Laboratory Information System

PK-01

Seasonal Variations of Clinical Data Reference Intervals

○Takuya KANNO, Takaaki KONDO, Chiaki KATO
Nagoya University Graduate School of Medicine
Pathophysiological Laboratory Sciences

1. INTRODUCTION

Time-series database construction based on the logic of latent reference intervals (LRIs) has been proposed. The purpose of this study is to apply the LRIs method to a large-sized laboratory database and determine the LRIs for their seasonal variations.

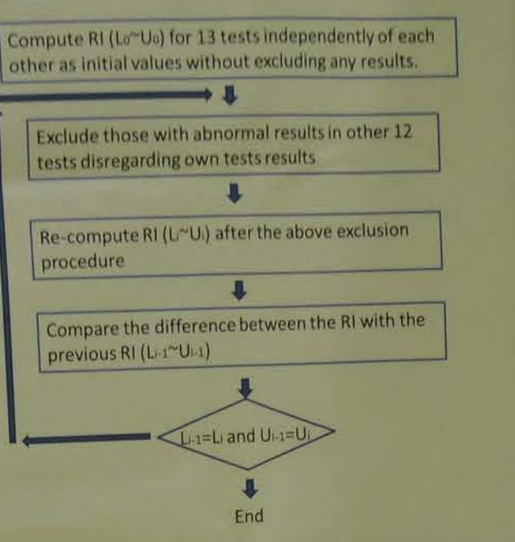
2. SUBJECTS and METHODS

We obtained the outpatient database at the Nagoya Universty Hospital. A total of 32,1964 ambulant cases aged 40-79 were measured for the following 13 items during Jan 2007-Dec 2011:

Total protein (TP), Albumin (ALB), Total Cholesterol (TC)
Fasting Blood Glucose (FBG), Blood Urea Nitrogen (BUN)
Creatinine (CRE), Uric acid (UA), Aspartate Aminotransferase (AST)
Alanine Aminotransferase (ALT), Lactase Dehydrogenase (LDH)
Alkaline Phosphatase (ALP), γ-Glutamyltransferase (γ-GTP)
Triacylglycerides (TG)

After determining all 13-item LRIs on a monthly basis, we calculated means for consecutive 60 months as the sample representative values to examine seasonal variations. The variation of consecutive values of each item mean was decomposed into three components, seasonal (*S[t]*), trend (*T[t]*), and irregular (*e[t]*) ones on the assumption of additivity.

For the statistical analysis of 12-month seasonality, autocorrelation coeffecients were calculated and tested. *R* (version 3.3.1) commands *stl()* and *acf()* were used for the decompostion and autocorrelation calculation.



Schematic View of LRIs Method

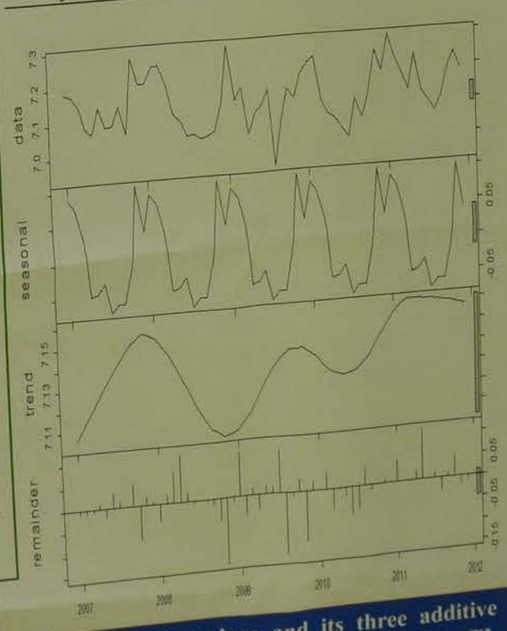
Reference intervals of total protein in men after each latent abnormal value exclusion (January, 2007)

Extraction step	Sample size	Mean	Min	Max	Range
Base	835	7.1	4.2	9.0	4.8
1	557	7.1	5.6	8.5	2.9
2	341	7.1	5.7	8.2	2.5
3	202	7.2	6.2	8.2	2.0
4	112	7.2	6.3	8.2	1.9
5	80	7.2	6.3	8.2	1.9

3. RESULTS and DISCUSSION

TP and FBG in male samples indicated significant autocorrelations, but did not in female samples. Significant autocorrelations were observed in TC in males and younger females. AST also showed high serum levels in winter and low in summer; this seasonal variation was consistently watched over all 4 gender/age subgroups. Furthermore, regarding liver function biomarkers, ALT in older males and ALP in younger males and older females also demonstrated similar results.

Our results are consistent with previous reports. The strong point of our study is the sophistication of sample construction with application of the LSI method. The underlying biological mechanism to generate such seasonal variation is yet to be investigated.



Total protein values and its three additive components obtained from a robust STL decomposition among 40-59 y/o male outpatients during January of 2007-December of 2011

Autocorrelation coefficients at lag of 12 months for time-series data of 13 test items by gender and age group ($*p < 0.05$)

Items	Male 40-59 y/o	Male 60-79 y/o	Female 40-59 y/o	Female 60-79 y/o
Total protein (TP)	0.32*	0.34*	0.097	0.14
Albumin (Alb)	0.13	0.062	-0.045	-0.11
Total cholesterol (TC)	0.41*	0.41*	0.28*	0.21
Fasting blood glucose (FBG)	0.30*	0.31*	-0.050	-0.020
Blood urea nitorogen (UN)	-0.020	0.033	0.18	0.052
Creatinine (Cre)	0.055	0.18	0.10	0.28
Uric acid (UA)	-0.13	0.16	-0.010	0.15
Aspartate aminotransferase (AST)	0.36*	0.40*	0.27*	0.48*
Alanine aminotransferase (ALT)	0.24	0.39*	0.21	0.27*
Lactase dehydorogenase (LDH)	-0.10	0.021	0.00020	0.13
Alkaline phosphatase (ALP)	0.31*	0.10	0.24	0.29*
γ-Glutamyltransferase (γ-GTP)	0.096	0.095	0.10	0.18
Triacylglyceride (TG)	-0.0067	0.023	-0.067	0.039

COI declaration
The presenter has no conflict of interest with any corporate organization relating to this presentation

Laboratory Information System

PK-03

Establishment of QMS Everolimus Assay on Abbott Architech c8000 Automatic Chemistry Analyzer

Yu-Hsuan Yang, Ya-Wen Tsai, Li-Ching Wu

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

Background

The Thermo Scientific QMS Everolimus is the newest addition to a full menu of immunosuppressant drug monitoring immunoassays. There are applications for a variety of clinical chemistry analyzers; however, studies on this assay adapted to the Abbott Architech c8000 chemistry analyzer have not been published. This study evaluated the analytical performance of Abbott Architech c8000 clinical chemistry analyzers for Everolimus.

Methods

The analysis was performed according to the QMS assay package insert.

Analytical performances (imprecision, linearity, limit of detection, and limit of quantification) of this new immunoassay were evaluated. The analyzers was compared with an HITACHI 7600 Analyzers and, which was recommend by the manufacture.


Fig 1

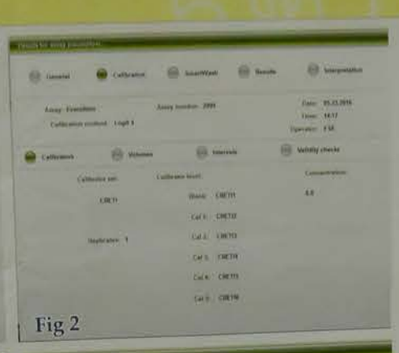


Fig 2

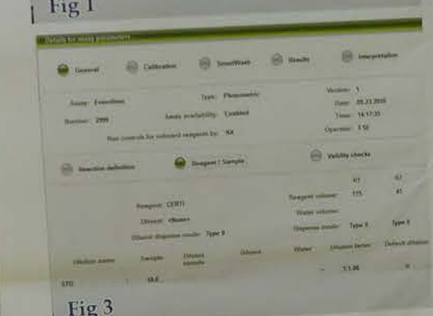


Fig 3

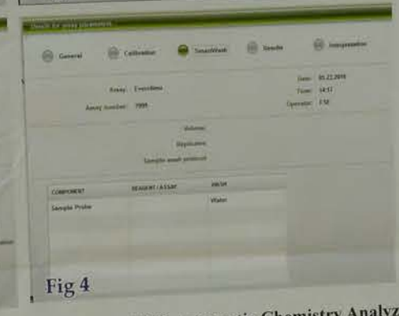
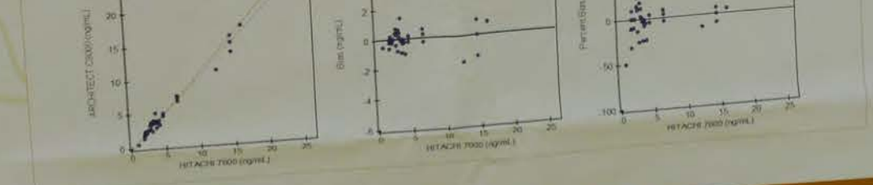


Fig 4

Fig(1-4): Parameters of Everolimus Assay on Abbott Architech c8000 Automatic Chemistry Analyzer

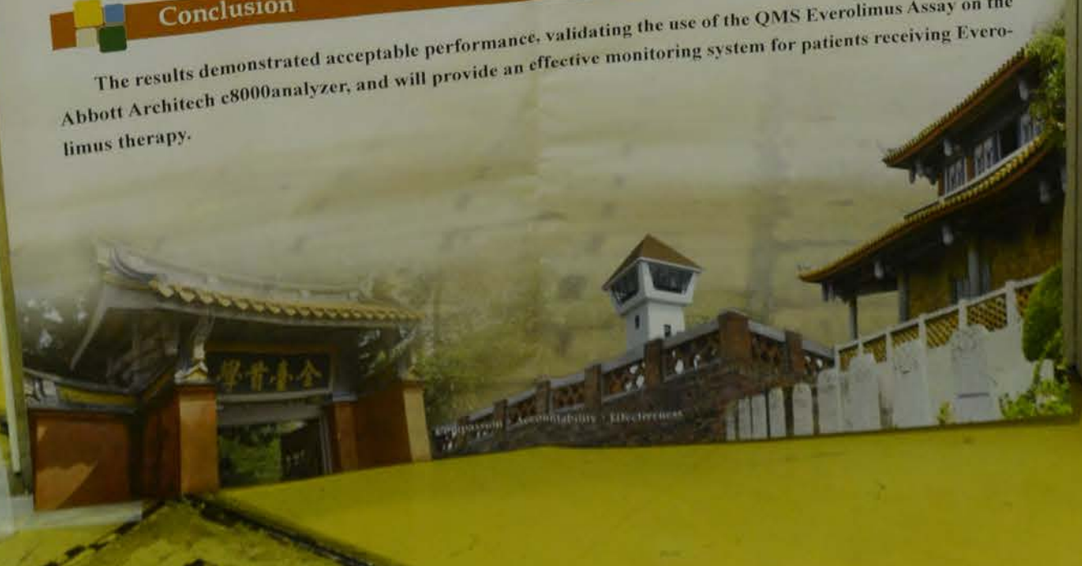
Results

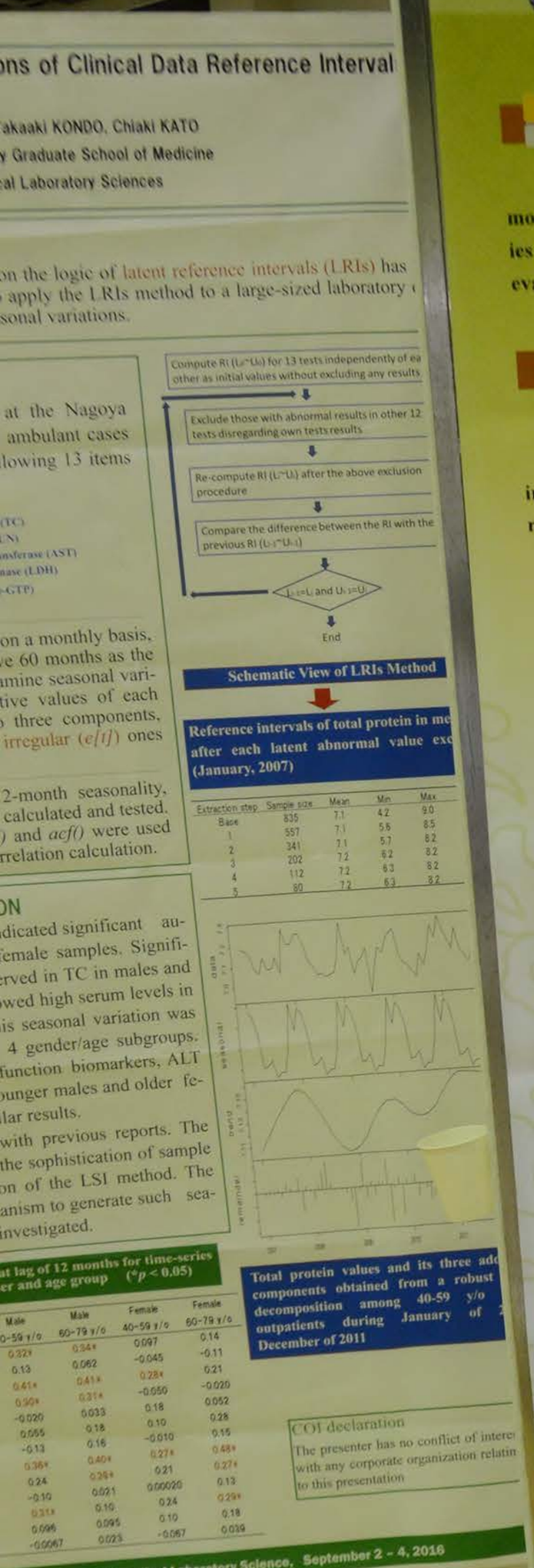
The assay was linear in the range of 0.0-20.0 ng/mL. Limit of detection was 1.5 ng/mL and lower limit of quantitation was 1.3 ng/mL. Within-day and between-day (20 days) coefficients of variation were between 3.1% and 8.76% at mean levels of 3.6, 8.0, and 15.2 ng/mL, respectively. We obtained a Deming regression of y =1.091x-0.452 (r = 0.9875) when comparing with the HITACHI 7600 Analyzers

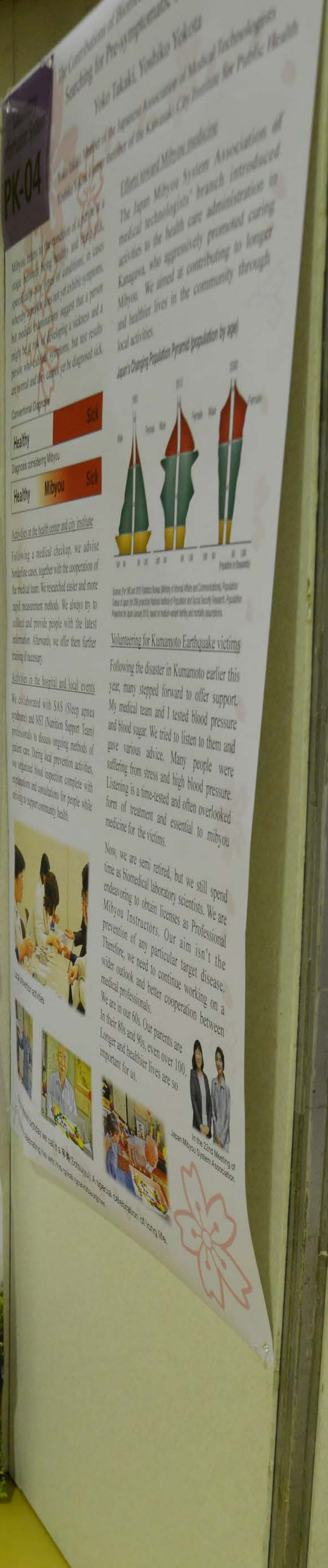


Conclusion

The results demonstrated acceptable performance, validating the use of the QMS Everolimus Assay on the Abbott Architech c8000analyzer, and will provide an effective monitoring system for patients receiving Everolimus therapy.







Laboratory Information System

PK-04

The Contributions of Biomedical Laboratory Scientists Searching for Pre-symptomatic Disease (Mibyou)

Yoko Takaki, Yoshiko Yokota

Yoko Takaki: Member of the Japanese Association of Medical Technologists
Yoshiko Yokota: Former member of the Kawasaki City Institute for Public Health

Mibyou refers to the condition of a person at a stage between being healthy and being sick, specifically two types of conditions; in cases whereby a person does not yet exhibit symptoms, but medical examinations suggest that a person might be at risk of developing a sickness and a person who exhibits symptoms, but test results are normal and they cannot yet be diagnosed sick.

Conventional Diagnosis

Diagnosis considering Mibyou

Activities in the health center and city institute

Following a medical checkup, we advise borderline cases, together with the cooperation of the medical team. We researched easier and more rapid measurement methods. We always try to collect and provide people with the latest information. Afterwards, we offer them further training if necessary.

Activities in the hospital and local events

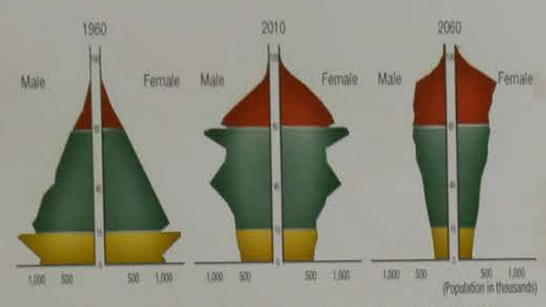
We collaborated with SAS (Sleep apnea syndrome) and NST (Nutrition Support Team) professionals to discuss ongoing methods of patient care. During local prevention activities, we organized blood inspection complete with explanations and consultations for people while striving to support community health.

Local prevention activities

Efforts toward Mibyou medicine

The Japan Mibyou System Association of medical technologists' branch introduced activities to the health care administration in Kanagawa, who aggressively promoted curing Mibyou. We aimed at contributing to longer and healthier lives in the community through local activities.

Japan's Changing Population Pyramid (population by age)



Sources: (For 1960 and 2010) Statistics Bureau (Ministry of Internal Affairs and Communications), *Population Census of Japan*; (for 2060 projection) National Institute of Population and Social Security Research, *Population Projections for Japan* (January 2012), based on medium-variant fertility and mortality assumptions.

Volunteering for Kumamoto Earthquake victims

Following the disaster in Kumamoto earlier this year, many stepped forward to offer support. My medical team and I tested blood pressure and blood sugar. We tried to listen to them and gave various advice. Many people were suffering from stress and high blood pressure. Listening is a time-tested and often overlooked form of treatment and essential to mibyou medicine for the victims.

Now, we are semi retired, but we still spend time as biomedical laboratory scientists. We are endeavoring to obtain licenses as Professional Mibyou Instructors. Our aim isn't the prevention of any particular target disease. Therefore, we need to continue working on a wider outlook and better cooperation between medical professionals.

We are in our 60s. Our parents are In their 80s and 90s, even over 100. Longer and healthier lives are so important for us.

In the 22nd Meeting of Japan Mibyou System Association

On our ninetieth birthday we call it a 卒寿(Sotsujyu): A special celebration of long life.
This man is celebrating his with his great granddaughter.

Current status and prospects for BLS to play expanded roles in endoscopic operations in Japan

Experience with medical teams and international medical support

A Baba, K Imaeda, N Tsunoda, A Iwashita, Y Hasegawa, *Yamashita Hospital, Ichinomiya, JAPAN*

Future prospects

The role of BLS in endoscopic treatment should expand because effort to increase their roles has been recommended in Japan. Therefore, further promotion of medical teams by the Japanese Association of Medical Technologists is important and adding endoscopic treatment to the curriculum for BLS trainees might also be useful.

Medical team at our hospital

Five BLS and 13 nurses comprise the regular endoscopic operations staff. Collaboration among individuals with different specialties has helped to improve our medical service.

Main roles in endoscopic treatment

(1) Assistance with endoscopic treatment
(2) Cleaning and sterilization endoscopes
(3) Reading capsule endoscopy findings
(4) Maintaining instruments

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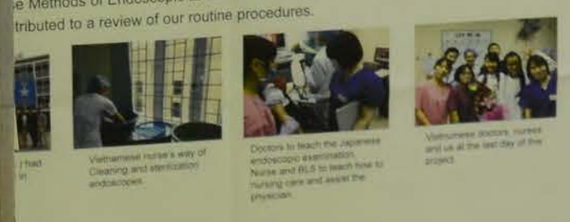

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Laboratory Information System

PK-05

The disaster medical care support in which we a medical technologist

Norihiko AMEMIYA[1)], Katsue Suzuki-INOUE

1) Department of Clinical Laboratory, University of Yamanashi Hospital
2) Department of Clinical Laboratory Medicine, Faculty of Medicine, University of Yamanashi Hospital

Background

"The Great Hanshin/Awaji Earthquake" occurred on January 17th in 1995. It lead many domestic medical institutions to concern about medical care at disaster sites. We took medical support action soon after the Yamanashi Prefecture requested us for disaster medical.

We took part in the training session for DMAT (Disaster Medical Assistance Team) on March 2012. Therefore, we have come to organize there DMATs.

In this session, we are going to share our experience of the training and the actual activities for 5 years after the huge earthquake.

Goals and Activities of DMAT

- The higher goal: the decreasing number of deaths above we could had saved at the disaster area
- The goals:
  - The consideration of primary care (initial treatment immediately in the sick and wounded as much as possible
  - The stabilization of the sick and wounded as much as possible prior to the medical treatment
  - (1) At the affected area: supporting hospital, taking action at the site and conveying
  - (2) At triaging Care Unit: SCU activity, works on means of transportation and conveyance

The role and attitude in logistics support

To secure means of communication and transportation, medical supplies and living necessities for the DMAT's activity
To make contact, coordinate and collect information
To conduct organized activity in mobility and keep self-consistency
To have the ability and equipment to survive
To have these attitudes below:
1: to have quick wits, smartness and consideration
2: to do whatever they need to do

Our activity and role for "The Great East Japan Earthquake"

<Between March 18th and May 13th in 2011>
We sent 19 medical aid units, 3 special composition units and a cumulative total of 124 persons to Minami Sanriku City in Miyagi Prefecture.

Doctor	11	Radiological technologist	1
Nurse	11	Physical therapist	1
Pharmacist	8	Cook	1
Medical technologist	2	Office worker	49

It had already been about a month since the earthquake hit when we took medical action for four days there. Therefore, the patients greeted subacute or chronic phases.

<The activities by Medical aid units>
The medical care of patients
The paperwork and Management of resources
The management of public health
The mental care for evacuee

CASE ①

The rescue operation at the Sasago Tunnel Collapse on December 2nd 2012

At 9:34 am, our DMAT members gathered at the main institution to be on standby. Requested by the Yamanashi Prefecture, the first and second party reorganized its units and immediately head to the collapsed site. On arrriving there, we made arrangement of rescue operation with the headquarters for disaster countermeasures.
However, the risk of high concentration gas and secondary explosion still remained. Then, we got the order to be back to our hospital temporally and to be ready for the night.
While waiting until 22.00 pm, we got the notice of dissolution. During the waiting period, we mainly entered data to the EMIS (Emergency Medical Information System).

Medical aid team and Medical Technologist

MTs were supposed to mainly provide clinics with the lab testing of blood glucose, prothrombin time and the other exams using POCT instruments and viral screening (flu and morovirus) by simple test kits, however, we seldom used them.

Many of the evacuee at gymnasiums as an evacuation area were elder people and scarcely went out of the buildings. Therefore, we learned the necessity of ultrasound equipment for POCT because we got concerned of Deep vein thrombosis; DVT.

From this experience, we expect that ultrasonography would be introduced as a medical relief activity in future, providing following-up medical examination for venous thrombosis.

CASE ②

The Mt. Ontake Eruption on September 28th and 29th 2014

At the midnight of September 27th, we got the order to send DMAT by the Yamanashi Prefecture in response to the occurrence of eruption. We arranged medical supplies, communication equipment and necessary goods, confirming with the headquarters for disaster countermeasures. In the early morning, our seven staffs arrived at Nagano Prefectural Kiso Hospital as a base and kept taking patients to the hospital, examining them and helping the head division.

Disaster Medical Assistance Team(DMAT)

DMAT is consisted of doctors, nurses and logistics (5 or 6 members per team) and is the team that has passed professional trainings. It enables us to have the mobility for taking action within about 48 hours after large scale disasters or mass casualty incidents happen.

<The birth of DMAT>
On January 17th 1995, "The Great Hanshin/Awaji Earthquake" occurred and was the worst natural disaster through the post-war. This incident made us recognize how late our initial medical system was taken. Later, it was reported that it would have been possible to save 500 more victims at that time if the same medical care had been provided as in usual circumstances. This huge earthquake made clear many problem to be solved of disaster medical.
Through this experience, they have recognized the importance of medical treatment by doctors at disaster sites with an administrative, a fire bridge, a police force and the Japan Self-Defense Forces.JSDF. That is why Ministry of Heath, Labor and Welfare launched DMAT on April 2005.

Activity contents by DMAT

In the two disaster relief action, there weren't any necessities for MTs to examine patients as a routine job. Our logistics mainly conducted a car, took patients, collected information and entered them to EMIS (Emergency Medical Information System). A secretary seemed to be more favorable for these tasks as coordinators, rather than any other medical service staffs, including MTs, pharmacists, radiologists and clinical engineers. At the workshops held by DMAT Executive Office every year, emergency response drills with Japan Self-Defense Forces, JSDF and triage trainings in the hospital, the occupation is the same as those above.
Although the present work contents will continue to remain, we expect MTs to take action as a member of medical providers.

Conclusion

DMAT logistics mainly do paperwork so far. However, MT would assume an important role in medical care from now on for subacute and chronic phases with ultrasonography, infection screening and POCT equipment management.
For that, it is getting more necessary for medical service workers to get actively involved to skill proficiency training, workshops for medical care providers held by administrative divisions of Japan, integrated emergency response drills and triage trainings in the hospital in order to be prepared for an unexpected disaster.
In addition, it was so effective to share information about disaster supports by other medical associations in the disaster medical training by JIMTEF(Japan International Medical Technology Foundation) in which 21 groups related to medical industry participated, that Japanese Association of Medical Technologists found out the necessity of collaboration with each medical groups.

Laboratory Information System

PK-06

Current status and prospects to play expanded roles in endoscopic operations
Experience with medical teams and international medical support

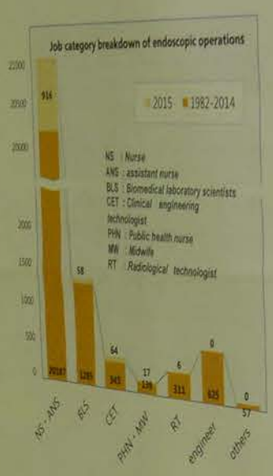
A Baba, K Imanaka, N Tsunoda, A Iwahashi, Y Hasegawa, Yamanashi Hospital, Yamanashi, JAPAN

Background

The main role of biomedical laboratory scientists (BLS) outside Japan is laboratory testing, whereas many BLS in Japan participate in physiological examinations. Five regular BLS are involved in endoscopic treatment at our hospital and two have qualifications in endoscopic procedures. However, few BLS are on the regular endoscopy staff at other Japanese institutions and nurses comprise the main staff.

Job category breakdown

Among 24,010 individuals who had become licensed endoscopic operators by 2015 in Japan, 21,103 were nurses and 1,343 were BLS.



Future prospects

The role of BLS in endoscopic treatment should expand because effort to increase their roles has been recommended in Japan. Therefore, further promotion of medical teams by the Japanese Association of Medical Technologists is important and adding endoscopic treatment to the curriculum for BLS trainees might also be useful.

Medical team at our hospital

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Main roles in endoscopic treatment

(1) Assistance with endoscopic treatment
(2) Cleaning and sterilization endoscopes
(3) Reading capsule endoscopy findings
(4) Maintaining instruments


(1) Assistance with ERCP


(2) Cleaning endoscopes


(3) capsule endoscopy


(4) Maintaining endoscopes

International medical support

We participated in an international medical support project in Vietnam in 2014.
(Training in Japanese Methods of Endoscopic Examination, Nagoya University, Professor Goto)
This experience contributed to a review of our routine procedures.


Doctor, nurse and a BLS I had supported at the hospital in Vietnam


Vietnamese nurse's way of Cleaning and sterilization endoscopes


Doctors to teach the Japanese endoscopic examination.
Nurse and BLS to teach how to nursing care and assist the physician


Vietnamese doctors, nurses and us at the last day of this project

Information activity

Few lectures in endoscopic treatment and practical training are available at BLS training s
We have provided lectures for BLS trainees that have increased the number of BLS who
become part of a staff that performs endoscopic operations.

Current problems

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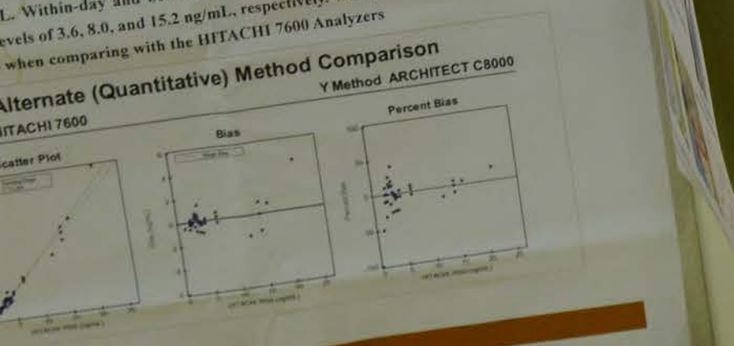

Laboratory Information System

PK-06

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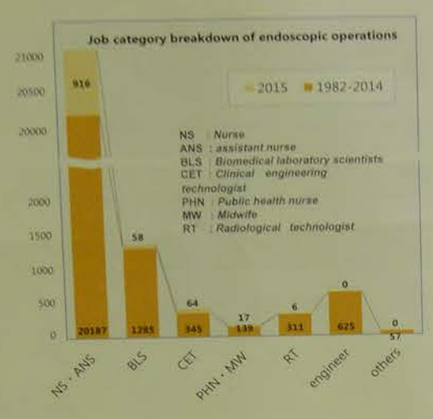

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Information activity

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Current problems

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B-2 B-2

Laboratory Information System

PK-07

Commercial Collaboration between Oita-Oka Hospital and Local Clinics

Facilitating Requests for Outpatient Services from Local Clinics

Yuka Yoshimoto[1], Yutaka Matsugami[2], Takahiro Kuroeda[2], Yoshiko Ito[1], Shinobu Goto[1], Yaeko Okada[2], Yoichi Tatsukawa[2]
[1]Department of Clinical Laboratory, Oita-Oka Hospital, [2]Department of Hospital Collaboration

Introduction

Oita-Oka Hospital
- Hospital beds : 224
- Diagnostic and treatment departments : 23
- Community health care support
- Secondary emergency hospital
- 7 : 1 nursing standard
- Collaborating facilities: 208
  - →medical facilities : 158
  - →care facilities : 50
- Strong departments : emergency, cardiovascular and plastic surgery

It has been over ten years since Oita-Oka Hospital started collaborating with private clinics. The program began in response to a general demand for access to diagnostic aids and medical imaging equipment from smaller hospitals and clinics in the area. In order to effectively meet the needs of these establishments, our program was designed based on responses to an open-ended survey.

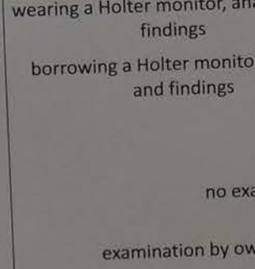
Methods

Surveys were administered to doctors in neighboring hospitals and clinics by the Oita-Oka Hospital Collaboration Committee. Replies from 35 facilities were collected and analyzed. A list of the most in-demand outpatient services was compiled based on that analysis. Medical laboratory technologists then visited hospitals and clinics with the Collaboration Committee directly to explain the list of services being offered and to answer any questions.

Results

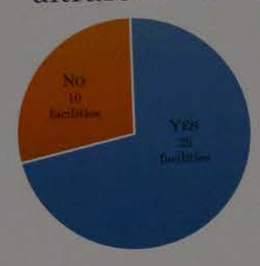
Survey result

1. Would you be interested in requesting blood tests on nights and holidays if available?



Comments;
- I want to request them on Saturday and Sunday.
- I want flow charts or a procedure manual.
- coagulation tests
- case-by-case

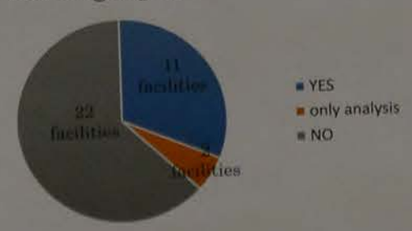
2. Would you be interested in requesting variety of ultrasound tests if available



Comments;
- as the occasion arises
- heart, deep vein, artery and shunt
- depends on the hospital department recommendation
- I want a procedural manual

3-1. Would you tell me about the outsourcing of Holter examinations if applicable.

- 3-2. Would you request or consider using Holter electrocardiography?

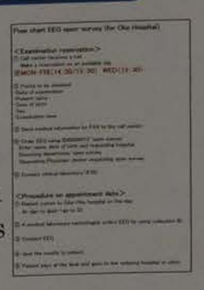


Meet the needs of doctors

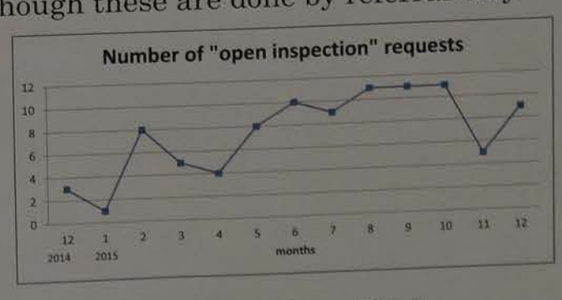
1. laboratory tests
- This began with doctors or medical staff delivering blood samples directly to Oita-Oka Hospital.
- Doctors using Oita-Oka Hospital's services for the first time were asked which tests they ordered most frequently. A list was made of their responses.

Requests were received from 3 facilities from May to December in 2015.

2. Physiological tests
- These have become 'open inspection' which means the results are given by the ordering doctor.
- Materials explaining how to order such tests were then distributed to hospitals and clinics.



- EEG , PFT , and NCV tests are also occasionally administered at the request of outside physicians.
- The number of PSG exams has also increased, although these are done by referral only.



- However, only the number of Holter examinations did not increase!!

Future measures
- Send reports via the internet
- Establish analyzing center and report quickly

Conclusion

The number of requests from local hospitals and clinics has not been very numerous. Being able to meet the needs of doctors and patients and request tests on nights and holidays build trust and confidence in the local community. If this leads to more patient referrals, medical laboratory technologists will be better able to play an active part in supporting community health care.

◆Hospital and clinics which requested our services.

Laboratory Information System

PK-08

Use it for Infection Control

Naoki INOUE, Akira YOKOKAWA, Kazuya SHIRAISHI, Koichi SHIMIZU, Hana HIYAMIZU

KAWAGUCHI KOGYO GENERAL HOSPITAL

Have you ever thought about if the tourniquets are good hygiene? Absolutely, it depends on the way you use it. In my work place, I have usually used it for every patient without any cleaning. So then, my answer was “always!!”. I have wanted to make that practice better. At first, I looked for the reports about how hygienic the tourniquets are. Then, World Health Organization (WHO) says that “tourniquets are a potential source of methicillin-resistant Staphylococcus aureus (MRSA), with up to 25% of tourniquets contaminated through lack of hand hygiene on the part of the phlebotomist or reuse of contaminated tourniquets.*1” Also, Centers for Disease Control and Prevention (CDC) says “MRSA is a bacteria that is resistant to many antibiotics. In the community, most MRSA infections are skin infections. In medical facilities, MRSA causes life-threatening bloodstream infections, pneumonia and surgical site infections.*2" After I read those articles, I started to think about it seriously and to make my plan concrete.

Next, what I should do is to prevent cross infections by using the tourniquets carefully. Moreover, I was often faced with patients who come back with bleeding due to insufficient hemostasis. I have seen it as a problem for safety and as a risk of infections.

So then, I investigated how contaminated the tourniquets are, culturing the bacteria. There were 10 Cultured samples, which I used a tourniquet for every patient without any cleaning for 2 hours, and wiped it by swab. I sent it to culture.

Next, I switch the reusable tourniquets for a single-use type for each patient. And I reuse it to stop patients bleeding with the tourniquet. I counted the patients who came back with bleeding, and compared those patients with a tourniquet to those without one for 5 days.

table.1

sample	corony	bacteria		
A	$4.0*10^3$	S.epidermidis	M.luteus	Micrococcrs sp.
B	$1.3*10^3$	S.hominis	Pseudomonas sp.	
C	$1.1*10^3$	M.luteus	gram negative bacilli *	
D	$6.4*10^2$	S.epidermidis	M.luteus	B.subtilis
E	$5.1*10^2$	S.hominis	M.luteus	Micrococcrs sp.
F	$2.9*10^3$	Micrococcus sp.	F. oryzihabitans	
G	$5.9*10^2$	S.capitis		
H	$1.7*10^3$	S.hominis	Pseudomonas sp.	P.agglomerans
I	$2.2*10^2$	S.warneri	B.subtilis	
J	$1.4*10^2$	gram negative bacilli *		

* not identified

Table.2

band-free					
day	1	2	3	4	5
sample	120	109	86	122	84
bleeding	1	4	1	0	1
with hemostasis-band					
day	1	2	3	4	5
sample	107	89	65	79	71
bleeding	0	0	0	0	1

From Table.1
Bacterial contamination, including skin indigenous bacteria, were found in all of 10 tourniquets. MRSA was not found in any sample.

FromTable.2
The number of patients with bleeding who use a band for stop bleeding was just 1 in over 400. Although, the number of patients with bleeding who stop bleeding by themselves were approximately 1 in 74. Moreover, one in over 400 seem that it happened because of insufficient band tension by phlebotomist. Since then, there are no patients with bleeding, and probability of it keeps going down.

Although there are no MRSA, it does not prove enough hygiene, but indicates tourniquets are poor hygiene, which should not be ignored. To use the single-use type is one of the solutions for preventing the cross infections.
Decreasing the ratio of bleeding means decreasing the infection source. I succeeded to decrease the ratio of bleeding. So then, single-use type contributes to decreasing the risk factor.
I felt that the potential of the single-use type is higher than expected. Now then, I have used it for infection control.

*1. best practice in phlebotomy 2.1.4, WHO
*2. MRSA infections, CDC

Special thanks language supervisor Rebekah

Laboratory Information System

PK-09

New trial for the purpose of the fertility preservation in Nagoya University Hospital.

○Harumi Kobayashi[1], Naomi Furusawa[1], Ryosuke Kikuchi[1], Hiroyuki Matumoto[1], Tadashi Matushita[2]

[1] Department of Medical Technique, Nagoya University Hospital
[2] Department of Clinical Laboratory, Nagoya University Hospital

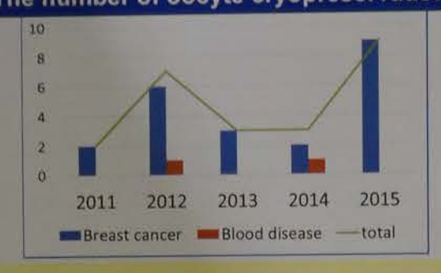
Background

- The treatment with anticancer drugs against a childbearing age women becomes the decrease of the ovarian function and the reduce of pregnancy rate.
- Here, we showed that the transition of the oocyte cryopreservation and the ovarian tissue cryopreservation at Nagoya University Hospital.

Transition of the oocyte cryopreservation from 2011 to 2015

- The oocyte cryopreservation of 24 cases has been carried out during these periods.
- Breast cancer was main as a primary disease.
- The average age at egg collection is 35.4 ± 4.2 years old and the unmarried rate is 78.9%.
- A death after oocyte cryopreservation was the two patients.

The number of oocyte cryopreservation.



Marriage rate.

Ovarian tissue cryopreservation

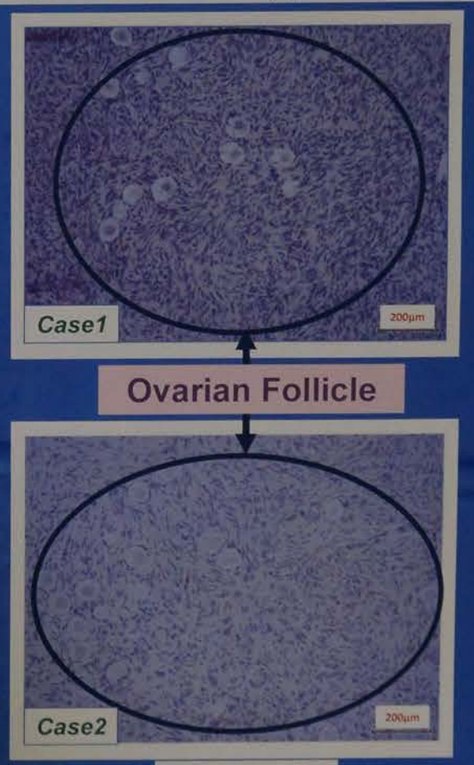
Case 1

- **Patient**: The 23 years old woman.
- **Main complaint**: Mediastinal shadow.
- **Primary disease** : Thymoma.
- **Background**: For fertility preservation, she came our hospital to consultation before she recieve postoperative chemotherapy on July 2014. An obstetrician suggested an oocyte cryopreservation and an ovarian tissue cryopreservation.
  She decided ovarian tissue cryopreservation.

Case 2

- **Patient**: The 13 years old woman.
- **Main complaint**: Headache and abnormal visual field.
- **Primary disease** : Germ cell tumor.
- **Background**: Endoscopic pituitary tumor resection had performed at March 2016. Ovarian function decline had been predicted by the post-operative treatment. Pediatrician suggested about an ovarian tissue cryopreservation to patients and their families.
  Patient and the parents wanted ovarian tissue cryopreservation.

◆ We resected the appendages under a laparoscope and cut cortex of the left or right ovarian tissue to 1cm × 1cm. We stored slices of flaps to liquid nitrogen in vitrification method.



(HE staining, x20)

◆ We performed histopathological examination, and were able to confirm a lot of ovarian follicles.

Discussion

- The transition of the oocyte cryopreservation for patients with cancer is an increase tendency year by year at our hospital, which for social background in Japan.
- The ovarian tissue cryopreservation is effective method for the patients with the time limitation.
- However, because of the small number of cases, we perform a detailed analysis in the future, will continue to report each time.

Laboratory Information System

PK-10

Short Time Smoking Cessation Support by Clinical Technologist

Efficacy of semi-structured interviews for inpatients with CKD under educational hospitalization and outpatients

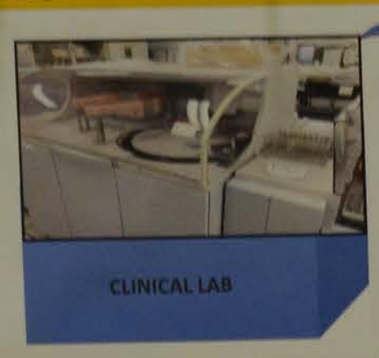
Takashi Yamamoto

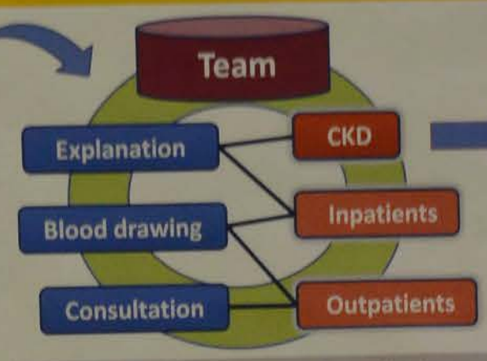
Hitachi, Ltd., Hitachi General hospital
Department of Clinical Technology

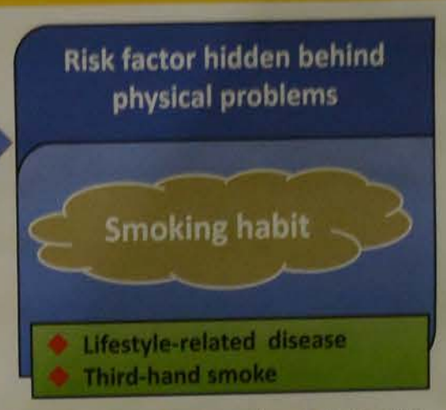
Yoshibumi Akatsu[1] Nobuko kikuchi[1] Ryo Morikawa MD[4]
Takeshi Nawa MD,PhD[3] Atsushi Ueda MD,PhD[2]

Department of Clinical Technology1) Department of Nephrology2)
Respiratory Medicine3) Metabolism internal medicine4)

Background







Former duty: laboratory test

Now: patient-centered team medical care

At a request of the department of nephrology, we are put in charge of clinical explanation for patients of the educational hospitalization by chronic kidney disease (CKD). The increasing opportunities to see various types of patients told us how serious physical problems coming from a lifestyle-related disease are. The evasion of smoking is particularly important to reduce health risks.

Objective

To confirm an effect of the smoking cessation support that a clinical technologist can perform in a short time.

Methods

Target persons: **234** patients who smoke. The patients were grouped into five stages according to Transtheoretical Model claimed by Prochaska.

Approach: **Semi-structured interviews** using **Motivational interviewing**(MI), **5A** (Ask, Advise, Assess, Assist, Arrange) and **5R** (Relevance, Risks, Rewards, Roadblocks, Repetition).

We repeatedly talked to them about smoking cessation during explanation on clinical examination. Smoking cessation support was carried out in less than one minute during blood drawing too.

Period of data collection: From March, 2015 to February, 2016

Statistical evaluation: chi-square test

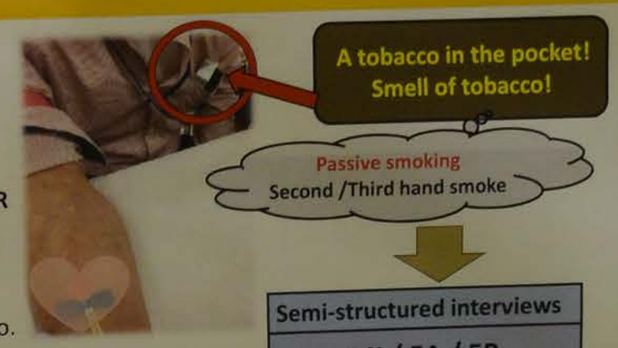


Figure1 Flow of smoking cessation support

Results

Table1 Participants' distribution among five stages according to Transtheoretical Model.

(N=230)

stages	number	%
Precontemplation	105	(45.7%)
Contemplation	81	(35.2%)
Preparation	14	(6.1%)
Action	4	(1.7%)
Maintenance	26	(11.3%)

➡ More than 80% of the participants are not ready to stop smoking.

Table2 Difference of the results by the number of opportunities.

	opportunity	
	once(first time)	multiple
Succeeded	0	6*
Failed	212	16
total	212	22

(*:P <0.001)

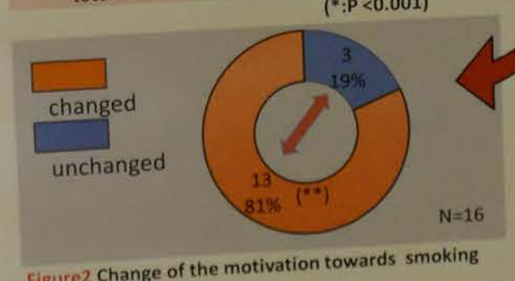


Figure2 Change of the motivation towards smoking cessation.

Table3 Breakdown of the target persons

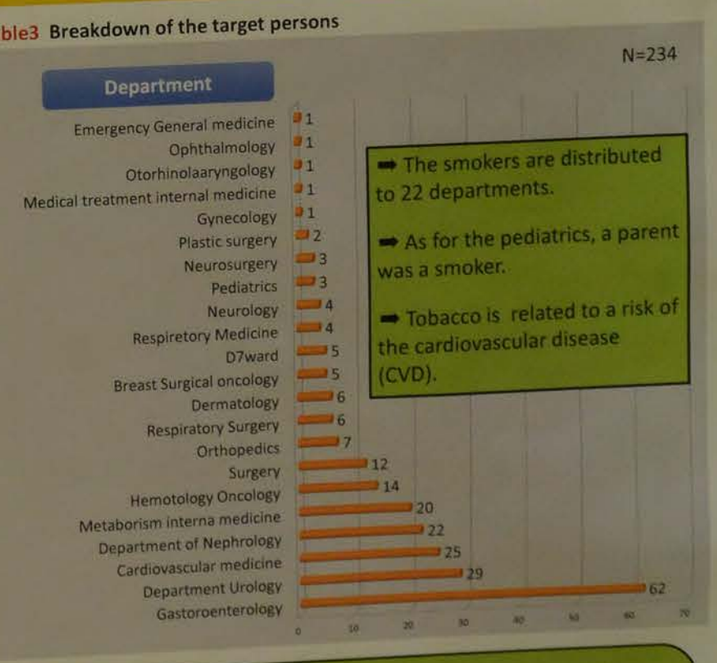


Table2:
Continuous smoking cessation support led to successful smoking cessation i.e. to Maintenance stage. 6 led to smoking cessation (*:p<0.001).

Figure2:
Motivation changed positively even among those who failed to stop smoking (**:P < 0.001).

Conclusion

- Even short time supports by clinical technologist work effectively and contribute to both patients' and their families' QOL.
- Clinical technologists can support patients and their families to improve their lifestyle.
- This finding leads us to improve quality and trust of clinical technologists.

Future work

We aim to...
1) develop smoking cessation counseling ability.
2) protect patients and families, children and medical staffs from passive smoking.

E-mail: takashi.yamamoto.bt@hitachi.com

HITACHI
Inspire the Next

Use it for Infection Control

Naoki INOUE, Akira YOKOKAWA,
Kazuya SHIRAISHI, Koichi SHIMIZU,
Hana HIYAMIZU

KAWAGUCHI KOGYO GENERAL HOSPITAL

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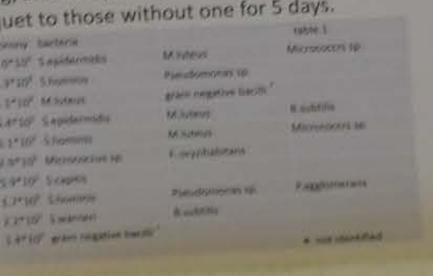

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*1. best practice in phlebotomy 2.1.4, WHO
*2. MRSA infections, CDC
Special thanks language supervisor Rebekah

Laboratory Information System

PK-11

TRIPS technology using RFID tags in the phlebotomy room of Kobe University hospital

Takumi Jikimoto, Yasuyuki Sakota, Yuri Ohta,
Yuji Nakamachi, Nobuhide Hayashi, Shimpei Kasagi, Jun Saegusa

Kobe University Hospital, Department of clinical laboratory , Japan

【Abstract】

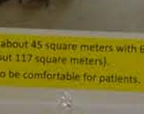
Radio Frequency Identification (RFID) tags are widely used in our daily life. Recently, Techno Medica corporation has developed RFID patient & specimen identification system, so called TRIPS*.

TRIPS* technology is safe, convenient, fast reading, and reduces misidentification. We installed TRIPS in our phlebotomy room in 2014. Here we will show what TRIPS brings us in our phlebotomy room.

* TRIPS:Techno Medica RFID Process Control System

【Hospital Brief Overview】 (2014)

- The number of BEDs: 934
  (General ward: 888 Psychopathic ward: 46)
- The number of departments: 37
- The number of patients
  Average number of outpatients: 2021/day (497,226/year)
  Average number of inpatients: 840/day
- The number of outpatient blood collection
  Average: 461/day (121,624/year)



【RFID Label】

The surface of RFID label is colored with pink to be identified against normal label. Barcode reading is not affected by pink color.

RFID is utilized for specimen management to read the data written in IC chip with magnetic wave.

【RFID Features】

1. Contactless and data-rewritable
2. Simultaneous processing
3. Identification with concealment
4. Wider read range

【RFID vs. Barcodes】

	RFID	BCD
Cost of the TAG	high	low
Print machine of the TAG	Exclusive	Generic
Reader machine of the TAG	Exclusive	Generic
Capacity of the TAG	<64Kbyte	<Several decades byte
Enabled device of the TAG	Many	Few
Endurance of the TAG	High	Low
Rewriting the dates of the TAG	Yes	No

【Instrument】

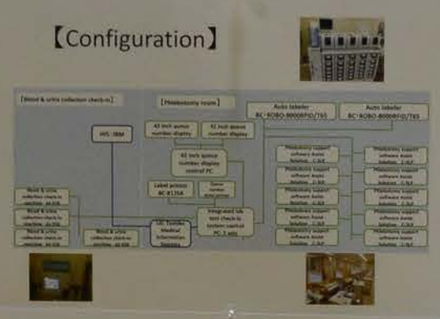
2 units of BC・ROBO8000RFID to automate selection and labeling of patients' test tube.

TRIPS consists of 2 clients, 1 server, 10 RFID tags reading phlebotomy table.

4 units of automated phlebotomy reception (AI-350) for an automated registration.

1 unit of StatVein that visualizes the vein and helps blood collection.

【Configuration】



【BC・ROBO-8000RFID Features】

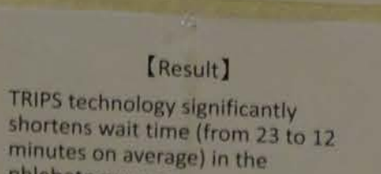
- Throughput: 12sec/patient (4 tubes)
- Under batch processing: 300patients/hour

- 30 types of tubes loadable
- Number of tubes loadable in drawer
  100 (Standard drawer)
  50 (Small drawer)

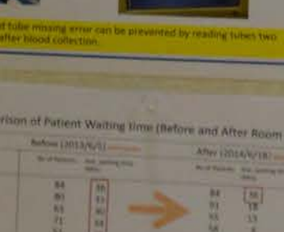
【Workflow】

1. 10 phebotomists draw blood from 461 outpatients per day on average in the phlebotomy room. Work flow of the outpatient phlebotomy is as below.
2. After registered with the automated phlebotomy reception, patients receive a queue ticket and/or a urine cup. Patients collect their urine and submit them to the urinalysis lab.
3. Patient identification is performed based on a queue ticket at the phlebotomy table. For those who is hard to hit veins, we sometimes use StatVein. We also take pictures of successful venipuncture point and save the image (record) into a data base. These methods will enable us to venipuncture next time easier.
4. Specimen identification is performed by TRIPS after phlebotomy.

【Blood & urine collection check-in machine】

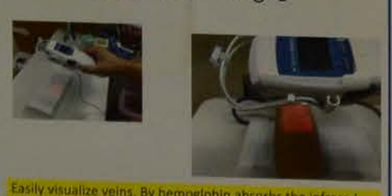


【Phlebotomy Room Waiting area】



Patient waiting area is about 45 square meters with 65 waiting seats out of whole phlebotomy room (about 117 square meters).
The room is designed to be comfortable for patients.

【STAT VEIN Usage】



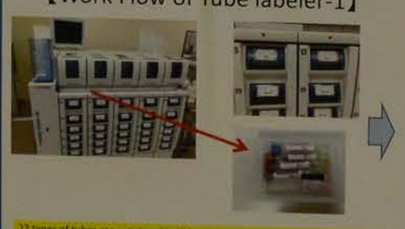
Easily visualize veins. By hemoglobin absorbs the infrared, to visualize the position of the exact subcutaneous vein.

【 STAT VEIN Usage photos 】

【STAT VEIN Data Base Usage】

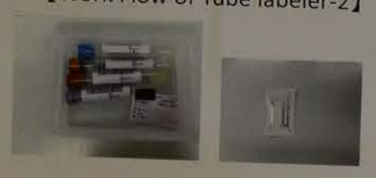
System archives photos of illuminated veins.

【Work Flow of Tube labeler-1】



23 types of tubes are registered in Kobe University Hospital. Maximum 10 tubes can be dropped on 1 rack (tray).

【Work Flow of Tube labeler-2】

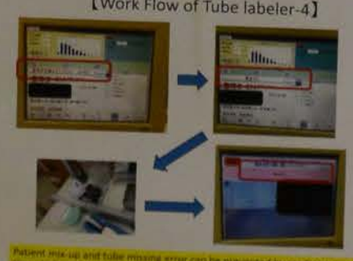


IC chip is stuck in label. RFID technology realizes simultaneous reading, which makes patient identification easier.

【Work Flow of Tube labeler-3】

Tube type and number of dispensed tubes can be checked simultaneously by putting a tray on IC chip scanner.

【Work Flow of Tube labeler-4】



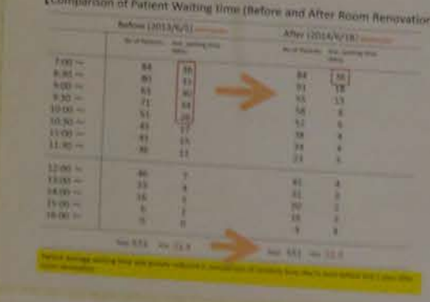
Patient mix-up and tube missing error can be prevented by reading tubes two times before and after blood collection.

【Result】

TRIPS technology significantly shortens wait time (from 23 to 12 minutes on average) in the phlebotomy room.

TRIPS also helps us to response promptly for the inpatient specimen tracking request and reduces opportunity to lose specimen tubes.

【Comparison of Patient Waiting Time (Before and After Room Renovation)】



【Improvement】

1. Simplifies patient identification and eliminates errors specimen are wasted by mistake.
2. STAT VEIN enables to collect blood from difficult-to-draw patients.
3. Average outpatient waiting time was reduced to 10 minutes, which results in no patient claim about waiting time.
4. Archives useful information of individual patient for blood collection.

【Discussion】

Shortening wait time in the phlebotomy room is one of the highest priority tasks in our laboratory.

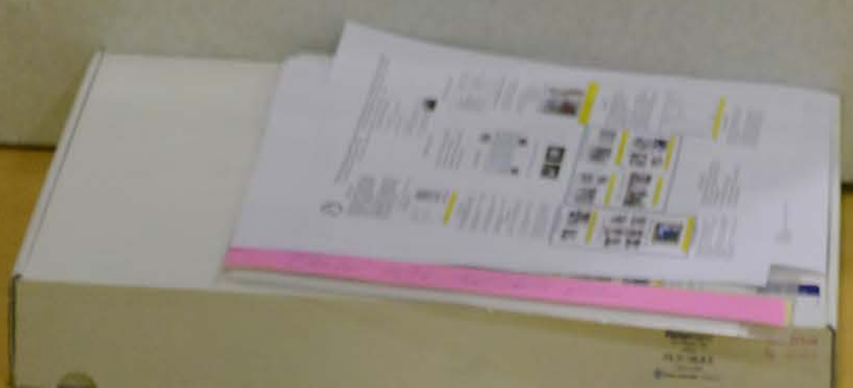
By utilizing TRIPS technology,

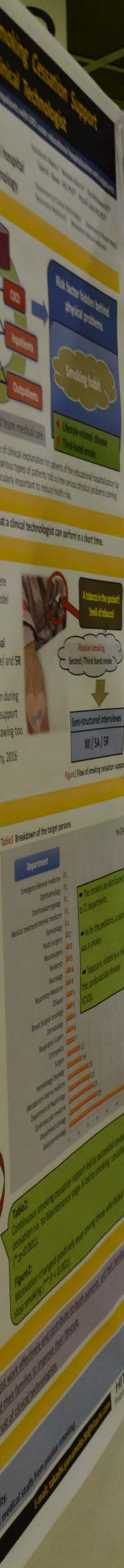
we believe that TRIPS can improve the patients' satisfaction.

【Conclusion】

Patients requested to reduce waiting time, which was the issue to be improved in department of clinical laboratory.

It was proven renovation of department of clinical laboratory reduced patient waiting time and streamlined clinical laboratory test registration, which made contribution to hospital diagnosis.





Determination of Low HCV Vire
RealTime HCV Ultrasensitive P
Acting Antiviral Agents Therap

Fabbio Marcuccilli [1], Marco Ciotti [1], Tania Guenci [1], S
Valentina Serafini [1], Carlo Federico Perno [1, 2]
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d Direct Acting Antiviral Agents (DAAs) have been developed to clear chronic HCV infection. Highly sensit
monitor patients on antiviral therapy.
tudy is to assess whether patients with detectable but not quantifiable viremia have more frequently a return
e viral load.
ve used an ultrasensitive (US) protocol by introducing a modification of the Abbott RealTime HCV assay: larger
ify HCV RNA below the validated LOD (Limit of detection) of 12 IU/ml of the standard assay. RNA extraction was
antification with the Abbott *m*2000rt. To evaluate the analytical performances of the US protocol a clinical sa
e-determined by the Abbott RealTime HCV assay was diluted with Basematrix to the target concentrations of S
ly. To evaluate intra-run variation and the LOD, ten replicates of each dilution were tested in 1 run and to ev
e analyzed in 4 runs.

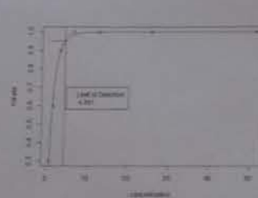
ATION and LOD
4 spanned from 13,6% to 43,3% based on the quantified

25,2	12,3	6,8	3,6	2,0	1,7	
3,6	3,0	2,4	1,5	0,7	0,6	
14,5%	24,2%	34,9%	43,3%	36,0%	36,5%	

ocol showed high detection rate in the range from 51,4
l: 82,8% (58/70).

Target Concentration IU/ml	51,4	25,7	12,8	6,4	3,2	1,6	0,8
Replicates							
1	80,0	29,0	19,0	4,2	3,9	2,1	1,9
2	47,0	23,0	14,0	8,4	2,5	TND	TND
3	48,0	20,0	13,0	5,9	4,3	TND	TND
4	68,0	20,0	10,9	4,3	1,9	TND	TND
5	62,0	29,0	13,0	7,0	1,9	TND	TND
6	54,0	29,0	8,5	10,9	TND	3,7	TND
7	58,0	27,0	9,0	3,2	5,3	1,8	TND
8	46,0	27,0	9,8	8,4	3,0	2,1	2,3
9	51,0	28,0	17,0	10,1	3,1	1,0	TND
10	46,0	22,0	13,0	4,0	6,4	3,7	1,0

TND: target not detected



The LO
analysis
Guidel
IU/ml o

Total variation across multiple runs
The CV % across 4 runs per target concentration wil
respectively, spanned from 18,9 % to 82,3% based o

Mean IU/ml	96,1	45,1	22,8	5,1
SD	18,1	9,2	5,2	2,5
CV	18,9%	20,5%	22,8%	48,5%

he US protocol of the Abbott RealTime HCV showed high precision, adequate LOD and it thus appropria
treatment HCV RNA concentrations for DAA therapies.

A-2 A-2

Laboratory Information System

PK-12

Evaluation of Delta Check Method by using Reference Change Value based on Uncertainty

Hironori Sasaki, Yoshimi Imai, Satomi Muroya, Toru Takahashi

Yamaguchi Grand Medical Center

INTRODUCTION

The delta check method is the most important quality control procedure that compares the two test results and detects whether the difference or ratio between test results exceeds pre-defined checking criteria. The same value, 20 %, in all analytes was previously set as the checking criteria in our laboratory. As the checking criteria did not consider biological variation and analytical variation, we could not evaluate changes in the test results objectively. Therefore, we needed to set checking criteria which had more than enough evidence to assess changes in the test results carefully.

AIM

In this study, to evaluate RCV as the new checking criteria in our laboratory, we performed the followings:

① calculations of RCV

② evaluations of the delta check using RCV

Reference Change Value : RCV

$$RCV = Z \times 2^{1/2} \times [(CV_I)^2 + (CV_A)^2]^{1/2}$$

- Difference between two consecutive test results that may indicate a change in the patient health state
- RCV depends on probability[Z], within-individual biological[CV_I] and analytical[CV_A] variation when pre-analytical variation is minimized.
- RCV can be one of judgements to assess variable factors of test results (biological variation, analytical value, etc) objectively.

(Fraser CG, Biological Variation: From Principles to Practice, 2001)

METHODS①

・Calculation of RCV

The RCV values of 26 clinical chemistry test items were calculated according to the following formula:

$$RCV = Z \times 2^{1/2} \times [(CV_I)^2 + (CV_A)^2]^{1/2}$$

Z score: Z

probability 99% = 2.58

Within-individual biological variation: CV_I(%)

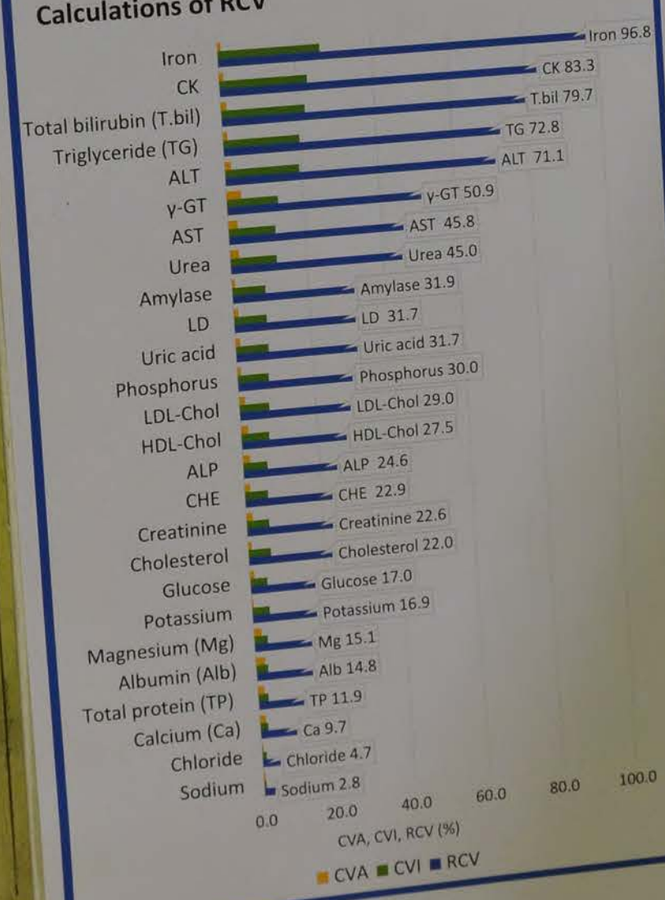
within-individual biological variation in healthy people quoted from Westgard's database

Analytical variation: CV_A (%)

relative measurement uncertainty estimated by data obtained from internal quality controls (excluding Total bilirubin)

RESULTS①

Calculations of RCV



METHODS②

・MATERIALS

We collected a total of 53,651 test results for 26 clinical chemistry test items from inpatients and outpatients, and selected out the test results required by each experiment description.

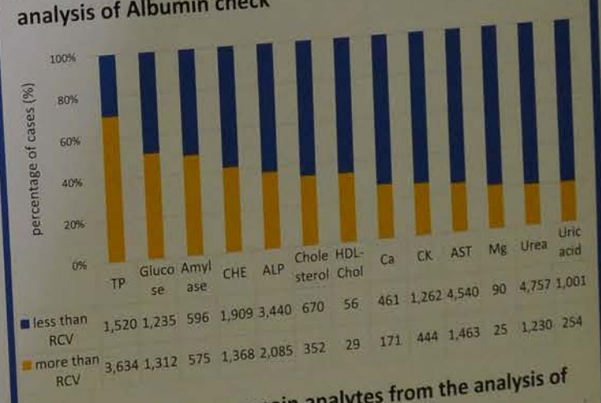
・The RCV values shown in RESULTS① were set as checking criteria for the delta check method in our laboratory information management system.

In this study, in order to evaluate both the relation between analytes and simultaneously checking components through the delta check method, we examined the followings with patients whose Albumin was checked through the delta check method:

1. variations of other analytes
2. correlations between main analytes
   (TP and Alb, AST and ALT, Urea and Creatinine, and Sodium and Chloride)

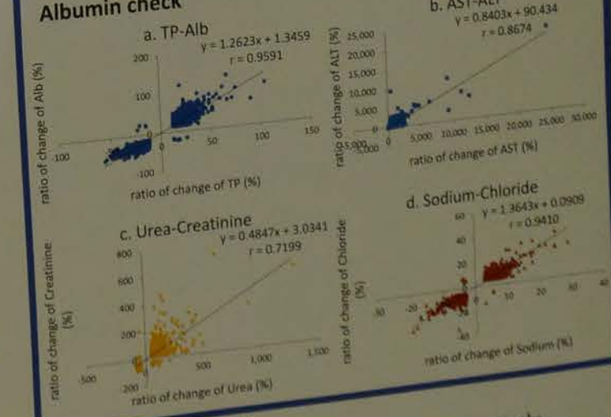
RESULTS②

Percentage of cases in greater than RCV99% value from the analysis of Albumin check



	TP	Glucose	Amylase	CHE	ALP	Cholesterol	HDL-Chol	Ca	CK	AST	Mg	Urea	Uric acid
less than RCV	1,520	1,235	596	1,909	3,440	670	56	461	1,262	4,540	90	4,757	1,001
more than RCV	3,634	1,312	575	1,368	2,085	352	29	171	444	1,463	25	1,230	254

Correlations between main analytes from the analysis of Albumin check



DISCUSSION

- RCV 99 % values were from 2.8 to 96.8 %.

⇒RCV mainly reflected within-individual biological variation. Compared to before, using RCV enabled us to objectively evaluate changes in test results.

- For patients whose Albumin was checked through the delta check method, high probability of analytes correlated with Albumin (TP, Glucose, Amylase, etc) was also checked. There were conventional correlations found between the main analytes in the ratio of change.

⇒The delta check method using RCV evaluates variation of a single analyte, but simultaneously often identifies other analytes strongly correlated with each other.

CONCLUSION

- The delta check method using RCV can simultaneously evaluate relations among multiple analytes and help us interpret the change of test results.
- The RCV was suggested to apply the criteria of judgment in the delta check method in our laboratory.
- Supposing that it is important to apply measurement uncertainty to the assessment of patient's results, measurement uncertainty was used to calculate RCV in this study.

FUTURE STUDY

- In the future, our objective will be to obtain and verify the appropriate z score and calculate RCV in individual patients.

Molecular Diagnosis

PL-01

Determination of RealTime HCV Acting Antiviral

t Time Smoking Cessation Support by Clinical Technologist

ctured interviews for inpatients with CKD under educational hospitalization and outpatients

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Hitachi General hospital

of Clinical Technology

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Department of Clinical Technology1) Department of Nephrology2) Respiratory Medicine3) Metabolism internal medicine4)

Team

CKD

Inpatients

Outpatients

Risk factor hidden behind physical problems

Smoking habit

Lifestyle-related disease

Third-hand smoke

v: patient-centered team medical care

, we are put in charge of clinical explanation for patients of the educational hospitalization by opportunities to see various types of patients told us how serious physical problems coming on of smoking is particularly important to reduce health risks.

ssation support that a clinical technologist can perform in a short time.

ke. The patients were Transtheoretical Model

s using Motivational sess, Assist, Arrange) and 5R ks, Repetition).

t smoking cessation during Smoking cessation support ute during blood drawing too.

rch, 2015 to February, 2016

st

A tobacco in the pocket! Smell of tobacco!

Passive smoking Second /Third hand smoke

Semi-structured interviews

MI / 5A / 5R

Figure1 Flow of smoking cessation support

Table3 Breakdown of the target persons N=234

Department

Emergency,General medicine 1
Ophthalmology 1
Otorhinolaryngology 1
Medical treatment internal medicine 1
Gynecology 1
Plastic surgery 2
Neurosurgery 3
Pediatrics 3
Neurology 4
Respiretory Medicine 4
D7ward 5
Breast Surgical oncology 5
Dermatology 6
Respiratory Surgery 6
Orthopedics 7
Surgery 12
Hemotology Oncology 14
Metaborism interna medicine 20
Department of Nephrology 22
Cardiovascular medicine 25
Department Urology 29
Gastoroenterology 62

➡ The smokers are distributed to 22 departments.

➡ As for the pediatrics, a parent was a smoker.

➡ Tobacco is related to a risk of the cardiovascular disease (CVD).

five odel.

(N=230)

% (45.7%) (35.2%) (6.1%) (1.7%) (11.3%)

ipants are not

the number of

multiple 6* 16 22

(*:p <0.001)

N=16

on towards smoking

Table2: Continuous smoking cessation support led to successful smoking cessation i.e. to Maintenance stage. 6 led to smoking cessation (*:p<0.001).

Figure2: Motivation changed positively even among those who failed to stop smoking (**:P < 0.001).

by clinical technologist work effectively and contribute to both patients' and their families' QOL.

support patients and their families to improve their lifestyle.

mprove quality and trust of clinical technologists.

ation counseling ability.

families, children and medical staffs from passive smoking.

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HITACHI Inspire the Next