

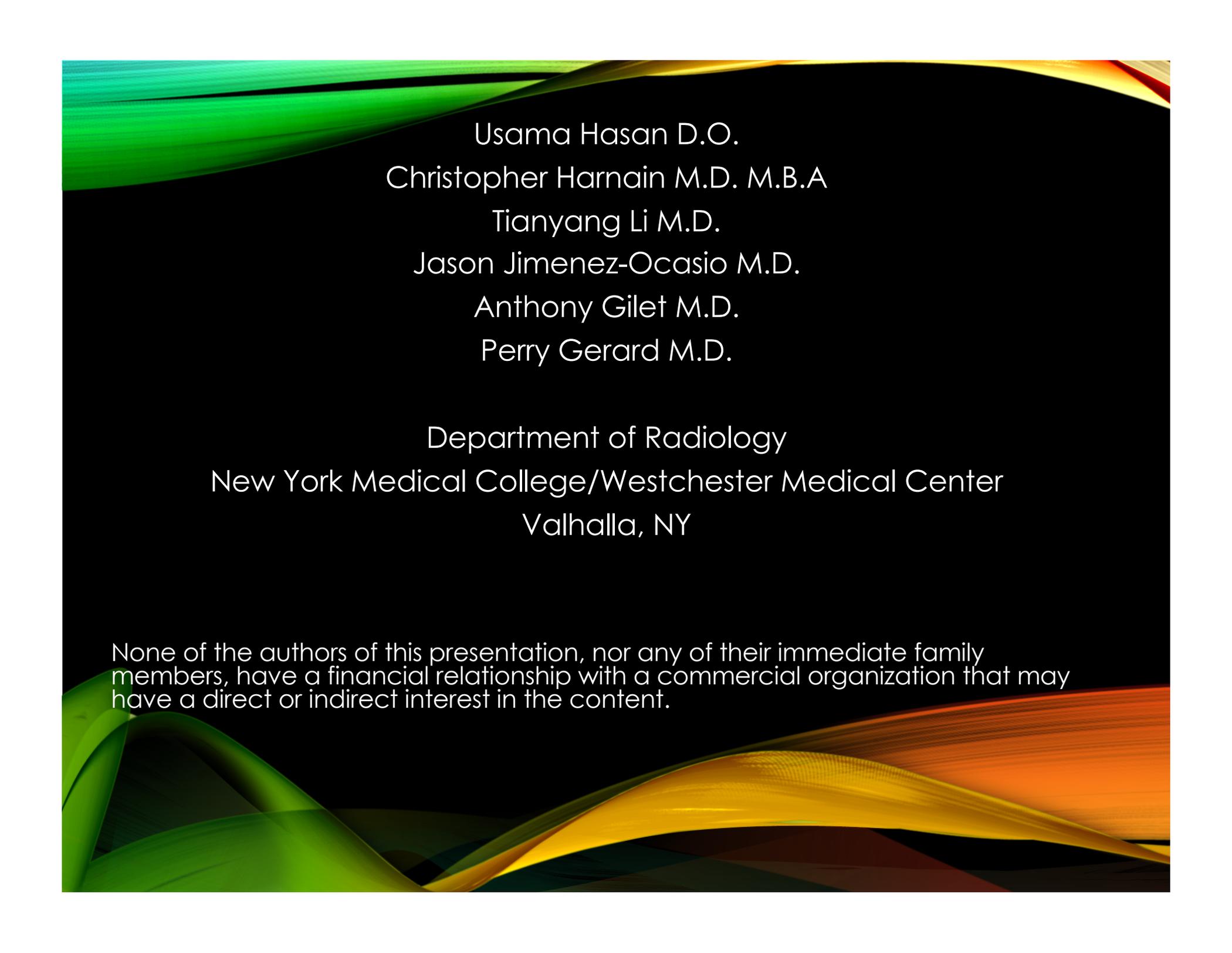
THE NUCLEAR DIET:

Utilizing Kaizen Principles To
Make A Lean Nuclear
Medicine Department



Westchester
— MEDICAL CENTER —





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INTRODUCTION

- Literally translating to “Good Change”, *Kaizen* is a philosophy of continuous improvement which aims to eliminate waste and streamline processes
- Introduced by the Toyota Motor Corporation around 1950
- Allowed Toyota to dynamically remove inefficiencies and subsequently realize cost savings
- Involves analysis of manageable components of a problem, and rapid implementation of a solution with continuous, real-time assessment

改 善

“Kai”

“Zen”

“Change”

“Good”



INTRODUCTION

- Each small change results in a minor improvement
- Over time, these minor improvements amount to significant steps forward in efficiency, quality and safety
- *Kaizen* encourages input from all levels of employees involved in the process, regardless of title
 - Leading to a collegial environment and supportive workplace culture
- **Plan → Do → Study → Adjust**
 - Plan: Identify the problem & brainstorm actions that can be taken to rectify it
 - Do: Perform the action aimed at improving the process
 - Study: Evaluate the effectiveness of the action
 - Adjust: Based on the evaluation, accept or improve the action to optimize results

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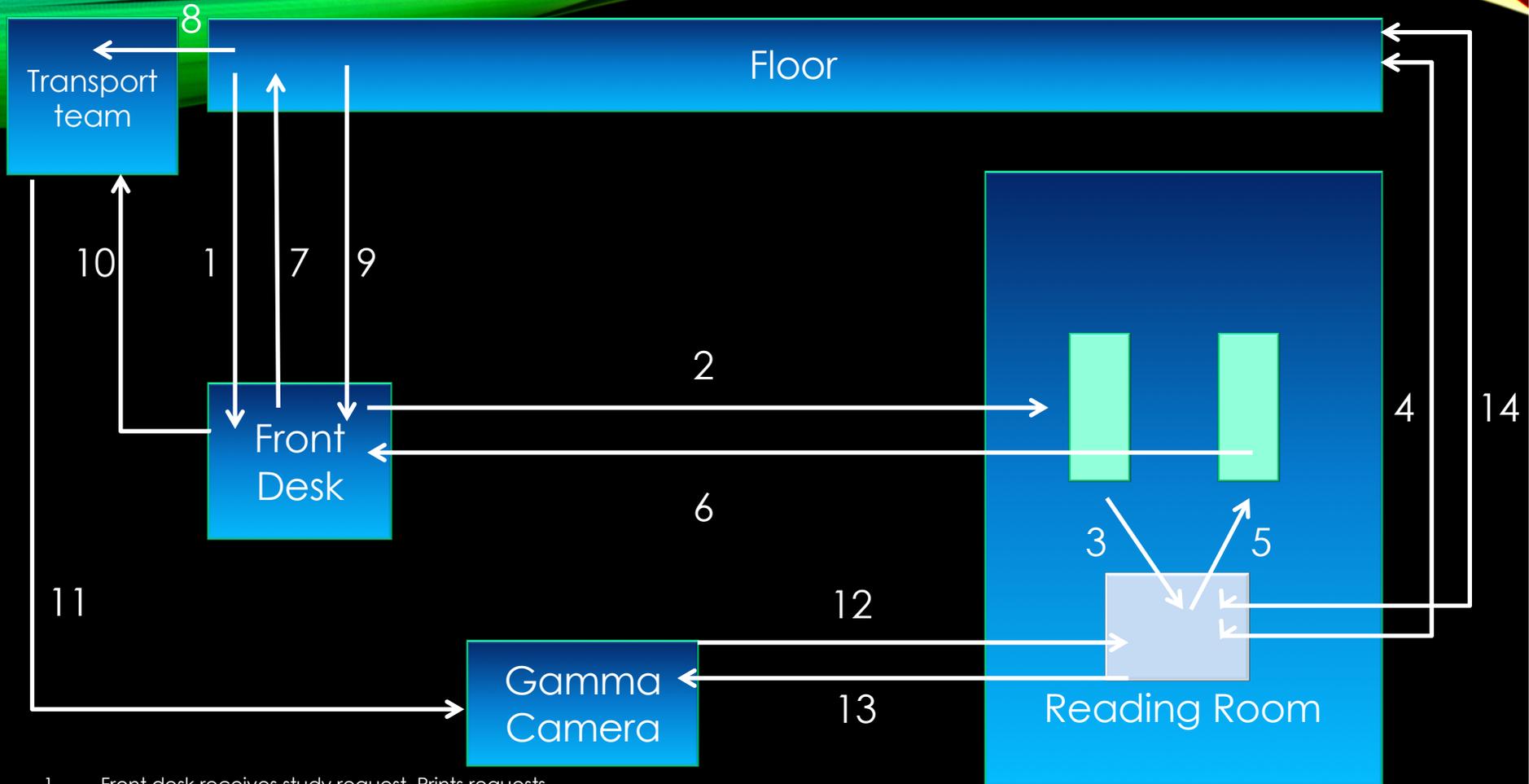
“Change”

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KAIZEN AT WMC

- At the Nuclear Medicine Department at Westchester Medical Center (WMC), we utilized the *Kaizen* philosophy to identify inefficiencies and implement changes to realize cost savings and increase patient satisfaction
- Over a period of 1 month, we conducted 15 minute meetings once a week, which included attending Radiologists, Radiology residents, Nuclear medicine technologists, and department administrative staff
- During these meetings, we discussed the proposed and implemented changes and explored their effectiveness and suggested additional changes to improve the processes, if necessary
- We created a spaghetti diagram outlining the physical flow and path of a study through the department, which demonstrated several examples of waste



1. Front desk receives study request. Prints requests.
2. Request walked over and places it in to be protocolled bin.
3. Radiologist picks up request, looks up patient information.
4. Radiologist calls ordering physician to protocol appropriately. (Variable time)
5. Radiologist places request in protocolled bin.
6. Front desk periodically checks protocolled bin and brings protocolled requests back to desk.
7. Front desk calls floor, speaks to patient's nurse
8. Nurse calls transport team to arrange time to come down.
9. Nurse calls back front desk for scheduled time. Time may not be feasible and multiple calls ensue.
10. Front desk calls transport team to bring patient down.
11. Patient comes down for study.
12. Images sent to radiologist.
13. Additional imaging done if necessary.
14. Report dictated and final report signed off



IDENTIFYING WASTE

- Excessive human motion was the most significant inefficiency found within our nuclear medicine department
 - Multiple rounds of physical transportation of order request and protocol printouts, back and forth between the front desk and reading room
- Inefficient communication
 - Waiting to speak with ordering physicians regarding inappropriate orders and order clarification
 - Back-and-forth calls with nursing and transport staff regarding appropriate times for bringing the inpatients to the department
- Timing of Radiotracer administration
 - Earliest Radiotracer administered at 8:30 am, resulting in the study being performed later in the morning → early morning not utilized



PROPOSED & IMPLEMENTED CHANGES

- Excessive Human Motion
 - To minimize physical work involving printing and transporting orders & protocols, we initiated digital ordering within the department
 - Order requests automatically populated at the reading stations via the hospital intranet
 - Once the order request appropriateness was checked and protocolled by the Radiologist, the front desk automatically received a notification to proceed





PROPOSED & IMPLEMENTED CHANGES

- Inefficient Communication
 - To minimize time wasted on clarifying or correcting orders, we met with department heads of major referring services such as Medicine, Urology, Gastroenterology and Oncology.
 - We implemented new order forms which contained a checklist which gave us complete relevant information such as:
 - Patient
 - When and how was the patient diagnosed?
 - A copy of the report for the diagnosing study
 - Study specific questions
 - In-111 Octreoscan: Is the patient off of Sandostatin medication?
 - HIDA Scan: Is the patient on any opioids? NPO / Last meal status?
 - Gastric emptying: Is the patient on any medications that affect GI motility, such as pain medication, PPI's etc.
 - Tc-99m Meckel's Scan: When were the PPI's started?



PROPOSED & IMPLEMENTED CHANGES

- Communication with nursing and transport staff
 - To reduce redundant communication regarding bringing the patient to the department, we aimed to strategically schedule Nuclear Medicine exams around the times when the patients were already in the Radiology suite for any additional studies

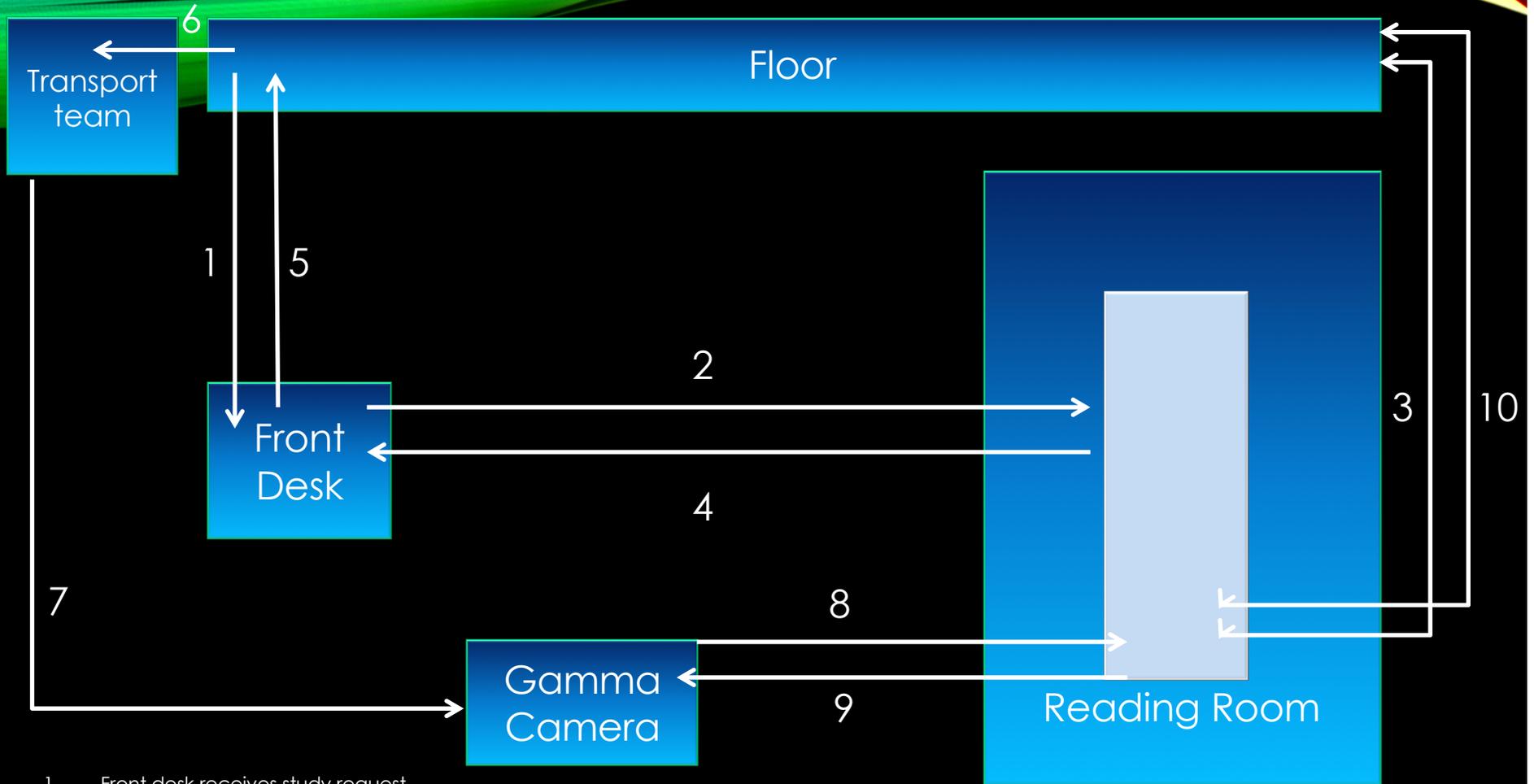




PROPOSED & IMPLEMENTED CHANGES

- Timing of Radiotracer administration
 - We pulled back the earliest radiotracer administration for inpatient studies from 8:30 am to 6:30 am.
 - This resulted in reducing waste of gamma camera non-usage during the early morning as the studies are now performed as early as 8:30 am
 - Another benefit of making this change was on the scheduling side
 - As there was less overlap and cluttering of studies in the afternoon, we were able to efficiently run the studies without having to jump from room to room
 - Resulting in better patient care and satisfaction





1. Front desk receives study request.
2. Requests are entered into the System to be protocolled.
3. Radiologist calls ordering physician to protocol appropriately. (Significantly reduced frequency)
4. Front Desk is notified that the study is protocolled.
5. Front desk calls floor, speaks to patient's nurse
6. Nurse calls transport team to arrange time to come down.
7. Patient comes down for study.
8. Images sent to radiologist.
9. Additional imaging done if necessary.
10. Report dictated and final report signed off



RESULTS

- By utilizing the *Kaizen* philosophy in our busy Nuclear medicine department, we were able to identify multiple sources of waste and implement changes to increase efficiency
- Over the 1 month, we were not only able to significantly reduce the number of inappropriate studies, but also the amount of time wasted in unnecessary human motion as well as redundant communication with the nursing and transport staff
- We were also able to schedule studies in a more efficient manner which reduced stress for the technologists and radiologists
- The overall result was improved satisfaction of the staff as well the patients, better patient care and a more streamline process during the course of the study



FUTURE DIRECTIONS

- In the future, we aim to integrate the ACR appropriateness criteria into our EMR and ordering systems for the ordering physicians
- This will result in a reduced rate of inappropriate studies, further reducing inappropriate communication between the nuclear medicine department and ordering physicians





CONCLUSIONS

- Toyota Motor System's philosophy of *Kaizen*, was successfully implemented our Nuclear Medicine Department
- Similarly, Spaghetti diagrams can be made to visualize the physical workflow in other departments, helping to realize waste and inefficiencies
- Through these diagrams, changes can be made to minimize inefficiencies, leading to increased patient satisfaction and realized cost savings