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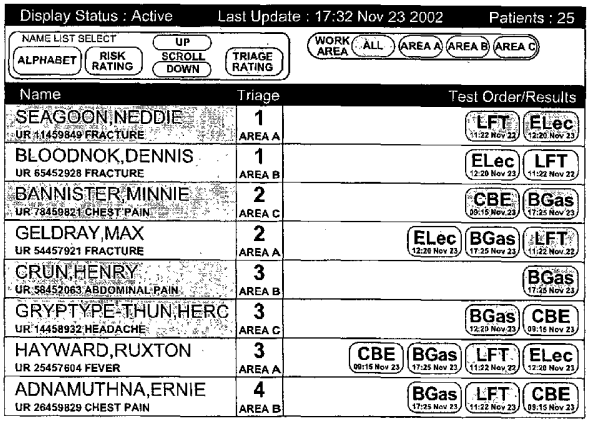
(54) Title: CLINICAL RISK MANAGEMENT SYSTEM AND METHOD



(57) Abstract: The system provides a health care professional with interactive information relating to one or more patients in a clinical environment. The system has a computer system connected to at least one interactive display device for processing the interaction between the health care professional and the device. There is at least one interactive display device located in the clinical environment, each device being adapted to display clinical and other information associated with a patient associated with said environment. The displayed information includes a list of all of said patients that have been entered into a patient computer records system. For each patient on the list, the system provides one or more interactive icons representative of a diagnostic test ordered by a health care professional. The icons being visually encoded with at least one indicator for indicating the ability to access a completed test result for a said patient, and/or whether a test order (investigation not yet reported upon) or a test result (investigation report is available) as well as to whether the diagnostic test result has been accepted by a predetermined health care professional. The icons are also visually encoded for the clinical risk assessment of the result. As well, the date/time of the diagnostic test order placement is provided. The icon can be actioned and test results and other information is made available to the authorised health care professional.

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CLINICAL RISK MANAGEMENT SYSTEM AND METHOD

FIELD OF THE INVENTION

The present invention relates to monitoring medical treatment environments for clinical risk monitoring and mitigation purposes, and in particular, discloses clinical a risk monitoring and mitigation system for a time critical hospital environment.

BACKGROUND OF THE INVENTION

In clinical care environments, methods of treatment often take on a time critical nature. For example hospital emergency departments (ED), are characterised by complex clinical decision making under time pressures, high patient turn over, high clinical work loads and difficulty in assessing important clinical data such as laboratory and other investigative test results.

Despite this, the majority of current Clinical Information Systems are designed to support administrative tasks, rather than supporting health care professionals in dealing with complex clinical patient, care related decisions, which are the essential generator of hospital costs and the source of a large proportion of adverse events. This deficiency in current Clinical Information Systems applies not only to those built for Emergency Departments but for the majority of other Hospital Departments as well.

The presentation of diagnostic test results provides an example of an area where valuable and practical support to busy health care professionals in the clinical environment is deficient. Large volumes of diagnostic test orders are continuously generated and equally large volumes of test results are fed back into the health care system. In the busy clinical environment, many system factors impede the full value and effectiveness of diagnostic investigations and often lead to serious adverse clinical outcomes. Some examples of typical deficiencies include:

- Long delays before potentially serious test results are brought to the attention of the responsible health care professional.
- Large numbers of test results are never read by the responsible health care professional and therefore are not applied in the clinical care process. For example, a recent British study found that some 40% of tests ordered in Hospital Emergency Departments are never read.
- Large numbers of 'normal' results take the time and attention of the clinical decision-makers whilst more urgent test results may remain unread.
- The attention of health care professionals is overloaded with large numbers of 'normal' results for patients who are not at clinical risk and that may delay treatment to those patients who are at risk.
- Health care professionals having to log into computer records systems to search for their results; often requiring a time consuming log in process, and taking valuable time to query the system for specific patient results. This results in the wastage of health care professional time.

These problems also apply to other sources of diagnostic and clinical information such as radiology reports, and results from procedures.

The impact of these deficiencies is significant. Delays in an important laboratory test result becoming known to a health care professional will lead to a delay in them taking proper clinical account of the result. An appropriate revised course of clinical action may then be delayed or postponed. Early intervention and fast "door to needle time" performance are critical factors in high quality health care and delayed or postponed clinical decisions give rise to significant clinical risk and for many patients, serious adverse outcomes.

Time to treatment is a critical factor in the outcome of many diseases treated in hospitals, for example, myocardial infarction (MI).

Additionally, clinical decision-makers are burdened by the rapidly expanding clinical knowledge base of new medical and scientific research and findings that will often be pertinent to the care decisions confronting them. The scale of this issue is illustrated by the cataloguing of over 400,000 new medical and scientific papers every year in the Medline ε database. There is clearly a practical problem in maintaining the currency of the clinical knowledge of practicing health care professionals. This is manifest in practice as unexplained variations in clinical practice and in patient outcomes.

One well-established response to the problem of unexplained variations in clinical practice is the development of standardised Clinical Guidelines. Groups of appropriate experts are brought together to synthesise relevant new knowledge and to prepare clinical practice summaries, referred to as a "clinical guideline". However, some clinical guidelines still run to tens of pages of printed material, although there have been many attempts to reduce the content using diagrams. Furthermore, in any clinical practice environment, one can expect a large number of clinical guidelines to be applicable.

Paper guidelines are difficult to use at the point of care. This can be overcome through the presentation of clinical guidelines on appropriate hospital information systems in a structured format that enables a health care professional to quickly step though the pertinent clinical considerations, at the point of care and customized for a patient's specific characteristics. Such an approach would greatly support health care professionals in dealing with complex clinical patient care related decisions, especially in an environment of constantly changing and improving knowledge.

SUMMARY OF INVENTION

It is an object of the present invention to mitigate the clinical risk associated with the ordering, receiving and reading of diagnostic tests and the making of care choices in response to changing patient patho-physiology and/or clinical events.

In accordance with a first aspect of the present invention, a system for providing health care professional interactive information in a clinical environment relating to one or more patients, said system comprises:

a computer system connected to at least one interactive display device for processing the interaction between the health care professional and said device;

at least one interactive display device located in a clinical environment, each said device adapted to display clinical and other information associated with a said patient associated with said environment, the displayed information including:

(a) a list of all of said patients, as have been entered into a patient computer records system,

(b) for each patient on the list, one or more interactive icons representative of a diagnostic test ordered by a health care professional and for accessing a completed test result for a said patient, the icons being visually encoded with at least one indicator representative of the type of test; whether the icon represents a test order (investigation not yet reported upon) or a test result (investigation report is available) ; whether the diagnostic test result has been accepted by a predetermined health care professional and the date/time of the diagnostic test order placement.

Preferably, for each patient in said list, there are one or more interactive icons for alerting health care professionals of a predetermined potential clinical risk or unrecorded task as assessed by said system based on the one or more tests that have

been ordered and their result(s).

Further preferably, for each patient in said list, there are one or more predetermined clinical guideline icons that in detailed view present patient-specific information in accordance with a clinical guideline associated with said patient.

In an aspect of the invention a said indicator comprises a colour coding associated with a said icon to alert health care professionals to a predetermined degree of clinical risk associated with a test result for a respective patient.

Preferably, the system operates in conjunction with existing computer records systems or a data warehouse for the provision of existing, basic clinical information associated with the patients. The system can interrogate the computer records systems or a data warehouse for the provision of patient lists, test results for patients and other clinical data within the environment.

In one example embodiment, the system operates in the emergency department of the hospital with the display information including a medical triage rating and/or an identifier to indicate the location of the patient in the emergency area. The interactive icons can include alphanumeric letter code and associated date information as well as colour coding, to convey the nature and importance of the diagnostic test and date/time when the indicated diagnostic test result was either ordered or posted. The interactive icons can comprise a touch screen button, which upon activation displays details of an associated medical report associated with the interactive designator. The display information can be divided into a series of rows, one for each patient, with each row containing a series of report indicators further including an overflow indicator indicating an overflow in the number of reports for a patient. Upon accessing the overflow indicator a separate menu appears listing the additional reports

associated with a particular patient. Each result icon in the row can be sorted by time order, time posted, or by predetermined risk rating.

The display information can be further sortable by treating health care professional. In one embodiment, the system allows for the selection of a treating health care professional identification and only those patients associated with that health care professional are displayed. The system can include a proximity detector for detecting a predetermined health care professional in proximity to the display and listing only those patients relevant to that individual.

In accordance with the clinical risk mitigation aspect of the invention, there is provided a system for providing users with direct access to established clinical guidelines, these being agreed processes and procedures for the care of particular medical/clinical conditions.

The clinical guidelines are included in the displayed information, under predetermined conditions. In one embodiment, the health care professional is able to select a particular clinical guideline by selecting, on screen, from a menu of relevant clinical guidelines from a clinical guideline framework provided by said system. In another embodiment, the user is prompted to consider a clinical guideline in response to particular patient conditions that may arise from time to time and/or as a result of new or modified clinical data for a patient (or combinations of clinical data for a patient).

Whenever a user selects a clinical guideline for a particular patient, certain aspects of the clinical guideline will be customised to take account of particular aspects of the patient's patho-physiology, clinical events and/or other relevant circumstances.

The clinical guideline will present structured options and choices to the user and will record the choices made. The system therefore can record and present a log of the clinical and care choice options that have been selected. The records created can be taken into account in reviewing the efficacy of specific clinical guidelines. The records can also be used in gauging user compliance with agreed clinical practice and investigating opportunities to further improve clinical guidelines.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described, by way only, with reference to the accompanying drawings in which:

Fig. 1 is a schematic illustration of the hardware arrangement of the preferred embodiment;

Figs. 2, 3, 7-14 illustrate various screen views utilised in the preferred embodiment;

Fig. 4 to Fig. 6 illustrate various icon components utilised in the preferred embodiment; and

Fig. 15 to Fig. 20 illustrate various screen shots showing the provision of clinical guidelines in accordance with the present invention.

DESCRIPTION OF PREFERRED AND OTHER EMBODIMENTS

In the preferred embodiment, there is provided an interactive computer system including a series of touch panel screens that are designed for utilisation in a clinical service environment, for example, the emergency department of a hospital. A hospital environment and in particular the Emergency Department is used for the embodiment of the invention as it represents probably the most time critical environment. However, the system has been found just as useful in other departments of hospitals as well as in medical General Practice environments where time can be just as critical but appropriate risk mitigation is just as important. The system, hereinafter referred to for

convenience as the "SecondScreen" system, is designed to supplement the established or legacy information systems within a clinical environment so as to provide ongoing surveillance of all diagnostic test results, for all patients in a nominated clinical work area. Also, for ease of reference the clinical users of such a system are referred to herein as health care professionals that may include health care professionals, clinicians, specialists, surgeons, psychiatrists, physiotherapists, nurses, etc. The ability for any particular health care professional to use the system can be predetermined by the administrator of the system and enforced by physical or operational means.

Turning initially to Fig. 1, there is illustrated a schematic of the hardware environment 1 of the preferred embodiment. The SecondScreen system is based around software running on a core hardware facility 2. The computer hardware facility 2 can comprise a high end personal computer or server type device utilising a modern operating system such as presently is the case including Linux or Windows NT, 2000 or XP operating systems. The operating system in turn runs a number of application type programs that are developed in accordance with the teachings described herein. The application programs can be written in a wide range of computer languages, for example in languages such as Visual Basic, Visual C++, .NET, XML, Perl (with TCL extensions) etc. Ideally, the language provides a wide functionality including full network interactivity and user interface design capability. Indeed utilising appropriate interfaces, such as Web Services or CORBA, multiple different languages could be utilised.

The programmed software running on the hardware facility 2 interacts with a number of other devices. For example, the software interacts with and controls a number of touch screen display devices 4—6. Each of these devices is placed in an appropriate location in a hospital clinical work area for accessing the system on demand. A printer facility 7 can also be provided for printing out results as will

become more apparent hereinafter. The system 2 is connected to a hospital network environment including networking nodes 9 eg. which interact with a number of databases which are assumed to contain the historical data associated with operations in a hospital environment. It is assumed that existing clinical systems contain the usual administrative information stored in databases. These databases are typically part of what is termed a legacy computer records system and are readily made to be accessible by the system of the preferred embodiment.

A first database 11 contains laboratory results, which can be queried by users in a database format. For example, the laboratory results might be stored in a SQL compliant database for access via user queries. A second database 12 is designed to carry patient details. The databases, 11, 12 continue to operate as they have previously operated with the preferred SecondScreen system embodiment providing a unique user interface which is particularly suitable for utilisation in time critical environments to deliver improved surveillance of all diagnostic test results ordered using the existing system of an interface provided by the SecondScreen system.

The SecondScreen system is set up to watch for both ordered (but not completed) test results and for completed and available test results, for all patients assigned to a predetermined clinical work area (for example, the Emergency Department). For all completed and available test results, the SecondScreen will calculate a clinical risk rating for each result (serious, moderate, normal or high, moderate, low) and generate a test icon with the appropriate colour coding, for presentation to health care professionals on the display panels 4-6. The criteria for assessing the potential risk rating of a test result can be determined by local experts and transcribed into the appropriate software elements in the SecondScreen system.

The SecondScreen system also provides an alerting system via screens 4 — 6 that

proactively displays risk-prioritised laboratory results in the clinical environment, such as the clinical work areas of an Emergency Department. SecondScreen provides this type of information rather than requiring the health care professional to check each result individually via an existing system, assuming they have remembered to do so.

The SecondScreen system may also be used to alert health care professionals when radiology results are available. Since radiology is a key factor in the management of many clinical conditions, any delay in viewing X-Rays can lead to delays in treatment and hence increase risks to patient treatment being timely and complete. It is assumed that the hospital's radiology system stores key work flow metrics, such as signalling the availability of films, or completed reports and the SecondScreen system is configured to alert these events to the relevant health care professionals.

The SecondScreen system is particularly valuable in high workload, high complexity clinical areas such as Hospital Emergency Departments.

The SecondScreen system supports clinical risk management by providing easy visual access to risk stratified test results and by using a colour graphical display showing each test result, it optimises the communication of risk information to the health care professional. The SecondScreen graphical displays provide easily read output and with proper placement in the Emergency Department, allows for accurate viewing for all care givers and health care professionals.

Turning now to Fig. 2, there is illustrated an example output display 20 of a SecondScreen system.

Laboratory results eg. 21 are listed against the relevant patient 25 in a visually encoded way such as using a colour coded format that allows easy identification of the type of test result and its potential risk rating for the patient. Other types of visual encoding could include shapes, shading, patterns, movement and changes at predetermined intervals of any of the prior encoding types. The risk rating can be determined via a risk assessment process within the SecondScreen system. The risk assessment rules can be determined by the hospital clinical organisation, the head of the clinical service or other appropriate health care professional and encoded in the system.

For example, results that are judged to be of high risk for the patient are displayed with a red icon 24, medium risk results are displayed with a yellow icon 23, and low risk results are colour coded green 21. Therefore, results that are abnormal and clinically important can be differentiated at a distance from test results with mildly abnormal results, as determined by local policy. The SecondScreen system does not override local procedural standards. It is programmed to conform to them and ultimately improves compliance with them. The relevant health care professional can access the details of a result by simply touching the icon on the SecondScreen display device. This opens a window containing all of the test details and allows an immediate print option for creating a paper record of the patient details and test results available at the time. The system may be configured for more or less levels of risk, and for different colours for each risk level.

In the preferred embodiment, important critical information can be alerted to a health care professional with a little or no effort on their part. Desirable attributes of the interface can include:

- The system uses large format flat display panel to allow health care

professionals to see the alert condition of new and existing lab results from a distance.

- The panel can have touch screen capability so that a health care professional can access a specific result simply by touching the associated icon of interest on the display panel.
- The panel can be fitted with a proximity device that reads the identity of a health care professional (preferably from an identification badge fitted with a passive Radio Frequency Identity Device RFID) and displays that health care professional's patients and diagnostic test results as a priority.
- The system can be extended to include audible alerts where critical results go unread, or to other structured alerts such as pager or mobile phone messages.

Additional features that can be provided can include:

- Track the clinical risk associated with the patient's diagnostic investigation/test results arising from diagnostic test and treatment orders generated in the clinical work area, for example, an Emergency Department.
- Identify the probability of the clinical risk that is likely to exist or arise for a patient in a clinical service area, for example, a patient admitted through the Emergency Department.
- Prompt clinical staff to respond to the biochemical clinical risk that may be indicated.
- Support clinical staff in avoiding the adverse outcomes associated with missed diagnostic investigation results.

By providing such an effective user interface, there can be an improved access to time critical information in the busy clinical environment (e.g. the Emergency

Department) and thereby facilitating an improved 'time to treatment'. This reduces the work pressure stress on clinical staff and reduces the volume of redundant tests. The system provides a clinical audit path for the review and evaluation of test ordering and the application of results thereby contributing to better patient outcomes.

The SecondScreen system provides important test results to the right health care professional in an effective time frame, which gives rise to:

- Reduced clinical risks due to the elimination of missed results, particularly in time critical environments.
- Faster 'door to treatment times' resulting in better patient outcomes and reduced risk of serious adverse outcomes.
- Improved diagnostic test utilisation.
- Maximum use of diagnostic information for patient management (e.g. laboratory results and radiology reports).

As a stand-alone system, the SecondScreen clinical risk management system also supports a powerful clinical audit capability. The SecondScreen system will support the clinical audit function by capturing and recording essential indicators of diagnostic services ordering, review and application.

The system of the preferred embodiment has the significant advantage in that it allows for a 'non disruptional technological change'. That is the structuring of new technology in a way that allows it to be introduced into complex health environment work flow patterns without causing disruption to those practices.

The preferred human interface component is the 17" (or larger) touch screen LCD display panel 4-6 (Fig. 1). In an example embodiment, three panels are deployed

within an Emergency Department (ED).

The system can be constructed to support an increasing level of complexity or number of displays over time.

In Fig. 3 there is provided an example screen of the standard touch screen for which the user has selected the display of patient names in descending order of priority, in accordance with their overall risk rating. The essence of the Display is a list of 'patient lines' 31, each showing that patient's identification (Name and Unit Record (UR) Number), their triage rating and the test icons for that patient. Even the name of patients that have been discharged from the environment can be maintained on the SecondScreen system if certain conditions are not met. Such as for example if not all the tests ordered have been "accepted" by the relevant health care professional the patient name remains on the list. The SecondScreen system can be used in a General Practitioner environment where patients are expected to leave the surgery before the results of tests can be reviewed. The SecondScreen system maintains the patient identification on the system until all ordered test results have been "accepted". This approach ensures the proper follow up of diagnostic tests by the health care professional. The availability of clinical guidelines in addition to the test alerts also mitigates risk.

Other alternatives are to display the patient names in descending alphabetical or numerical order 37 or by descending triage-rating order 38. The screen provides the following functionality:

- Display of the patients 31 assigned to the Emergency Department (ED); including Name, Unit Record number, triage medical description code, location in the ED and the assigned triage rating 32 provided by the hospital database.

- Display of laboratory tests 35 ordered for the patient (but not reported) including test type, and the date and time the test was ordered in the Emergency Department.
- Display of laboratory tests 34 for which completed reports are available, for the patient including test type, and the date and time the test was ordered in the Emergency Department.
- Display of the risk rating assessed for each laboratory result returned from the pathology system.
- Display of the laboratory test result parameters for patients who may be in the environment or patients that have been discharged or are absent from the environment.

As noted previously, it is a feature of the preferred embodiment to use touch screens as part of the human interface between the system and the clinical staff. Each laboratory test has an interactive icon associated with it; the details of the test status can be read by simply touching the test icon of interest on the screen. This opens a further on screen window to display the complete test report details.

It is assumed that the clinical work environment backroom computer system (eg. an Emergency Department computer support system) supplies a list of test types relevant to its clinical needs for inclusion in the SecondScreen system and specifies a three or four letter code to be attached to each test type.

A typical interactive test icon in this embodiment is shown separately 40 in Fig 4. The type of test is described by the three or four letter code 41. In this example, the code LFT stands for a Liver Function Test. The date/time stamp for when the order for the test was received is also displayed 42. The code used can be one that conforms to a standard or a local convention.

The colour coding of the test icon is also used in this embodiment to convey important information about the test. The first icon to be displayed is a white colour-coded icon that is generated whenever the SecondScreen system is advised of new test orders, via the internal hospital systems (11,12 of Fig. 1). The icon includes a date/time stamp to record when the order was placed. Once a laboratory test result is returned from the pathology system, the relevant icon will be coloured as shown pictorially in Fig. 5 in red, yellow or green background. A red background signifies potential high risk in the result for the patient as assessed by the SecondScreen system. A date/time stamp records when the order was returned and displayed. A yellow background signifies potential medium risk in the result for the patient. A green background signifies potential low risk in the result for the patient. The results may be ordered on screen by date, or by multiple ordered criteria such as risk, date, and whether the result has been read.

A health care professional can read the details of any laboratory result, alerts or clinical guidelines by interacting with the icon and in this embodiment that is achieved by simply touching the appropriate icon e.g. 45 on the display screen.

In other embodiments, the icon may be interacted with by way of electronic wireless means or by audio commands.

This action opens, a larger "overlay" window containing the full detail for the report on the test result, alert, or guideline and optionally can offer a choice of actions to the health care professional, including the ability to print off a copy of the report, to record that the result has been read and noted or to leave the result active for reading at a later date. The SecondScreen system will also provide as a function of the interactive icons an alert to the health care professional of potential clinical risks or

unrecorded tasks. An example of which is a framework of prompts to check and record vital signs of the patient and dependant on the result prompt none, one or more alerts or suggested tests. Such a framework can be in accordance with known or agreed clinical guidelines.

When a health care professional has read a test result and has made a selection on the touch screen to signify the result has been read, the associated test icon will be shaded out to indicate the test result has been read and thereby "accepted". The shading of an icon retains the original colour coding but with a lighter shade of that colour applied.

A triage rating 32 assigned at time of admission is shown in the patient line next to the patient identification details. The rating is 1 for high priority through to 5 for lowest priority. The rating number can be obtained from the Hospital database system.

There may be more than one work area sharing the patient clinical load and in this embodiment of SecondScreen, three work areas are provided for; Area A, Area B and Area C. At the time of admission, the patient is usually assigned to a work area. This data is collected in the Hospital database system and is transferred to the SecondScreen system. The clinical work area code is displayed with the triage rating. The triage rating for a patient is displayed in a column headed 'Triage' and the work area to which the patient is assigned is shown directly beneath the triage-rating figure.

The default for the display screen in 'Risk Rating' display is shown in Fig. 3. The purpose of this mode is to show those patients who are potentially at most risk. The name of the patient is highlighted with the colour of the highest risk rating of un-read test result for them. Patients with a high risk rating e.g. 31A are displayed first, followed by those with medium risk 31B, then low risk and finally those with no un-read test results. If more than one patient has the same test result risk assessment, the

display will show those patients in descending order of the number of results that remain un-read ie not "accepted".

At any time, a user of the Display can choose to see the patient list in alphabetical order. This option is invoked by touching the button labelled "Alphabet" 37 in the 'Name List Select' area of the Display panel. Similarly, a user of the Display can also choose to see the patient list in Triage Rating order. This option is invoked by touching the button labelled "Triage Rating" 38 on the 'Name List Select' area of the Display panel. Example screens showing the patient line reordering are shown in Fig. 7 and Fig. 8 respectively.

To open and read a test result, the user touches the test icon for the test of interest and the Display opens an overlay window as shown in Fig. 9. The overlay window contains the complete laboratory report data for that test, as provided by the Hospital's Pathology system.

The test results as delivered from the Hospital Pathology system are contained in the middle of the overlay panel 60, with the patient identifiers at the top of the panel 61. Three action buttons 62-64 are available for further user control, as follows:

- PRINT RESULT: allows a paper record to be printed, for health care professional reference or filing.
- ACCEPT RESULT AS READ: tells the system that the risk rating has been observed and changes the status of the test icon to "read". The implication is that the clinical value of the result has been extracted and the result icon no longer needs to provide an alert of the risk rating: the icon remains on the system but is "faded out", to signify that it has been read and the alert is no longer active.
- CLOSE: shuts down the test results window but leaves the status of the test

icon as 'unread' in this instance, the icon 50 remains in full risk rating colour, the implication being that the risk rating status of the result is preserved for subsequent action.

In instances where a very long laboratory report has been filed, the overlay window may offer a second (and subsequent) page(s) to deliver the full laboratory report information. The Display panel provides for 'workplace options' 70 in a top right hand area of the Display labelled "work area". The work areas should reflect actual physical work spaces and is a user-defined field. This feature allows the patient list to be filtered to display only those patients assigned to a nominated work area. This reduces the potential length of the patient list and assists with efficient processing of user queries against the patient list. Display screens are likely to be allocated to separate work places. However, a user in that work place will also be able to view test results for patients located in other work areas of the Emergency Department or the hospital.

Data overflow, that is, the existence of more patient data than can be shown in the viewing area of the Display, may be an issue in some work environments. The display of patient data is deliberately in large easily read format so that it can be seen from a distance, thereby making it easier for busy clinical staff to be aware of the test result situation from most points within the service area. Two types of data overflow can occur:

- Overflow in the number of test icons that can be displayed in the 'Test Order/Results' section of a patient line.
- Overflow in the number of patients in the selected work area (particularly of all work areas in of ED are selected).

As shown in Fig. 10, instances will arise where multiple test results become available for a single patient and generate too many test icons for the available screen space. In these instances, an overflow icon 75, 76 will appear at the right hand side of the relevant patient line and will flash. Figure 10 illustrates test icon overflow for patients Seagoon, Neddie and Hayward, Ruxton. As illustrated in Fig. 11, by touching the test overflow icon a new window is opened for the patient and displays all test icons 81 for that patient. Touching any one of these icons (test result rather than test order) will produce a new window with the result details.

In order to handle an overflow of patient lines, the Display panel has two 'scroll' buttons e.g. 83 located in the Name List Select area (top left-hand corner of display).

These function as follows:

- If more patient lines exist above the set shown on the screen, the 'UP' scroll button be activated.
- If more patient lines exist below the set shown on the screen, the 'DOWN' scroll button be activated.
- If more patient lines exist above and below the set shown on the screen, both the 'UP' and 'DOWN' scroll buttons will be activated.

A user can view unseen patient lines by touching the appropriate scroll button.

A second option for patient line overflow may be to physically mount another Display panel beneath an existing one and then invoke "tandem" operation of the pair of screens via the Display Panel Software. The lower screen can act as an extension of the viewing area, enabling twice the number of patient lines to be viewed. All other functions can remain the same.

It is also possible for the SecondScreen to shift the location of a patient on a list to the then visible portion of the display screen if certain criteria are met. Such as if the most recent test result for a patient is rated as critical and requires urgent attention by the treating health care professional, that patient's details may be shifted to the top of whatever list is being currently displayed accompanied by an alerting visual and or audible indicator. Thus with the health care professional in proximity to the display screen, it is appropriate that the SecondScreen system prompts them of critical information availability.

A further alternative viewing mechanism provides for matching of a treating health care professional with the patients assigned to them, or to the clinical unit/group to which they belong. Implementation of this function requires the interface with other clinical and/or patient management computer records systems, for example, an Emergency Department patient management system, to provide not only the individual patient details but also the assigned treating health care professional for each patient, or a hospital system that assigns each inpatient to a clinical unit. The purpose of this function is to make it easier for any particular health care professional to quickly view their list of patients and/or to quickly access their list of patients, without wasting time scrolling through all patients recorded in the system. An example of this refinement is shown in Fig. 12. There are several significant additional functions in the Display;

- There is a health care professional Select panel 90 in the upper right hand corner of the Display.
- Each patient line includes the name or in some examples the identification of the treating health care professional e.g. 91.
- The system can provide the option of displaying "health care professional lines" instead of "Patient lines".

There are three methods of identifying the patients allocated to a health care professional in the panel Fig. 12, via:

- LIST: opens a list 94 of health care professionals and allows selection of one 95.
- PROXIMITY: uses a sensor to detect the presence of a health care professional near the Display.
- OFF: means no filter is applied and each patient line has to be visually scanned by the viewer for the name of the health care professional.

As illustrated in Fig. 13, when the "LIST" button in the Doctor Select panel is touched, it opens a window containing the names 94 of all Doctors or health care professionals providing services in the clinical work environment. This information can be taken from the hospital system.

If Dr Jones 95 was to be selected from the health care professional list, then only those patients of Dr Jones are subsequently displayed.

Located for example in the physical frame of each display screen, is an antenna linked to a proximity detector for reading transponders that are allocated, on a unique basis, to every health care professional working in the clinical area. Suitable proximity

devices include a range of commercially available devices that are able to detect passive transponders at a distance of up to 40 centimetres from the display screen antenna. As described earlier as RFID. With the "PROXIMITY" button selected the display device, incorporating the antenna and suitable software, detects an electronically encoded health care professional nametag within its proximity that contains the passive transponder device. Such devices are small and inexpensive typically passive devices that can be affixed to the health care professional's identifying name badge. Once the nametag is within a distance of approx 40cm from the Display, the system detects their presence and decodes the information contained in it. The decoded information includes the health care professional's name and the SecondScreen filters out the patients for that health care professional and shows only those patients in the patient list on the display. In addition, the health care professional's name or identification code will be prominently displayed so that there is no confusion that the patient list is a selective list for a specific health care professional. Figure 14 illustrates the resultant display. With the "OFF" button 100 selected in the Doctor or health care professional Select panel, the display includes all patients recorded with the system. The Name List Select functions 101 of Alphabet, Risk Rating, Triage Rating and the Scroll function work with any of the Doctor or health care professional Select functions.

Additional refinements to the system are possible. For example, the system can be adapted to allow the ordering of diagnostic tests from the SecondScreen system, with a two-way data transfer link established with the respective clinical and/or patient management system. Instead of the data transfer being only one way (patient details passing from the computer records system to SecondScreen) test order data can be generated in the SecondScreen System and passed into the appropriate computer records system patient record where that exists. This addition provides health care professionals with the time saving ability to use the human interface of the

SecondScreen System to rapidly compile a new test order for a patient, via a touch screen menu selection with all the advantages of the SecondScreen interface.

In a further refinement of the preferred embodiment, the SecondScreen system can provide a health care professional focused display. This function, controlled by the system administrator, changes the focus of the display from patient lines to health care professional lines. There is still a specific display line for each treating health care professional/patient combination, but rather than showing the patient's name in a prominent fashion, the treating health care professional's name is displayed. The Name List Select functions will then work on health care professionals' names, rather than patients' names.

In this mode of display, the patient's name can be included in the health care professional line (for example, the patient's family and given names) or it can be omitted, as determined by the system administrator.

In a further refinement of the preferred embodiment, the system can provide a coded identification function. The system allows the option of displaying "coded identifiers" for the identification of either the treating health care professional or of patients. Under this option, the actual name for the treating health care professionals or patients will be omitted, in favour of individual codes, to be set by the system administrator.

In a further refinement of the preferred embodiment, the system can include access to results such as radiology results and options that are more sophisticated for alerting health care professionals to results that have remained 'un-read' for a period of time, including interactive alert icons that appear if clinical actions have not been completed in a timely manner.

As radiology and other reports are often stored as free text, the SecondScreen can signal the availability of those results but not assess the risk of the test findings. If hospitals allow radiologists and others involved in conducting and assessing the tests to enter alert states in their systems and reports, then the SecondScreen System can use this to risk stratify such results.

In such a system, radiology results reporting requires an interface connection with the Radiology Reporting system and assumes that the risk rating of Radiology reports will be done in that Department and satisfactorily communicated to the SecondScreen system via the interface.

In a further refinement, the visual encoded graphical display output can be supplemented with a variety of additional alerts. The alert types are user controlled and can include any or all of the following:

- Alert messages sent to SecondScreen and displayed on the relevant patient's result line as an alert icon.
- Audible outputs from the system in the clinical care environment.
- Generation of SMS messages to nominated health care professional mobile phones.
- Generation of e-mail messages to nominated health care professionals or their support staff.
- Generation of radio paging and other wireless technologies for communicating to predetermined health care professionals.

Where an alert is not responded to within the parameters set by the system administrator e.g. no response within a nominated time frame, an escalation of alert

process can be invoked. The parameters for the escalation process can also be user controlled and typically would include the dispatch (and further management if required) of the alert to supervisory staff, Head of Unit, Consultant or other persons.

It will be evident to those skilled in the art that many different software designs can be utilised to implement the user interface of the preferred embodiment. For Example, in Fig. 15, there is illustrated a possible software arrangement. The various modules involved in the arrangement 110 can be programmed utilising the previously mentioned software languages. A first series of modules 111, 112 are responsible for interaction with the relevant touch screen displays. The displayed driver modules 111-112 are driven by a GUI drive module 114 which stores the current GUI state of information in a GUI state database 115. The information associated with a patient located within the Emergency Department can be stored in a separate database 116.

The information associated with patient's pathology test (Laboratory test orders and results/reports) can be stored in a separate database 116A. The algorithms and rules for risk rating individual test results and for external alert escalation can be stored in a database 116B. The system is under the overall control of a control module 118 which regularly interrogates the databases 116, 116A, 116B and monitors changes in the Graphical User Interface (GUI) driver module 114 so as to provide overall control of the system. The control module 118 interacts with a computer records system interface 120, which is designed to interrogate any of the computer systems used by the hospital to acquire information therefrom. The control module 118 interacts with the external alerting rules data base 116B as an external alerting system interface 120B which is designed to pass alerting information to health care professionals, administrators and other staff, as is pre-determined in the alerting rules data base 116B, via a range of established, commercially available modalities, including but not limited to email, Short Message Service and Radio Paging. The

control module 118 also communicates with a printer and report module 122 and other communication devices as required 124. The arrangement of Fig 15 provides for an overall control system to implement the user interface as previously described.

Other embodiments are possible, for example Fig. 16 illustrates one software module design suitable for implementing the preferred embodiment (clinical guidelines) at the point of care, in that it shows the system generation of a clinical guideline interactive icon (the touch screen "button" coloured in this embodiment "blue" and labelled "Warfarin" 126, to signify the availability, on the display, of the guideline for the anti-coagulant drug Warfarin. In this embodiment, the Warfarin clinical guideline interactive icon was generated by the SecondScreen system because the relevant patient had a red rated test result (INR) 128, indicating a problem with the administration of Warfarin.

Figure 17 illustrates one software module design suitable for implementing the structured clinical process, wherein a new display provides additional interactive touch screen "buttons" to order new diagnostic tests (Repeat INR) 130, to record the clinical observations (No Bleeding or Mild Bleeding) 132 and/or to move to a further display screen to consider further clinical options 134.

Figure 18 illustrates one software module design suitable for assisting a user to calculate the optimal dosage of a particular drug, taking into account a relevant patient risk factor (eg Weight).

Figure 19 illustrates one software module design suitable for collecting additional patient specific data, directly from the display using interactive touch screen "buttons" (Patient's weight).

Figure 20 illustrates one software module design suitable for configuring the system, again from the display, to check for a specific clinical event at a later point in time. For example, re-checking the existing pathology system for an INR result for the specific patient. Fig. 20 illustrates one software module design suitable for implementing the preferred embodiment.

The foregoing describes only the preferred modes of implementation of the present invention. Modifications, obvious to those skilled in the art, can be made thereto without departing from the scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A system for providing health care professional interactive information in a clinical environment relating to one or more patients, said system comprising:

a computer system connected to at least one interactive display device for processing the interaction between the health care professional and said device;

at least one interactive display device located in a clinical environment, each said device adapted to display clinical and other information associated with a said patient associated with said environment, the displayed information including:

(a) a list of all of said patients, as have been entered into a patient computer records system,

(b) for each patient on the list, one or more interactive icons representative of a diagnostic test ordered by a health care professional and for accessing a completed test result for a said patient, the icons being visually encoded with at least one indicator representative of the type of test; whether the icon represents a test order (investigation not yet reported upon) or a test result (investigation report is available) ; whether the diagnostic test result has been accepted by a predetermined health care professional and the date/time of the diagnostic test order placement.

2. A system as claimed in claim 1 wherein for each patient in said list, there are one or more interactive icons for alerting health care professionals of a predetermined potential clinical risk or unrecorded task as assessed by said system based on the one or more tests that have been ordered and their result(s).

3. A system as claimed in claim 1 wherein for each patient in said list, there are one or more predetermined clinical guideline icons that in detailed view present patient-specific information in accordance with a clinical guideline associated with said patient.

4. A system as claimed in claims 1 and 2 wherein a said indicator comprises a colour

coding associated with a said icon to alert health care professionals to a predetermined degree of clinical risk associated with a test result for a respective patient.

5. A system as claimed in claim 4 wherein said colour coding includes red for high levels of clinical risk, yellow for moderate levels of clinical risk and green for low levels of clinical risk as compared with each other.

6. A system as claimed in claim 5 wherein a said interactive icon changes to shading of the current colour after a predetermined health care professional has viewed the test result and also confirms by a predetermined interaction with said interactive device that said test result has been accepted.

7. A system as claimed in any previous claim wherein said system operates in conjunction with patient computer records systems associated with one or more time critical clinical environments for the provision of information associated with said patients.

8. A system as claimed in claim 7 wherein said system interrogates said computer records system for the provision of said test results.

9. A system as claimed in any previous claim wherein said system operates in the Emergency Department of said environment.

10. A system as claimed in any previous claim wherein said display further displays information including a triage rating and/or a clinical work area identifier associated with the assigned location of said patient.

11. A system as claimed in any previous claim wherein said interactive icons include a predetermined alphanumeric letter code and predetermined time and date information.

12. A system as claimed in any previous claim wherein said interactive icons comprise a touch activated "button" which upon activation displays details of a test report associated with said interactive icon.

13. A system as claimed in any previous claim wherein said display information is arranged on said display in one or more rows, one row for each patient, and each row containing one or more report icons further including an overflow indicator indicating there exist more reports for a patient than can be displayed in said row.

14. A system as claimed in claim 13 wherein upon actuation of said overflow indicator a separate display appears on said screen device listing all or the remaining interactive icons associated with a respective patient.

15. A system as claimed in any previous claim wherein each patient is associated with a predetermined health care professional identification and said displayed information is sortable by said identification.

16. A system as claimed in any previous claim wherein said system allows for the selection of a predetermined health care professional and only those patients associated with said health care professional are displayed.

17. A system as claimed in any previous claim wherein each patient is associated with a predetermined health care professionals identification and said system further comprises a proximity detector for detecting said health care professional adjacent said display and listing cases relevant to that health care professional.

18. A system as claimed in any previous claim wherein said system further activates a range of external alerting modalities, such as email, short message services and radio paging, to further alert predetermined health care professional of clinical risk

situations, according to one or more rules and/or parameters determined according to clinical guidelines.

19. A system as claimed in any previous claim wherein said system permits a health care professional to reconfigure the displayed lines of information to show a predetermined health care professionals identification as the prominent display item and to include other information in an associated display line, including one or more related patient identification numbers, triage rating, icons and, patient location identifier for each said patient.

20. A system as claimed in any previous claim wherein said system allows identifiers to replace either a health care professional or patient name or both.

21. A system as claimed in any previous claim wherein the said system displays a "clinical guideline" interactive icon against a specific patient, when the displayed clinical guideline has been selected, by the system, from a library of clinical guidelines accessible by said system, based on patient information relevant to the patient or on predetermined recorded clinical event(s) relevant to that patient.

22. A system as claimed in any previous claim wherein the said system displays a menu of agreed "clinical guidelines", stored on said system, that enable a health care professional to select a specific clinical guideline, using a touch activated "button" located on said interactive display device.

23. A system as claimed in claim 21 and claim 22 that, for each specific "clinical guideline", also displays a clinical decision framework, relevant patient specific information, pertinent care choices, advice and warnings on particular choices (where appropriate) and facilitates the health care professional making care choices through a touch activated "button" located on said interactive display device.

24. A system as claimed in claim 23 wherein the displayed clinical decision framework may be customised to the specific patient, in accordance with predetermined recorded patient parameters, attributes or associated clinical data.

25. A system as claimed in any previous claim wherein the displayed information may include at least one of:

(a) coded information, within a "clinical guideline" interactive icon, to identify a specific clinical guideline;

(b) wherein upon activation, an option of opening further displays, via the use of further interactive touch activated "button(s)" located on said interactive display device, which provide structured prompts to the health care professional for consideration of clinical action in accordance with a predetermined clinical guideline;

(c) where additional displays provide further touch activated "button(s)" located on said interactive display device that invoke further clinical activity for or on behalf of a patient.

26. A system as claimed in any previous claim wherein selections made by the health care professional via interactive touch activated "button(s)" located on said interactive display device invoke further activity, including at least one of:

(a) the ordering of additional investigating/diagnostic tests;

(b) the printing of clinical reports;

(c) the printing of discharge summaries;

(c) the dispatch of alerts/alarms to other persons;

(d) the real-time monitoring of other medical information systems and/or computer systems for clinical or demographic data relevant to a said patient and/or a predetermined clinical guideline;

(e) the collection, in real time, of patient clinical or demographic data to further customise an existing clinical guideline, for a respective patient;

(f) updating of stored clinical information for a said patient;

(g) ordering of a diagnostic test or treatment routine;

(h) management of a diagnostic test of treatment routine.

27. A system as claimed in any previous claim wherein selections made by a said health care professional with respect to any particular clinical option are recorded by said system and made available for reporting for one or more of the following purposes; reviewing the efficacy of specific clinical guidelines; assessing a selected health care professionals compliance with clinical guidelines; investigating further improvement of clinical guidelines.

28. A system substantially as hereinbefore described with reference to the accompanying drawings.

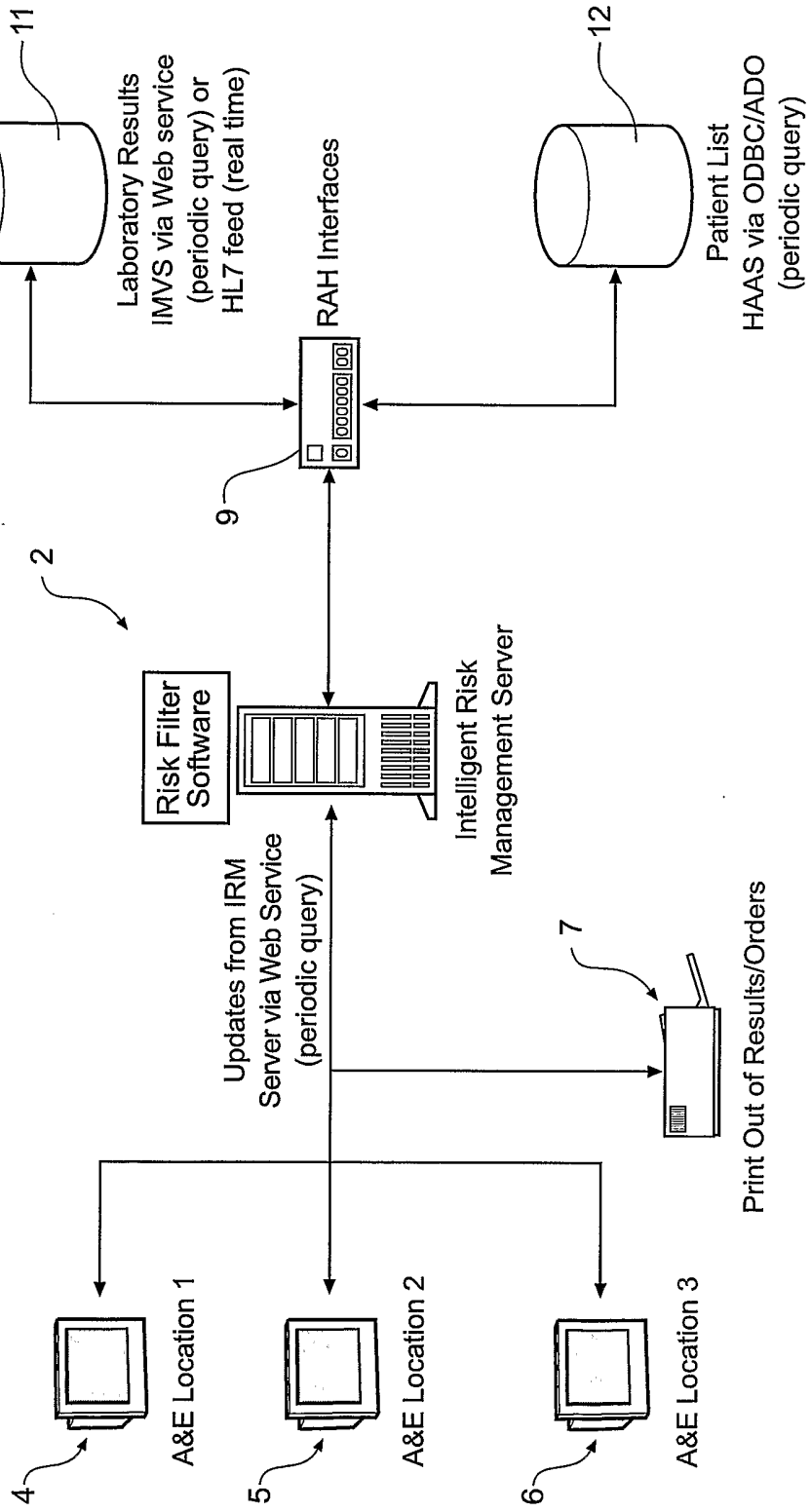
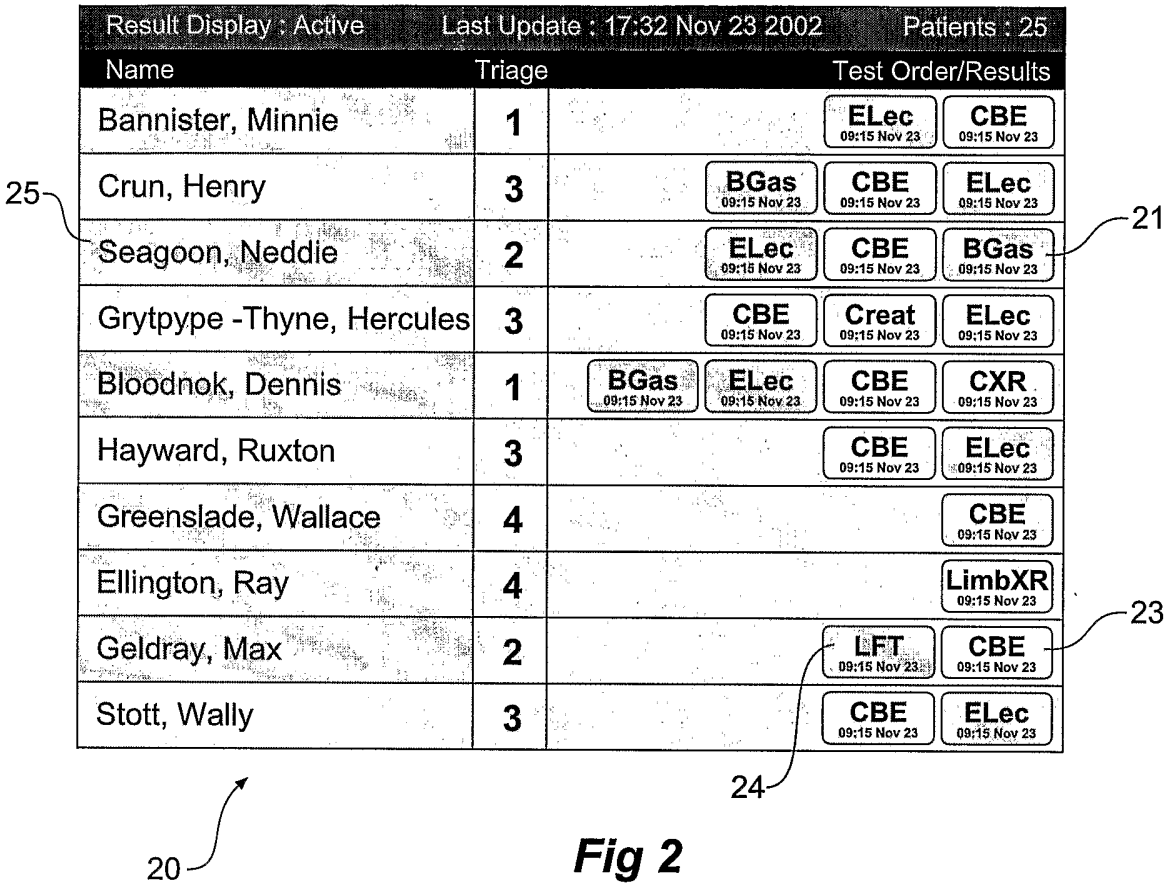

11
Laboratory Results
IMVS via Web service
(periodic query) or
HL7 feed (real time)
12
Patient List
HAAS via ODBC/ADO
(periodic query)
RAH Interfaces
9
2
Risk Filter
Software
Intelligent Risk
Management Server
Updates from IRM
Server via Web Service
(periodic query)
7
Print Out of Results/Orders
A&E Location 1
A&E Location 2
A&E Location 3
4
5
6

Fig 1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Last Update : 17:32 Nov 23 2002
Patients : 25
Name
Triage
Test Order/Results
Bannister, Minnie 1 ELec 09:15 Nov 23 CBE 09:15 Nov 23
Crun, Henry 3 BGas 09:15 Nov 23 CBE 09:15 Nov 23 ELec 09:15 Nov 23
Seagoon, Neddie 2 ELec 09:15 Nov 23 CBE 09:15 Nov 23 BGas 09:15 Nov 23
Grytpype -Thyne, Hercules 3 CBE 09:15 Nov 23 Creat 09:15 Nov 23 ELec 09:15 Nov 23
Bloodnok, Dennis 1 BGas 09:15 Nov 23 ELec 09:15 Nov 23 CBE 09:15 Nov 23 CXR 09:15 Nov 23
Hayward, Ruxton 3 CBE 09:15 Nov 23 ELec 09:15 Nov 23
Greenslade, Wallace 4 CBE 09:15 Nov 23
Ellington, Ray 4 LimbXR 09:15 Nov 23
Geldray, Max 2 LFT 09:15 Nov 23 CBE 09:15 Nov 23
Stott, Wally 3 CBE 09:15 Nov 23 ELec 09:15 Nov 23
25
21
23
24
20

Fig 2

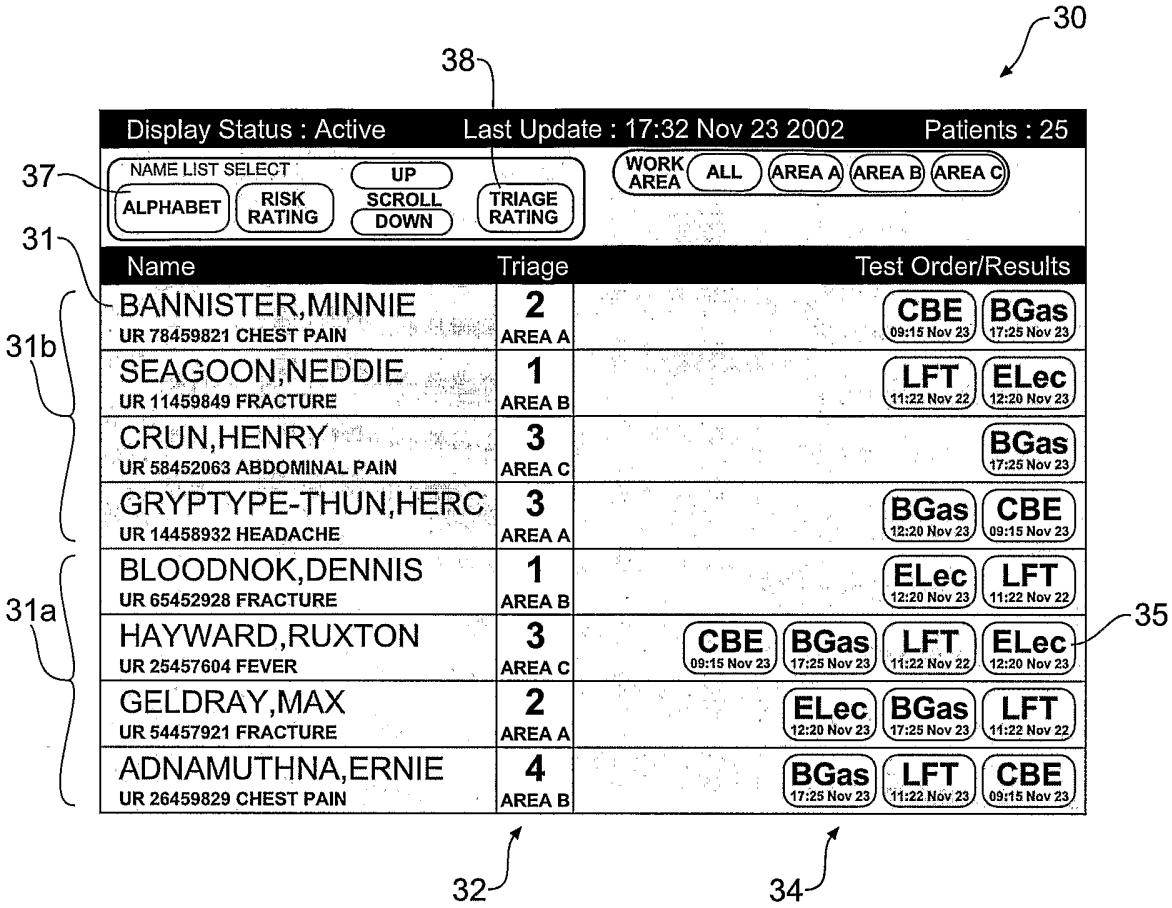


Fig 3

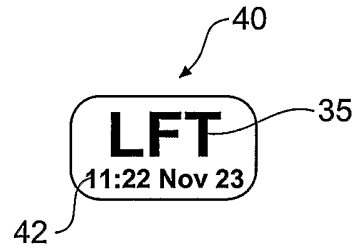


Fig 4

Fig 5

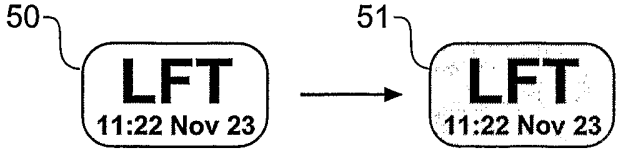


Fig 6

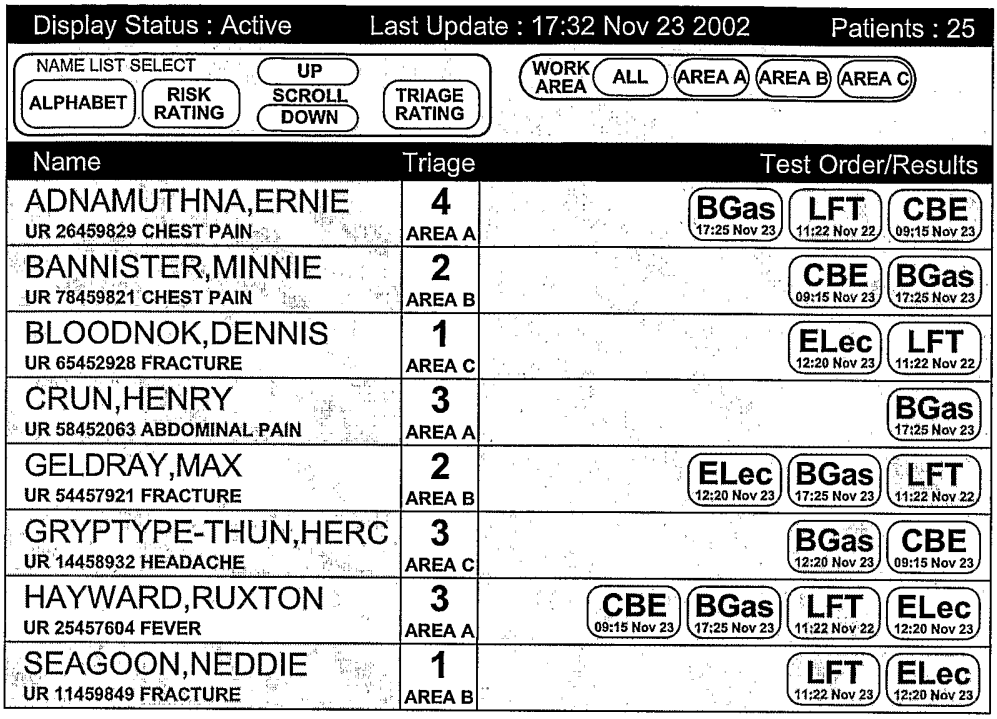

Display Status : Active
Last Update : 17:32 Nov 23 2002
Patients : 25
NAME LIST SELECT
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
Name
Triage
Test Order/Results
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN
4
AREA A
BGas 17:25 Nov 23
LFT 11:22 Nov 22
CBE 09:15 Nov 23
BANNISTER,MINNIE
UR 78459821 CHEST PAIN
2
AREA B
CBE 09:15 Nov 23
BGas 17:25 Nov 23
BLOODNOK,DENNIS
UR 65452928 FRACTURE
1
AREA C
ELec 12:20 Nov 23
LFT 11:22 Nov 22
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN
3
AREA A
BGas 17:25 Nov 23
GELDRAY,MAX
UR 54457921 FRACTURE
2
AREA B
ELec 12:20 Nov 23
BGas 17:25 Nov 23
LFT 11:22 Nov 22
GRYPTYPE-THUN,HERC
UR 14458932 HEADACHE
3
AREA C
BGas 12:20 Nov 23
CBE 09:15 Nov 23
HAYWARD,RUXTON
UR 25457604 FEVER
3
AREA A
CBE 09:15 Nov 23
BGas 17:25 Nov 23
LFT 11:22 Nov 22
ELec 12:20 Nov 23
SEAGOON,NEDDIE
UR 11459849 FRACTURE
1
AREA B
LFT 11:22 Nov 23
ELec 12:20 Nov 23

Fig 7

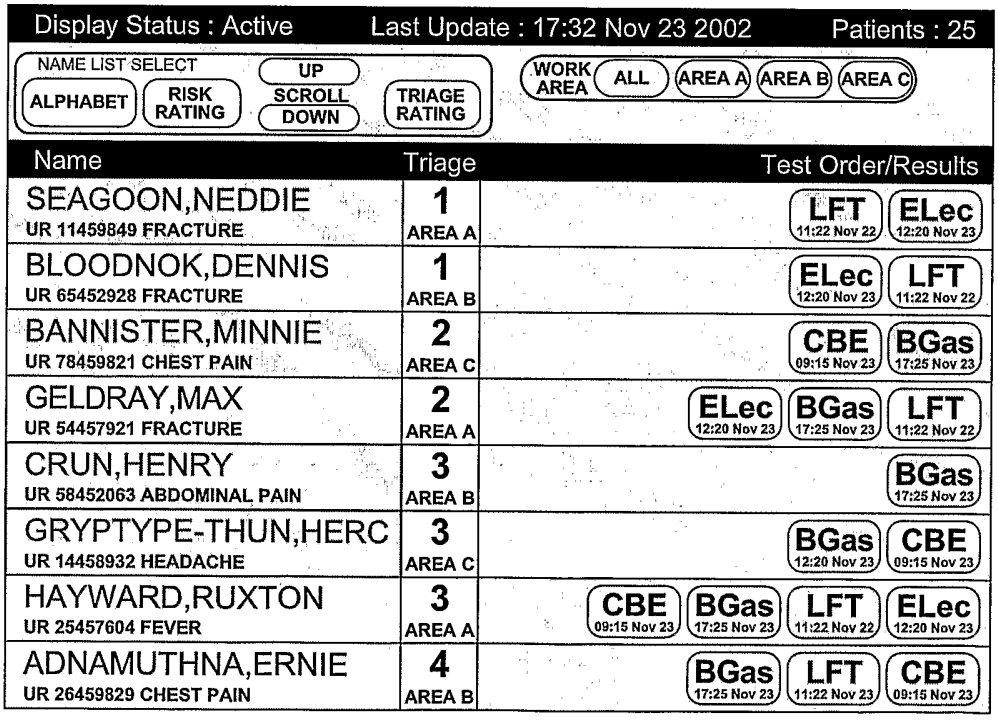
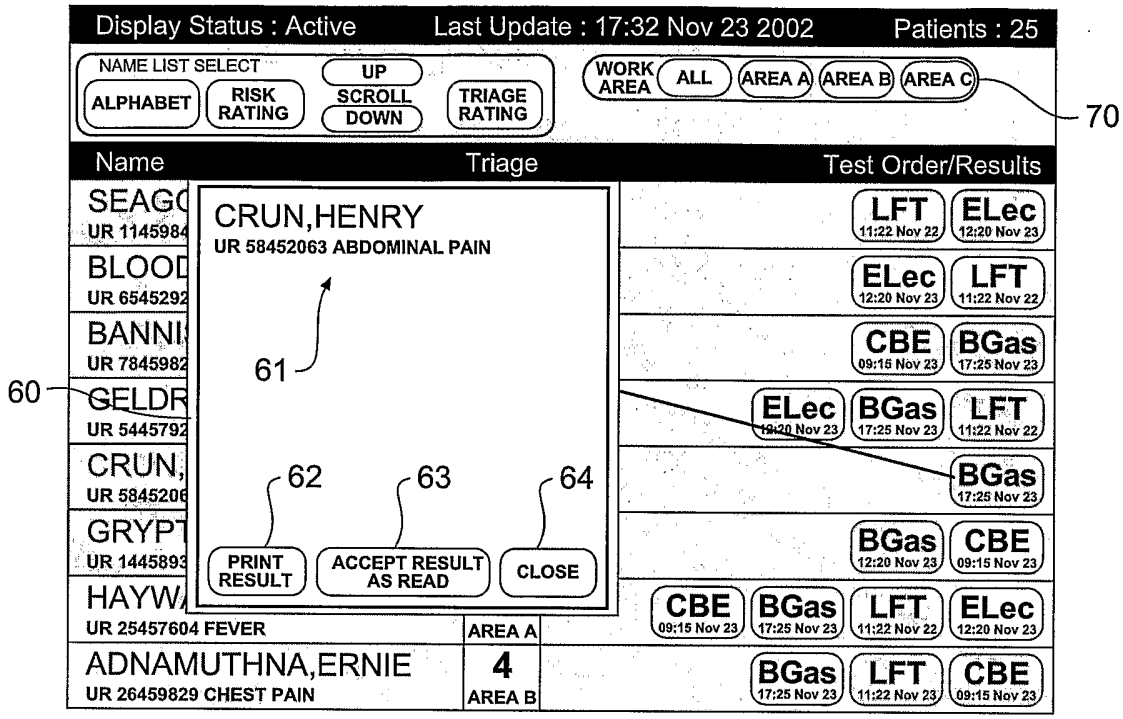

Display Status : Active
Last Update : 17:32 Nov 23 2002
Patients : 25
NAME LIST SELECT
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
Name
Triage
Test Order/Results
SEAGOON,NEDDIE
UR 11459849 FRACTURE
1
AREA A
LFT 11:22 Nov 22
ELec 12:20 Nov 23
BLOODNOK,DENNIS
UR 65452928 FRACTURE
1
AREA B
ELec 12:20 Nov 23
LFT 11:22 Nov 22
BANNISTER,MINNIE
UR 78459821 CHEST PAIN
2
AREA C
CBE 09:15 Nov 23
BGas 17:25 Nov 23
GELDRAY,MAX
UR 54457921 FRACTURE
2
AREA A
ELec 12:20 Nov 23
BGas 17:25 Nov 23
LFT 11:22 Nov 22
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN
3
AREA B
BGas 17:25 Nov 23
GRYPTYPE-THUN,HERC
UR 14458932 HEADACHE
3
AREA C
BGas 12:20 Nov 23
CBE 09:15 Nov 23
HAYWARD,RUXTON
UR 25457604 FEVER
3
AREA A
CBE 09:15 Nov 23
BGas 17:25 Nov 23
LFT 11:22 Nov 22
ELec 12:20 Nov 23
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN
4
AREA B
BGas 17:25 Nov 23
LFT 11:22 Nov 23
CBE 09:15 Nov 23

Fig 8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Last Update : 17:32 Nov 23 2002
Patients : 25
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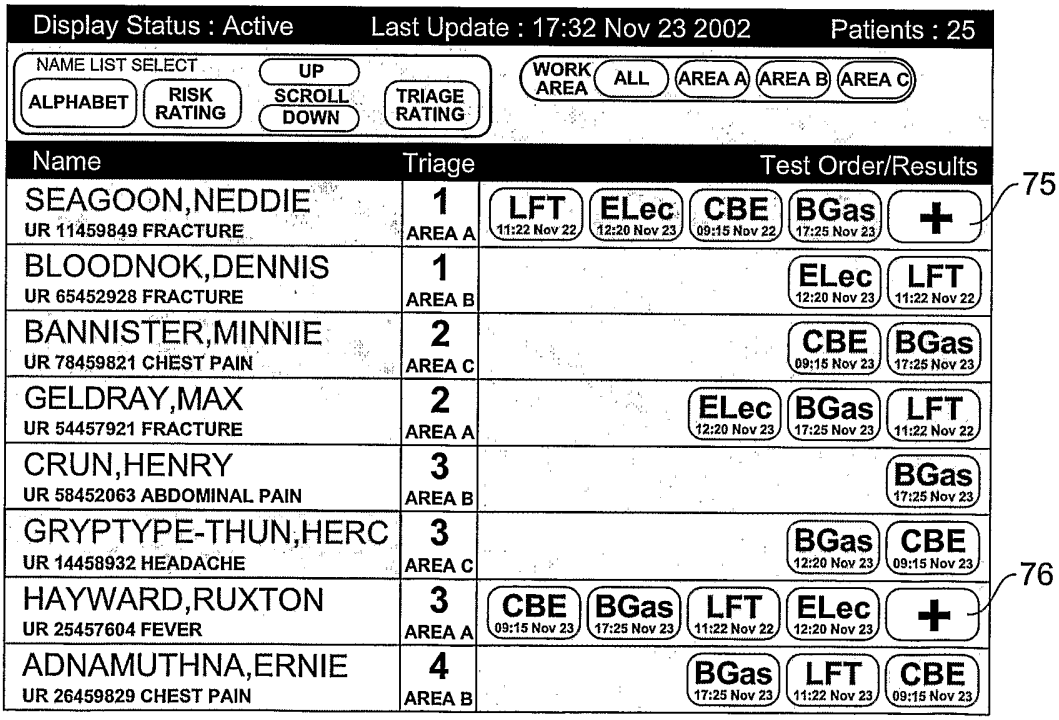
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
70
Name
Triage
Test Order/Results
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN
61
60
62
63
64
PRINT RESULT
ACCEPT RESULT AS READ
CLOSE
HAYWARD,RUXTON
UR 25457604 FEVER
AREA A
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN
4
AREA B

Fig 9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Last Update : 17:32 Nov 23 2002
Patients : 25
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ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
Name
Triage
Test Order/Results
75
SEAGOON,NEDDIE
UR 11459849 FRACTURE
1
AREA A
BLOODNOK,DENNIS
UR 65452928 FRACTURE
1
AREA B
BANNISTER,MINNIE
UR 78459821 CHEST PAIN
2
AREA C
GELDRAY,MAX
UR 54457921 FRACTURE
2
AREA A
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN
3
AREA B
GRYPTYPE-THUN,HERC
UR 14458932 HEADACHE
3
AREA C
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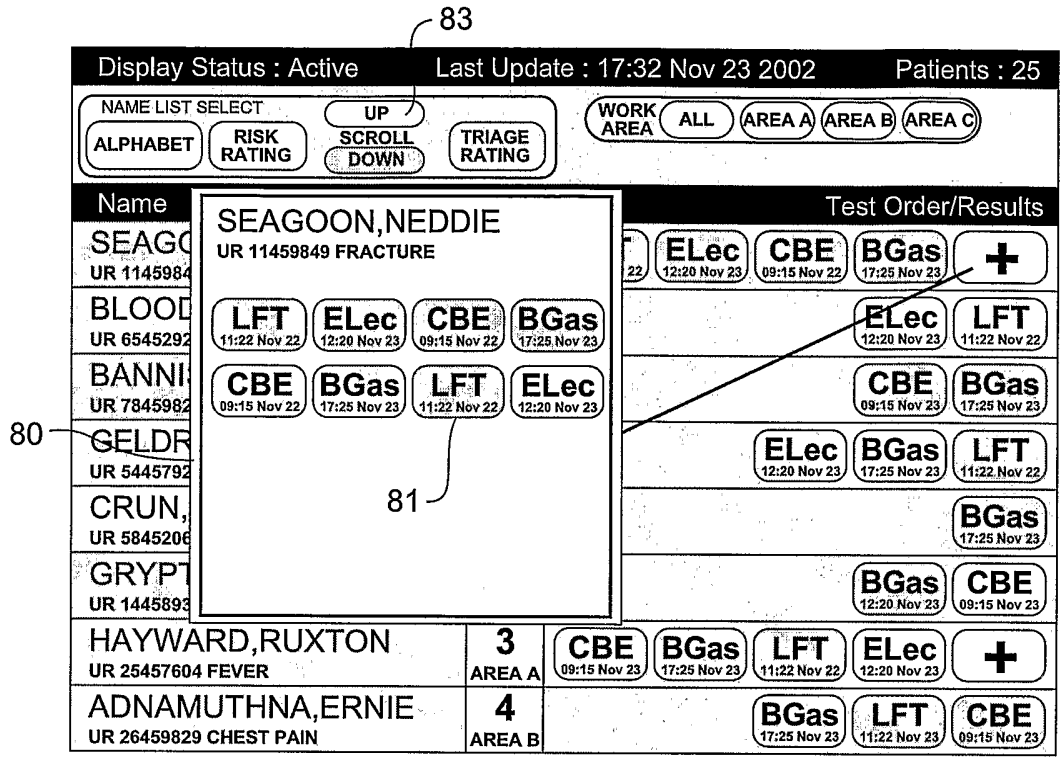
UR 26459829 CHEST PAIN
4
AREA B

Fig 10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Patients : 25
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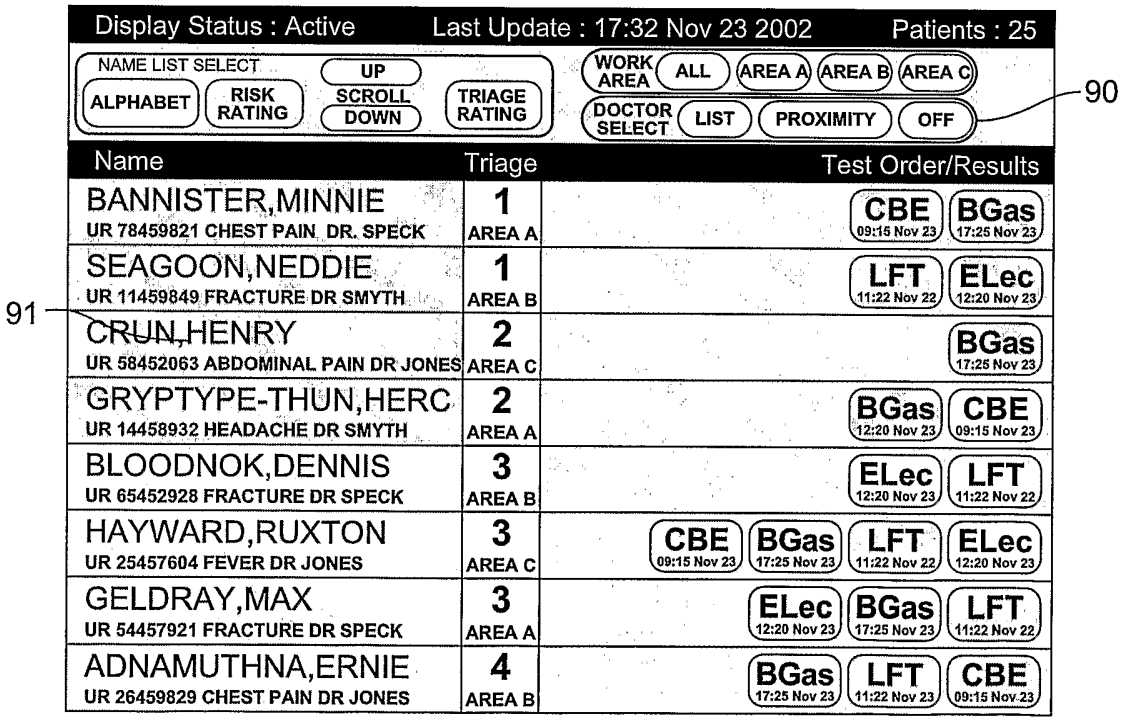
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
Name
Test Order/Results
SEAGOON,NEDDIE
UR 11459849 FRACTURE
LFT 11:22 Nov 22
ELec 12:20 Nov 23
CBE 09:15 Nov 22
BGas 17:25 Nov 23
CBE 09:15 Nov 22
BGas 17:25 Nov 23
LFT 11:22 Nov 22
ELec 12:20 Nov 23
80
81
HAYWARD,RUXTON
UR 25457604 FEVER
3
AREA A
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN
4
AREA B

Fig 11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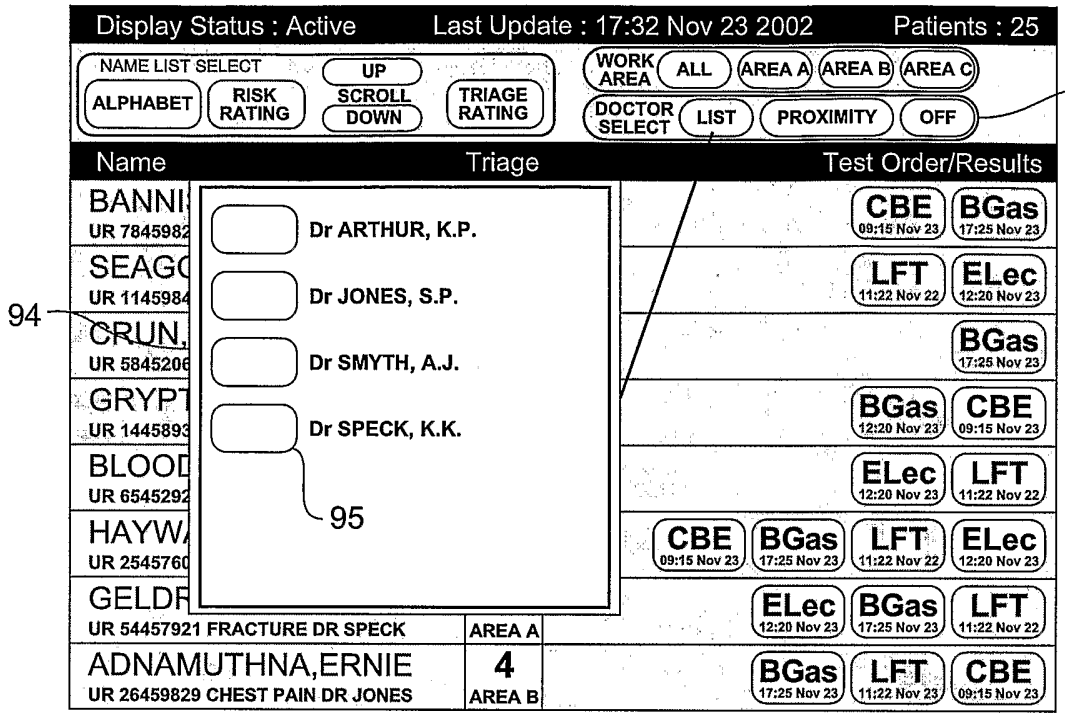
Last Update : 17:32 Nov 23 2002
Patients : 25
NAME LIST SELECT
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
DOCTOR SELECT
LIST
PROXIMITY
OFF
90
Name
Triage
Test Order/Results
BANNISTER,MINNIE
UR 78459821 CHEST PAIN DR. SPECK
1
AREA A
SEAGOON,NEDDIE
UR 11459849 FRACTURE DR SMYTH
1
AREA B
91
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN DR JONES
2
AREA C
GRYPTYPE-THUN,HERC
UR 14458932 HEADACHE DR SMYTH
2
AREA A
BLOODNOK,DENNIS
UR 65452928 FRACTURE DR SPECK
3
AREA B
HAYWARD,RUXTON
UR 25457604 FEVER DR JONES
3
AREA C
GELDRAY,MAX
UR 54457921 FRACTURE DR SPECK
3
AREA A
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN DR JONES
4
AREA B

Fig 12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Last Update : 17:32 Nov 23 2002
Patients : 25
NAME LIST SELECT
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
DOCTOR SELECT
LIST
PROXIMITY
OFF
90
Name
Triage
Test Order/Results
94
Dr ARTHUR, K.P.
Dr JONES, S.P.
Dr SMYTH, A.J.
Dr SPECK, K.K.
95
UR 54457921 FRACTURE DR SPECK
AREA A
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN DR JONES
4
AREA B
CBE 09:15 Nov 23
BGas 17:25 Nov 23
LFT 11:22 Nov 22
ELec 12:20 Nov 23

Fig 13

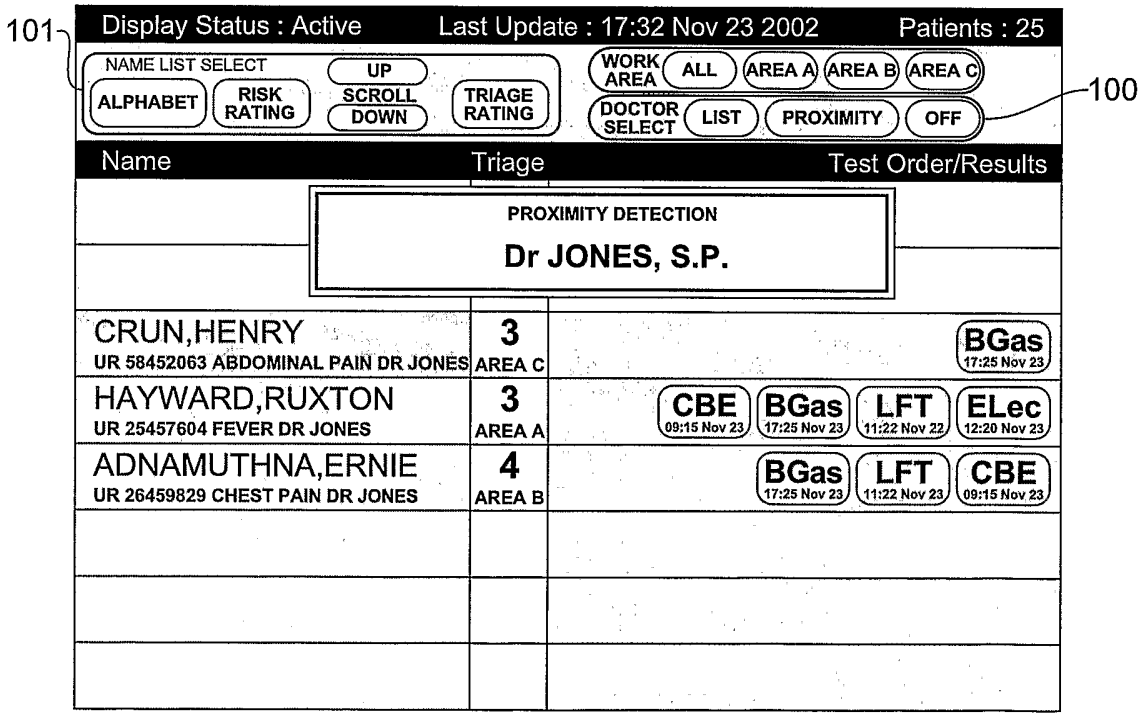
101
Display Status : Active
Last Update : 17:32 Nov 23 2002
Patients : 25
NAME LIST SELECT
ALPHABET
RISK RATING
UP SCROLL DOWN
TRIAGE RATING
WORK AREA
ALL
AREA A
AREA B
AREA C
DOCTOR SELECT
LIST
PROXIMITY
OFF
100
Name
Triage
Test Order/Results
PROXIMITY DETECTION
Dr JONES, S.P.
CRUN,HENRY
UR 58452063 ABDOMINAL PAIN DR JONES
3
AREA C
HAYWARD,RUXTON
UR 25457604 FEVER DR JONES
3
AREA A
ADNAMUTHNA,ERNIE
UR 26459829 CHEST PAIN DR JONES
4
AREA B
BGas 17:25 Nov 23
CBE 09:15 Nov 23
LFT 11:22 Nov 22
ELec 12:20 Nov 23

Fig 14

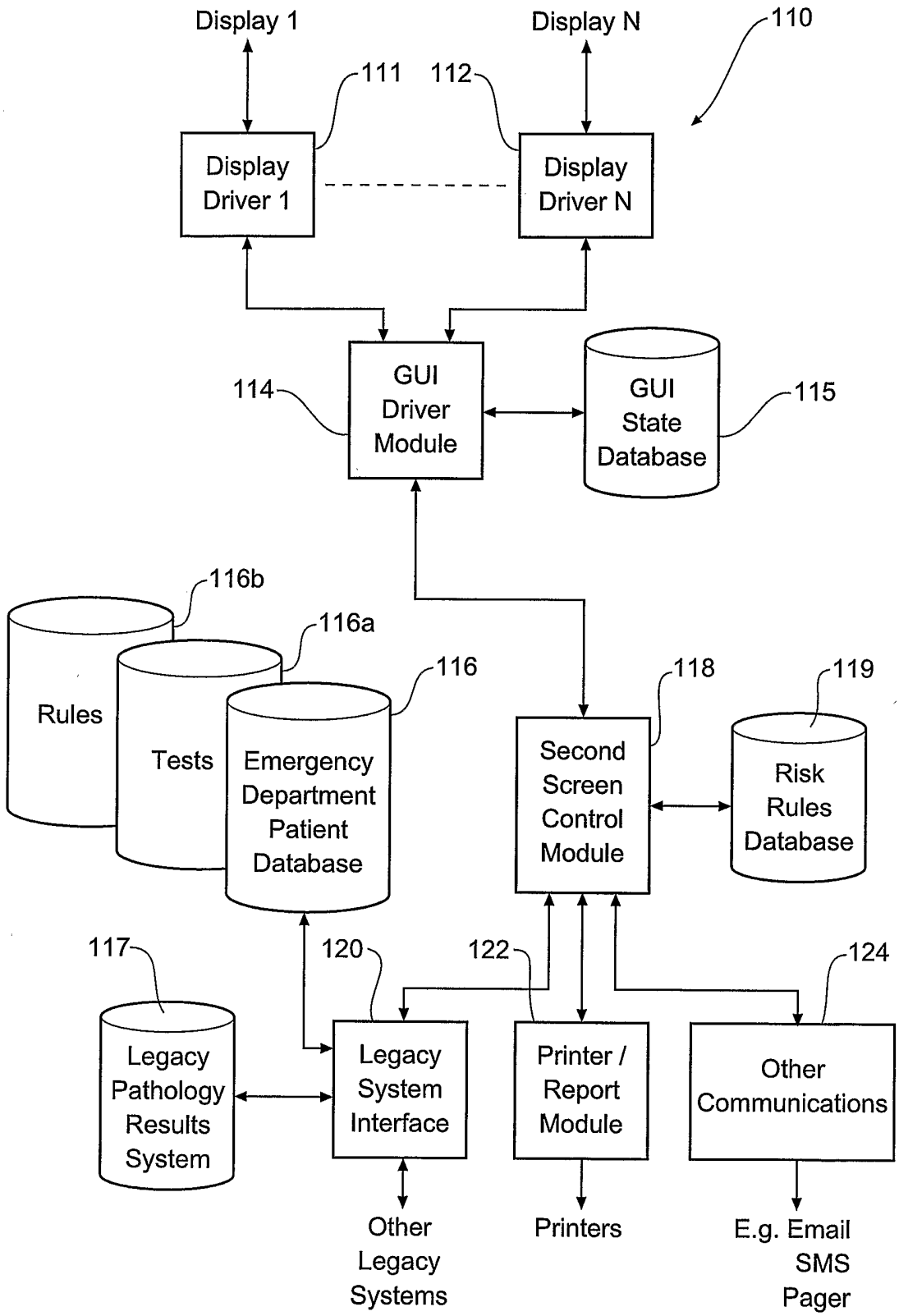
Display 1
Display N
110
111
112
Display Driver 1
Display Driver N
114
GUI Driver Module
GUI State Database
115
116b
116a
116
Rules
Tests
Emergency Department Patient Database
118
119
Second Screen Control Module
Risk Rules Database
117
120
122
124
Legacy Pathology Results System
Legacy System Interface
Printer / Report Module
Other Communications
Other Legacy Systems
Printers
E.g. Email SMS Pager

Fig 15

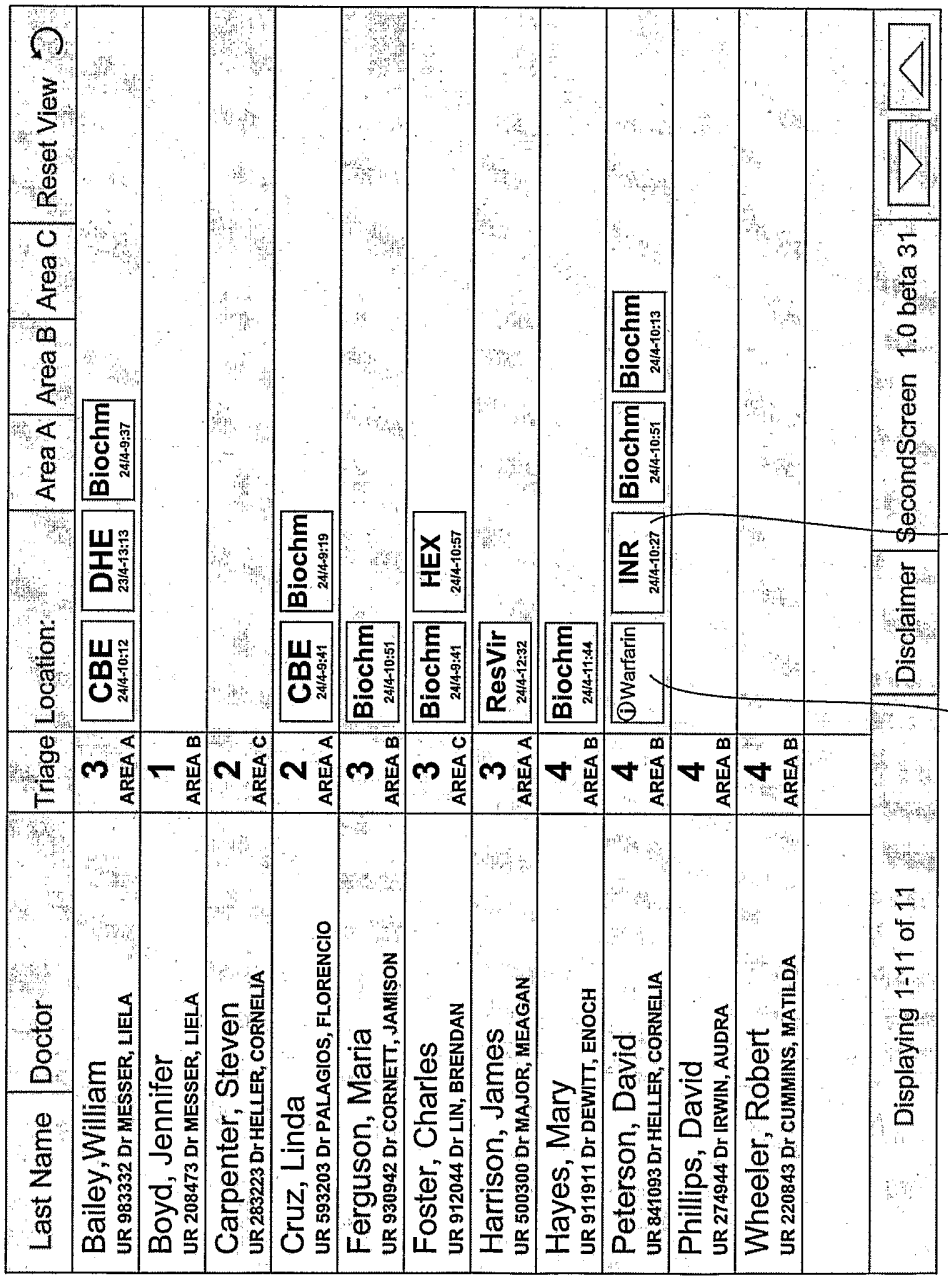
Last Name
Doctor
Triage
Location:
Area A
Area B
Area C
Reset View
Bailey,William
UR 983332 Dr MESSER, LIELA
3
AREA A
CBE
24/4-10:12
DHE
23/4-13:13
Biochm
24/4-9:37
Boyd, Jennifer
UR 208473 Dr MESSER, LIELA
1
AREA B
Carpenter, Steven
UR 283223 Dr HELLER, CORNELIA
2
AREA C
Cruz, Linda
UR 593203 Dr PALAGIOS, FLORENCIO
2
AREA A
CBE
24/4-9:41
Biochm
24/4-9:19
Ferguson, Maria
UR 930942 Dr CORNETT, JAMISON
3
AREA B
Biochm
24/4-10:51
Foster, Charles
UR 912044 Dr LIN, BRENDAN
3
AREA C
Biochm
24/4-9:41
HEX
24/4-10:57
Harrison, James
UR 500300 Dr MAJOR, MEAGAN
3
AREA A
ResVir
24/4-12:32
Hayes, Mary
UR 911911 Dr DEWITT, ENOCH
4
AREA B
Biochm
24/4-11:44
Peterson, David
UR 841093 Dr HELLER, CORNELIA
4
AREA B
Warfarin
INR
24/4-10:27
Biochm
24/4-10:51
Biochm
24/4-10:13
Phillips, David
UR 274944 Dr IRWIN, AUDRA
4
AREA B
Wheeler, Robert
UR 220843 Dr CUMMINS, MATILDA
4
AREA B
Displaying 1-11 of 11
Disclaimer
SecondScreen 1.0 beta 31
126
128

Fig 16

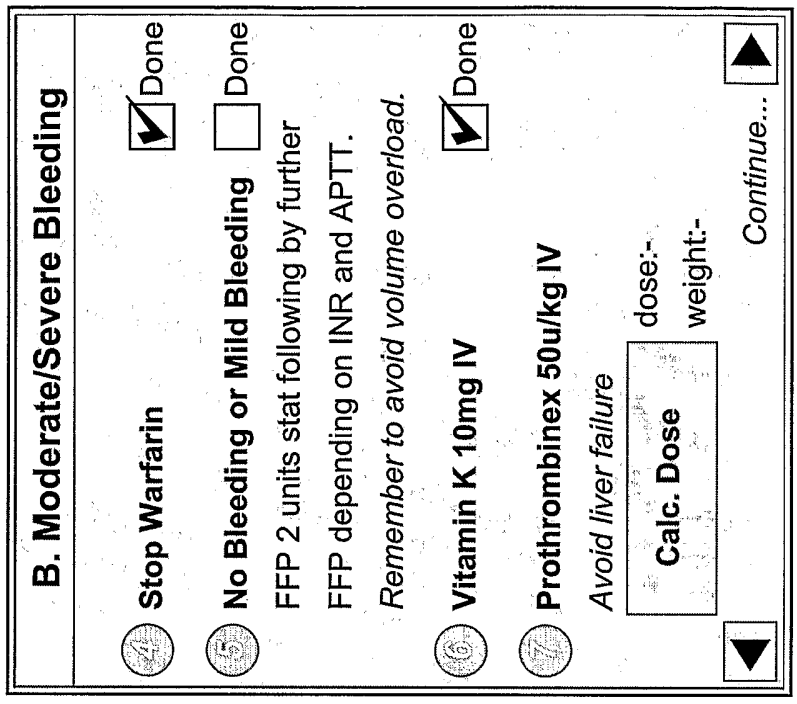
B. Moderate/Severe Bleeding
4 Stop Warfarin
Done
5 No Bleeding or Mild Bleeding
Done
FFP 2 units stat following by further
FFP depending on INR and APTT.
Remember to avoid volume overload.
16 Vitamin K 10mg IV
Done
17 Prothrombinex 50u/kg IV
Avoid liver failure
Calc. Dose
dose:-
weight:-
Continue...

Fig 18

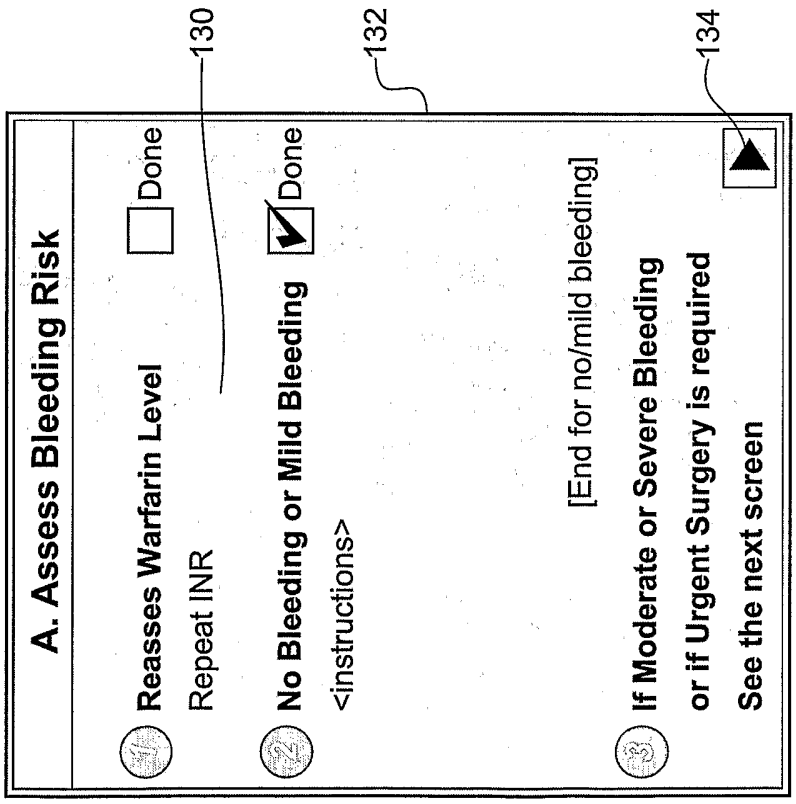
A. Assess Bleeding Risk
1 Reasses Warfarin Level
Done
Repeat INR
2 No Bleeding or Mild Bleeding
Done
<instructions>
[End for no/mild bleeding]
3 If Moderate or Severe Bleeding
or if Urgent Surgery is required
See the next screen
130
132
134

Fig 17

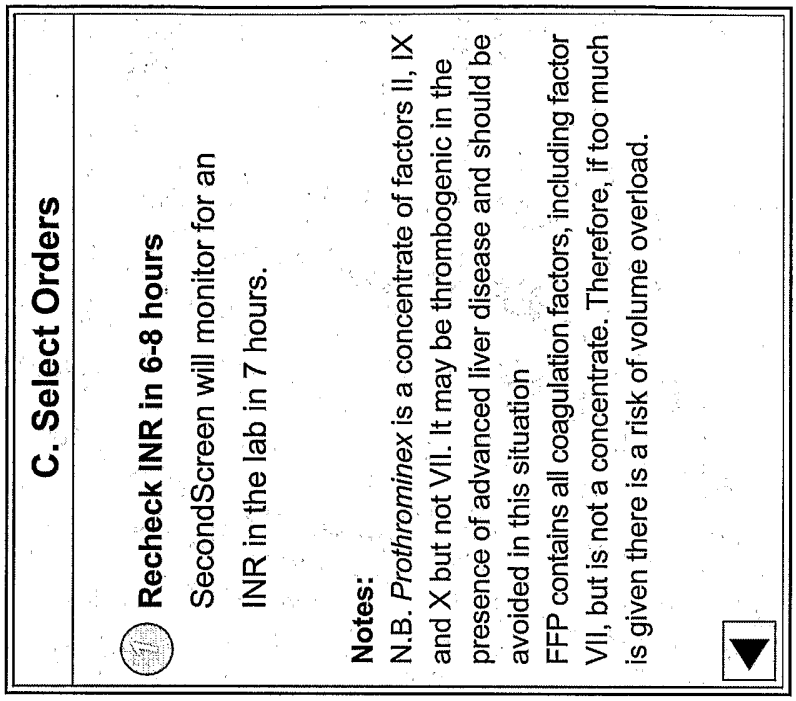
C. Select Orders
1
Recheck INR in 6-8 hours
SecondScreen will monitor for an
INR in the lab in 7 hours.
Notes:
N.B. Prothrominex is a concentrate of factors II, IX and X but not VII. It may be thrombogenic in the presence of advanced liver disease and should be avoided in this situation
FFP contains all coagulation factors, including factor VII, but is not a concentrate. Therefore, if too much is given there is a risk of volume overload.

Fig 20

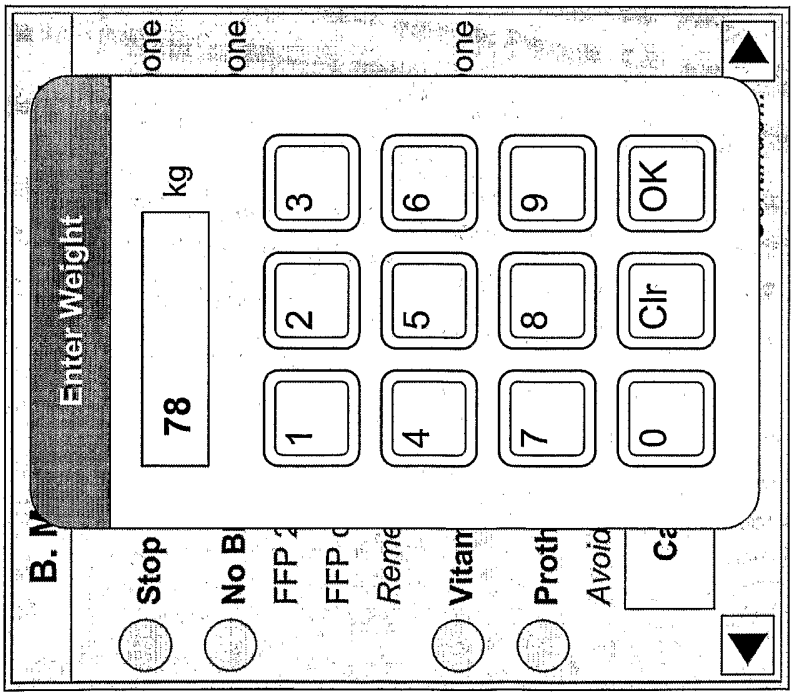
Enter Weight
78
kg
1
2
3
4
5
6
7
8
9
0
Clr
OK

Fig 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU03/01479

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: G06F 17/00 G06F 159/00 G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT. G06F 17/60, G06F 17/00, G06F 19/00, G06F 159/00 and keywords: clinical, diagnostic, test, icon, interact and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/93175 A (VISUALMED CLINICAL SYSTEMS INC.) 6 December 2001 Whole document, especially page 13, line 1 - page 20, line 24.	1-28
A	US 6018713 A (COLI et al.) 25 January 2000 Whole document	
A	WO 02/071303 A (WWA.SYSMED LTD) 12 September 2002 Whole document	

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 November 2003	27 NOV 2003
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **ROSEMARY LONGSTAFF** Telephone No : (02) 6283 2637

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU03/01479

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6024699 A (SURWIT et al.) 15 February 2000 Whole document	
A	US 5760704 A (BARTON et al.) 2 June 1998 Whole document	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU03/01479

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	0193175	AU	68856/01	CA	2328545	US	2001050610
US	6018713						
WO	02071303						
US	6024699	AU	20926/99	CA	2322563	EP	1062615
		EP	1197907	US	6589169	WO	9946718
US	5760704						

END OF ANNEX