INNOVATION & TRANSFORMATION – HSJ MODERNISING DIAGNOSTICS

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TAKING PRIDE IN OUR CARE

Barking, Havering and Redbridge University Hospitals NHS Trust

Declarations

Case study from Barking Havering Redbridge University Hospitals NHS Trust – Digestive Diseases Centre (DDC)

Barking, Havering and Redbridge University Hospitals NHS Trust

#GutFeeling October 2020

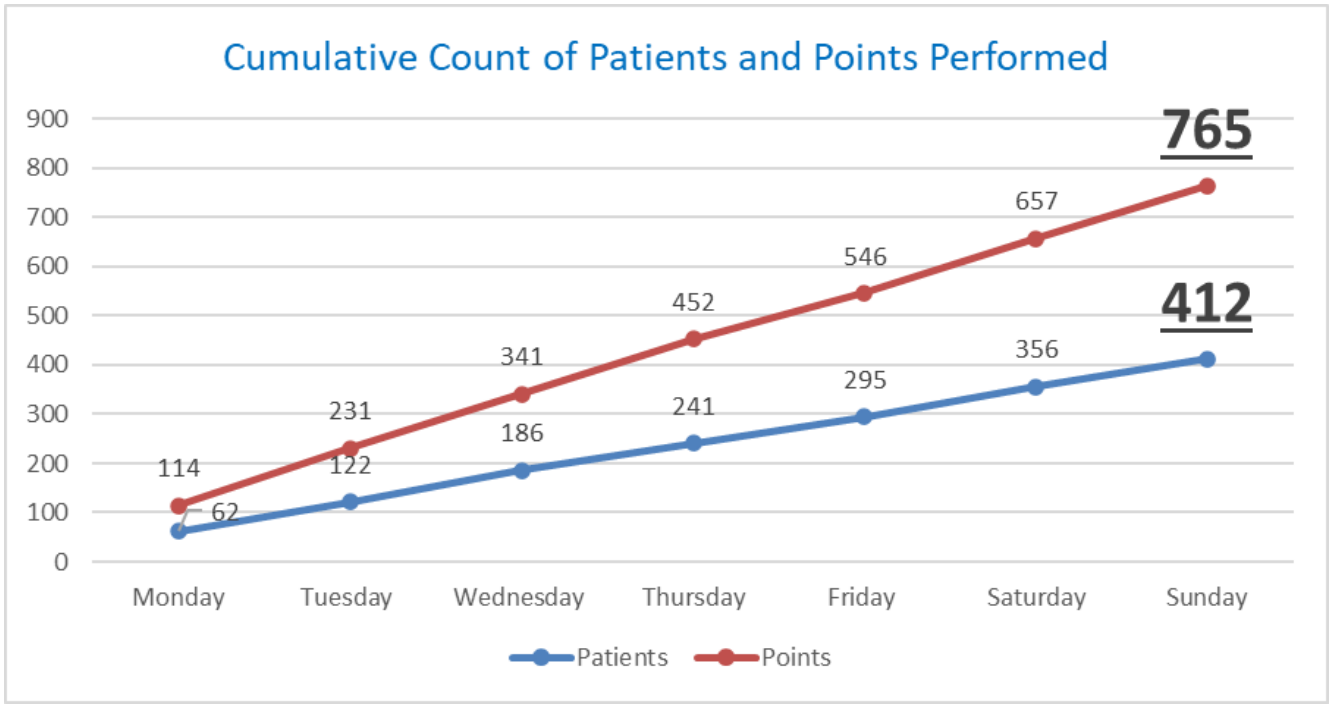
47% increase on patient procedures to previous month

List attrition reduced from 25% to **18.6%**

Valuable patient experience feedback

Rich learning from deep dives with QI

Notable financial benefit to the trust **(£52K)**



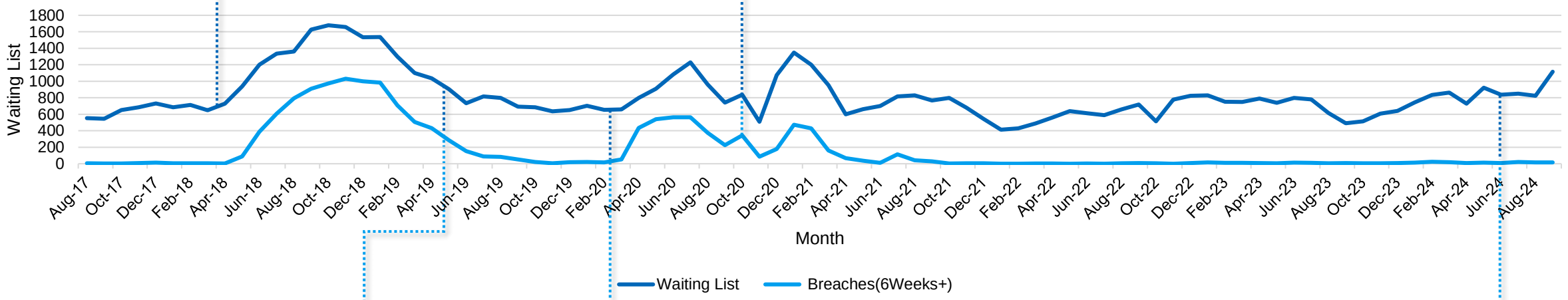
In total, **412 patients** received endoscopies through Green and Yellow Pathways across both sites. In total, **765 points** were achieved via both pathways across both sites. Achieved **10.4 points per list** via the **green pathway.**

Waiting List

- 94-96% utilisation
- 7-9% DNA
- Average points per list 10
- 7 Core endoscopy rooms
- 1 Procedure room and 1 room at CDC
- Advanced therapeutic endoscopy
- Deep sedation – July 2023
- SpyGlass & RFA

Fire in the decontamination unit

#GutFeeling



Digestive Diseases Centre formed

COVID-19 pandemic

Cessation of community gastroenterology service

Digestive Disease Directorates

What they are ☑	What they are not ☒
The main digestive disease specialties (Gastroenterology, Upper Gastrointestinal Surgery, Colorectal Surgery, and GI Endoscopy) are all aligned to the same operational directorate / care group in a trust.	The digestive disease specialties are aligned to different operational directorates / care groups e.g. UGI and Colorectal Surgery aligned to a Surgery Directorate whilst Gastroenterology and Endoscopy are aligned to a Medicine Directorate
Single leadership team, and governance structure, with clarity of responsibility / accountability for the delivery of quality and productive digestive disease care.	Individual leadership teams, and associated governance, for the varying digestive disease specialties meaning no-one has overall responsibility for quality (integrated) and productive care.
Digestive disease specialties ideally co-located enabling integrated care delivery (e.g. one-stop-shop services) and supporting true multi-disciplinary team working.	Digestive disease specialties geographically dispersed resulting in barriers to integrated care delivery and reducing day-to-day opportunities for collaborative multi-disciplinary working.
Ideally a single combined budget, for the digestive disease specialties, supporting integrated working and providing financial flexibility that enables innovation and redesign.	Separate budgets, for the digestive disease specialties, resulting in barriers to integrated working together with a more complex financial decision-making context that is not conducive to promoting innovation and redesign.

Snapshot of GI Endoscopy Performance in a Small Number of Trusts with Digestive Disease Directorates

Trust	% >6ww (National Average 23.9%) ~	Surveillance Lists Recovered #	BCSP FIT@80 Early Adopter *	% of Planned Lists Occurring (National Average 91%) ^	In-sourcing ^	JAG Accreditation $
University Hospitals of Derby and Burton NHS FT	5.1%	☑	☑	97%	0%	☑
Cambridge University Hospitals NHS Trust	0.7%	☑		94%		☑
Barking, Havering & Redbridge University Hospitals NHS FT	0.9%	☑	☑	95%	0%	☑
University College Hospital London NHS FT	6.9%	☑	☑	95%	0.2%	☑
University Hospitals Bristol and Weston NHS FT	10.6%	☑	☑	No data	No data	

Data Sources: ~ DM01 November 2024; # WLMDS November 2024; * Nationally eight services approved to be early adopters; ^Endoscopy informal data collection November 2025; $ JAG website February 2025

TNE Pilot Launch

Launched in **2022**

10 pilot sites

£2.48m capital funding secured (Digital LIMs underspend)

£150k revenue funding secured (HEE)

Lessons Learnt for Replication

Take Home Messages

- **Transformation** for diagnostic Upper GI Endoscopy without sedation outside core endoscopy capacity
- **TNE for frail**, highly comorbid patients where sedation is a risk
- Upper GI FDS can be completed in **7-10 days**
- **Equal image quality** and ability to biopsy
- Endoscopy **capacity freed**, expand to CDCs/Clinics
- **Collaboration** with **JAG, AUGIS** and **BSG**

TNE Champion

We found without a TNE clinical lead or champion, implementing and embedding this new innovative service becomes more challenging.

TNE Promotion

TNE promotion via primary care and providing patients with clear information on a TNE procedure offers greater chance of success.

One-stop TNE Service

We found by providing patients with a one-stop TNE service, this was most effective for both patients and the provider.

A&C Training

All diagnostic Upper GI endoscopy converted to TNE without sedation requires training in admin & clerical.

The Full Report & Promotion

- The full TNE evaluation report can be found on the NHS Futures page, via this link:
  Endoscopy - NHSE London Diagnostic Programme - FutureNHS Collaboration Platform

- Peer reviewed Publication in Clinical Medicine with collaborative authorship with all 10 pilot sites – to the Frontline Gastroenterology, led by Mohamed Hussein, Consultant Gastroenterologist, GSTT

https://www.sciencedirect.com/science/article/pii/S1470211825000181

- Training for TNE on e-LH

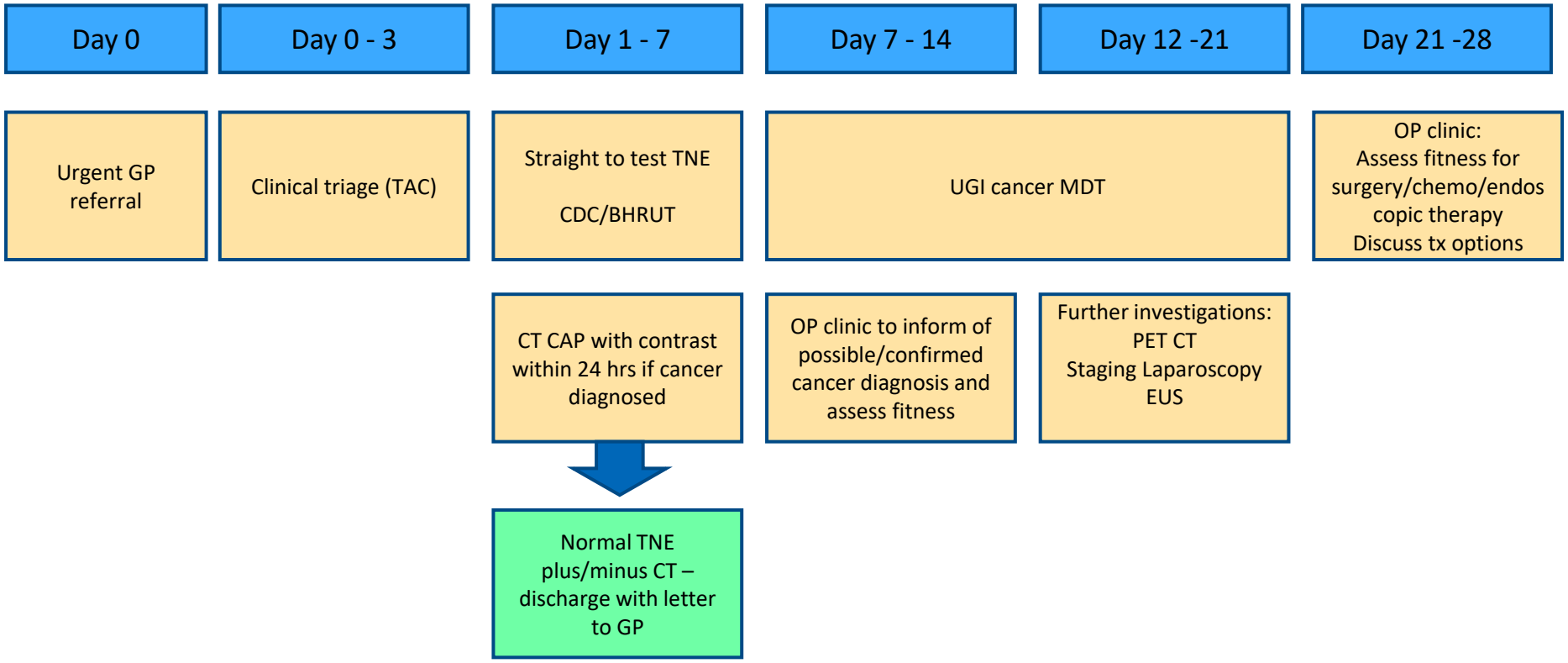
https://www.e-lfh.org.uk/programmes/transnasal-endoscopy-tne/

NHS
North East London
Cancer Alliance

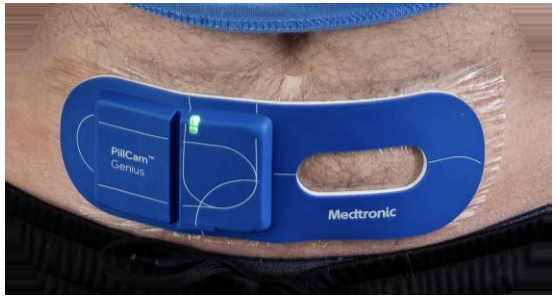
Over 50,000 more diagnostic scans and tests for local residents thanks to opening of Barking Community Diagnostic Centre

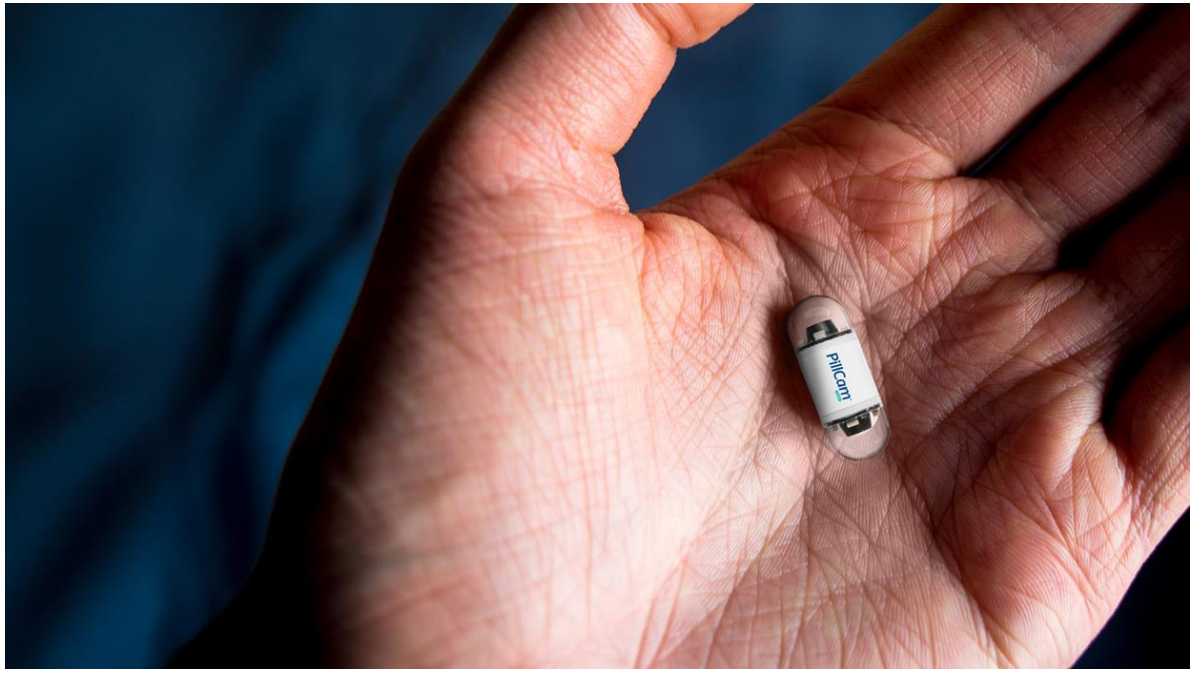
- **Cytosponge**, which detects cancer or pre-cancerous conditions of the stomach and gullet through a simple pill-on-a-string.
- **Colon capsule**, which is a capsule (pictured below) containing a small disposable camera which, once swallowed, takes thousands of pictures as it travels along the gut to help identify the cause of symptoms.
- **Transnasal Endoscopy**, where a thin flexible tube called an endoscope is passed through your nose and down the back of your throat to look directly at the oesophagus.

One Stop Shop UGI TNE pathway

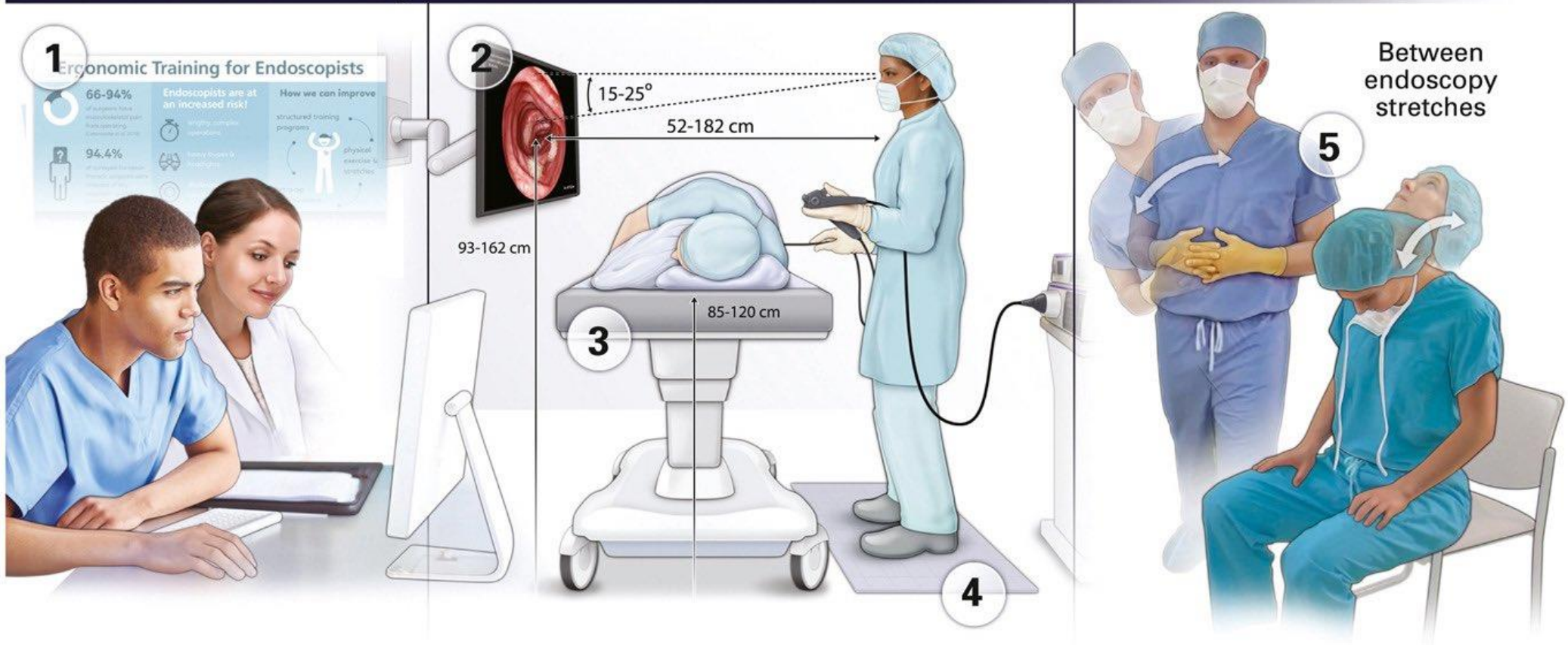


Patch Technology with Capsules





ASGE Guideline Ergonomics Recommendations



1. The ASGE recommends ergonomic education to reduce the risk of ERI. (Strong recommendation, low quality of evidence).
2. The ASGE recommends a neutral monitor position during endoscopies to reduce the risk of ERI. (Strong recommendation, low quality of evidence).
3. The ASGE recommends the use of neutral bed height to reduce the risk of ERI. (Strong recommendation, very low quality of evidence).
4. The ASGE suggests the use of anti-fatigue mats to reduce the risk of ERI. (Conditional recommendation, very low quality of evidence).
5. The ASGE suggests that GI endoscopists take micro breaks and scheduled macro breaks to reduce the risk of ERI. (Conditional recommendation, very low quality of evidence).

THE FUTURE – ROBOTIC COLONOSCOPY

diagnostics

MDPI

Review

Robotic Colonoscopy and Beyond: Insights into Modern Lower Gastrointestinal Endoscopy

Emanuele Tumino [1], Pierfrancesco Visaggi [1,2,*], Valeria Bolognesi [1], Linda Ceccarelli [2], Christian Lambiase [2], Sergio Coda [3], Purushothaman Premchand [3], Massimo Bellini [2], Nicola de Bortoli [2] and Emanuele Marciano [1]

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Abstract: Lower gastrointestinal endoscopy is considered the gold standard for the diagnosis and removal of colonic polyps. Delays in colonoscopy following a positive fecal immunochemical test increase the likelihood of advanced adenomas and colorectal cancer (CRC) occurrence. However, patients may refuse to undergo conventional colonoscopy (CC) due to fear of possible risks and pain or discomfort. In this regard, patients undergoing CC frequently require sedation to better tolerate the procedure, increasing the risk of deep sedation or other complications related to sedation. Accordingly, the use of CC as a first-line screening strategy for CRC is hampered by patients' reluctance due to its invasiveness and anxiety about possible discomfort. To overcome the limitations of CC and improve patients' compliance, several studies have investigated the use of robotic colonoscopy (RC) both in experimental models and in vivo. Self-propelling robotic colonoscopes have proven to be promising thanks to their peculiar dexterity and adaptability to the shape of the lower gastrointestinal tract, allowing a virtually painless examination of the colon. In some instances, when alternatives to CC and RC are required, barium enema (BE), computed tomographic colonography (CTC), and colon capsule endoscopy (CCE) may be options. However, BE and CTC are limited by the need for subsequent investigations whenever suspicious lesions are found. In this narrative review, we discussed the current clinical applications of RC, CTC, and CCE, as well as the advantages and disadvantages of different endoscopic procedures, with a particular focus on RC.

Keywords: colonoscopy; robotic colonoscopy; lower gastrointestinal endoscopy

Citation: Tumino, E.; Visaggi, P.; Bolognesi, V.; Ceccarelli, L.; Lambiase, C.; Coda, S.; Premchand, P.; Bellini, M.; de Bortoli, N.; Marciano, E. Robotic Colonoscopy and Beyond: Insights into Modern Lower Gastrointestinal Endoscopy. *Diagnostics* **2023**, *13*, 2452. https://doi.org/10.3390/diagnostics13142452

Academic Editor: Keiji Hanada

Received: 19 June 2023
Revised: 17 July 2023
Accepted: 21 July 2023
Published: 23 July 2023

1. Introduction

Colorectal cancer (CRC) is a major cause of neoplastic mortality, ranking third and second for worldwide cancer incidence and cancer-related deaths, respectively, leading to almost 1 million deaths per year [1,2]. Accordingly, in 2020, almost 2 million patients were diagnosed with CRC [1]. Most CRCs develop from preneoplastic colonic polyps, which can be present for years before the development of the CRC [3]. Accordingly, effective screening and early diagnosis can reduce mortality and improve outcomes in cancer patients [4–6]. For patients at risk of CRC, both invasive (i.e., colonoscopy) and non-invasive (i.e., fecal immunochemical testing, FIT) screening strategies are available [7]. When colonoscopy is delayed following a positive FIT, the likelihood of subsequent advanced adenomas, CRC, and advanced CRC increases [8]. In addition, it has been estimated that the mortality risk of CRC in patients not complying with a colonoscopy following a positive FIT is twice as high as that of patients who undergo a colonoscopy following a positive FIT [9]. Nevertheless, it has been estimated that 27.5% of FIT-positive patients do not undergo any subsequent lower gastrointestinal investigation [10]. Of note, lower gastrointestinal endoscopy is considered the gold standard for the diagnosis and removal of colonic polyps [11,12].

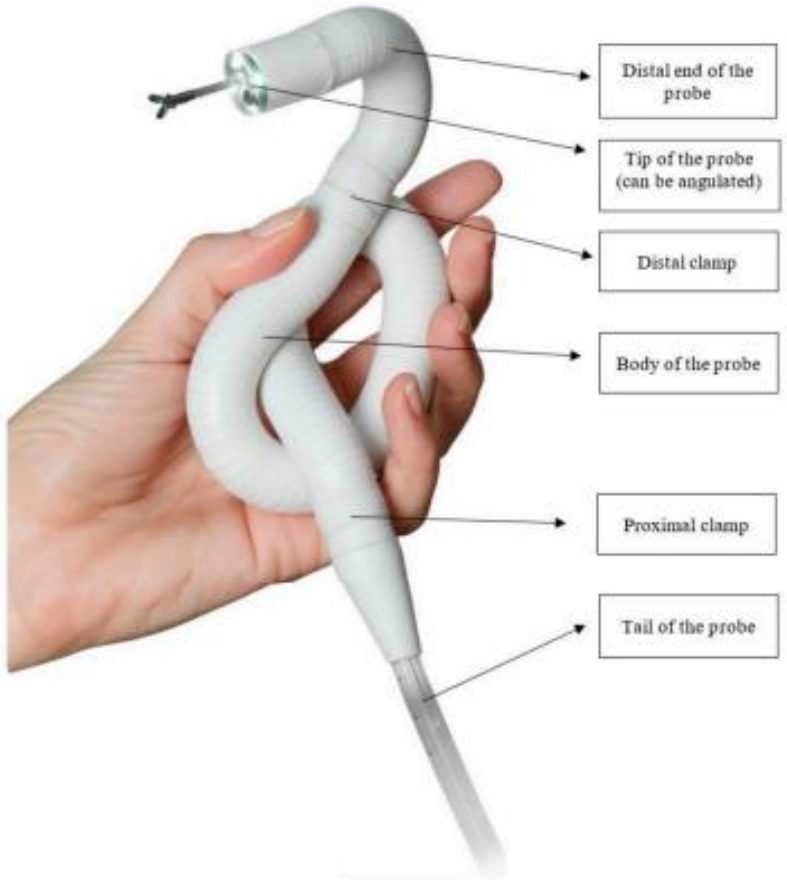
Robotic Colonoscopy System	Characteristics	Availability on the Market
Endotics System	• Electro-pneumatic self-advancing locomotion • The device is controlled remotely by a hand-held control unit	AVAILABLE in clinical practice
NeoGuide Endoscopy System	• Electro-mechanical propulsion with a "follow-the-leader" mechanism. • Composed by a 16-segment insertion tube that controls the snake-like movement of the probe. • Position sensors are located at the distal tip and at the external base of the device to obtain live view of the position of the scope, insertion depth, and computed real-time 3D mapping of the colon	NOT AVAILABLE
Invendoscope SC40	• Electro-mechanical propulsion with an inverted sleeve mechanism • Has a robotically driven tip controlled remotely by a hand-held control unit	NOT AVAILABLE
Aer-O-Scope System	• Self-propelling, self-steering, and disposable. • The locomotion happens through two inflatable balloons (distal and proximal end of the probe) and internal pneumatic pressure for pushing the frontal mobile balloon forward and backward.	NOT AVAILABLE
ColonoSight System	• Electro-mechanical propulsion • Has a reusable part (the colonoscope) and a disposable part (multi-lumen sheath with working channel.	NOT AVAILABLE
Robotic-assisted Colonoscopy Capsule	• Magnetic colon capsule with an external magnetic field locomotion system • An external robot with a magnet is used to navigate the capsule in the colon.	AVAILABLE for experimental use

WHAT IS ENDOTICS COLONOSCOPY?

- Is a **disposable soft robotic** colonoscopy
- Steerable tip and **highest flexible body** and tail (7.5 mm diameter).
- The head consists of a **150° circa angle camera**
- Channels for water, air and tools
- The robot is controlled by a **handheld console**
- The robot can then elongate and move forward with the aid of clampers that can grip and release like that of a caterpillar

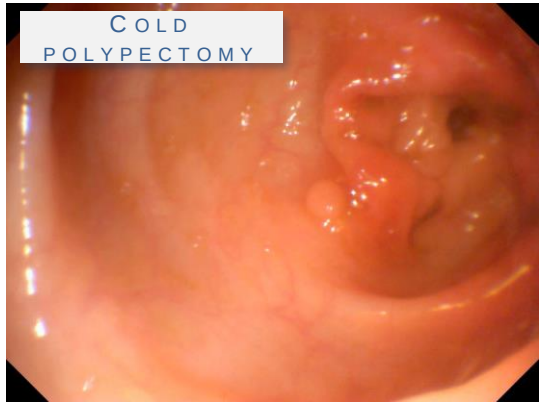
- The **workstation** is the hub that connects the software, the joystick and the probe that connects via the extendable arm
- Workstation is **transportable** and has an easy set-up

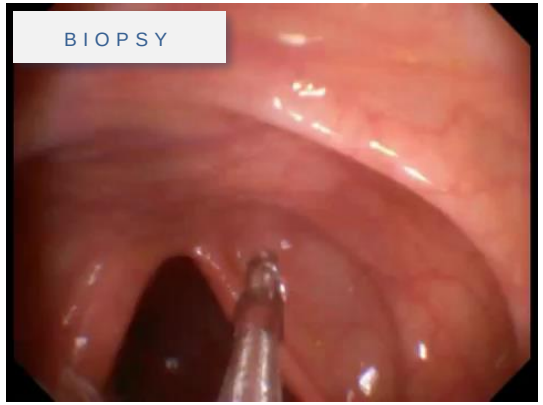
ENDOTICS SYSTEM – ADVANTAGES

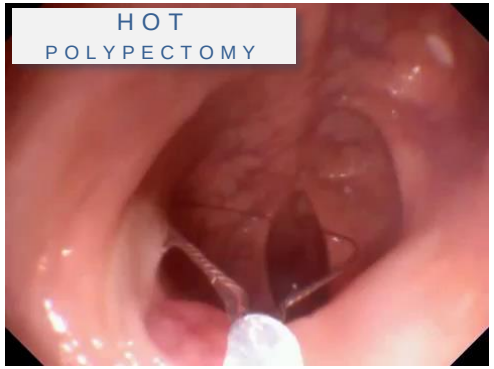


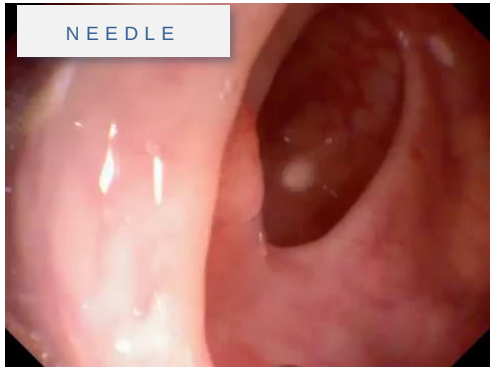
- **Disposable, no decontamination**
- **Painless** (except of the air insufflation)
  - maximum force generates pressure of 44.17 mmHg
  - design inherently prevents loop formation
- **Only one nurse** required in the room
- Perforation extremely rare as no push required
- **Safer for the operator** (better ergonomics)

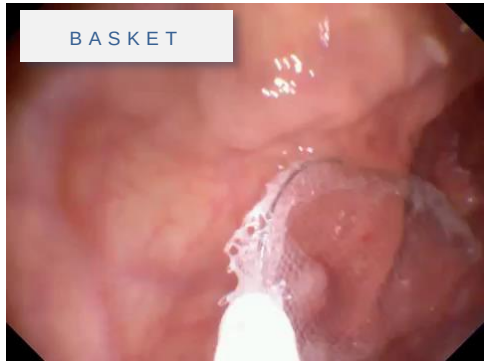
ENDOTICS® SYSTEM – WHAT YOU CAN DO











DDW2024
Digestive Disease Week®
MAY 18-21, 2024 | WASHINGTON, D.C.
EXHIBIT DATES: MAY 19-21, 2024

ROBOTIC COLONOSCOPY TO IMPROVE PAIN, DISCOMFORT AND COMPLETION RATE IN A UK COHORT

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PURPOSE / OBJECTIVES

Colonoscopy is the gold standard for the diagnosis and therapy in the lower gastrointestinal (GI) tract. However, around 75% of patients experience pain or discomfort.[1] The application of robotic technology promises to advance and overcome the difficulties faced during colonoscopy including technical challenges. The Endotics® System[2], is a disposable remote controlled robotic colonoscope that is CE marked and FDA approved.

We aim to show that robotic colonoscopy is a safe and effective method of examining the colon with improved levels of pain and discomfort experienced thereby potentially providing a successful alternative to standard colonoscopy.

MATERIAL & METHODS

One expert endoscopist performed the robotic colonoscopy at Barking, Havering and Redbridge University Hospitals NHS Trust between January 2023 to January 2024.

Patient cohort included those who had failed a standard colonoscopy due to discomfort or fixed colonic segments and initial diagnostic colonoscopies were recruited. The procedure was performed in a clinical room, outside the endoscopy unit.

Key performance indicators for colonoscopy was recorded and endoscopy reports and nursing observational records analysed.

RESULTS

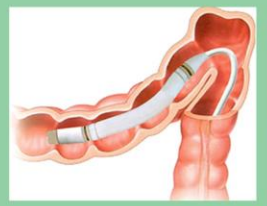
42 patients were recruited (25 female:17 male), mean age 55 years (range 23-80 years).
21 (50%) had a failed standard colonoscopy prior.
35 (83.3%) had no sedation with their robotic colonoscopy, 6 (14.3%) Entonox and 1 (2.4%) sedation.
31 (77.5%) had a complete procedure to caecum. 9 (21.4%) were not complete, 6 due to severe sigmoid and 3 severe descending diverticulosis, 35 (83%) reported no or minimal discomfort.
The average duration of procedure was 57mins (range 20-102 mins).
There were no complications in the robotic procedures.
19/21 procedures (90%) were successful with the robotic method after failing standard colonoscopy.

What is robotic colonoscopy?

The robotic colonoscopy system is composed of a sterile, disposable probe. The probe has a head, a steerable tip and flexible body and tail (7.5 mm diameter). The head consists of a 140° angle camera and channels for water, air and tools . The robot is controlled by a handheld console. The robot can then elongate and move forward with the aid of clampers that can grip and release like that of an inchworm.[3]

When would you choose robotic colonoscopy over standard?

-Second line after failed standard colonoscopy
-incomplete due to patient pain
-incomplete due to technical inability to progress
-Unable to tolerate a standard colonoscopy in the past including with sedation



KEY POINTS

1. Robotic colonoscopy provides a safe and effective solution for those patients who have failed a standard colonoscopy
2. Robotic colonoscopy is a valid first option for patients with known severe diverticular disease or sedation is deemed unsafe
3. Further work is required to understand its potential growth with clinical implementation allowing this to occur

RESULTS

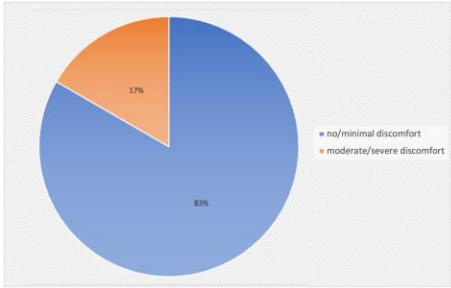


Figure 1: Reported discomfort by robotic colonoscopy patients. [None/minimal 35 (83%), Moderate/Severe 7 (17%)]

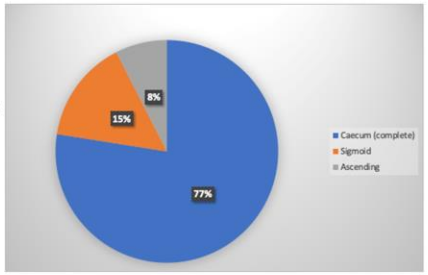


Figure 2: Completion rate in robotic colonoscopy. [Caecum 31 (77.5%), Not complete 9 (21.4%)]

SUMMARY / CONCLUSION

Robotic colonoscopy provides a safe and effective method of colonoscopy with improved comfort scores in this early cohort of patients.
It provides an alternative to conventional colonoscopy with improved overall completion rates, including those who had previously failed a standard colonoscopy.
A learning curve is being established with an aim to reduce the total procedure time. Furthermore, reduced or no sedation robotic procedure rates outside a conventional endoscopy unit are being explored. Prospective data including polyp and adenoma detection rates in addition to comfort scores and colonoscopy key performance indicators are also being collected.

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DISCLOSURES: All authors have no disclosures to declare.

BHRUT EXPERIENCE – PILOT STUDY

- 106 cases (48 male 58 female), mean age 56.4
- 23 previously failed colonoscopy due to pain
- 76% completion to caecum – (16/23 previously failed standard completed with robotic colonoscopy)
- 87.5% with no discomfort or minimal discomfort
- 5 patients had therapeutic intervention with polypectomy
- 98% performed with no pre-medication (conscious sedation)
- Average caecal intubation time 31.07minutes

SUMMARY

- Safest colonoscopy so far
- Expansion of indications and of experts performing the procedures
- Disposable is a great advantage
- Can be performed in outpatient clinics/CDCs
- Minimise staff requirements and avoid sedation
- Success in patients with previously failed standard colonoscopy
- Can increase productivity - easy set-up and learning curve
- Can be more cost effective when numbers are increased


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LEADERSHIP FOR ME

People

- Circle of safety

Empower

- Autonomy
- Belonging
- Contribution

Process

- Start with why

Empathy

- People before numbers

Thank you

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TAKING PRIDE IN OUR CARE

NHS
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