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A Model for Personnel Allocation at Hospitals

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AGENDA

I. Introduction

II. Strategies for Developing the Model

III. Model Explanation through Case Study

IV. Verification of the Model

V. Summary and Future Task

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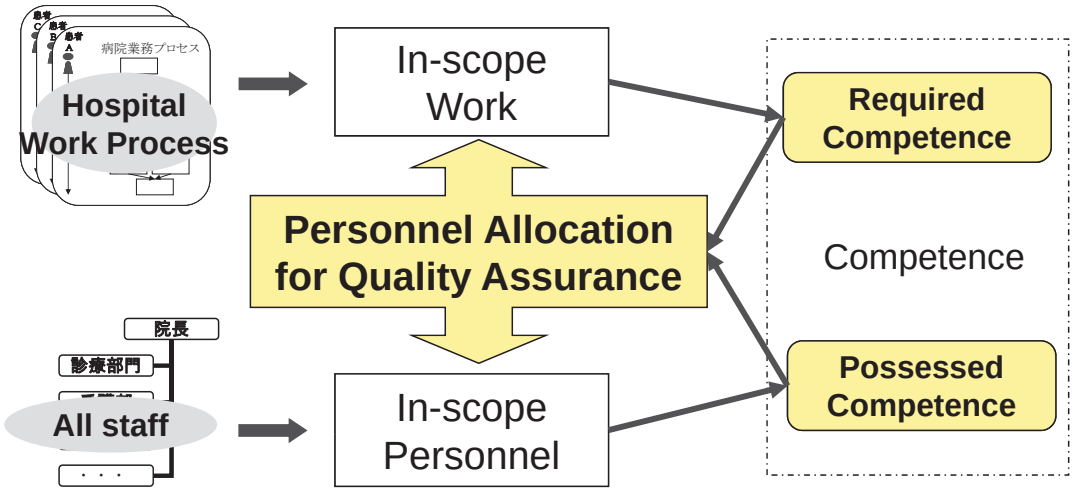
Motivations

- Social concern about the assurance of healthcare quality
- Quality of healthcare relies heavily on personnel's competence
- However, at hospitals available human resources are limited.

A Method for personnel allocation for quality assurance with limited human resources is required

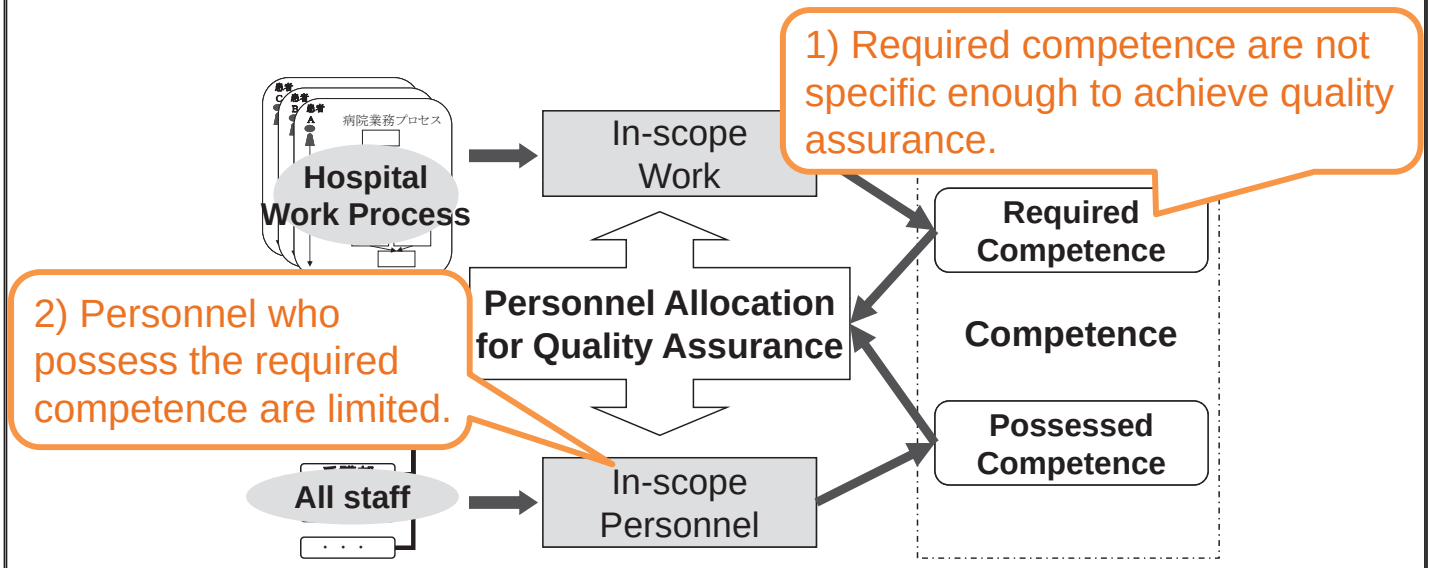
Personnel Allocation for Quality Assurance

- Required Competence ≦ Possessed Competence



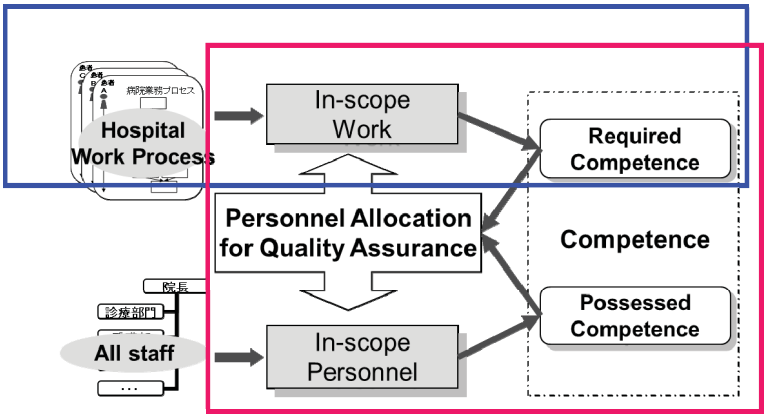
Issues to Implement the Concept

- The concept itself is understood well for hospitals
- However, the concept has not implemented effectively for two reasons



Purpose and Strategy

- Purpose of this study
  - Develop a method for personnel allocation in order to achieve quality assurance with limited human resources at hospitals
- Strategy: Two Issues have to be addressed
  - 1) Derive criteria to evaluate competence for quality assurance
  - 2) Derive logic for personnel allocation in the viewpoints of human resource utilization



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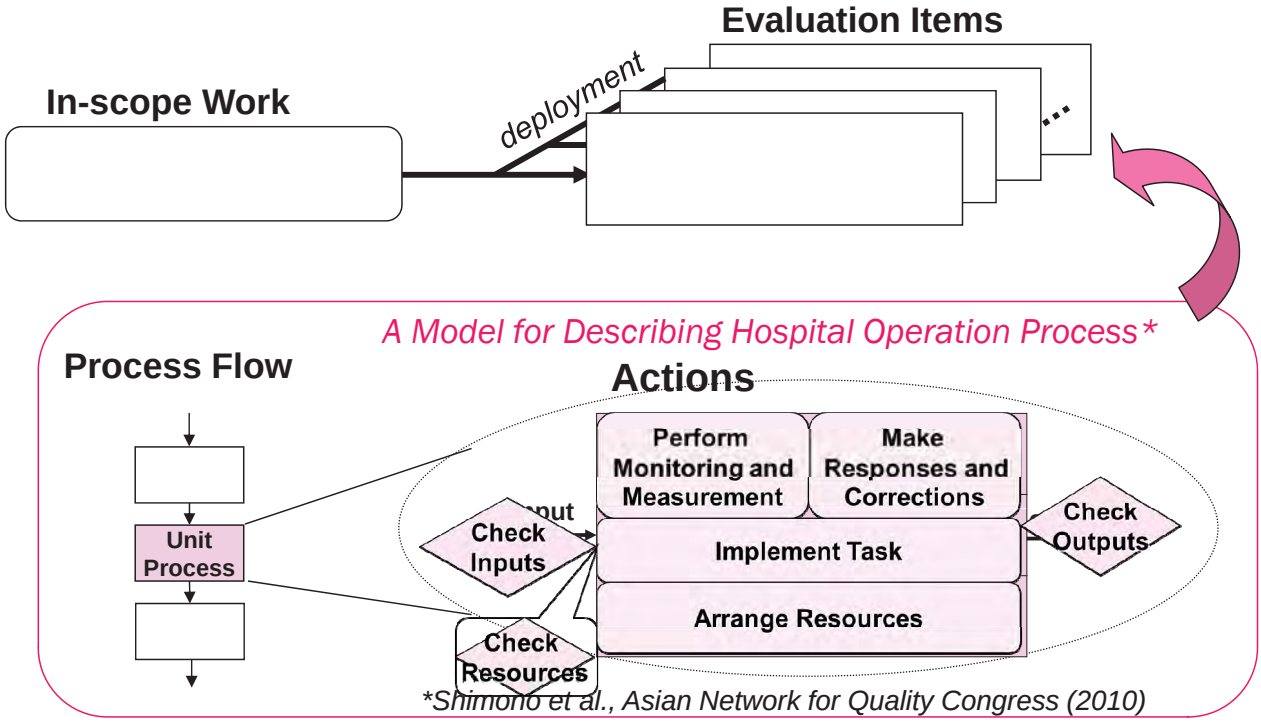
Strategy 1)

Items for Evaluating Competence

- Items effect quality are derived through the *deployment* of the in-scope work



*Shimono et al., Asian Network for Quality Congress (2010)

Strategy 2)

Classify Possessed Competence

- It is necessary to define criteria for each item to be evaluated

Level	Level 1	Level 2	Level 3	Level 4
Generic content per level	Ability to implement with on-site help	Ability to implement in typical cases by oneself and to ask the highly-leveled personnel for help in standard or complex cases	Ability to implement in standard cases by oneself and to ask the highly-leveled personnel for help in complex cases	Ability to implement in complex cases by oneself
Image per level	Highly-level; All cases	Highly-level; Typical Cases	Standard Cases	All Cases Includes Difficult cases

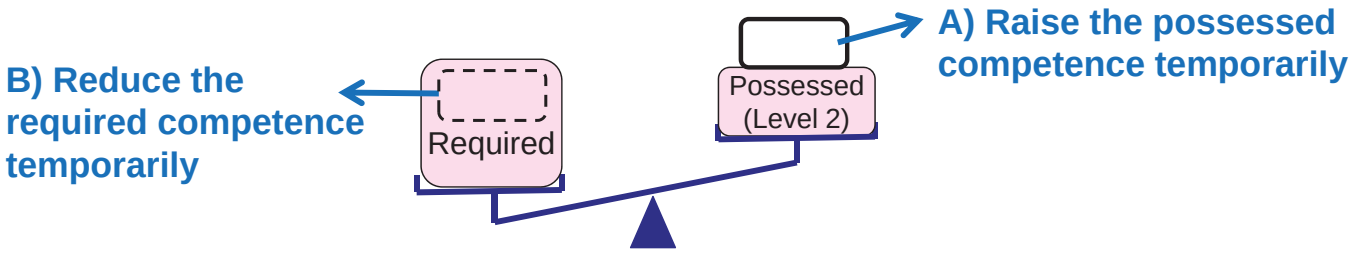
Scale for Competence can distinguish level 2 from level 3.

"Standard cases" means cases for which standardized response processes are defined, and does not mean "Typical or simple cases".

Strategy 2)

Utilize Level 2 Personnel

- Level 2 personnel is in the situation of Required > Possessed.



- Two types of conditional allocation

  A) Allocated in combination with a highly-leveled (Level 3 or 4) personnel
  (Receive support by high-level personnel for non-typical cases)

  B) Allocated with waiting instructions in non-typical cases
  (Avoid non-typical cases)

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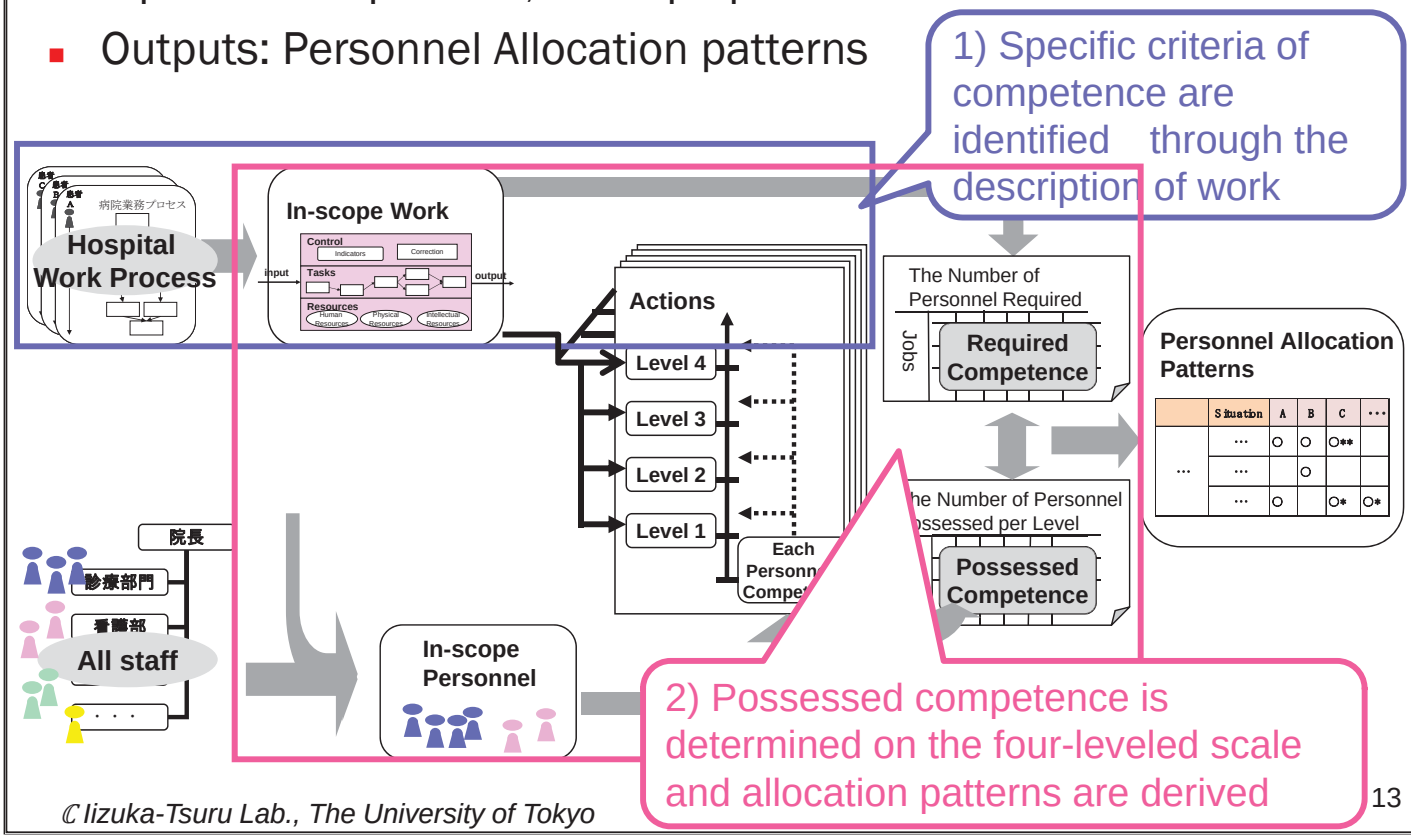
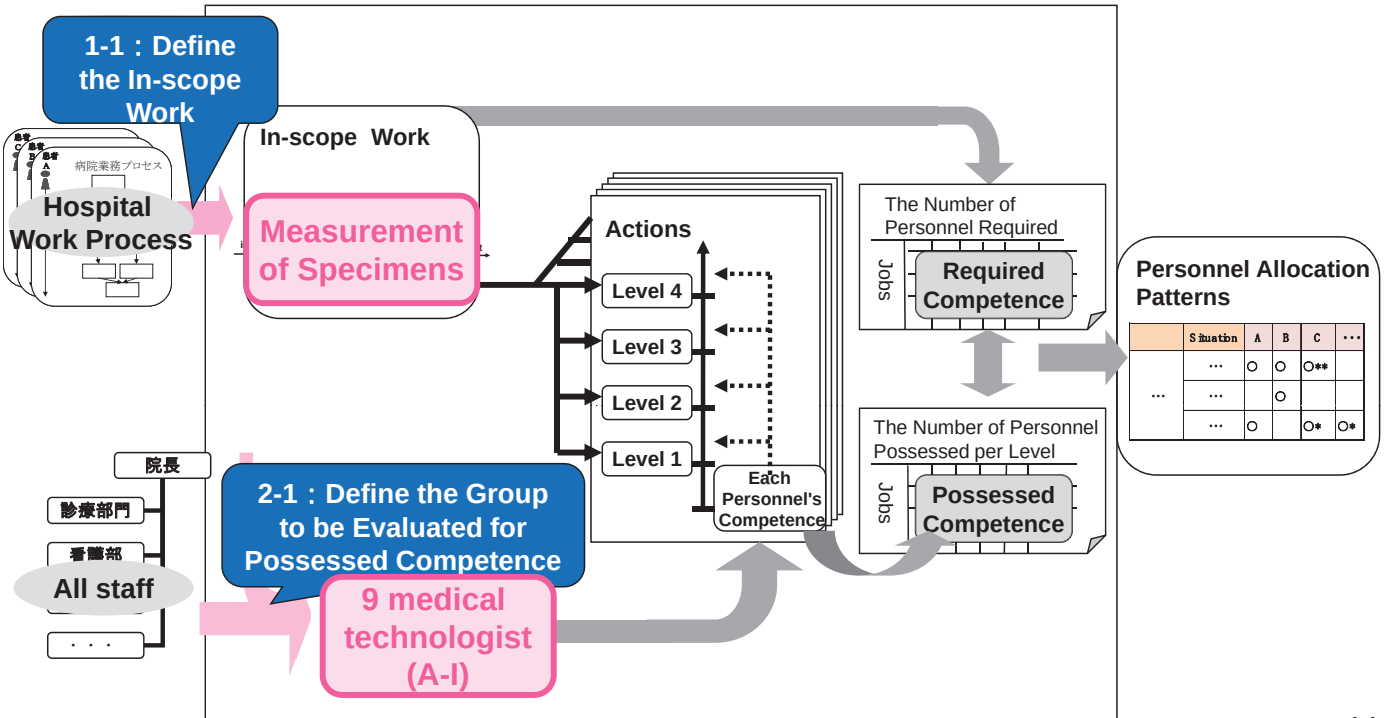
Outline of the Developed Model

- Inputs: In-scope work, In-scope personnel
- Outputs: Personnel Allocation patterns



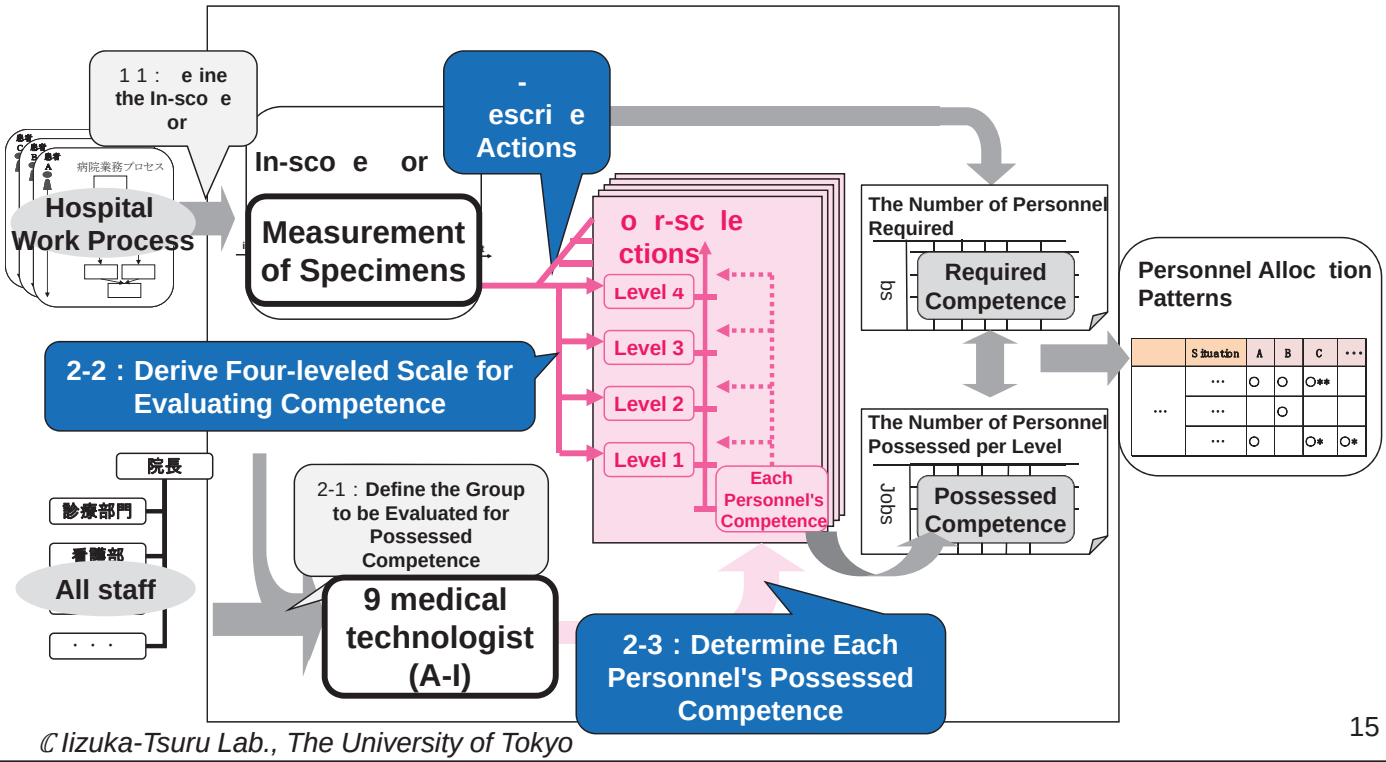
Inputs to the Model for the Case

- Inputs to the model
  - the in-scope work, the in-scope personnel



Model Explanation through Case Study

- Intermediate outputs of the model
  - Actions, Four-leveled Scale, Each personnel's possessed competence



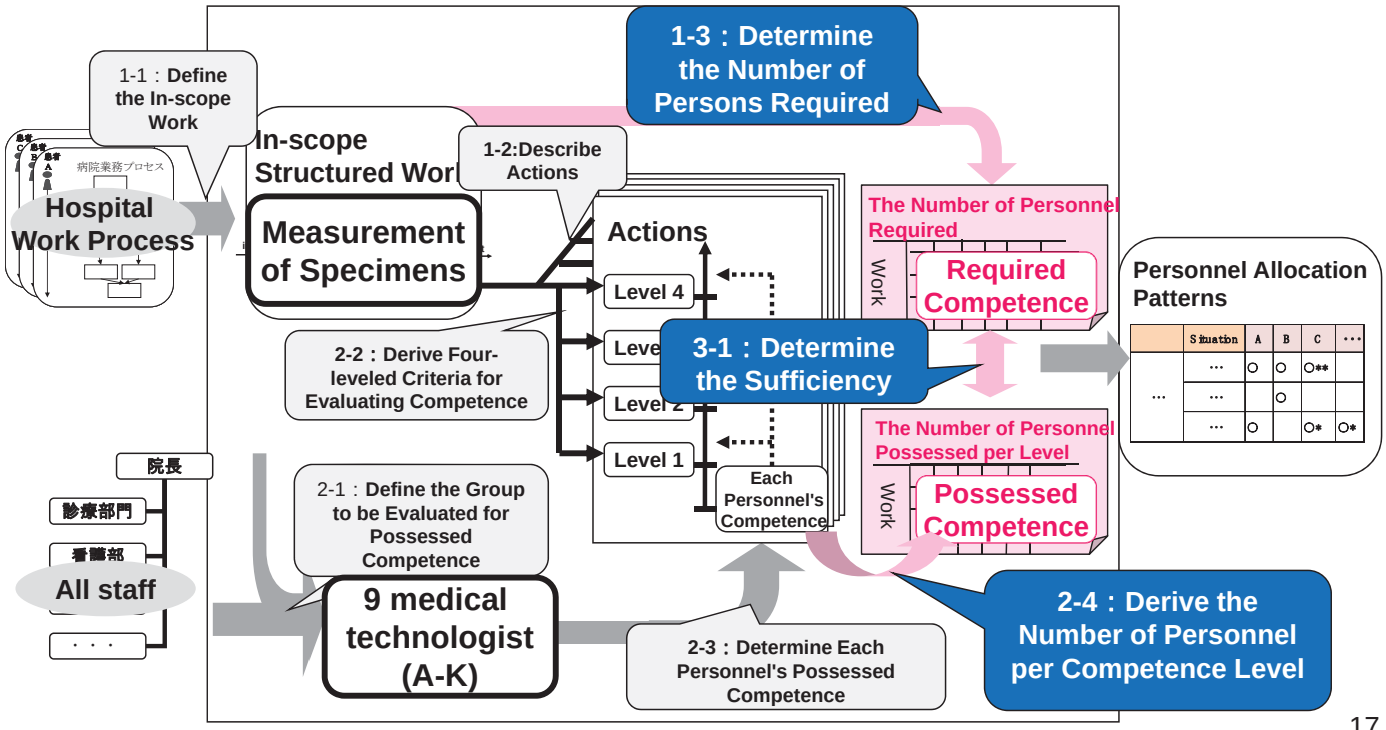
The intermediate outputs of the Model

1-2: Describe Actions | **2-2 : Derive Four-leveled Criteria for Evaluating Competence** | **2-3 : Determine Each Personnel's Possessed Competence**

Unit Process	Actions		Four-leveled Scale				Each Personnel's Competence per Action									Each Personnel's Competence per Unit Process								
	Action Type	Content	Level1	Level2	Level3	Level4	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Measurement of Specimens	Implement Task	Measure specimens with testing instruments		Ability to measure specimens of normal size	Ability to measure small specimens		3	3	3	3	3	3	3	3	3									
	Check Outputs	Judge testing results within an upper limit and lower limit		Ability to know how to judge testing results within an upper limit and lower limit by the manual	Ability to judge testing results within an upper limit and lower limit by the manual	Ability to judge and make a respondes to the testing results within an upper limit and lower limit	4	4	4	4	4	4	3	4	4									
	Check Outputs	Judge testing results within an allowable value of remeasurement		Ability to know how to judge testing results within an allowable value of remeasurement by the manual	Ability to judge testing results within an allowable value of remeasurement by the manual	Ability to judge and make a respondes to the testing results within an allowable value of remeasurement	3	3	3	3	3	3	3	3	3	2	2	2	2	3	3	1	2	2
	Check Outputs	Judge testing results by the previous value		Ability to compare the testing results with the previous value	Ability to judge the testing results by comparison with the previous value and by consideration of patient's information	Ability to judge the testing results by comparison with the previous value and by considreation of any factors and make responses	4	4	3	3	3	3	2	4	3									
	Control	Monitor and handle the measurement machine and conveyor		Ability to monitor and recognize the troubles of the measurement machine and conveyor	Ability to monitor and make a first-aid action of the measurement machine and conveyor	Ability to monitor and handle the troubles of the measurement machine and conveyor	2	2	2	2	3	3	0	2	2									

Model Explanation through Case Study

- Intermediate outputs of the model
  - Actions, Four-leveled Scale, Each personnel's possessed competence



The intermediate outputs of the Model

1-3：Determine the Number of Persons Required

2-4：Derive the Number of Personnel per Competence Level

3-1：Determine the Sufficiency

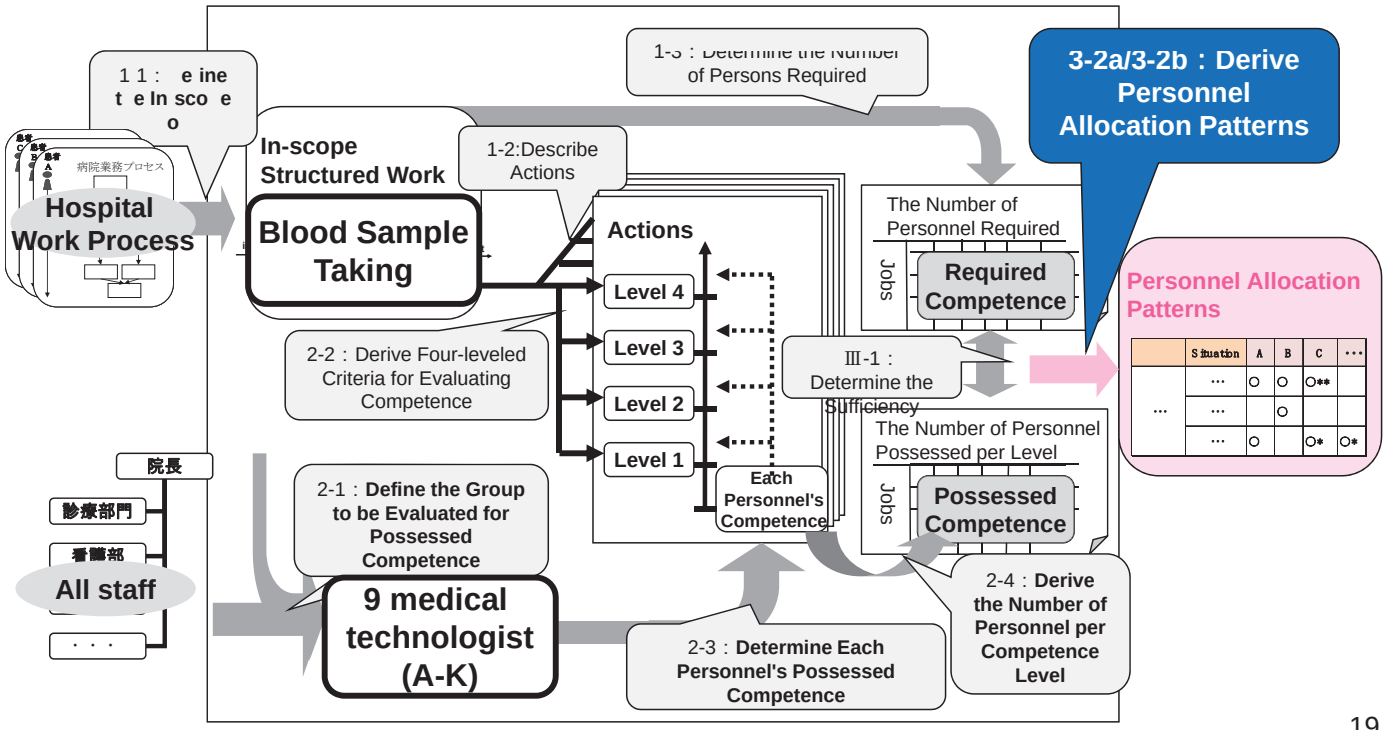
Unit Process / Situation	Intermediate Output	The Number of Personnel Required	The Number of Personnel Possessed per Level			Sufficiency / Insufficiency	
			Level 4	Level 3	Level 2	Calculation Result	Determination Result
Measurement of Specimens	Day Shift	3	0	2	6	-1	Insufficient
	Night Shift	1				-0.8	Insufficient

★Calculation Formula
="The Number of Personnel Possessed" - "The Number of Personnel Required"

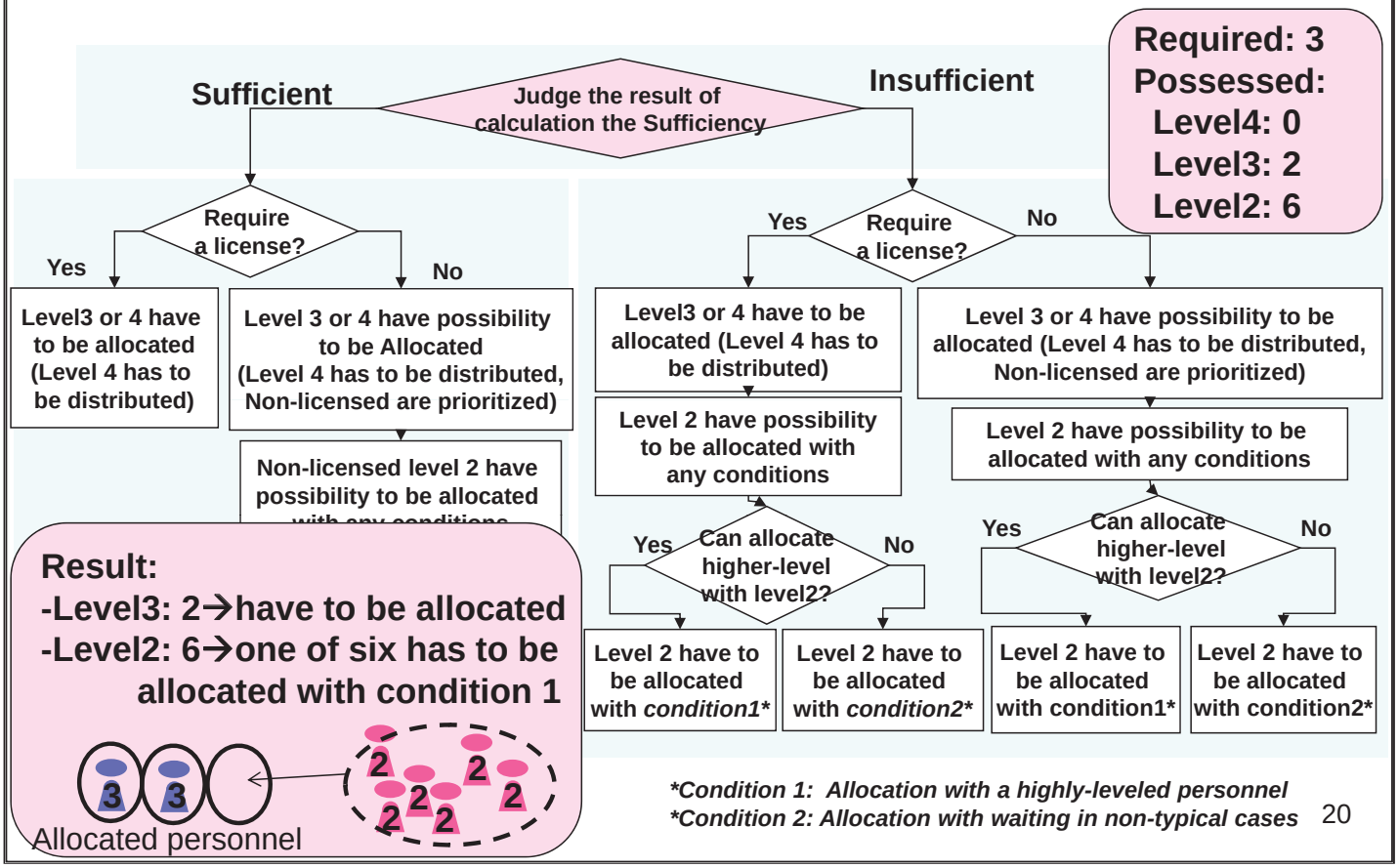
★How to determine whether the number of personnel is sufficient or not
Calculation Result ≧0 → Sufficient
Calculation Result <0 → Insufficient

Model Explanation through Case Study

- Outputs of the model



Logic Flow for Deriving Personnel Allocation Patterns



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- Probability and condition of allocation are showed For each person

Unit Process	Situation (Shift etc.)	Number of Personnel Required	A Licensed, Expert	B Licensed, Expert	C Licensed, Mid-level	D Licensed, Mid-level	E Licensed, Mid-level	F Licensed, Mid-level	G Licensed, freshman	H Licensed, Expert	I Licensed, Expert
Measurement of Specimens	Day Shift	3	○*	○*	○*	○*	●	●		○*	○*
	Night Shift	1	○**	○**	○**	○**	○	○		○**	○**

Meaning of Circles	
○	One of the personnel marked "○" has to be allocated
●	All personnel marked "●" have to be allocated
	Cannot be allocated

Meaning of Superscripts	
*	Conditional allocation with a highly-leveled personnel (Condition 1)
**	Conditional allocation with waiting in non-typical cases (Condition 2)

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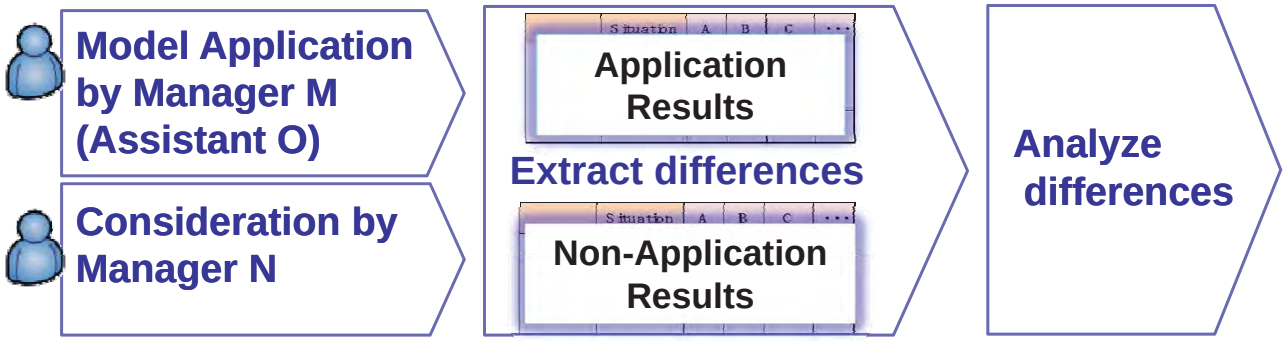
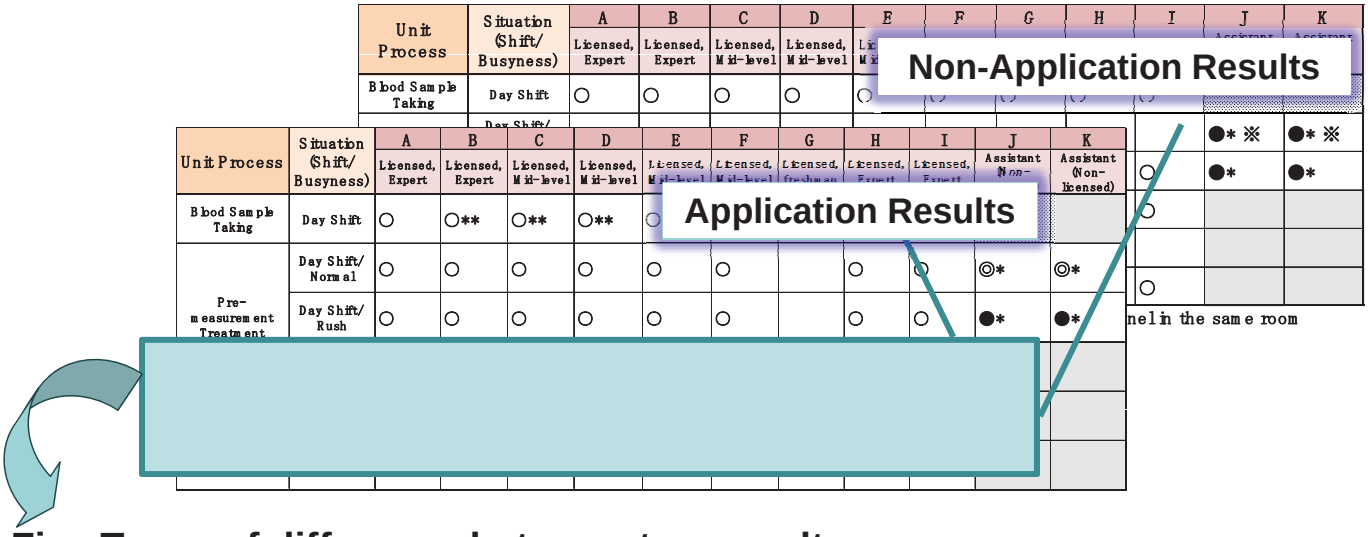
Verification Settings

- Objective
  - Compare our model to traditional allocation methods in terms of quality assurance with human resource utilization
- Procedure



- Cases: 3 unit processes of clinical test process
  - Blood Sample Taking
  - Pre-measurement Treatment
  - Measurement of Specimens

Extraction of Differences ?et? een T? o ?esults



Five Types of difference between two results

No.	Application Results	Non-application Results
1	Allocation with condition 2(○**)	Allocation without conditions (○)
2	Allocation with condition 1(○*)	Allocation without conditions (○)
3	Allocation with condition 2(○**)	Non Allocation (No symbol)
4	Allocation without condition(○)	Non Allocation (No symbol)
5	Having possibility of allocation (◎)	Having sureness of allocation (●)

Verification Results

No.		
□		
□		
□		
□ □		

The superiority of our model in deriving allocation patterns for the case unit processes is pointed

Scope of Applicability of the Model

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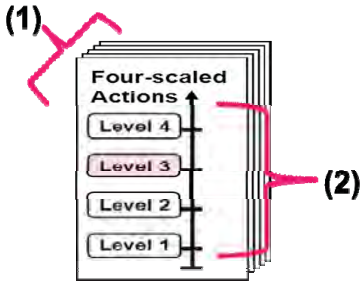

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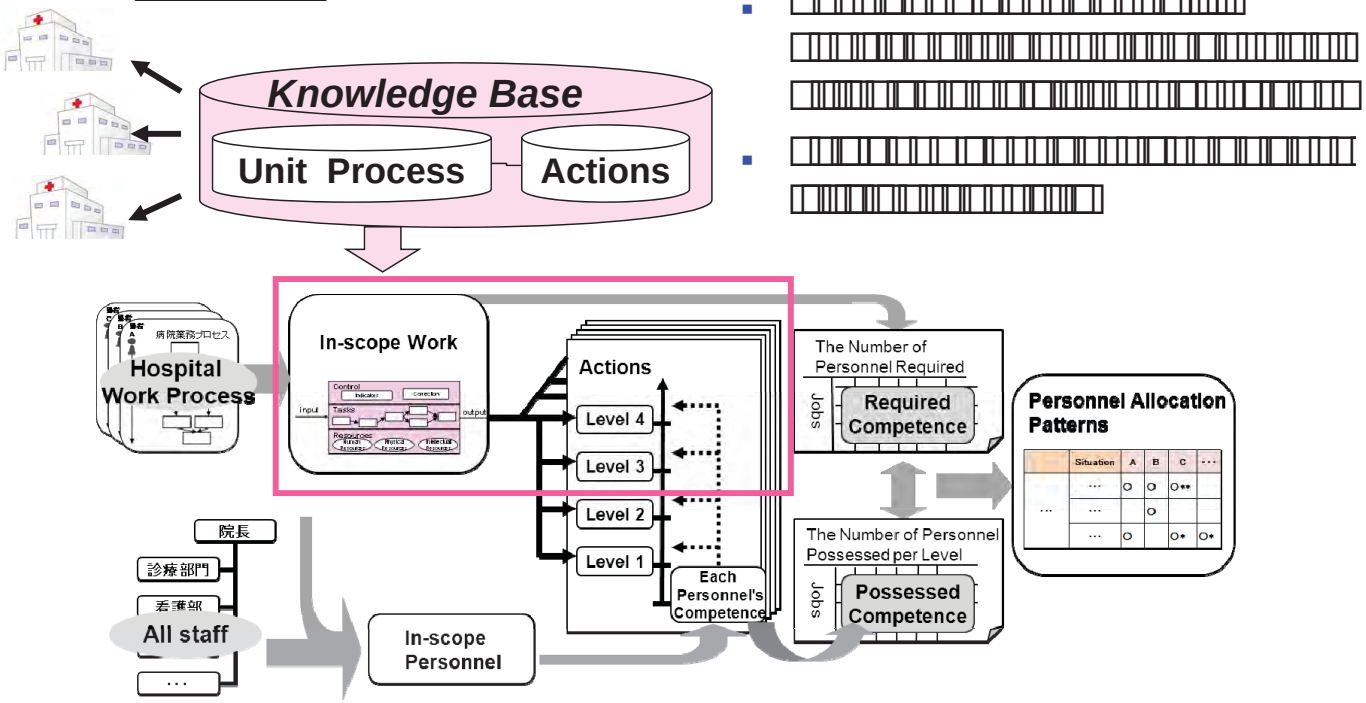
The developed model can be applied for any works at hospitals under the condition that the work is standardized

Future Tasks



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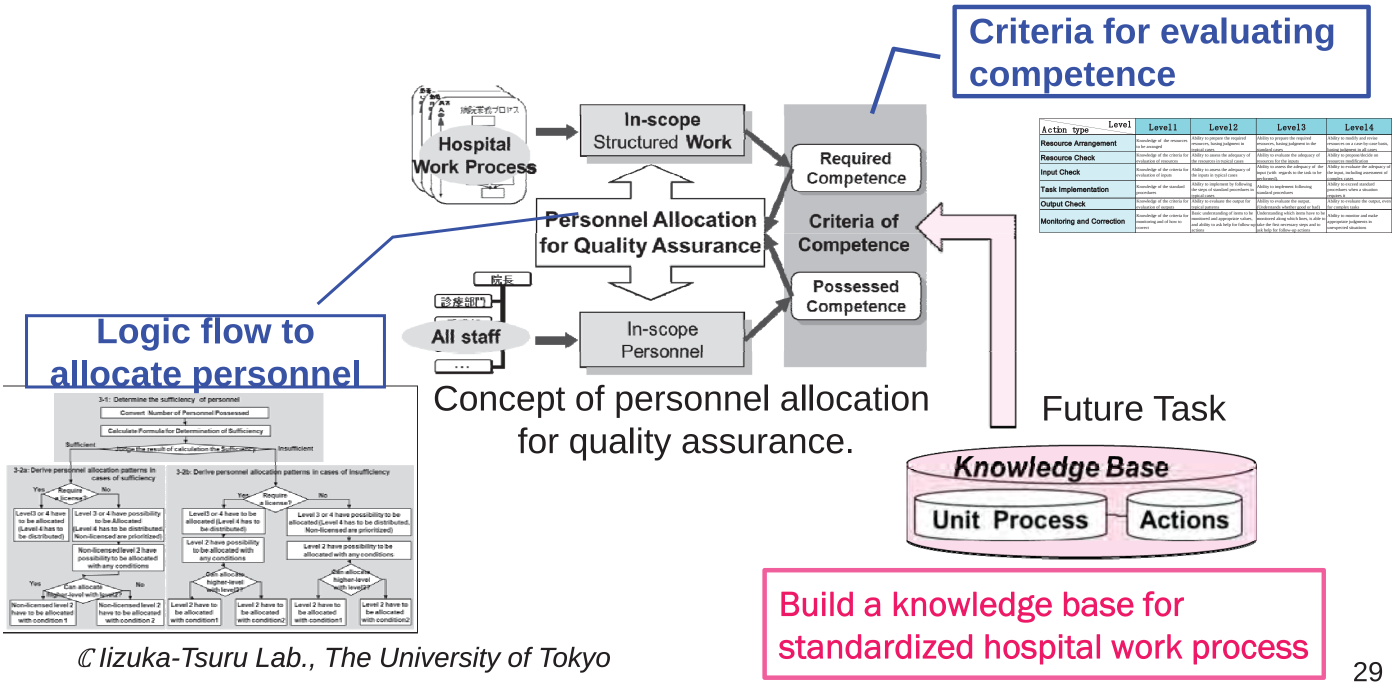
Criteria for evaluating competence
Hospital Work Process
In-scope Structured Work
Required Competence
Personnel Allocation for Quality Assurance
Criteria of Competence
Possessed Competence
All staff
In-scope Personnel
Logic flow to allocate personnel
Concept of personnel allocation for quality assurance.
Future Task
Knowledge Base
Unit Process
Actions
Build a knowledge base for standardized hospital work process