

Increase Utilisation of Dual Energy CT for Patients with Urinary Stones



Dr Lee Chau Hung Department of Diagnostic Radiology

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

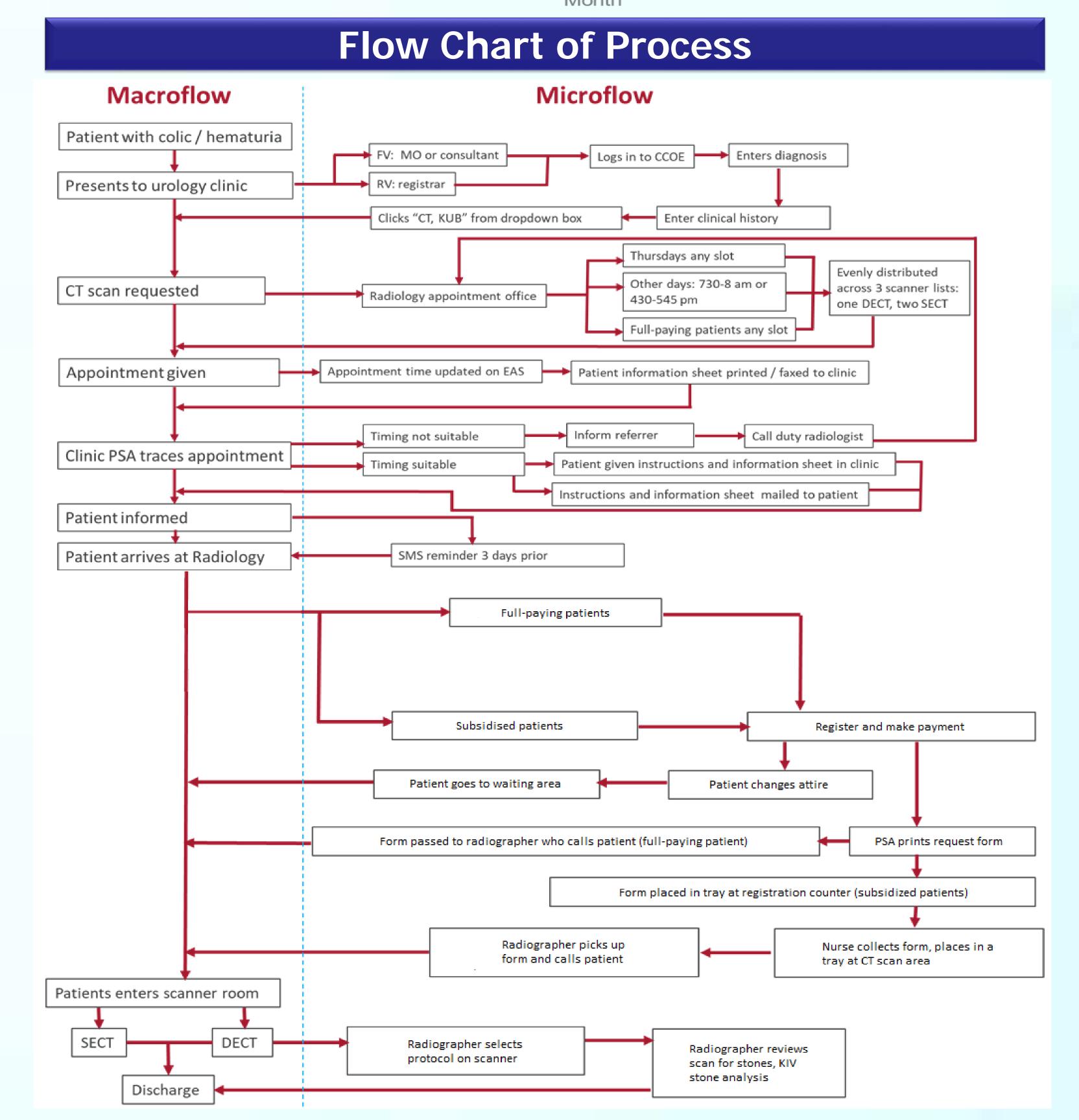
Mission Statement

Team Members					
	Name	Designation	Department		
Team Leader	Dr Lee Chau Hung	Consultant	Radiology		
Team Members	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		
Sponsors	Adj A/Prof Gregory Kaw	Head of Department	Radiology		
	Ms Chow Mui Gek	Nurse Manager	Radiography Service		
Facilitator	Adj A/Prof Chong Yew Lam				

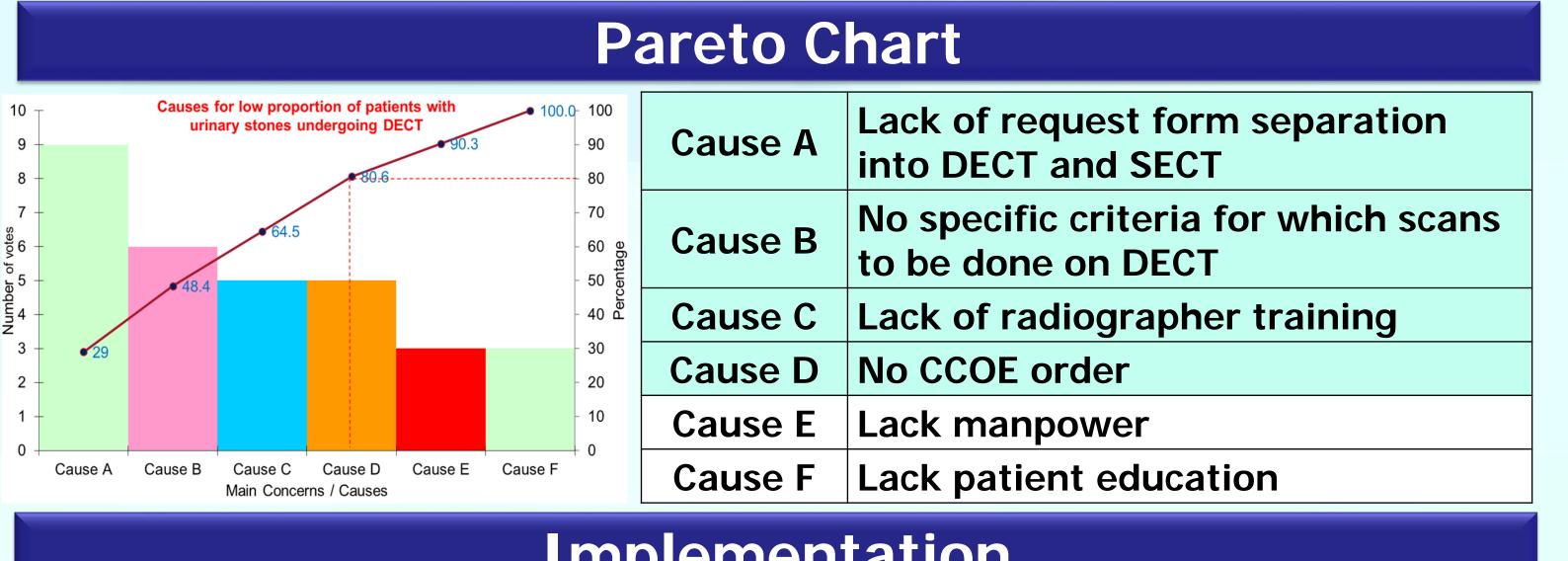
Evidence for a Problem Worth Solving

- 1. 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.
- 2. 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.

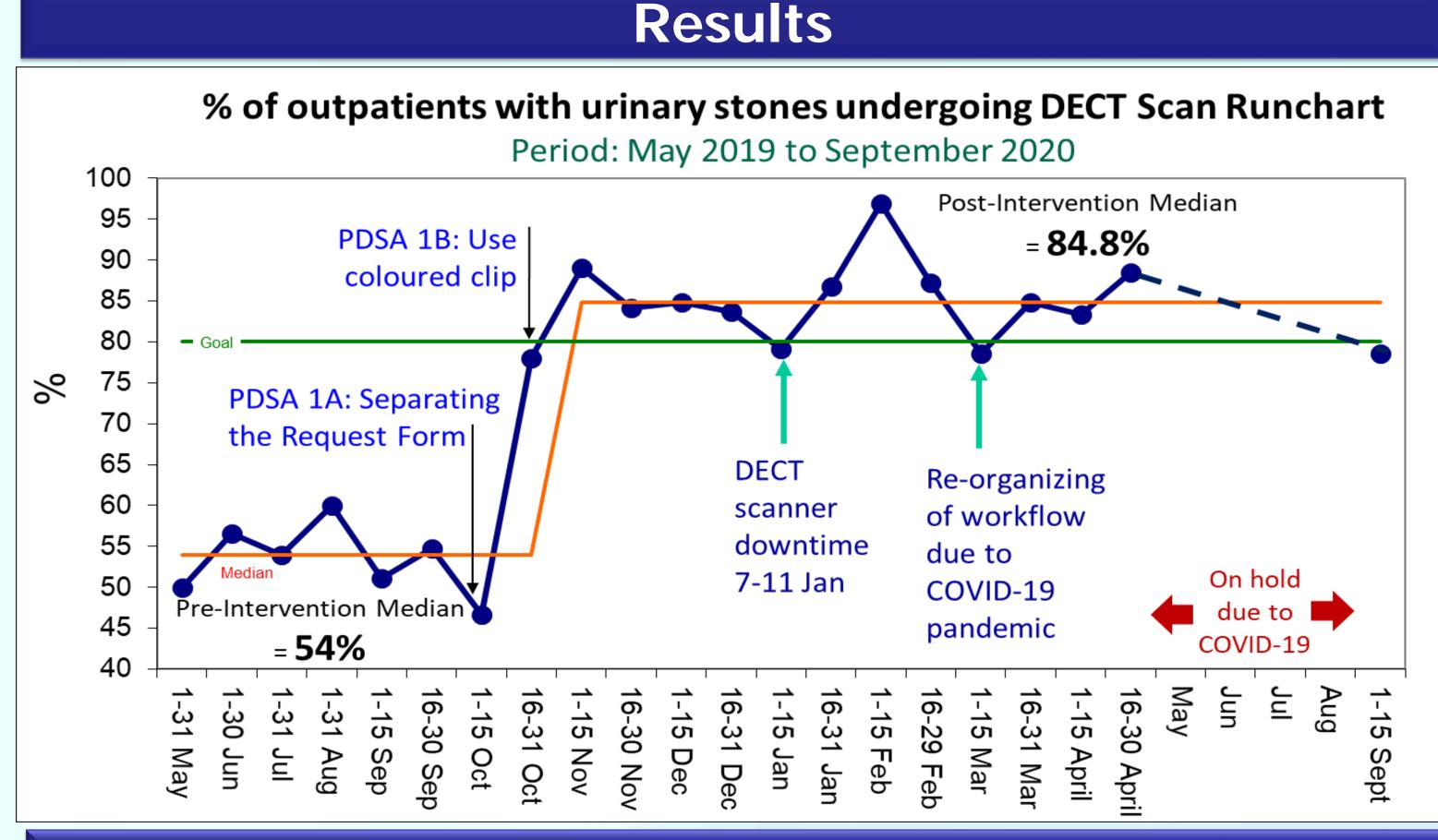
Current Performance of a Process Percentage of Patients with Urinary Stones who underwent Dual Energy CT % of patients with urinary stones who underwent dual energy CT Period: May 2019 to August 2019 70 **60** 60 (49/82)(48/80)56.6 54 ergy (43/76)(47/87)55 50 Baseline Median = **58%** 45 40 May-19 Jun-19 Jul-19 Aug-19 Month



Cause and Effect Diagram Did not specifically Insufficient DECT Feels it is not necessary to wait for DECT scanners DECT (eg restless Many factors affecting Not aware of newer technology Unexpected of indicating on request for Unsure of clinical benefit -Unsure how to indicate Refuse to wait for order for DECT Patient late - scanned DECT scanner downtime availability of DECT scanne on next available Lack of referrer educati The proportion of patients with urinary stones No CCOE order referred to the Feels rushed who undergo DEC ich scans to be done on DECT Majority of scans Peak periods Radiographer unsure which to Radiographer does scan Radiographer feels of scan indication Radiographer prefers do slots for all scans Adhoc nature of DECT protocol



	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			



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)	(5x\$1000)-(6x\$31.50+1x\$1000) =\$3,811				
Total Cost Savings (Annualized)	\$18,292.80				

Note:

- 1. No additional cost to patient for DECT scan
- 2. Cost of medical therapy per patient = \$31.50 (for 6 months) 3. 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.