

# THE VARIABILITY IN INTERPRETATION OF COLONIC CODES IN CT COLONOGRAPHY REPORTING: A SINGLE CENTRE EXPERIENCE

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# BACKGROUND

- Although standardised summary codes to classify colonic findings (C-codes) on CT colonography (CTC) have been used for several years, there is no clear guidance on how these codes should be interpreted
- In the United Kingdom, C-codes have been published by the National Bowel Cancer Screening Programme (BCSP) as a requirement under the minimum dataset for BCSP CTC reporting with scores ranging from Cx to C5b <sup>(1,2)</sup>

1. Zalis ME, Barish MA, Choi JR et al (2005) Working Group on Virtual Colonoscopy. CT colonography reporting and data system: a consensus proposal. Radiology DOI: 10.1148/radiol.2361041926

2. Bowel cancer screening: guidelines for CTC imaging, NHS National Bowel Cancer Screening programme (2021) Available via <https://www.gov.uk/government/publications/bowel-cancer-screening-imaging-use/bowel-cancer-screening-guidelines-for-ctc-imaging>. Accessed 1 Jul 2023



# BACKGROUND

- The use of C-codes in our institution is encouraged for all CTC reports to assist us with auditing our service, rather than just for BCSP studies
- In addition to consultants, NUH has an advanced radiographer CTC service with CTC radiographers undertaking a provisional report of the colonic findings, which are then checked by consultant radiologists



# C-CODES USED IN BCSP MINIMUM REPORTING DATASET (3)

Nottingham **NHS**  
University Hospital  
Site Unit

**CT Colonography minimum reporting specification**

**1. Consent and procedure:** Verbal consent and rectal catheterisation performed by – Operator

**2. Technique:** Buscopan (dose), IV Contrast, Single/Dual/Triple position with Gastrografin tagging, +/- Chest. 2D/3D review

**3. Quality:** Good/Adequate/Poor bowel preparation & distension

**4. Intracolonic findings minimum data set:**

<b>Cx</b> Inadequate study
<b>C1</b> Normal, benign lesion or 1-2 polyps ≤ 5mm
<b>Low risk</b>
<b>C2</b> 1 – 2 polyps, 6 to 9mm
<b>Intermediate risk</b>
<b>C3a</b> 3 – 4 polyps, 1 to 9mm
<b>C3b</b> 1 – 2 polyps, at least one ≥ 10mm
<b>C3c</b> Indeterminate stricture
<b>High risk</b>
<b>C4a</b> ≥ 5 polyps, 1 to 9mm
<b>C4b</b> ≥ 3 polyps, at least one ≥ 10mm
<b>C5a</b> Colon mass, characteristic of malignancy
<b>C5b</b> No tumour additional to colonoscopy findings

**5. Extracolonic findings minimum data set:**

<b>E1</b> Normal, anatomic or post-surgical variant
<b>E2</b> Incidental, unimportant /already known
<b>E3</b> New incompletely characterized finding (further investigation according to local protocol)
<b>E4</b> Potentially important new finding, requires further action
<b>E5</b> Significant new finding identified

In line with NICE, ESGAR and NHSBCSP guidelines all **Polyps 6mm or larger** should be reported.

**Descriptive terms for suspected/characteristic POLYP morphology:**

<b>Pedunculated (lp)</b>	Stalk between polyp and underlying mucosa
<b>Semi-pedunculated (lsp)</b>	Broad-based, base narrower than top but no stalk
<b>Sessile (ls)</b>	No stalk - base & top of lesion have same diameter. Height at least 2.5 mm
<b>Flat: slightly elevated (lla)</b>	Height less than 2.5mm
<b>Flat: slightly elevated with depressed centre (lla/c)</b>	Height less than 2.5mm

Updated Nov 2019

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3. CTC reporting minimum data set, BSGAR (2021) Available via <https://www.bsgar.org/standards/bsgar-standards/ctc-reporting-minimum-data-set/>. Accessed 1 Jul 2023

# AIMS

1. To establish C-code demographics and reporting practice at our hospital
2. To determine the agreement between CTC reporters when using C-codes in reporting CTC
3. To identify if agreement was influenced by:
  - a) Type of reporter (radiologist vs radiographer)
  - b) Reporting experience
  - c) BCSP reporting experience
  - d) Diminutive polyp reporting
  - e) Adequacy of the quality of the study (i.e. if the study was incomplete or inadequate)



# METHODS

- Online questionnaire sent to all radiologists, radiology trainees and reporting radiographers that reported CTC scans at our hospital.
- Questionnaire included 9 questions asked about the participants' demographics and reporting practice, followed by 11 case scenarios where participants were asked to classify a case using the C-code classification they used in their routine reporting.



# QUESTIONNAIRE

- For the 11 scoring questions, participants were asked to select which C-code they would apply in each given scenario. Participants were able to give more than one C-code for each scenario if they desired.
- Example scenarios:
  1. *Adequate study. Two diminutive (<6 mm) polyps.*
  2. *Inadequate study with collapsed sigmoid colon on all views, the rest of the CTC has adequate distension. 15mm sessile polyp in the caecum.*

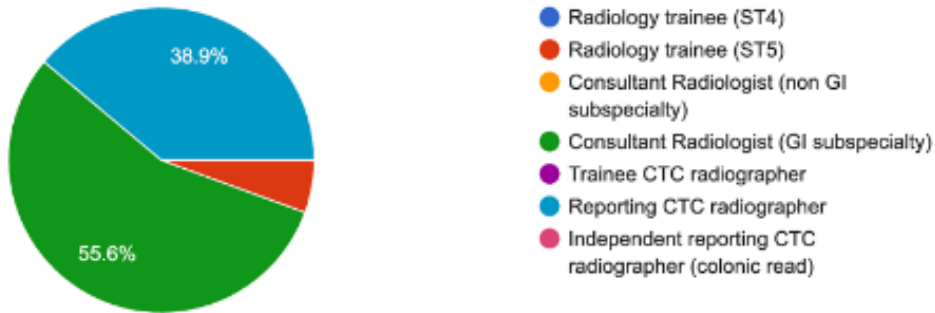


# RESULTS

- 18 responses received (of 21 invited participants)
  - 10 consultant radiologists, 7 CTC radiographers, 1 final-year GI radiology trainee
- 90% radiologists and 100% radiographers stated they “always” use C-codes

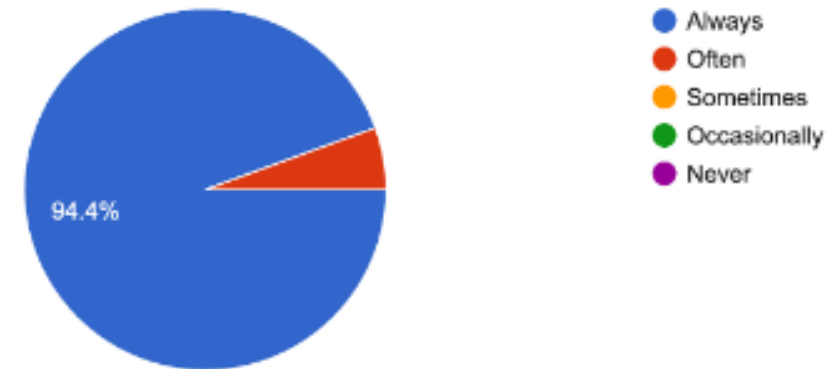
Are you a: (select one)

18 responses



In your usual reporting practice, how often do you use C-codes (for both symptomatic and screening)?

18 responses





# RESULTS

- 17 participants stated they used BSCP/BSGAR C-codes with 1 participant using C-RADS <sup>(4)</sup> and one responder saying they were unsure
- Only half of responders stated that they routinely reported diminutive (<6mm) polyps, with radiographers slightly more likely to report these than radiologists

4. Pooler BD, Kim DH, Lam VP, Burnside ES, Pickhardt PJ (2014) CT Colonography Reporting and Data System (C-RADS): benchmark values from a clinical screening program. AJR Am J Roentgenol DOI: 10.2214/AJR.13.11272.

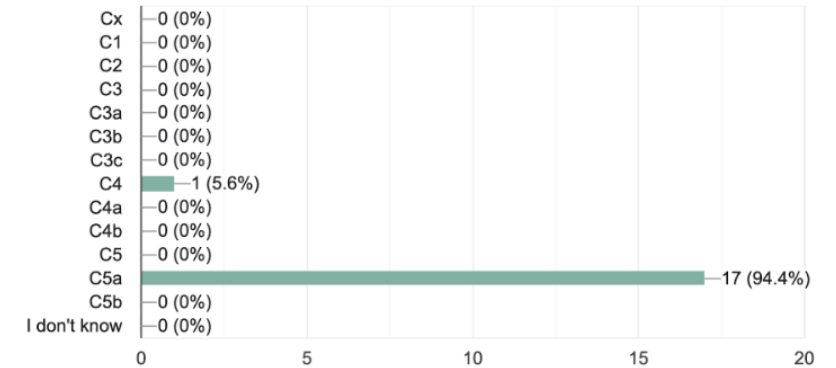
# RESULTS

- Variation in interobserver agreement between cases (examples shown here) with only one case scenario with agreement from all participants
- Overall interobserver agreement was “fair” with a kappa of **0.39** (95% CI 0.38-0.41) and mean pairwise agreement of **46.9%**
- Two different C-codes were used in 17/198 responses

7. Adequate study. You find 2 circumferential bulky colonic cancers with transmural extension. One in the rectum and the other in the transverse colon. The patient has not had a colonoscopy.

(select all that you would use in your report)

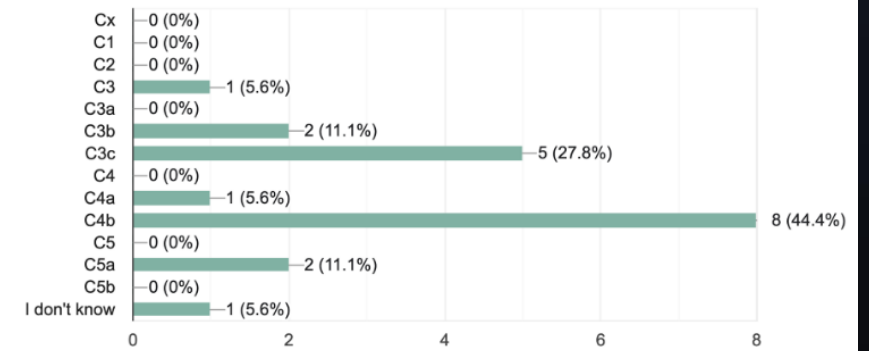
18 responses



9. Adequate study. There is a 15cm sigmoid stricture with background severe diverticulosis. In addition, there is a 21mm flat lesion within the ascending colon and 5 diminutive colonic polyps (<6mm). The patient has not had a colonoscopy.

(select all that you would use in your report)

18 responses



# RESULTS

- Interobserver agreement was found to be higher in:
  - Less experienced reporters (defined as those who had reported <1000 CTCs) ( $p < 0.001$ )
  - Those who reported diminutive polyps ( $p < 0.001$ )
  - Adequate (as opposed to inadequate) cases ( $p < 0.001$ )
- Interobserver agreement was not significantly higher between radiologist/radiographer groups, or between those who reported BCSP CTCs and those who did not ( $p = 0.09$ )



# DISCUSSION

- Our results demonstrate only fair agreement in the use and interpretation of C-codes locally
- This poses a potential problem as these codes are used to standardise categorisation of studies, to provide clarity to referring clinicians, audit our service and to evaluate practice across different centres



# SPECIFIC AREAS OF DISAGREEMENT

- Prioritisation in cases of multiple findings +/- inadequate study
- Reporting of diminutive (<6mm) polyps
- Lateral spreading tumour/flat lesion characterisation
- Centrally depressed polyps
- Number of C-codes per report, for example:
  - When study is inadequate (Cx) but a definite polyp/cancer is seen (C1-5b)
  - Strictures (C3c) vs cancer (C5a/b)



# NEXT STEPS

- Findings discussed at local GI meeting to explain the importance of standardisation to help with auditing the CTC service
  
- Aim to develop guidelines to standardise C-code use, taking account of:
  - Existing BCSP C-code guidelines
  - **Template reporting**
  - National Standards of practice for CTC RCR/BSGAR guidelines and requirements for quality improvement and auditing of the CTC services



# TEMPLATE REPORTING

- In recent months there has been the introduction of a reporting template for CTC reporters, which includes:
  - A list of C-codes and also instructions on how to prioritise C-code use when there are multiple findings
  - Definitions of “inadequate” in relation to the study and guidance on in what circumstances the “Cx” code should be used
  - A new local “adequacy code” to allow auditing of local CTC adequacy rates

## Adequacy code:

**A0** Inadequate study. The entire colon has not been assessed

**A1** Adequate study. The entire colon has been assessed.



# CONCLUSION

- Our questionnaire has demonstrated that there is local variation in how C-codes are used
- We suggest actionable proposals based on these findings to help develop formal national guidance and improve interobserver agreement

