



160160



G00002

Laboratory Specimen Collection Management System

Description

[0001] The invention relates to a laboratory specimen collection management system for the clinical laboratory, and especially, a system to identify the type and number of tubes to use to collect patient specimens for testing by the laboratory analyzer and facilitate the collection of the specimens at the point of care.

[0002] Existing specimen collection requires a specimen taker (clinician) to determine the type of tube, number of tube and the amount of specimen of each tube before collecting the specimen. This is not a simple exercise and requires experiential knowledge on the part of the specimen taker. Usually, the specimen taker consults a chart for each of the specimen test orders ordered by a doctor. As there are a number of different permutations in tube selection, the process becomes tedious and mistakes are inevitable, compromising patient safety in medical care.

[0003] In the existing system, specimens collected at the point of care are labeled to identify them with the patients providing the specimens. The label is a non-standard label produced by specimen takers to assist them in their administration of specimen collection. Tube labels at the point of care are pre-generated *en masse* and applied to the tubes when the specimens are collected. Such practice has led to errors in tube labeling where a tube has been labeled with a wrong patient identification, again compromising patient safety. Although the number of errors is not huge, one is simply too many in a healthcare environment where the prognosis of a patient's health is based on the result of a specimen test.

[0004] When the specimens arrive at the laboratory, a new set of labels, readable by the laboratory analyzer, is generated. Among other information, the new label contains the accession number essential for the laboratory analysis process. In total, there are two labels for every tube of specimen collected. Having to stick two labels onto a tube is inefficient and potentially a systemic problem in the specimen collection process. Not only does it take time to print labels for the tubes, ensuring correct tube-label match is time-consuming and error-prone in a manual setting during peak period when the stress level on the care-giver is at its highest.

[0005] In accordance with the present invention, a laboratory specimen collection management system comprises a number of specimen collection stations coupled to a specimen processing system. Each specimen collection station consists of a user interface device, a bar-code scanner or data input device, a processing unit, and a printer. Located at the point of care, specimen collection stations are used by clinicians to collect specimens. A specimen collection station can be stationary or mobile.

1
JTP
14/8/07

The advantage of a mobile specimen collection station is that it can be pushed to the point of care e.g. to the patient bedside.

[0006] Patients are identified and verified electronically by the specimen collection station via the bar-code scanner. The specimen tests ordered by the doctors are displayed graphically on the user interface informing the specimen taker of the type of tube, number of tubes, color code of the tube and the amount of specimen to take for a patient. A label is printed *in situ* for each tube displayed on the user interface. Each printed label contains the patient identification code, patient name, the unique laboratory analyzer test accession number for a specimen, date and time of print, location, test codes and color of tube. Only one unique label is required for each tube of specimen taken. The specimen processing system has a processing unit that is coupled to a database containing among other information, the laboratory analyzer test accession number for a specimen.

[0007] The specimen processing system contains the business logic for determining the type of tube, number of tubes, color code of the tube and the amount of specimen to take for a patient.

[0008] An advantage of the invention is that by having a laboratory specimen management system in which information on the tubes to collect is controlled by the system; it is possible to ensure the correct types and number of tubes to collect, ensuring patient safety and improving efficiency in specimen collection.

[0009] Another advantage of the invention is due to *in-situ* printing of labels. Because the labels are printed *in situ* at the point of care, label mix-up is eliminated and errors arising will be reduced, again contributing to enhanced patient safety.

[0010] Preferably, the specimen collection processing server is additionally coupled to a specimen receipt unit that verifies that the label attached to a specimen tube is indeed the correct label. Thus, the specimen collection management system may further reduce another level of error due to the wrong attachment of available labels for a patient.

[0011] Typically, a number of specimen collection stations may be located at different geographical locations within the care-giving premises.

[0012] Typically, the specimen collection stations may be mobile that can be moved about or stationary in a fixed location within the care-giving premises.

[0013] An example of a laboratory specimen collection management system in accordance with the invention will now be described with reference to the accompanying drawings in which:

[0014] FIG. 1 is a schematic diagram showing a laboratory specimen collection management system. Specimen collection stations are connected to a set of specimen processing system via the Internet (3) on a wireless (1) or wired (2) mode. The specimen processing system communicates with the laboratory analyzer system using the international HL7 standard protocol. Coupled to the specimen processing systems is a database management system containing among other things, the unique laboratory analyzer test accession number for a specimen.

[0015] FIG. 2 is a perspective view of a specimen collection station for use within the laboratory specimen collection management system shown in FIG. 1. A specimen collection station consists of four major components: printer, static or mobile user interface device, processing unit, and data input device. A static user interface device could be a touch screen monitor and a mobile user interface device may include PDA (personal digital assistant) or tablet PC (personal computer). A data input device may be a keyboard or bar-code scanner. All devices communicate via the processing unit.

[0016] FIG. 3 shows how a mobile specimen collection station looks like when deployed at the point of care. The entire specimen collection station can be stationary, or mobile if all the devices and processing unit are placed on a trolley as shown in FIG. 3. A mobile specimen collection station allows it to be pushed to the point of care e.g. at the patient bedside.

[0017] FIG. 4 is a schematic view of the specimen processing system within the laboratory specimen collection management system shown in FIG. 1. There are five major components in a specimen processing system. A HL7 listener server (1) listens to incoming messages from a computerized clinician ordering system. An incoming message contains information about specimen orders made by clinicians done via a separate system that is beyond the scope of this patent filing. All incoming messages are stored in a database server (5). Users interface with the specimen processing system via a rich internet application/user interface (2). The behavior of the specimen processing system is controlled by the proprietary processing logic (3) – the heart of the specimen processing system. The specimen processing system is coupled to the laboratory analyzer via the laboratory analyzer connector (4). The communication protocol between the specimen processing system and the laboratory analyzer is HL7 – an international standard for healthcare information communication.