

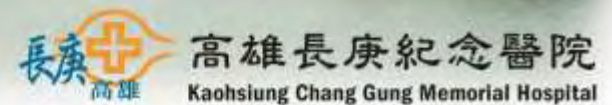


Applying Team Resource Management Concept to Develop a Nuclear Medicine Examination Alert Cloud



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Outline

- Introduction
- Object
- Methods
- Conclusion

Introduction

communication-related problem details	In between medical team				In between the medical team and patients			In between patients/dependents		Other communication factors	Number of communication events
	Lack of communication	Unclear shift	Unclear doctor's advice	Inconsistent with abbreviation cognition	In between the team and patients or dependents	Insufficient or inappropriate health education	Failure to inform patient of complete information	Lack of communication between patient and dependents	Poor communication in between patients		
Event category	N	N	N	N	N	N	N	N	N	N	N
Drug event	590	234	56	15	182	57	2	—	—	66	999
Surgical event	579	—	—	—	9	51	200	20	—	2	678
Blood transfusion event	113	—	—	—	5	1	—	—	—	2	121
Medical care	687	—	—	—	401	243	138	24	—	11	1,001
Injurious behavior	39	—	—	—	322	43	—	187	704	34	1,194
Tube event	369	—	—	—	1,182	1,165	6	595	—	196	2,792
Unexpected cardiac arrest	18	—	—	—	3	—	17	—	—	4	37
Anesthesia event	9	4	0	—	6	—	4	—	—	0	14
Inspection	803	—	—	—	160	2	112	—	—	6	923
Total	3,207	238	56	15	2,270	1,562	479	826	321	321	7,899



Introduction

- Communication events is 7899
- “lack of communication in between medical team” is the highest relative frequency ratio



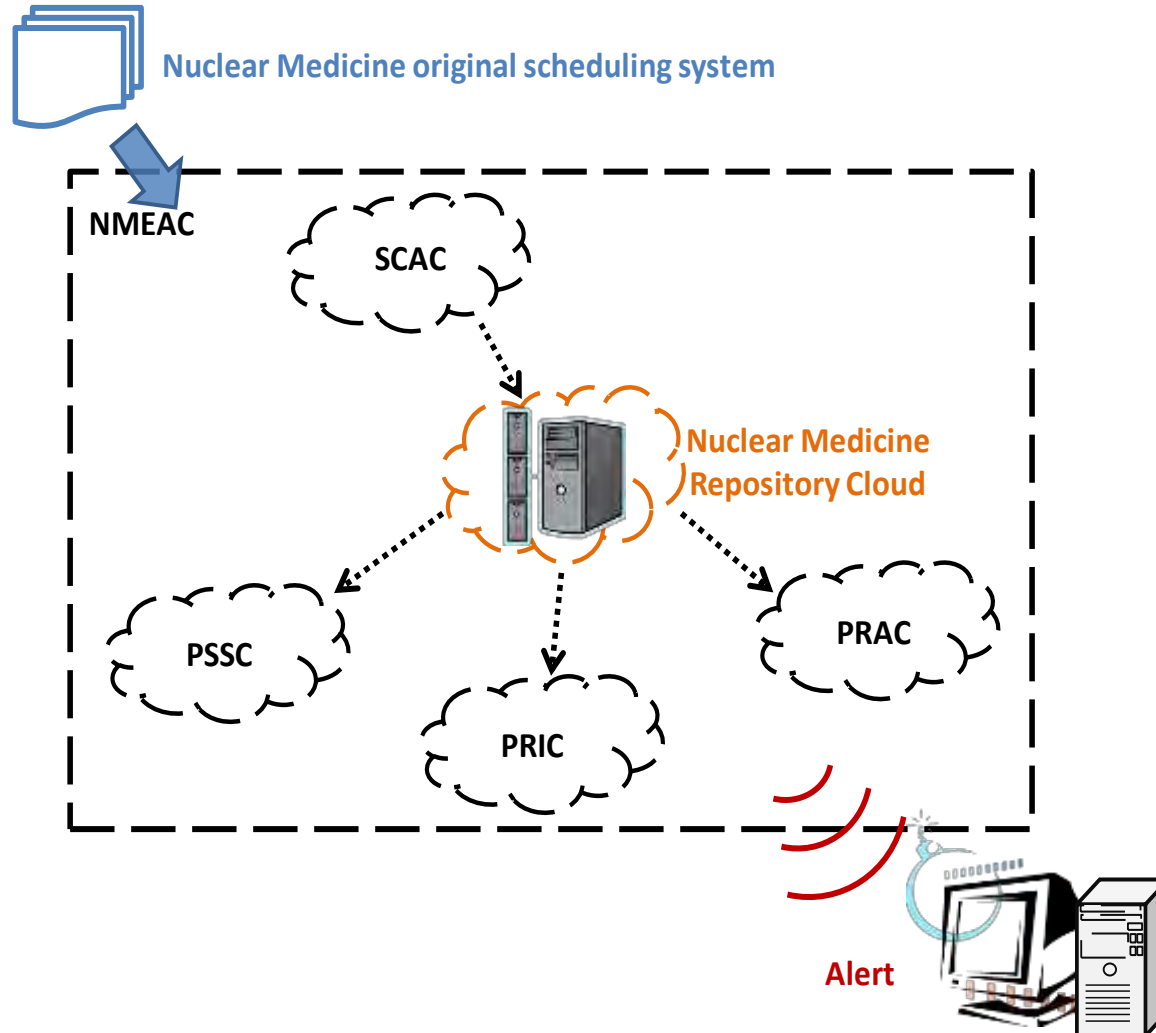
Introduction

- Team Resource Management, TRM
 - Leadership
 - Situation Monitoring
 - Mutual Support
 - **Communication**

Object

- The concept of TRM is used to integrate nuclear medicine examination alert cloud constructed on the basis of cloud computing technology into a system
- Nuclear Medicine Examination Alert Cloud

Methods



Methods

- Nuclear Medicine Original Scheduling System
 - Original patient's information data
- Nuclear Medicine Examination Alert Cloud
 - Correct patient's registration number, patient name, examination item, scheduling date, scheduling time

Methods

- Scan registration number
- patient information can be directly displayed to notify each examination room, injection room and drug preparation room
- Multi-fields search

Patient Registration Alert Criteria

Light	TD	On Time
Red	$TD < 0$	Lateness
Yellow	$TD > 30$	Early arrival
Green	$0 \leq TD \leq 30$	On time

$$TD = ST - RT$$

TD : Time Difference

ST : Scheduling Time

RT : Registered Time

Conclusion

Nuclear Medicine Examination Alert Cloud

檢查日期: 2016/11/14

查詢: 本日病人, 未完成清單, 第一次檢查時間, 第二次檢查時間, 查詢日期, 已完成清單, 第一次警告訊息, 第二次警告訊息

姓名	病歷號	檢查項目	第一次 檢查時間	第一次 警告訊息	第一次 報到時間	出藥時間	吃藥/打針時間	第二次 檢查時間	第二次 報到時間	第二次 警告訊息	檢查完成時間
1		Ca work-up(3mCi)	10:45:00	On time	10:27:41 AM	10:22:38 AM	10:37:10 AM	時 分			11:22:38 AM
2		Tl-201	11:00:00	On time	10:52:56 AM	10:22:49 AM	10:58:01 AM	15 時 15 分	01:56:18 PM	On time	03:28:12 PM
3		Ca work-up(3mCi)	10:45:00	On time	10:27:41 AM	08:23:08 AM	09:30:08 AM	時 分			10:03:08 AM
4		I-131(120mCi) 劑量	11:00:00	On time	10:42:53 AM			時 分			11:41:21 AM
5		Tl-201	11:00:00	On time	10:33:50 AM	10:22:53 AM	10:48:17 AM	15 時 15 分	02:05:15 PM	On time	03:30:27 PM
6		Tl-201	10:45:00	On time	10:40:58 AM	10:22:41 AM	10:42:23 AM	15 時 20 分	03:00:22 PM	On time	03:44:51 PM
7		Tl-201	11:30:00	Early arrival	10:23:58 AM	10:22:55 AM	11:21:38 AM	15 時 30 分	02:49:48 PM	Early arrival	03:52:26 PM
8		Tl-201	10:40:00	On time	10:16:15 AM	10:22:27 AM	10:34:55 AM	15 時 00 分	02:45:28 PM	On time	03:13:46 PM
9		Tl-201	10:30:00	On time	10:12:29 AM	10:21:31 AM	10:24:47 AM	14 時 30 分	01:50:38 PM	Early arrival	02:37:22 PM
10		Tl-201	10:30:00	On time	10:28:26 AM	10:21:35 AM	10:31:30 AM	14 時 40 分	02:32:40 PM	On time	02:52:44 PM
11		Tl-201	10:50:00	On time	10:38:32 AM	10:22:44 AM	10:40:43 AM	15 時 00 分	02:55:19 PM	On time	03:34:02 PM
12		Tl-201	10:30:00	On time	10:20:35 AM	10:21:39 AM	10:25:51 AM	14 時 40 分	02:25:59 PM	On time	02:47:54 PM
13		Tl-201	10:30:00	On time	10:11:56 AM	10:21:44 AM	10:23:58 AM	14 時 45 分	02:18:58 PM	On time	02:55:10 PM
14		Tl-201	10:30:00	On time	10:10:56 AM	10:21:49 AM	10:22:15 AM	14 時 50 分	02:35:38 PM	On time	03:03:29 PM
15		Tl-201	10:45:00	On time	11:22:38 AM	10:21:58 AM	11:26:38 AM	15 時 20 分	03:05:33 PM	On time	03:45:07 PM

Legend:

- Patient Registration Name
- Examination Number
- First Scheduling Time
- First Alert Message
- First Registered Time
- Drug Prepare Time
- Injection Time
- Second Scheduling Time
- Second Registered Time
- Second Alert Message
- Finish Time

Conclusion

核醫檢查警示雲

檢查日期: 2016/11/14

已就診 15/14198

第一波病人報到 第二波病人報到

姓名	病歷號	檢查項目	第一次檢查時間	第一次警示訊息	第一次報到時間	出藥時間	吃藥/打針時間	第二次檢查時間	第二次報到時間	第二次警示訊息	檢查完成時間
		Ca work-up(3mCi)	10:45:00	1 warning	10:23:08 AM	09:23:08 AM	09:30:08 AM				10:03:08 AM
		Tl-201	11:00:00	1 warning	11:05:00 AM	10:21:55 AM	11:26:38 AM	15 時 20 分	03:05:33 PM	On time	03:45:07 PM
		Tl-201	11:30:00	Early arrival	10:23:58 AM	10:22:55 AM	11:21:38 AM	15 時 30 分	02:49:48 PM	Early arrival	03:52:26 PM
		Ca work-up(3mCi)	10:45:00	On time	10:27:41 AM	10:22:38 AM	10:37:10 AM				11:22:38 AM
		Tl-201	11:00:00	On time	10:52:56 AM	10:22:49 AM	10:58:01 AM	15 時 15 分	01:56:18 PM	On time	03:28:12 PM
		I-131(120mCi) 預檢	11:00:00	On time	10:42:53 AM						11:41:21 AM
		Tl-201	11:00:00	On time	10:33:50 AM	10:22:53 AM	10:49:17 AM	15 時 15 分	02:05:15 PM	On time	03:30:27 PM
		Tl-201	10:45:00	On time	10:40:56 AM	10:22:41 AM	10:42:23 AM	15 時 20 分	03:00:22 PM	On time	03:44:51 PM
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		Tl-201	10:30:00	On time	10:12:29 AM	10:21:31 AM	10:24:47 AM	14 時 30 分	01:50:38 PM	Early arrival	02:37:22 PM
		Tl-201	10:30:00	On time	10:28:26 AM	10:21:35 AM	10:31:30 AM	14 時 40 分	02:32:40 PM	On time	02:52:44 PM
		Tl-201	10:50:00	On time	10:38:32 AM	10:22:44 AM	10:40:43 AM	16 時 30 分	01:15:00 PM	1 warning	03:34:02 PM
		Tl-201	10:30:00	On time	10:20:35 AM	10:21:39 AM	10:25:51 AM	14 時 40 分	02:25:59 PM	On time	02:47:54 PM
		Tl-201	10:30:00	On time	10:11:56 AM	10:21:44 AM	10:23:58 AM	14 時 45 分	02:16:56 PM	On time	02:55:10 PM
		Tl-201	10:30:00	On time	10:10:56 AM	10:21:48 AM	10:22:15 AM	14 時 50 分	02:35:36 PM	On time	03:03:29 PM

Methods

- $CR = RC \cup YC \cup GC \cup R \cup UR / TTC$
- $PM = (YC + GC) / R$

RC : Red Case YC : Yellow Case GC : Green Case

R : Registered UR : Unregistered TTC : Today Total Case

CR : Case Ratio PM : Patient's Mood

First Patient Registered

Second

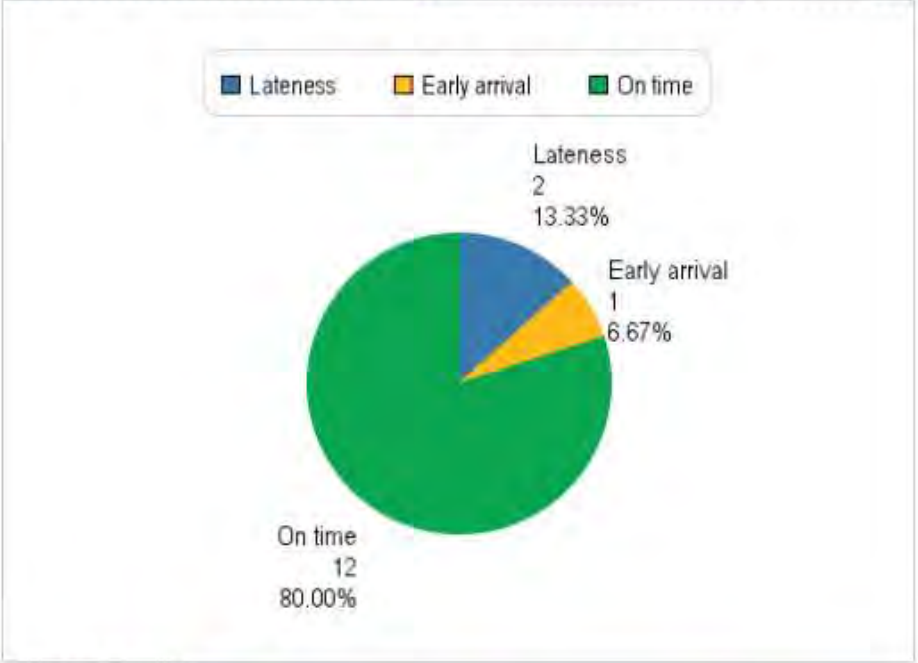
- Today total case: 15
- Registered: 15
- Unregistered: 0
- Lateness: 2
- On time: 12
- Early arrival: 1

Examination Room 1,2,3

- ⊙ Lateness : 1
- ⊙ On time : 2
- ⊙ Early arrival : 0

Examination Room 5

- ⊙ Lateness : 1
- ⊙ On time : 10
- ⊙ Early arrival : 1



Second Patient Registered

First

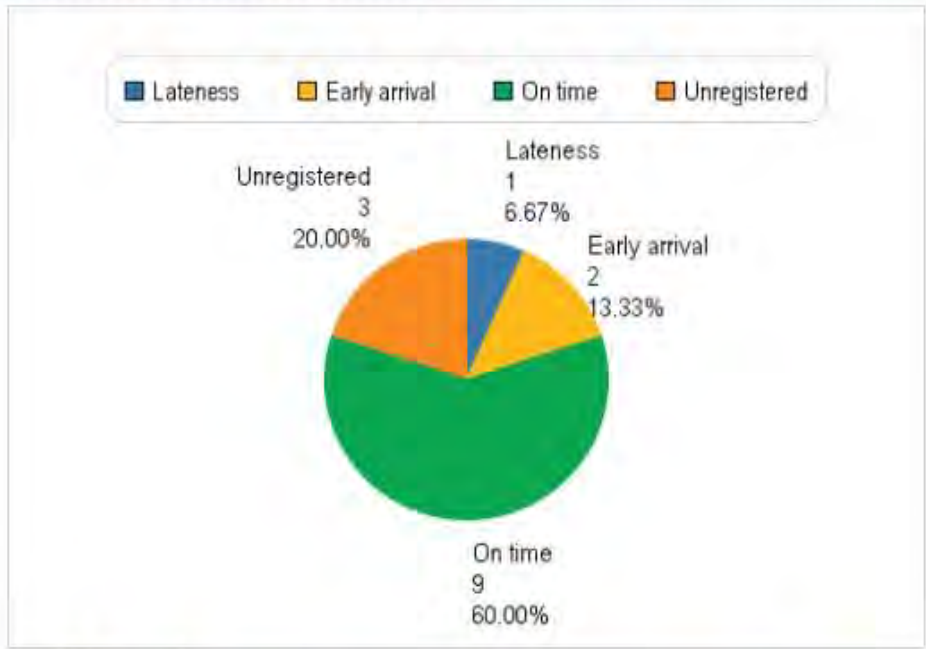
- Today total case: 15
- Registered: 12
- Unregistered: 3
- Lateness: 1
- On time: 9
- Early arrival: 2

Examination Room 1,2,3

- ⊙ Lateness : 0
- ⊙ On time : 0
- ⊙ Early arrival : 0

Examination Room 5

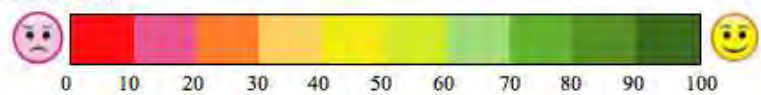
- ⊙ Lateness : 1
- ⊙ On time : 9
- ⊙ Early arrival : 2



Patient's mood:



Patient's mood:



Thank you for your attention

Conclusion

- Nuclear Medicine
 - Nurse, Radiology, Pharmacist

Conclusion

Registration	Waiting factors upon the registration	Waiting time (person/min.)		Waiting factors upon the examination Before improvement	Waiting time (person/min.)		Examination unit
		Before improvement	After improvement		Before improvement	After improvement	
Registration	Scheduling	5	1	Unheard			Photographic room No. 1/2/3/5
	Health education	15	2	Misheard			
	Consultation	15	2	Forget informing			
Counter staffs	Blood drawing	5	3	Wrong notification	About 10~30 min.	Within about 1~2 min.	Injection room
Registered nurse	Case received	5	1	Examination for the patient			Drug preparation room
	Patient registration	8	2	Giving injection of radioisotope			
				Not giving injection of radioisotope			