Supplementary Materials

Statistical analysis

Analyses were conducted in Python using Jupyter Notebook. Continuous variables are presented as median [interquartile range, IQR] and categorical variables as n (%).

Discrimination of SUVmax for the endpoints (Lesion_any, advanced neoplasia, and cancer) was assessed using receiver operating characteristic (ROC) analysis and the area under the curve (AUC). 95% confidence intervals (CIs) for AUC were estimated using nonparametric bootstrap resampling (2,000 iterations), and these SUVmax-only AUC estimates should be interpreted as descriptive ROC summaries.

The Youden index was used to derive an exploratory SUVmax cut-off as a cohort-specific statistical summary and not as a directly applicable clinical decision threshold. For the Youden-derived cut-off and prespecified SUVmax thresholds, diagnostic performance metrics (sensitivity, specificity, positive predictive value [PPV], negative predictive value [NPV], and likelihood ratios) were reported, with prespecified thresholds included primarily for clinical interpretability and comparability. Because cut-off selection was not repeated within the resampling procedure, cut-off-based performance estimates should be interpreted as descriptive and may be optimistic.

As a secondary analysis, multivariable logistic regression models incorporating SUVmax, age, sex, and colon location were internally validated using stratified 5-fold cross-validation with out-of-fold predicted probabilities. Because SUVmax-only ROC/AUC summaries are descriptive, AUC values from SUVmax-only and cross-validated multivariable models are not presented as directly comparable estimates. AUC CIs for these models were obtained by bootstrap resampling of out-of-fold predictions (2,000 iterations). All tests were two-sided, and statistical significance was evaluated at a 0.05 level where applicable.

Model specification and coefficient estimates were reported, and model calibration was assessed using out-of-fold predicted probabilities summarised with a recalibration intercept and slope; calibration curves were constructed to visualise agreement between predicted and observed risks.

Table S1. Baseline characteristics of patients with incidental focal colorectal [18F]FDG uptake undergoing colonoscopy (N=208).

Characteristic	**Overall (N=208)**
Age, years, median [IQR]	66.0 [58.0–74.0]
SUVmax, median [IQR]	9.1 [6.7–13.1]
Sex: female	84 (40.4%)
Sex: male	124 (59.6%)
Location (4 groups): Right	56 (26.9%)
Location (4 groups): Transverse	11 (5.3%)
Location (4 groups): Left	96 (46.2%)
Location (4 groups): Rectum/Rectosigmoid	45 (21.6%)
Colonoscopy: Normal	56 (26.9%)
Colonoscopy: Polyp	88 (42.3%)
Colonoscopy: Mass/Tumour	45 (21.6%)
Colonoscopy: Inflammatory/Ulcerative	13 (6.2%)
Colonoscopy: Diverticular disease	6 (2.9%)
Neoplastic lesion on colonoscopy (Lesion_any=1)	133 (63.9%)
Histology available (Pathology_available=1)	149 (71.6%)
--- Histology subset (Pathology_available=1) ---	n = 149
Pathology group: Cancer (1)	44 (29.5%)
Pathology group: High-grade (2)	61 (40.9%)
Pathology group: Low-grade/benign (3)	44 (29.5%)
Advanced neoplasia (cancer + HGD)	105 (70.5%)
Cancer (verified histology)	44 (29.5%)

Values are median [IQR] or n (%). Colon location was categorised as Right, Transverse, Left, and Rectum/rectosigmoid. Colonoscopy categories were Normal, Polyp, Mass/Tumour, Inflammatory/Ulcerative, and Diverticular disease. Histology-based characteristics are shown for the subgroup with available pathology (Pathology_available=1; n=149). Advanced neoplasia was defined as cancer or high-grade dysplasia.

Table S2. Diagnostic performance of SUVmax for colonoscopy- and pathology-defined colorectal outcomes

Threshold	Cut-off (SUVmax)	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	LR+	LR−
a. Colonoscopy-defined neoplastic lesion (Lesion_any), N=208							
AUC = 0.724 (95% CI 0.655–0.796); Youden cut-off = 8.7.							
Youden-optimal	8.7	67.7% (59.7–75.6)	70.7% (60.4–81.0)	80.4% (73.0–87.7)	55.2% (45.3–65.2)	2.31	0.46
SUVmax ≥ 5.0	5.0	94.0% (89.9–98.0)	16.0% (7.7–24.3)	66.5% (59.7–73.2)	60.0% (38.5–81.5)	1.12	0.38
SUVmax ≥ 7.5	7.5	78.2% (71.2–85.2)	49.3% (38.0–60.6)	73.2% (66.0–80.5)	56.1% (44.1–68.0)	1.54	0.44
SUVmax ≥ 10.0	10.0	57.1% (48.7–65.6)	78.7% (69.4–87.9)	82.6% (74.9–90.4)	50.9% (41.8–60.0)	2.68	0.54
b. Advanced neoplasia (histology-verified), n=149							
AUC = 0.702 (95% CI 0.605–0.785); Youden cut-off = 10.4.							
Youden-optimal	10.4	61.0% (51.6–70.3)	77.3% (64.9–89.7)	86.5% (78.7–94.3)	45.3% (34.1–56.6)	2.68	0.51
SUVmax ≥ 5.0	5.0	95.2% (91.2–99.3)	13.6% (3.5–23.8)	72.5% (65.0–79.9)	54.5% (25.1–84.0)	1.10	0.35
SUVmax ≥ 7.5	7.5	81.9% (74.5–89.3)	34.1% (20.1–48.1)	74.8% (66.8–82.7)	44.1% (27.4–60.8)	1.24	0.53
SUVmax ≥ 10.0	10.0	64.8% (55.6–73.9)	70.5% (57.0–83.9)	84.0% (76.0–91.9)	45.6% (33.8–57.4)	2.19	0.50
c. Advanced neoplasia (full-cohort sensitivity), N=208*							
AUC = 0.739 (95% CI 0.667–0.807); Youden cut-off = 10.4.							
Youden-optimal	10.4	61.0% (51.6–70.3)	81.6% (74.1–89.0)	77.1% (68.1–86.1)	67.2% (59.0–75.4)	3.30	0.48
SUVmax ≥ 5.0	5.0	95.2% (91.2–99.3)	14.6% (7.8–21.4)	53.2% (46.1–60.3)	75.0% (56.0–94.0)	1.11	0.33
SUVmax ≥ 7.5	7.5	81.9% (74.5–89.3)	45.6% (36.0–55.3)	60.6% (52.5–68.6)	71.2% (60.3–82.1)	1.51	0.40
SUVmax ≥ 10.0	10.0	64.8% (55.6–73.9)	76.7% (68.5–84.9)	73.9% (64.9–82.9)	68.1% (59.6–76.6)	2.78	0.46
d. Cancer (histology-verified), n=149							
AUC = 0.729 (95% CI 0.639–0.811); Youden cut-off = 10.5							
Youden-optimal	10.5	81.8% (70.4%–93.2%)	65.7% (56.6%-74.8%)	50.0% (38.5%–61.5%)	89.6% (82.8%-96.4%)	2.39	0.28
SUVmax ≥ 5.0	5.0	97.7% (93.3%–100.0%)	9.5% (3.9%-15.1%)	31.2% (23.4%–38.9%)	90.9% (73.9%-100.0%)	1.08	0.24
SUVmax ≥ 7.5	7.5	93.2% (85.7%–100.0%)	29.5% (20.8%-38.2%)	35.7% (26.9%–44.4%)	91.2% (81.6%-100.0%)	1.32	0.23
SUVmax ≥ 10.0	10.0	84.1% (73.3%–94.9%)	58.1% (48.7%-67.5%)	45.7% (34.8%–56.5%)	89.7% (82.5%-96.9%)	2.01	0.27

* In the full-cohort sensitivity analysis, patients without histopathology were assumed not to have advanced neoplasia (advanced neoplasia = 0).

Abbreviations: AUC, area under the receiver operating characteristic curve; CI, confidence interval; PPV, positive predictive value; NPV, negative predictive value; LR+, positive likelihood ratio; LR−, negative likelihood ratio; HGD, high-grade dysplasia.

'Lesion_any' was defined as the presence of a neoplastic lesion on colonoscopy (polyp or mass/tumour; Lesion_any=1) versus no neoplastic lesion (normal, inflammatory/ulcerative, or diverticular findings; Lesion_any=0). **Here, 'polyp' refers to any endoscopist-reported mucosal polypoid lesion, whereas inflammatory/ulcerative and diverticular findings were grouped as non-neoplastic because they reflect benign non-neoplastic conditions rather than a neoplastic lesion.** Advanced neoplasia was defined as cancer or high-grade dysplasia. Cancer was coded as 1 and non-cancer histology as 0. Histology-verified analyses include only patients with available pathology (n=149). For advanced neoplasia, two analyses are presented: a histology-verified analysis (n=149) and a sensitivity analysis in the full cohort (N=208) where missing histology was treated as non-advanced neoplasia. The Youden-optimal SUVmax cut-off and prespecified SUVmax thresholds are shown. Sensitivity, specificity, PPV, NPV, and likelihood ratios are reported with 95% confidence intervals where applicable. Cut-off selection was not nested within resampling; therefore, cut-off-based performance may be optimistic. **Accordingly, Youden-derived cut-offs are reported for descriptive purposes and are not proposed as directly applicable clinical thresholds without external validation.**

Table S3. Multivariable logistic regression model coefficients and out-of-fold (OOF) performance for colonoscopy-defined neoplastic lesion (Lesion_any; N=208), histology-verified advanced neoplasia (n=149), and histology-verified cancer (n=149).

a. Model coefficients (multivariable logistic regression; out-of-fold estimates)		
Endpoint	Predictor	Adjusted OR (95% CI)
Lesion_any (all)	SUVmax (per 1 SD increase)	3.406 (2.092–7.030)
Lesion_any (all)	Age (per 1 SD increase)	1.652 (1.203–2.395)
Lesion_any (all)	Sex (male vs. female)	2.305 (1.322–4.291)
Lesion_any (all)	Colon location: Transverse vs. Right	2.054 (0.887–4.740)
Lesion_any (all)	Colon location: Left vs. Right	1.581 (0.823–3.131)
Lesion_any (all)	Colon location: Rectum/rectosigmoid vs. Right	0.808 (0.373–1.701)

Advanced neoplasia (verified)	SUVmax (per 1 SD increase)	2.498 (1.547–5.311)
Advanced neoplasia (verified)	Age (per 1 SD increase)	0.987 (0.638–1.473)
Advanced neoplasia (verified)	Sex (male vs. female)	0.967 (0.471–1.928)
Advanced neoplasia (verified)	Colon location: Transverse vs. Right	1.345 (0.585–3.246)
Advanced neoplasia (verified)	Colon location: Left vs. Right	2.428 (1.155–5.032)
Advanced neoplasia (verified)	Colon location: Rectum/rectosigmoid vs. Right	1.025 (0.430–2.233)
Cancer (verified)	SUVmax (per 1 SD increase)	1.799 (1.283–3.124)
Cancer (verified)	Age (per 1 SD increase)	0.982 (0.626–1.482)
Cancer (verified)	Sex (male vs. female)	0.826 (0.403–1.620)
Cancer (verified)	Colon location: Transverse vs. Right	2.855 (1.081–6.808)
Cancer (verified)	Colon location: Left vs. Right	1.765 (0.869–3.556)
Cancer (verified)	Colon location: Rectum/rectosigmoid vs. Right	1.599 (0.662–3.581)

b. Discrimination and calibration summary (OOF)

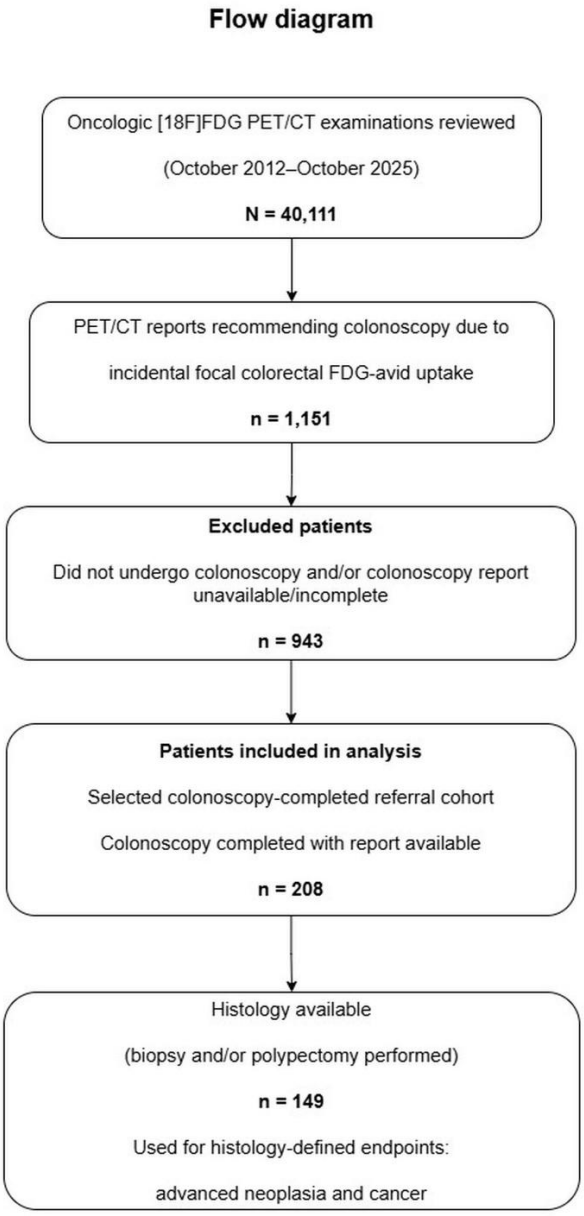
Endpoint	N	Events	SUVmax-only AUC (95% CI)	Multivariable OOF AUC (95% CI)	Calibration intercept (OOF)	Calibration slope (OOF)
Advanced neoplasia (verified)	149	105	0.702 (0.605–0.785)	0.659 (0.565–0.750)	0.244	0.712
Cancer (verified)	149	44	0.729 (0.639–0.811)	0.676 (0.576–0.773)	-0.339	0.578
Lesion_any (all)	208	133	0.724 (0.655–0.796)	0.754 (0.685–0.816)	0.026	0.939

Abbreviations: AUC, area under the curve; CI, confidence interval; OOF, out-of-fold; OR, odds ratio; SD, standard deviation.

(a) Adjusted odds ratios (ORs) with 95% confidence intervals for SUVmax, age, sex, and colon location (Right as reference; Transverse, Left, and Rectum/rectosigmoid as indicator terms). Continuous predictors (SUVmax and age) were z-standardised; the ORs therefore represent a 1-SD increase.

(b) Discrimination and calibration summaries for the multivariable models based on stratified 5-fold cross-validation using OOF predicted probabilities. AUC 95% confidence intervals were obtained by bootstrap resampling of OOF predictions (2,000 iterations). Calibration intercept and slope were derived from logistic recalibration of the observed outcome on the logit of OOF predicted probabilities. ΔAUC denotes **the numerical difference between the cross-validated multivariable OOF AUC and the descriptive SUVmax-only AUC, and should not be interpreted as a methodologically matched comparison.**

Figure S1. Flow diagram of the study cohort.



The diagram follows STARD recommendations. Among 40,111 oncologic [18F]FDG PET/CT examinations (October 2012–October 2025), 1,151 examinations included a report recommendation for colonoscopy because of incidental focal colorectal FDG-avid uptake. A total of 208 patients with a completed colonoscopy report were included. Histology was available in 149 cases in which biopsy and/or polypectomy was performed.

Figure 1. Representative example of incidental focal colorectal [18F]FDG uptake

A 61-year-old man underwent [18F] FDG PET/CT for the metabolic characterisation of a pulmonary nodule; an incidental, intensely hypermetabolic focus was detected in the sigmoid colon (SUVmax = 11.1). Subsequent colonoscopy with polypectomy confirmed a tubulovillous adenoma with high-grade dysplasia on histopathology.

(a) Whole-body maximum intensity projection (MIP) image demonstrates a focal hypermetabolic focus in the sigmoid colon (arrow). (b) The axial fused PET/CT image confirms intense [18F]FDG uptake in the sigmoid colon (arrow). (c) The axial CT image shows the corresponding sigmoid colonic lesion (arrow).

Figure 2. ROC curves of SUVmax for colonoscopy- and pathology-defined colorectal outcomes

Receiver operating characteristic (ROC) curves of colorectal lesion SUVmax on oncologic [18F]FDG PET/CT for detecting: (a) a colonoscopy-defined neoplastic lesion (polyp or mass/tumour) in the full cohort (N=208); (b) advanced neoplasia (high-grade dysplasia or cancer) in the histology-verified subset (n=149); (c) advanced neoplasia in a full-cohort sensitivity analysis* (N=208); and (d) cancer in the histology-verified subset (n=149). AUC values with 95% confidence intervals are shown for each panel. **These AUC values represent descriptive ROC summaries for SUVmax and are not presented as directly comparable to cross-validated OOF AUCs from multivariable models.**

Figure 3. Calibration of multivariable models using out-of-fold (OOF) predictions

Calibration plots are shown for **(a)** colonoscopy-based lesion presence (Lesion_any, all patients; n=208), **(b)** histology-verified advanced neoplasia (n=149), and **(c)** histology-verified cancer (n=149). Predicted probabilities were obtained from internal validation using out-of-fold predictions and are plotted against observed event rates within risk quantiles (points connected

by a line). The dashed diagonal line indicates perfect calibration. Calibration intercept and slope were derived from logistic recalibration of the outcome on the logit of OOF predicted probabilities; intercept values >0 suggest overall underestimation of risk. whereas slopes <1 indicate overfitting (predictions that are too extreme).