GREENER BIOPSY SAMPLING IN ENDOSCOPY

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board

Spread & Scale Climate Academy Leadership Day

10 February 2026 | 09.00 – 15.00 Sophia Gardens Cricket Stadium, Cardiff

SUSTAINABILITY IN ENDOSCOPY

WHY SUSTAINABILITY MATTERS IN ENDOSCOPY

Resource Intensity and Waste

Endoscopy ranks third in clinical waste generation, using many single-use items that cause high carbon emissions.

Environmental Impact of Procedures

Each endoscopic procedure can produce up to 28.4 kg of CO_2e from consumables, travel, and energy use.

Sustainability Initiatives

Professional bodies urge adopting greener practices like reducing unnecessary procedures and optimizing consumables.

Ethical and Strategic Goals

Sustainability aligns with NHS strategies aiming for net-zero emissions by 2040 while ensuring high patient care.

Excessive or non-targeted biopsy sampling not only increases environmental waste but also creates additional workload, delays for pathology, and unnecessary financial burden, without improving patient outcomes when not clinically indicated.

By **June 2027**, we will demonstrate that introducing a standardised "evidence-based biopsy protocol" can **reduce biopsy-related consumable waste by 25%** across **at least 250 patient procedures**.

PROBLEM & AIM STATEMENT

CURRENT CHALLENGES

Challenges in Biopsy Sampling

Current biopsy practices produce excessive single-use waste and formalin usage without clear clinical need, increasing carbon emissions and costs.

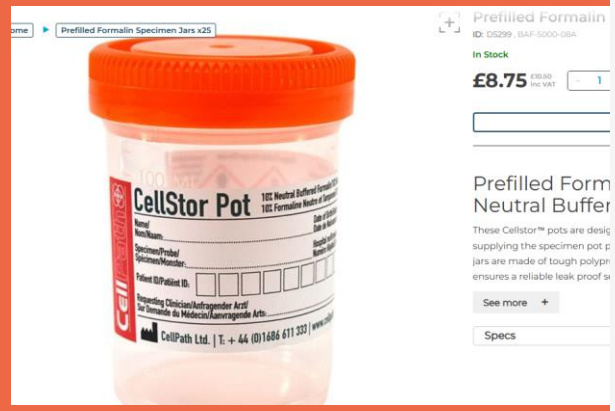
Variability and Over-Sampling Issues

Inconsistent adherence to guidelines causes over-sampling, multiple specimen pots, and adds pathology workload and safety risks.

Implementation and Measurement

Implement evidence-based protocols, optimize specimen handling, and engage staff through education and governance to measure success.

DRIVER DIAGRAM AND CHANGE IDEAS



Annual workload impact

- 6,543 Histology pots
- 1,310 hours direct lab staff time (5hrs day)
- 67,400 Path reporting points
- 1,123 hours reporting time (4.3 hrs day)
- Environmental
- Fiscal

Audit of GI biopsies

ABUHB

April 24-April 25

Rachel Puw-Jones - Consultant Biomedical Scientist

PATHOLOGY

KEY DRIVERS AND INTERVENTIONS FOR IMPROVEMENT

Evidence-Based Decision-Making

Utilize pre-procedure checklists and guidelines to avoid low-value biopsies, improving clinical efficiency and patient care.

Standardised Sampling Protocols

Apply protocols like the Seattle protocol and ensure optimal biopsy quantity to maintain diagnostic accuracy and reduce waste.

Specimen Handling Optimisation

Combine samples appropriately, use right-sized containers, and remove pre-labelling to minimize specimen waste.

Sustainable Procurement and Waste Segregation

Favor reusable systems over disposable items and segregate waste effectively to reduce incineration and environmental impact.

Built a clear problem definition and project aim

- We now have a shared understanding of why biopsy sampling contributes significantly to unnecessary consumables, waste and carbon impacts (aligned with Green Endoscopy principles).
- The team has agreed on a realistic, measurable aim for the next 12–18 months.

2. Developed prototype tools to enable change

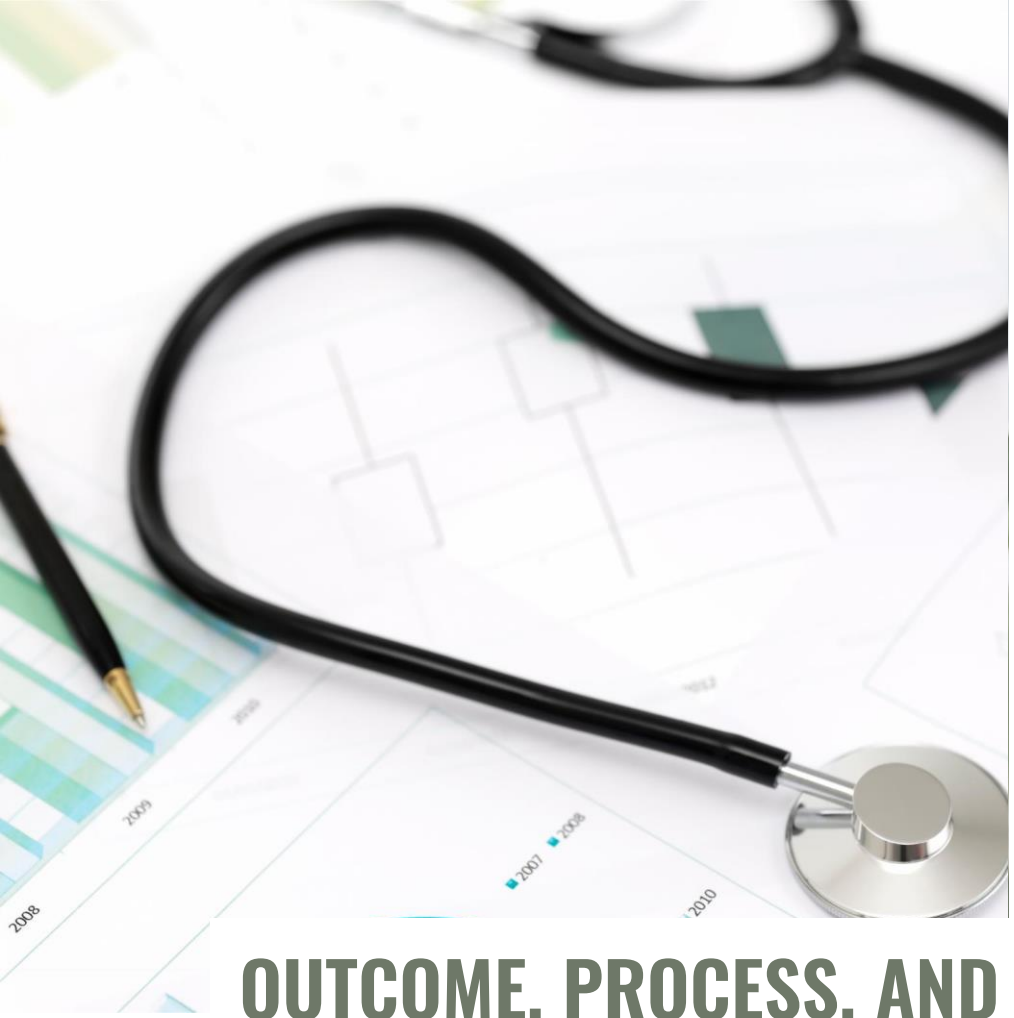
- First drafts of:
  - **Combined-pot SOP rules** (awaiting pathology input)
  - **Visual reminders for Barrett's & coeliac sampling**
  - **Data collection sheet** for biopsy pots used

3. Early staff engagement & positive feedback

- Initial conversations show enthusiasm from nurses, endoscopists, and pathology for reducing unnecessary waste.
- Several clinicians have expressed interest in trialling the prototype prompts during pilot lists.

ACHIEVEMENTS

MEASUREMENT FRAMEWORK



OUTCOME, PROCESS, AND BALANCING MEASURES

Driver diagram clarified the project “big picture”

- Helped organise the problems into rational primary drivers: indication, sampling, pathology processes, waste handling, and education.
- This created clarity for stakeholders early on.

Measurement for improvement tools

- To seek help with QI team re: design run-charts, choose outcome/process/balancing measures, and build a data capture sheet that will support testing when the pilot starts.

Stakeholder mapping

- Highlighted that pathology engagement is essential early on prompting early conversations that will prevent delays later

METHODS

Awareness-raising methods you should use:

- **Publications / Briefs:**

Create a 1-page explainer summarising:
→ the problem (waste, delay, cost)
→ evidence (no benefit from unnecessary biopsies)
→ expected benefits.

- **Presentations in MDT / Endoscopy Huddles:**

Short 5-minute "why this matters" slots.

- **Posters in the department / screensaver prompts:**

"Did you know? 1 unnecessary biopsy pot = X g CO_2e."

- **Social messaging / internal communications:**

Messaging via internal Teams channels or staff groups.

- **Meet-ups / Micro-teaching/ lab tour**

Endoscopist-led 10-minute discussions at start-of-list briefing.

- **Web-based resources: - Green Endoscopy**

A SharePoint page with evidence summaries and progress updates.

IMPLEMENTATION AND GOVERNANCE

LOWER GASTROINTESTINAL ENDOSCOPIC BIOPSY PROTOCOL

GENERAL

DO NOT biopsy macroscopically normal mucosa, unless checking for microscopic colitis (2 from left and 2 from right).

Remove polyps rather than biopsy where possible.

Practice polypectomy within skill set, after appropriate consent and with adequate facilities and time allowance.

IBD

Take 2 biopsies per segment for suspected new IBD cases.

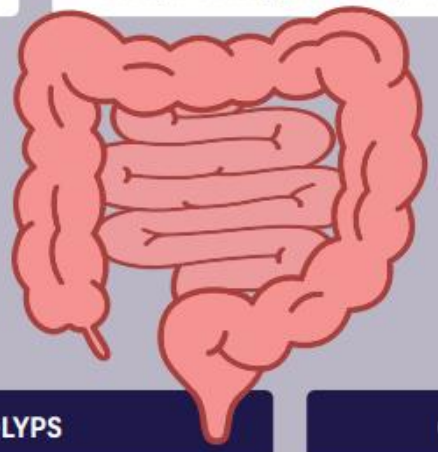
Take minimum of 2 biopsies from inflamed area and send for CMV to assess activity.

Take targeted biopsies of visible lesions with biopsies from right and left colon with chromoendoscopy for surveillance.

For 'high risk' patients, chromoendoscopy should be performed with targeted biopsies and 4-quadrant biopsies every 10cm.

Background biopsies should be taken from areas with pseudopolyps.

For pouch surveillance, 2 biopsies should be taken from each of the afferent ileal loop, efferent loop, pouch and cuff, and any visible abnormalities.



POLYPS

Polyps should be place in separate pots to enable assessment of excision (specimen cassettes or strips can be used for separation).

Use snare for polyp removal where possible, rather than biopsy forceps.

Rectosigmoid hyperplastic polyps <10mm do not need to be removed. Excise only if morphology in doubt.

Take 1-2 targeted biopsies from complex polyps only so scarring doesn't impede future removal.

CANCER

Do not attempt to remove lesions if malignancy is suspected.

Tattoo before biopsies. If not possible, flush the channel first with water.

If performing polypectomy after sampling malignant lesion, make sure to flush channel and change polyp trap.

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Upper GI Endoscopy Biopsy Recommendations

? Eosinophilic or Lymphocytic Oesophagitis

8 biopsies in total - 2 separate pots

4 lower oesophagus (4cm above squamo -columnar junction)

4 mid oesophagus (14cm above squamo -columnar junction)

Barrett's Oesophagus

4 biopsies (quadrantic) every 2cm (in separate pots, labelled with distance from mouth guard)

≤2 biopsies from any visible lesion – record distance from mouthguard - 1 pot

Malignant looking lesions & strictures

Advanced - 8 biopsies in 1 pot

Endoscopically resectable ≤ 2 biopsies in 1 pot

Ulcers (stomach & oesophagus) & LA Grade C & D Oesophagitis

6 biopsies in total, base and edge - 1 pot

? Linitis Plastica

At least 10 biopsies (bite on bite) - 1 pot

Atrophic Gastritis / Gastric Intestinal Metaplasia

6 biopsies in total - 2 pots

Pot 1
2 Antrum
1 Incisura

Pot 2
1 Upper Body (lesser curve)
1 Upper Body (greater curve)
1 Cardia

? Coeliac Disease

6 Biopsies in total - 2 separate pots

Pot 1 - 2 biopsies from D1, Pot 2 - 4 biopsies from D2 take these in:

A. Refractory IDA with no other cause, irrespective of TTG level

B. Weight loss and Upper GI symptoms with no other cause – irrespective of TTG level

C. Positive TTG but less than x 10ULN

Submucosal lesion / Gastric fold thickening

6 biopsies (bite on bite) - 1 pot

?Heliocobacter pylori

Rapid Urease ('CLO') Test (from proximal stomach if on PPI)

4 biopsies if taking samples for culture & sensitivity eg recurrent treatment failure, 2 from antrum, 2 from lesser curve - 1 pot

Gastric & Duodenal Polyps

1 Biopsy from each polyp (in separate pots), if meets criteria -

A. Hyperplastic (only if ≥1cm or pedunculated or post gastrectomy or Atrophic stomach & take atrophic gastritis protocol biopsies)

B. Fundic Gland (only if ≥1cm, ulcerated or atypical appearance)

C. Adenomas

No Requirement to Biopsy

A. Inlet Patches

B. Oesophageal Candidiasis

C. LA grade A,B oesophagitis

D. Irregular Z line (<1cm)

E. Typical Fundic Glandular Cysts

F. Other Gastritis (but test for H. pylori)

G. Typical Duodenal Ulcers

H. Patients with Iron Deficiency Anaemia (IDA) who are anti-TTG antibody negative

I. TTG ≥x10 ULN

J. Patients with weight loss /anaemia should have TTG done prior to endoscopy to avoid biopsies if possible

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EMBEDDING SUSTAINABILITY INTO PRACTICE

Strong Governance and Standards

Implementation depends on governance aligned with national sustainability strategies and JAG GRS 1.9 standards.

Collaboration and Compliance

Pathology collaboration ensures specimen handling aligns with COSHH regulations for formalin safety.

Staff Engagement and Education

Education sessions, visual prompts, and feedback encourage staff participation in sustainability efforts.

Sustainable Procurement and Reporting

Procurement sources reusable alternatives; progress is reported to quality and sustainability committees.

Competing clinical pressures
High demand on the endoscopy service (capacity, waiting lists, turnover of cases) makes it difficult to create protected time for small tests of change

Variation in clinician comfort with reducing biopsies
Some clinicians remain cautious about reducing or rationalising biopsies without strong assurance that safety and diagnostic accuracy are protected.

Manual data collection requirements
No automated way to pull pot numbers, CO_2e data, or sampling metrics → early testing depends on manual recording, which slows progress.

Staff availability: project team are full-time nurses working on the floor
- Members of the project team have **full clinical workloads**, constant patient-facing responsibilities, and are regularly "in the numbers."
- This limits the time available for:
  - designing and testing tools,
  - data collection,
  - attending improvement meetings,
  - observing lists for measurement.

Early-stage uncertainty
- Because we are still in prototype mode, processes, tools, and agreements are not yet solidified → slows confidence and pace of early testing.

BARRIERS

EXPECTED IMPACT AND NEXT STEPS

- how much funding is needed
- for how long
- what it would be spent on
- and how it would make a tangible difference to progress or scale

WHAT WE NEED?

PROJECTED BENEFITS AND FUTURE ACTIONS

Environmental Impact Reduction

Projected benefits include reducing single-use plastic and formalin waste and lowering carbon emissions per procedure.

Clinical and Staff Benefits

Maintaining clinical quality and enhancing staff safety through clearer workflows and evidence-based protocols.

Future Sustainability Actions

Next steps include PDSA cycles, sustainability dashboards, scaling practices, and embedding sustainability in audits.