

## Places to Managing Medicines Patients Brought in Hospital: Which is Better Central Pharmacy or Hospital Wards?

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### Abstract

**Background:** Checking patients brought in medicine (CPBM) service in a hospital is one of the core service in the pharmacy division. At the National Cancer Center Hospital East, pharmacists performed the service in a central pharmacy, however, it has changed the working place, from the central pharmacy to hospital wards, since it was criticized that patients had long waiting time for CPBM. According to the change of working place, ward pharmacists check the medicines in a ward from February 5<sup>th</sup> 2015, compared that pharmacists checked the medicine in the central pharmacy in the past.

**Objective:** We evaluated benefits of change locations from the central pharmacy to hospital wards to check medicines brought to hospital by inpatients.

**Methods:** We conducted retrospective analysis of pharmacists' records of medicines brought to a hospital. We made two groups, central pharmacy group (CG) which pharmacists who worked in a dispensing room worked for the service in the central pharmacy from January 7<sup>th</sup> 2015 to February 4<sup>th</sup> 2015 and ward pharmacy group (WG) which ward pharmacists worked for the service in the ward from February 5<sup>th</sup> 2015 to March 5<sup>th</sup> 2015.

**Results:** There were 836 cases in WG and 836 cases in CG, respectively. There is no difference in patient demographics between WG and CG. The rate of CPBM was higher in WG [87% (724/836)] than in CG [72% (606/836)] ( $p < 0.001$ ). Average ( $\pm$  SD) time of the service, from start to double check, was shorter in WG [53 minutes ( $\pm$  38)] than in CG [126 minutes ( $\pm$  60)] ( $p < 0.001$ ). Pharmacists' interventions according to the check was higher in WG [32% (264/836)] than in CG [14% (121/836)] ( $p < 0.001$ ). Check for narcotic medicines was 15% (127/836) in WG and 0% in CG.

**Conclusion:** The change of service location does not only reduce patients' waiting time but also enhance clinical pharmacy service in inpatient.

**Keywords:** Ward pharmacist; Clinical pharmacy; Pharmacy service; Patients' brought in medicines; Multidisciplinary medicine

### Introduction

In a hospital, pharmacy services have a range of responsibilities for patients' treatment in various fields and those pharmacy services related to patients' outcome [1,2]. Since 2012, allocation of pharmacists in every hospital ward on medical safety managing medicines achieve health reimbursement fee in Japan, role of pharmacists in a hospital ward has been developed dramatically [3]. Checking and managing patients brought in medicine (CPBM) is one of the core service in pharmacy division [3,4]. At the National Cancer Center Hospital East (NCCHE), pharmacists performed the service in a central pharmacy, however, it has changed the working place, from central pharmacy to hospital wards, since it was criticized that patients had long waiting time for the CPBM service. The central pharmacy was in the first floor and its counter did not have enough space to perform the CPBM service and it caused long line of inpatients, moreover, there was no seats for patients and therefore patients have to stand during the CPBM service. To solve the problem, we decided to change the

location of the CPBM service from the pharmacy counter to a ward due to limited place of the pharmacy counter. According to the change of working place, ward pharmacists see patients in a patient room and check the medicines in a ward from February 5<sup>th</sup> 2015, compared that pharmacists see patients on a pharmacy counter and check the medicine in a dispensing room in the past. Even though there were reports that oncology pharmacists contributed for cancer treatment [5-7] and CPBM [3,4,8,9] was beneficial for hospitalized patients, no data has been reported on the effects of the workplace of the service.

### Aim of the Study

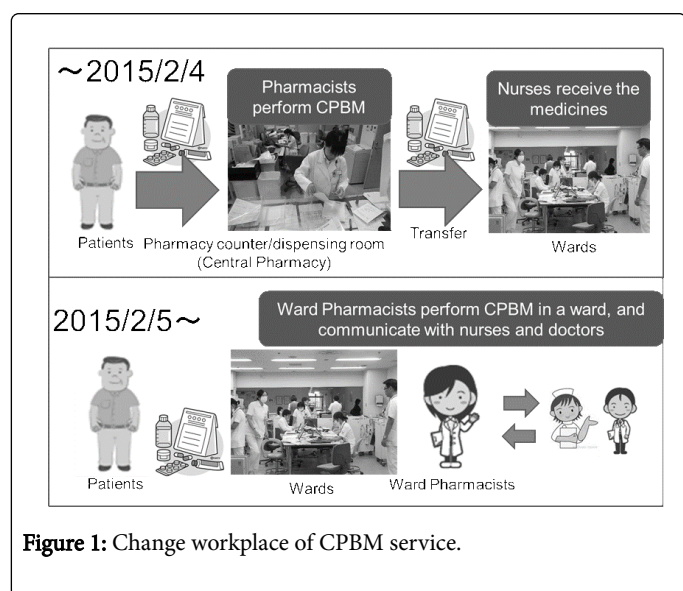
We evaluated benefits of change locations from central pharmacy to hospital wards to check medicines brought to hospital by inpatients.

### Methods

#### Study design and data sources

We conducted retrospective analysis of pharmacists' records of medicines brought to hospital January 7<sup>th</sup> to March 5<sup>th</sup> 2015. Subjects

were identified from a computer-generated list from the electric patients' record database system. We made two groups, central pharmacy group (CG) which pharmacists who worked in dispensing room worked for the service in the central pharmacy from January 7<sup>th</sup> 2015 to February 4<sup>th</sup> 2015 and ward pharmacy group (WG) which ward pharmacists worked for the service in a ward from February 5<sup>th</sup> 2015 to March 5<sup>th</sup> 2015. We compared the two groups for 20 business days in each group (Figure 1).



**Figure 1:** Change workplace of CPBM service.

## Settings

The NCCHE is the national research center hospital and one of the largest cancer treatment hospitals in Japan, which has 425 beds, total ten hospital wards, number of inpatients was from 800 to 900 per month, number of pharmacists was about 50 and number of ward pharmacists was nine.

## Data analysis

Bivariate analyses were employed to examine differences in the background characteristics of the hospitals, using t-tests for continuous variables and chi-square tests for categorical variables. All data were analyzed using SPSS version 22.0 (SPSS Inc., Chicago, IL). A p-value of <0.05 was considered statistically significant.

## Results

### Patients' characteristics

There were 836 cases in WG and 836 cases in CG, respectively. There were no statistical differences in number of patients in each hospital ward and diagnosis and treatment department between two groups (Table 1).

	WG n=836	Percentage (%)	CG n=836	Percentage (%)	p-value
<b>Hospital wards</b>					
Palliative care unit	22	3%	30	4%	n.s.
4A ward	2	0.2%	1	0.1%	n.s.
4B ward	93	11%	88	11%	n.s.
5A ward	102	12%	109	13%	n.s.
5B ward	96	11%	95	11%	n.s.
6A ward	108	13%	110	13%	n.s.
6B ward	116	14%	104	12%	n.s.
7A ward	103	12%	108	13%	n.s.
7B ward	107	13%	113	14%	n.s.
8F ward	87	10%	78	9%	n.s.
<b>Diagnosis and treatment department</b>					
Gastric Surgery	22	3%	19	2%	n.s.
Palliative Medicine	23	3%	27	3%	n.s.
Hepatobiliary and Pancreatic Surgery	24	3%	29	3%	n.s.
Hepatobiliary and Pancreatic Oncology	112	13%	114	14%	n.s.

Plastic and Reconstructive Surgery	1	0.1%	1	0.1%	n.s.
Hematology	29	3%	36	4%	n.s.
Thoracic Surgery	50	6%	49	6%	n.s.
Thoracic Oncology	161	19%	146	17%	n.s.
Pediatric Oncology	2	0.2%	2	0.2%	n.s.
Gastrointestinal Oncology	150	18%	150	18%	n.s.
Digestive Endoscopy	39	5%	43	5%	n.s.
Esophageal Surgery	21	3%	19	2%	n.s.
Orthopedic surgery	3	0.4%	2	0.2%	n.s.
Colorectal Surgery	52	6%	41	5%	n.s.
Head and Neck Surgery	44	5%	49	6%	n.s.
Head and Neck Medical Oncology	30	4%	44	5%	n.s.
Breast Surgery	19	2%	17	2%	n.s.
Breast and Medical Oncology	38	5%	34	4%	n.s.
Urology	16	2%	14	2%	n.s.
n.s: no significant by Chi-squared test and Fisher's exact probability test					

**Table 1:** Patients' characteristics.

### Rates of CPBM service

The rate of CPBM service was higher in WG [87% (724/836)] than in CG [72% (606/836)] ( $p < 0.001$ ). Of 836 inpatients in WG, 112 patients (13%) did not have brought in medicine and 110 patients (13%) were emergency hospital admission patients, however, we could not find the reasons of missing 230 patients in CG.

### Time required for CPBM service

Average ( $\pm$  SD) time of the service, from start to double check, was shorter in WG [53 minutes ( $\pm$  38)] than in CG [126 minutes ( $\pm$  60)] ( $p < 0.001$ ). Median [range] time of the service, from start to double check, was 46 minutes [2-300] in WG and 121 minutes [6-305] in CG.

### Pharmacy intervention through CPBM service

Pharmacists' interventions according to the check was higher in WG [32% (264/836)] than in CG [14% (121/836)] ( $p < 0.001$ ). Fifteen percent of inpatient of WG (127/836) had narcotic medicines and ward pharmacists timely controlled and registered of the narcotic medicines in a ward compare that CG had no timely management for the medicine in a ward and nurses had to bring the narcotic medicine to pharmacy dispensing room to ask double check and register the medicine. Of the 15% patients, average and median number of narcotic drugs was 1.8 and 2.0, respectively (Table 2).

	WG n=836	Percentage (%)	CG n=836	Percentage (%)	p-value
Rate of CPBM	723	86%	606	72%	$p < 0.001^*$
Did not do CPBM	0	0%	230	28%	
Patients who did not have medicine	113	14%	n.a.		
Admissions after office hours	110	13%	n.a.		
Time required CPBM service [minutes]					
Average	53		126		$p < 0.001^{**}$
SD	38		60		
Median	46		121		

[Range]	[2-300]		[6-305]		
Pharmacy intervention through CPBM service	264	37%	121	20%	p<0.001**
n.a.: no available; *Chi-squared test; **Student t-test					

**Table 2:** Comparison between CG and WG.

## Discussion

This study clarified the change location for CPBM service from central pharmacy dispensing room to a hospital ward enhanced the service and ward pharmacy interventions. It is obvious that patients waiting time was zero in WG because pharmacists went to patients' room to receive their brought in medicines. In addition, time required for CPBM was decreased by half and the rate of the services was increased after the improvement of business operations. It was surprised that 200 cases in the CG was not performed CPBM service. From the WG data, about 100 cases might not have their medicine to a hospital, however, the CG would not check emergency hospital admission cases or patients who did not want to visit pharmacy counter. Compared to the CG, the WG checked all cases because a ward pharmacists work in a ward with nurses and doctors. Without pharmacists' CPBM, nurses have to check the medicine, however, there was a report that pharmacists' CPBM was superior to nurses [10]. The benefit of ward pharmacy services have been reported [3,11,12] and the CPBM is beneficial for patients' care in a hospital [3,4,8]. The CPBM service is basic evaluation of inpatients and the information relates to following patients' treatment. For example, Imai et al., reported that the service prevents potential adverse drug reactions [9] and Horiuchi et al., reported that screening of cancellation medicine before operation at medicine support center [13]. The CPBM is necessary to evaluate patients' pharmacotherapy and pharmacists could work for the risk management using STOPP criteria [14-16]. In the NCCHE, pharmacists do not use STOPP criteria [14] for inpatient intervention, however, the change of work setting was associated with a twofold increase in pharmacy interventions for patients' treatment. The incidence that patients had narcotic medicines was 15%. Apparently, these controlled medicines should be checked and registered by pharmacists, and the improvement of service enabled pharmacists that they promptly manage for patients' brought in narcotic medicines in a ward. There were study limitations that we did not measure number of pharmacists who worked for CPBM service in the CG. In the CG, four or three pharmacists and two ward pharmacists supported the service. In the WG, nine pharmacists worked at least four hours in a ward. So, there might be more manpower in WG, compared to CG. Number of pharmacists who involved for the CBPM is not possible to compare between WG and CG due to complicated work shift. Pharmacists in CG work for dispensing service in central pharmacy and ward pharmacists in WG work for clinical role, such as medication counseling and review of treatment and doctors' prescriptions. Working style and efficiency for clinical interventions, including CBPM, is different between WG and CG. It could be major reason causing the observed differences. Even though we randomly chose subjects who admitted to a hospital January 7<sup>th</sup> to March 5<sup>th</sup> 2015, there were no significant difference in patients' characteristics, such as the diagnosis and treatment, between WG and CG. Our results showed benefits of CBPM by ward pharmacists in a ward from relatively reliable and adequate populations.

## Conclusion

The survey clarified that the change of service location does not only reduce patients' waiting time but also enhance the CPBM and following clinical pharmacy services in inpatient.

## Ethical Approval

The study was approved by the Institutional Review Board of the National Cancer Center (Approval# 2015-228) and was conducted in accordance with all applicable ethical standards.

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