

The background image shows a clinical setting, likely a dialysis unit. In the foreground, a female nurse in a pink uniform and face mask is operating a dialysis machine. In the middle ground, a male staff member in a blue uniform is smiling while attending to a patient lying in a bed. The patient is connected to various medical tubes and monitors. In the background, another nurse in a pink uniform is visible, and there are more medical machines and equipment. The overall scene is brightly lit and professional.

2014

Educational Sessions; Blood Purification Systems

Healthcare technology management for dialysis patients by clinical engineers in Japan: A case of Yabuki Hospital.

Shiho Esashi

Jun Yoshioka

Japan Association for Clinical Engineers (JACE)

Background

Past presentations at AAMI's conference

2011

“Clinical Engineers System in Japan and New Basic Job Guidelines 2010”

Kiyoshi Matsusaka, AAMI 2011 Conference & Expo (San Antonio, TX)



2012

“Defining the Role of the Medical Equipment Safety Manager”

Kiyoshi Matsusaka, AAMI 2012 Conference & Expo (Charlotte, NC)



2013

“Healthcare Technology Management by Clinical Engineers”

Jun Yoshioka, AAMI 2013 Conference & Expo (Long Beach, CA)

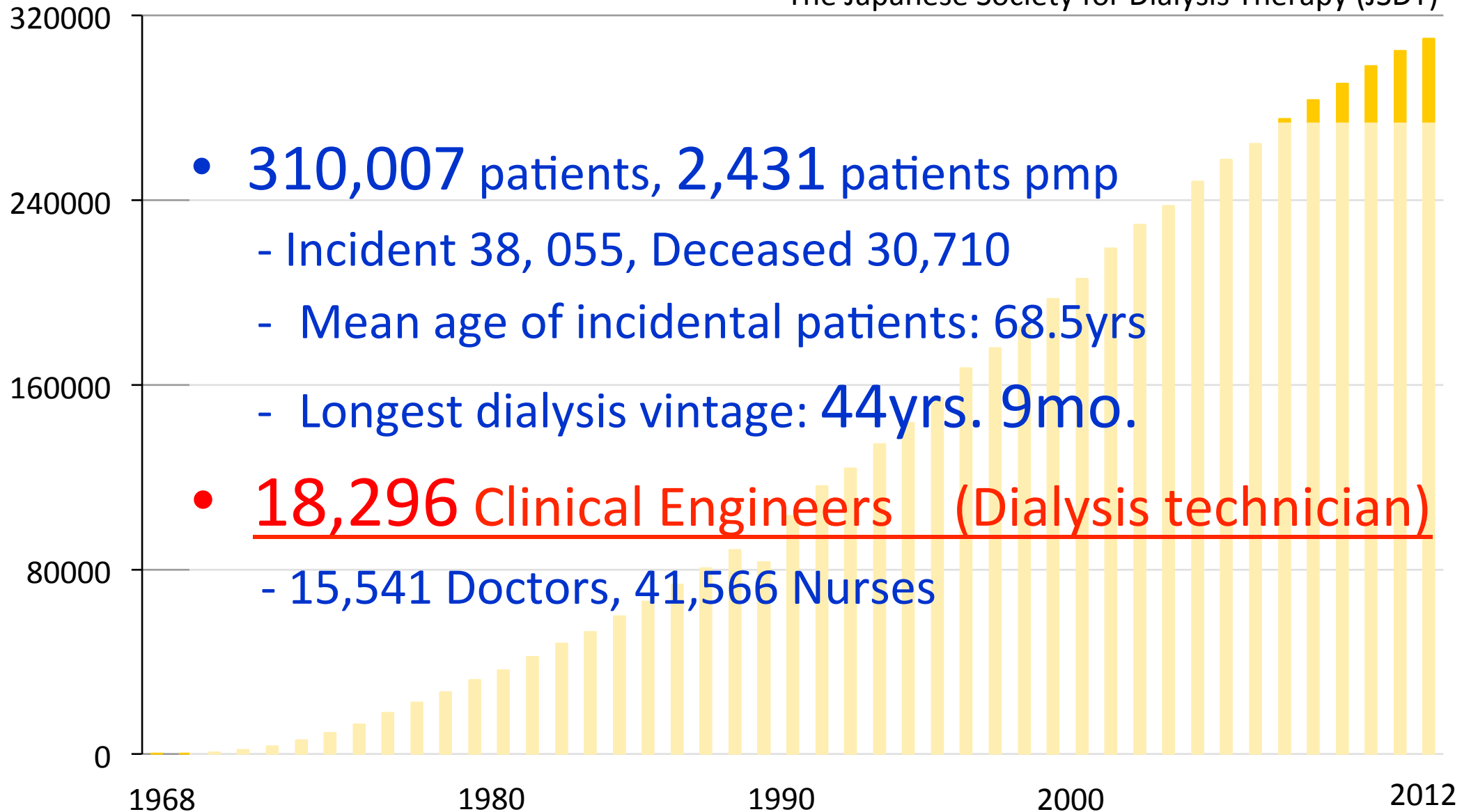


Outline

1. Yabuki hospital
2. The current state of dialysis patients in Japan
3. Healthcare technology management by CEs
4. Linking the dialysis management system to electronic medical records

Japanese dialysis as of 2012

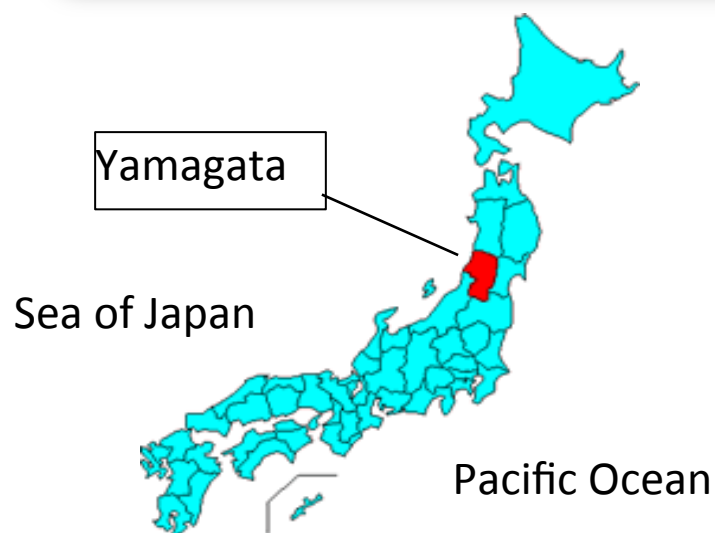
The Japanese Society for Dialysis Therapy (JSDT)



Yabuki Group

Yabuki hospital

Dialysis machine : 81 sets
Patient load : 244 persons
CE : 10 persons



Honchou Yabuki clinic

Dialysis machine : 45 sets
Patient load : 135 persons
CE : 10 persons

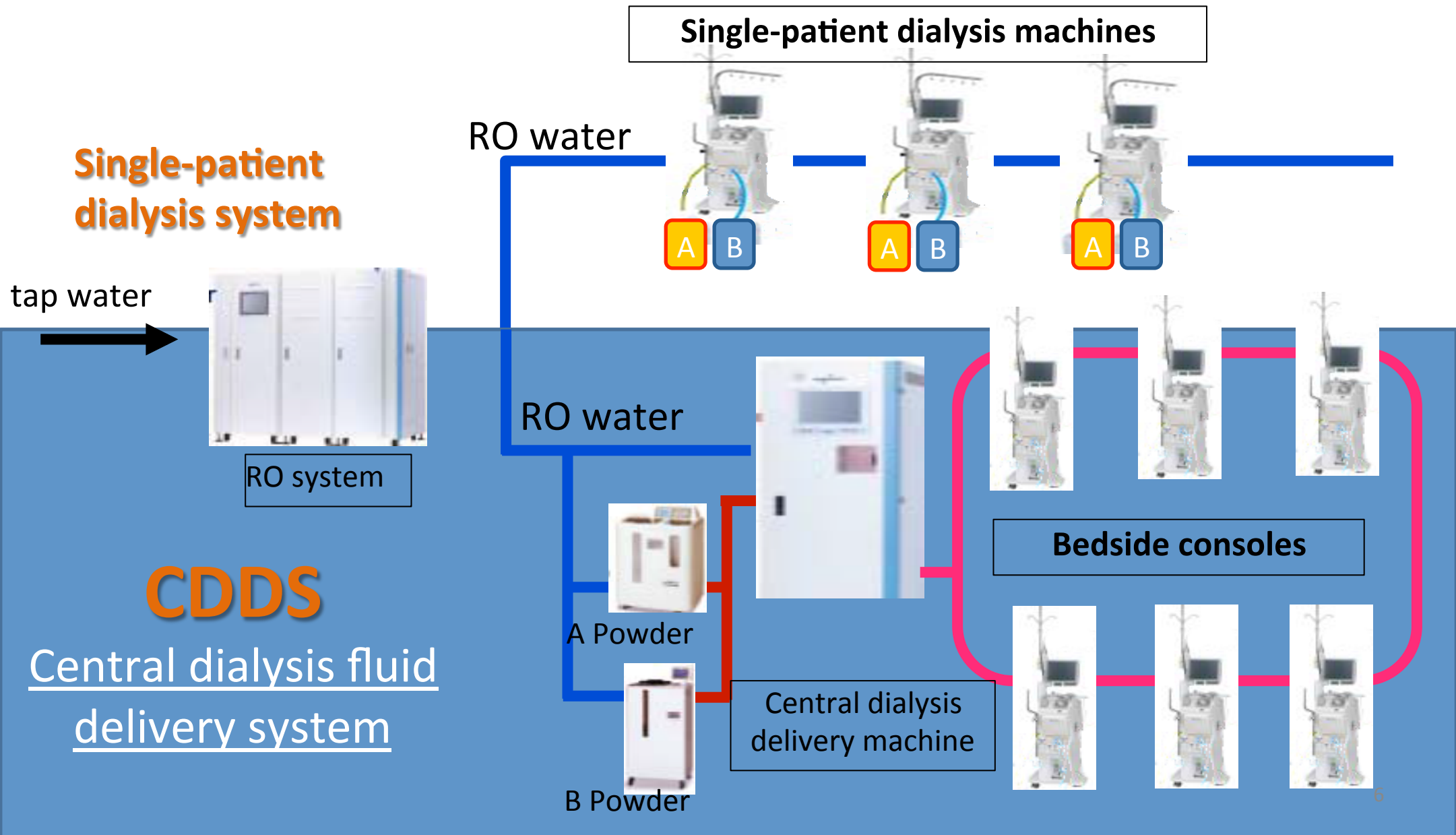


Tendo Yabuki clinic

Dialysis machine : 52sets
Patient load : 130 persons
CE : 8 persons



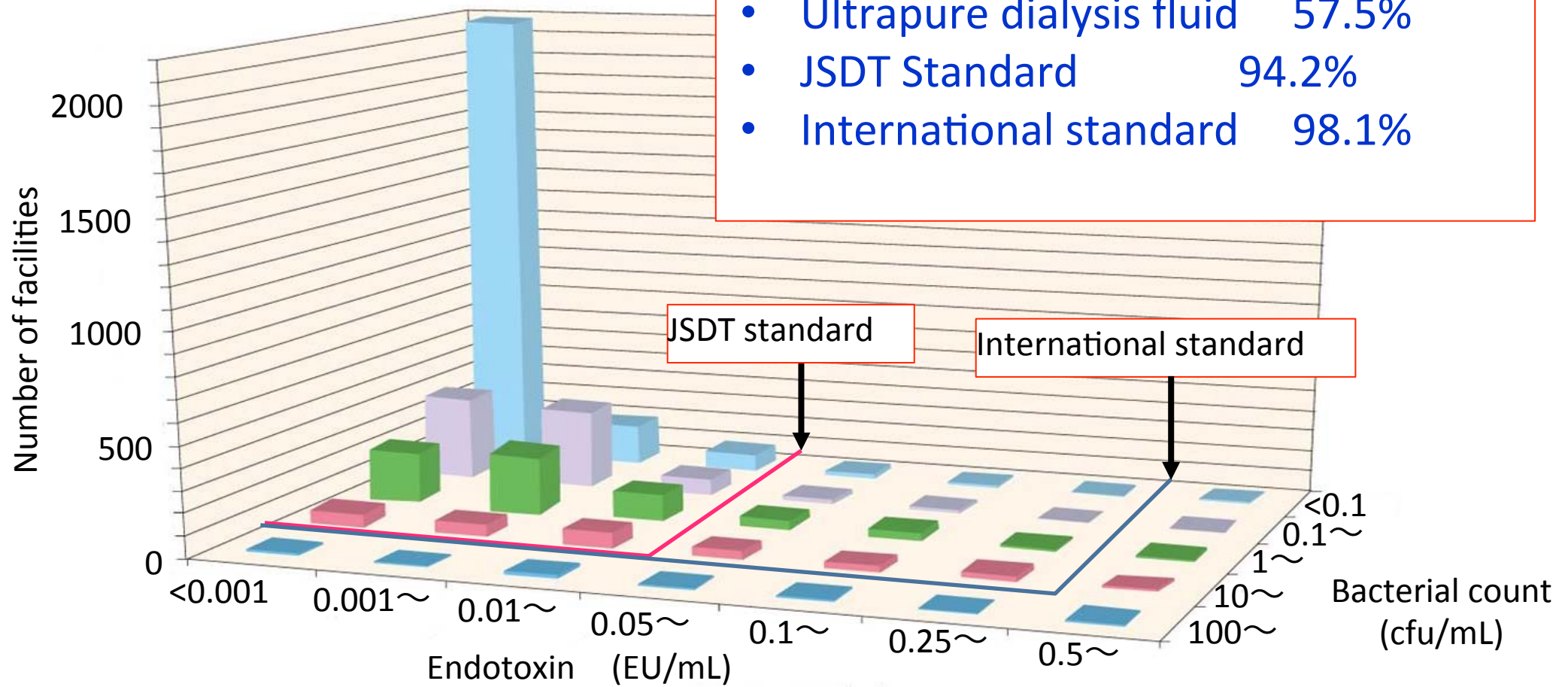
Single-patient dialysis system and CDDDS



Water quality in CDDS

Percent achievement of each standard

- Ultrapure dialysis fluid 57.5%
- JSDT Standard 94.2%
- International standard 98.1%



The Japanese Society for Dialysis Therapy (JSDT)

Comparison of initial and running costs

Model case in Japan

- Facility: 40 dialysis beds,
80 chronic dialysis patients
- Dialysis prescription: 3 times/w, 4 hours/session, Dialysate flow rate: 500mL/min.
- Estimated cost (Dialysis machines, Control system)

	CDDS	Single Patient system
– Initial	1,228,000 US\$	1,250,000 US\$
– Running	244,000 US\$	341,000 US\$

Pro's and Con's in CDDS

Pro's

- Economical
- Easy daily preparation of dialysis fluid
- Easy control of dialysis fluid quality
- Easy daily maintenance (disinfection of dialysis machines and entire dialysis fluid loop)

Con's

- Choice of only one dialysis fluid to all patients
- More time required in emergent shutdown

CDDS in International Standard

- ISO 23500: “Guidance for the preparation and quality management of fluids for hemodialysis and related therapies”
- Annex B: Equipment
 - [B.7 Central dialysis fluid storage and delivery systems](#)
 - B.7.1 General
 - B.7.2 Design and maintenance
 - B.7.3 Dialysis fluid storage
 - B.7.4 Materials compatibility

National Licensed Clinical Engineers

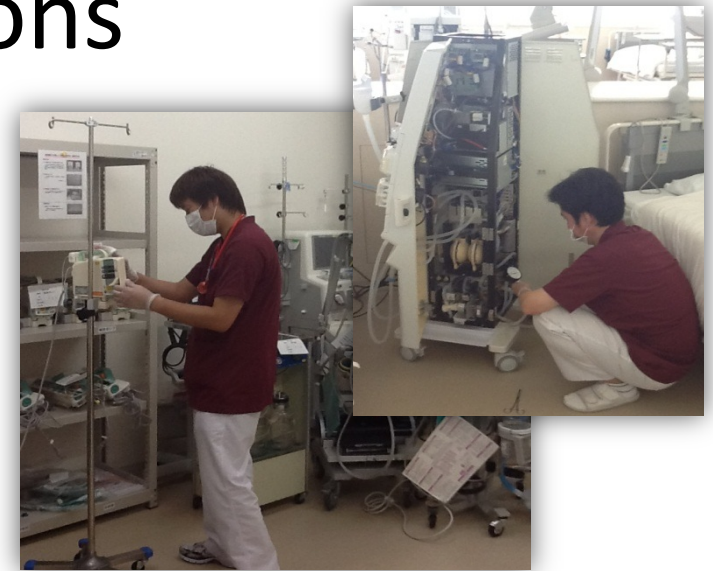
- Clinical engineer (CE)
 - Established in 1987
 - A unique license
- Education
 - University (4yrs) or academy (3yrs)
 - Master course (2yrs), Doctor course (3yrs)
- Work place
 - Operating room, Dialysis room, Cardiac catheterization room, Hyperbaric oxygenation room, ICU, HCU, NICU, Emergency room, and the hospital ward.

A dialysis technician

- is a medical professional that has been certified to operate dialysis equipment and assist patients while they are receiving dialysis.
- has decreased dialysis machines failure which exposes patients to potentially harmful risks.

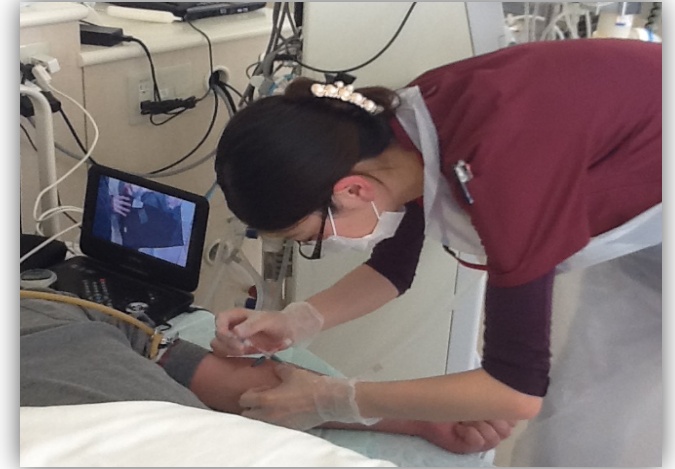
Business Operations

- Maintenance
 - Dialysis machines
 - Other medical devices
- Dialysis fluid
 - Preparation, quality control
- Construction
 - Dialysis management system
 - Electronic medical records



Dialysis session work as a daily routine job

- Puncturing blood vessels
- Operating dialysis machines
- Checking patients' vital signs and monitoring dialysis machines
- A team approach to patient care
 - Data analysis
 - Evaluation of dialysis efficacy
 - Evaluation of arteriovenous fistula



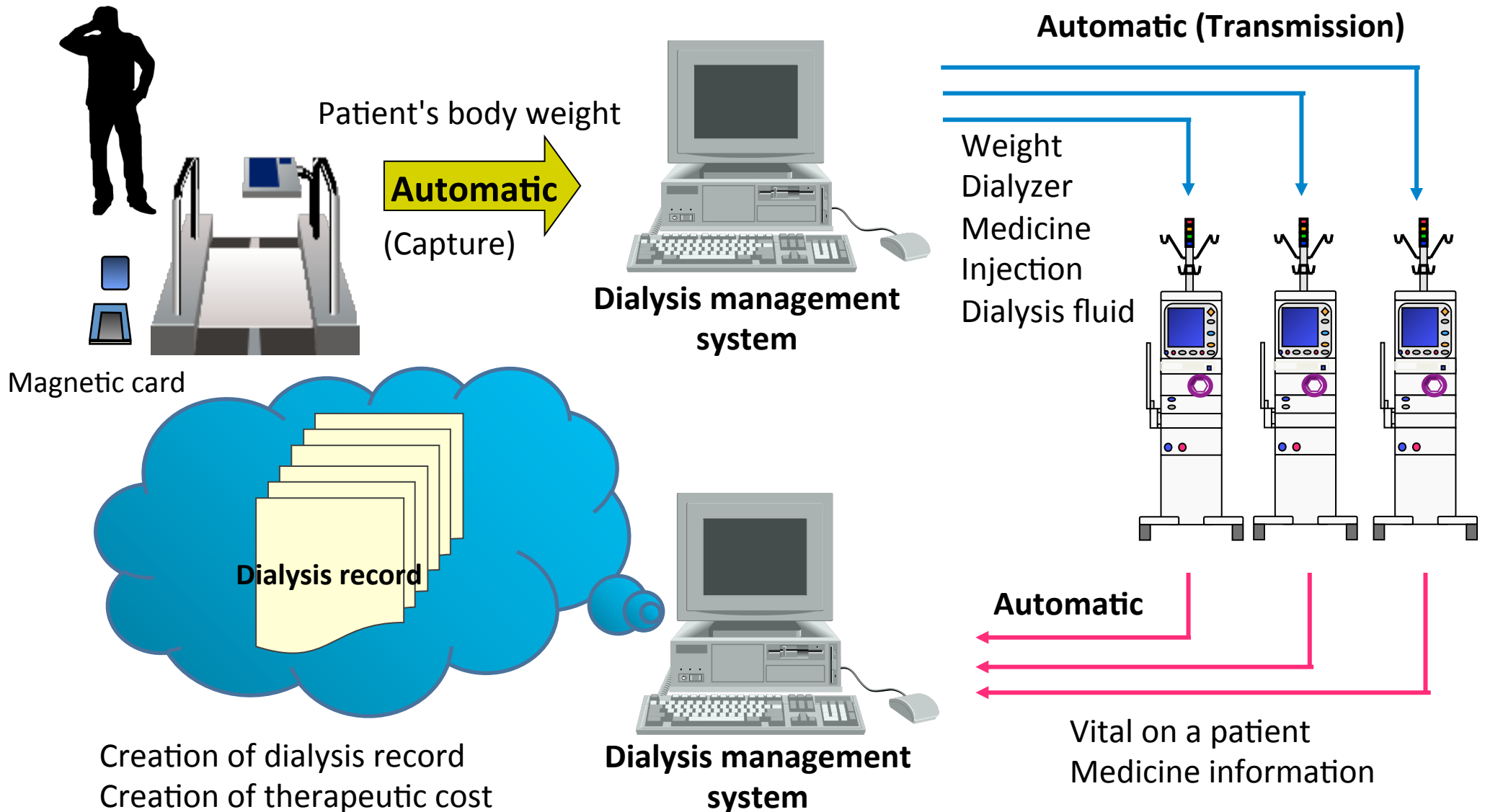
Team approach for dialysis patients

- Nutritional support
- Dialysis access care
- QOL monitoring
- Foot care
- Oral care
- Psycho-nephrology
- Social support



Patient friendly
dialysis

Dialysis management system



Development of information technology

The Electronic medical record (EMR)

- The EMR system electronically records the consultation data of an individual so as to display these data as needed.
- The EMR system improves the quality of patient care and decreases medical errors.



Coordination

1: Dialysis management system

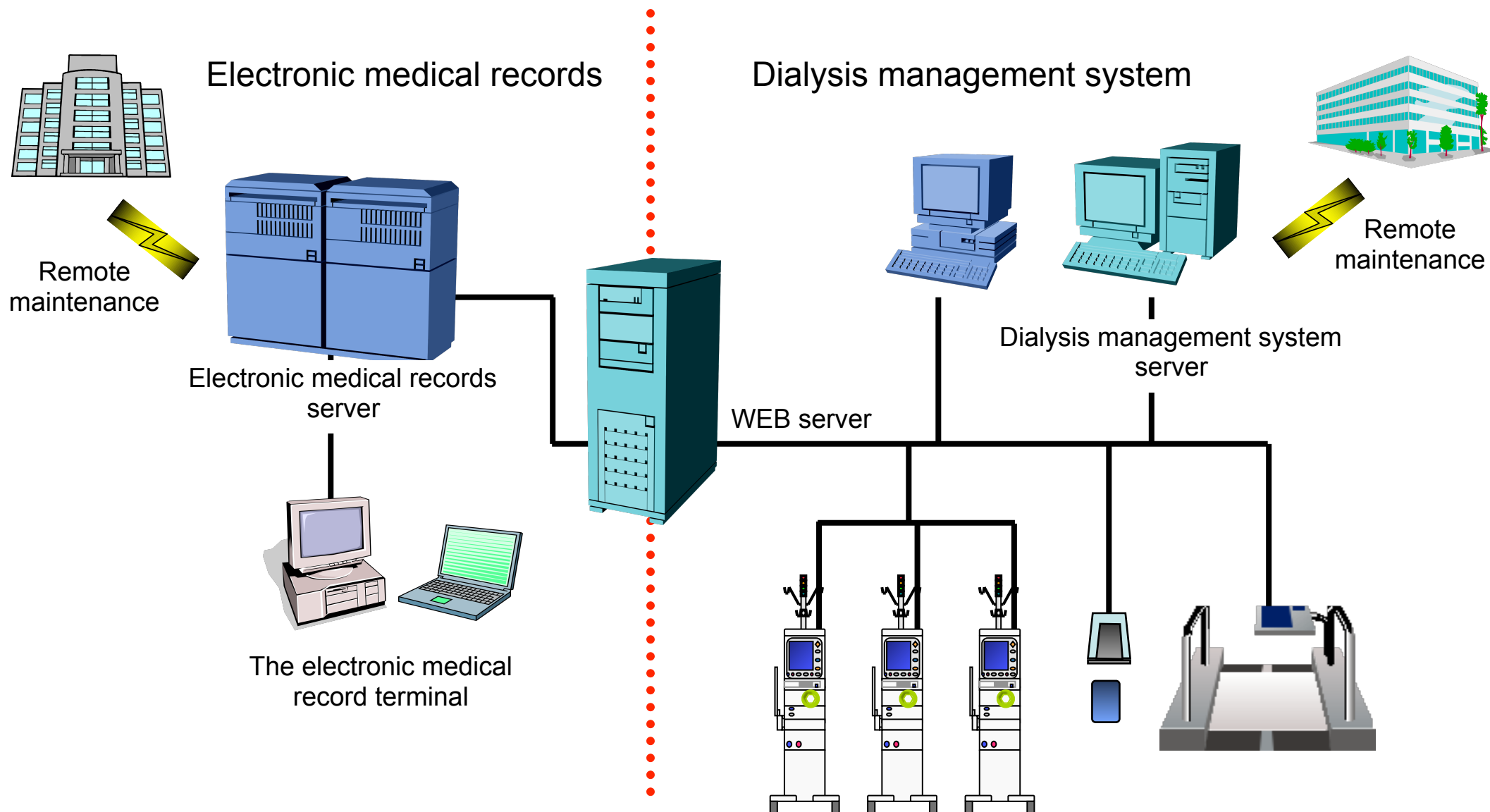
Environment for safety in treatment

2: Electronic medical records

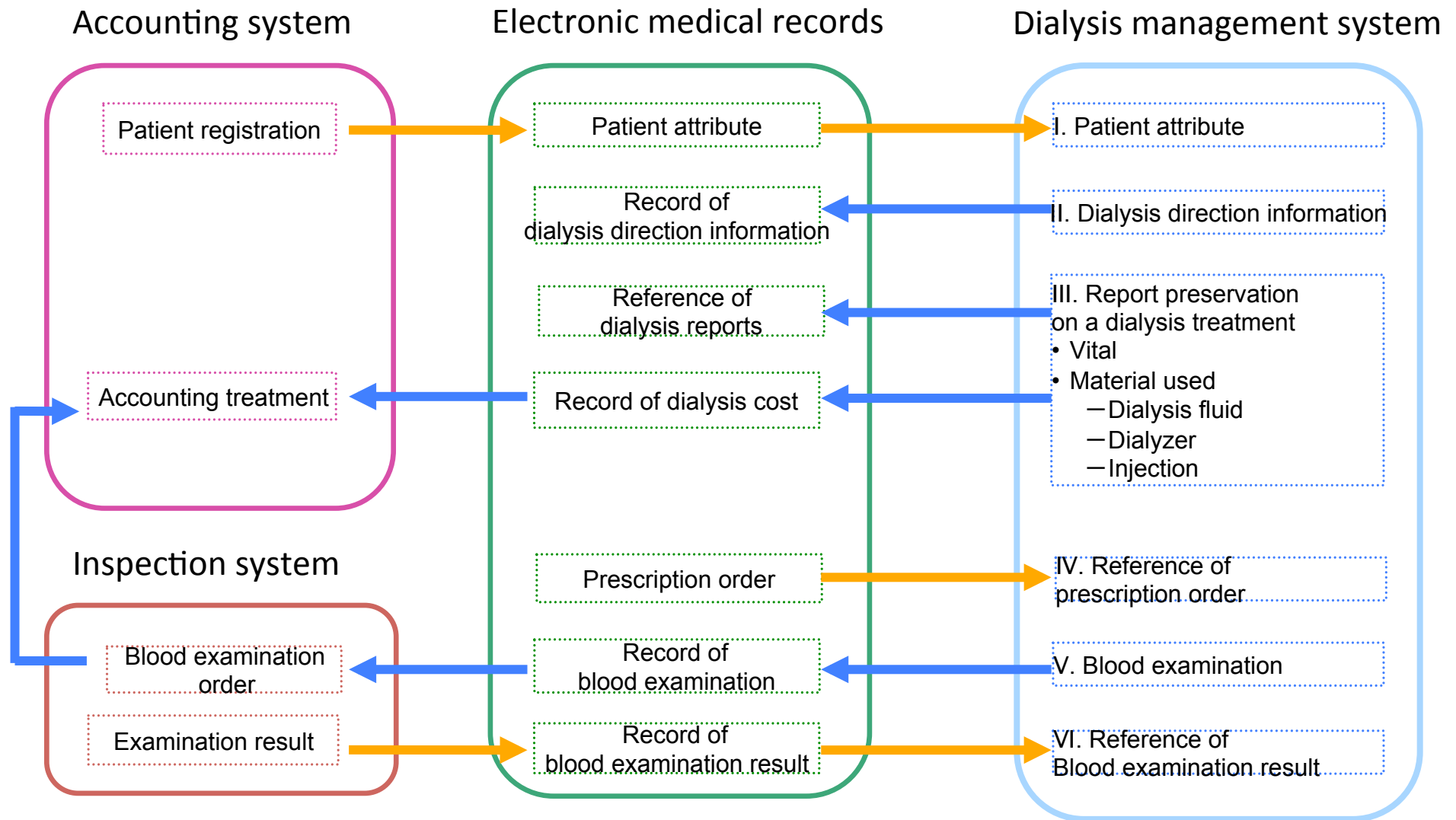
Sharing of patient information among departments

Those systems are necessary to linking the dialysis management system to electronic medical records

Linking the dialysis management system to electronic medical records- MAP

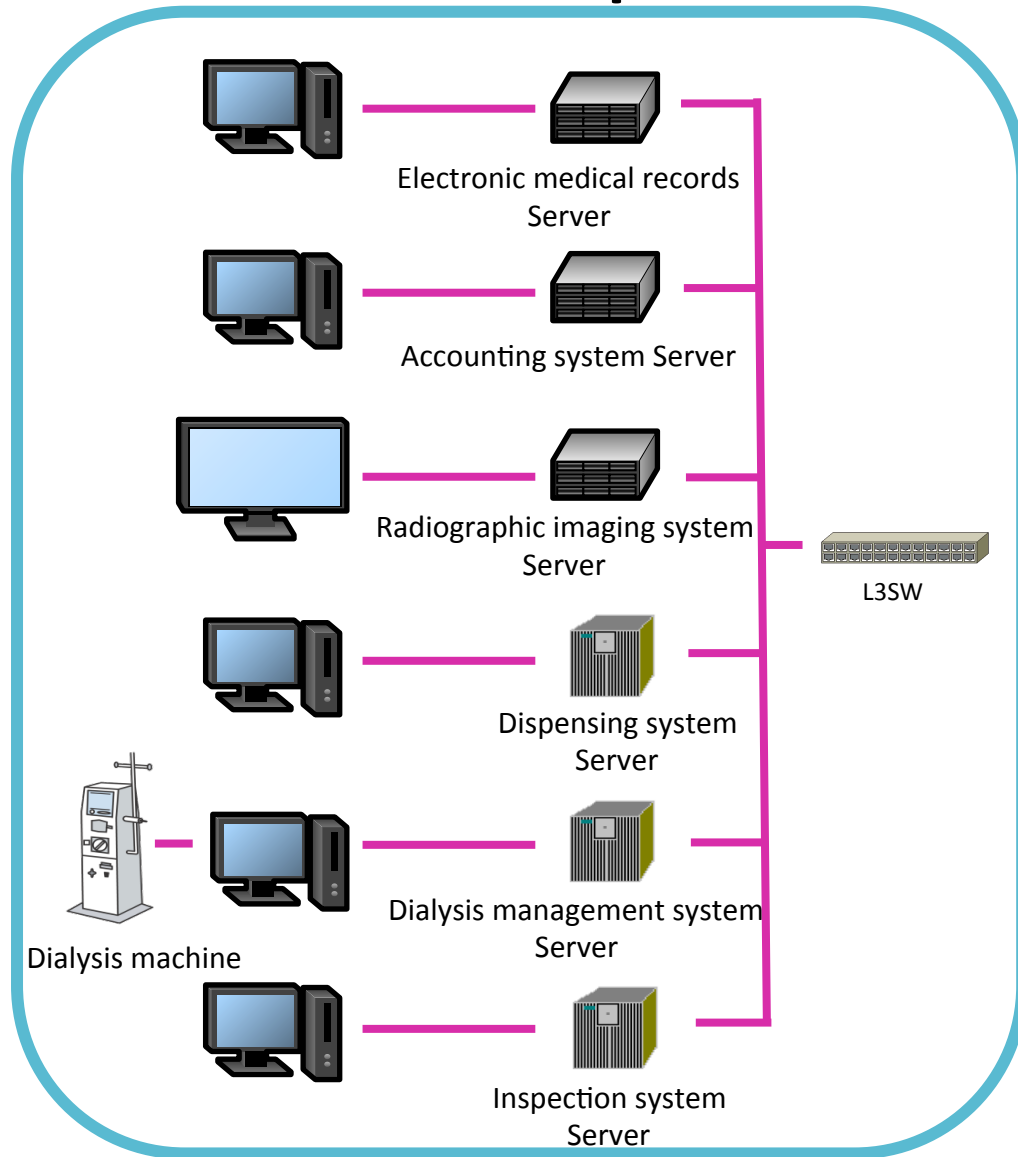


The cooperation of each system

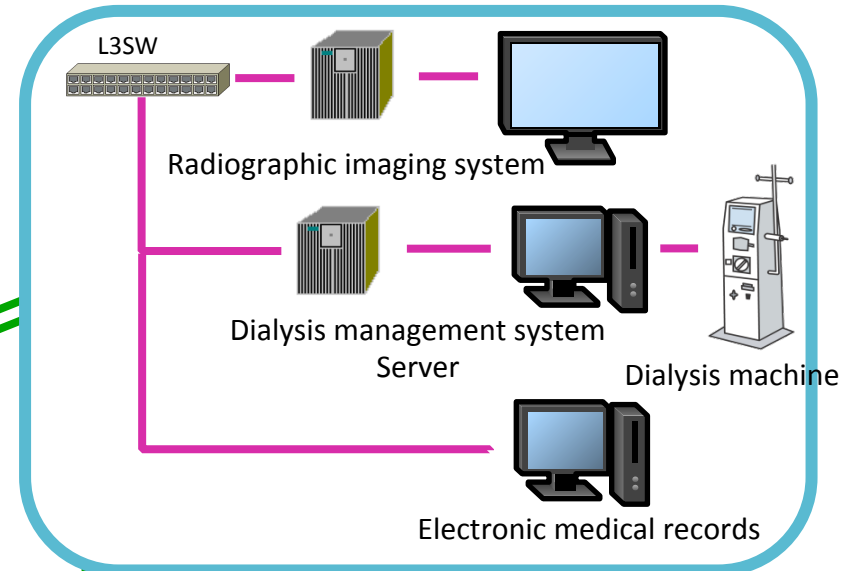


Network composition figure

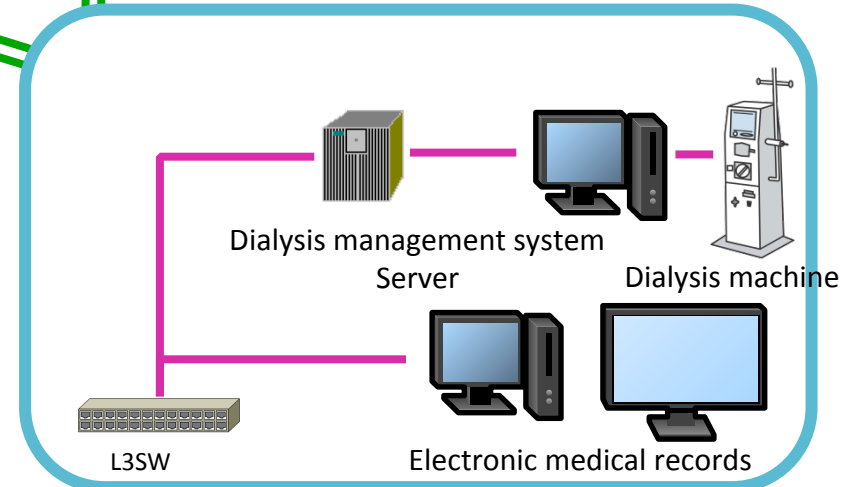
Yabuki hospital



Honchou Yabuki clinic



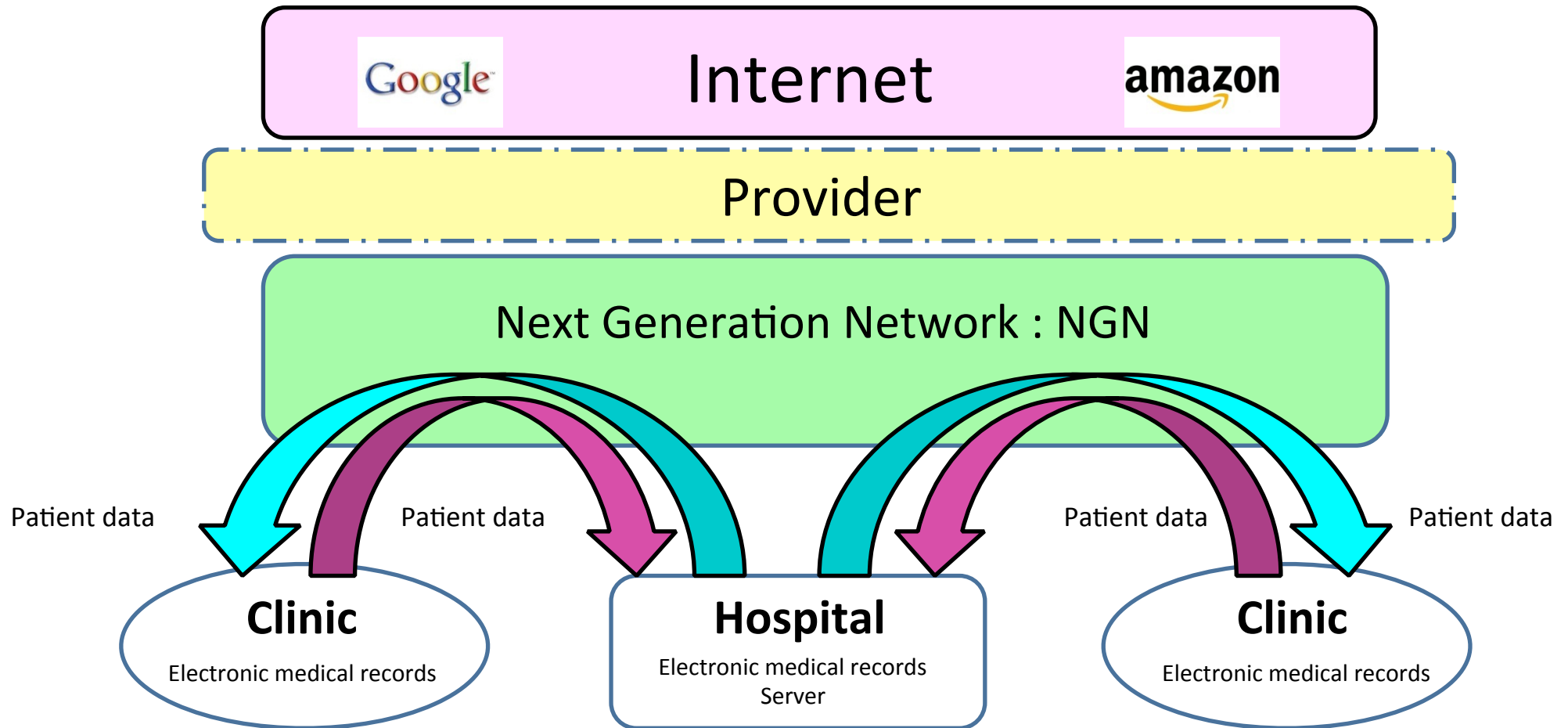
Tendo Yabuki clinic



LAN access

IP sec-VPN

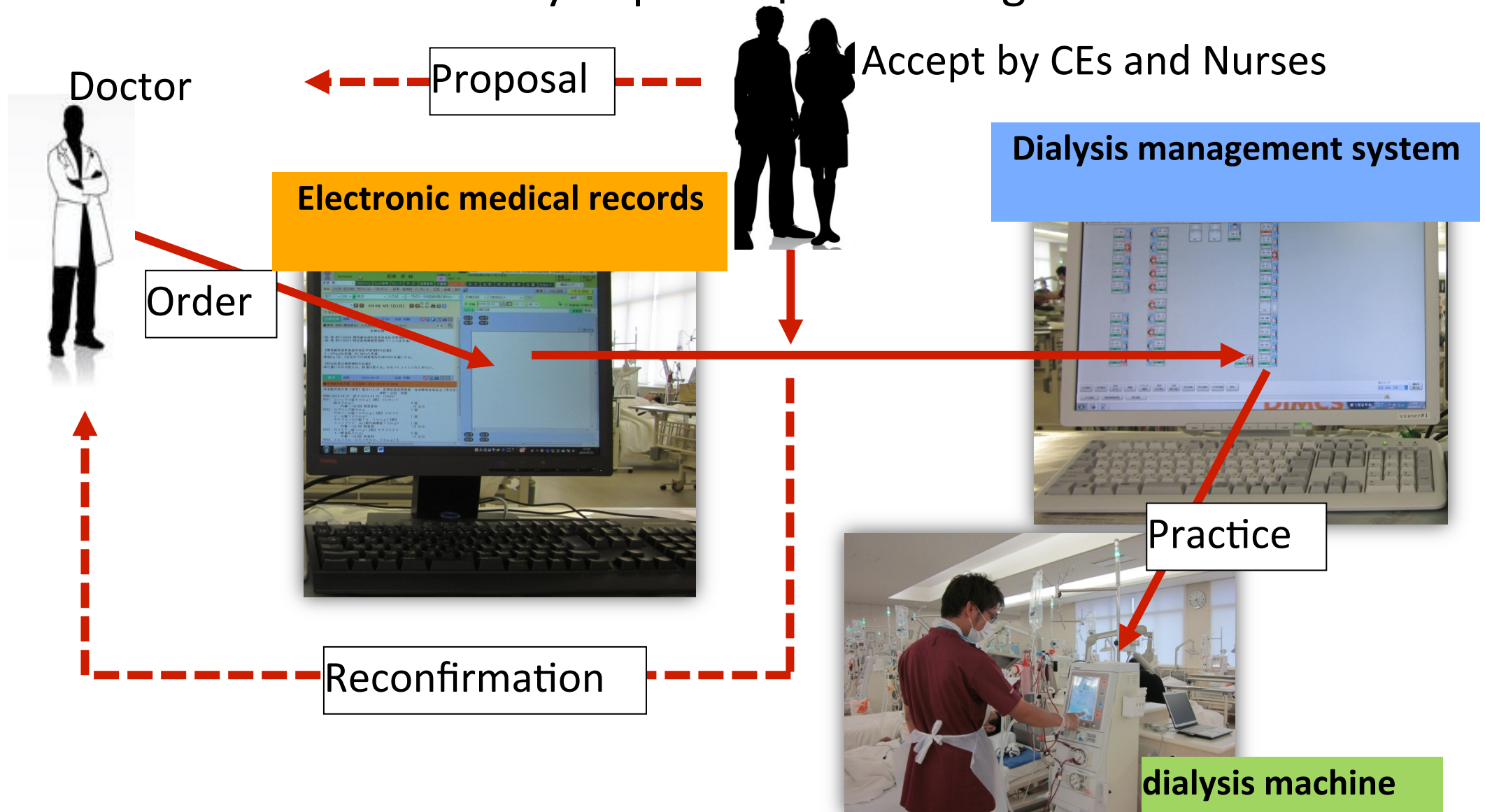
Network security of an electronic medical record



- Communication Design via NGN
- Communication between institutions using IP sec-VPN (encrypted data)

Flowchart of doctor order

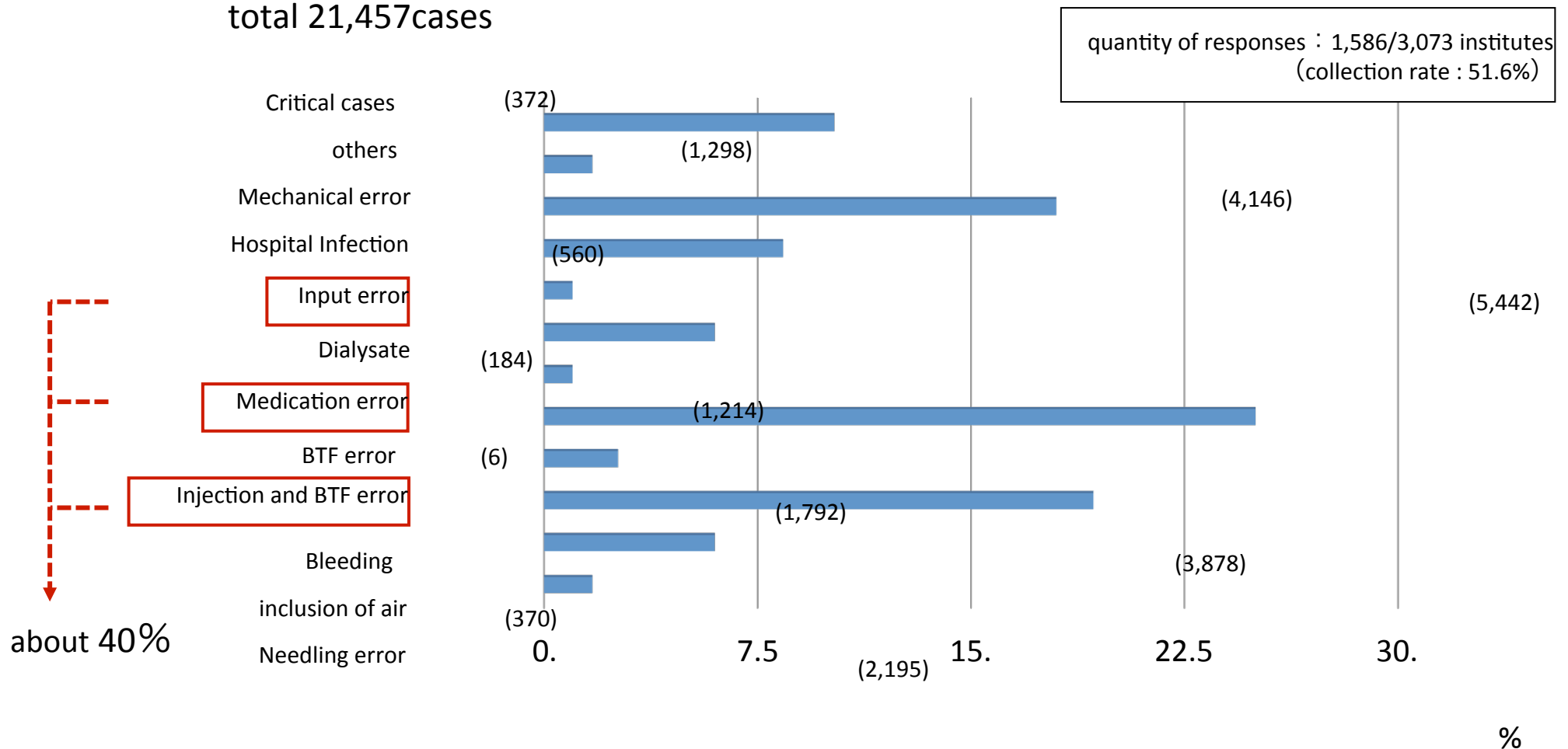
— Dialysis prescription change —



Survey of medical accidents in hemodialysis treatment

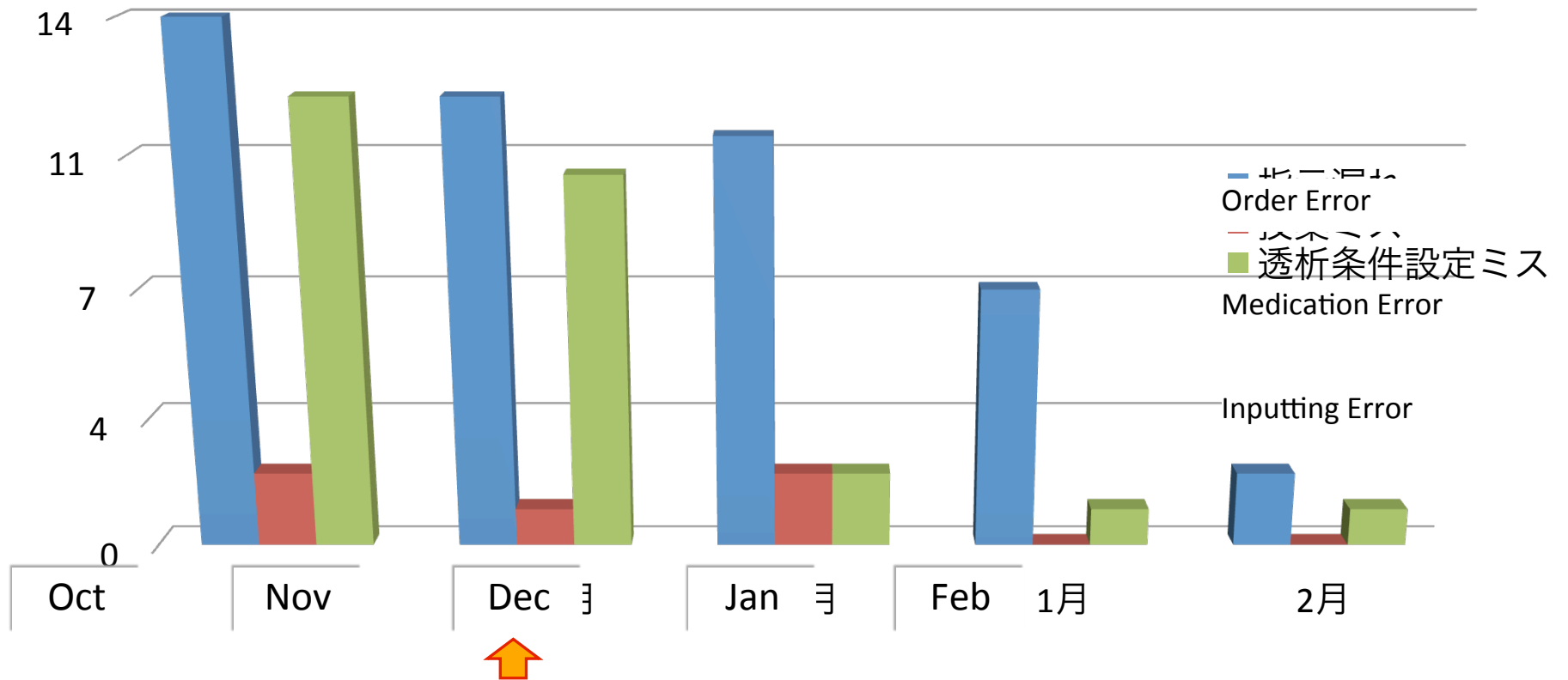
A study of medical accidents and the composition of a malpractice countermeasure manual regarding hemodialysis treatment (1999)

total 21,457cases



The number of human errors

Yabuki group total number of cases



Install the link EMR and Dialysis Management System

Benefits of the system linkage

- Secure refraction of physicians' order
- Human error prevention
- Patient information sharing with other staff
- Efficient work and labor-saving
 - A batch of data can be sent
(prescription information and treatment record to EMS)
 - Paperless environment
 - No need for medical clerks
 - Physician can make or change the order from any PC
 - Prevention of medical billing error

Problems of the system linkage

- Needs some time to learn operation methods
 - Manual preparation, Hold training sessions
- Running cost
 - High cost of establishing the system linkage
 - Maintenance cost for the each system
 - High cost of adding a program and customizing it
- Slowdown of the PCs caused by data storage

Is Japan method “GALAPAGOS”?



“GALAPAGOS Ce



light au



A Powder



B Powder



Central dialysis
delivery machine

Patient friendly
dialysis?



DVD
VIDEO

Conclusion

- The Japan-method dialysis system is a patient friendly team approach.
- The central dialysis fluid delivery system (CDDS) and national licensed clinical engineer (CE) system are the keys to the success of Japan-method dialysis.
- The linkage of EMR and the dialysis management system is effective in providing the patients with safe and smooth hemodialysis treatment.
- We hope that our dialysis method improves the QOL of many dialysis patients throughout the world.

お し ま い

*Thank you for your attention and
thank you for your time*