



# Adding Value To Computed Tomography and Magnetic Resonance Imaging: Point Of Care Testing To Assess Estimated Glomerular Filtration Rate and Protect Renal Function

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## Introduction

Virginia Commonwealth University Health System (VCUHS) Department of Radiology was looking for a way to streamline how we obtain renal function testing information prior to administration of iodinated contrast or gadolinium contrast. During intravenous access stick, the nurse obtains a sample for point of care testing. Timeliness of eGFR calculation assures that if contrast will be administered, it is based on current renal function. We continue to refine our pre-scan process to provide the utmost safety for the patient. We were able to improve our efficiency and reduce the number of rescheduled or cancelled scans.

## Purpose

Pre-existing renal dysfunction is the best predictor of contrast induced nephropathy (CIN)

1. Patients referred for contrast enhanced imaging such as computed tomography (CT) or magnetic resonance imaging (MRI) did not have renal function tests within 30 days
  2. Known risk factors for renal disease include diabetes, older age, previous renal disease and renal transplantation.
- Alternatives available when a patient has known risk factors include performing the study without IV contrast, changing contrast to an iso-osmolar or alternate agent or rescheduling the patient. Point of care testing (POCT) provides immediate results in an imaging setting, allowing determination of which patients are appropriate candidates for intravenous contrast media.

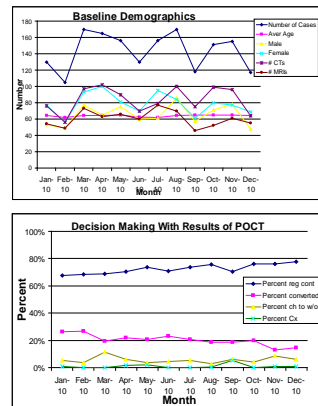
## Methods

In 2010, a total of 13,105 contrast enhanced studies were performed at two scanner locations. POCT was performed in 13.1% of the cases. VCUHS departmental policy requires that selected patients have creatinine and eGFR results available within the past 30 days. This group includes:

- All adult patients with diabetes,
- All pediatric patients (under age 18 years) who have uncontrolled diabetes or uncontrolled hypertension,
- All patients with history of renal disease,
- All patients 65 years of age and older.

Data was extracted retrospectively from two documents created at the time of the scan encounter. First was the assessment form which the patient completes prior to the study. Second was the I-Stat creatinine value along with the standard calculation of the eGFR value using the modified diet in renal disease (MDRD) 4 element formula.

See Figures 1-6.



## Tools Figures 1-6

**Data Tool:**

**eGFR Calculation:**

**CT Pre-Evaluation:**

**Patient Education about Contrast Use:**

**MRI Pre-Evaluation Form (2 pages)**

## References

1. American College of Radiology Contrast Manual Version 7, published 2010.
2. Ginaldi S. New contrast administration protocols: safety considerations. Applied Radiology 2002;31(3):34-37.

## Outcomes of POCT:

Data compiled for 2010 shows:

45.3%	Male:	780
54.7%	Female:	943
Age Ranges: 8 – 93		
58.0% CT's: 1004		
41.9% MRI's: 726		

Monthly average number of POCT: 143.6

Average age:	64.0
Self reported renal problems:	15.0%
Self reported diabetes:	44.7%

eGFR over 60: 72.7%

eGFR between 45 and 60: 18.3%

eGFR less than 45: 9.1%

This correlates with decision making related to contrast administration:

72.5%	received the usual contrast agent;
20.2%	converted to an alternative agent;
5.6%	got a non-contrast study,
0.97%	had the exam canceled.

Use of POCT has enhanced patient management and clinician decision making by:

- Improving scanner table time efficiencies
- Managing appropriately patients with marginal renal function at risk for acute post contrast problems.
- Elevating patients' perceptions of evidence based clinical practice rooted in safety.
- Value added radiology practice perceived by ordering referring clinicians.
- Cost savings to the enterprise: empty table time mitigated by the technologists who rework schedules to manage scanner throughput.
- Reducing number of exams cancelled
- Decreasing reliance on faxed reports from out of network labs related to legibility, date of exam, etc.
- Technologists/ nurse conclude the episode of care in one purposeful encounter

## Disclosure

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation