

## **Project Title**

Increase Utilisation of Dual Energy CT for Patients with Urinary Stones

## **Project Lead and Members**

Project lead: Dr Lee Chau Hung

Project members: Dr Yeow Yuyi, Ms Ong Ee Ling, Mr Lawrence Chin, Ms Sabrina

Sabtu and Dr Salada Rolando

## **Organisation(s) Involved**

Tan Tock Seng Hospital

## **Healthcare Family Group(s) Involved in this Project**

Allied Health, Ancillary Care, Medical, Nursing

## **Applicable Specialty or Discipline**

Radiology, Urology, Radiography Service

## **Project Period**

Start date: May 2019

Completed date: September 2020

## **Aims**

To improve the percentage of outpatients with urinary stones referred to radiology department who undergo dual energy computed tomography (CT) scan from 58% to 80% within 6 months

## **Project Attachment**

See poster attached/below

## **Background**

See poster attached/below

## **Methods**

See poster attached/below

## **Results**

See poster attached/below

## **Conclusion**

See poster attached/below

## **Additional Information**

Accorded the NHG Quality Day 2021 (Category E: Innovation in Healthcare) Merit Award

## **Project Category**

Care & Process Redesign

Quality Improvement, Clinical Practice Improvement

Quality Improvement, Job Effectiveness

## **Keywords**

CPIP, Dual Energy CT, Urinary Stone

## **Name and Email of Project Contact Person(s)**

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## Mission Statement

To improve the percentage of outpatients with urinary stones referred to radiology department who undergo dual energy computed tomography (CT) scan from 58% to 80% within 6 months

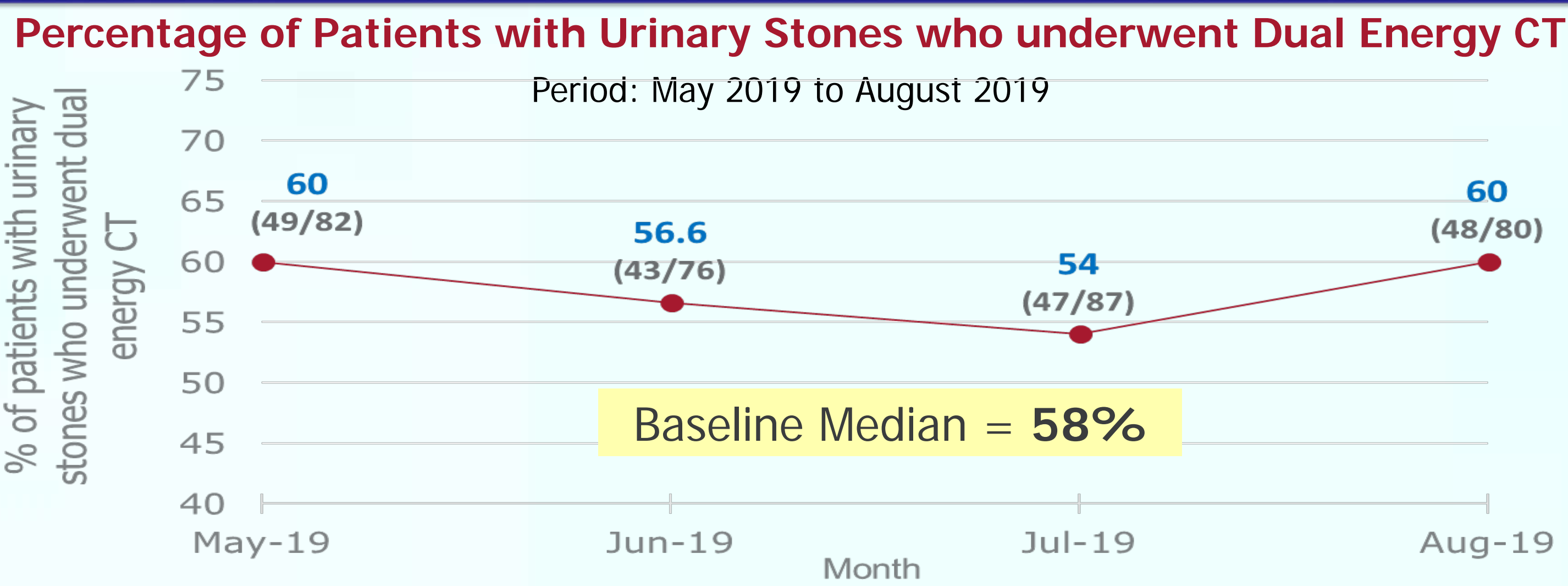
## Team Members

	Name	Designation	Department
<b>Team Leader</b>	Dr Lee Chau Hung	Consultant	Radiology
<b>Team Members</b>	Dr Yeow Yuyi	Associate Consultant	Urology
	Ms Ong Ee Ling	Senior Radiographer	Radiology
	Mr Lawrence Chin	Senior Radiographer	Radiology
	Ms Sabrina Sabtu	Head PSA, Clinic 2A/2B	Urology
	Dr Salada Rolando	Resident Physician	Urology
<b>Sponsors</b>	Adj A/Prof Gregory Kaw	Head of Department	Radiology
	Ms Chow Mui Gek	Nurse Manager	Radiography Service
<b>Facilitator</b>	Adj A/Prof Chong Yew Lam		

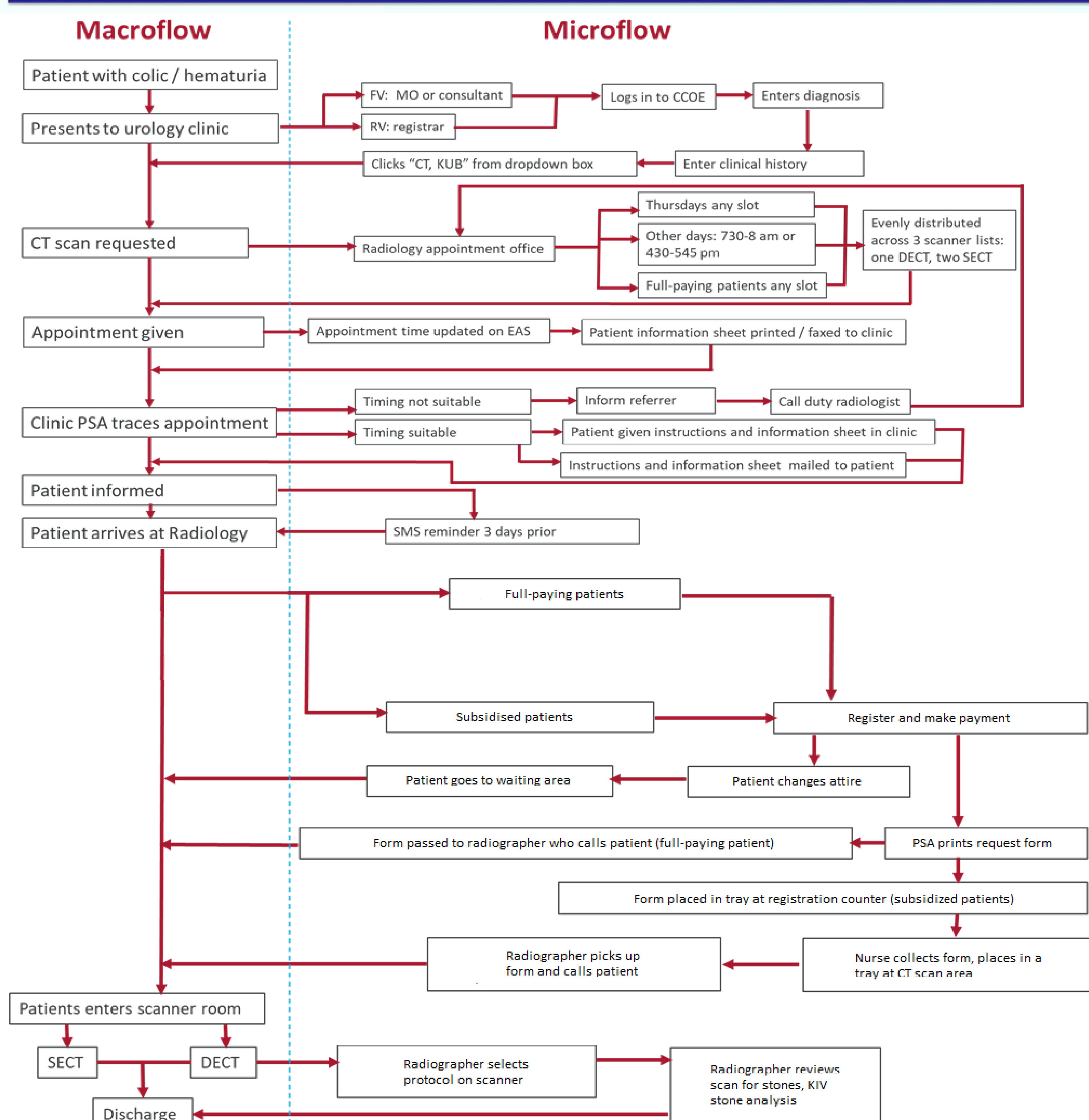
## Evidence for a Problem Worth Solving

- Dual energy CT is an established tool in differentiating uric acid and non-uric acid urinary stones
  - Hidas G et al. Determination of renal stone composition with dual-energy CT: in vivo analysis and comparison with x-ray diffraction. *Radiology*. 2010.
  - Ilyas M et al. Dual-energy computed tomography: A reliable and established tool for in vivo differentiation of uric acid from non-uric acid renal stones. *Niger Postgrad Med J*. 2018.
- Differentiating uric from non-uric acid urinary stones is important to determine if medical or surgical management is more appropriate
  - Kambadakone AR et al. New and evolving concepts in the imaging and management of urolithiasis: urologists' perspective. *Radiographics*. 2010.
  - Cameron MA et al. Uric Acid Nephrolithiasis. *Urol Clin North Am*. 2007.

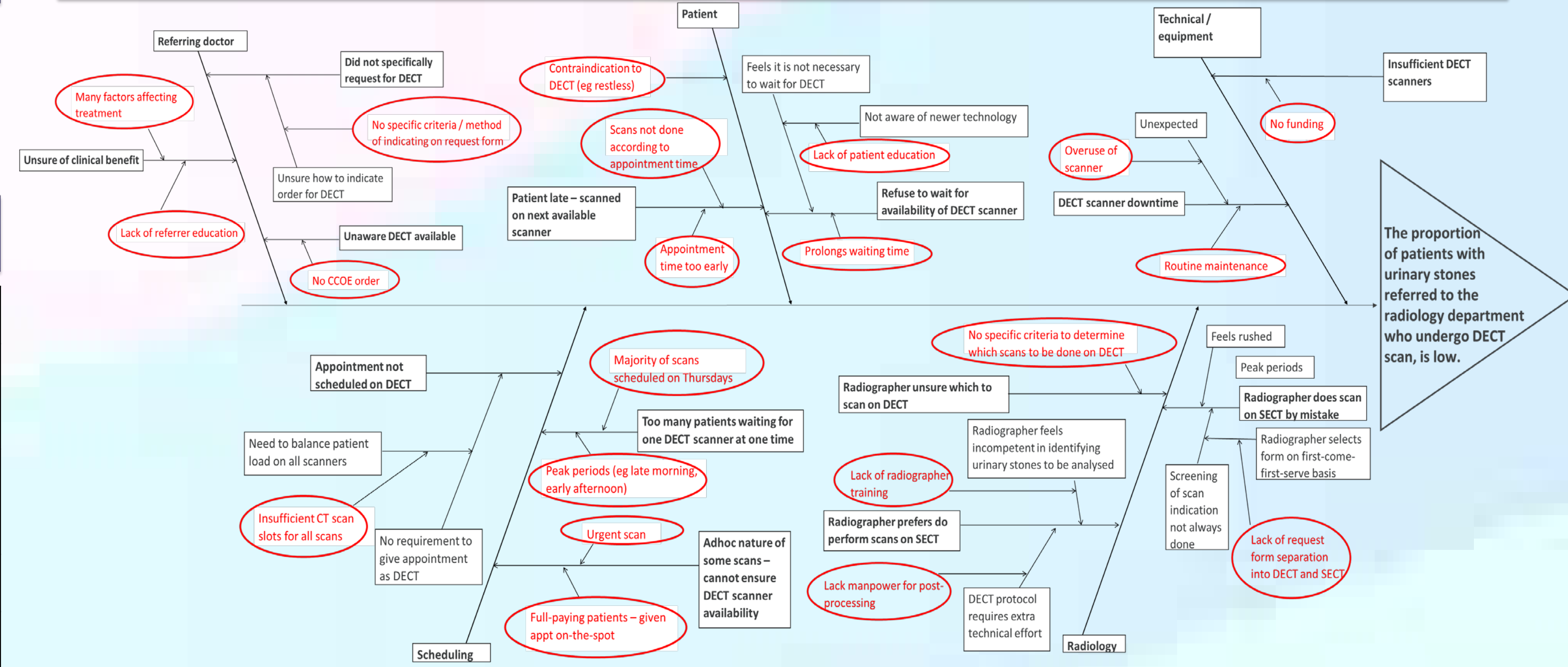
## Current Performance of a Process



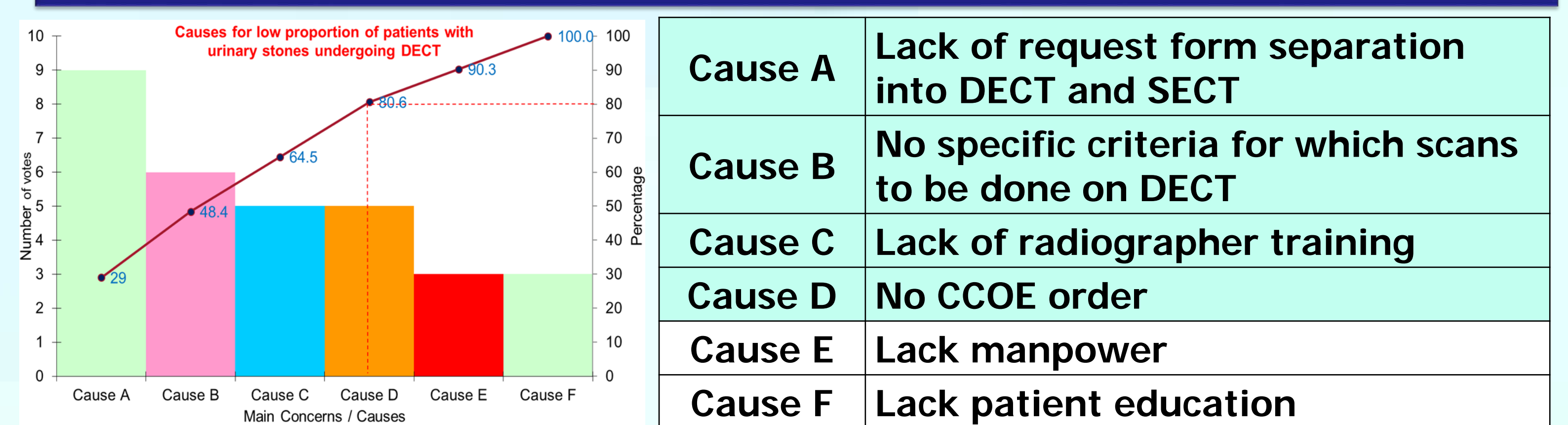
## Flow Chart of Process



## Cause and Effect Diagram



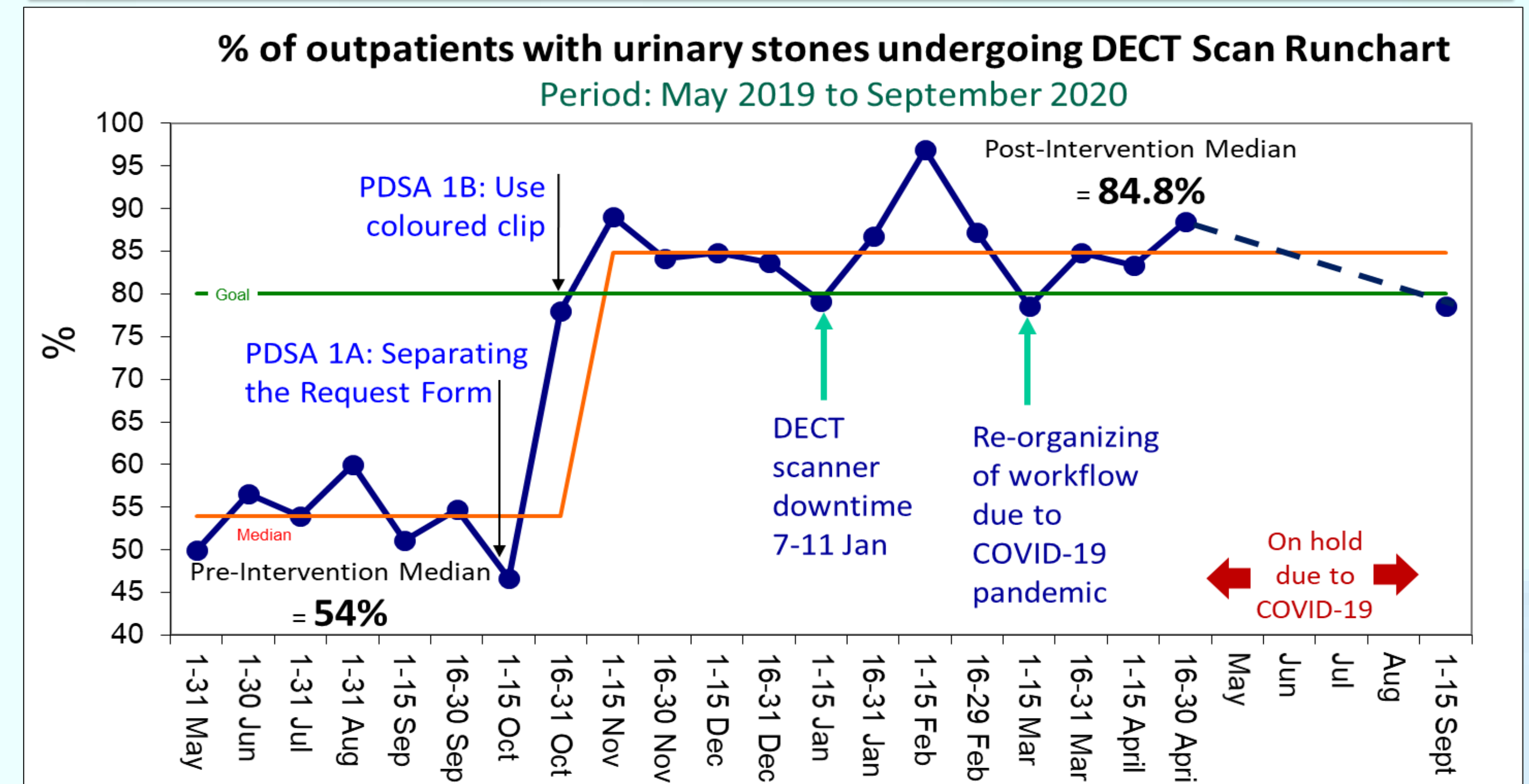
## Pareto Chart



## Implementation

Root Cause	Intervention	Implementation Date
Lack of request form separation into DECT and SECT	Separate CT KUB request forms from the other request forms in the CT scan room	16 Oct 2019

## Results



## Cost Savings

	Pre-Intervention Period: 1 Aug-15 Oct 2019	Post-Intervention Period: 16 Oct-31 Dec 2019
No. of patients who underwent medical therapy	0	6
No. of patients who underwent surgical therapy	5	1
Total Cost Savings (in ~2.5 months)	$(5 \times \$1000) - (6 \times \$31.50 + 1 \times \$1000) = \$3,811$	
<b>Total Cost Savings (Annualized)</b>	<b>\$18,292.80</b>	

**Note:**

- No additional cost to patient for DECT scan
- Cost of medical therapy per patient = \$31.50 (for 6 months)
- Cost of surgical therapy per patient = \$1000

## Problems Encountered

- Identifying macroflow and microflow with the team.
- Convincing staff on the ground of the problem worth solving.
- Planning interventions that are effective, yet least disruptive for maximum compliance.

## Strategies to Sustain

- This CPIP has demonstrated that it is possible to perform CT KUB scans of >80% of patients with urinary stones on DECT with minimal impact on balance measures.
- In the long term, it would be feasible to create a CCOE order for dual energy CT KUB (addressing root cause D).
- The requesting clinician would be able to place a specific request for dual energy CT KUB.
- Radiology department could discontinue the use of the paper clips.