



March. 17, 2015

## How to Snatch Personal Medical Record and to Make Medical Supplies and Medicines Available in Time of Disaster

*Kochi Organization for  
Medical Reformation and Renewal*  
Shu KURAMOTO



Kochi Prefecture  
Government Building



Kochi Castle  
高知城



Seismic Isolation  
of Toyo Tite !!

19 20  
98 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 |

National University

National University Corporation

Department of  
General Medicine

President of  
Kochi Medical School Hospital

To Radiographic inspection



ほうしゃせんぶ  
放射線部



けんさぶ  
検査部

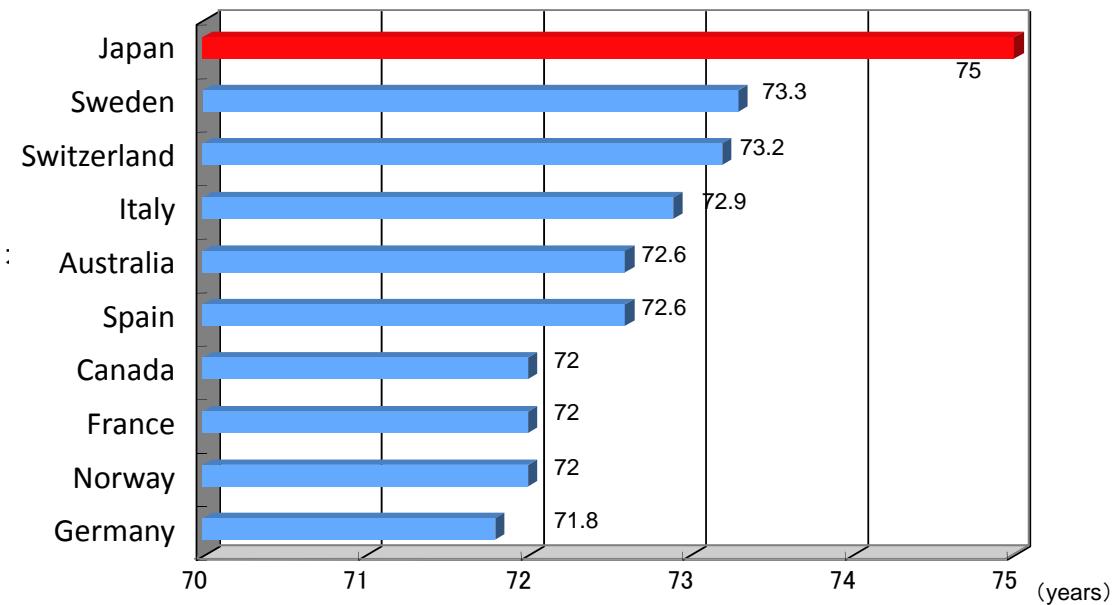


びょうとう  
病棟

Informations in the Hospital

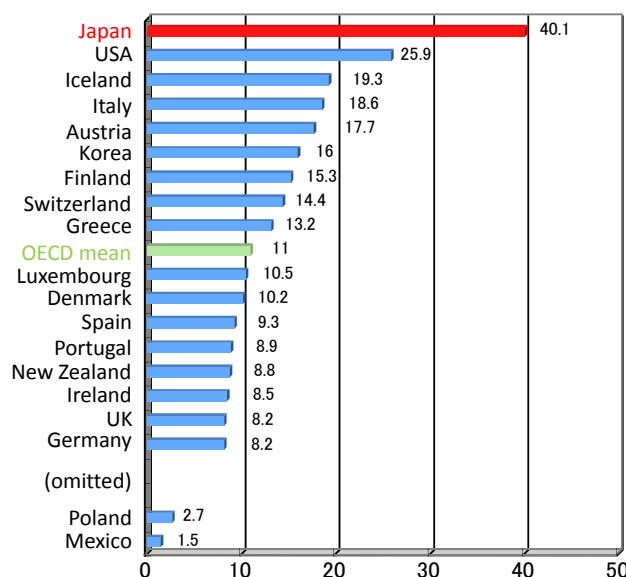
To the wards

# Healthy Longevity

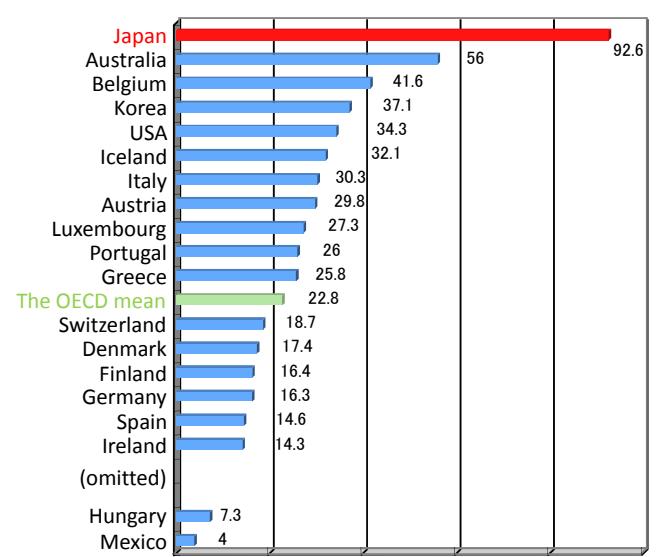


WHO World Health Statistics 2010

## MRI Units

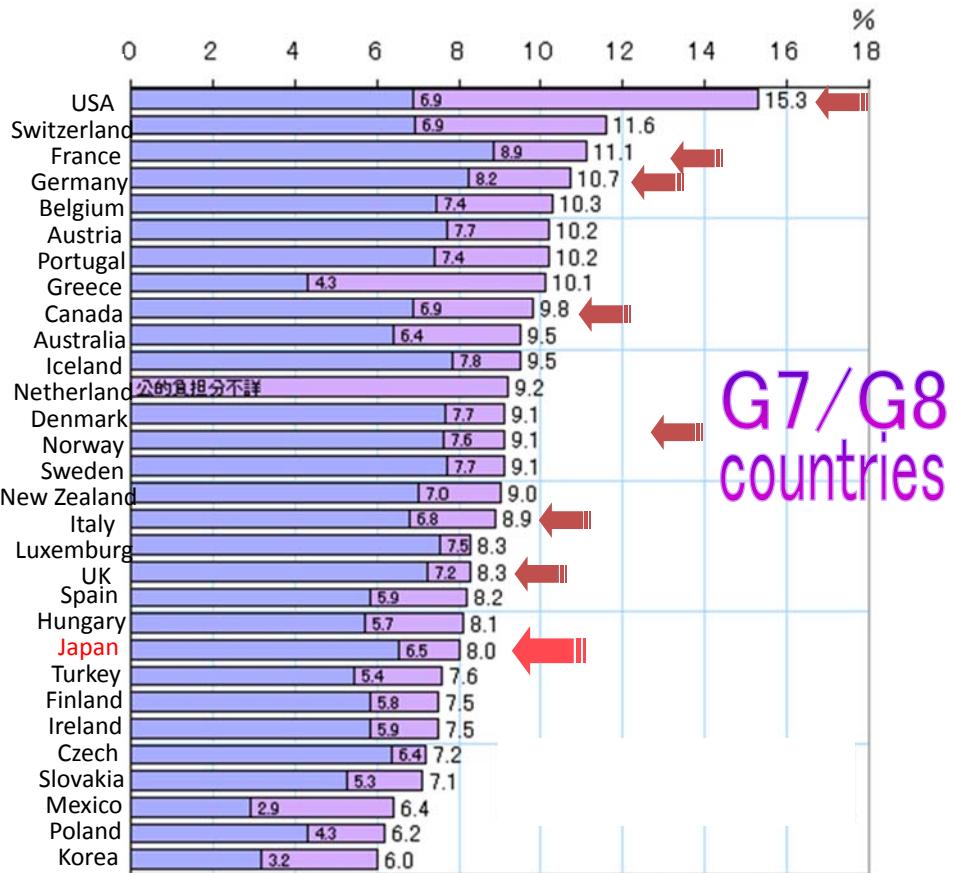


## CT Scanners



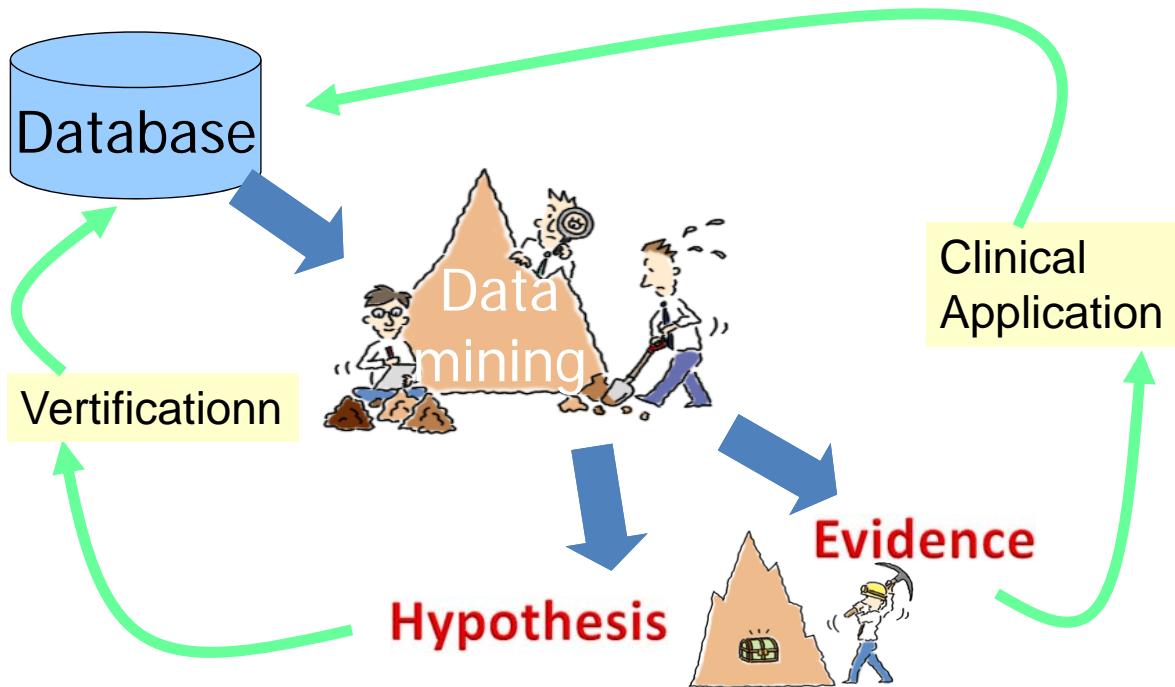
( per population of 100,000 in 2002)

National medical expenses relative to GDP

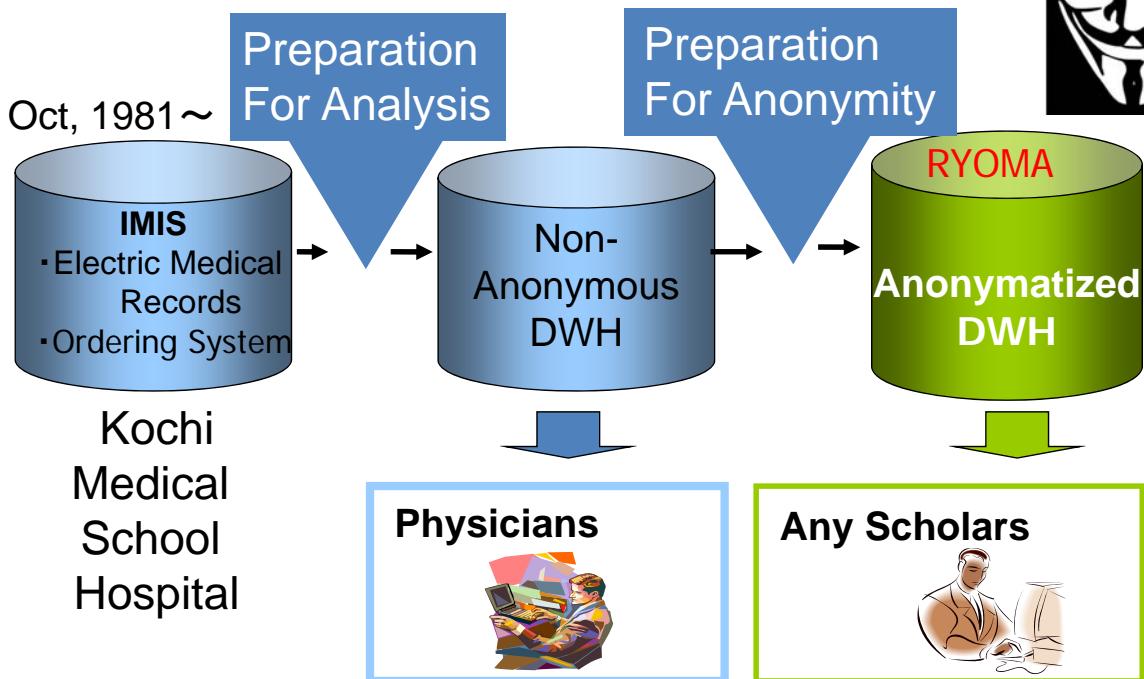


G7/G8 countries

## Datamining and EBM

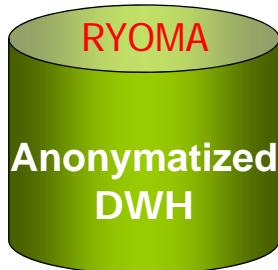


# Retrieval sYstem for Open Medical Analysis



## For the Secondary Use of Medical Records

- Anonymity : Name, Patient ID, Birthday  
date of examination, and so and so
- Reconstruction of Database
- Data Cleansing



Any Scholars



# Automated hematology Analyzer

## Sysmex XE2100

### Red Blood cells

### White Blood cells

### Platelets

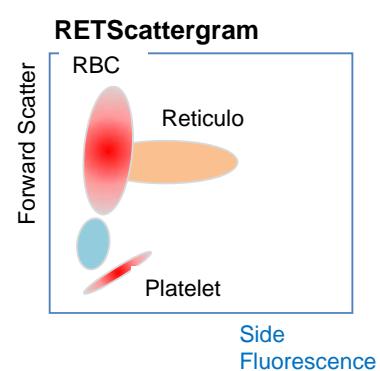
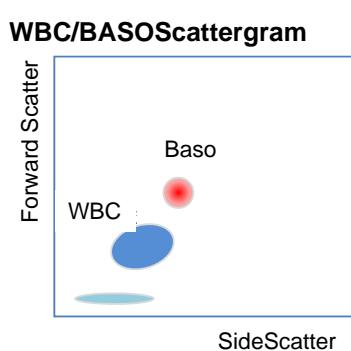
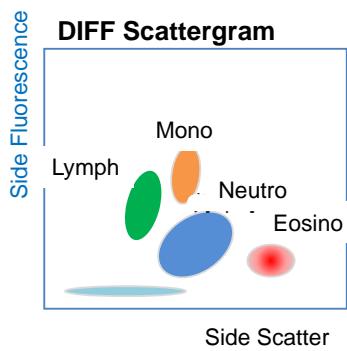
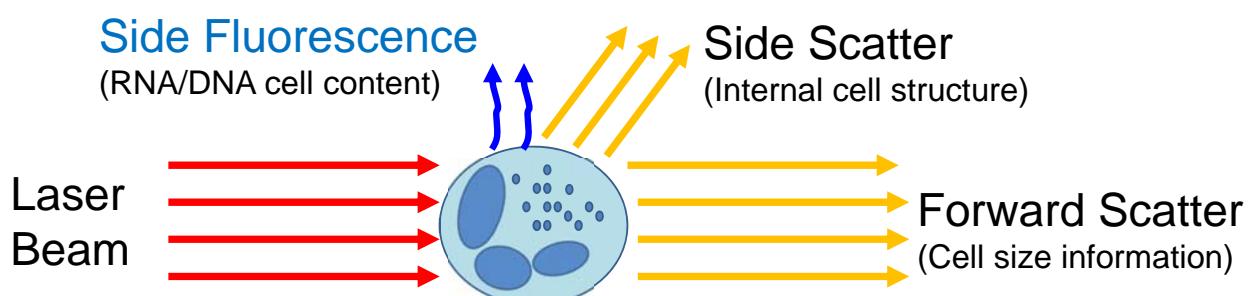
### Reticulocytes

(Young Red Blood cells)

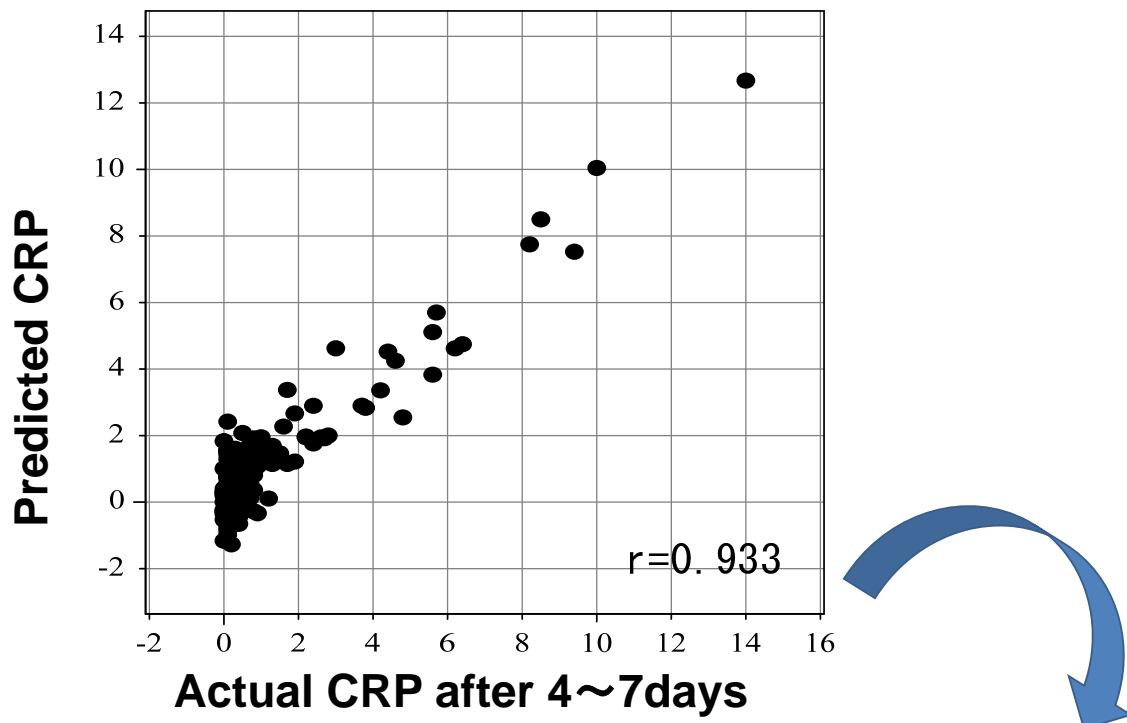
Neutrophil Stab Cell  
Segmented Cell  
Eosinophil  
Basophil  
Monocyte  
Lymphocyte

## Counting Differentiating Leukocytes by Flow Cytometry Using Semiconductor Laser

Automated hematology Analyzer  
Sysmex XE2100

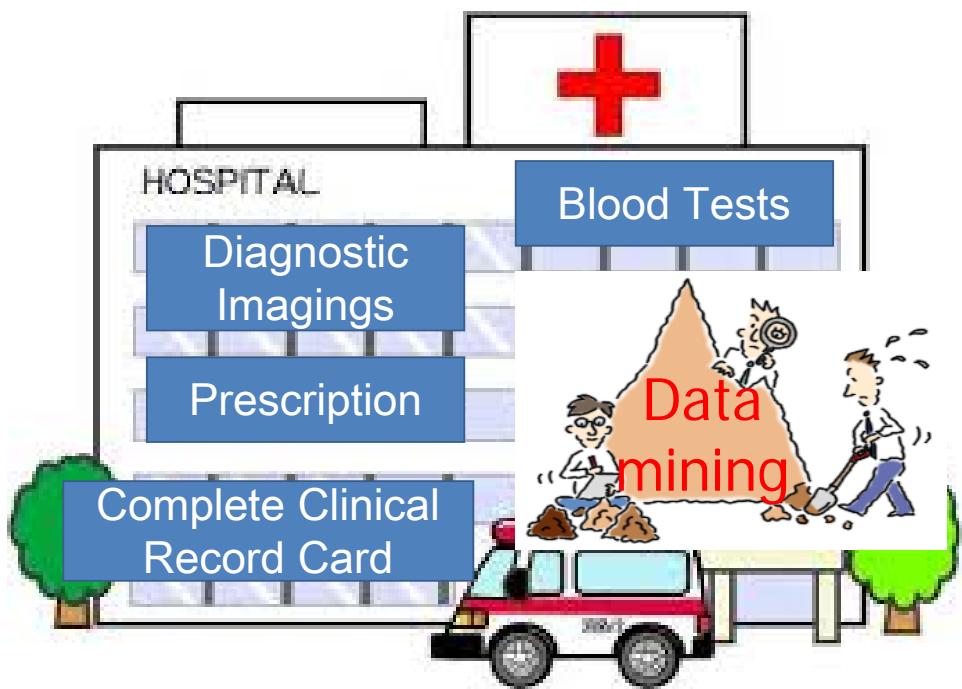


CBC = complete blood count



A half of CRP examinations could be unnecessary

| 0  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   | 25   | 26   | 27   | 28   | 29   |      |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0  | 3.43 | 1.65 | 2.15 | 1.82 | 0.8  | 0.6  | 0.7  | 1.11 | 0.69 | 0.4  | 4.1  | 0.18 | 0.12 | 0.59 | 1.95 | 1.44 | 1.42 | 1.28 | 1.55 | 2.34 | 3.27 | 3.34 | 2.55 | 1.91 | 1.04 | 1.55 | 3.16 | 9.92 | 10.6 | 4.42 |
| 1  | 2.59 | 2.68 | 1.66 | 1.97 | 0.77 | 0.82 | 0.39 | 0.79 | 0.9  | 0.19 | 0.23 | 0.26 | 0.42 | 0.18 | 0.3  | 0.73 | 0.86 | 1.94 | 1.07 | 1.64 | 1.27 | 1.11 | 2.19 | 2.09 | 0.92 | 1.38 | 4.66 | 7.99 | 12.7 | 8.25 |
| 2  | 2.73 | 1.91 | 1.61 | 1.22 | 1.47 | 0.67 | 0.47 | 0.4  | 0.58 | 0.27 | 0.35 | 0.41 | 0.19 | 0.31 | 0.34 | 0.29 | 0.59 | 0.67 | 0.81 | 0.96 | 1.08 | 0.86 | 1.11 | 0.59 | 0.52 | 0.82 | 3.68 | 8.91 | 11.1 | 6.8  |
| 3  | 3.55 | 1.46 | 1.37 | 1.06 | 1.04 | 0.98 | 0.62 | 0.4  | 0.74 | 0.27 | 0.28 | 0.24 | 0.61 | 0.21 | 0.17 | 1.09 | 0.48 | 0.31 | 0.53 | 0.77 | 0.76 | 0.69 | 0.82 | 0.84 | 0.84 | 1.22 | 3    | 4.19 | 5.71 | 7.76 |
| 4  | 2.74 | 1.73 | 2.31 | 1.25 | 1.12 | 1.05 | 1.08 | 0.41 | 0.48 | 0.37 | 0.16 | 0.38 | 0.52 | 0.51 | 0.49 | 0.41 | 0.29 | 0.71 | 0.47 | 0.66 | 0.69 | 0.94 | 0.43 | 0.57 | 0.35 | 1.18 | 2.33 | 5.24 | 3.53 | 8.92 |
| 5  | 4.15 | 2.35 | 1.04 | 1.93 | 1.54 | 1.16 | 0.68 | 0.84 | 0.41 | 0.42 | 0.49 | 0.4  | 0.48 | 0.32 | 0.89 | 1.48 | 0.69 | 0.42 | 0.36 | 0.54 | 0.85 | 0.48 | 0.34 | 0.51 | 0.66 | 0.53 | 1.98 | 1.78 | 4.02 | 7.7  |
| 6  | 3.27 | 2.26 | 1.92 | 2.05 | 1.58 | 1.41 | 0.8  | 0.99 | 0.76 | 1    | 0.57 | 0.42 | 0.25 | 0.49 | 1.13 | 2.26 | 0.9  | 0.4  | 0.65 | 0.33 | 0.74 | 1.15 | 0.97 | 0.96 | 0.5  | 0.56 | 0.8  | 1.57 | 2.86 | 6.43 |
| 7  | 3    | 2.74 | 2.57 | 2.25 | 1.15 | 1.69 | 0.76 | 0.8  | 1.16 | 0.87 | 0.79 | 0.59 | 0.44 | 0.31 | 0.84 | 1.8  | 0.85 | 1.09 | 0.99 | 0.9  | 0.65 | 0.7  | 0.55 | 0.71 | 0.45 | 0.55 | 1.43 | 0.46 | 7.44 | 4.34 |
| 8  | 3.71 | 2.46 | 1.52 | 1.82 | 0.97 | 1.85 | 1.14 | 1.03 | 0.64 | 0.97 | 0.88 | 0.98 | 0.83 | 0.67 | 0.75 | 1.11 | 0.82 | 0.66 | 0.39 | 0.56 | 0.45 | 0.54 | 0.28 | 0.46 | 0.29 | 0.6  | 0.37 | 3.24 | 6.67 | 3.41 |
| 9  | 3.34 | 2.15 | 1.52 | 1.96 | 1.12 | 2.02 | 0.5  | 1.24 | 0.79 | 0.8  | 1.4  | 1.82 | 0.82 | 1.05 | 2.04 | 1.98 | 0.53 | 0.25 | 0.3  | 0.19 | 0.47 | 0.29 | 0.71 | 0.43 | 0.24 | 0.31 | 1.18 | 2.8  | 6.61 | 13.3 |
| 10 | 2.88 | 2.37 | 1.03 | 2.01 | 1.71 | 2.57 | 1.35 | 0.76 | 1.43 | 1.09 | 0.93 | 1.9  | 1.69 | 2.26 | 1.24 | 1.02 | 0.36 | 0.28 | 0.78 | 0.37 | 0.15 | 0.24 | 0.72 | 0.47 | 0.17 | 0.24 | 2.9  | 2.11 | 10.9 | 9.36 |
| 11 | 3.36 | 2.52 | 2.41 | 2.51 | 2.18 | 1.51 | 1.02 | 1.93 | 1.08 | 1.96 | 2    | 1.78 | 1.6  | 1.2  | 0.43 | 0.76 | 0.46 | 0.65 | 0.47 | 0.13 | 0.34 | 0.35 | 0.63 | 0.43 | 0.51 | 0.23 | 0.58 | 2.67 | 15.4 | 8.55 |
| 12 | 4.27 | 3.14 | 2.95 | 2.22 | 2.25 | 2.1  | 1.16 | 0.75 | 2.27 | 1.45 | 1.32 | 0.79 | 1.7  | 0.69 | 0.38 | 0.47 | 0.37 | 0.36 | 0.61 | 0.57 | 0.61 | 0.46 | 0.18 | 0.57 | 0.14 | 0.31 | 0.23 | 2.45 | 0.27 |      |
| 13 | 3.32 | 3.47 | 2.84 | 2.86 | 2.2  | 1.92 | 1.03 | 1.44 | 2.17 | 1.08 | 1.65 | 2.06 | 0.69 | 0.55 | 0.37 | 0.3  | 1.1  | 0.58 | 1.39 | 0.75 | 0.44 | 0.24 | 0.21 | 0.34 | 0.31 | 0.28 | 0.31 | 1.8  | 0.02 |      |
| 14 | 4.07 | 3.24 | 2.82 | 2.34 | 2.07 | 2.15 | 1.94 | 1    | 2.17 | 1.89 | 2.18 | 1.53 | 1.14 | 0.8  | 0.77 | 0.61 | 0.49 | 0.47 | 0.7  | 0.55 | 0.6  | 0.52 | 0.33 | 0.29 | 0.36 | 0.24 | 0.17 | 0.46 | 0.48 | 3.74 |
| 15 | 4.84 | 3.3  | 3.13 | 2.41 | 2.62 | 3.41 | 2.72 | 2.15 | 2.55 | 1.54 | 3.05 | 2.07 | 2.59 | 1.26 | 0.61 | 0.51 | 0.64 | 0.58 | 0.89 | 1.07 | 0.54 | 0.5  | 0.16 | 0.34 | 0.6  | 0.29 | 0.43 | 0.36 | 0.98 |      |
| 16 | 4.52 | 4.79 | 3.87 | 3.91 | 2.8  | 3.27 | 2.8  | 2.73 | 1.92 | 3.29 | 2.2  | 1.87 | 1.35 | 1.28 | 0.86 | 1.42 | 1.32 | 1    | 1.2  | 1.13 | 0.51 | 0.62 | 0.41 | 0.25 | 0.32 | 0.25 | 0.19 | 0.25 | 0.51 | 1.37 |
| 17 | 6.55 | 4.94 | 5.08 | 3.93 | 3.32 | 2.58 | 2.32 | 2.72 | 2.67 | 3.34 | 1.74 | 2.03 | 0.7  | 0.89 | 1.96 | 1.67 | 1.71 | 0.81 | 0.78 | 0.9  | 0.69 | 0.53 | 0.29 | 0.23 | 0.29 | 0.21 | 0.26 | 0.14 | 0.31 | 0.82 |
| 18 | 6.17 | 5.84 | 4.91 | 4.19 | 4.99 | 3.23 | 3.03 | 3.44 | 2.59 | 2.89 | 2.79 | 2.44 | 1.32 | 2.53 | 1.9  | 2.3  | 1.01 | 1.3  | 0.45 | 0.81 | 0.7  | 0.37 | 0.44 | 0.23 | 0.18 | 0.35 | 0.24 | 0.28 | 0.6  | 0.44 |
| 19 | 6.31 | 3.86 | 3.28 | 4.95 | 4.52 | 4.03 | 3.63 | 4    | 3.61 | 2.3  | 1.32 | 1.75 | 2.52 | 1.58 | 1.97 | 1.59 | 2.86 | 0.91 | 1.62 | 0.9  | 0.6  | 0.57 | 0.31 | 0.21 | 0.35 | 0.37 | 0.26 | 0.23 | 0.42 | 0.32 |
| 20 | 4.27 | 4.7  | 6.81 | 4.98 | 4.44 | 4.04 | 4.29 | 2.1  | 3.53 | 3.46 | 2.11 | 1.94 | 3.21 | 1.79 | 3.03 | 3.62 | 1.6  | 1.05 | 1.14 | 0.89 | 0.69 | 0.38 | 0.34 | 0.33 | 0.2  | 0.2  | 0.21 | 0.09 | 0.31 | 0.14 |
| 21 | 8.08 | 5.97 | 3.9  | 5.93 | 5.25 | 3.65 | 3.92 | 3.82 | 3.02 | 3.2  | 2.88 | 2.3  | 1.51 | 1.65 | 2.34 | 1.88 | 1.6  | 1.21 | 0.7  | 0.83 | 0.4  | 0.24 | 0.63 | 0.19 | 0.21 | 0.29 | 0.34 | 0.28 | 0.57 | 0.55 |
| 22 | 7.88 | 6.65 | 6.06 | 5.14 | 5.05 | 4.99 | 3.4  | 3.08 | 2.41 | 3.78 | 2.93 | 2.07 | 2.82 | 1.72 | 2.31 | 1.42 | 0.82 | 0.72 | 0.59 | 0.54 | 0.28 | 0.35 | 0.21 | 0.17 | 0.19 | 0.27 | 0.37 | 0.23 | 0.34 | 0.94 |
| 23 | 7.68 | 6.63 | 6.55 | 6.28 | 4.3  | 5.96 | 4.38 | 4.88 | 3.44 | 2.62 | 3.42 | 2.77 | 1.61 | 2.53 | 2.05 | 1.64 | 1.17 | 0.37 | 0.5  | 0.56 | 0.64 | 0.19 | 0.3  | 0.17 | 0.19 | 0.21 | 0.28 | 0.29 | 0.75 | 0.51 |
| 24 | 9.18 | 8.78 | 7.4  | 5.39 | 5.38 | 5.03 | 4.99 | 3.3  | 2.81 | 2.69 | 2.08 | 2.94 | 2.99 | 2.52 | 2.35 | 1.16 | 1.2  | 1.37 | 0.63 | 0.35 | 0.68 | 0.42 | 0.69 | 0.7  | 0.26 | 0.7  | 0.58 | 0.55 | 0.41 | 0.67 |
| 25 | 9.41 | 7.77 | 8.51 | 7.45 | 6.85 | 4.96 | 4.19 | 2.89 | 5.42 | 3.64 | 4.13 | 4.01 | 3.27 | 2.71 | 2.46 | 1.7  | 1.35 | 1.7  | 1.93 | 0.54 | 0.31 | 0.38 | 0.65 | 0.44 | 1.19 | 0.5  | 0.35 | 0.49 | 0.71 | 0.74 |
| 26 | 10.2 | 14   | 9.69 | 7.01 | 6.99 | 5.03 | 4.07 | 3.07 | 4.21 | 5.24 | 4.42 | 4.5  | 4.54 | 4.04 | 3.35 | 1.94 | 1.77 | 2.04 | 1.87 | 1.04 | 0.99 | 0.92 | 1.33 | 0.9  | 0.54 | 0.79 | 1.12 | 0.62 | 1.04 | 0.56 |
| 27 | 12   | 12   | 8.95 | 8.82 | 7.86 | 5.56 | 4.61 | 5.34 | 7.13 | 6.8  | 6.5  | 5.68 | 5.94 | 5.82 | 4.88 | 2.88 | 2.25 | 2.13 | 0.67 | 1.03 | 0.9  | 0.4  | 0.61 | 0.6  | 0.39 | 0.31 | 0.67 | 0.78 | 1.49 | 1.19 |
| 28 | 12.9 | 14.3 | 11.9 | 8.64 | 7.36 | 8.35 | 8.59 | 10.8 | 10.1 | 8.63 | 8.56 | 7.61 | 9.15 | 9.96 | 5.3  | 4.6  | 3.03 | 1.64 | 1.33 | 0.86 | 0.81 | 0.67 | 0.49 | 0.21 | 0.24 | 0.65 | 0.57 | 1.24 | 1.26 | 1.56 |
| 29 | 13.8 | 13   | 12.8 | 11.3 | 9.69 | 10.2 | 13.3 | 13.8 | 12   | 11.1 | 9.64 | 10.2 | 7.72 | 8.82 | 6.81 | 5.52 | 3.41 | 2.31 | 1.27 | 0.65 | 0.85 | 1.15 | 0.51 | 0.35 | 0.31 | 0.42 | 1.03 | 0.72 | 1.39 | 2.31 |



Out-Hospital  
Backup

Sharing among  
Institutes

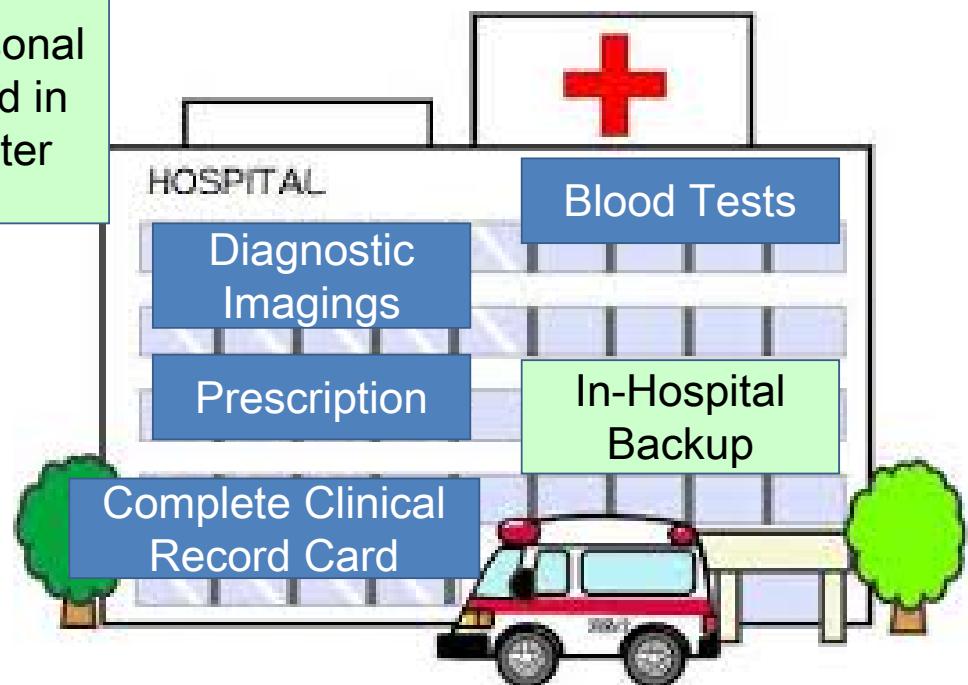
To Snatch Personal  
Medical Record in  
Time of Disaster

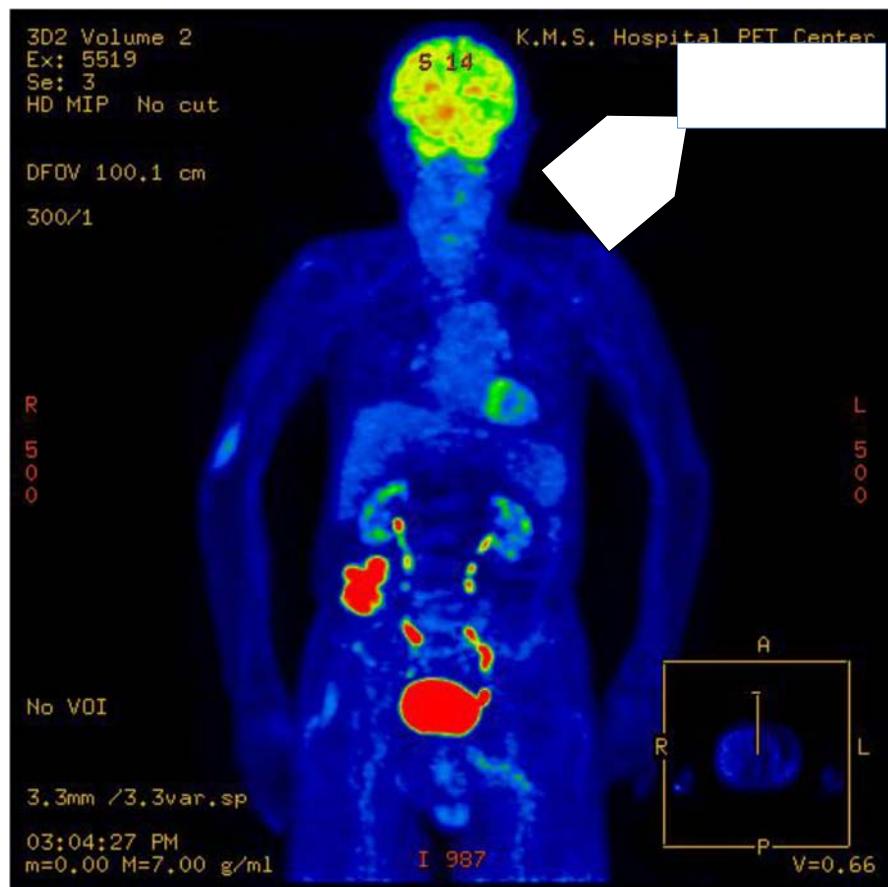
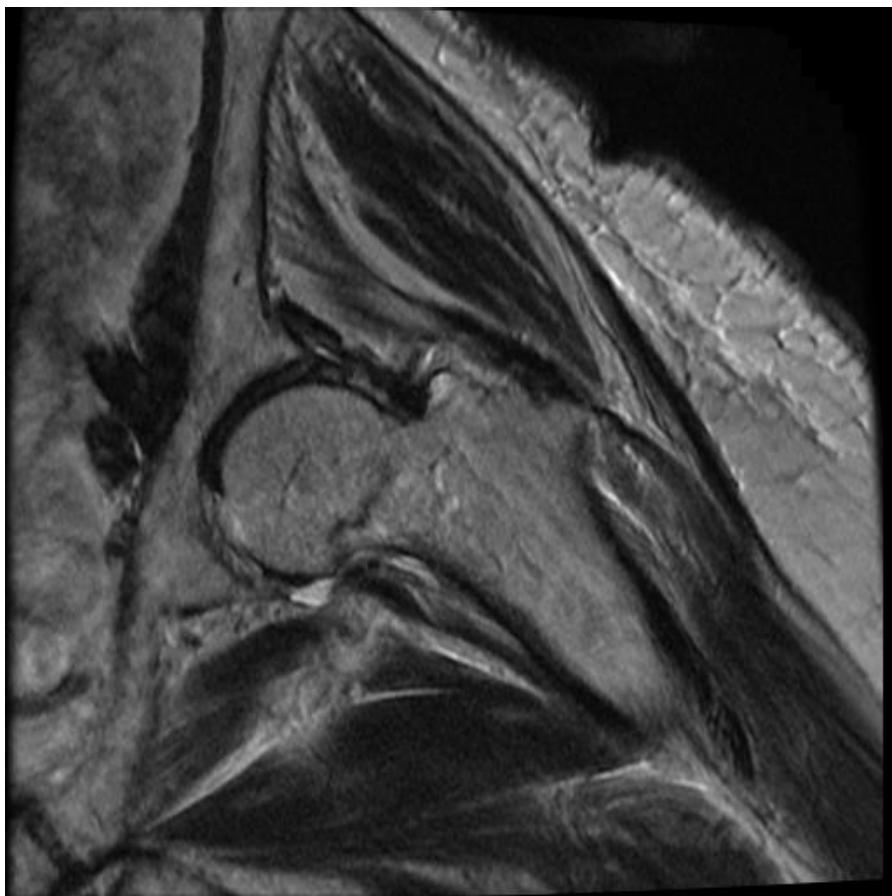
HOSPITAL

Diagnostic  
Imagings  
Prescription  
Complete Clinical  
Record Card

Blood Tests

In-Hospital  
Backup





- Medical records are updated everyday
- Rare diseases are carefully excluded even from the anonymous DWH

|           | Jan 12 | March 10 | May 8 | July 5 | Sept 2 | Oct 31 |
|-----------|--------|----------|-------|--------|--------|--------|
| T Protein | 7.2    | 7.0      | 7.1   | 6.9    | 6.8    | 6.6    |
| Albumin   | 4.4    | 4.3      | 4.4   | 4.2    | 4.0    | 3.8    |
| AST       | 28     | 28       | 20    | 48     | 22     | 32     |
| ALT       | 23     | 23       | 18    | 67     | 31     | 27     |
| Creatinin | 0.7    | 0.9      | 0.8   | 0.8    | 1.0    | 1.3    |

## Standard Value (Normal Value)

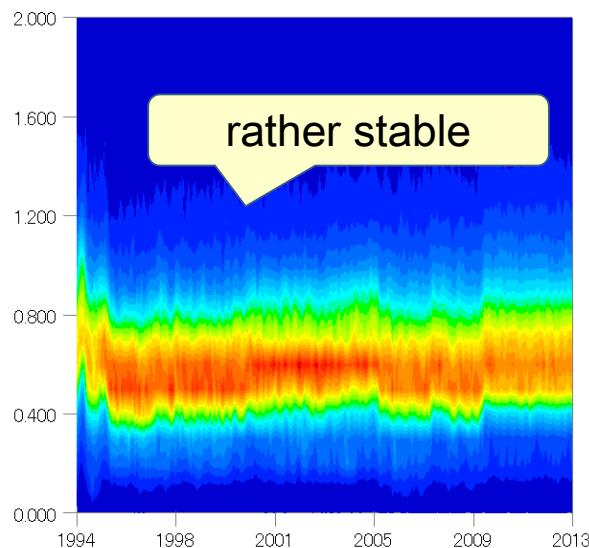
- Mesurement Method
- Analytical Instruments
- Purelity of Water
- Room Temperature
- Reactivities



Influencing the Result of Blood Test

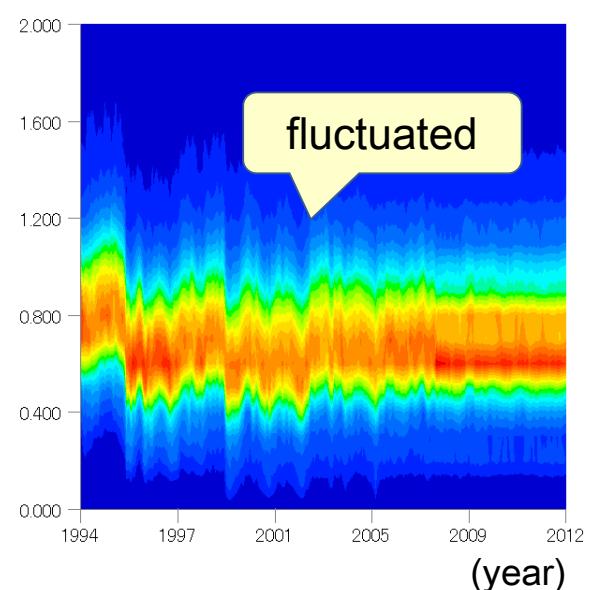
# Serum creatinine levels from 1994 to 2012 at 2 hospitals

CREATININE



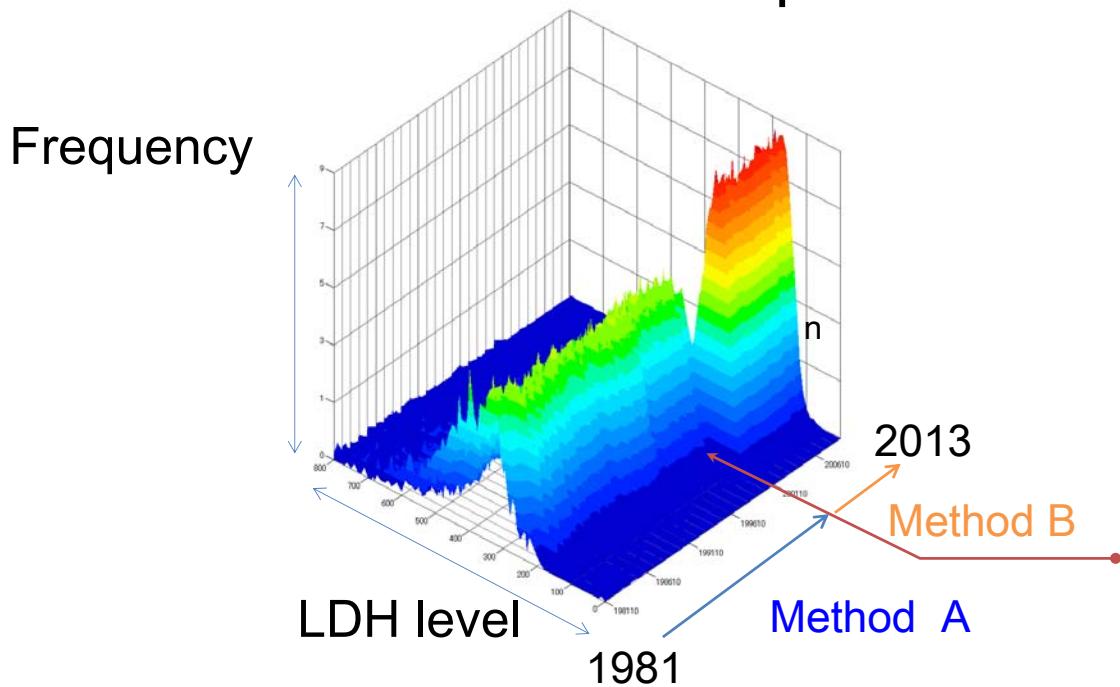
Hospital A

CREATININE



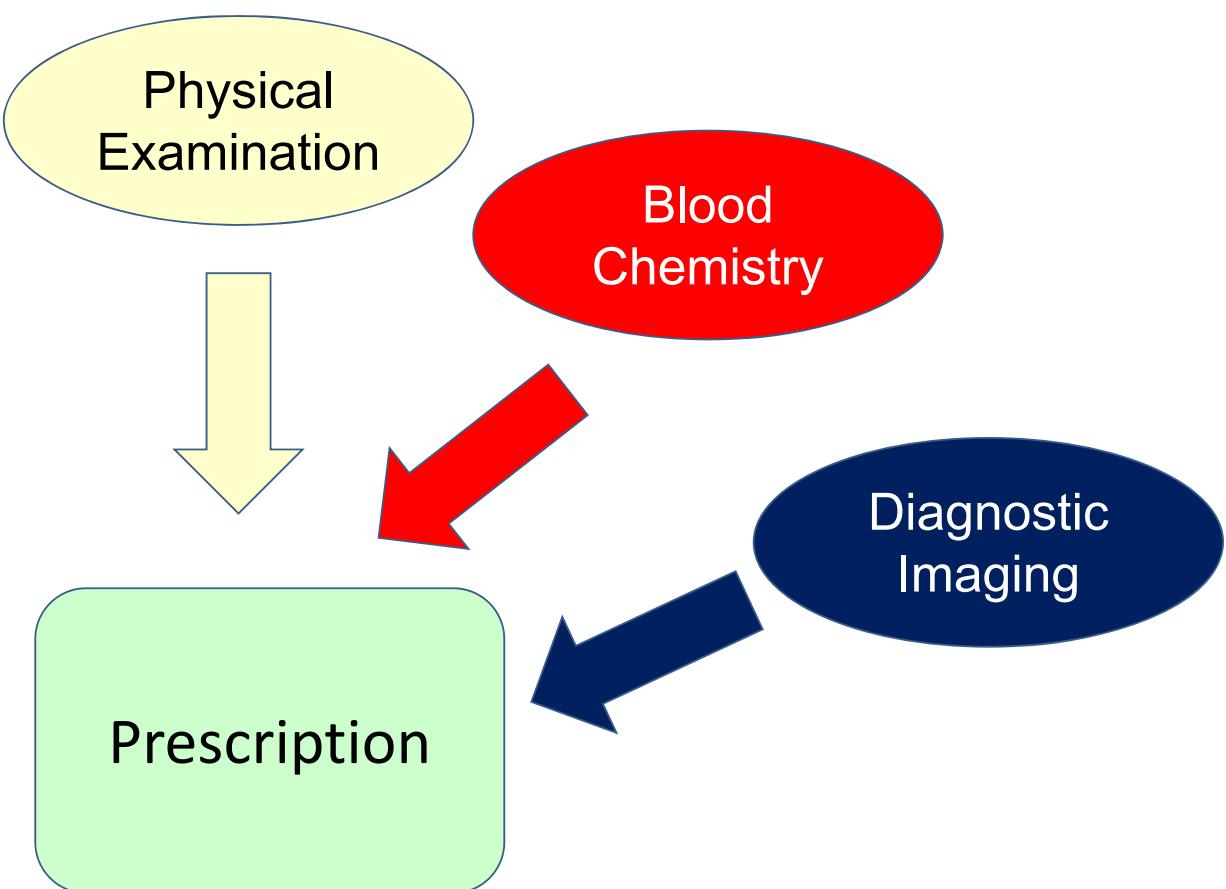
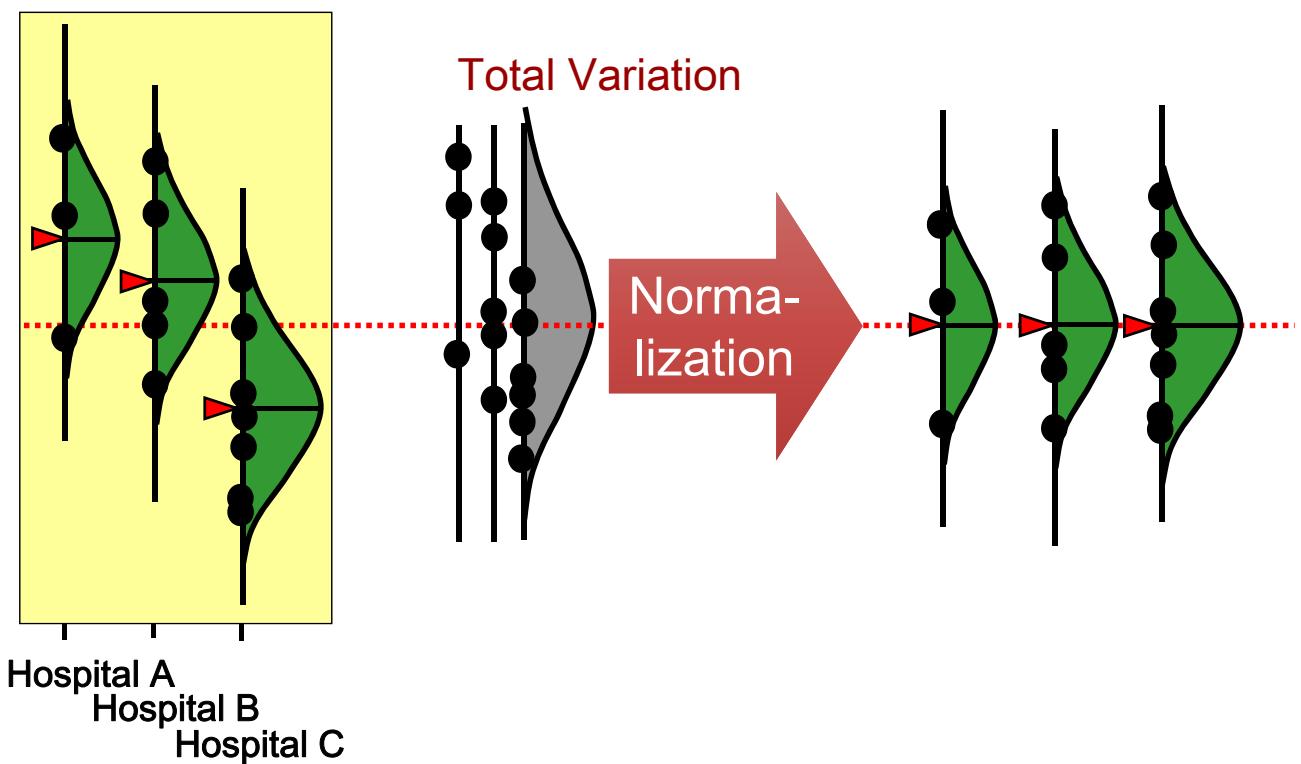
Hospital B

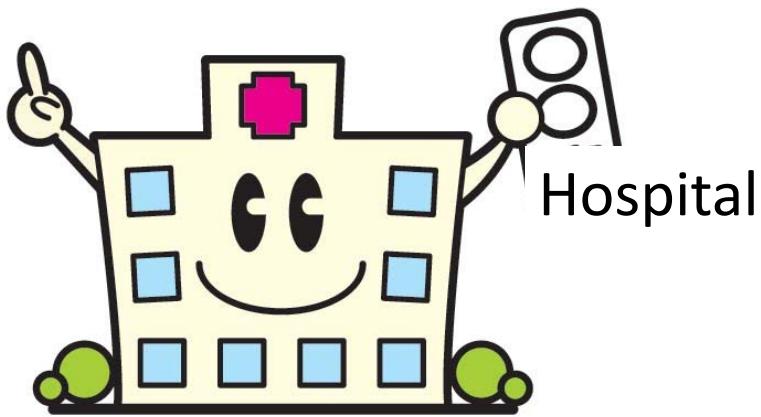
# Longitudinal serum creatinine levels from 1981 to 2013 at Hospital C



# Normalization between methods of measurement or along hospitals

## Fluctuation and Difference





Insurer

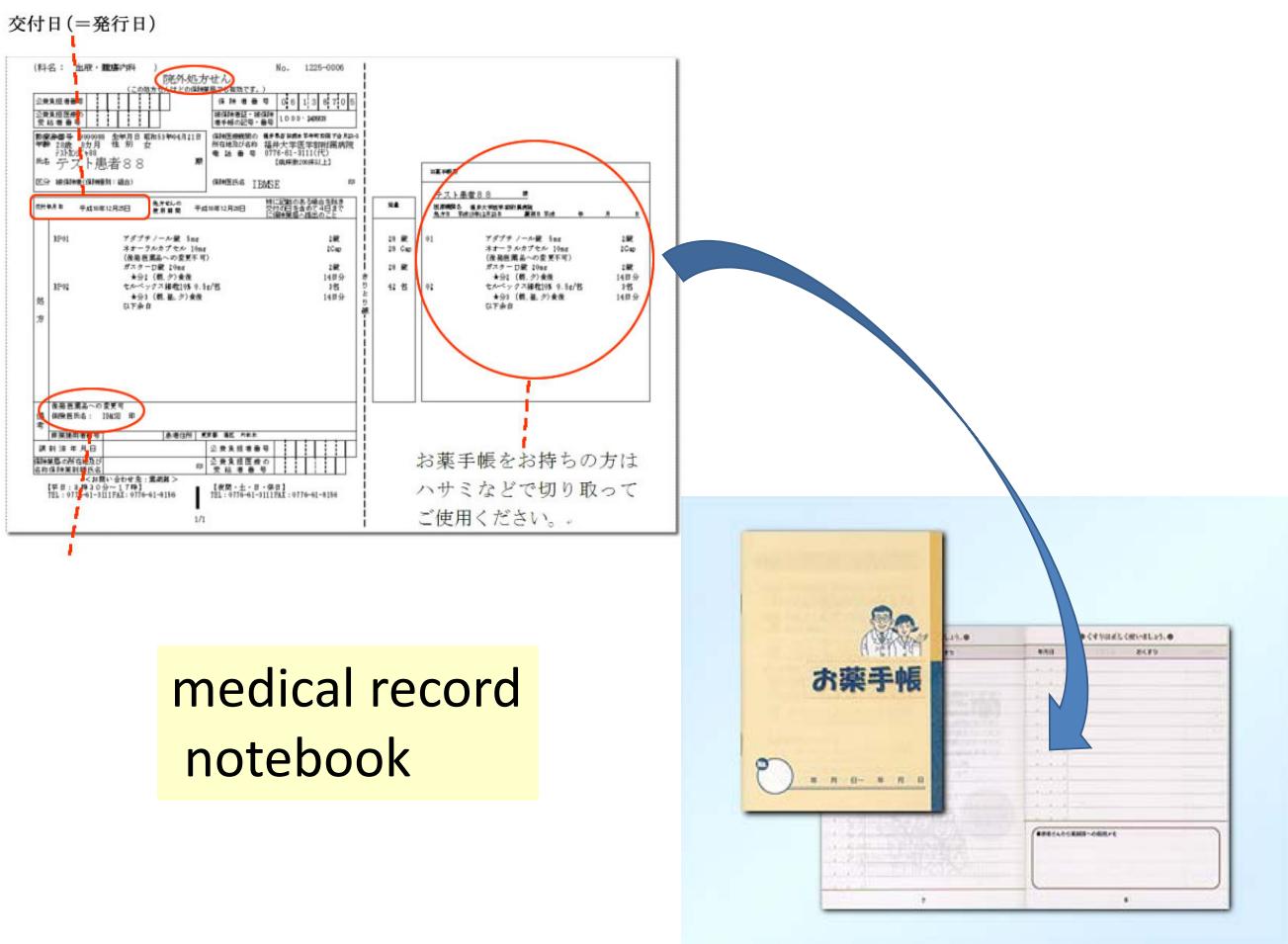
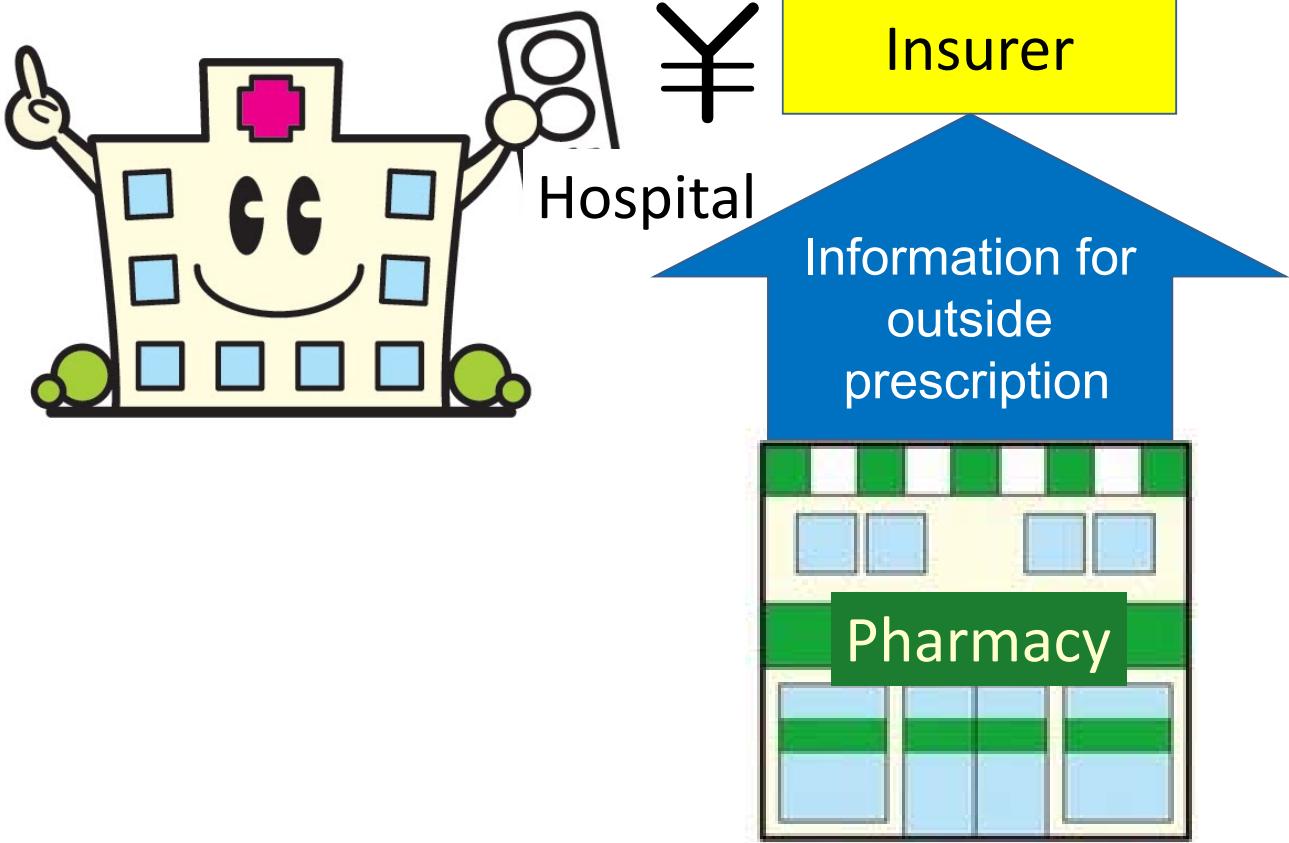


Insurer

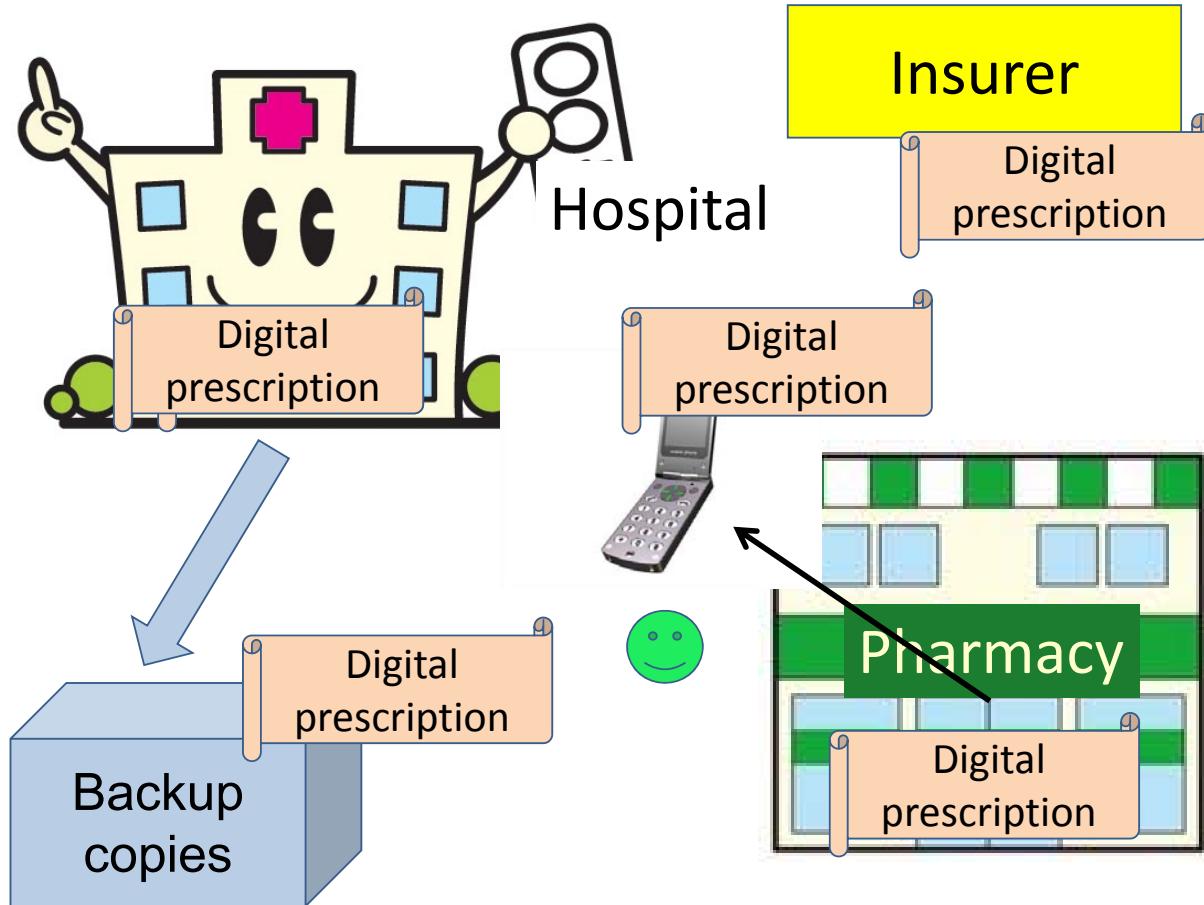
70%

Patients

30%



交付日(=発行日)



## Hospital



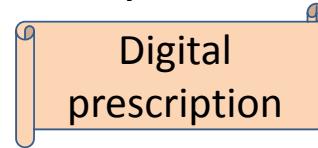
## Insurer



## Backup Copies



## Pharmacy



## Insurer



With Agree



Pharmacy

With Agree





Search for clinical record sheet (河北新報)





Women's feminine products  
Saled in Ho Chi Minh City  
in Viet Nam

## Birth Control Protections



# Stoma Bag



## System Resilience

