus file, quickly in a single step. Using the global replacement function can save a caregiver the tedious, time-consuming and error prone task of retyping the three letters in the SYS field in the first column for every one of many data elements related to one specific system, that he needs to record in an encounter. For example, Figure 36b shows a series of data elements that a physician recorded in the bus file without typing the three letters for labeling the system in the SYS field and the date of occurrence for each data element in the DATE field. Figure 36d shows the same series of data elements of Figure 36b, after answering the questions of Figure 36a, requesting replacement of the blank SYS and DATE fields as shown in Figure 36c. Then selecting the option 8, "COPY BUS TO CARD", on screen 151 shown in Figure 36 by typing the appropriate number and pressing the ENTER key initiates instant linkage and integration, of all the data elements from the bus file and the permanent file into one data file.

Deleting individual records from the permanent and the bus database files involves two steps. In the first step, the user marks one or more specific records using the appropriate BROWSE screen according to the instructions presented in the help toolbar 25 as shown at the top of the screen 23 of Figure 3.

Permanent deletion of individual data elements, which were previously marked for deletion in the "bus file" or in the "permanent data file" is done by selecting the option 1, "USE BUS", or 5, "USE CARD", respectively from screen 151 of Figure 36, and then selecting the option "ERASE MARKED", by typing the appropriate number, 9, and pressing the ENTER key.

Selecting the option "ERASE ALL", from screen 151 of Figure 36, by typing the appropriate number, 10, and pressing the ENTER key, cleans the selected file from the data. Once a file is deleted, it cannot be recalled. Therefore, in order to prevent unintentional deletion of data, the user is questioned if he really wants to delete the data on the file, before this command is executed.

Figures 37, 38 and 39 illustrate the linkage and integration of two HEALTH VIEWS of a person that has two personal health information packages. The first (old) device screen 161 in Figure 37 contains data for the period 1995-2000, and the second (new) device screen 163 in Figure 38 contains data for the period 1-6/2001.

Figure 37 shows a printed HEALTH VIEW 161, which was printed by selecting the option 8, ("PRINT HEALTH VIEW"), from main menu screen 13 of Figure 1, using the first (old) owner's device containing data for the period 1995-2000.

Figure 38 shows a printed HEALTH VIEW 163, which was printed by selecting the option 8, ("PRINT HEALTH VIEW"), from main menu screen 13 of Figure 1, using the second (new) owner's device containing data for the period 1-6/2001.

Figure 39 shows a printed HEALTH VIEW 171 that combines health views 161 and 163, which was printed by selecting the option 8, ("PRINT HEALTH VIEW"), from main menu screen 13 of Figure 1, using the integrated device, after linking and integrating data from an old device and a new device. Health views 161, 163 and 171 list all of the entries by systems 167 and topics 169 within the systems for the specific periods.

Figure 40 is a blank data recording form 181, which may be printed from information on the portable computer readable device by selecting the option 7, "PRINT A BLANK FORM", from the MAIN MENU 11 on screen 13 shown in Figure 1. Data recording form 181 has spaces in columns headed SYS (system) 183, NO (number of problem in system) 185, T (topic) 187, Data 189, Details 191, SQ (sequence) 193, SUB (subject) 195 and DATE+TIME 197. A line 198 is provided at the bottom for an identification, signature and date of the person entering the information, if desired. Spaces 199 at the top provide the owner's identification and telephone number, and spaces 200 provide for recording first date and last date of occurrence of data that are recorded on the data recording form.

Figure 41 shows screen 201, showing a database structure containing field numbers 203, field names 205, field types 207, and field widths 209. The fields are columns in the screens and printouts.

Figure 42 shows a screen 211 or printout, which lists recorded entries 213 by chronological sequence 214 of entry of the data.

Figure 43 shows a screen 221 that lists entries grouped in clusters according to systems 222.

Figure 43a shows a printed HEALTH VIEW 225, in which the name, address and date of birth of the owner are displayed in the first line 226. All unexplained data are labeled with three question marks (???) 227 and are displayed clearly at the top of the screen, clustered in clinically relevant groups, by problem numbers, and thus draw the caregivers attention immediately. Figures 43b, 43c and 43d are continuations of the printed HEALTH VIEW shown in Figure 43a.

Figures 44, 44a and 44b show an example of a chapter in a textbook 231, which describes a disease.

Figures 45 and 45a show a screen 233 or printout, which presents the symptoms, laboratory test results, treatments and all other relevant data elements extracted from the text shown

in screen 231 of Figures 44 and 44a-b, grouped into systems 234 using the present invention for convenient use by a health caregiver studying the disease or for teaching the disease to students.

Figure 46 shows a system 250 on a device 251, which is a computer readable storage device. Complete and simple instructions 253 are provided on the bottom of the identification labels. The entire operation is controlled by the database management software program, which is resident on the portable computer readable storage device 251 during its operation, and uses only the random-access memory (RAM) of a PC, but does not use the hard disk or the windows operating system in all of its standard functions. Since a RAM of a PC cannot store information after the electricity has been turned off, even for a fraction of a second, the system works outside of the hard drive of a computer, leaving no permanent records in the computer. Device 251 includes all of the necessary software and instructions and includes software for printing a blank form for later use and a health view for the caregiver's use and for the owner's review. Device 252 is a backup copy of device 251. Personal data may be provided in spaces 255. A passport photo or thumbprint or any selected identifier may be provided in space 257.

Figure 47 is a flow-chart 260 showing steps of using the invention. In the first step 261 the caregiver (CG) 262 gets 263 a device 265 and gets or prints from the device inserted in a PC a data recording form 267, also called a blank form.

In the second step 271 the caregiver 262 collects 273 data and writes 275 data elements on the form 267. In the next step 281, the caregiver inserts 283 the device 265 into the reader/writer of his computer and, using the computer (PC) keyboard, enters 285 data elements 287 directly in the data file 289 in the device.

In the next step 291, the caregiver 262 browses 293 the data and completes 295 the data.

Next, in step 301 the caregiver (CG) 262 displays 303 and/or prints 305 the data by systems 307. The systems 307 in this step are the body systems 234 shown in Figure 45, for example.

In the next step 311 the caregiver displays 303 and/or prints 305 the data by types 309, for example pain or chest pain.

Next, in step 315 the caregiver searches 317 and displays 303 and/or prints 305 selected data 319.

In step 321 the caregiver prints 305 a health view 323.

In step 325 the caregiver prints 305 a blank form 267.

In step 327 the caregiver gives a package 329 to the owner. Package 329 includes a device 265 with recorded data and software, a health view 323 and a blank form 267.

In step 331 the owner 332 reads 333 the health view 323. The owner 332 may be a person whose records are included in the health view 323 and device 265, or the owner of an animal or a flock or herd of animals whose records are included in the device 265 and health view 323.

In step 335 the owner asks 337 the caregiver to add 338 missing data or to correct 339 inaccurate data. The caregiver corrects or adds the data in step 341, and steps 327, 331 and 335 are repeated.

In step 343 the owner 332 gives the package 329 to a caregiver at the next encounter 347, which may be a scheduled or emergency visit, or a visit for laboratory work or updates. Then steps 271 and sequential are repeated.

In Figure 48 the system 350 is shown.

A package 329, which includes a health view 323, a blank form 267 and a storage device 265, is provided by or to the caregiver 262.

In the first instance, before any use, the device 265 contains the software but no records. Usually in that case the caregiver has the device 265 and form 267.

If the system has been used previously by the owner 332, the owner gives the package 329, which includes the health view 323, to the caregiver.

This provides 351 information to the caregiver 262, who enters 275 the information on form 267. The caregiver inserts 283 the device 265 into a computer 353 and enters 285 data from the form 267 via the keyboard directly into the RAM or the computer and into the data file of the device 265. The caregiver reviews and corrects the entered data. The caregiver displays 303 the data and prints 305 a new blank form 267 and an updated health view 323, and provides the updated device 265 from the computer. The new blank form 267, the updated health view 323 and the updated device 265 provide the updated package 329, which is ready to be given to a caregiver on the owner's next encounter with a caregiver.

Referring to Figures 49 and 50, a computer 330 has a random access memory (RAM) 332 and a display 334. A disc drive 336 accepts a portable computer readable and writeable device. A keyboard 338 connected to the computer 330 controls selection of screens and input of data. Once the device has been placed in the drive 336, the keyboard operator keys the number "1" and "Enter". The system automatically starts and displays the main menu screen shown in Figure 1. A printer 340 is connected to the computer and prints out blank forms and health views upon selection by the computer operator's keystrokes on the keyboard 338.

Figure 51 shows a computer readable and writeable device 342, which is contained in a transparent case 344 with a living hinge along one side 346. Before a caregiver returns the updated computer readable and writeable device 342 to the owner, the device is placed in the case, and the case is closed and sealed. One form of sealing is shown in which a label 348 with the caregiver's identification is wrapped around the openable edges 354 of the case 344. The label 348 is permanently adhered to opposite sides of the case near the

openable edges 354. The owner carries the device 342 in the sealed case 344. The device 342, in the closed and sealed case is given to the next healthcare provider. The condition of the seal indicates whether the case has been opened.

Referring to Figure 52, the portable health information package 329 may be handed back and forth from the owner to the primary care giver physician's office 360, to a psychiatrist 362, a dentist 364, a pharmacist 366, optometrist 368, physiotherapist 370, a hospital facility for in-patients 372 or out-patients 374, or an emergency room 376. The package 329 may be used at the site of an accident 380, in a nursing home 382, at a distant site 384 in another city or country, or by other caregivers 386.

In the preferred embodiment, each data element is recorded as one structured free text record in the personal database file, which when printed can fit one horizontal line in a standard 8½ x 11" or A4 size page. As shown in Figure 41, each record comprises ten character-type fields 203, which are used to record data components. Each field has a predefined length. The data are recorded in all fields as characters, even in fields that contain date data. A label of a body system is recorded in the SYS field by three characters. The number of the problem in a body system is recorded in the NO field with up to two characters. The type of data is recorded in the T field, using one character. The data are recorded in the DATA field with up to thirty-four characters. Details of data are recorded in the DETAILS field using up to seventeen characters. The sequence of topics in a problem is recorded in the SQ field by up to two characters. The subject of the data is recorded in the SUB field by up to three characters. The date of the occurrence of each data element is recorded in the DATE field by up to ten characters. The time of the occurrence of each data element is recorded in the TIME field by up to eleven characters. The source of each data element is recorded in the SOURCE field by up to fifteen characters. Thus, each data

element is recorded as one record in the personal database by up to ninety-nine characters, as shown in screen 201 of Figure 41.

Although one can use any characters to label body systems, in the preferred embodiment, it is recommended, as shown in screen 69 of Figure 15, to use the following character combinations 71 to label body systems in the system (SYS) field: CVS=cardiovascular system; DEN=dental system; END=endocrine system; ENT=ear, nose and throat systems; EYE=eye (ophthalmic) system; GIT=gastrointestinal system; GUR=genitourinary system; GYN=gynecologic system; HEB=hepato-biliary system; HEM=hematologic system; MET=metabolic and nutritional conditions; MUS=musculoskeletal system; NEU=neurologic system; PSY=psychiatric conditions; RES=respiratory system; SKN=skin (dermatologic) system; SYS=systemic conditions; ALL=all body systems. Using the recommended character combinations when recording data elements enables instant clustering of data elements by body system in the database file, and also displaying data by systems by selecting the appropriate number 1-18 in screen 69 of Figure 15. For instance, Figure 16 shows screen 73, which displays only data related to the musculoskeletal system because the caregiver has selected option 13, ("13.MUS"), in screen 69 of Figure 15. Figure 17 shows screen 77, which displays only data related to the skin (dermatologic) system because the caregiver has selected option 17, ("17.SKN"), in screen 69 of Figure 15.

If a data element cannot be classified and its cause is unknown, it is recommended to label the body system (SYS) of the data element with three question marks (???). This ensures that unexplained data will be instantly displayed clearly at the top of the browse screen 23 as shown in Figure 3 and at the top of the health view printout as shown in Figure 43a, and thus draw the caregivers attention immediately. All data elements labeled with three question marks (???) are displayed

clearly at the top of the screen also in Figures 3-5,7-10,12-13,20,21,25,29, 43 and 43a.

In the preferred embodiment of the present invention, personal identification data of the owner can be added to the components of the package in four simple methods. The name, ID number, telephone number, signature of the owner and the date in which the data were last updated can be hand written on the preprinted paper label already affixed to the surface of the portable computer readable device, shown in Figure 46. A passport picture of the owner can be glued on the preprinted paper label already affixed to the surface of the portable computer readable device, shown in Figure 46. A short personal identification label of the owner, such as his name, his ID number or a telephone number can be recorded electronically on the portable computer readable device, by selecting option 1, ("1.MAKE A BACKUP"), as shown in screen 13 of Figure 1, and then answering questions 18 and 20, and then following instructions 19 in screen 17 of Figure 2. The name, address and date of birth of the owner can be recorded electronically as a record in the portable personal database file, by selecting option 5, ("5.ADD NEW DATA"), in screen 13 of Figure 1, and then recording the name in the data field leaving the system field (SYS") blank. This ensures that the name, address and date of birth of the owner will be displayed clearly as the first line of the browse screen as shown in Figure 3 and at the top of the HEALTH VIEW printout as shown in Figure 43a, and thus draw the caregivers attention immediately. One or all of the personal identification data can be changed or removed completely on any one of the components of the package, whenever the owner wants, using the same simple methods within seconds anywhere, and thus enables him to maintain anonymity.

Although one can use any characters to label types of data, in the preferred embodiment, it is recommended, to use the following characters to label types of data: F=family history; S=signs and symptoms; L=laboratory examinations and

tests; D=diagnoses; T=all treatments. Although one can use any other characters to label subjects, in the preferred embodiment, it is recommended, to use the following characters combinations to label the most common subjects: BLD=blood; TAB=tablet. Using the recommended characters when recording data elements enables instant clustering of data elements by types of data and subjects in the database file, and also displaying data by selecting the appropriate numbers in screen 81 of Figure 18. For instance, Figure 19 shows screen 83, which displays only family history data 84 because the caregiver has selected option 1, ("1.FAMILY HISTORY"), in screen 81 of Figure 18. Figure 20 shows screen 85, which displays only signs and symptoms data 86 because the caregiver has selected option 2 ("2.SIGNS & SYMPTOMS") in screen 81 of Figure 18.

Although in the preferred embodiment of the present invention it is possible to record on one portable computer readable storage device more than eight thousand data elements, which is in most cases more than necessary for all the health data of the owner from birth to death with no exception, it is recommended to record only abnormal and normal relevant health data elements. Recording only abnormal and normal relevant health data elements has significant advantages. It reduces the work needed to enter data, and enables every caregiver to view and/or print an overview of the complete medical history of a patient, or only the relevant data that he needs to perform his task, usually with one click of a button, in a clear, concise layout, which can support his diagnostic and management decisions.

The invention provides a simple, standard, fast, accurate and very easy uniform method for recording each and every health data element with no exception, using structured professional free text, in computer readable and in eye readable forms by all caregivers, at all points of care anywhere in the world.

Each and every health data element of the owner, with no exception, is recorded quickly in one simple standard form by all caregivers at all points of care, anywhere in the world, with no exception. Every caregiver records all findings, tests, diagnoses, therapies and any other health data, in his own natural professional language, at all points of care, anywhere in the world. Caregivers record all complaints of the owner and any other information provided by him, in the owner's own words, at all points of care, anywhere in the world. Every caregiver records exact time, as well as temporal uncertainty and multiple temporal granularities, for each and every data element, even if it cannot fit into any standard "valid" date field.

It is usable with any existing personal computer, even computers that have very slow processors and do not have a hard disk.

Backup of all or any one of the components of the package can be easily done within seconds anywhere.

In the preferred embodiment, the portable device is inserted into the reader/writer. The presentation of the health data elements is organized according to the body organ systems for presenting the health data elements further grouped by topic and sequenced according to the labeling designations. The presentation displays the health data elements according to any other labeling designations of the data elements in any of the fields. The health data elements are displayed and printed according to the labeling designations, by body systems, problem number, topics and sequence of the topics.

Health data elements are recorded to the health data file, including attributes of health information data in fields in the health data elements. Health data elements and the fields of health information in the health data file, all in one in a standard universal structure, which stores identifications of fields in the portable device and body organ system

designations in the portable health data file in the portable device.

In the preferred embodiment, in order to link and integrate data from two portable computer readable devices, the recorded health data elements are temporarily transferred from one portable device into the hard disk of a personal computer. The second portable device is inserted into the appropriate reader/writer, and the health data elements are transferred from the hard disk to the second portable device. A search of the health data elements is performed in the health data file for specific attributes in the health data fields of the health data file.

The need to link and integrate data from two devices occurs when one part of the health information of the owner is stored on one device and another part of his health information is stored on another device. This happens when the owner does not have with him the old device at the point of care, and his caregiver records new data on a new temporary device.

In one embodiment, application files are included in the portable device. Displaying the applications files includes display screens on the display screen of the computer for selecting organizations and presentations of the data elements according to specific attributes and fields. The applications files also provide organizing and presenting the health data elements by body organ system, problem number, topic, sequence and subject.

In one embodiment, the display has attributes of health information in fields in the health data elements and includes the health information data in fields of body organ system, problem number, topic data, details data, sequence of topic presentation, subject data, date data and time data.

In one embodiment, the portable device is inserted into an appropriate reader/writer and may print out a form from the portable device for a user to use for recording data elements.

In another embodiment, the device is inserted in an appropriate reader/writer. This enables application software from the portable device to control the data processing system, the application files and the health data files in the portable device by commands to a random access memory connected to the reader/writer.

In another embodiment, the portable device is inserted in an appropriate reader/writer, temporarily transferring the data processing system. The application files and the health data files may be transferred from the portable device. The portable device is removed from the reader/writer. A second portable device is inserted in the reader/writer for transferring the data from the random access memory to the second portable device.

In one embodiment, the present invention includes displaying each health data element as one line on a display screen. The health data elements are stored and organized, including organizing the health data elements into groups according to body organ system designation when the displaying of the health data elements occurs.

In one embodiment, each health data element may be printed as one line on a printout. The health data elements may also be stored and organized, including organizing the health data elements into groups according to at least one of the body organ system designations when the printing of the health data elements occurs.

In another embodiment, the present invention is a personal health data package apparatus including a programmable detachable portable computer readable and writable device, a data processing system in the portable device, a health data file in the portable device, health data elements recorded in the health data file, the health data elements, further comprising attributes of health information data in fields in the health data elements, the health data elements and the fields of health information being stored in the health data

file, identifications of fields stored in the portable device, and body organ system designations stored in the portable device.

In this embodiment, the recorded health data elements include recordings of abnormal and normal relevant health data elements. The portable device is inserted into the appropriate reader/writer. The health data elements are organized according to the body organ systems for presenting the health data elements according to the body organ systems.

Another embodiment utilizes a display for displaying the health data elements according to body organ systems, a printer for printing the health data elements according to body organ systems, and a hard disc for temporarily transferring the recorded health data elements from the portable device into the hard disc. A second portable device may be inserted in the reader/writer, for transferring the health data elements from the hard disc to the second portable device.

One embodiment includes an application file in the portable device having search commands for searching the health data elements in the health data file for specific attributes in specific fields in the health data file. The present invention also includes applications files in the portable device.

The applications files include display screens for selecting organizations and presentations of the health data elements according to specific attributes and fields.

In one embodiment, the health data elements are stored in the portable device and are organized when presented by body organ system, problem number, topic, sequence and subject.

In another embodiment, the attributes of the health information are stored as data in the fields and the health data elements in fields of body organ system, problem number, topic data, details data, sequence, date data and time data. Information is stored in the portable device for printing out a form for a user to use for recording data elements.

In one embodiment, the portable device inserted in a reader/writer enables application software to control the data processing system, the application files and the health data files in the portable device with commands to a random access memory connected to a drive.

In one embodiment, portable device is inserted in a reader/writer for temporarily transferring the data processing system, the application files and the health data files in the portable device to the random access memory before removing the portable device from the reader/writer. A second portable device inserted in the drive for transferring the data from the random access memory to the second portable device.

While the preferred embodiment of the invention is recording, storing, organizing, displaying and printing health data of human beings, alternative embodiments include variations of the invention for storage and retrieval of other types of data, such as health data of animals, and a variety of personal data of humans and animals or groups of animals. The cost of manufacturing a complete package, in which the computer readable storage device is a 3.5-inch floppy disk, is minimal.

In the preferred embodiment, the portable personal health information package uses standard 3.5-inch floppy disks as a portable computer readable storage device, and standard 3.5 disk drives of any personal computer as reader/writers, for storage of the complete database management software program and the owner's personal health data file, ready for use with any standard personal computer.

The present invention further includes a data processing system in the portable device, a health data file in the portable device. The present invention records health data elements to the health data file, including attributes of health information data in fields in the health data elements, stores health data elements and the fields of health information in the health data file, all in one in a standard universal structure, stores identifications of fields in the

portable device and stores Body organ system designations in the portable health data file in the portable device.

The present invention records abnormal and normal relevant health data elements. The portable device may also be inserted into reader/writer. The presentation of the health data elements can be organized according to the body organ systems for presenting the health data elements further grouped by topic and sequence according to the labeling designations. The presentation may also display the health data elements according to any other labeling designations of the data elements in any of the fields. The user may print the health data elements according to the labeling designations, by body systems, problem number, topic and sequence of the topics.

In the present invention, the recorded health data elements may be temporarily transferred from the portable device into a hard disc of a personal computer. A second portable device may be inserted into the appropriate reader/writer, and the health data elements may be transferred from the hard disc to the second portable device.

The present invention allows for a search of the health data elements to be performed in the health data file for specific attributes in the health data fields of the health data file.

Application files may be included in the portable device. Displaying the applications files may include display screens on the display screen of the computer for selecting organizations and presentations of the data elements according to specific attributes and fields. Providing the applications files may also provide organizing and presenting the health data elements by body organ system, problem number, topic, sequence and subject.

The display has attributes of health information in fields in the health data elements and includes the health information data in fields of body organ system, problem number, topic

data, details data, sequence of topic presentation, subject data, date data and time data.

The portable device may be inserted into an appropriate reader/writer and may print out a form from the portable device for a user to use for recording data elements.

The portable device may further be inserted in an appropriate reader/writer. This enables application software from the portable device to control the data processing system, the application files and the health data files in the portable device by commands to a random access memory connected to the reader/writer.

The portable device may also be inserted in an appropriate reader/writer and temporarily transferring the data processing system. The application files and the health data files may be inserted in the portable device. The portable device may be removed from the reader/writer. A second portable device may be inserted in the reader/writer for transferring the data from the random access memory to the second portable device.

The present invention includes displaying each health data element as one line on a display screen. The health data elements are stored and organized, including organizing the health data elements into groups according to at least one body organ system designation when the displaying of the health data elements occurs.

Each health data element may be printed as one line on a printout.

The health data elements may also be stored and organized, including organizing the health data elements into groups according to at least one of the body organ system designations when the printing of the health data elements occurs.

The present invention is a personal health data package apparatus including a programmable detachable portable computer readable and writable device, a data processing system in the portable device, a health data file in the portable device, health data elements recorded in the health data file, the

health data elements, further comprising attributes of health information data in fields in the health data elements, the health data elements and the fields of health information being stored in the health data file, identifications of fields being stored in the portable device, and body organ system designations being stored in the portable device.

The recorded health data elements include recordings of abnormal and normal relevant health data elements.

The portable device is inserted into the appropriate reader/writer. The health data elements are organized according to the body organ systems for presenting the health data elements according to the body organ systems.

The present invention includes a display for displaying the health data elements according to body organ systems, a printer for printing the health data elements according to body organ systems, and a hard disc for temporarily transferring the recorded health data elements from the portable device into the hard disc. A second portable device may be inserted in the reader/writer, for transferring the health data elements from the hard disc to the second portable device.

The present invention also includes an application file in the portable device having search commands for searching the health data elements in the health data file for specific attributes in specific fields in the health data file. The present invention also includes applications files in the portable device.

The applications files include display screens for selecting organizations and presentations of the health data elements according to specific attributes and fields.

In the present invention, the health data elements are stored in the portable device and are organized when presented by body organ system, problem number, topic, sequence and subject.

In the present invention, the attributes of the health information data in the fields and the health data elements in

fields of body organ system, problem number, topic data, details data, sequence, date data and time data. Information is stored in the portable device for printing out a form for a user to use for recording data elements.

The present invention includes a portable device in a reader/writer enabling application software for controlling the data processing system, the application files and the health data files in the portable device with commands to a random access memory connected to a drive.

The present invention includes inserting a portable device in a reader/writer for temporarily transferring the data processing system, the application files and the health data files in the portable device to the random access memory before removing the portable device from the reader/writer, and a second portable device inserted in the drive for transferring the data from the random access memory to the second portable device.

The new system enables a computer to record, link and integrate health data of a memory device of an individual from birth to death, collected from all paper-based medical records, computer-based medical records, and all other sources of information.

The new system enables a person to carry with him at all times his complete health information, and allows him to grant his caregivers instant access to all or any part of his health data, whenever the information is needed at all points of care, anywhere in the world with no exception.

The new memory device placed in a computer can print an updated structured summary of the owner's health history from birth to death, which displays his health data, organized by body organ systems and types and subtypes of data that is instantaneously eye-readable.

The new system enables every caregiver to view and/or print only the relevant data that he needs to perform his task, usually with one click of the button, in a clear, concise

layout, which can support diagnostic and health management decisions.

The new method and apparatus enables a patient to view all his own health information, correct inaccurate data, add missing data, gain understanding of his own health, and have absolute control over the privacy, confidentiality, security, backups and access to his personal health data.

The package works fast even with very old computers that have slow processors, and do not have a hard disk, because the database management software program and a personal database file are contained in a portable computer readable storage device, and the database management software program is resident on the portable computer readable storage device during its operation, and uses only the RAM of a PC.

The new system uses a variety of portable programmable detachable computer readable/writable memory devices to store and carry the personal database file and the database management software program. The devices include, without limitation, optical memory cards, floppy disks, flash memory cards, PCMCIA cards and other computer readable storage devices with comparable storage capacity.

OTHER EMBODIMENTS OF THE INVENTION

While the preferred embodiment of the invention is recording, storing, organizing, displaying and printing health data of human beings, alternative embodiments include variations of the invention for storage and retrieval of other types of data, such as health data of animals, machine maintenance data, and a variety of personal data such as, curriculum vitae, addresses and telephone numbers, birthdays, anniversaries etc.

While the preferred embodiment of the invention uses a conventional 3.5 inch floppy disk as a portable computer readable storage device, the invention can use a variety of other portable programmable detachable computer readable devices, to store and carry the personal database file and the

database management software program, including optical memory cards, flash memory cards, PCMCIA cards and other computer readable storage devices with comparable storage capacity.

The invention is independent of any specific hardware or software. If in the future any other new types of personal computer, portable programmable detachable computer readable/writable device, or software language will gain wide acceptance, then it will be possible to use them worldwide, as parts of the present invention.

CONCLUSIONS, RAMIFICATIONS, AND SCOPE OF THE INVENTION

The reader will see that the portable personal health information package of the present invention can overcome today anywhere in the world, many very common universal problems, that prevent caregivers from getting all the relevant data from the past health history of patients at all points of care, which innumerable commercial bodies, academic institutes, national and international organizations and countless individuals, tried to solve and failed.

The invention has the potential to greatly improve communication among caregivers, alter dramatically how patient healthcare information will be accessed, transmitted and used, and improve the way information is shared within the medical community. The invention can improve the quality and reduce the cost of healthcare given to the owner of the package, anywhere in the world. There are no technical, financial or legal barriers that can prevent immediate widespread use of the package anywhere in the world. Therefore, it is possible to begin to use the system immediately, anywhere in the world with no exception - in poor countries and in rich countries alike, and the vision that many millions of people would carry their personal health information package can be realized. Widespread use of the invention can have a dramatic positive effect upon public health and cost containment, and will be highly

beneficial to for patients, caregivers, insurers and society at large, worldwide.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplifications of the preferred embodiments thereof. Many other variations are possible. Accordingly, the scope of the invention should be determined not by the embodiments illustrated, but by reference to the accompanying claims and their legal equivalents.

I claim:

1. A method for handling personal health data, comprising:

providing a personal programmable detachable portable computer readable and writable device;

providing a data processing system in the portable device;

providing a health data file in the portable device;

recording health data elements in the health data file;

providing attributes of health information data in fields of health information in the health data elements;

storing the health data elements in the fields of health information as records in the health data file in a standard universal structure;

storing identifications of the fields of health information in the portable device; and

storing body organ system designations in the portable health data file in the portable device.

2. The method of claim 1, wherein the recording comprises recording abnormal and normal relevant health data elements.

3. The method of claim 1, further comprising inserting the portable device in a reader/writer and presenting the health data elements.

4. The method of claim 3, further comprising organizing presentation of the health data elements according to the body organ systems for presenting the health data elements further grouped by topic and sequence according to labeling designations.

5. The method of claim 3, wherein the presenting further comprises displaying the health data elements according to other labeling designations of the data elements in any of the fields.

6. The method of claim 3, wherein the presenting further comprises printing the health data elements according to the

labeling designations, by body systems, problem number, topic and sequence of the topics.

7. The method of claim 3, further comprising:

temporarily transferring the recorded health data elements from the portable device into a hard disc of a personal computer;

inserting a second portable device into the reader/writer;
and

transferring the health data elements from the hard disc to the second portable device.

8. The method of claim 3, further comprising performing a search of the health data elements in the health data file for specific attributes in the health data fields of the health data file.

9. The method of claim 1, further comprising providing applications files in the portable device.

10. The method of claim 9, wherein the providing of applications files further comprises providing display screens on a display of a computer for selecting organizations and presentations of the data elements labeled by specific attributes in the fields.

11. The method of claim 9, further comprising organizing and presenting the health data elements by body organ system, problem number, topic, sequence and subject.

12. The method of claim 1, wherein the providing of attributes of health information in fields in the health data elements comprises providing the health information data in fields of body organ system, problem number, topic, data, details, sequence of topic presentation, subject, date, time and source.

13. The method of claim 1, further comprising inserting the portable device in an appropriate reader/writer, printing out a form from the portable device for a user and using the form for recording data elements.

14. The method of claim 1, further comprising inserting the portable device in an appropriate reader/writer and enabling application software from the portable device for controlling the data processing system, application files and the health data files in the portable device by commands to a random access memory connected to the reader/writer.

15. The method of claim 1, further comprising storing application files in the portable device, inserting the portable device in an appropriate reader/writer and temporarily accessing the application files and the health data file in the portable device as data to a random access memory and a hard disc, removing the portable device from the reader/writer, inserting a second portable device in the reader/writer and transferring the data from the hard drive via the random access memory to the second portable device.

16. The method of claim 1, further comprising displaying each health data element as one line on a display screen.

17. The method of claim 16, further comprising storing the health data elements and organizing the health data elements into groups according to at least one body organ system designation when the displaying of the health data elements occurs.

18. The method of claim 1, further comprising printing each health data element as one line on a printout.

19. The method of claim 16, further comprising storing the health data elements and organizing the health data elements into groups according to at least one of the body organ system designations when the printing of the health data elements occurs.

20. Personal health data package apparatus, comprising:
a portable, programmable, detachable computer readable and writable device;

a data processing system in the portable device;

a health data file in the portable device;

health data elements recorded in the health data file;

the health data elements further comprising attributes of health information data in fields in the health data elements;
the health data elements and the fields of health information being stored in the health data file;
identifications of fields stored in the portable device;
and
body organ system designations stored in the portable device.

21. The apparatus of claim 20, wherein the recorded health data elements comprise recorded abnormal and normal relevant health data elements.

22. The apparatus of claim 20, further comprising an appropriate reader/writer for receiving the portable device.

23. The apparatus of claim 22, wherein the health data elements are organized according to the body organ systems for presenting the health data elements according to the body organ systems.

24. The apparatus of claim 22, further comprising a display for displaying the health data elements according to body organ systems.

25. The apparatus of claim 22, further comprising a printer for printing the health data elements according to body organ systems.

26. The apparatus of claim 22, further comprising a hard disc for temporarily storing the recorded health data elements from the portable device into the hard disc, a second portable device inserted in the reader/writer, the health data elements being transferred from the hard disc to the second portable device.

27. The apparatus of claim 22, further comprising an application file in the portable device having search commands for searching the health data elements in the health data file for specific attributes in specific fields in the health data file.

28. The apparatus of claim 20, further comprising applications files in the portable device.

29. The apparatus of claim 28, wherein the applications files comprise display screens for selecting organizations and presentations of the health data elements according to specific attributes and fields.

30. The apparatus of claim 28, wherein the health data elements are stored in the portable device and are organized when presented by body organ system, problem number, topic, sequence and subject.

31. The apparatus of claim 20, wherein the attributes of the health data elements are grouped according to body organ system, problem number, topic, data, details, sequence, date, time and source.

32. The apparatus of claim 20, further comprising information stored in the portable device for printing out a form for a user to use for recording data elements.

33. The apparatus of claim 20, further comprising a reader/writer and the portable device in the reader/writer and enabling application software for controlling the data processing system, the application files and the health data files in the portable device with commands to a random access memory connected to a drive.

34. The apparatus of claim 20, further comprising a reader/writer, and wherein the portable device is inserted in the reader/writer for temporarily transferring the health data file in the portable device to a hard drive via a random access memory before removing the portable device from the reader/writer, and a second portable device inserted in the reader/writer for transferring the health data file from the hard drive via the random access memory to the second portable device.

35. A method of storing and presenting health care information, comprising:

providing a portable readable and writable memory storage device;

storing a software program in the device for recording, organizing and linking health data elements;

storing applications programs in the device for controlling and linking screens;

placing the device in a processor;

accessing the stored software and applications programs from the device by a random access memory in the processor;

displaying screens on a display connected to the processor;

selecting screens for inputting health data;

inputting abnormal and relevant normal health data with inputs connected to the processor by completing available abnormal and relevant normal information in fields, including body systems, within line data elements in response to prompts;

temporarily storing the input line data elements in the random access memory;

automatically reorganizing the line data elements according to topic fields and chronology in the random access memory;

storing the line data elements on the portable memory storage device;

removing the device from the processor; and

removing the software program, applications programs and line data elements from the random access memory.

36. The method of claim 35, further comprising after the display selecting a form-printing, printing a form with a printer connected to the processor, completing the form by writing abnormal and relevant normal information on the form, and using the completed form for the inputting of the health data.

37. The method of claim 35, further comprising after the reorganizing printing a health view with a printer connected to

the processor, and presenting on the health view line data elements organized according to body systems.

38. The method of claim 35, further comprising presenting the portable memory storage device to a health care giver, inserting the device in a computer, printing a form, completing the form with new abnormal and relevant normal health information, inputting information in the computer as new line data elements, and updating the portable memory storage device with the new line data elements.

39. The method of claim 38, further comprising placing the updated device in a container and sealing the container.

40. The method of claim 39, further comprising presenting the sealed container to a next health care giver.

41. A method for handling personal health data, comprising:

providing a health data file;

recording health data elements in the health data file;

providing attributes of health information data in fields of health information in the health data elements;

storing the health data elements in the fields of health information as records in the health data file;

storing identifications of the fields of health information; and

storing body organ system designations in the health data file.

42. The method of claim 41, wherein the recording comprises recording abnormal and normal relevant health data elements.

43. The method of claim 41, wherein the storing comprises storing in a portable device and further comprising inserting the portable device in a reader/writer and presenting the health data elements.

44. The method of claim 41, further comprising organizing presentation of the health data elements according to the body organ systems for presenting the health data elements further

grouped by topic and sequence according to labeling designations.

45. The method of claim 41, wherein the presenting further comprises displaying the health data elements according to other labeling designations of the data elements in any of the fields.

46. The method of claim 41, wherein the presenting further comprises printing the health data elements according to the labeling designations, by body systems, problem number, topic and sequence of the topics.

47. The method of claim 41, further comprising:
temporarily transferring the recorded health data elements from a first portable device into a hard disc of a personal computer;

inserting a second portable device into a reader/writer;
and

transferring the health data elements from the hard disc to the second portable device.

48. The method of claim 41, further comprising performing a search of the health data elements in the health data file for specific attributes in the health data fields of the health data file.

49. The method of claim 41, further comprising providing applications files in the health data file.

50. The method of claim 49, wherein the providing of applications files further comprises providing display screens on a display of a computer for selecting organizations and presentations of the data elements labeled by specific attributes in the fields.

51. The method of claim 49, further comprising organizing and presenting the health data elements by body organ system, problem number, topic, sequence and subject.

52. The method of claim 41, wherein the providing of attributes of health information in fields in the health data elements comprises providing the health information data in

fields of body organ system, problem number, topic, data, details, sequence of topic presentation, subject, date, time and source.

53. The method of claim 41, further comprising inserting the health data file in an appropriate reader/writer, printing out a form from the health data file for a user and using the form for recording data elements.

54. The method of claim 41, further comprising inserting the health data file in an appropriate reader/writer and enabling application software from the health data file for controlling the data processing system, application files and the health data file by commands to a random access memory connected to the reader/writer.

55. The method of claim 41, further comprising storing application files and the health data file in a first portable device, inserting the portable device in an appropriate reader/writer and temporarily accessing the application files and the health data file in the portable device as data by a random access memory and a hard disc, removing the portable device from the reader/writer, inserting a second portable device in the reader/writer and transferring, linking and integrating the data from the hard disc via the random access memory to the second portable device.

56. The method of claim 41, further comprising displaying each health data element as one line on a display screen.

57. The method of claim 56, further comprising storing the health data elements and organizing the health data elements into groups according to at least one body organ system designation when the displaying of the health data elements occurs.

58. The method of claim 41, further comprising printing each health data element as one line on a printout.

59. The method of claim 56, further comprising storing the health data elements and organizing the health data elements into groups according to at least one of the body

organ system designations when the printing of the health data elements occurs.

60. Personal health data package apparatus, comprising:
a health data file;
health data elements recorded in the health data file;
the health data elements further comprising attributes of health information data in fields in the health data elements;
the health data elements and the fields of health information being stored in the health data file;
identifications of fields stored in the portable device;
and

body organ system designations stored in the portable device.

61. The apparatus of claim 60, wherein the recorded health data elements comprise recorded abnormal and normal relevant health data elements.

62. The apparatus of claim 60, further comprising an appropriate reader/writer for receiving the health data file.

63. The apparatus of claim 62, wherein the health data elements are organized according to the body organ systems for presenting the health data elements according to the body organ systems.

64. The apparatus of claim 62, further comprising a display for displaying the health data elements according to body organ systems.

65. The apparatus of claim 62, further comprising a printer for printing the health data elements according to body organ systems.

66. The apparatus of claim 62, further comprising a first portable device storing the health data file, a hard disc for temporarily transferring the recorded health data elements from the first portable device into the hard disc, a second portable device inserted in the reader/writer, the health data elements being transferred linked and integrated from the hard disc to the second portable device.

67. The apparatus of claim 66, further comprising application files in the first and second portable devices having search commands for searching the health data elements in the health data file for specific attributes in specific fields in the health data file.

68. The apparatus of claim 60, further comprising a portable device for storing the health data file and application files in the portable device.

69. The apparatus of claim 68, wherein the applications files comprise display screens for selecting organizations and presentations of the health data elements according to specific attributes and fields.

70. The apparatus of claim 68, wherein the health data elements are stored in the portable device and are organized when presented by body organ system, problem number, topic, sequence and subject.

71. The apparatus of claim 60, wherein the attributes of the health information data in the fields and the health data elements in fields of body organ system, problem number, topic, data, details, sequence, date, time and source.

72. The apparatus of claim 68, further comprising information stored in the portable device for printing out a form for a user to use for recording data elements.

73. The apparatus of claim 68, further comprising a reader/writer and the portable device in the reader/writer and enabling application software for controlling the data processing system, the application files and the health data files in the portable device with commands to a random access memory connected to a drive.

74. The apparatus of claim 68, further comprising a reader/writer and the portable device inserted in the reader/writer for temporarily transferring the data processing system, the application files and the health data files in the portable device to the random access memory before removing the portable device from the reader/writer, and a second portable

device inserted in the drive for transferring the data from the random access memory to the second portable device.

75. A method of storing and presenting health care information, comprising:

- storing a software program in a device for recording, organizing and linking health data elements;

- storing applications programs in the device for controlling and linking screens;

- placing the device in a processor;

- installing the stored software and applications programs from the device into a random access memory in the processor;

- displaying screens on a display connected to the processor;

- selecting screens for inputting health data;

- inputting abnormal and relevant normal health data with inputs connected to the processor by completing available abnormal and relevant normal information in fields, including body systems, within line data elements in response to prompts;

- temporarily storing the input line data elements in the random access memory;

- automatically reorganizing the line data elements according to topic fields and chronology in the random access memory;

- storing the line data elements on the portable memory storage device;

- removing the device from the processor; and

- removing the software program, applications programs and line data elements from the random access memory.

76. The method of claim 75, further comprising after the display selecting a form-printing, printing a form with a printer connected to the processor, completing the form by writing abnormal and relevant normal information on the form, and using the completed form for the inputting of the health data.

77. The method of claim 75, further comprising after the reorganizing printing a health view with a printer connected to the processor, and presenting on the health view line data elements organized according to body systems.

78. The method of claim 75, further comprising presenting the device to a health care giver, inserting the device in a computer, printing a form, completing the form with new abnormal and relevant normal health information, inputting information in the computer as new line data elements, and updating the device with the new line data elements.

79. The method of claim 78, further comprising placing the updated device in a container and sealing the container.

80. The method of claim 79, further comprising presenting the sealed container to a next health care giver.

81. An animal health data record system comprising a health data record having multiple recorded health data elements and further comprising multiple health information fields within the health data elements by which and in which the health data elements are organized.

82. The system of claim 81, wherein the multiple health information fields comprise body organ systems, data and details.

83. The system of claim 82, wherein the multiple health information fields further comprise problem numbers, topics and subjects.

84. The system of claim 83, wherein the multiple health information fields further comprise dates of occurrence.

85. The system of claim 84, wherein the multiple health information fields comprise times of occurrence and sources of report.

86. The system of claim 81, wherein the health data elements and the health information fields are arranged orthographically.

87. The system of claim 81, wherein the health data elements are arranged horizontally and the health information fields are arranged vertically.

PORTABLE HEALTH INFORMATION PACKAGE

M A I N M E N U

15

- 1. MAKE A BACKUP !!!
- 2. BROWSE-EDIT DATA
- 3. DISPLAY by SYSTEMS
- 4. DISPLAY by TOPICS
- 5. ADD NEW DATA
- 6. LINK DATA
- 7. PRINT A BLANK FORM
- 8. PRINT "HEALTH VIEW"

0. EXIT TO DOS

select 1

11 *16* *13*

FIG. 1

Volume in drive A is MILLER N
Volume label (11 characters, ENTER for none)? ← 18

Delete current volume label (Y/N)? n ← 20

← 19

Insert SOURCE diskette in drive A:

Press any key to continue . . .

Copying 80 tracks, 18 sectors per track, 2 side(s)

Reading from source diskette . . .

Insert TARGET diskette in drive A:

Press any key to continue . . .

Writing to target diskette . . .

Do you wish to write another duplicate of this disk (Y/N)?

← 21

↖ 17

FIG 2

CURSOR <-- --> Char: → Field: Home End Pan: ^ ^ →	UP DOWN Record: PgUp PgDn Page: F1 Help:	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit: ^End Abort: Esc Set Options: ^Home
--	---	--	--

SYS NO T DATA (34) Miller Nancy ??? 1 s syncope ??? 1 s syncope ??? 2 s cough, non productive ??? 3 s vertigo ??? 4 s frontal hard mass, left ??? 5 1 high SAP (serum alk. phosphatase) cvs 1 d varicose veins, legs cvs 2 d thrombophlebitis, leg, lt. cvs 2 d thrombophlebitis, left calf cvs 3 d hypertension, fluctuating	DETAILS Atlanta, GA. USA severe 5-6mm 100/85 Lt. > Rt.	SQ SUB DATE DOB Aug12,1936 ana 24.09.1963 ana 18.02.1966 ana 1968,69,70 ana 02-08-1983 pex 08.08.1983 bld 28-08-1984 pex 17.04.1978 pex +- 06/1982 pex 03.02.1986 cln since 1972
--	---	---

CURSOR <-- --> Char: → Field: Home End Pan: ^ ^ →	UP DOWN Record: PgUp PgDn Page: F1 Help:	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit: ^End Abort: Esc Set Options: ^Home
--	---	--	--

FIG. 3

FIG. 3a

25

29

32

33

35

37

41

SYS NO	T DATA	DETAILS	SQ	SUB DATE
???	Miller Nancy	Atlanta, GA. USA	1	DOB Aug12,1936
???	s syncope		2	ana 24.09.1963
???	s syncope			ana 18.02.1966
???	s cough, non productive	severe		ana 1968,69,70
???	s vertigo			ana 02-08-1983
???	s frontal hard mass, left	5-6mm		pex 08.08.1983
???	s high SAP (serum alk. phosphatase)	100/85		bld 28-08-1984
cvs 1	d varicose veins, legs	Lt. > Rt.		pex 17.04.1978
cvs 2	d thrombophlebitis, leg, lt.			pex +- 06/1982
cvs 2	d thrombophlebitis, left calf			pex 03.02.1986
cvs 3	d hypertension, fluctuating			cln since 1972
cvs 3	f hypertension	mother		ana at age 30
cvs 3	f hypertension	sister		ana at age 25
cvs 3	f hypertension	150/110		pex 07.12.1977
cvs 3	f cardiomegaly	isotope scan		iso 29.04.1980
cvs 3	S HYPERTENSIVE RETINOPATHY	GRADE 1		pex 13.06.1964
cvs 3	T DIGOXIN	0,25mgx1 qd		tab 1965->1966

42

29

23

FIG 4

Bottom SYS NO	Top DATA	Lock	Record No.	Freeze DETAILS	Find SQ	03:00:48 pm SUB DATE
44	Miller Nancy			Atlanta, GA. USA	1	DOB Aug12, 1936
???	s syncope		43		2	ana 24.09.1963
???	s syncope					ana 18.02.1966
???	s cough, non productive			severe		ana 1968, 69, 70
???	s vertigo					ana 02-08-1983
???	s frontal hard mass, left			5-6mm		pex 08.08.1983
???	s high SAP (serum alk. phosphatase)			100/85		bld 28-08-1984
CVS 1	d varicose veins, legs			Lt. > Rt.		pex 17.04.1978
CVS 2	d thrombophlebitis, leg, lt.					pex +- 06/1982
CVS 2	d thrombophlebitis, left calf					pex 03.02.1986
CVS 3	d hypertension, fluctuating					cln since 1972
CVS 3	f hypertension			mother		ana at age 30
CVS 3	f hypertension		29	sister		ana at age 25
CVS 3	f hypertension			150/110		pex 07.12.1977
CVS 3	l cardiomegaly			isotope scan		iso 29.04.1980
CVS 3	S HYPERTENSIVE RETINOPATHY			GRADE 1		pex 13.06.1964
CVS 3	T DIGOXIN			0,25mgx1 qd		tab 1965->1966

23

FIG 5

Bottom SYS NO	T DATA	Lock	Record No.	DETAILS	Freeze	SQ	SUB	DATE	Find
mus 6	D TENNIS ELBOW, RT.						cln	18.08.1983	03:05:56 pm
mus 7	D TENNIS ELBOW, LEFT						cln	26.09.1985	
mus 8	T REPAIR OF POST OP. ABDOM. HERNIA						sur	02.06.1986	
psy 1	d schizopphrenia, acute episode			hospitalized			cln	07.03.1976	
psy 1	d psychotic episode			hospitalized			cln	07.06.1964	
psy 1	d schizopphrenia, acute event			hospitalized			cln	14.06.1986	
psy 1	d schizopphrenia, paranoid						cln	2-4/1964	
psy 1	f schizopphrenia			father			ana	at age 55	
psy 1	t halidol						tab	Start 1987	
psy 1	t phenergan						tab	Start 1987	
res 1	d chornic obstructive lung disease						cln	08.06.1983	
res 1	l obstructive lung disease						pft	08.06.1983	
res 1	s heavy smoker			pul. funct. tests			ana	from age 13	
res 1	s EXERTIONAL DYSPNEA			80-100 cig. qd			ana	since 1977	
res 1	t ventolin			inhalation			inh	1983 (May)	
skn 1	d urticaria after anti-tetanus						cln	25.09.1963	
skn 2	d urticaria after toxoid						cln	02.11.1970	
skn 3	d drug eruptions (sulpha and iodine)						cln	August 1977	
skn 4	d erysipelas cruris, right						cln	27.03.1977	
skn 4	d erysipelas, Lt. leg, recc.						cln	1978-1983	

Top 52

29

29a

23a

FIG 6

Bottom SYS NO	T	DATA	Top	Record No.	Freeze	Find	05:52:39 pm
???	1	s	Miller Nancy				Aug12, 1936
???	1	s	syncope				24.09.1963
???	2	s	cough, non productive				18.02.1966
???	3	s	vertigo				1968, 69, 70
???	4	s	frontal hard mass, left				ana 02-08-1983
???	5	l	high SAP (serum alk. phosphatase)				pex 08.08.1983
cvs	1	d	varicose veins, legs				bld 28-08-1984
cvs	2	d	thrombophlebitis, leg, lt.				pex 17.04.1978
cvs	2	d	thrombophlebitis, left calf				pex +- 06/1982
cvs	3	d	hypertension, fluctuating				pex 03.02.1986
cvs	3	f	hypertension				cln since 1972
cvs	3	f	hypertension				ana at age 30
cvs	3	l	hypertension				ana at age 25
cvs	3	l	hypertension				pex 07.12.1977
cvs	3	l	cardiomegaly				iso 29.04.1980
cvs	3	S	HYPERTENSIVE RETINOPATHY				pex 13.06.1964
cvs	3	T	DIGOXIN				tab 1965->1966

43

46

Lock

Change number of columns to lock to: 5

45

48

severe
5-6mm
100/85
Lt. > Rt.

mother
sister
150/110
isotope scan
GRADE 1
0, 25mgx1 qd

23

FIG 7

SYS NO	T DATA	DETAILS	SOURCE
???	1 Miller Nancy	Atlanta, GA. USA	patient
???	1 s syncope		husband
???	1 s syncope		husband
???	2 s cough, non productive	severe	patient
???	3 s vertigo		patient
???	4 s frontal hard mass, left	5-6mm	MD Johnson
???	5 1 high SAP (serum alk. phosphatase)	100/85	report (chem.)
CVS 1	d varicose veins, legs	Lt. > Rt.	MD Smith
CVS 2	d thrombophlebitis, leg, lt.		MD Smith
CVS 2	d thrombophlebitis, left calf		MD Smith
CVS 3	d hypertension, fluctuating		record (clinic)
CVS 3	f hypertension	mother	patient
CVS 3	f hypertension	sister	patient
CVS 3	1 hypertension	150/110	RN Gilbert
CVS 3	1 cardiomegaly	isotope scan	report (iso)
CVS 3	S HYPERTENSIVE RETINOPATHY	GRADE 1	MD Ophthamol.
CVS 3	T DIGOXIN	0,25mgx1 qd	record (clinic)

← 29

47 ↗

49 ↗

FIG 8

SYS NO	T DATA	SUB DATE	TIME
???	1 Miller Nancy	DOB Aug12, 1936	
???	1 s syncope	ana 24.09.1963	morning
???	1 s syncope	ana 18.02.1966	evening
???	2 s cough, non productive	ana 1968, 69, 70	in summers
???	3 s vertigo	ana 02-08-1983	whole day
???	4 s frontal hard mass, left	pex 08.08.1983	
???	5 l high SAP (serum alk. phosphatase)	bld 28-08-1984	
CVS 1	d varicose veins, legs	pex 17.04.1978	
CVS 2	d thrombophlebitis, leg, lt.	pex +- 06/1982	
CVS 2	d thrombophlebitis, left calf	pex 03.02.1986	-14.02.1986
CVS 3	d hypertension, fluctuating	cln since 1972	
CVS 3	f hypertension	ana at age 30	
CVS 3	f hypertension	ana at age 25	
CVS 3	l hypertension	pex 07.12.1977	08:30 AM
CVS 3	l cardiomegaly	iso 29.04.1980	
CVS 3	S HYPERTENSIVE RETINOPATHY	pex 13.06.1964	
CVS 3	T DIGOXIN	tab 1965->1966	

← 29

50 ↑

↑
51

FIG 9

10/58

Bottom	Top	Lock	Find	TE
SYS NO T	DATA	-----	06:14:37 pm	-----
???	Miller Nancy			g12, 1936
???	s syncope			.09.1963
???	s syncope			ana 18.02.1966
???	s cough, non productive			ana 1968, 69, 70
???	s vertigo			ana 02-08-1983
???	s frontal hard mass, left			pex 08.08.1983
???	s high SAP (serum alk. phosphatase)			bld 28-08-1984
CVS 1	d varicose veins, legs			pex 17.04.1978
CVS 2	d thrombophlebitis, leg, lt.			pex +- 06/1982
CVS 2	d thrombophlebitis, left calf			pex 03.02.1986
CVS 3	d hypertension, fluctuating			cln since 1972
CVS 3	f hypertension			ana at age 30
CVS 3	f hypertension			ana at age 25
CVS 3	l hypertension			pex 07.12.1977
CVS 3	l cardiomegaly			iso 29.04.1980
CVS 3	S HYPERTENSIVE RETINOPATHY			pex 13.06.1964
CVS 3	T DIGOXIN			tab 1965->1966

Record No. 54
 Enter new record number: 19

severe

5-6mm

100/85

Lt. > Rt.

mother

sister

150/110

isotope scan

GRADE 1

0, 25mgx1 qd

↑ 23

FIG 10

SYS NO	T DATA	DETAILS	SQ	SUB	DATE
gur 2	1 small right kidney		1	usd	29.04.1980
gur 2	1 no visualization, right kidney		2	iso	28.07.1980
gyn 1	d menopause			ana	at age 43
gyn 2	d endometrial glandular hyperplasia	57		cln	06.03.1978
gyn 2	1 uterine curetage			sur	06.03.1978
gyn 2	1 uterine curetage			sur	28.03.1979
gyn 2	1 uterine curetage			sur	10.12.1980
gyn 2	1 uterine curetage	for PMB		sur	30.01.1982
gyn 2	1 uterine curetage	for PMB		sur	14.05.1985
gyn 2	1 atypical glandular hyperplasia		1	his	28.03.1979
gyn 2	s post-menopausal bleeding	at the age of 48		ana	01.03.1978
gyn 2	s meno-metrorrhagia			ana	24.03.1971
gyn 2	s vaginal bleeding			ana	27.08.1981
gyn 2	s post menopausal bleeding			ana	03.02.1983
gyn 2	s post menopausal bleeding			ana	10.05.1985
gyn 3	1 trichomonas vaginalis	vaginal smear		bct	27.10.1983
heb 1	1 hepatomegaly	isotope scan		iso	23.07.1980

55

FIG 11

12/58

Bottom	Top	Lock	Record No.	Find
SYS NO T	DATA	-----		03:33:34 pm
???	Miller Nancy			
???	syncope			
???	syncope			
???	s cough, non productive			
???	s vertigo			
???	s frontal hard mass, left			
???	s high SAP (serum alk. phosphatase)			
CVS 1	d varicose veins, legs			
CVS 2	d thrombophlebitis, leg, lt.			
CVS 2	d thrombophlebitis, left calf			
CVS 3	d hypertension, fluctuating			
CVS 3	f hypertension			
CVS 3	f hypertension			
CVS 3	l hypertension			
CVS 3	l cardiomegaly			
CVS 3	S HYPERTENSIVE RETINOPATHY			
CVS 3	T DIGOXIN			

Freeze	59	2	ana 18.02.1966	ana at age 30
Enter field name to freeze: [DATE]		61	ana 1968,69,70	ana at age 25
			ana 02-08-1983	pex 07.12.1977
			pex 08.08.1983	iso 29.04.1980
			bld 28-08-1984	pex 13.06.1964
			pex 17.04.1978	tab 1965->1966
			pex +- 06/1982	
			pex 03.02.1986	
			cln since 1972	
			severe	
			5-6mm	
			100/85	
			lt. > Rt.	
			mother	
			sister	
			150/110	
			isotope scan	
			GRADE 1	
			0, 25mgx1 qd	

↑ 23

FIG 12

Bottom	Top	Lock	Record No.	Freeze	06:30:46 pm
SYS NO T	DATA	-----			
???	Miller Nancy				36
???	s syncope				63
???	s syncope				
???	s cough, non productive				
???	s vertigo				
???	s frontal hard mass, left				
???	s high SAP (serum alk. phosphatase)				
CVS 1	d varicose veins, legs				
CVS 2	d thrombophlebitis, leg, lt.				
CVS 2	d thrombophlebitis, left calf				
CVS 3	d hypertension, fluctuating				
CVS 3	f hypertension				
CVS 3	f hypertension				
CVS 3	l hypertension				
CVS 3	l cardiomegaly				
CVS 3	S HYPERTENSIVE RETINOPATHY				
CVS 3	T DIGOXIN				

Enter search string: MET	63	Find	06:30:46 pm
severe	65		
5-6mm			
100/85			
Lt. > Rt.			
mother			
sister			
150/110			
isotope scan			
GRADE 1			
0,25mgx1 qd			

↑ 23

FIG 13

SYS NO	T DATA	DETAILS	SQ	SUB	DATE
met 1	d obesity, severe			cln	since 1947
met 1	l overweight, severe	136 kg		pex	17.05.1965
met 1	l overweight, severe	143 kg		pex	17.04.1978
met 1	l overweight, severe	161 kg		pex	26.10.1983
met 1	t gastric bypass + gastrostomy	for overweight+++		sur	20.12.1983
met 2	l hyperuricemia	9.5 mg%		bld	12.08.1982
met 2	l hyperuricemia	9.4 mg%		bld	17.12.1982
met 2	l hyperuricemia	7.6-8.9 mg%		bld	01-02/1983
met 2	l hyperuricosuria	600 mg/24h	1	urn	18.03.1983
met 2	t allopurinol	100mgx2		tab	since 4/83
mus 1	L BI-MALEOLAR FRACTURE, ANKLE, RT.			xrs	21.05.1965
mus 1	T OPEN REDUCTION OF FRACTURE			sur	24.05.1965
mus 2	d arthritis, rheumatoid			cln	21.01.1966
mus 2	s painful swelling of joints			ana	since 1963
mus 3	d discopathy			cln	since 1971
mus 3	l osteophyte, L5	L4-L5		iso	28.07.1980
mus 3	l herniation of lumbar discus	L4-L5		xrs	04.06.1971

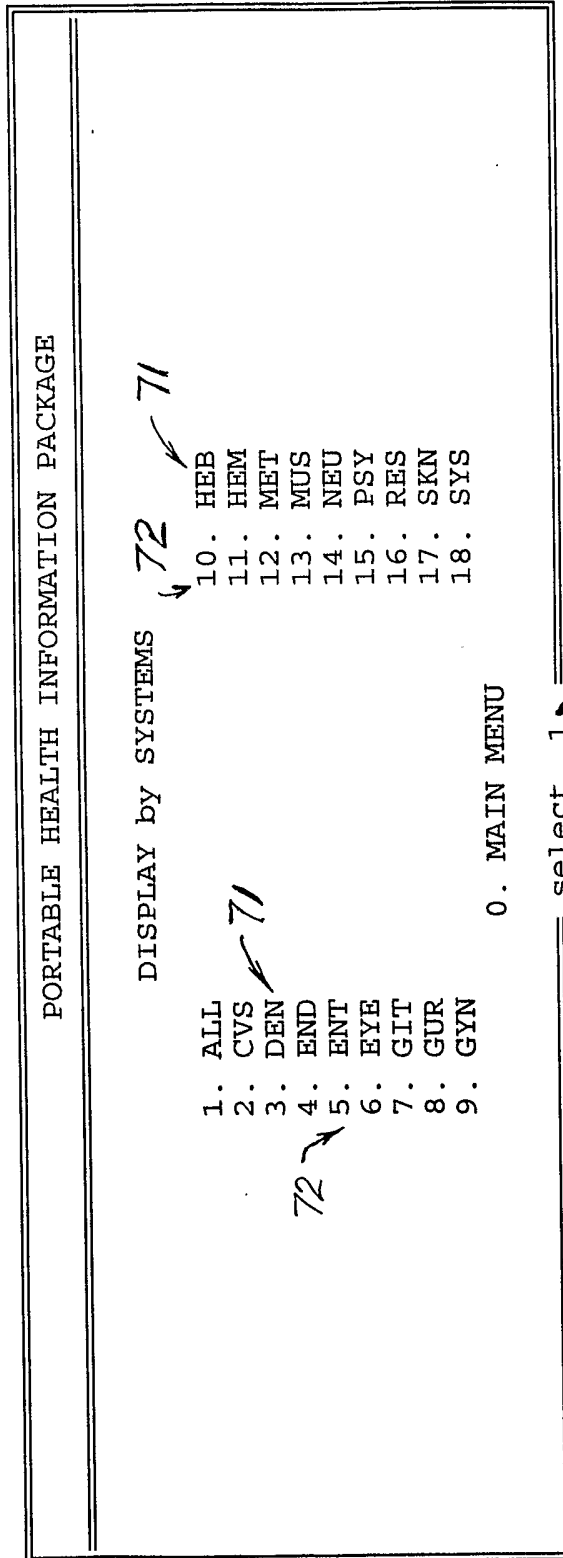
66

29

68

67

FIG 14



69

FIG 15

mus 1	L BI-MALEOLAR FRACTURE, ANKLE, RT.	xrs	21.05.1965
mus 1	T OPEN REDUCTION OF FRACTURE	sur	24.05.1965
mus 2	d arthritis, rheumatoid	cln	21.01.1964
mus 2	s painfull swelling of joints	ana	since 1963
mus 3	d discopathy	cln	since 1971
mus 3	l herniation of lumbar discus	xrs	04.06.1971
mus 3	l osteophyte, L5	iso	28.07.1980
mus 3	s LBP	ana	Since 2/71
mus 4	s shoulder pain	ana	01.01.1981
mus 4	T VOLTAREN	tab	January/81
mus 5	L DEG. CHANGES, CERVICAL VERTEBRAE	xrs	00.02.1983
mus 5	s cervical pain	ana	18.01.1983
mus 5	S CERVICAL PAIN	ana	28.06.1984
mus 6	D TENNIS ELBOW, RT.	cln	18.08.1983
mus 7	D TENNIS ELBOW, LEFT	cln	26.09.1985
mus 8	T REPAIR OF POST OP. ABDOM. HERNIA	sur	02.06.1986

1
2

-17.01.1981
-23.01.1983
-12.07.1984

75

73

FIG 16

cln 25.09.1963
cln 02.11.1970
cln August 1977
cln 27.03.1977
cln 1978-1983

skn 1 d urticaria after anti-tetanus
skn 2 d urticaria after toxoid
skn 3 d drug eruptions (sulpha and iodine)
skn 4 d erysipelas cruris, right
skn 4 d erysipelas, Lt. leg, recc.

↖ 79

↖ 77

FIG 17

PORTABLE HEALTH INFORMATION PACKAGE

DISPLAY by TOPICS

1. FAMILY HISTORY	5. ALL TREATMENTS
2. SIGNS & SYMPTOMS	6. TABLETS (only)
3. LABS & TESTS	7. BLOOD TESTS
4. DIAGNOSES	8. SEARCH & DISPLAY
	0. MAIN MENU

select 1

82 ↓

↖ 82

↖ 81

FIG 18

ana at age 30
ana at age 25
ana at age 55

mother
sister
father

cv3 3 f hypertension
cv3 3 f hypertension
psy 1 f schizophrania

← 84

← 83

FIG 19

ana	24.09.1963
ana	18.02.1966
ana	1968,69,70
ana	02-08-1983
pex	08.08.1983
pex	13.06.1964
pex	23.12.1982
pex	04.08.1985
ana	31.07.1963
ana	01.01.1981
ana	02.03.1983
ana	16.06.1983
ana	at age 48
ana	24.03.1971
ana	27.08.1981
ana	03.02.1983
ana	10.05.1985
ana	since 1963
ana	Since 2/71

???	1	s	syncope
???	1	s	syncope
???	2	s	cough, non productive
???	3	s	vertigo
???	4	s	frontal hard mass, left
cvs	3	S	HYPERTENSIVE RETINOPATHY
cvs	4	s	systolic murmur
cvs	5	s	aortic insufficiency
cvs	6	s	chest pain
cvs	6	s	chest pain
cvs	6	s	chest pain
cvs	6	s	chest pain
gyn	2	s	post-menopausal bleeding
gyn	2	s	meno-metrorrhagia
gyn	2	s	vaginal bleeding
gyn	2	s	post menopausal bleeding
gyn	2	s	post menopausal bleeding
mus	2	s	painfull swelling of joints
mus	3	s	LBP

Press any key to continue...

85

86

FIG 20

???	5	1 high SAP (serum alk. phosphatase)	100/85	bld	28-08-1984
cvs	3	1 hypertension	150/110	pex	07.12.1977
cvs	3	1 cardiomegaly	isotope scan	iso	29.04.1980
cvs	5	1 aortic insufficiency	echo-cardiogram	eco	22.01.1986
ent	1	1 high ASLO	350	bld	28.06.1961
git	2	1 narrow gastro-jej. anastomosis	post op.	xrs	20.09.1984
gur	2	1 small right kidney	in ultrasound	usd	29.04.1980
gur	2	1 no visualizaton, right kidney	isotope scanning	iso	28.07.1980
gyn	2	1 uterine curretage		sur	06.03.1978
gyn	2	1 uterine curretage		sur	28.03.1979
gyn	2	1 uterine curretage		sur	10.12.1980
gyn	2	1 uterine curretage	for PMB	sur	30.01.1982
gyn	2	1 uterine curretage	for PMB	sur	14.05.1985
gyn	2	1 atypical glandular hyperplasia	vaginal smear	his	28.03.1979
gyn	3	1 trichomonas vaginalis	isotope scan	bct	27.10.1983
heb	1	1 hepatomegaly	in ultrasound	iso	23.07.1980
heb	2	1 septum in gallbladder	136 kg	usd	14.06.1985
met	1	1 overweight, severe	143 kg	pex	17.05.1965
met	1	1 overweight, severe		pex	17.04.1978

Press any key to continue...

88

↑ 87

FIG 21

cvs 1	d varicose veins, legs	Lt. > Rt.	pex 17.04.1978
cvs 2	d thrombophlebitis, leg, lt.		pex +- 06/1982
cvs 2	d thrombophlebitis, left calf		pex 03.02.1986
cvs 3	d hypertension, fluctuating		cln since 1972
ent 1	d follicular tonsillitis		pex 22.6.61-->
gur 1	d urinary tract infections (x3)		urn 1-7/1962
gur 1	d urinary tract infection		urn 25.12.1962
gur 1	d urinary tract infection	B. proteus	urn 31.05.1964
gur 1	d urinary tract infection	E.coli	urn ?June 1966
gur 1	d urinary tract infection	Pseudomonas	urn 27.08.1984
gyn 1	d menopause		ana at age 43
gyn 2	d endometrial glandular hyperplasia		cln 06.03.1978
met 1	d obesity, severe		cln since 1947
mus 2	d arthritis, rheumatoid		cln 21.01.1964
mus 3	d discopathy	L4-L5	cln since 1971
mus 6	D TENNIS ELBOW, RT.		cln 18.08.1983
mus 7	D TENNIS ELBOW, LEFT		cln 26.09.1985
psy 1	d schizophrenia, acute episode	hospitalized	cln 07.03.1976
psy 1	d psychotic episode	hospitalized	cln 07.06.1964
press any	key to continue...		

90

89

FIG 22

3	cv	DIGOXIN	0,25mgx1 qd	tab	1965->1966
3	cv	FUSID	40mg qod	tab	1965->1966
6	cv	ADALAT	10mgx3 qd	tab	since 1981
1	gi	appendectomy		sur	4June 1946
2	gi	re-gastro-enterostomy	bypass stenosis	sur	end of 84
1	me	gastric bypass + gastrostomy	for overweight+++	sur	20.12.1983
2	me	allopurinol	100mgx2	tab	since 4/83
1	mu	OPEN REDUCTION OF FRACTURE		sur	24.05.1965
4	mu	VOLTAREN	50mgx3	tab	January/81
8	mu	REPAIR OF POST OP. ABDOM. HERNIA		sur	02.06.1986
1	ps	halidol		tab	Start 1987
1	ps	phenergan		tab	Start 1987
1	re	ventolin	inhalation	inh	1983 (May)

92

91

FIG 23

tab 1965->1966
 tab 1965->1966
 tab since 1981
 tab since 4/83
 tab January/81
 tab Start 1987
 tab Start 1987

0,25mgx1 qd
 40mg qod
 10mgx3 qd
 100mgx2
 50mgx3

cvs 3 T DIGOXIN
 cvs 3 T FUSID
 cvs 6 T ADALAT
 met 2 t allopurinol
 mus 4 T VOLTAREN
 psy 1 t halidol
 psy 1 t phenergan

94

93

FIG 24

???	5	1	high SAP (serum alk. phosphatase)	100/85	bld	28-08-1984
ent	1	1	high ASLO	350	bld	28.06.1961
met	2	1	hyperuricemia	9.5 mg%	bld	12.08.1982
met	2	1	hyperuricemia	9.4 mg%	bld	17.12.1982
met	2	1	hyperuricemia	7.6-8.9 mg%	bld	01-02/1983

↗
102

↖ 95.

FIG 25

SEARCH ON WHAT FIELD? SUB — 96
LOOK FOR WHAT SUB? XRS

98

← 97



97a

FIG 26a

SEARCH ON WHAT FIELD?
LOOK FOR WHAT ?

← 97a

FIG 26

← 97

git 2	1	narrow gastro-jejunal anastomosis			
mus 1	L	BI-MALEOLAR FRACTURE, ANKLE, RT.	post op.	xrs	20.09.1984
mus 3	L	herniation of lumbar discus	L4-L5	xrs	21.05.1965
mus 5	L	DEG. CHANGES, CERVICAL VERTEBRAE		xrs	04.06.1971
				xrs	00.02.1983

↙ 100
↖ 98

FIG 27

↖ 99

SEARCH ON WHAT FIELD? SUB — 103
 LOOK FOR WHAT SUB? PEX } 105

FIG 28

↖ 101

???	4	s	frontal hard mass, left	pex	08.08.1983
cvs	1	d	varicose veins, legs	pex	17.04.1978
cvs	2	d	thrombophlebitis, leg, lt.	pex	+ 06/1982
cvs	2	d	thrombophlebitis, left calf	pex	03.02.1986
cvs	3	l	hypertension	pex	07.12.1977
cvs	3	S	HYPERTENSIVE RETINOPATHY	pex	13.06.1964
cvs	4	s	systolic murmur	pex	23.12.1982
cvs	5	s	aortic insufficiency	pex	04.08.1985
ent	1	d	follicular tonsillitis	pex	22.6.61-->
met	1	l	overweight, severe	pex	17.05.1965
met	1	l	overweight, severe	pex	17.04.1978
met	1	l	overweight, severe	pex	26.10.1983

← 100

5-6mm
 Lt. > Rt.
 150/110
 GRADE 1
 grade 2/6
 136 kg
 143 kg
 161 kg

↑ 105

↑ 107

FIG 29

SEARCH ON WHAT FIELD? DATA — //11
 LOOK FOR WHAT DATA? CHEST PAIN } //113

↑ //109
FIG 30

cvs 6 s chest pain
 cvs 6 s chest pain
 cvs 6 s chest pain
 cvs 6 s chest pain

↑ //117

after effort ana 31.07.1963
 retro-sternal ana 01.01.1981
 rad. Lt. shoulder ana 02.03.1983
 like presssure ana 16.06.1983

↑ //115

FIG 31

CURSOR Char: <--- --> Word: Home End	UP DOWN Field: PgUp PgDn Page: F1 Help:	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit/Save: ^End Abort: Esc Memo: ^Home
--	--	--	--

SYS _____
 NO _____
 T _____
 DATA _____
 DETAILS _____
 SQ _____
 SUB _____
 DATE _____
 TIME _____
 SOURCE _____

125

127

121

FIG. 32

123

SYS _____
 NO _____
 T _____
 DATA _____
 DETAILS _____
 SQ _____
 SUB _____
 DATE _____
 TIME _____
 SOURCE _____

129
128

131

FIG 33

SYS NO	T DATA	DETAILS	SQ	SUB DATE
psy 1	d schizopphrenia, acute episode	hospitalized	cln	07.03.1976
psy 1	d psychotic episode	hospitalized	cln	07.06.1964
psy 1	d schizopphrenia, acute event	hospitalized	cln	14.06.1986
psy 1	d schizopphrenia, paranoid		cln	2-4/1964
psy 1	f schizopphrenia	father	ana	at age 55
psy 1	t halidol		tab	Start 1987
psy 1	t phenergan		tab	Start 1987
res 1	d chornic obstructive lung disease		cln	08.06.1983
res 1	l obstructive lung disease		pft	08.06.1983
res 1	s heavy smoker	pul. funct. tests	1	ana from age 13
res 1	s EXERTIONAL DYSPNEA	80-100 cig. qd	2	ana since 1977
res 1	t ventolin	inhalation	inh	1983 (May)
skn 1	d urticaria after anti-tetanus		cln	25.09.1963
skn 2	d urticaria after toxoid		cln	02.11.1970
skn 3	d drug eruptions (sulpha and iodine)		cln	August 1977
skn 4	d erysipelas cruris, right		cln	27.03.1977
skn 4	d erysipelas, Lt. leg, recc.		cln	1978-1983

====> Add new records? (Y/N) 137

↑ 133

FIG 34

SYS NO	T DATA	DETAILS	SQ	SUB	DATE
psy 1	d psychotic episode	hospitalized		cln	07.06.1964
psy 1	d schizophrenia, acute event	hospitalized		cln	14.06.1986
psy 1	d schizophrenia, paranoid			cln	2-4/1964
psy 1	f schizophrenia	father		ana	at age 55
psy 1	t halidol			tab	Start 1987
psy 1	t phenergan			tab	Start 1987
res 1	d chornic obstructive lung disease			cln	08.06.1983
res 1	l obstructive lung disease			pft	08.06.1983
res 1	s heavy smoker	pul. funct. tests	1	ana	from age 13
res 1	s EXERTIONAL DYSPNEA	80-100 cig. qd	2	ana	since 1977
res 1	t ventolin	inhalation		inh	1983 (May)
skn 1	d urticaria after anti-tetanus			cln	25.09.1963
skn 2	d urticaria after toxoid			cln	02.11.1970
skn 3	d drug eruptions (sulpha and iodine)			cln	August 1977
skn 4	d erysipelas cruris, right			cln	27.03.1977
skn 4	d erysipelas, Lt. leg, recc.			cln	1978-1983

145

143

135

↑ 141

FIG 35

PORTABLE HEALTH INFORMATION PACKAGE

LINK DATA

1. USE BUS	5. USE CARD
2. BROWSE-MARK (bus)	6. BROWSE-MARK (card)
3. ADD NEW DATA (bus)	7. ADD NEW DATA (card)
4. GLOBAL REPLACEMENT (bus)	8. COPY BUS TO CARD
9. ERASE MARKED	10. ERASE ALL
select 1 ← 153	
55. COPY CARD TO DISK ---> AND THEN ---> 99. COPY DISK TO BUS	

FIG 36

↑ /51

FIG 36a

REPLACE WHAT FIELD? → XX
 REPLACE WITH WHAT ? → ZZ
 ARE YOU SURE (Y/N) → YY

↑ /52

SYS NO	T DATA	SQ	SUB	DATE	TIME
1	d URTI		clin		
1	s cough	1	sym		07:00
1	s myalgia	2	sym		14:00
1	s hoarsness ← 29	3	sym		18:30
1	s running nose	4	sym		19:30
1	s sore throat	5	sym		19:30
1	s coldness sensation	6	sym		20:35
1	t Robitussin		syr		>26.12.2000

FIG 36b

REPLACE WHAT FIELD? SYS
 REPLACE WITH WHAT SYS? RES
 ARE YOU SURE (Y/N)

REPLACE WHAT FIELD? DATE
 REPLACE WITH WHAT DATE? 13.02.2002
 ARE YOU SURE (Y/N)

FIG 36c

SYS NO	T DATA	SQ	SUB	DATE	TIME
RES 1	d URTI	1	cln	13.02.2002	07:00
RES 1	s cough	2	sym	13.02.2002	14:00
RES 1	s myalgia	3	sym	13.02.2002	18:30
RES 1	s hoarsness	4	sym	13.02.2002	19:30
RES 1	s running nose	5	sym	13.02.2002	19:30
RES 1	s sore throat	6	sym	13.02.2002	20:35
RES 1	s coldness sensation		syr	13.02.2002	>26.02.2002
RES 1	t Robitussin				

← 29

FIG 36d

PORTABLE HEALTH INFORMATION PACKAGE

HEALTH VIEW

** =====

* Smith Robert

data: 1995-2000 DOB 12.JAN.35

167

** ===== CVS

* 169

* . 1

d myocardial infarction
l anteroseptal MI, acute
l narrow coronaries (LAD, RC, CIR)
s chest pain, severe
t coronary artery bypass graft

anteroseptal
QS in V1-V4
100% 99% 70%
on effort
x3 coronaries
cln 25.02.1995
ecg 25.02.1995
ang 03.03.1995
ana 24.02.1995
sur 06.03.1995

** ===== git

* . 1

d duodenal ulcer
l duodenal ulcer
s heartburn
t omeprazole (Losec)

by endoscopy
before meals
20 mg qd
cln 15.12.1998
end 15.12.1998
ana since 7/98
cap 16.12.1998

** ===== res

* . 1

d upper respiratory tract infection
t robitussin syrup

1 tablespoon q3h
cln 22.11.2000
syr 23.11.2000

161

FIG 37

PORTABLE HEALTH INFORMATION PACKAGE

HEALTH VIEW

```

** =====
*
** Smith Robert      data: 1-6/2001      DOB 12.JAN.35
** ===== 167) ===== CVS
*
*   . 1
t aspirin           100 mg x1 qd      tab 02.05.2001
** =====
**                               eye
*   . 1
d glaucoma
l increased intraocular pressure
s blurred vision
** ===== git
*   . 2
d bleeding duodenal ulcer
l anemia
l positive occult blood in stool
l bleeding duodenal ulcer
s sudden weakness
s black stool
t blood transfusion
t lansoprazole (zoton)

```

```

bilateral
46 mm Hg (bilat.)
cln 24.02.2001
pex 24.02.2001
ana 1/2001-->>

```

```

after aspirin
9,1 g%
+++
by endoscopy
+profuse sweating
x3
2 packs
15 mg x1 qd
cln 12.06.2001
bld 10.06.2001
stl 10.06.2001
end 12.06.2001
ana 09.06.2001
ana 09.06.2001
iv 10.06.2001
cap 14.06.2001

```



FIG 38

163

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PORTABLE HEALTH INFORMATION PACKAGE
HEALTH VIEW

** =====

* Smith Robert data: 1995-6/2001 DOB 12.JAN.35

** ===== CVS

* . 1
d myocardial infarction anteroseptal cln 25.02.1995
l anteroseptal MI, acute QS in V1-V4 ecg 25.02.1995
l narrow coronaries (LAD, RC, CIR) 100% 99% 70% ang 03.03.1995
s chest pain, severe on effort ana 24.02.1995
t coronary artery bypass graft x3 coronaries sur 06.03.1995
t aspirin 100 mg x1 qd tab 02.05.2001

167

** ===== eye

* ← 169 . 1
d glaucoma bilateral cln 24.02.2001
l increased intraocular pressure 46 mm Hg (bilat.) pex 24.02.2001
s blurred vision ana 1/2001-->>

** ===== git

* . 1
d duodenal ulcer cln 15.12.1998
l duodenal ulcer by endoscopy end 15.12.1998
s heartburn before meals ana since 7/98
t omeprazole (Losec) 20 mg qd cap 16.12.1998

* . 2
d bleeding duodenal ulcer after aspirin cln 12.06.2001
l anemia 9,1 g% bld 10.06.2001
l positive occult blood in stool +++ stl 10.06.2001
l bleeding duodenal ulcer by endoscopy end 12.06.2001
s sudden weakness +profuse sweating ana 09.06.2001
s black stool x3 ana 09.06.2001
t blood transfusion 2 packs iv 10.06.2001
t lansoprazole (zoton) 15 mg x1 qd cap 14.06.2001

** ===== res

* . 1
d upper respiratory tract infection cln 22.11.2000
t robitussin syrup 1 tablespoon q3h syr 23.11.2000

↑
171

FIG 39

Structure for database:

Field	Field Name	Type	Width
1	SYS	Character	3
2	NO	Character	2
3	T	Character	1
203 4	DATA	Character	34
5	DETAILS	Character	17
6	SQ	Character	2
7	SUB	Character	3
8	DATE	Character	10
9	TIME	Character	11
10	SOURCE	Character	15
**	Total	**	99

Handwritten annotations: 205 points to field T; 207 points to the Total row; 209 points to the width of the SOURCE field.

FIG 41

201

Record#	SYS	NO	T	DATA	DETAILS	SQ	SUB
	1	skn	1	d urticaria after anti-tetanus			cln
	2	skn	2	d urticaria after toxoid			cln
	3	skn	3	d drug eruptions (sulpha and iodine)			cln
	4	skn	4	d erysipelas cruris, right			cln
	5	skn	4	d erysipelas, Lt. leg, recc.	x5		cln
	6	cvs	2	d thrombophlebitis, leg, lt.			pex
214	7	cvs	2	d thrombophlebitis, left calf			pex
	8	cvs	1	d varicose veins, legs	Lt. > Rt.		pex
	9	cvs	3	d hypertension, fluctuating			cln
	10	cvs	3	l hypertension	150/110		pex
	11	res	1	s heavy smoker	80-100 cig. qd	1	ana
	12	git	1	t appendectomy			sur
	13	ent	1	d follicular tonsillitis			pex
	14	ent	1	l high ASLO	350		bld
	15	gur	1	d urinary tract infections (x3)			urn
	16	gur	1	d urinary tract infection			urn
	17	gur	1	d urinary tract infection	B. proteus		urn
	18	gur	1	d urinary tract infection	E.coli		urn
	19	gur	2	l small right kidney	in ultrasound	1	usd
	20	gur	2	l no visualization, right kidney	isotope scanning	2	iso
	21	gur	1	d urinary tract infection	Pseudomonas		urn
	22	gyn	1	d menopause			ana
	23	gyn	2	d endometrial glandular hyperplasia			cln
	24	gyn	2	s post-menopausal bleeding			ana
	25	gyn	2	l uterine curretage			sur
	26	gyn	2	s meno-metrorrhagia			ana
	27	gyn	2	l uterine curretage			sur
	28	gyn	2	l atypical glandular hyperplasia		1	his
	29	gyn	2	l uterine curretage	for PMB		sur
	30	gyn	2	s vaginal bleeding			ana
	31	gyn	2	l uterine curretage			sur
	32	gyn	2	s post menopausal bleeding			ana
	33	gyn	2	l uterine curretage	for PMB		sur
	34	gyn	2	s post menopausal bleeding			ana
	35	gyn	3	l trichomonas vaginalis	vaginal smear		bct
	36	met	1	d obesity, severe			cln
	37	met	1	l overweight, severe	136 kg		pex
	38	met	1	l overweight, severe	143 kg		pex
	39	met	1	l overweight, severe	161 kg		pex
	40	met	1	t gastric bypass + gastrostomy	for overweight+++		sur
	41	git	2	l narrow gastro-jejun. anastomosis	post op.		xrs
	42	git	2	t re-gastro-enterostomy	bypass stenosis		sur
	43	met	2	l hyperuricemia	9.5 mg%		bld
	44	met	2	l hyperuricosuria	600 mg/24h	1	urn
	45	met	2	l hyperuricemia	9.4 mg%		bld
	46	met	2	l hyperuricemia	7.6-8.9 mg%		bld
	47	met	2	t allopurinol	100mgx2		tab
	48	psy	1	d schizophrenia, acute episode	hospitalized		cln
	49	psy	1	d psychotic episode	hospitalized		cln
	50	psy	1	d schizophrenia, acute event	hospitalized		cln
	51	psy	1	t halidol			tab
	52	psy	1	t phenergan			tab
	53	cvs	6	s chest pain	after effort		ana
	54	cvs	6	s chest pain	retro-sternal		ana
	55	cvs	6	s chest pain	rad. Lt. shoulder		ana
	56	cvs	6	s chest pain	like pressure		ana
	57	???	2	s cough, non productive	severe		ana
	58	???	3	s vertigo			ana
	59	???	4	s frontal hard mass, left	5-6mm		pex
	60	???	5	l high SAP (serum alk. phosphatase)	100/85		bld
	61	???	1	s syncope		1	ana
	62	???	1	s syncope		2	ana

FIG 42

Record#	SYS	NO	T	DATA	DETAILS	SQ	SUB
63				Miller Nancy	Atlanta, GA. USA		DOB
61	???	1	s	syncope		1	ana
62	???	1	s	syncope		2	ana
57	???	2	s	cough, non productive	severe		ana
58	???	3	s	vertigo			ana
59	???	4	s	frontal hard mass, left	5-6mm		pex
60	???	5	l	high SAP (serum alk. phosphatase)	100/85		bld
8	cvs	1	d	varicose veins, legs	Lt. > Rt.		pex
6	cvs	2	d	thrombophlebitis, leg, lt.			pex
7	cvs	2	d	thrombophlebitis, left calf			pex
9	cvs	3	d	hypertension, fluctuating			cln
92	cvs	3	f	hypertension	mother		ana
95	cvs	3	f	hypertension	sister		ana
10	cvs	3	l	hypertension	150/110		pex
64	cvs	3	l	cardiomegaly	isotope scan		iso
71	cvs	3	S	HYPERTENSIVE RETINOPATHY	GRADE 1		pex
69	cvs	3	T	DIGOXIN	0,25mgx1 qd		tab
70	cvs	3	T	FUSID	40mg qod		tab
65	cvs	4	s	systolic murmur	grade 2/6		pex
67	cvs	5	l	aortic insufficiency	echo-cardiogram		eco
66	cvs	5	s	aortic insufficiency			pex
53	cvs	6	s	chest pain	after effort		ana
54	cvs	6	s	chest pain	retro-sternal		ana
55	cvs	6	s	chest pain	rad. Lt. shoulder		ana
56	cvs	6	s	chest pain	like pressure		ana
68	cvs	6	T	ADALAT	10mgx3 qd		tab
13	ent	1	d	follicular tonsillitis			pex
14	ent	1	l	high ASLO	350		bld
12	git	1	t	appendectomy			sur
41	git	2	l	narrow gastro-jej. anastomosis	post op.		xrs
42	git	2	t	re-gastro-enterostomy	bypass stenosis		sur
15	gur	1	d	urinary tract infections (x3)			urn
16	gur	1	d	urinary tract infection			urn
17	gur	1	d	urinary tract infection	B. proteus		urn
18	gur	1	d	urinary tract infection	E.coli		urn
21	gur	1	d	urinary tract infection	Pseudomonas		urn
19	gur	2	l	small right kidney	in ultrasound	1	usd
20	gur	2	l	no visualization, right kidney	isotope scanning	2	iso
22	gyn	1	d	menopause			ana
23	gyn	2	d	endometrial glandular hyperplasia			cln
25	gyn	2	l	uterine curretage			sur
27	gyn	2	l	uterine curretage			sur
29	gyn	2	l	uterine curretage	for PMB		sur
31	gyn	2	l	uterine curretage			sur
33	gyn	2	l	uterine curretage	for PMB		sur
28	gyn	2	l	atypical glandular hyperplasia		1	his
24	gyn	2	s	post-menopausal bleeding			ana
26	gyn	2	s	meno-metrorrhagia			ana
30	gyn	2	s	vaginal bleeding			ana
32	gyn	2	s	post menopausal bleeding			ana
34	gyn	2	s	post menopausal bleeding			ana
35	gyn	3	l	trichomonas vaginalis	vaginal smear		bct
88	heb	1	l	hepatomegaly	isotope scan		iso
89	heb	2	l	septum in gallbladder	in ultrasound		usd
36	met	1	d	obesity, severe			cln
37	met	1	l	overweight, severe	136 kg		pex
38	met	1	l	overweight, severe	143 kg		pex
39	met	1	l	overweight, severe	161 kg		pex
40	met	1	t	gastric bypass + gastrostomy	for overweight+++		sur
43	met	2	l	hyperuricemia	9.5 mg%		bld
45	met	2	l	hyperuricemia	9.4 mg%		bld
46	met	2	l	hyperuricemia	7.6-8.9 mg%		bld

FIG 43

PORTABLE HEALTH INFORMATION PACKAGE

HEALTH VIEW

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```

** =====
*
Miller Nancy                ↖ 226 Atlanta, GA. USA   DOB Aug12,1936
** ===== ???

* . 1
s syncope                    ana 24.09.1963
s syncope                    ana 18.02.1966

* . 2
s cough, non productive      severe                ana 1968,69,70

* . 3
s vertigo                    ana 02-08-1983

* . 4
s frontal hard mass, left    5-6mm                pex 08.08.1983

* . 5
l high SAP (serum alk. phosphatase) 100/85              bld 28-08-1984
** ===== CVS

* . 1
d varicose veins, legs      Lt. > Rt.           pex 17.04.1978

* . 2
d thrombophlebitis, leg, lt.
d thrombophlebitis, left calf      pex +- 06/1982
pex 03.02.1986

* . 3
d hypertension, fluctuating
f hypertension                mother               cln since 1972
f hypertension                sister              ana at age 30
l hypertension                150/110            ana at age 25
l cardiomegaly                isotope scan       pex 07.12.1977
s HYPERTENSIVE RETINOPATHY    GRADE 1            iso 29.04.1980
t DIGOXIN                      0,25mgx1 qd       pex 13.06.1964
t FUSID                        40mg qod          tab 1965->1966
                             tab 1965->1966

* . 4
s systolic murmur            grade 2/6           pex 23.12.1982

* . 5
l aortic insufficiency        echo-cardiogram     eco 22.01.1986
s aortic insufficiency        pex 04.08.1985
    
```

FIG 43a

```

*           . 6
s chest pain          after effort          ana 31.07.1963
s chest pain          retro-sternal       ana 01.01.1981
s chest pain          rad. Lt. shoulder  ana 02.03.1983
s chest pain          like pressure     ana 16.06.1983
t ADALAT              10mgx3 qd         tab since 1981

** ===== ent

*           . 1
d follicular tonsillitis          pex 22.6.61-->
l high ASLO                        350             bld 28.06.1961

** ===== git

*           . 1
t appendectomy                    sur 4June 1946

*           . 2
l narrow gastro-jej. anastomosis  post op.        xrs 20.09.1984
t re-gastro-enterostomy          bypass stenosis sur end of 84

** ===== gur

*           . 1
d urinary tract infections (x3)    urn 1-7/1962
d urinary tract infection         urn 25.12.1962
d urinary tract infection         B. proteus      urn 31.05.1964
d urinary tract infection         E.coli          urn ?June 1966
d urinary tract infection         Pseudomonas    urn 27.08.1984

*           . 2
l small right kidney              in ultrasound   usd 29.04.1980
l no visualization, right kidney  isotope scanning iso 28.07.1980

** ===== gyn

*           . 1
d menopause                      ana at age 43

*           . 2
d endometrial glandular hyperplasia  cln 06.03.1978
l uterine curretage                sur 06.03.1978
l uterine curretage                sur 28.03.1979
l uterine curretage                for PMB         sur 10.12.1980
l uterine curretage                sur 30.01.1982
l uterine curretage                for PMB         sur 14.05.1985
l atypical glandular hyperplasia    his 28.03.1979
s post-menopausal bleeding         ana at age 48
s meno-metrorrhagia                ana 24.03.1971
s vaginal bleeding                 ana 27.08.1981
s post menopausal bleeding         ana 03.02.1983
s post menopausal bleeding         ana 10.05.1985

*           . 3
l trichomonas vaginalis           vaginal smear   bct 27.10.1983

```

FIG 43b

```

** ===== heb
*
* . 1
l hepatomegaly isotope scan iso 23.07.1980
*
* . 2
l septum in gallbladder in ultrasound usd 14.06.1985
** ===== met
*
* . 1
d obesity, severe cln since 1947
l overweight, severe 136 kg pex 17.05.1965
l overweight, severe 143 kg pex 17.04.1978
l overweight, severe 161 kg pex 26.10.1983
t gastric bypass + gastrostomy for overweight+++ sur 20.12.1983
*
* . 2
l hyperuricemia 9.5 mg% bld 12.08.1982
l hyperuricemia 9.4 mg% bld 17.12.1982
l hyperuricemia 7.6-8.9 mg% bld 01-02/1983
l hyperuricosuria 600 mg/24h urn 18.03.1983
t allopurinol 100mgx2 tab since 4/83
** ===== mus
*
* . 1
l BI-MALEOLAR FRACTURE, ANKLE, RT. xrs 21.05.1965
t OPEN REDUCTION OF FRACTURE sur 24.05.1965
*
* . 2
d arthritis, rheumatoid cln 21.01.1964
s painfull swelling of joints ana since 1963
*
* . 3
d discopathy L4-L5 cln since 1971
l herniation of lumbar discus L4-L5 xrs 04.06.1971
l osteophyte, L5 isotope scan iso 28.07.1980
s LBP ana Since 2/71
*
* . 4
s shoulder pain ana 01.01.1981
t VOLTAREN 50mgx3 tab January/81
*
* . 5
l DEG. CHANGES, CERVICAL VERTEBRAE xrs 00.02.1983
s cervical pain ana 18.01.1983
s CERVICAL PAIN ana 28.06.1984
*
* . 6
d TENNIS ELBOW, RT. cln 18.08.1983
*
* . 7
d TENNIS ELBOW, LEFT cln 26.09.1985
*
* . 8
t REPAIR OF POST OP. ABDOM. HERNIA sur 02.06.1986

```

FIG 43c

```

** ===== psy
*
d . 1
d schizophrenia, acute episode hospitalized cln 07.03.1976
d psychotic episode hospitalized cln 07.06.1964
d schizophrenia, acute event hospitalized cln 14.06.1986
d schizophrenia, paranoid cln 2-4/1964
f schizophrenia father ana at age 55
t halidol tab Start 1987
t phenergan tab Start 1987

** ===== res
*
d . 1
d chornic obstructive lung disease cln 08.06.1983
l obstructive lung disease pul. funct. tests pft 08.06.1983
s heavy smoker .80-100 cig. qd ana from age13
s EXERTIONAL DYSPNEA ana since 1977
t ventolin inhalation inh 1983 (May)

** ===== skn
*
d . 1
d urticaria after anti-tetanus cln 25.09.1963

*
d . 2
d urticaria after toxoid cln 02.11.1970

*
d . 3
d drug eruptions (sulpha and iodine) cln August1977

*
d . 4
d erysipelas cruris, right cln 27.03.1977
d erysipelas, Lt. leg, recc. x5 cln 1978-1983
    
```

FIG 43d

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↙ 231

 59 Pellagra ← 232

Steven B. Heymsfield, M.D., John R. Galloway, M.D.

CRITERIA FOR DIAGNOSIS

Poor diet, often compounded by chronic alcoholism, places the patient at risk for niacin deficiency. Skin lesions, alterations in mental status, and diarrhea suggest the diagnosis in such a setting. Niacin deficiency is present when the urinary ratio of N¹-methyl-2-pyridine-5-carboxamide to N¹-methylnicotinamide is less than one.

with high-calorie, vitamin-poor alcohol. Dermatitis, diarrhea, and dementia are the hallmark of pellagra. The skin of the extremities becomes reddened when exposed to sun, and with chronic solar exposure, becomes dark and rough. The mouth and tongue become sore. The patient may have esophagitis, steatorrhea and abdominal pain. Hallucinations, anxiety, depression, psychoses, and stupor are frequent but nonspecific manifestations of cerebral involvement.

CLINICAL MANIFESTATIONS**SUBJECTIVE**

Classic pellagra is due to a vitamin deficient diet, most importantly a diet deficient in niacin. The most common clinical setting is the chronic alcoholic who replaces calorie sources rich in vitamins

OBJECTIVE

A symmetric erythematous photodermatitis, especially of the extremities, is the characteristic skin lesion of pellagra. "Cassal's necklace," a band of dermatitis over the anterior neck, is found in some cases. Less specific skin changes include desquamation, hyperpigmentation, and edema. Neurological examination reveals

FIG. 44

the subjective disturbances discussed above and, in some cases, a peripheral neuropathy is present.

A decreased urinary excretion of N¹-methyl nicotinamide and N¹-methyl-2-pyridone-5-carboxamide is specific for pellagra. Other nonspecific laboratory findings include anemia, hypokalemia, hypocalcemia, hypoalbuminemia, and low plasma tryptophan. The electroencephalogram may show an increase in delta and theta wave activity, especially in those patients showing mental disturbances.

PLANS

DIAGNOSTIC

Classical symptoms are dermatitis, diarrhea, and dementia; however they do not very often appear together in the same patient. Reduction in plasma tryptophan levels is consistent with pellagra (normal concentration is 0.045 μm/mL). Reduced urinary excretion of N¹-methylnicotinamide occurs with onset of clinical symptoms and diminished excretion of N¹-methyl-2-pyridone-5-carboxamide occurs prior to clinical evidence of pellagra. Neither of these urinary assays are simple to perform nor readily available. Accordingly, the diagnosis is usually established after therapeutic response to nicotinic acid and other nutrients.

THERAPEUTIC

The treatment of pellagra is based on the administration of a high-protein diet in conjunction with niacin supplementation. The diet should consist of 1 g protein/kg body weight. Initially, the fat-intake should be low to avoid steatorrhea. Niacinamide is the preferred form of the vitamin, but niacin and tryptophan are also therapeutic. While the recommended allowance for niacin equivalents is 13–20 mg/day, a dose of 50 mg of niacin in addition to dietary niacin is necessary to reverse a deficient state. Dosages of 3 g/day or more may induce liver damage.

EDUCATION

A high content of niacin and its equivalents is found in liver, lean meat, poultry, eggs, milk, cheese, yeast, whole grain, nuts and legumes. Pellagra develops in chronic alcoholics and in those who consume low-protein diets. Pellagra may be secondary to malabsorption. In those already at risk because of inadequate diet, isoniazid, 6-mercaptopurine, 5-flourouracil, and chloramphenicol may precipitate pellagra.

FOLLOWUP

Following discharge, the patient should be seen every two to three months, and the diet history should be reviewed. If nutrition improves over three or four visits, the counseling program can be minimized to every six months to once a year.

DISCUSSION

BACKGROUND INFORMATION AND BASIC SCIENCE

Nicotinic acid, the by-product of nicotine oxidation, was discovered by Huber in 1867 (Figure 59–1). Pellagra was endemic to the United States during the first four decades of the twentieth century. Joseph Goldberger demonstrated in 1915 that pellagra was a nutritional disorder. In 1937 Elvehjem and coworkers cured black tongue, a related disease in dogs, with nicotinic acid. By 1945, acute cases were seldom seen due chiefly to economic progress.

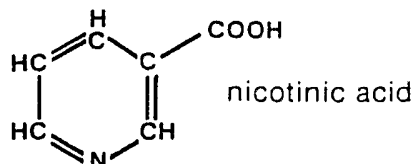
Niacin is available in three forms: nicotinic acid, nicotinic acid amide, and the amino acid tryptophan which is converted to niacin in a 60:1 ratio.

Nicotinic acid forms the active portion of the coenzymes nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP), both of which are necessary for cellular oxidative reactions.

NATURAL HISTORY

Inadequate cellular niacin is ultimately expressed as a dermatitis that starts on the extremities as an erythematous rash aggravated

NIACIN



Occurrence: liver, lean meat, poultry, eggs, milk, cheese, yeast, whole grain, nuts, legumes

Function: nicotinamide adenine dinucleotide and nicotinamide adenine dinucleotide phosphate are coenzymes to dehydrogenases which function in cellular oxidative reactions

Figure 59–1. The chemical structure, occurrence, active form, and functions of Niacin.

176 Nutritional disorders

by sunlight and eventually leads to hyperpigmentation and exfoliation. If left untreated, the patient progressively weakens from diarrhea and electrolyte disturbances, and death results. However, with proper treatment most patients recover rapidly. Severe cases may suffer irreversible neurological damage. Dietary habits must be improved to prevent relapse.

PREVENTION

Pellagra may be prevented by adequate dietary intake or by the supplementation of niacin equivalents (see "Education"). If alcoholism is the cause of a poor diet, the patient should be educated on the relationship of alcohol abuse to poor diet and pellagra.

COST CONTAINMENT

Nutritional counseling of the undernourished alcoholic patient is the first step in the prevention of this disorder. Niacin is inexpen-

sive in supplement form, and it is easy to obtain in a variety of food sources.

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FIG. 44b

PORTABLE HEALTH INFORMATION PACKAGE

HEALTH VIEW

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** =====

* PELLAGRA ← 232 from TEXTBOOK

** ===== GIT 234

* DIARRHEA
 ESOPHAGITIS
 STEATORRHEA
 ABDOMINAL PAINS

** ===== HEM 234

* ANEMIA

** ===== MET

* N1-METHYL NICOTINAMIDE 1. urn. excr.
 N1-METHYL-2-PYRIDONE-5-CARBOXAMI 1. urn. excr.
 HYPOKALEMIA
 HYPOCALCEMIA
 HYPOALBUMINEMIA
 TRYPTOPHAN, LOW < 0.045 nm/ml
 HIGH-PROTEIN DIET 1 g.prot./kg
 NIACIN 0.3-1.0 g/day
 LOW FAT DIET (INITIALLY) avoid diarrhea
 HIGH CONTENT OF NIACIN liver, meat ++
 FOLLOW-UP Q. 2-3 months
 REDUCE ALCOHOL INTAKE in alcoholics
 MALNUTRITION niacin def.
 ALCOHOLISM, CHRONIC
 METHYPYRIDINE/METHYLNICOTINAMIDE < 1

** ===== NEP

* DEMENTIA
 HALLUCINATIONS
 ANXIETY
 DEPRESSION
 PSYCHOSIS
 STUPOR
 NEUROPATHY, PERIPHERAL
 DELTA WAVE ACTIVITY increased
 THETA WAVE ACTIVITY increased

FIG. 45

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** ===== ORL

*
SORE TONGUE
SORE MOUTH

** ===== SKN

*
SKIN REDDENING, EXTREMITIES
SKIN DARK & ROUGH, EXTREMITIES
PHOTODERMATITIS, ERYTHEMATOUS
"CASSAL'S NECKLACE" DERMATITIS
DESQUAMATION
HYPERPIGMENTATION
SKIN EDEMA

by exp. to sun
chr. solar exp
symetr. extrem
anterior neck

FIG. 45 a

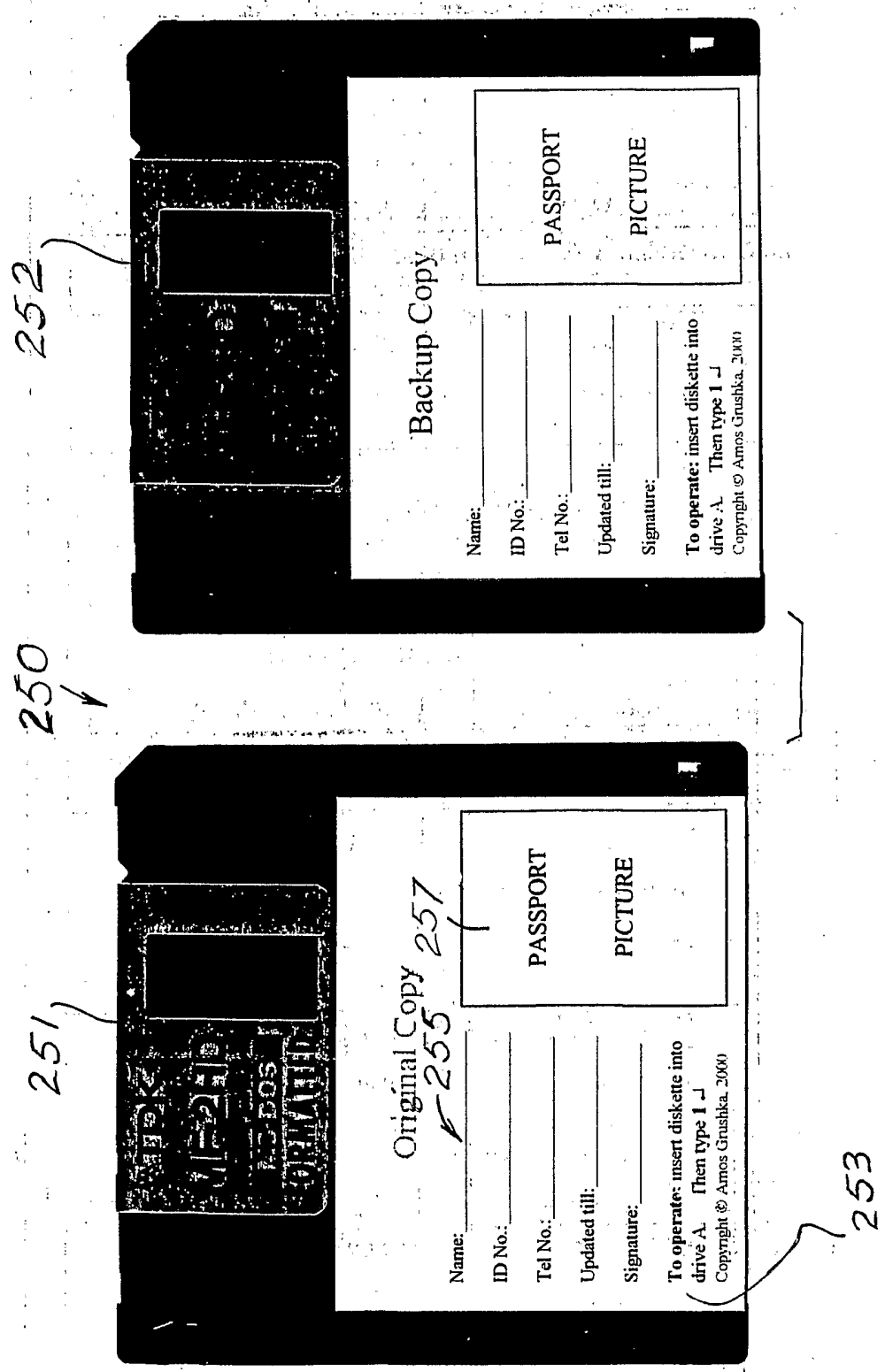


FIG 46

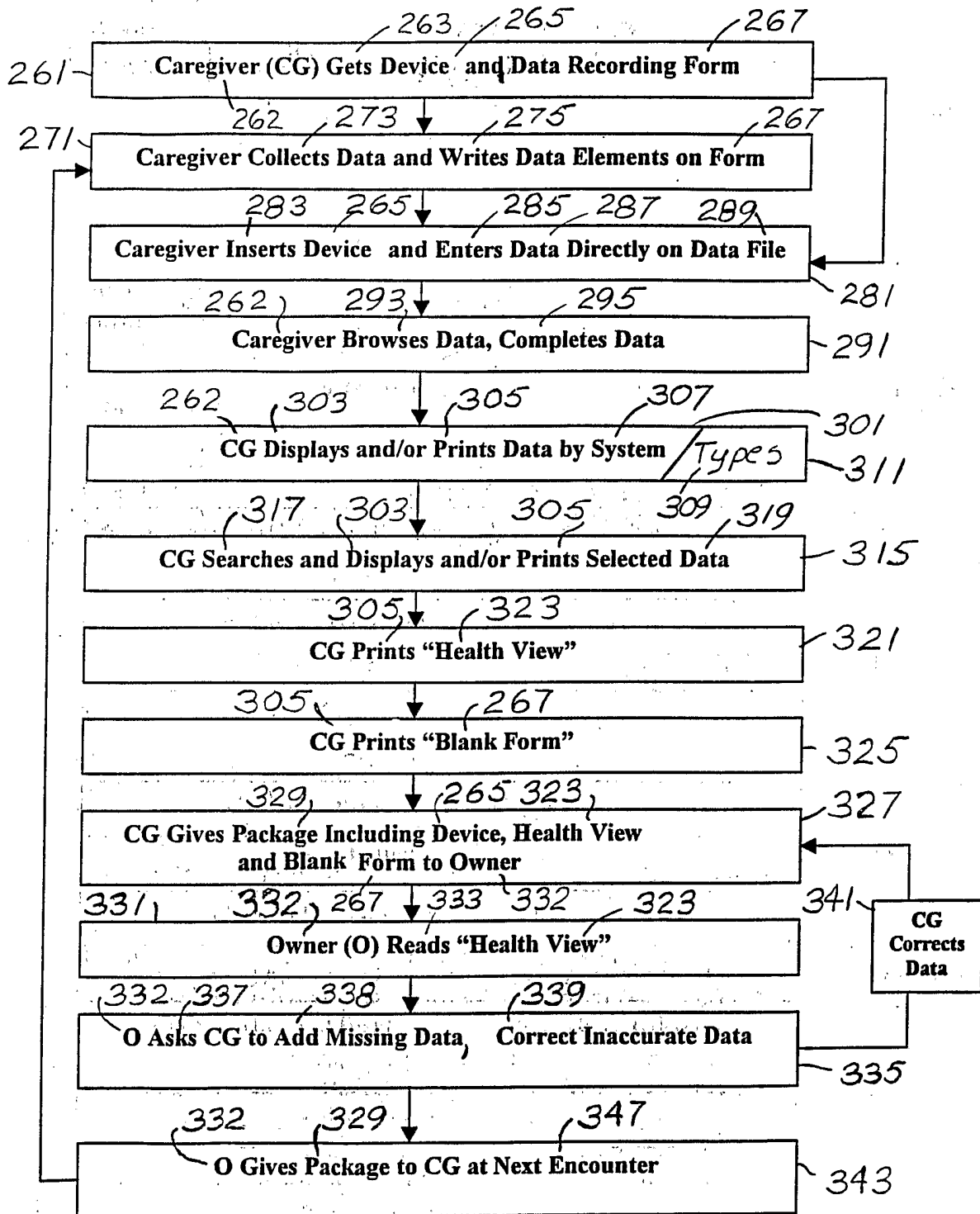


FIG. 47 ²⁶⁰

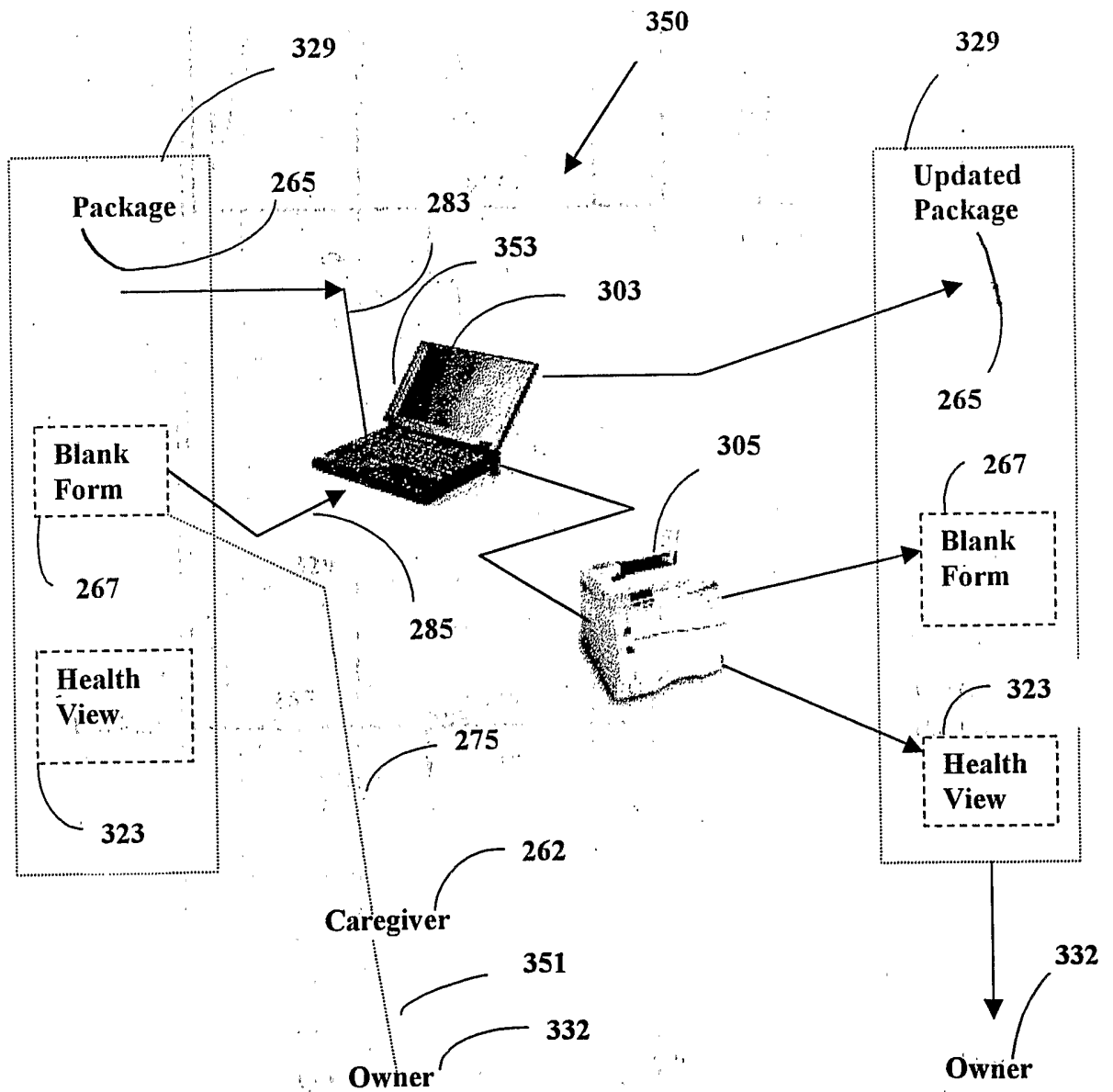


FIG. 48

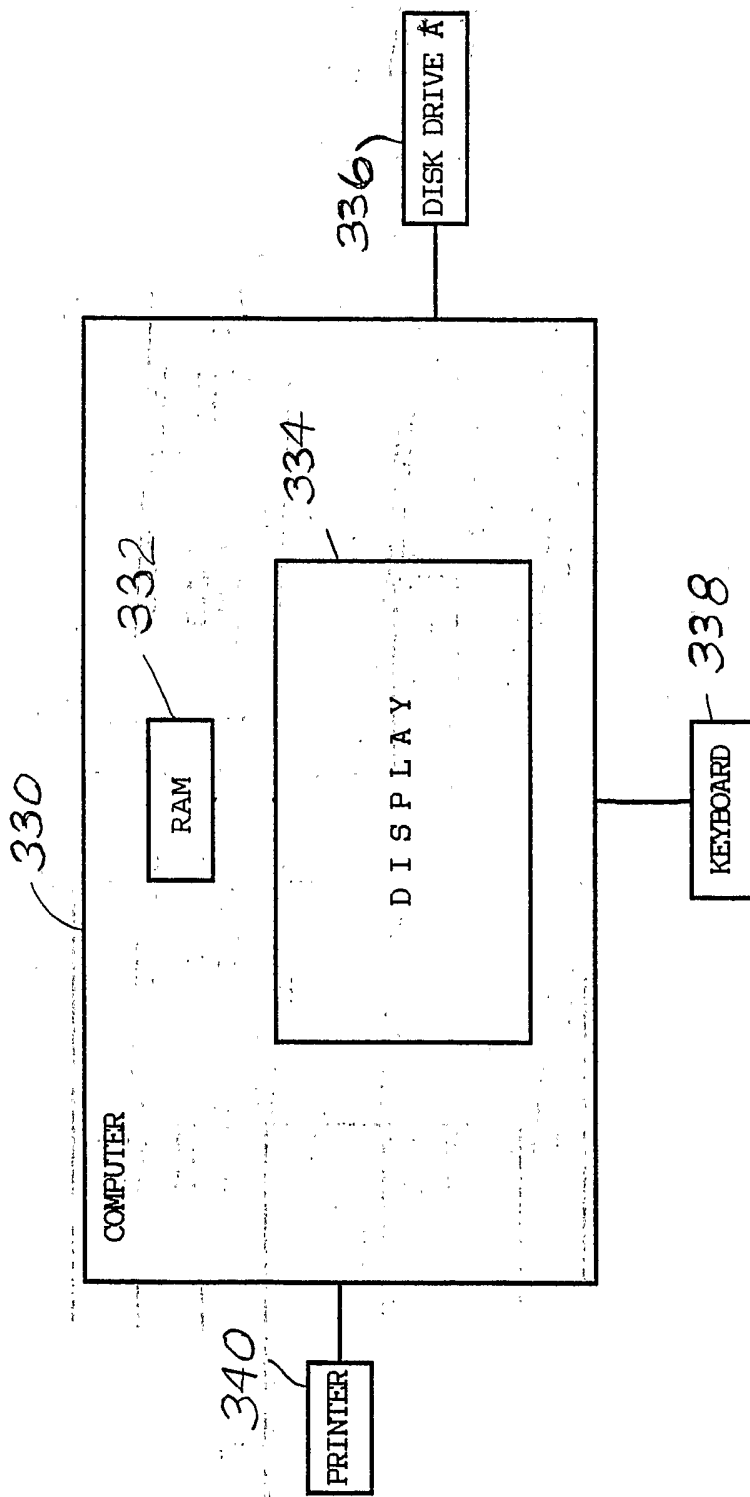


FIG. 49

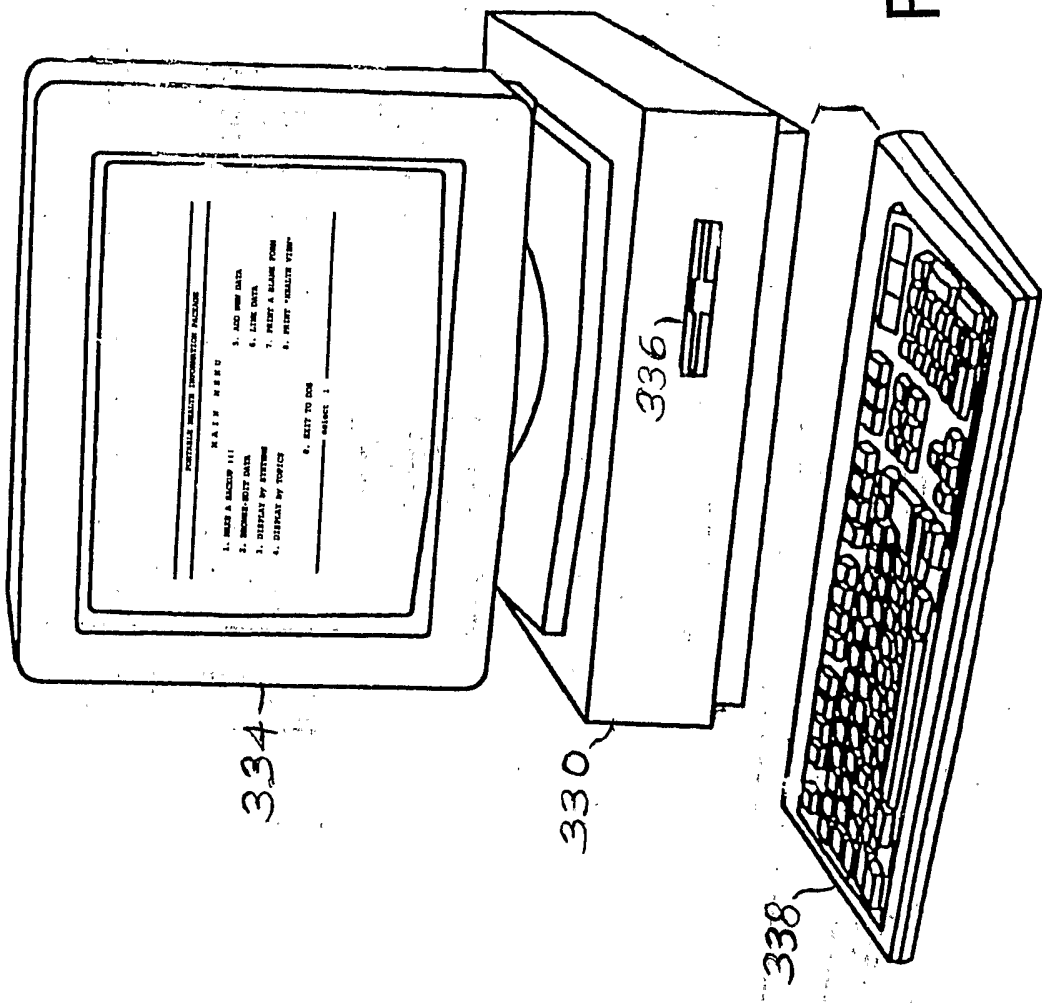


FIG. 50

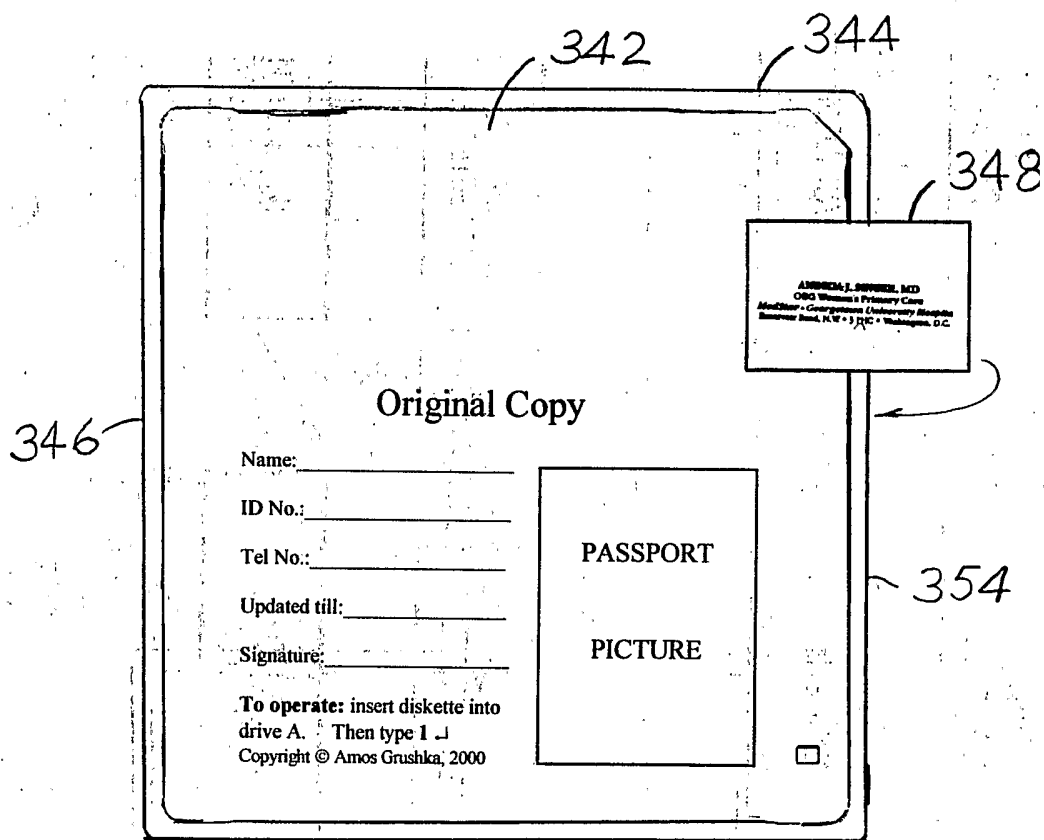


FIG. 51

FIG. 52

