# Increasing the Percentage of Patient Completed Elective CT Scan Within 90 Minutes in Radiology Department, Taiping Hospital

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## Introduction

Computed Tomography (CT) scan is a useful imaging technique for diagnosis of many diseases. Volume of use has increased over the years leading to long waits which causes public dissatisfaction. We aim to increase the percentage of patient completed elective CT scan within 90 minutes after registration.

## Outline of Problem

Reason for choosing:

| | |
|---|---|
| **Seriousness** | Long completion time of CT scan has a negative impact on patient care. It affects public confidence in healthcare facilities and causes patient's dissatisfaction |
| **Measurability** | Data can be collected from computer registration system & image viewing system |
| **Appropriateness** | It is appropriate to reduce completion time of CT scan to improve patient's care |
| **Remediable** | Remedial action is possible and some are within our control |
| **Timed/Timeliness** | The study could be completed in 12 months |

**Problem statement:**

| | |
|---|---|
| **Problem** | Long completion time of elective CT scan in Radiology Department of Taiping Hospital |
| **Effect** | Patient might get frustrated at long waits. It give negative impact on patient's care and affect public confidence in healthcare facilities |
| **Possible Cause** | No proper scheduling system, urgent cases done in between cases, complexity of certain case, inadequate patient preparation |
| **Aim of Study** | To increase the percentage of patient completed elective CT scan within 90 minutes |

**Situation Analysis** [Pilot study in Nov-Dec 2022]: only 55% of patient had CT examination completed within 90 minutes after registration.

## Definition:

**Completion time**=The time between registration time on arrival at counter and time when the scan is completed.
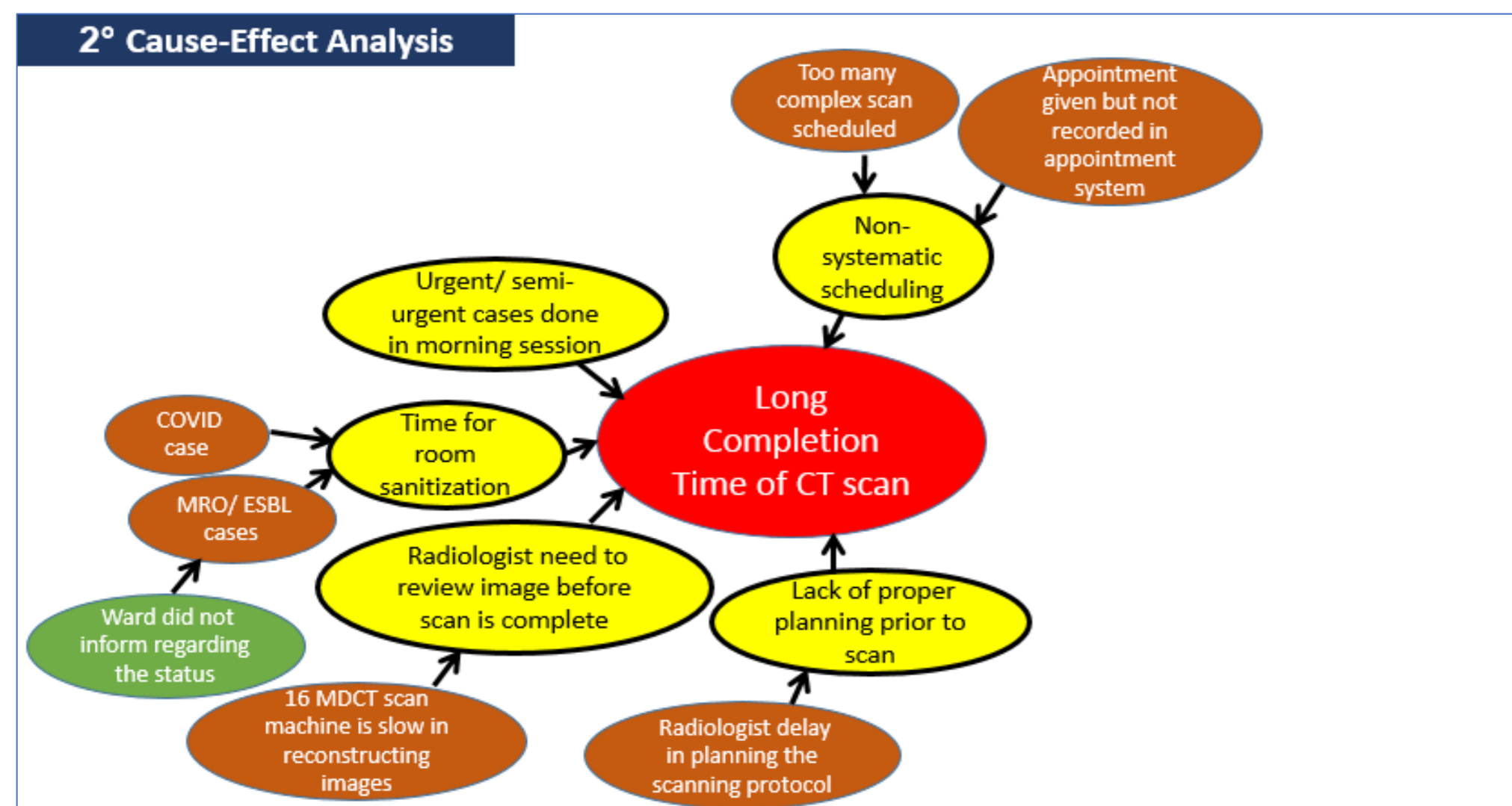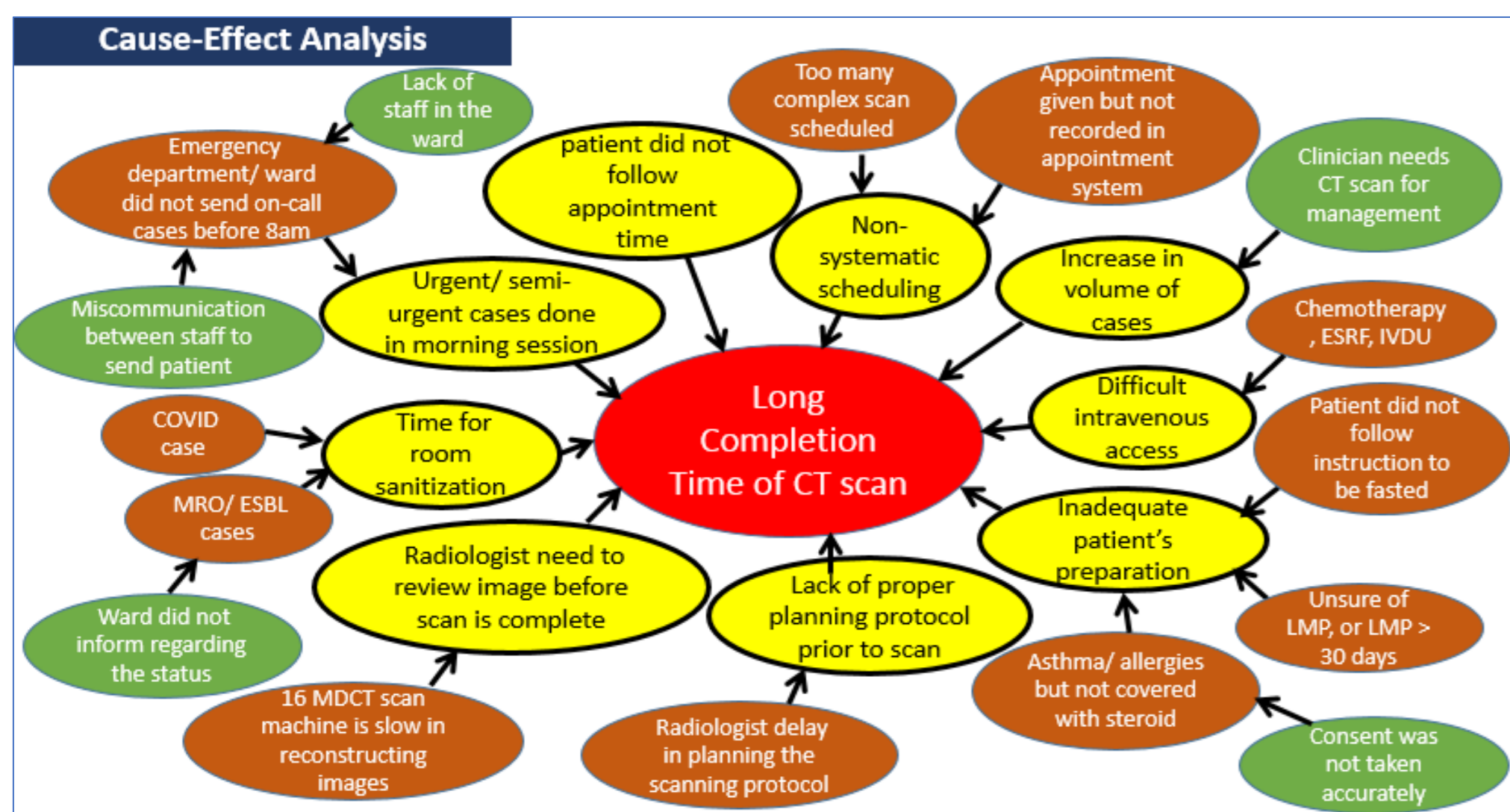


## Key Measures for Improvement

**General objective:** To increase the percentage of patient completed elective CT scan within 90 minutes in Radiology Department, Taiping Hospital.

**Specific objective:**
- To verify long completion time of elective CT scan.
- To identify the cause and contributing factors for long completion time.
- To formulate and implement remedial measures.
- To evaluate the outcome of remedial measures taken.

## Indicator and Standard

**Clinical indicator:** Percentage of patients who completed elective CT scan within 90 minutes.
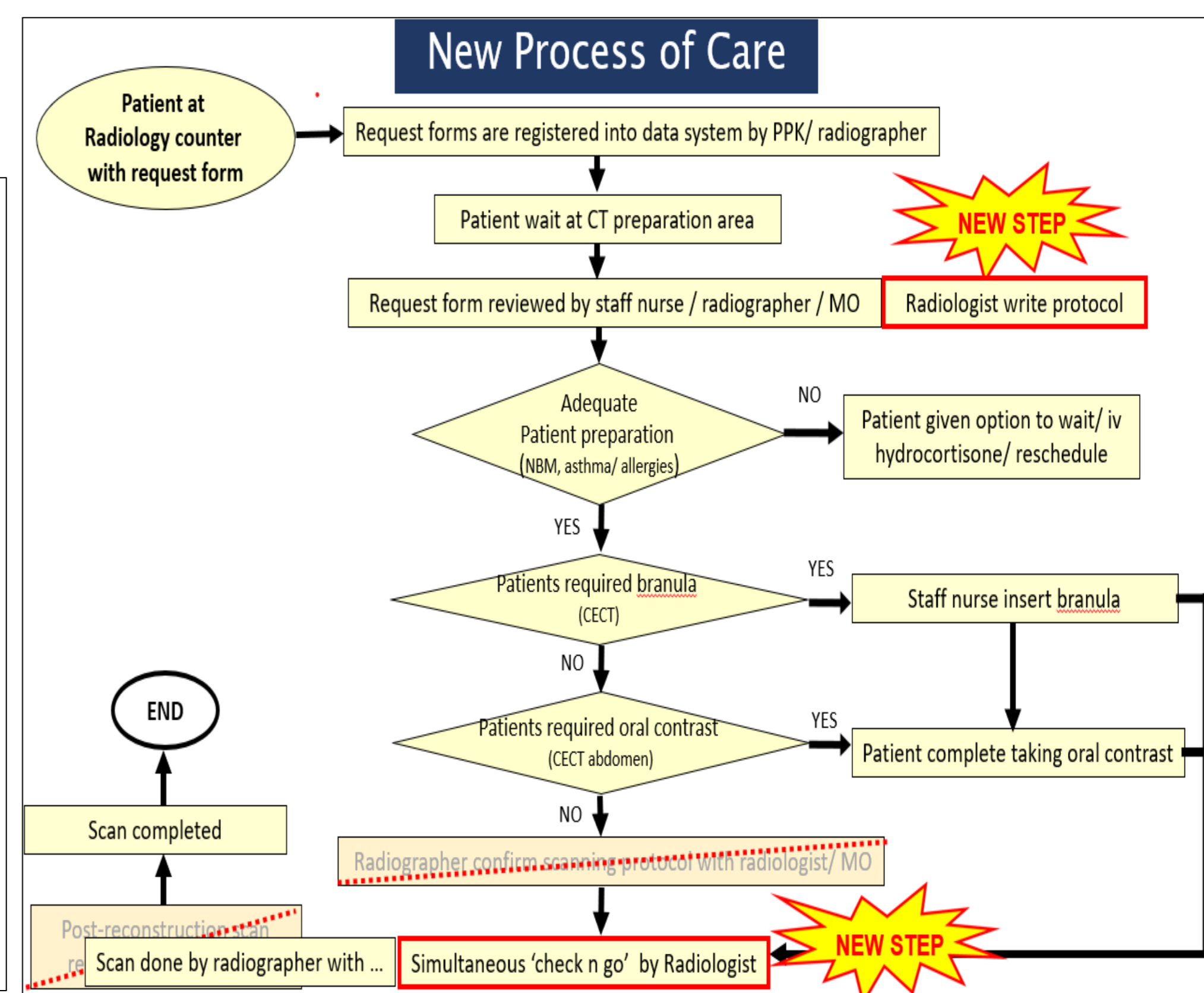
**Formula of the standard:**

| |
|---|
| Number of patients who completed elective CT scan within 90 minutes / Total patients underwent elective CT scan x 100% |

**Standard:** >70 % (pilot study in November to December 2022: 55%, department discussion, no national KPI)
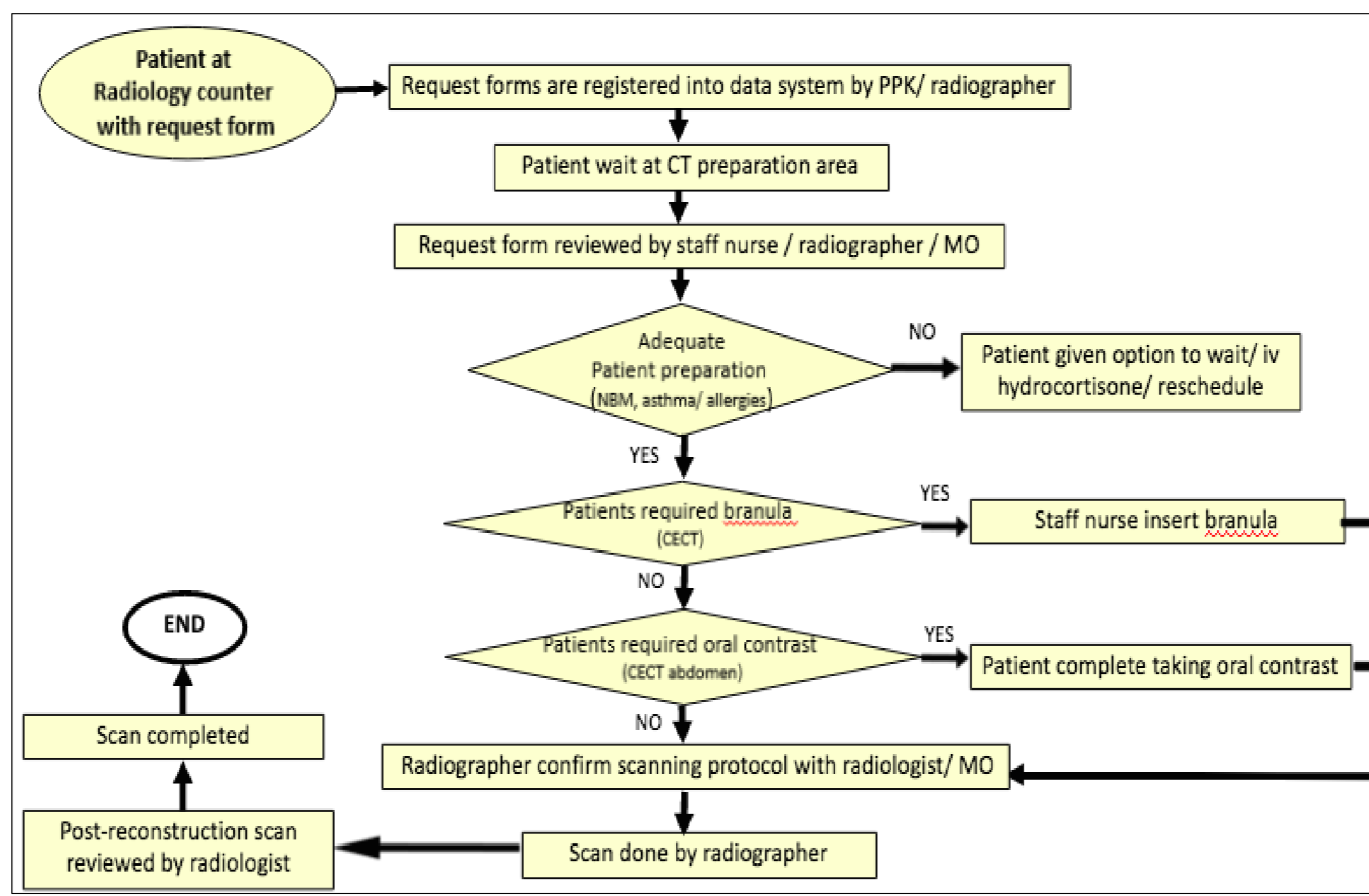
## Process of care:



## Methodology

| | Pre-remedial | Implementation of Remedial Measures | Post-remedial |
|---|---|---|---|
| **Type of Study** | Cross sectional study | | Cross sectional study |
| **Time Frame** | January - February 2023 | April – October 2023 | November -December 2023 |
| **Sample Size** | 86 | | 90 |

**Inclusion criteria:** All elective cases for CT scan including in-patient and out-patient

**Exclusion criteria:** Emergency cases and patient with difficult intravenous access.

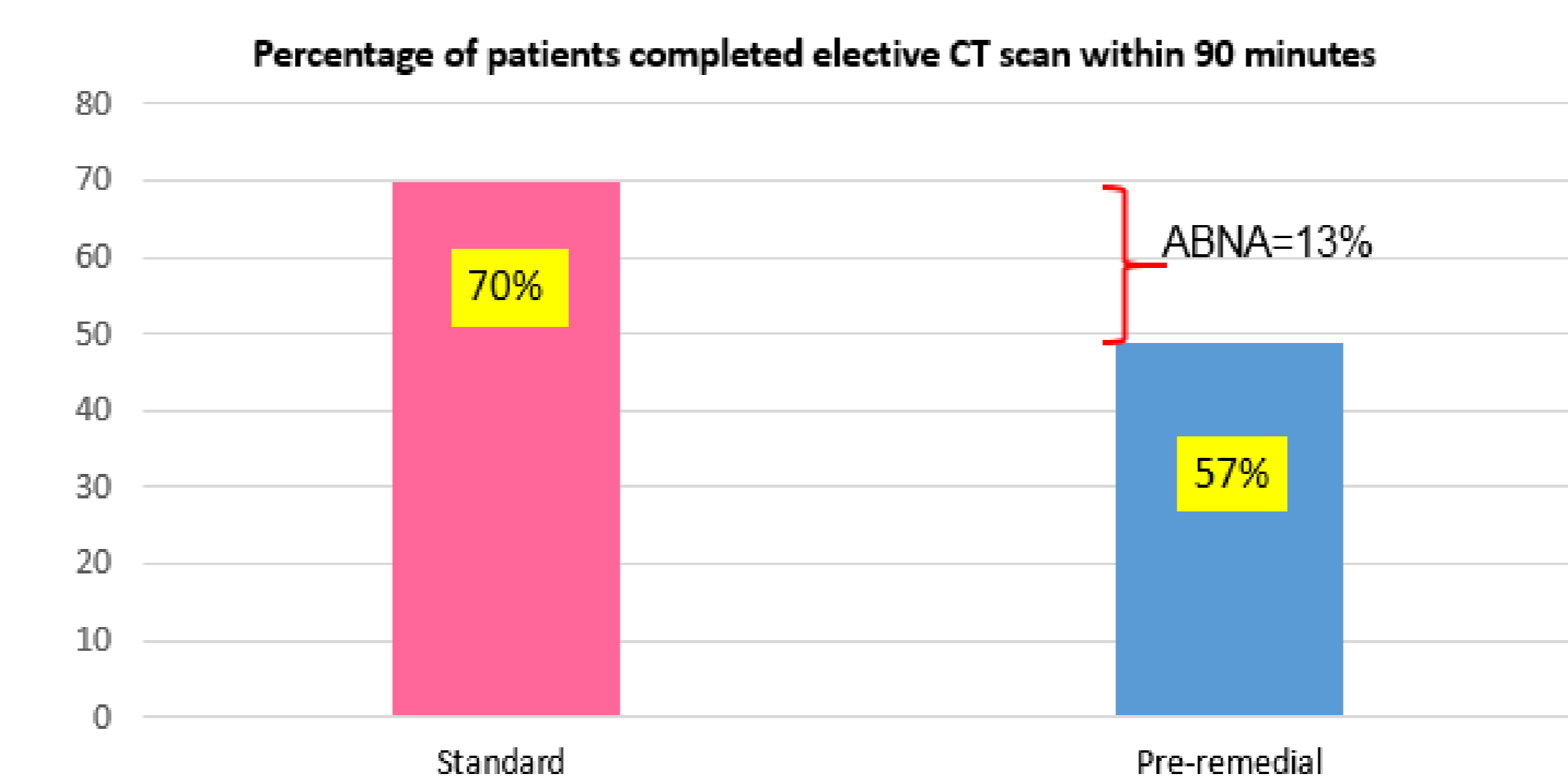## Analysis & Interpretation

**Pre-remedial Results:**



Figure 1: Achievable Benefit Not Achieved (Percentage of patients completed elective CT scan within 90 minutes as compared to standard)

## Factors Causing Long Completion Time

1. Non-systematic scheduling (35%)
2. Waiting time for machine reconstruction of image (27%)
3. Late planning for scanning protocol (15%)
4. Inadequate patient's preparation (15%)
5. Semi-urgent cases done in the morning session (5%)
6. Waiting time for room sanitization (3%)

## Strategy for Change

1. Implementation of the new appointment system
- even distribution of elective cases between contrast and non-contrasted study



2. Radiologist/MO 'check and go'
- Simultaneous check when the scan is done, to ensure adequate coverage of body part, iv contrast is delivered to save time.



3. Prompt planning for scanning protocol by radiologist/ MO
4. Semi-urgent case are done after elective cases finish

## New Process of care:



## Effect of Change

### Model of Good Care

| No | Process | Criteria | Standard | Pre | Post |
|---|---|---|---|---|---|
| 1 | Appointment date given by radiographer | Even distribution of type of scan which requires oral and iv contrast | 100% | 60% | 80% |
| 2 | Request form reviewed by staff nurse / radiographer / MO | Planning for scan protocol | 100% | 60% | 90% |
| 3 | Adequate patient's preparation (NBM, asthma/ allergies) | 1. Patient required iv contrast is fasted >4 hours 2. Patient with asthma and allergies has taken steroid pre-medication | 100% | 90% | 90% |
| 4 | Patients required branula | Correct size of branula is inserted by the staff nurse according to type of scan | 100% | 90% | 90% |
| 5 | Patients required oral contrast for CECT abdomen | Oral contrast is taken by patient prior to the scan | 90% | 90% | 90% |
| 7 | Radiologist review scan images | Simultaneous 'check n go' by Radiologist (adequate coverage of body part, intravenous contrast is delivered into body, no life-threatening condition before releasing the patient) | 100% | 50% | 70% |

**Post-remedial Results:**
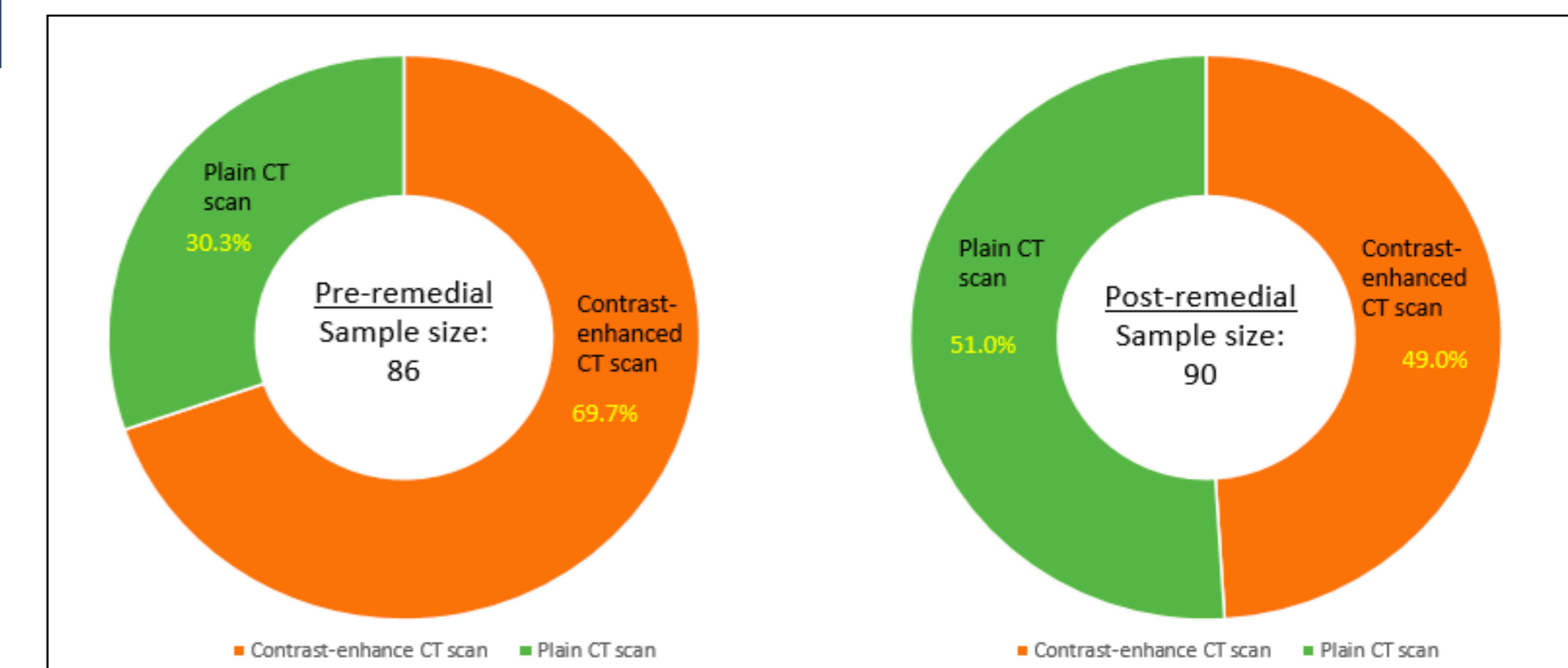


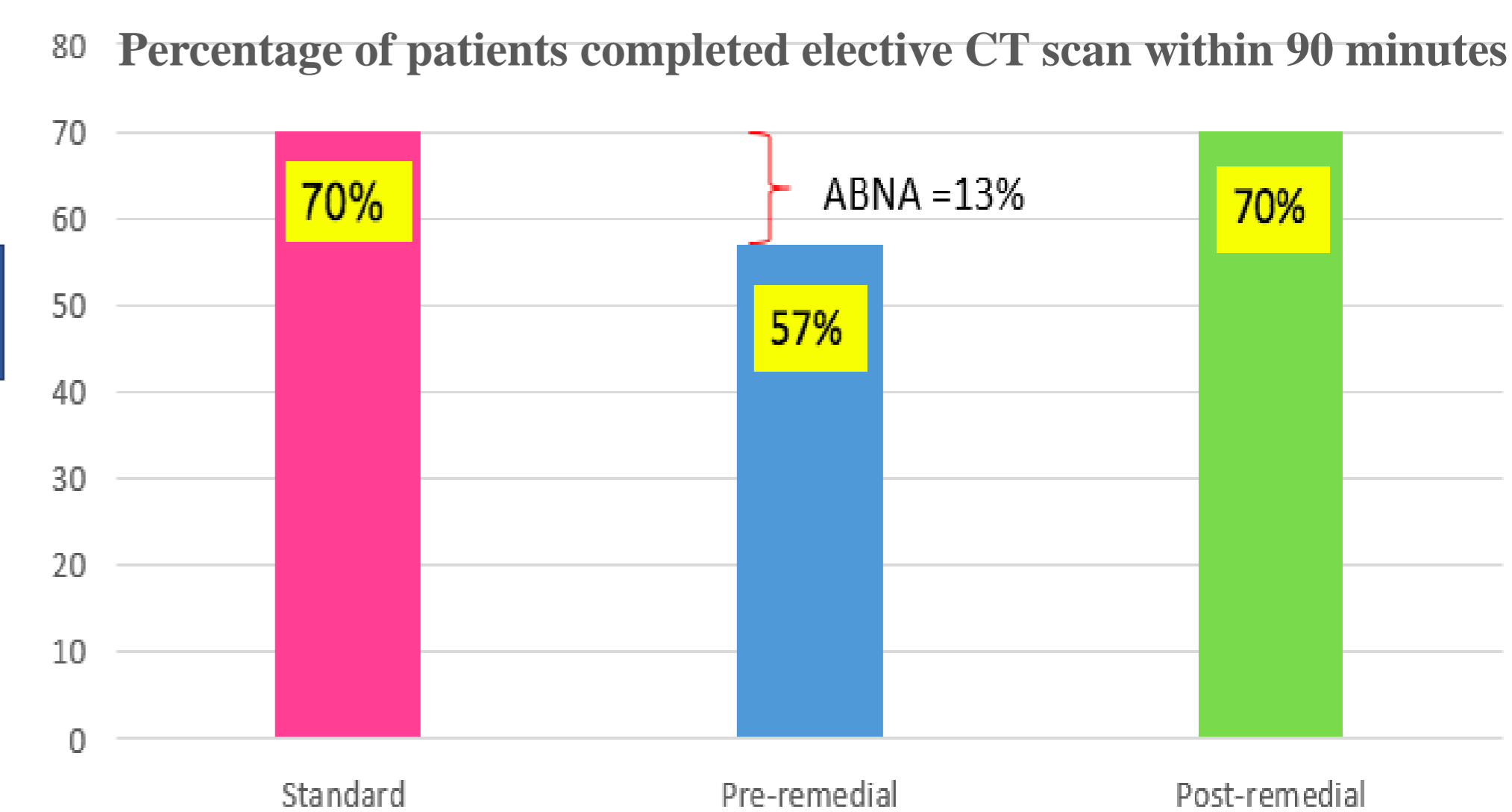Figure 2: Percentage of plain vs contrast enhanced CT in Pre-remedial and Post-remedial Phase



Figure 3: Percentage of Patients Completed Elective CT scan within 90 minutes In Pre-remedial vs Post-remedial Phase compared to ABNA

## The Next Step

- More effort is needed to sustain and improve the completion time of CT scan and continuous monitoring of this situation
- In the future, the percentage of patient completed CT scan within 90 minutes can be increase from 70% to 75%

## Acknowledgement

## Reference

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