Failures can occur at any stage of the journey of a specimen through the clinical laboratory, from the initiation of the request to the receipt of the results by the requesting clinician. It is essential that risk control measures are taken to ensure errors are minimised at each stage of the laboratory process. A laboratory error is any defect occurring at any part of the testing process, from ordering tests to reporting, interpreting, and reacting to results. Although they have been traditionally identified with quality control (QC), the vast majority of these arise from the extra-analytical phases of the total testing process. QC will not tell you about bubbles, clots, hemolysis, anticoagulants or IV fluid contamination, etc.

Therefore, ISO standards strongly advocate that the medical laboratory implement risk management (RM) as a way to ensure quality in their testing processes. It is a requirement of ISO15189 that “The laboratory shall evaluate the impact of work processes and potential failures on examination results as they affect patient safety, and shall modify processes to reduce or eliminate the identified risks,” which means that the laboratory shall carry out RM for patient safety. All activities of a laboratory involve risks to patients that must be managed.

Since risk can occur in any aspects of testing process, the laboratory should conduct a systematic risk identification exercise to register identified risks. Then, evaluate each risk and implement risk control measures for each unacceptable risk to contain risk at acceptable level. Therefore, RM should not be a stand-alone activity or be separate from the testing processes of the laboratory.

However, the level of detail and complexity of the RM system will be dependent on the nature (i.e., size, structure, complexity) of a laboratory and its activities. That is what RM is all about, creating patient safety laboratory services.

Modify from ISO31000 and CLSI EP23
Process Improvement and Operational Efficiency through Test Result Autoverification in the Hematology Department

Lin Chen Hsu, Chih Hsiung Kuo
Department of Laboratory, St. Vincent's Hospital, Kaohsiung

Background
To continuously improve and provide more rapid and accurate report is the goal of all laboratories. Our hematology department equipped with multiple analyzers to offer a variety of tests including CBC, HbA1c, PT, aPTT, D-dimer, PCT, NT-proBNP etc. and some of which were still manual data entered. Therefore, we adopted an integrated process re-engineer and implemented test result auto-verification to simplify and streamline the complicated process in the hematology department.

Method
After a total process re-engineering in the hematology department, we sequentially upgraded coagulation analyzer (Sysmex CS2100i), immunoanalyzer (BioMerieux Vidas3), Glycohemoglobin analyzer (ARKRAY HA-8180V) and digital cell morphology system (CellaVision DM96) in December 2014. All testing results were delivered to a single middleware (Sysmex WAM), the same as the currently existing hematology analyzers (Sysmex HST-302N). It provides automatic and manual validation reporting to the laboratory information system (LIS). Consequently, we readjusted the test process, eliminated manual data transcription, and implemented test result auto-verification and real-time auto-release system in June 2015.

Results
Approximately 520 specimens were processed per day in the hematology department. Daily results show the auto-verification passing rate of all test results to be 85% (440 results). It can save about 2.5 hours (0.3FTE) in staff to review the test results per day. The achievement rates of reporting of stat results for emergency department patients within 20 minutes were 98% and within 30 minutes for outpatients were 97%.

Conclusion
Test results auto-verification and auto-release enable laboratory staff to focus on abnormal test results, not only reduce post-analytical process time, but also prevent human errors. A well-designed auto-verification and auto-release system can be an important tool in addressing such crucial issues as medical errors, turn-around time and operational efficiency.

Figure 1. The cumulative percentage of reporting time of stat results for ED patients.

Figure 2. The cumulative percentage of reporting time of stat results for outpatients.
Beyond the microscope: Assessing the continuing professional development needs of medical technologists in the Philippines

Oliver Shane R Dumoad 1, 2, Chidel A Panganiban 2

1 Philippine Association of Medical Technologists - Bataan Chapter
2 College of Allied Medical Professions, Lyceum of the Philippines University - Bataan

INTRODUCTION

Medical technologies play a vital role in the delivery of healthcare services through the performance of laboratory tests used in the diagnosis, treatment, and management of patients. To ensure the accuracy and reliability of laboratory test results, medical technologists should keep abreast with the latest trends and developments in laboratory medicine [1]. Continuing professional development (CPD) refers to maintenance and enhancement of knowledge, expertise, and competence of professionals throughout their careers to a plan formulated with regard to the needs of the profession, the employee, the profession and society [2]. There is an increasing interest among professional regulatory agencies in requiring practitioners to demonstrate their engagement with CPD in order to maintain professional competency amid the ever-changing scope of practice and technological advances [3]. In the Philippines, Republic Act 10712 was recently enacted into law requiring the conduct of mandatory CPD programs for all professionals as a requirement for the renewal of professional licenses [4]. The development of CPD programs must be based on an empirical assessment of the needs of and planners should focus on addressing shortfalls between existing knowledge or skill and needed competencies [5,6]. Further, needs assessment studies should focus on the actual and perceived professional practice requirements, related enabling competence and capabilities, and corresponding learning and change requirements [7]. As such, this study assessed the CPD needs, preferred modes of CPD delivery and perceptions regarding CPD among medical technologists in the Philippines.

METHODS

A cross-sectional assessment regarding CPD was performed using an online questionnaire (refer to the QR Code link below). Respondent training needs, preferences and perceptions of the respondents were rated using a 4-point scale and organized into five domains of competency.

DOMAINS

- Public hospital-based laboratory
- Private non-hospital-based (e.g. clinics)
- Private hospital-based laboratory
- Private hospital-based laborator
- Private non-hospital-based laboratory
- Other

RESULTS

LEADING TOPICS

LEADING TOPICS

CLINICAL LABORATORY SAFETY
- Laboratory and equipment management
- Personal protective equipment
- Infection prevention and control

TECHNICAL COMPETENCIES
- Clinical laboratory testing
- Laboratory test procedures
- Equipment operation

LABORATORY MANAGEMENT
- Laboratory and equipment management
- Personal protective equipment
- Infection prevention and control

MEDICAL TECHNOLOGY CONCEPTS AND PRACTICE (MTCP)
- Cost of equipment
- Time spent on equipment maintenance
- Training needs

MEDICAL TECHNOLOGY RESEARCH
- Confronted with lack of CPD
- Perceived need to change routines of work
- Perceived need to change routines of work
- Perceived need to change routines of work

CONCLUSION

The most focused area for training in rank order (mean according to the identified domains were (a) quality management systems, (b) laboratory management, (c) medical technology concepts and practice, and (d) medical technology research. CPD programs accredited providers should focus on these areas in developing their plans. The leading topics identified by the respondents were clinical laboratory safety, specimen measurement, competency development, and working ethics. The most preferred modes of CPD delivery were self-directed learning and workshops. Scientific. There were a few respondents who were willing to devote 3-4 hours of their time every month to CPD activities, prefer weekends over weekdays, and are mostly hindered by the cost of CPD programs and distance of the venue. However, there were some who noted that there were significant variances in perceived CPD needs of the medical technology professionals when grouped according to cadre type. The study also noted that future research should be conducted further in this field. As a result, this study provides a baseline data for medical technology CPD programs in the Philippines, future trends and technologies will also need to be considered in addressing the perceived CPD needs of medical technologists and ensure readiness in the delivery of CPD programs and activities in the country. As CPD needs will vary over time given the dynamics of professional practice and technology in laboratory medicine, this study highlights the need for lifelong learning among medical technology practitioners to maintain relevance and competency in the said field.

REFERENCES

Change Control from a leader’s perspective

How can the leader follow ongoing changes in a large decentralized department?

Brit Valaaas Viddal, Biomedical Laboratory Scientist and head of the Department of Medical Biochemistry,
Helge Møre and Romsdal, Norway
brit.valaaas@helse-mr.no

Introduction
Change Control is used in the laboratory quality management system in a formal process to ensure that changes are introduced in a controlled and coordinated manner. It helps to meet the criteria from both Norwegian authorities and Norwegian accreditation. As the Department of Medical Biochemistry at Akershus hospital Change Control was first established in 2000 at the Institute of Transfusion Medicine as a claim of the producer of blood products. This department experienced that Change Control was a suitable tool for implementation in the entire department which consists of four laboratories located at four different hospitals.

Method
Change Control ensures that every change in systems or methods will be followed in a controlled and coordinated way. The procedure includes changes in e.g. analytical methods, instrumentation, IT programs, routines and organization. Prior to all changes a risk assessment will be performed. All changes must be documented in the same template which has to be signed by the laboratory specialist and the laboratory leader.

Examples of questions to be asked in the form:

Before start:
- What are you going to change?
- Why?
- Value?
- Give a short overview of the change.
- Perform a risk assessment:
  - What kind of risk factors may be involved?
  - What can be done to avoid the risks?
- What can be done to minimize any consequences.
After the leaders approved:
- Make a plan:
  - Establish who, what and where changes eventually have implications for
    - Equipment
    - Facilities
    - IT programs
    - Procedures
    - Structure
    - New guidelines
    - Information
    - Support
    - Others
- Perform documentation of every change that has been done
  - Why
  - Where
  - Verifications
- Make a plan for follow up

The change control form will be signed by the leader and saved in the hospital’s quality management system.

Results
Implementation of Change Control enables leaders at different levels to continuously follow changes that are being implemented in the laboratories. All changes are documented in the department’s quality management system which enables the department’s leader to have full control over all ongoing changes in the department’s laboratories, even if they are located in different geographic areas.

HELSE MÔRE OG ROMSDAL
Reduction in Hospital-Wide Clinical Laboratory Specimen Identification Errors following Process Interventions: A 10-year Retrospective Observational Study

Hsiao-Chen Nien 1,2, Chih-Ni Lin 3, Ying-Dou Chang 1, Tsao-Lan Wu 3

1. Department of Laboratory Medicine, Cheng Gung Medical Foundation, Linkou Branch, Taoyuan, Taiwan. 2. Department of Medical Technology and Laboratory Science, Cheng Gung University, Taoyuan, Taiwan. 3. Department of Medical Laboratories Administration Center, Cheng Gung Medical Foundation, Taoyuan, Taiwan.

Introduction
- Accurate patient identification and specimen labeling in the time of collection are crucial steps in the prevention of medical errors, thereby improving patient safety.
- Common errors related to patient samples occur at the time of collection and often involve mismatched regulation and specimen labels, and unidentifiable patient specimens. Though frequent, we follow that such errors in patient specimen identification (ESI) can be almost entirely eliminated.

Material and Methods
All patient specimen identification errors that occurred in the outpatient department (OPD), emergency department (ED), and inpatient department (IPD) of a 3,000-bed academic medical center in Taiwan were documented and analyzed retrospectively from 2005 to 2014. To reduce such errors, the following series of strategies were implemented:
- Intervention I: A restrictive specimen acceptance policy for the ED and IPD on 1 April 2008. Relabeling of mismatched or unidentifiable specimens were not allowed, except for in cases of mismatchable specimens.
- Intervention II: A computer-assisted barcode positive patient ID system for the ED on 1 August 2007. Positive patient specimen identification.

The hospital uses a second barcode reader and scan the patient’s barcode once the ESI label has been attached. This data is then transmitted to the computerized system where it is matched with the patient data in the system. If there is no match, the system will alert the user.

Results

Table 1: Outpatient specimen identification errors between 2005 and 2014.

<table>
<thead>
<tr>
<th>Year</th>
<th>ESI Detected</th>
<th>ESI Specimen</th>
<th>ESI Specimen</th>
<th>ESI Specimen</th>
<th>ESI Specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>421</td>
<td>78,005</td>
<td>4,092</td>
<td>312</td>
<td>5,198</td>
</tr>
<tr>
<td>2006</td>
<td>457</td>
<td>87,845</td>
<td>5,167</td>
<td>333</td>
<td>5,303</td>
</tr>
<tr>
<td>2007</td>
<td>586</td>
<td>93,852</td>
<td>5,410</td>
<td>362</td>
<td>5,495</td>
</tr>
<tr>
<td>2008</td>
<td>44</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2009</td>
<td>42</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2010</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2011</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2012</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2013</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
<tr>
<td>2014</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
<td>1,065</td>
</tr>
</tbody>
</table>

Figure 1. Quarterly errors (y-axis) in patient identification over a 10-year period at Taichung Chang Gung Memorial Hospital. Arrows indicate the start of the four interventions.

Table 2: Specimen identification errors before and after ESI interventions

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Year</th>
<th>ESI Detected</th>
<th>ESI Specimen</th>
<th>ESI Specimen</th>
<th>ESI Specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>2005</td>
<td>421</td>
<td>78,005</td>
<td>4,092</td>
<td>312</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>2006</td>
<td>457</td>
<td>87,845</td>
<td>5,167</td>
<td>333</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>2009</td>
<td>44</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>2014</td>
<td>41</td>
<td>22,373</td>
<td>1,041</td>
<td>12</td>
</tr>
</tbody>
</table>

Conclusion
Accurate patient identification is a challenge in patient safety in medical settings. The data collected in our study indicate that a restrictive specimen acceptance policy, computer-generated positive identification systems, and interdisciplinary cooperation can significantly reduce patient identification errors.
Using the TPR System to Reduce Accidents and Improve Patient Safety
Nai-Ding Liao, Kun-Chen Chan, Li-Ching Wu
Division of Clinical Pathology, Chi Mei Medical Center, Tainan, Taiwan

Objectives

Patient safety is the foundation of all quality medical services. In order to effectively handle errors and reduce the number of such incidents, Chi Mei Medical Center has established the TPR (Taiwan Pathology Safety Reporting) system. According to the TPR system, our division reflects on the mistakes, analyses the cause and nature of the accident, and then develops a prevention and correction mechanism to keep the mistakes from happening again. This allows our division to avoid the same kind of error and to maintain a safe medical environment.

Reporting Incidents and Data Analysis

There were 90 errors in our division in 2015. The majority of these incidents - 55 of them - were about laboratory medicine. The second most common type of mistake involved blood transfusions. There were 41 of these.

The reporting unit was mainly from the Division of Clinical Pathology (CP), which reported 40 incidents, then OPD with 3 incidents.

The monthly occurrence of incidents from TPR system in 2015.

Most of the mistakes - 65 of them - occurred during working hours between 14:00 and 17:00.

The majority of errors occurred in sample collection and delivery, then incubator, then 10 mistakes involving sample analysis and interpretation.

Reasons, Results, and Improvements

1. Ten incidents were analyzed as system errors and were handled and tracked in a Non-Confidential Report (NCR). Six of the mistakes were resolved by modifying codes from the Laboratory Information System (LIS), and no further problems occurred.

2. In the first quarter, five incidents occurred in the specimen handling. They were caused by operational errors committed by new employees who were using the specimen recording system. The mistakes were resolved by additional hands-on testing, as well as further professional development and training. No such errors occurred in the second through fourth quarters.

3. During the first half of the year, there were eight incidents caused by clerical identification errors. Samples were automatically extracted at sample hampers were mismatched on blood collection tubes. These errors occurred during peak hours and were partly a result of shortage of labor. Clinical units now make an effort to strengthen patient identification accuracy and bar code identification. They also send labor support during peak hours. During the second half of the year, the errors decreased by 90%.

4. For the first half of the year, five incidents happened between 16:00-17:00, the duty medical assistants were re-evaluated. They were also re-trained in standard operating procedures. As a result, the error rate decreased by 75% during the second half of the year.

5. Fourteen blood problems were discovered due to improper storage. Eight incidents were reported as insufficient by section nurses were sponsored errors made by medical assistants. In order to resolve these issues, the clinic established the standard operating procedures (SOP) of blood product storage. This involved re-organizing warning labels, blood product storage procedures, and the tracking of occurring rates of abnormal incidents.

Conclusion

By maintaining statistics of abnormal incidents and by utilizing risk analysis, error occurrence rates will decrease. At the same time, patient safety will increase. This will help maintain the standard of a standardized medical environment.
Analysis of Turnaround Time for Inpatient Specimens after Organizational Integration in a Medical Center in Taiwan

Chan Kun-Chen, Liao Nai-Din, Wu Li-Ching
Department of Clinical Pathology, Chi Mei Medical Center, Tainan, Taiwan

Introduction

The laboratory turnaround time can be defined differently according to the test type (stat vs routine), analyte, and institution. It is commonly defined as the time from when a test is ordered until the result is reported. The Department of Clinical Pathology in Medical Center in Taiwan defines the laboratory turnaround time (TAT) for outpatients as the time taken from printing a barcode to reporting the test result. Traditionally, laboratory TAT is determined by the timely progress of 3 phases of testing: preanalytical, analytical, and postanalytical. We designed a new LIS that records TAT data automatically and analyzes the time taken for the 3 phases that comprise the total laboratory TAT for each test.

Laboratory analytical turnaround time (TAT) is regarded as a reliable indicator for laboratory effectiveness. The study was to assess laboratory analytical turnaround time in our laboratory and determine the contribution of the different phases after organizational integration.

Method:

The barcode sample see Fig 1. TAT is subdivided into preanalytical, analytical, and postanalytical phases based on four checkpoints when reading barcodes, the data are entered automatically into the LIS (Fig 2). The turnaround time (TAT) for all the samples (both routine and emergency) from a medical center for the hospitalized patients were evaluated for one year.

RESULTS

The average TAT for the clinical chemistry samples for before organizational integration and after organizational integration were 3.11 h and 2.22 h for routine inpatient samples. Completion times of the preanalytical, analytical, and postanalytical phases for clinical biochemistry samples before organizational integration were 52.75 ± 19.58, 81.53 ± 29.09, and 82.03 ± 20.10 min, respectively (Fig 3); for after organizational integration were 55.38 ± 16.48, 34.18 ± 12.98, and 43.90 ± 19.54 min, respectively (Fig 4).

Conclusion:

For specimens reported between 60 and 90 min, the preanalytical phase was found to need improvement in order to shorten TAT; the main target for improvement was identified as the "waiting time for phlebotomy" step. The TAT demonstrates the need for improvement in the pre- and post-analytical periods. Monitoring the TAT periodically for different phases is beneficial to patient safety.
Improving Patient Safety by Introducing an Effective Intelligence Technology-Based System for Critical Value Notification

Jung-Chin Chen, Le-Hsi Tsai, Yen-Hua Kung, Yen-Chun Lin, Hung-Wen Tsai.
Department of Pathology, National Cheng-Kung University Hospital, Tainan, Taiwan.

Background
Approximately 4000 abnormal laboratory results were reported monthly in NDUH. Although short message service (SMS) sent automatic messages, we needed to switch to a manual process in 5.4% of cases due to communication failure. It is time-consuming and potentially harmful for patients as a result of personal omission, especially for outpatients with life-threatening critical values. Therefore, we introduced a self-designed fall-safe intelligence technology-based critical value notification system (ITNOTIS) in 2015 to improve successful critical value notification rate and clinical intervention.

Method
Our new ITNOTIS system could fix those problems (Figure 1): 1. User-friendly system to replace handwritten steps: When there is communication failure or no critical feedback response, the laboratory will be alerted by a pop-up window, which offers the phone number of the responsible physician. The laboratory staff could quickly phone the physician and then all the events could be documented electronically (Figure 2). 2. Back-up process for critical value notification: A primary care provider (PCP) fails to respond to the life-threatening critical value within 20 minutes, a back-up process will intervene. Our hospital call-center takes over by repeatedly calling the PCP or informing the second-floor duty doctor (Figure 3). The ITNOTIS will automatically direct and record all steps, including follow-up of clinical intervention (Figure 4).

Result
After introducing ITNOTIS system, we could:
1. Improve the manual notification time (5 mins vs 1 min) and rate (52% vs 99%)(Figure 5).


Figure 4. User-friendly interface offers sufficient information.

Figure 5. Improvement in manual notification process after ITNOTIS introduced.

Conclusion
Our fall-safe ITNOTIS system improves the critical value notification by combining automatic SMS with a back-up process, and prove effective in improving the notification rate of abnormal results.
Introduction

Effective healthcare systems start with an accurate diagnosis, and laboratory plays an important role. This is a fact, especially in 70% - 80% of healthcare diagnoses affecting diagnosis and treatment analysis. Laboratory investigations and pathology services are used not only for disease diagnosis and management, but also in health programs for evidence-based decision making. Therefore, the importance of a country is seen in laboratory setup and identifying strengths and points of need in laboratories.

Survey goal

Identify areas in which efforts should be directed in order to strengthen the national laboratory system in Mongolia.

Subjects and Methods

- Two areas of the laboratory system were evaluated: strategic organization in the Ministry of Health level and specific institutional inspection at the laboratory level
- The assessment was conducted using the Laboratory Assessment Tool

Conclusion and Recommendations

1. A well-planned and legislatively sound model for the registration and laboratory professional staff should be established.
2. Each laboratory should formally designate an appropriately trained Quality assurance officer.
3. A formal professional development/continuing education system for laboratory professionals should be set up.
4. Quality policy and implementation plans need to be developed.
To get all the test results immediately at any time, make a 10,000-bed hospital.

Then you can hire many laboratory technicians who can work weekends and at night by taking weekdays off.

Yasuhi Kunou, Laboratory Medicine, Nagoya City West Medical Center.

**[Introduction]** Importance of getting test results immediately

A patient comes with a headache at midnight. A cerebrospinal fluid sample is taken.⇒⇒⇒⇒⇒⇒

(Case 1) Suppose we get the results immediately.

⇒And the herpes simplex virus result is positive.

⇒The patient needs acyclovir only.

(Case 2) Suppose we cannot get the results immediately.

⇒The patient needs medications for herpes, bacteria, fungi and TB.

**[Methods to get test results immediately]**

Japan is over populated.

⇒10,000 patients are hospitalized within a radius of 20 kilometers in big cities.

⇒Consolidate small hospitals into a 10,000-bed hospital.

⇒This huge hospital can hire extremely many laboratory technicians.

⇒Make many of them work weekends and at night.

⇒And let them take weekdays off.

⇒Make them work like people in Las Vegas.

**[Results concerning tests]**

There are extremely many technicians in a 10,000-bed hospital.

⇒They can do all the tests inside the hospital anytime.

⇒Almost all the test results come immediately.

**[Results concerning doctors]**

1. Huge hospitals can hire extremely many doctors.

⇒Make many doctors work on weekends and at night.

⇒And let them take weekdays off.

⇒Specialists always see patients even on weekends and at night.

⇒Huge hospitals accept all the ambulances.

⇒Small hospitals need no technicians at night.

⇒Surgeries are done immediately anytime.

⇒Patients who work on weekends can have colonoscopy on weekends.

⇒More early cancers will be found.

⇒The number of doctors in one 10,000-bed hospital is smaller than the number of doctors in twenty 500-bed hospitals.

⇒Twenty 500-bed hospitals have 20 * 100 = 2,000 doctors.

Hence the government saves money.

**[Conclusion]**

We need huge hospitals.

学会後、廃棄して下さい
The study of radioimmunoassay laboratory management and quality control

Healthcare failure mode and effects analysis (HFMEA) as a risk-assessment tool to prevent tumor marker laboratory report errors

Ming-Shu Chen1, Jia-Ling Chen2

1. Department of Health Care Administration, Aeronautical Technology, New Taipei City, Taiwan
2. Department of Nuclear Medicine, Far Eastern Memorial Hospital, New Taipei City, Taiwan

BACKGROUND: Healthcare failure mode and effect analysis (HFMEA), proposed by Joint Commission on Accreditation of Healthcare Organizations (JCAHO), is a proactive tool used to analyze risks, identify failures before they happen and prioritize remedial measures. The aim of this study was to evaluate the frequency, type, preventability, as well as severity of tumor marker report errors in a radioimmunoassay (RIA) laboratory of a tertiary medical center, to examine the hazards associated with the process and identify the areas needing improvement.

METHODS: The RFID tool and HFMEA program was performed in the RIA laboratory between June 2013 and December 2015. The multidisciplinary teams including 3 nuclear physicians, 3 laboratory medical technologists and 1 nurse practitioner and 1 HFMEA staff were trained to analyze the process of tumor markers reporting, to identify possible causes of failures and potential effects. Potential probability and severity were classified using a four-point scale according to the HFMEA Severity Scale. The study planned to reduce the failure rates and assessed the improvement of medical quality and patient safety.

RESULTS: After analyzing the 23 sub-steps from the 5 main steps (A-E) in the process (as the Table 1), errors were classified into 31 failure modes, 40 associated causes and effects were identified (as the Table 2). The main reasons were: (1) sample errors, (2) insufficient specimen, (3) outsourcing laboratory errors, and (4) manual data input errors. The improvement procedures included: (1) to specify the information of test specimen on the website; (2) to regularly follow major outliers; (3) to double check sample aliquots; (4) to periodically review outsourcing lab reports error rate; and (5) to double confirm the outsourcing reports. The introduction of new activities in the revised process significantly reduced failure rates and severity scores.

Table 1. The flow chart of tumor Marker tests check-up in radioimmunoassay laboratory

<table>
<thead>
<tr>
<th>Main step A</th>
<th>Main step B</th>
<th>Main step C</th>
<th>Main step D</th>
<th>Main step E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Choose order</td>
<td>B: Print order to patient</td>
<td>C: Outsource report</td>
<td>D: Report input</td>
<td>E: Report confirms</td>
</tr>
<tr>
<td>B: Print the barcode stickers</td>
<td>C: Check the specimen</td>
<td>D: C-1 Manual report</td>
<td>E-1: Initial report</td>
<td>E-2: Final report</td>
</tr>
<tr>
<td>C: Check the specimen</td>
<td>D: 2-12 Manual report</td>
<td>E-2: Final report</td>
<td>E-2: Final report</td>
<td>E: E-3 Critical value alarm</td>
</tr>
</tbody>
</table>

Table 2. The Hazard Analysis Matrix and Risk Score Index Table

<table>
<thead>
<tr>
<th>Process</th>
<th>Potential causes of failure mode</th>
<th>Failure mode</th>
<th>Risk score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood sampling</td>
<td>B-4: Specimen error (Barcode stickers wrong)</td>
<td>4-1: Blood sampling counter posted the wrong bar code stickers</td>
<td>4</td>
</tr>
<tr>
<td>Double check and ordering by MT</td>
<td>B-5: Insufficient specimen count</td>
<td>2-5-1: Insufficient specimen counter</td>
<td>2</td>
</tr>
<tr>
<td>Outsource report</td>
<td>B-6: Incorrect specimen number</td>
<td>2-6-1: Incorrect specimen number</td>
<td>2</td>
</tr>
<tr>
<td>C-4: Analysis process error</td>
<td>C-4-1: Analysis process error</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C-4-2: Interpretation error</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>D: Report input</td>
<td>D-1: Incorrect report</td>
<td>1-1-1: Incorrect report</td>
<td>1</td>
</tr>
<tr>
<td>E: Report confirms</td>
<td>E-3: Critical value alarm</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

CONCLUSIONS: HFMEA is an effective proactive risk-assessment tool to aid in identifying errors of RIA tumor marker reports, and enhancing the laboratory quality.

KEYWORDS: Laboratory Quality Improvement; RFID tool; Tumor Markers; Healthcare Failure Mode and Effects Analysis (HFMEA)
Comparing different quality control indicators of uncertainty in the clinical biochemistry laboratory

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Department of Healthcare Administration, Oriental Institute of Technology, Taiwan
Department of Healthcare Information and Management, Ming Chuan University, Taiwan
Department of Applied Statistics and Information Science, Ming Chuan University, Taiwan

Background In order to enable clinical doctors to accurately diagnose and treat diseases, the clinical medical technologists at laboratories have to continue to improve quality control ability to ensure the accuracy of test results and reduce the uncertainty of measurement. Different from the quality control indicators for traditional measurement of uncertainty, this study applied industrial quality control process indicator, Cpk, to clinical biochemistry laboratories, and performed the comparison on identification of quality control between the traditional indicators. This study collected the quality control data of high and low concentrations of daily biochemical test items (including GLU, BUN, CRE, ALP, AST, ALT, GPT, N Protein, K, Na, PO4, Ca, and P). All of these test items were tested by different laboratories from December 2015 to December 2016. Furthermore, this study analyzed and compared the difference between the traditional indicators and the Cpk indicator.

Results This study found that, compared with the traditional indicators, such as CUS, CUS, and TOL, the laboratory to monitor in quality control ability reflected the same quality control ability in many aspects. For example, when CV or bias was close to or exceeded reference range values, CUS usually would also exceed or was close to reference range values. Moreover, except for CUS of NA values, CUS usually would also exceed or was close to reference range values. The Cpk of any one of other biochemical test items was greater than 1.67 (Table 1), and even the CUS indicator of the test items did not meet the standard of 3.33. Therefore, the control identification of the indicator, CUS, was lower in quality control, and it could fail to effectively control laboratory supervision of the actual issues during examination or in device.

Conclusion This study suggested that, if future laboratories intend to use statistical quality control indicators as the quality control process ability indicators of certain biochemical test items, they can attempt to use CUS which is easier to calculate than the statistical quality control indicators. Furthermore, the statistical quality control indicators are sensitive to unexpected factors, such as instrument error and environment, compared to the CUS indicator. The Shewhart statistical quality control indicators are more suitable for use in individual laboratories, whereas the CUS indicators are more suitable for large laboratories. The CUS indicator may be used as an important indicator of laboratory quality control, and the measurement data of all laboratories should be used to determine the reference interval.

Keywords: Biochemistry; Quality assessment; Uncertainty; Quality Control Indicators
Using Root Cause Analysis to Improve The Problem of Missing Specimen

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¹Department of laboratory medicine, ²Department of education, Taipei Medical University-Shuang Hsing Hospital, New Taipei City, Taiwan

Background
The management jobs of laboratory specimen for test results has the right, wrong inseparable impact include identification of the specimen, specimen transport, receive, handling, storage, destruction. Therefore our laboratory list some indicators monitored in quality improvement conference like Patient Identification, Specimen Loss, Rejection Rate of Specimens to ensure test results instant and accurate.

Method
From 2015, we find specimen loss reason can be divided into the specimen pump leak, the specimen mistakenly lose, the specimen falling to track, and unknown reason in total of 10 cases, especially we found three cases: three specimen falling to track in 2015 February and March, So for this issue we not cause anymore and we find four high risk specimen falling spaces (Picture 2) when transport specimen from first floor to basement floor. And we take the following measures:
1. We make transparent acrylic to replace black acrylic so that when specimen falling to track we can see it instantly (Picture 2).
2. We mark the specimen labeled clearly informed when transporting the specimen do not exceed the height to avoid specimen overload. (Picture 3)
3. When specimen transport have inspection report the single cartridge to avoid inspection too thick to stop track.
4. Track manufacturer cut specimen transport speed to avoid specimen pop up in transit.

Result
After this improvement we have not yet found a case of missing specimen from 2015 April to 2016 April.

2014-2016 Missing Specimen Cases

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>June</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>July</td>
<td>3</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Aug</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Sept</td>
<td>5</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Oct</td>
<td>6</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Nov</td>
<td>7</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Dec</td>
<td>8</td>
<td>14</td>
<td>0</td>
</tr>
</tbody>
</table>
The establishment of E-document management system
Using management information systems improve organizational performance

Yeu-Han Yeh, Cyue-Hsiu Hsu, Yen-Chen Hsieh, Yu-Fen Chien
National Taiwan university hospital Yun-Lin branch, the department of laboratory medicine, Taiwan

Proposes
The paperless medical office is a trend in recent years due to heightened awareness of the environment. After ISO 15189 Medical Laboratory Accreditation was performed by case lab, the numerous SOP documents and record forms were produced since 2003. Several problems such as document storage, costs, and waste disposal have to be solved.

Methods
E-document management system was imported by case lab since 2011. In the first stage, all quality control records were integrated into a real-time online quality control system. Quality control (QC) data were automatically sent to system by instrument, and QC performance was compared with different machines and different locations (Fig. 1). In the second stage, the knowledge management system was imported and then provided digital QM/QP/SOP documents online. Electronic documents were monitored by Document Control Procedure (Fig. 2). In the third stage, a number of ISO records were recorded online, such as instrument maintenance lists and temperature monitoring records. Therefore, maintenance lists can be inspected online and on-time by administrators (Fig. 3).

Results
After importing E-documents systems, about 34,000 pieces of paper including 1024 SOP documents and 537 records were saved (Fig. 4). The advantages of the establishment of E-document management system include reducing the time spent in files transporting, providing online inspection, reducing the risk of infection during transporting documents, saving files storage space, reducing paper waste disposal. Consequently, using management information systems can improve organizational performance, achieve standardization and enhance quality of laboratory.
Root cause analysis to prevent about transfusion error reporting
To effectively reduce the incidence of abnormal events of blood banks

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Kaohsiung Medical University Hospital, Kaohsiung Medical University

Introduction
2015, 6.29 Patient A emergency admissions to hospital, medical records showed the blood type of the patient is "A", but when transfusion therapy performed, nurse found the type of blood product is "A", and lab report showed is "O" which one was right?
A transfusion incident borders near miss events and "no harm events", though immediate stop because no injury occurred, but if the "misdiagnosis" actually occurs, may result in patient injury. This case the extent of damage considered "severe", SAC Level 3, because the case is of considerable educational value, the process root cause analysis (RCA)

Method

outcomes 1
Blood typing flag similar in the same time

outcomes 2
Training and assessment

Why tree
-表彰 pity is the same of patient type
- There are differences between the lab report
- There is no report of blood product type in the patient record

For the correct operation of the various transfusion-related inspection, and to familiarize with the correct use of information systems, in terms of clinical staff it is quite important, the project hopes to improve this application RCA practices, identify the root causes blood bank error exception event, and then actual import to standard procedures in order to effectively reduce the incidence of abnormal events of Blood Banks
Optimization of Blood Culture Reporting Efficiency by Workflow Improvement

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Ye-Hsuan Yang
Li-Chuan Wang
Ya-Hen Tsai
Li-Ching Wu

Department of Clinical Pathology, Chi-Mei Medical Center Young Kang Division, Tainan, Taiwan

Background

Chi-Mei Medical Center has undertaken a series of Workflow Improvement Projects (WIPs) to improve patient care. One such project focused on blood culture reporting efficiency. The project aimed to reduce the time required for blood culture results to be reported to the clinician, thereby allowing for earlier diagnosis and treatment.

Methods

The project involved the implementation of a new workflow process that included the following steps:

1. **Training for Collectors**: Educating the team on the importance of timely and accurate blood culture collection.
2. **Routine Education**: Regular training sessions to reinforce the importance of timely reporting.
3. **Installation of MALDI-TOF MS**: This technology was installed to enhance the identification process, reducing the time required for results.

Results

- **Average Blood Volume**: The average blood volume increased from 3.9ml to 7.9ml, reaching 102.6% of the expected value.
- **Detection Time**: The time to detect pathogen decreased from 4 hours to 2 hours.
- **Contamination Rate**: The contamination rate decreased from 3.41% to 2.37%, reduced by 31.6%.
- **Final Report Time**: The preliminary report time for blood culture was shortened from 48.92 hours to 33.65 hours.

Conclusion

Bacteremia or sepsis is the immune response caused by pathogen infection, leading to clinical symptoms like fever and elevated WBC. To diagnose the cause of bacteremia, it is crucial to perform blood culture with good quality collection. Besides, introduce new technology and proceed workflow improvement can significantly reduce the reporting time, hence provide earlier treatment to patients suffering from sepsis.
Introduction

After non-aliquot laboratory specimens with barcode which included the patient’s ID data and physicians’ requisition had been implemented in hospital, risk from misidentification was eliminated to the minimum. In contrast, errors caused by lost specimens are drawing more and more attention by clinical department. For specimen that was lost somewhere between delivery and laboratory processes, some can be repeated, such as blood or urine. Nevertheless doing so may not only put the patient at risk from additional procedure but also impose a greater burden on the health care system through additional cost, time and labor. Moreover it may hinder patient from being diagnosed appropriately and treated timely. Furthermore, lost specimens may increase patient anxiety, or be a source of potential litigation. Of greater concern are for those specimen difficult to collect or cannot recollect, such as pediatric specimens and timed specimens. The establishment of specimen transport tracking mechanism is desired to early detect errors and retrieve lost specimens, in order to mitigate the risks aroused by these incidents.

Materials & Methods

The specimen transport tracking mechanism was established based on the way of corrective actions and preventive actions which comes out from error view analysis focused on lost specimen nonconformity. Table 1 depicts the potential error occurred in steps involved in process of getting a specimen from clinical unit to the laboratory, and its corresponding corrective or preventive actions.

| Table 1 |
|-----------------|--------------------------------|
| Misidentification | Preventive / Corrective action to avoid or detect errors |
| Never released from clinical unit | Barcoding before specimen collection. |
| Never transported to laboratory / Lost in transit | Each specimen packed into a bag, and bag barcode generated which can track to every staffed specimen. Each bag scanned by nurse while taken out by transporter. |
| Never received by laboratory | Bag and staffed specimen barcode scanned to detect possible error (unmatched specimen), such as missing specimen or misplaced specimen. |
| Never released by work station / Lost in laboratory delivery | Use specimen collection box for carriage. Each specimen loaded in tube rack immediately after barcode scanned. |
| Never released from clinical unit, lost in transit or laboratory process | Every 30 minutes, stat specimen receipt list checked for ensuring specimen on track. Every 2 hours, regular specimen receipt list checked for ensuring specimen on track. |
| Detected errors / Missing or misplaced specimen | Initiate retrieving action while laboratory process error detected. Notify nursing staff for release and transit errors. |

A total of 15,149,947 cases investigated from 2013 to 2015. We used specimens loss rate (PLR) and occurrences of lost specimen events as the indicators to evaluate the efficacy of specimen transport tracking mechanism.

Results

Figure 1 showed the annual specimen loss rate on a downward trend from 1.56 PPM to 0.29 PPM after specimen transport tracking mechanism was implemented from 2013 to 2015 (fully implemented till 2013).

Although there were still two lost specimens occurred respectively in 2014 and 2015, simultaneously 50 specimens were recovered by retrieving action initiated via specimen transport tracking mechanism. The analysis was shown as Table 2. The causes of these 50 near misses were grouped into specimen released error, transit error and laboratory process error, in which the contribution of each cause were 36%, 52% and 12%, respectively.

| Table 2 |
|-----------------|--------------------------------|
| Error/person involved | Number |
| Specimens released error | Nursing staff |
| Translit errors | Translit |
| Laboratory process errors | Laboratory staff |
| | 1. Lateral in nursing station | 13 cases |
| | 2. No signature on collection sheet | 1 case |
| | 3. Specimen in transit loss | 4 cases |
| | 4. Specimen transmitted | 4 cases |
| | 5. Specimen in laboratory | 5 cases |
| | 6. Specimen not matched | 5 cases |
| | 7. Specimen not matched | 5 cases |
| | 8. Specimen not matched | 5 cases |
| | 9. Specimen not matched | 5 cases |
| | 10. Specimen not matched | 5 cases |

Discussion

Human lapses always regarded as the proximal cause of an adverse event. Our tracking mechanism settled up along process mapping, which focuses on what steps in the process a checkpoint can be put into place to early detect occurrences of lost specimen and recovery. In order to reduce the risk of human lapses, the systemic timely reminder is regarded as effective mechanism to replace invalid caution label and revise training. On the other hand, the accountability between each healthcare provider who involves in processes will be clarified. In addition, consistent communication patterns should be established between nursing staff and laboratory personnel, especially at hand-off of specimens and a change of shift.

Conclusion

The specimen transport tracking mechanism can effectively eliminate occurrences of lost specimens through decreasing reliance on human vigilance.
Introduction

Quality systems play a significant role in ensuring the diagnostic, treatment, and reporting accuracy of the medical laboratory (ML) operations at all stages. Implementations of ISO 15189:2012 require basic laboratory management (LM) and ML to fulfill specific conformance requirements (CRs) ranging from basic to strategic levels to relate to management, clinical, and external requirements. Specifically, Clause 4 of ISO 15189:2012 focuses on the management of a requirement conforming to a given CR, with basic, LM, and ML to consider in all areas related to the laboratory’s compliance. The implementation of the CR requirements of ISO 15189:2012, by the ML personnel, is required to ensure the quality assurance and overall conformance of the laboratory to the standard.

The focus of this study is to systematically analyze the conformity of CRs to ISO 15189:2012 for a selected number of MLs. The study provides insights on the evaluation of ISO 15189:2012 guidance applicable to MLs for accreditation bodies (ABs) for the purpose of ensuring CRs are met.

Materials and Methods

Conformance analysis

Conformance analysis was used for the identification of CRMLs and the identification of MLs. This was implemented using a comprehensive software application, a QMIS tool for the implementation.

Excellency assessment

The ISO 15189:2012 CRs framework was used to conduct excellency assessment on the conformance of CRMLs for the selected CRMLs.

Results

Selection/evaluation criteria for comparative analysis

A total of 10 MLs were selected for comparative analysis. These MLs are the 3rd-level members of International Accreditation Commissions.

Excellency assessment of conformance checklist from selected accreditation bodies

Evaluation checklist from the selected MLs was used for the excellency assessment. The results are presented in Table 1.

Table 1: The frequency of conformance requirements by the evaluated checklist.

<table>
<thead>
<tr>
<th>CRML</th>
<th>CR 1</th>
<th>CR 2</th>
<th>CR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML A</td>
<td>99%</td>
<td>98%</td>
<td>97%</td>
</tr>
<tr>
<td>ML B</td>
<td>97%</td>
<td>96%</td>
<td>95%</td>
</tr>
<tr>
<td>ML C</td>
<td>95%</td>
<td>94%</td>
<td>93%</td>
</tr>
<tr>
<td>ML D</td>
<td>93%</td>
<td>92%</td>
<td>91%</td>
</tr>
</tbody>
</table>

Point distribution analysis of conformance requirements

The CR coverage of each checklist of the six evaluated checklists was plotted on columns for point distribution analysis. The results are presented in Figure 1.

Discussion

The results of the study show that the conformance of ISO 15189:2012 to CRs for CRMLs is provided by the MLs for the selected MLs. The analysis and the findings indicate that the analysis was performed using the criteria of ISO 15189:2012. The evaluation assessment required the CRs coverage to be a percentage of the CRs that were checked and the CRs for which the checklist provided insights into the CR coverage and the CRs that were checked to provide insights into the CR coverage. The evaluation results can be used as an evidence of the CR coverage in the selected MLs.

This research has two major practical implications. First, for the sake of the health care providers, who provide patient care and continuously make health care decisions based on the level of coverage provided. Second, the need for the health care providers to use the CRs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs for the conformance of the CRMLs to the CRMLs.
Introduction

The Ministry of Health, Labour and Welfare in Japan is promoting cooperation of medical technology between institutions. The main hospital and their respective out-patient care teams are promoting an integrated community care system that enables a smooth transition from emergency care to long-term care and hospice care.

Sekihinkai Hospital, as a main hospital, is promoting such integration. We have had health care seminars called Kenkou-juku in Japanese for local residents on weekends since November 2012. Over the past three years, we have had more than 15,000 total participants, so these seminars were quite successful.

Details about Kenkou-juku:

Every weekend there are two back-to-back seminars. Each seminar is run by a different hospital staff member and covers a different topic. They are held at local community centers for free.

Leaflet

Past Three Years:

Period: November 2012 to November 2015
Total seminars held: 1279, 12 types of instructors

Type of Instructors

Emergency life-saving techniques 3%
Medical Radiology Technologies 3%
Clinical Education of Engineering 5%
Nutritional Issues 7%
Physical Therapists 6%

Topics Covered in Seminars

Cardiology 7%
Cancer general clinical department 5%
Diabetes mellitus 3%
Gastroenterology 3%

Example Seminars Given by Clinical Laboratory Technicians

<table>
<thead>
<tr>
<th>Departments</th>
<th>Classification</th>
<th>Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiology</td>
<td>Heart, Vascular</td>
<td>&quot;Risk factors of hyperlipidemia: bad and good statements explained&quot;</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>Diabetes</td>
<td>&quot;Causes of diabetes, lifestyle&quot;</td>
</tr>
<tr>
<td>General internal medicine</td>
<td>Blood</td>
<td>&quot;Understanding diabetes, through analysis of blood tests calculation&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Gastroenterology</td>
<td>&quot;Do you have stomach discomfort? Perhaps you have acid reflux&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;Understanding causation of diarrhea by oral endoscopy&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;What's the difference between oral and nasal endoscopy&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;The ABCs of stomach check up&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;Inspecting your stomach for signs of cancer&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;How to detect cancer: physical, medical tests&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;Understanding cause of blood tests&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;Breast cancer is not a disease only for women!&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;Scan at least compression&quot;</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>Medical treatment</td>
<td>&quot;What do you understand about the echocardiography examination?&quot;</td>
</tr>
</tbody>
</table>

Sample Questions from Patients and Answers:

Patient:

This is my checkup data. What range is desirable for good cholesterol?

Clinical Laboratory Technician:

The normal range for good cholesterol is more than 40 mg/dL. Try to keep blood pressure lower than 140/90 mg/dL and triglycerides lower than 150mg/dL. Lipid level control and aerobic exercise are effective for arteriosclerosis prevention.

How about walking? Walking is effective for raising good cholesterol.

Patient:

This report is my husband's medical checkup. HbA1c was 14% extended normal level, but he told me they were no problem. I did not think so, what should his HbA1c level be?

Clinical Laboratory Technician:

That's too high. The HbA1c normal range is more than 5,4%. I recommend a review of diabetes and nutrition guidance.

Conclusions:

We, the Clinical Laboratory Technicians, have run 1276 out of 1279 seminars.

Many seminars were related to medical care for elderly people. Top three seminars were osteoporosis, cancer and elderly persons medical care. But there were not any planned lectures about elderly person medical care.

However, there were not any planned lectures about elderly person medical care, we provide, therefore it will be necessary to include this in the future.

In these workshops, we were able to explain lab data to patients directly and had the opportunity to explain our work.

Through learning about different labs that do, patients can increase their knowledge of how to receive the most appropriate care, and can make the appropriate connections with their regional healthcare institutions.

Kenkou-juku is an ideal opportunity for us to communicate and connect with local residents personally and individually.

Message for other Clinical Laboratory Technicians

We have few opportunities to build good relationship with patients, we enjoy interacting with them during Kenkou-juku.

Let's go out of the laboratory, and engage in positive communication through the clinical interaction.

Let's improve our role in elderly person medical care, such as dementia diagnosis through olfaction examinations.

Let's try to diagnose dementia early through such interactions.

Clinical research support by medical challenge to the new field

O'Hidenobu Koga

ASO Iizuka Hospital

Clinical Research Support Unit / Health Information Management

POCA cycle of desirable CR.

Introduce this new initiative for foreign medical technology.
**Introductions**

St. Luke's International Hospital was accredited by Joint Commission International (JCI) in July 2012. JCI requires medical staff to confirm a patient's identity by implementing at least two methods. Our laboratory performs it for all patients in their examinations.

**Methods**

We analyzed the reports on patient misidentification which occurred at phlebotomy and physiological examinations between 2010 and 2013.

**Procedures and Patient Confirmation**

**Phlebotomy**

1. Patient is identified by check-in and face-to-face confirmation.
2. Blood sample is drawn from patient after confirming the identification.

**Physiological Examination**

1. Patient is identified by check-in and face-to-face confirmation.
2. Blood sample is drawn from patient after confirming the identification.

**Results**

- **Figure 1**: Flowchart of the identification process with examples of misidentification.
- **Figure 2**: Bar graph showing the number of misidentification incidents.
- **Figure 3**: Causes of misidentification incidents.

**Discussion and Conclusion**

It is well known that human error and computer software errors can contribute to patient misidentification in the laboratory. Any individual operation of equipment by medical technologist may cause some mistakes even if there are established systems in place for preventing incidents. However, implementing the plan that asks patients to confirm their full name and their date of birth before any procedure resulted in at least a meaningful reduction in misidentification. Therefore, it is necessary to establish measures and continue implementing them to avoid serious medical accidents. In addition, it is important that both the medical team and the patient cooperate in matters of confirming patient identification.
Clinical research support by medical technologist
Challenge to the new field

Hidenobu Koga
ASO IIZUKA Hospital
Clinical Research Support Unit / Health Information Management

[Introduction & Purpose]
- In recent years, visualization of medical information and improvement of quality of clinical research (CR) have been emphasized in the medical field.
- Statistical approach and the adjustment of covariates in observational studies are difficult for many researchers.
- From July 2014, I had transferred to the medical information management and CR support unit and launched the department of medical information analysis along with the Health information manager.
- Our main business is the secondary use and visualization of medical information and CR support.
- Figure 1 shows the PDCA cycle of desirable CR.
- In this congress, we introduce this new initiative for foreign medical technologist.

**Fig1. PDCA cycle of desirable Clinical Research**

[Result]
- Figure 2 shows the number of order (request) by medical occupation in 2015 (2015/04~2016/03).
- The detail request contents were descriptive and inferential statistics, multivariate analysis, survival analysis, CR design, support of making slide and congress abstract.
- It seemed that appropriate use of statistical hypothesis test and the comparison between the different groups (especially, patient background) were difficult for many researchers.

[Discussion]
- In CR, researchers have to rotate the correct PDCA cycle of CR.
- In order to improve the quality of CR, it has been required to carry out in cooperation from the stage of the start of the CR than by researchers alone.
- Under such circumstances, the role of statistics and statistical personnel is particularly important.
- However, it is not well equipped CR system in many hospitals in Japan.
- CR support seemed to become the new active field of clinical laboratory technicians.
- CR support for all medical staff by medical technologist might to become the new active field of medical technologist.

[Contact us]
HIDENOBU KOGA  (ktogah51@nih-net.com)
Introduction
Continuous Positive Airway Pressure (CPAP) User for Sleep Apnea Syndrome (SAS) needs regular visits to hospital. This time we had succeeded in streaming works by the management of CPAP using the communication modem (MCC). We report the survey results for CCM to investigate the effectiveness.

Methods
Target is patients who obtained the consent CPAP user and using more than 2 month and November 2015 of the examine. The survey asks multiple-choice questions and yes no questions. We carried out to the waiting time of patients and doctors.

Result
It is 123 people to using CPAP more than 2 month among 231 people. Patients Outpatients of CPAP. (male 94 people, average age 57.0 years-old; female 21 people, average age 60.5 years-old).

Are you need the report?
- Patient: Yes 40%, No 60%
- Doctor: Yes 60%, No 40%

Are you interested in the Content of the report?
- Patient: Yes 80%, No 20%
- Doctor: Yes 60%, No 40%

Importance of the report
- Patient: 100, 50, 80, 70, 60, 50, 20, 10
- Doctor: 100, 50, 80, 70, 60, 50, 20, 10

Benefit of MCC in patients
- Patient: be sure to get the report: 40%, feel secure with the check by hospital: 60%, wait time can be shortened: 50%
- Doctor: unnecessary to visit with the card: 40%

The report was found to be very important for the patients and doctors. And therefore making a report is indispensable to the examination to the laboratory.

Value Statement:
Maintaining clinical laboratory science education locally through resident training programs.
Joining a diverse community of clinical laboratory educators.
Shaping excellence and improving clinical laboratory science education locally.
Working together to improve the quality of clinical laboratory science education.

As stated above we can make a relationship of total win by MCC. I think that medical technologists should be a person who understands well the patient’s sleep and we can be a good supporter in the team medical by the advantage of MCC.