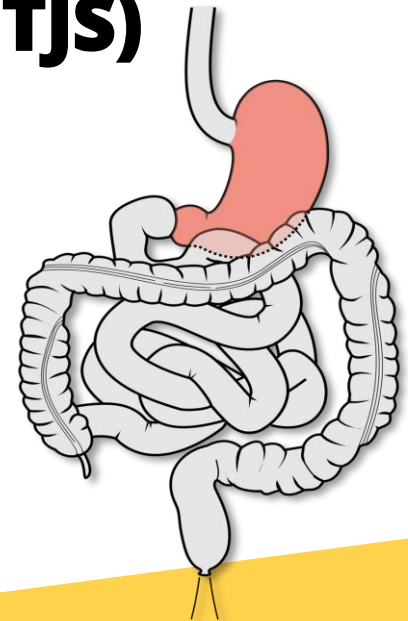


# Improving Percentage of Successful Bowel Cleansing among Patients Prescribed with Polyethylene-Glycol (PEG)-4000 Powder for Colonoscopy in Hospital Tuanku Ja'afar Seremban (HTJS)

**ADIBAH BINTI MURAYADI**  
PEGAWAI FARMASI UF52  
HOSPITAL TUANKU JA'AFAR SEREMBAN  
NEGERI SEMBILAN



# TEAM MEMBERS

## Pharmacy Dept.

Ahmad Ridza bin Ahmad Nizam  
Cheong Jia Wen  
Siti Nabilah binti Md Yazid  
Tien Ja She  
Adibah binti Murayadi  
Muhammad Sahmi bin Mohd Sairi  
Shirlie Goh  
Thanapriya Anbalagan

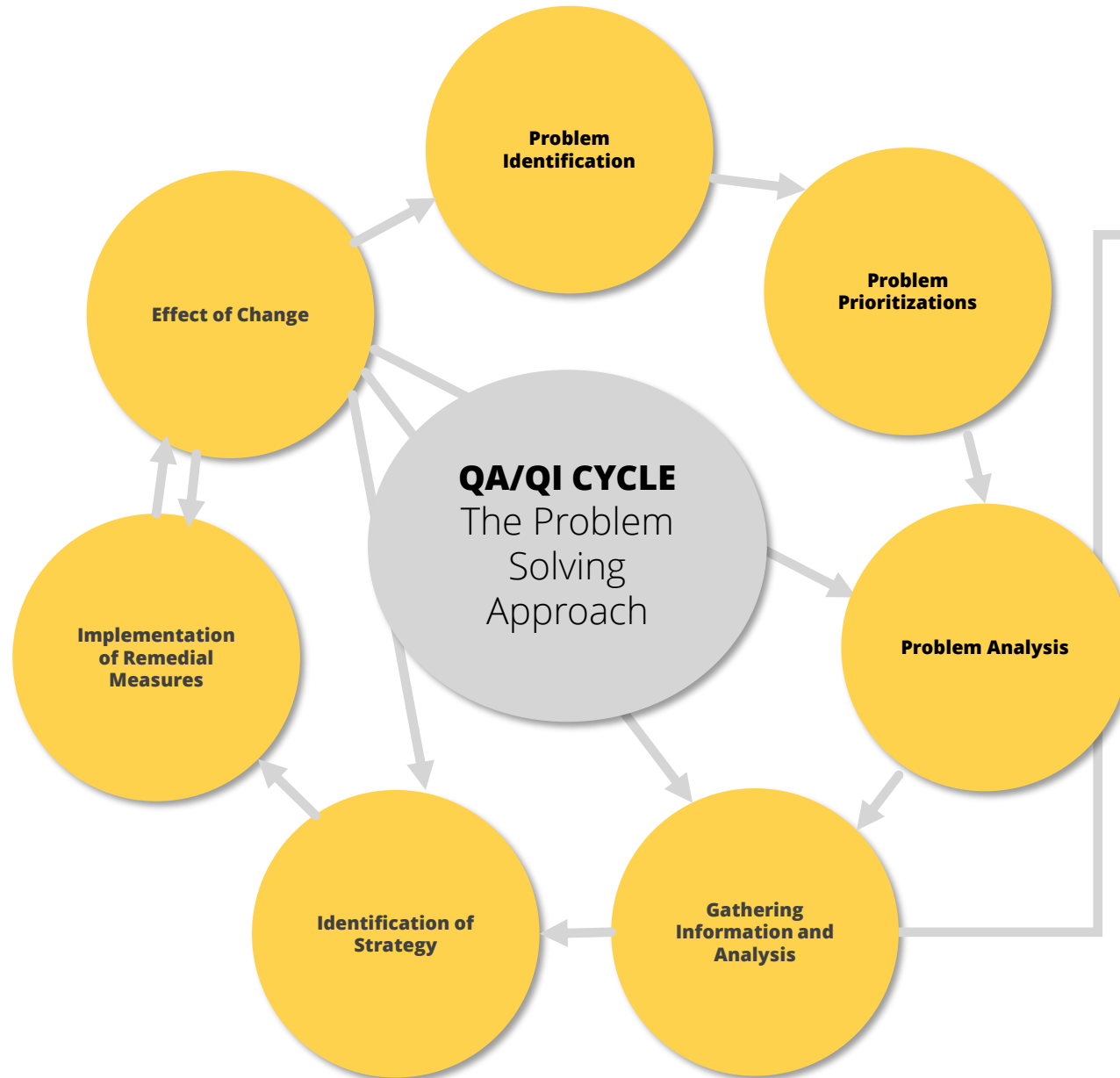


## Surgical Dept.

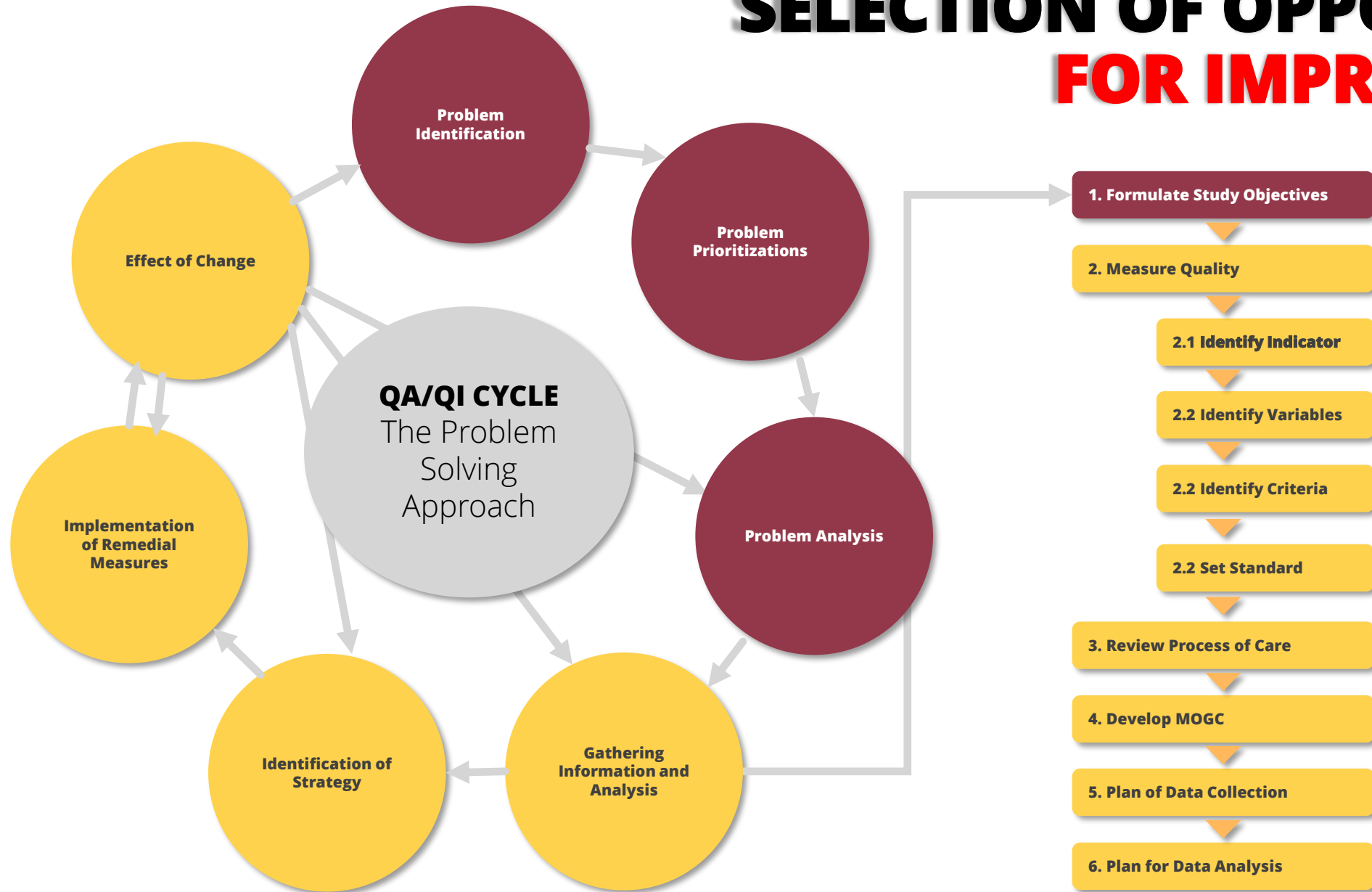
Dr (Mdm) Zaidah binti Mohd Ali  
Dr (Ms) Norfarizan binti Azmi  
Abdul Aziz bin Ab Mulup  
Shamsul Akman bin Anuar  
Fazliana binti Mokhtar

A collaboration between  
Pharmacy Dept. & Surgical Dept. HTJS

# QA/QI CYCLE: THE PROBLEM SOLVING APPROACH



# SELECTION OF OPPORTUNITY FOR IMPROVEMENT



# PROBLEM IDENTIFICATION

Low percentage of correct tube use for TDM blood sample

Low percentage of successful bowel cleansing for colonoscopy among patients prescribed with Polyethylene-Glycol (PEG)-4000 Powder

Low percentage of proper handling on liquid preparation

Long waiting time for prescription with psychotropics in Outpatient Pharmacy

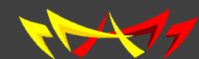
# PRIORITIZATION OF PROBLEM

QUALITY ISSUE	S	M	A	R	T	Total
Low percentage of correct tube use for TDM blood sample	18	14	22	28	38	120
Low percentage of successful bowel cleansing for colonoscopy among patients prescribed with Polyethylene-Glycol (PEG)-4000 Powder	36	38	35	38	37	184
Long waiting time for prescription with psychotropics in Outpatient Pharmacy	28	34	33	26	33	154
Low percentage of proper handling on liquid preparation	22	14	34	30	15	115

Rating Scale 1=Low, 2=Medium, 3=High

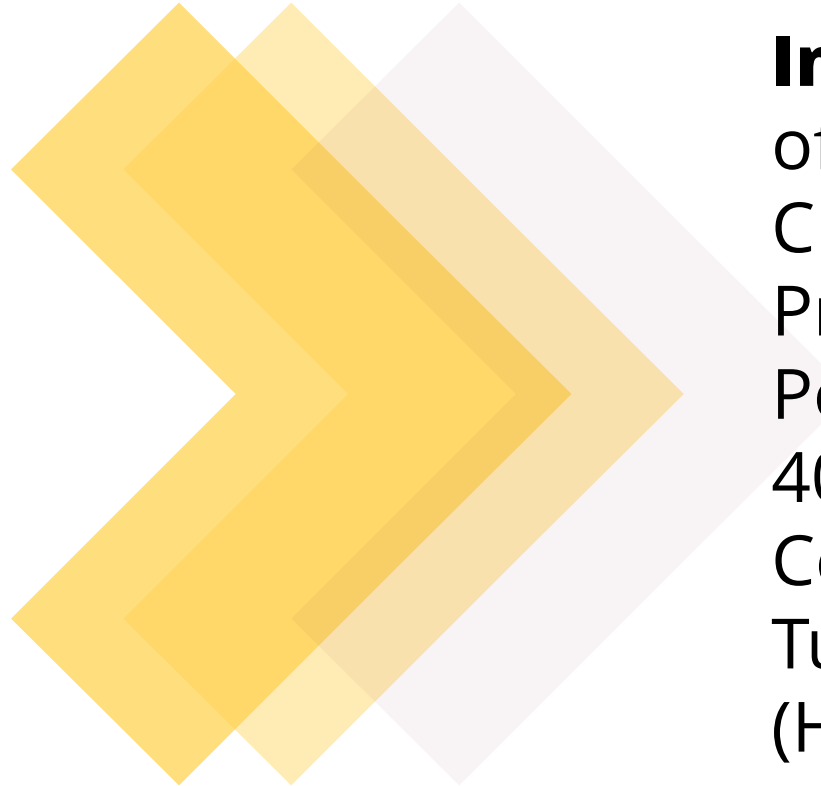
**SMART Criteria**

**13 Group Members**



# REFINED TITLE

**Low Percentage**  
of Successful Bowel  
Cleansing for  
Colonoscopy among  
Patients Prescribed  
with Polyethylene-  
Glycol (PEG)-4000  
Powder



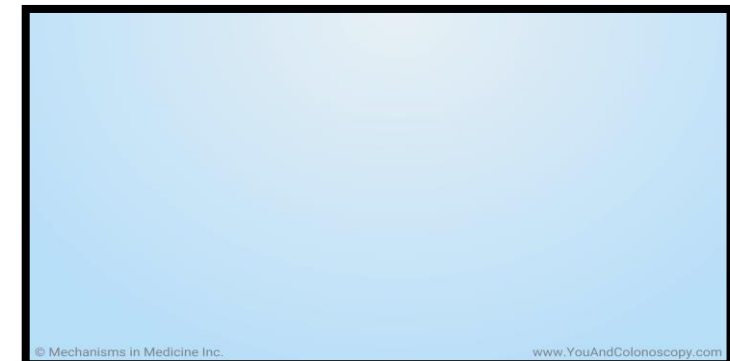
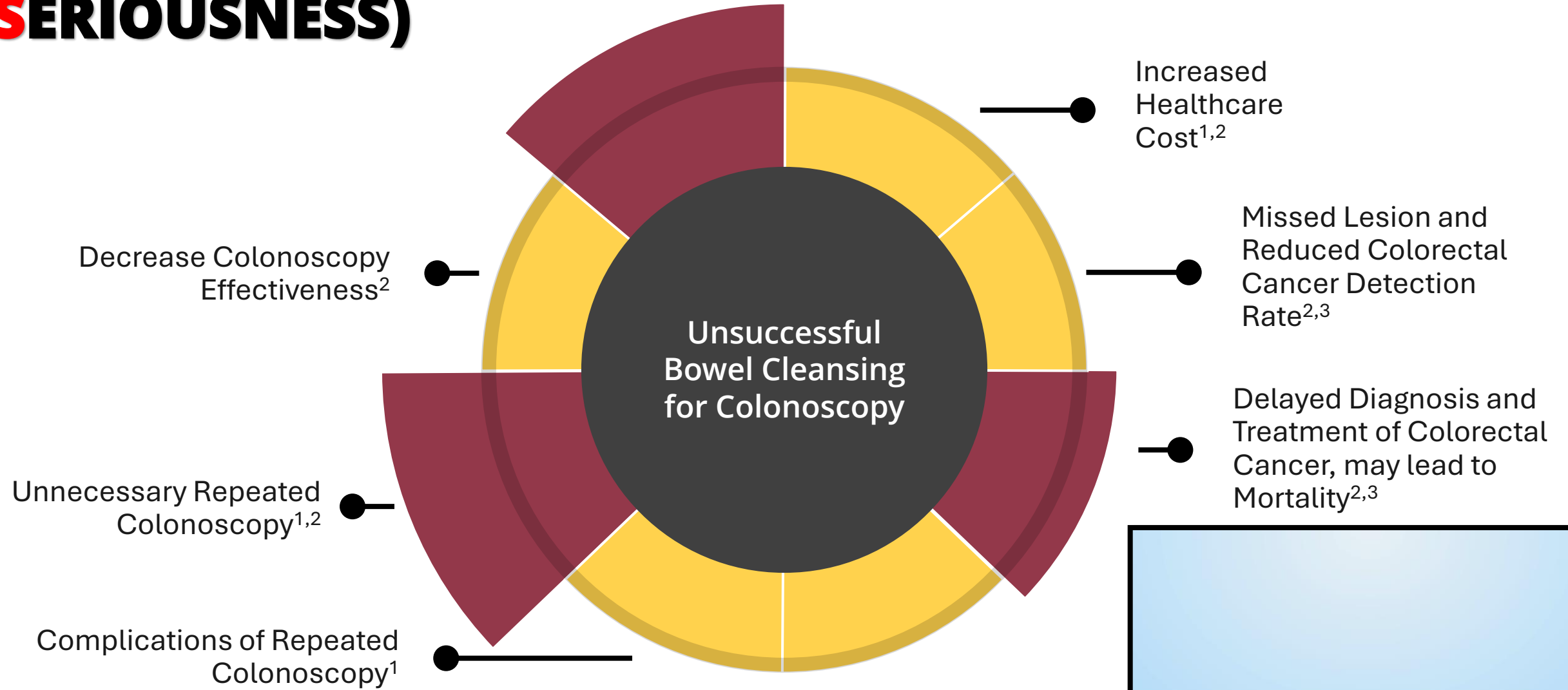
**Improving Percentage**  
of Successful Bowel  
Cleansing among Patients  
Prescribed with  
Polyethylene-Glycol (PEG)-  
4000 Powder for  
Colonoscopy in Hospital  
Tuanku Ja'afar Seremban  
(HTJS)

# REASONS FOR SELECTION





# REASONS FOR SELECTION (SERIOUSNESS)



© Mechanisms in Medicine Inc. [www.YouAndColonoscopy.com](http://www.YouAndColonoscopy.com)

1. European Society of Gastrointestinal Endoscopy (ESGE) Guideline, 2019  
2. Rex et al. Quality indicators for colonoscopy. *Am J Gastroenterol.* (2015) 110:72–90. 10.1038  
3. Lebowitz et al. The impact of suboptimal bowel preparation on adenoma miss rates and the factors associated with early repeat colonoscopy. *Gastrointest Endosc* 2011; **73**: 1207–14.  
4. Sánchez et al. Prevalence of missed lesions in patients with inadequate bowel preparation through a very early repeat colonoscopy. *Dig Endosc* 2022; **34**: 1176–84.

# COLORECTAL CANCER FACTS

Mortality due to colorectal cancer as high as 52% in

2nd most common

**Low percentage of successful bowel cleansing for colonoscopy may become an obstacle to achieve National Strategic Plan for Colorectal Cancer 2021-2025 aim for early detection and diagnosis of colorectal cancer in Malaysia**

**3<sup>RD</sup>**  
**MOST COMMON CANCER WORLDWIDE<sup>1</sup>**

Region	Population	Number
Asia	461 422	
Europe	242 483	
North America	64 121	
*Latin America and the Carribean	64 666	
Africa	40 034	
Oceania	8 066	
Total	880 792	

**National Strategic Plan for Colorectal Cancer 2021-2025: to control the colorectal cancer burden in Malaysia by improving early detection and diagnosis<sup>4</sup>**

1. Colorectal cancer facts – World Health Organization. Available from: <https://www.who.int/news-room/fact-sheets/detail/colorectal-cancer>
2. E. Goodarzi et al., Worldwide Incidence and Mortality of Colorectal Cancer and Human Development Index (HDI): An Ecological Study. World Cancer Research Journal 2019;6:e1433
3. Malaysia National Cancer Registry report: 2012-2016.
4. National Strategic Plan for Colorectal Cancer 2021-2025, Ministry of Health, Malaysia



# REASONS FOR SELECTION



# REASONS FOR SELECTION



**M**

## **Measurable**

Percentage of successful bowel cleansing



**A**

## **Appropriateness**

Patient care, cost related to patient therapy



**R**

## **Remediable**

Multidisciplinary approach



**T**

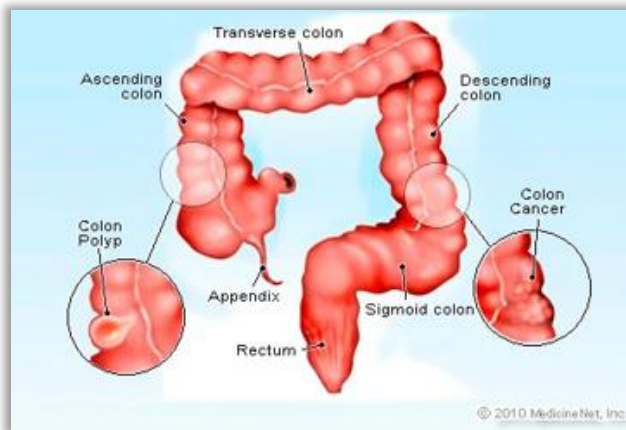
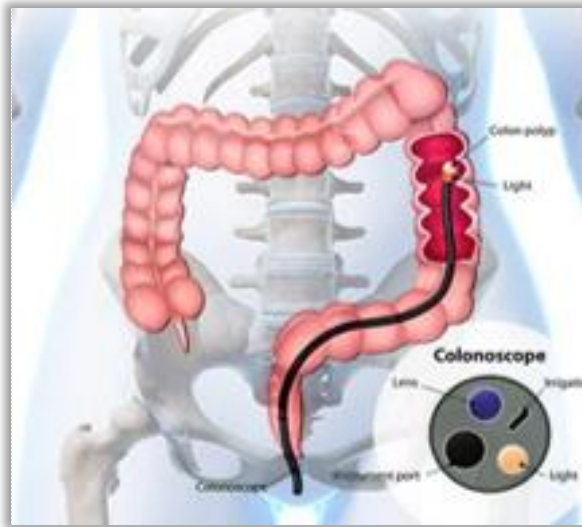
## **Timeliness**

Estimated to be completed within 1 year



# INTRODUCTION

## COLONOSCOPY

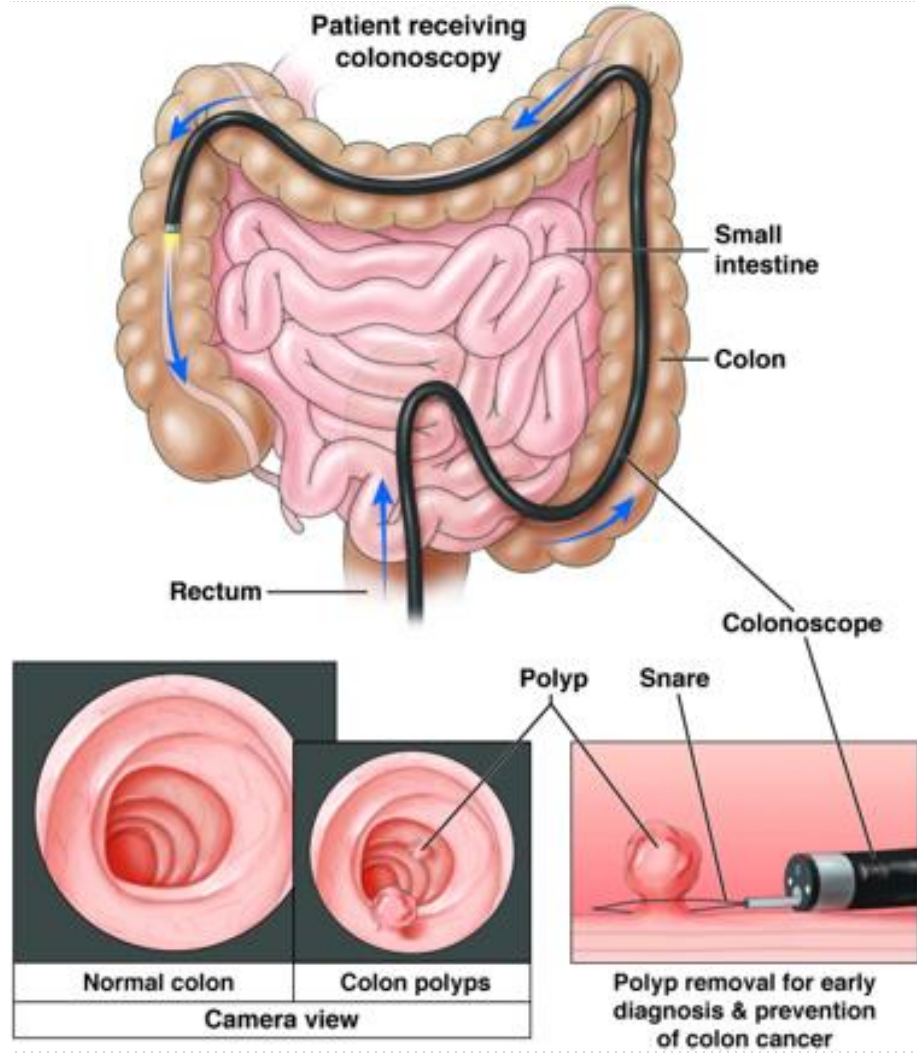


An endoscopy examination of the **colons**<sup>1</sup>

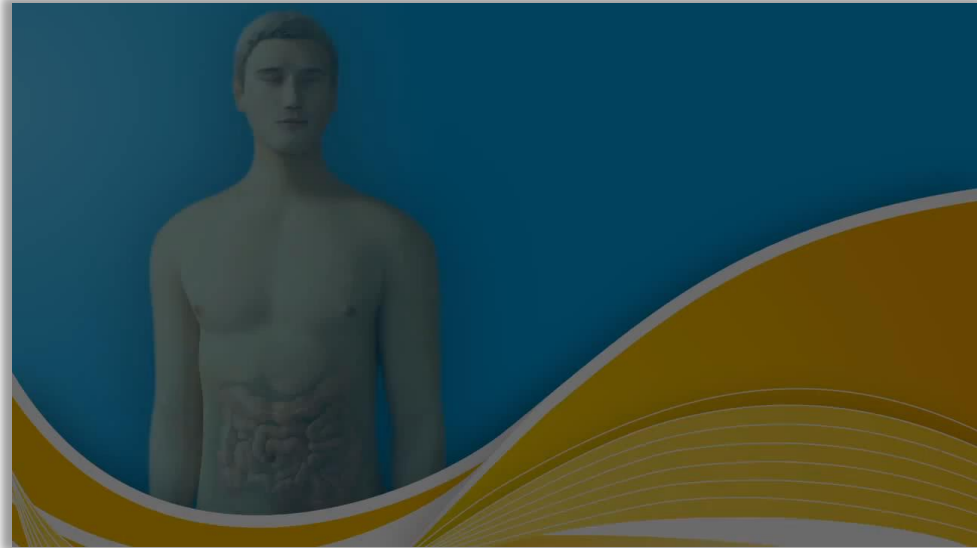
**Gold standard** for the detection of **polyps and colorectal cancer**<sup>1</sup>

The ability to detect the colorectal cancer strongly depends on the **quality of bowel cleansing**, which facilitates the clear visualization of the mucosal surface<sup>1</sup>

1. National Strategic Plan for Colorectal Cancer 2021-2-25, Ministry of Health, Malaysia



# Bowel cleansing procedure



- ◆ A procedure undertaken before a diagnostic procedure of the bowel for examining abnormalities and disease<sup>1</sup>
- ◆ **Cleansing of intestines** from fecal matter and secretions<sup>2</sup>
- ◆ Involving **laxative medications** and diet modifications<sup>2</sup>



1. Hassan et al. 2019. Bowel preparation for colonoscopy: European Society of Gastrointestinal Endoscopy (ESGE) Guideline – Update 2019. Endoscopy, 51(8), 775–794.  
2. Colonoscopy bowel preparation. Available from: <https://my.clevelandclinic.org/health/treatments/22657-colonoscopy-bowel-preparation>

81.9 %

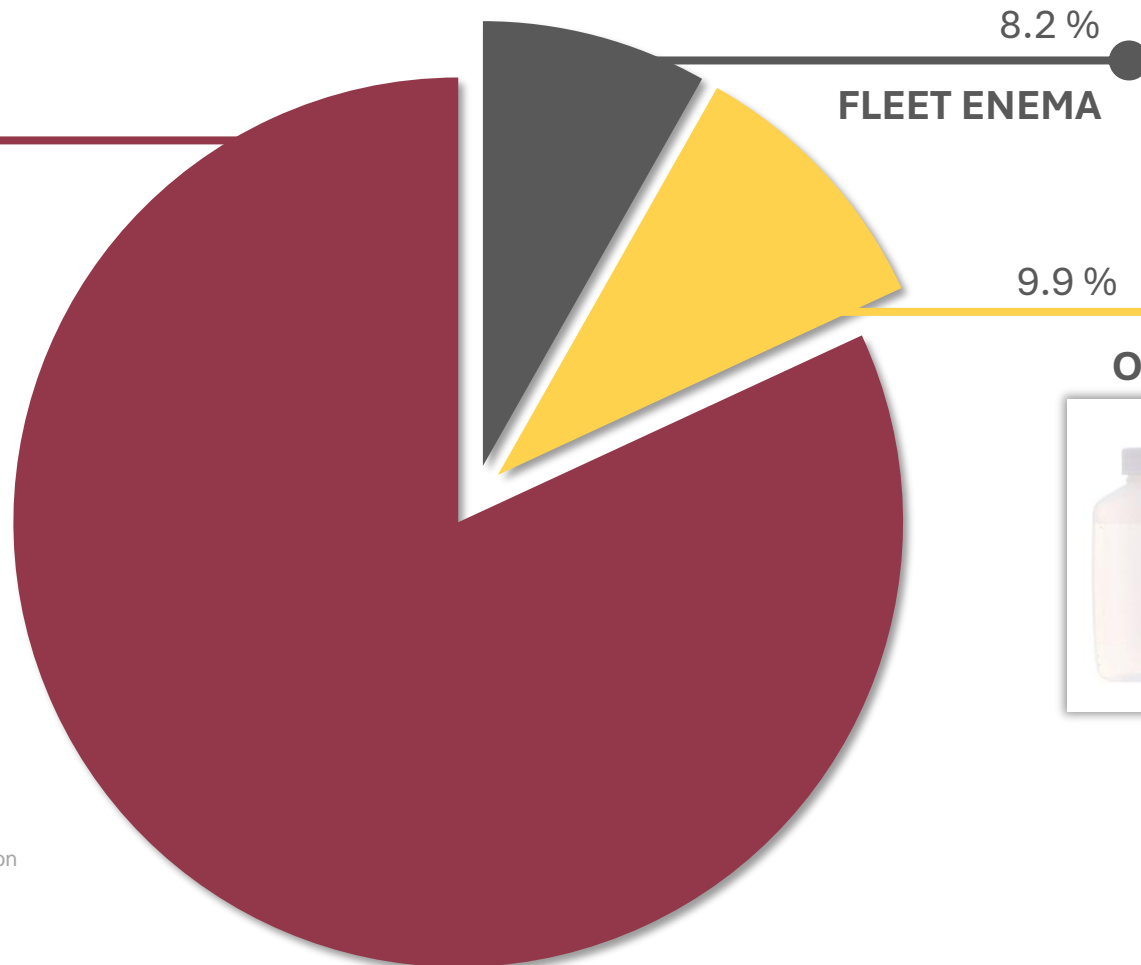
### PEG-4000 POWDER



**Safer** than sodium phosphate preparations for patients

- with electrolyte or fluid imbalances
- in conditions such as chronic kidney disease, congestive heart failure and liver failure

Connor A et al. Consensus guidelines for the safe prescription and administration of oral bowel-cleansing agents  
*Gut* 2012;61:1525-1532.



8.2 %  
**FLEET ENEMA**

### ORAL FLEET



9.9 %

## Utilization of Bowel Cleansing Agents in HTJS

June 2022





# Boston Bowel Preparation Scale (BBPS)

<b>Score 0: Poor</b> Presence of liquid or solid faecal content, preventing visualisation of mucosa		
<b>Score 1: Regular</b> Presence of liquid or semi-solid faecal content, allowing only partial visualisation of mucosa		
<b>Score 2: Good</b> Scarce liquid faecal content, allowing good visualisation of mucosa		
<b>Score 3: Excellent</b> Absence of liquid faecal content, allowing excellent visualisation of mucosa		

Note: Each segment receives a score of 0-3 according to the amount of remains present and the proportion of evaluable mucosa, and these are added up to produce a total score

- Standardized **9-point assessment scale** for the colon
- Colon is divided into **3 segments**: right colon, transverse colon, and left colon.
- Each of the segment is classified from **0 to 3** depending on the degree of soiling.
- Sum total of the 3 segments represents the degree of soiling scores:

$\leq 5$  points: poor bowel cleansing

**6-7 points: good bowel cleansing**

**$\geq 8$  points: very good bowel cleansing**

BBPS		3	2	1	0
3=Excellent					
2=Good					
1=Poor					
0=Inadequate					
LC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BBPS=	<input type="checkbox"/>				



**Only 29%** meet the minimum standard of at least 90% colonoscopies with **adequate bowel cleansing**<sup>1</sup>



**30.1%** patients had **poor bowel cleansing** in Malaysian tertiary center<sup>2</sup>

Factors: **Long colonoscopy appointment waiting time, non-adherence to bowel cleansing instructions, and incomplete intake of the preparation**<sup>3</sup>

Intensive patient **educational programme: counselling, written instructions and educational booklets** significantly improve **the quality** of bowel cleansing for colonoscopy<sup>4,5</sup>

1. Maida M, Annibale B, Benedetti A, Burra P, Frulloni L, Ianiro G, Lizza F, Repici A, Savarino E, Sinagra E, Vecchi M, Ricciardiello L Italian Society of Gastroenterology (SIGE) Quality of endoscopic screening for colorectal cancer in Italy: A national survey. *Dig Liver Dis.* 2022;54:1410–1418.
2. Leong PY, Wong LW. Use of drugs for bowel preparation for colonoscopy in Miri General Hospital. *Sarawak Journal of Pharmacy* 1 (2018) 84-95
3. Hautefeuille G, Lapuelle J, Chaussade S, Ponchon T, Molard BR, Coulom P, Laugier R, Henri F, Cadiot G. Factors related to bowel cleansing failure before colonoscopy: Results of the PACOME study. *United European Gastroenterol J.* 2014 Feb;2(1):22-9.
4. Gkolfakis et al 2019. Strategies to Improve Inpatients' Quality of Bowel Preparation for Colonoscopy: A Systematic Review and Meta-Analysis. *Gastroenterology Research and Practice*, 2019, e5147208.
5. Janahiraman et al 2020. Effect of an intensive patient educational programme on the quality of bowel preparation for colonoscopy: A single-blind randomised controlled trial. *BMJ Open Gastroenterology*, 7(1), e000376

# PROBLEM STATEMENT

## PROBLEM

A study conducted in HTJS (May-June 2022) found **only 38.8%** successful bowel cleansing among patients prescribed with PEG-4000 powder for colonoscopy in HTJS.

## EFFECT

May reduce cancer detection rates, **miss diagnosis, and delay treatment,** besides increasing costs and complications related to repeated colonoscopies.

## POSSIBLE CAUSES

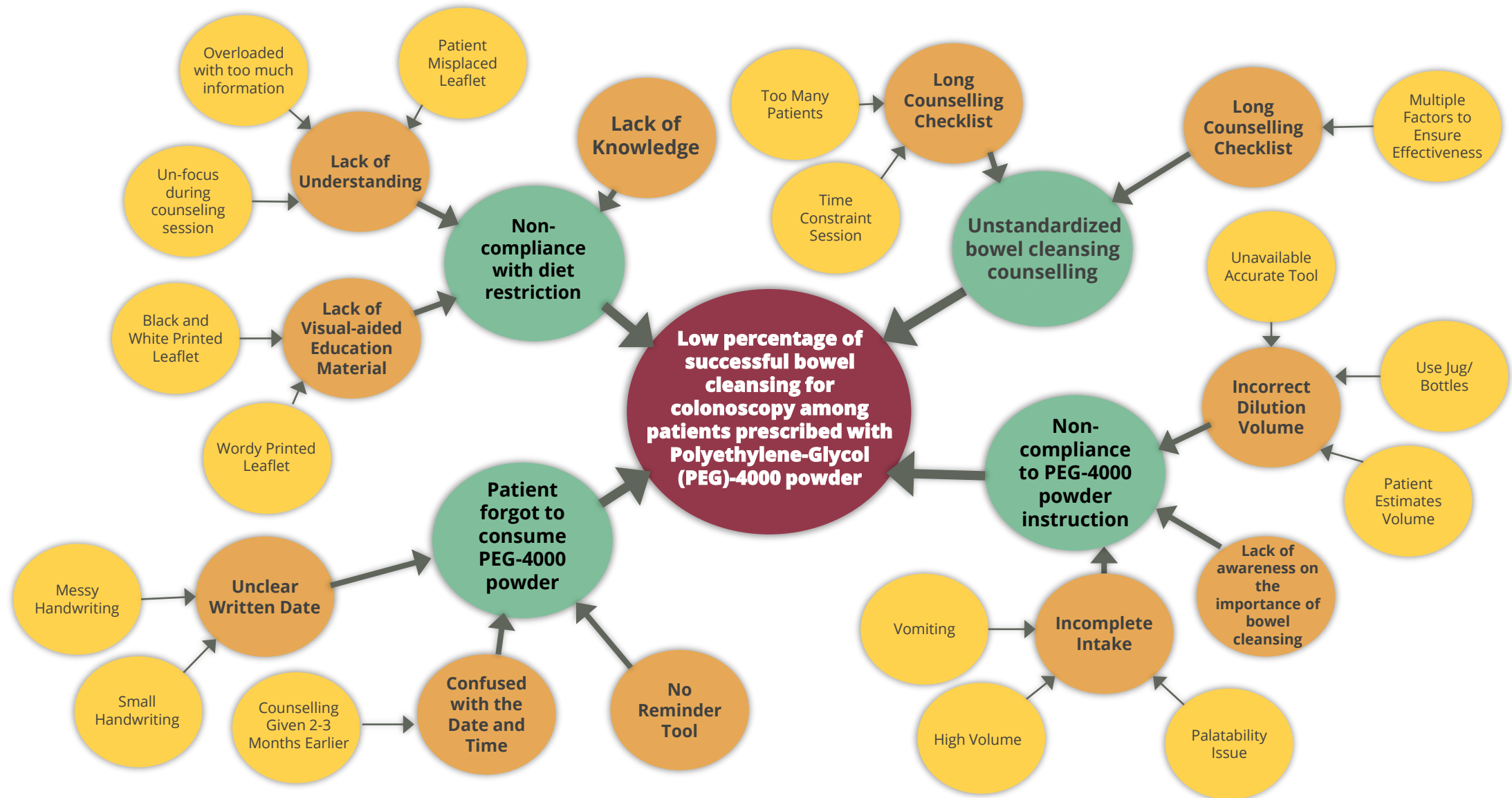
Non-compliance to PEG-4000 powder instructions, non-compliance to diet restrictions, patient forgot to consume PEG-4000, and unstandardized bowel cleansing counselling

## AIM OF STUDY

We aim to **improve the percentage of successful bowel cleansing** among patients prescribed with PEG-4000 powder for colonoscopy in HTJS



# PROBLEM ANALYSIS CHART



# STUDY OBJECTIVE

## General Objective

To improve the percentage of successful bowel cleansing for colonoscopy among patients prescribed with Polyethylene-Glycol (PEG)-4000 powder in HTJS

## Specific Objectives

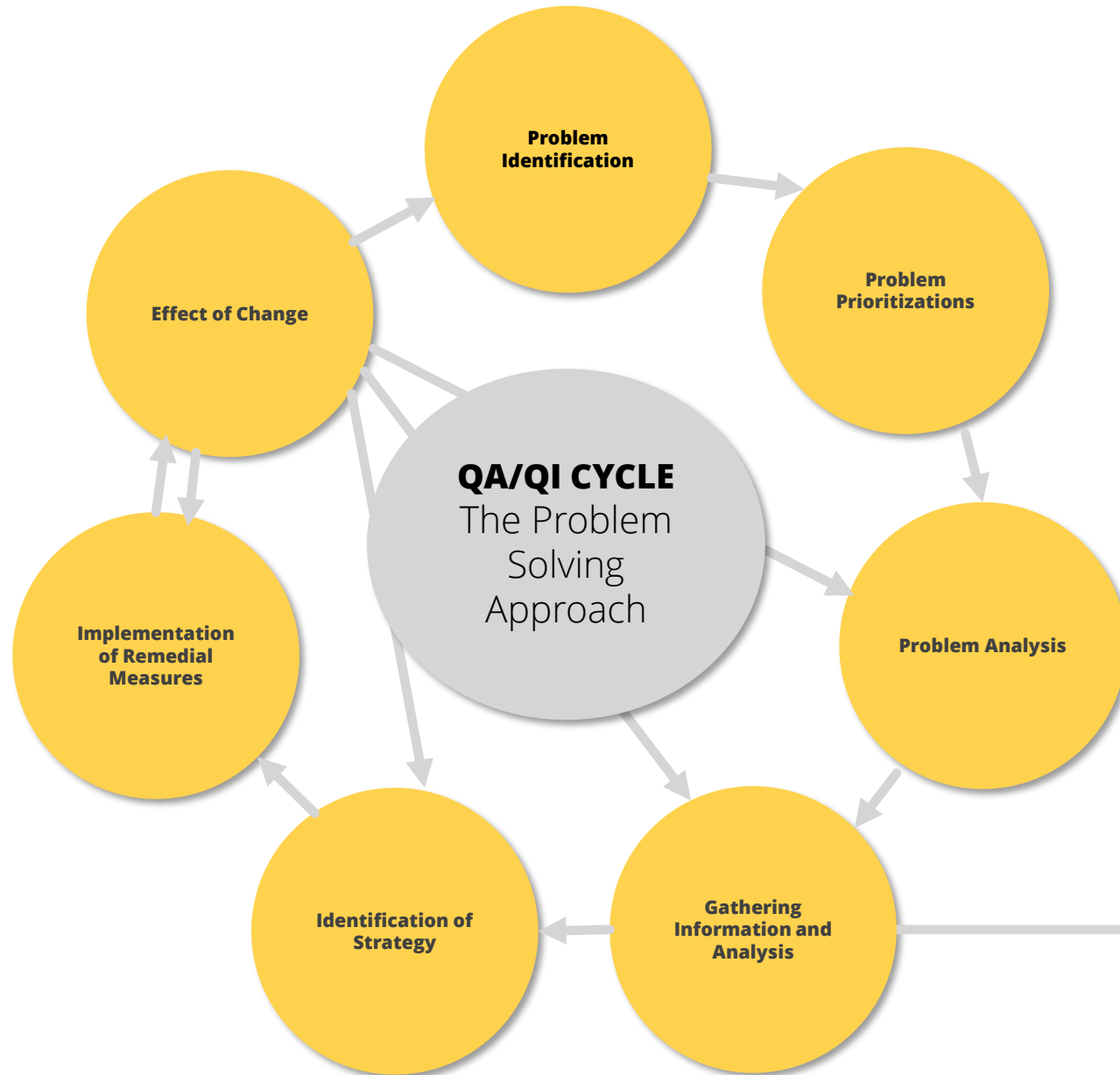
To verify the magnitude of successful bowel cleansing among patients prescribed with PEG-4000 powder for colonoscopy

To determine the probable causes contributing to unsuccessful bowel cleansing for colonoscopy

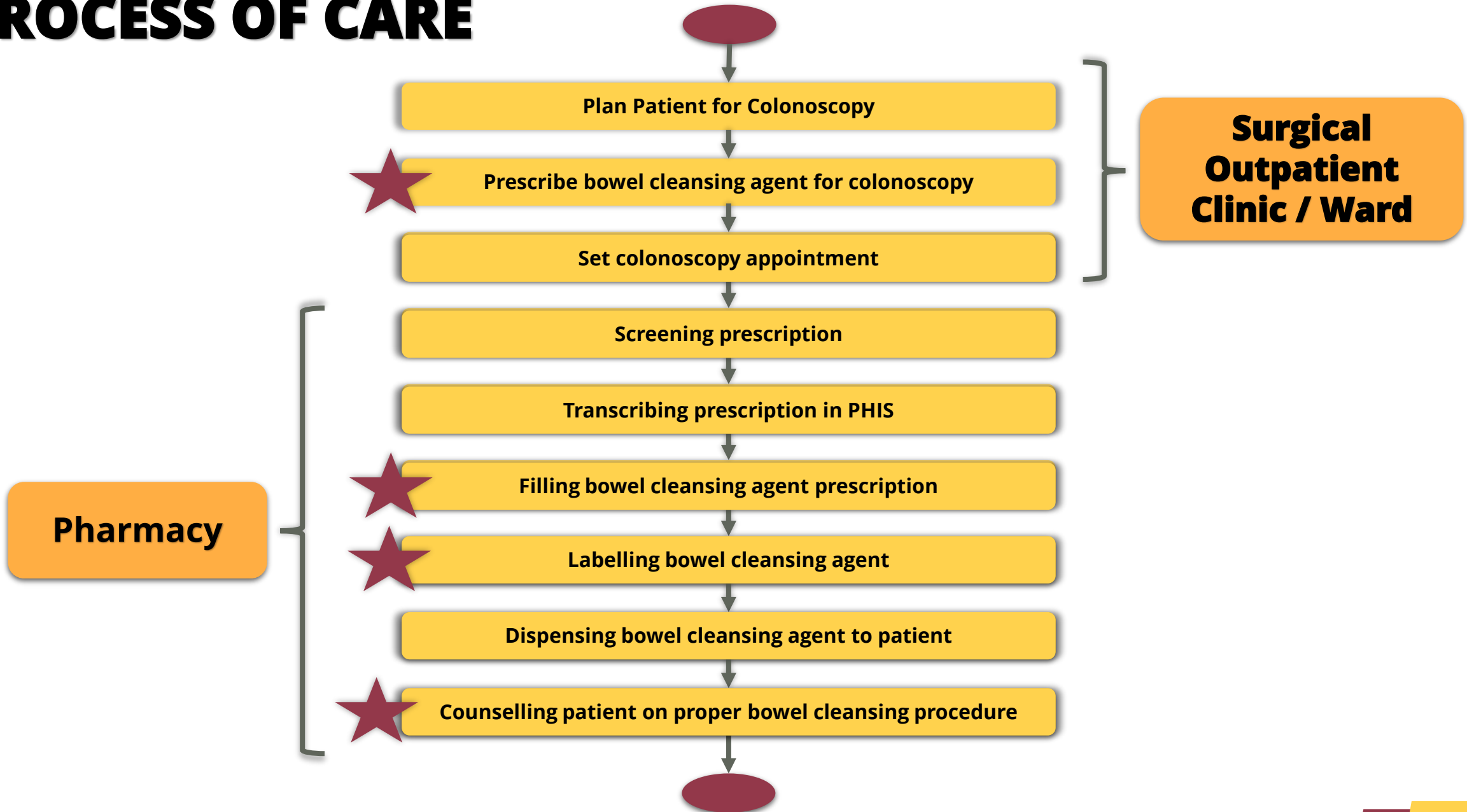
To formulate medical measures and implement them

To re-evaluate the effectiveness of the remedial measures.

# KEY MEASURES FOR IMPROVEMENT



# PROCESS OF CARE



## Process of Care Surgical Outpatient Clinic / Ward

Plan Patient for Colonoscopy

★ Prescribe bowel cleansing agent for colonoscopy

Set colonoscopy appointment





Screening prescription

Transcribing prescription in PHIS

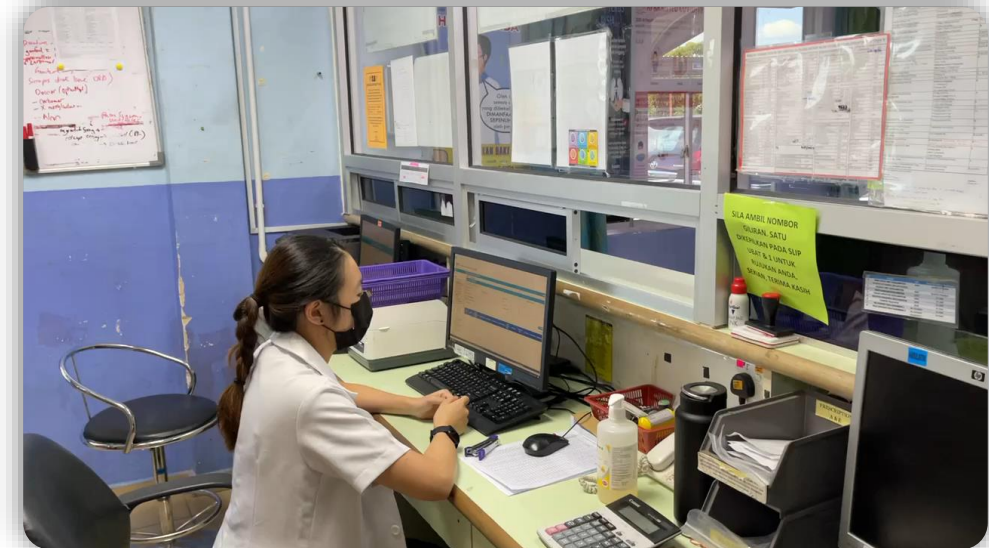
★ Filling bowel cleansing agent prescription

★ Labelling bowel cleansing agent

Dispensing bowel cleansing agent to patient

★ Counselling patient on proper bowel cleansing procedure

## Process of Care Pharmacy



# MODEL OF GOOD CARE (MOGC) SURGICAL OUTPATIENT CLINIC/WARD

STEP		CRITERIA	STANDARD
1.	Plan patient for colonoscopy	<ul style="list-style-type: none"> <li>Identify patient indicated for colonoscopy</li> <li>Provide patient with information about colonoscopy and bowel cleansing for colonoscopy</li> <li>Obtain patient's agreement for colonoscopy</li> </ul>	100% 100% 100%
2.	<b>Prescribe bowel cleansing agent for colonoscopy</b>	<ul style="list-style-type: none"> <li>Prescribe the appropriate choice of bowel cleansing agent</li> <li>Ensure complete prescription details as below:               <ul style="list-style-type: none"> <li>- Correct patient</li> <li>- Correct bowel cleansing agent</li> <li>- Correct dose</li> <li>- Correct frequency</li> <li>- Correct date and dosing time for bowel cleansing</li> <li>- Correct date and time for colonoscopy</li> <li>- Prescriber's sign and stamp</li> </ul> </li> <li>Provide patient with bowel cleansing agent product information</li> </ul>	100% 100% 100% 100% 100% 100% 100% 100%
3.	Set colonoscopy appointment date	Provide patient with the date and time details of the scheduled colonoscopy	100%



# MODEL OF GOOD CARE (MOGC)



## PHARMACY (1)

STEP		CRITERIA	STANDARD
1.	Screening prescription	Ensure prescription is valid	100%
		Ensure complete prescription details as below: <ul style="list-style-type: none"> <li>- Correct patient</li> <li>- Correct bowel cleansing agent</li> <li>- Correct dose</li> <li>- Correct frequency</li> <li>- Correct date and dosing time for bowel cleansing</li> <li>- Correct date and time for colonoscopy</li> <li>- Prescriber's sign and stamp</li> </ul>	100% 100% 100% 100% 100% 100%
		Provide serial number for identification	100%
2.	Transcribing prescription in PhIS	Contact prescriber for prescription deemed for pharmacist's intervention	100%
		Transcribe correct patient, correct bowel cleansing agent, correct dose, correct frequency in PhIS system	100%
		Print label for the correct patient from the PhIS system	100%
3.	<b>Filling bowel cleansing agent prescription</b>	Fill according to correct patient, dose, frequency	100%
		Fill Polyethylene-Glycol (PEG)-4000 Powder into a designated pouch	100%



# MODEL OF GOOD CARE (MOGC)

## PHARMACY (2)

STEP		CRITERIA	STANDARD
4. 	<b>Labeling bowel cleansing agent</b>	Label according to correct patient, dose, frequency	100%
		Label date and time for bowel cleansing, date and time for colonoscopy for Polyethylene-Glycol (PEG)-4000 Powder on the designated pouch	100%
5.	Dispensing bowel cleansing agent to patient	Obtain serial number from patient for identification	100%
		Countercheck to ensure correct patient, correct bowel cleansing agent, correct dose, correct frequency, date and time for bowel cleansing, date and time for colonoscopy	100%
		Dispense Polyethylene-Glycol (PEG)-4000 Powder at a specifically assigned counter	100%
6. 	<b>Counsel patient on bowel cleansing instructions</b>	Provide structural counselling on indication of bowel cleansing, diet restriction, how to consume bowel cleansing agent, date and time for bowel cleansing, date and time for colonoscopy	100%
		Counselled on how to take Polyethylene-Glycol (PEG)-4000 Powder using the designated pouch	100%
		Counsel patient prescribed with Polyethylene-Glycol (PEG)-4000 Powder on bowel cleansing instructions using comprehensive counselling video	100%



# INDICATOR & STANDARD


Guideline Thieme

colonoscopy, a same-day bowel preparation as an acceptable alternative to split dosing. ESGE recommends the use of high volume or low volume PEG-based regimens as well as that of non-PEG-based

---

Guideline Thieme

**Bowel preparation for colonoscopy: European Society of Gastrointestinal Endoscopy (ESGE) Guideline – Update 2019**



ration for colonoscopy. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system was adopted to define the strength of recommendations and the quality of evidence.

tion, "diet," "laxative," "colonoscopy," and "endoscopy." Searches were performed (at least) on Medline (via PubMed) and the Cochrane Central Register of Controlled Trials from after 2013 (date of the previous ESGE guideline [14]) up to Decem-

olonoscopy cost-ineffective [12]. For these reasons, a  $\geq 90\%$  minimum standard for adequate bowel preparation (assessed using validated scales) has been recently recommended by the Quality Committee of the European Society of Gastrointestinal Endoscopy (ESGE) [13].

quate bowel preparation is also one of the most unfavorable predictors for cecal intubation failure [4–6] and unsatisfactory patient experience [7]. In addition it results in shorter colonoscopy surveillance intervals [8,9], longer hospital stays, and increased healthcare costs [10,11] and may render screening colonoscopy cost-ineffective [12]. For these reasons, a  $\geq 90\%$  minimum standard for adequate bowel preparation (assessed using validated scales) has been recently recommended by the Quality Committee of the European Society of Gastrointestinal Endoscopy (ESGE) [13].

Since the publication of the ESGE Guideline on bowel preparation in 2013 [14], additional evidence has been published on the efficacy and safety of different aspects of bowel preparation, including diet, timing, and type of laxative, as well as patient information and specific scenarios. The main aim of this update is to incorporate such new evidence into the clinical recommendations to be adopted in routine and specific scenarios.

ed to the entire group for general discussion during a meeting held in January 2019 in Munich. Further details on the development methodology of ESGE guidelines have been reported elsewhere [16]. In March 2019, a draft prepared by the task force leaders was sent to all group members. After the agreement of

**ABBREVIATIONS**

- ADR adenoma detection rate
- CI confidence interval
- ESGE European Society of Gastrointestinal Endoscopy
- GI gastrointestinal
- GRADE Grading of Recommendations Assessment, Development, and Evaluation
- HR hazard ratio
- IBD inflammatory bowel disease
- LGIB lower gastrointestinal bleeding
- MCSP magnesium citrate plus sodium picosulfate
- OSP oral sodium phosphate
- OSS oral sulfate solution
- OR odds ratio
- PEG polyethylene glycol
- RCT randomized controlled trial
- RR relative risk

Hasan Cezare et al. Bowel preparation for colonoscopy: ESGE Guideline – Update 2019... Endoscopy

## Indicator

Percentage of successful bowel cleansing for colonoscopy among patients prescribed with Polyethylene-Glycol (PEG)-4000 powder =

Number of patients prescribed with PEG-4000 powder undergoing colonoscopy with BBPS >5 X 100%

Total number of patients prescribed with PEG-4000 powder undergoing colonoscopy

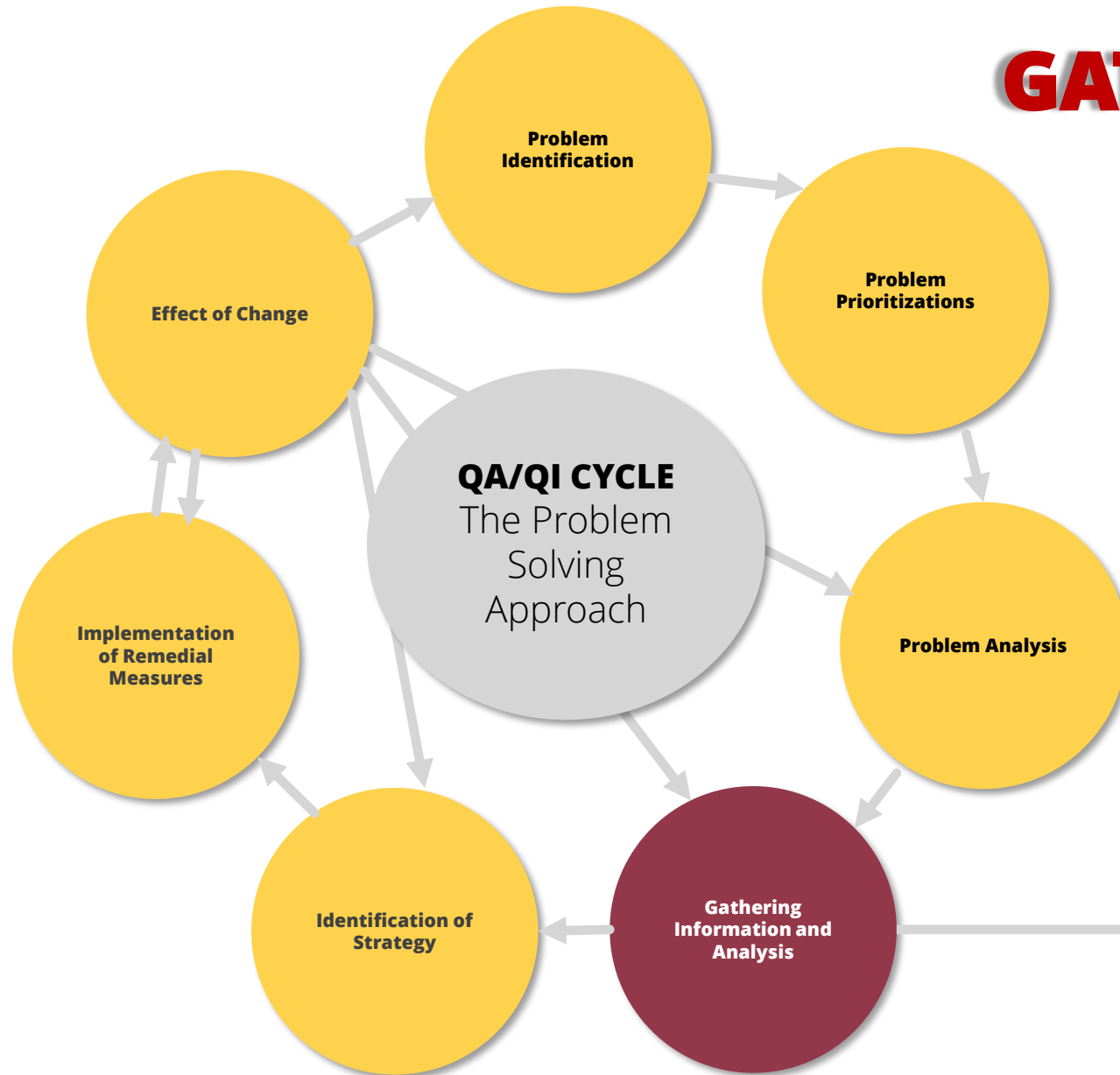
## Standard

**$\geq 90\%$**

patients achieving successful bowel cleansing

European Society of Gastrointestinal Endoscopy (ESGE) Guideline, 2019

# PROCESS OF GATHERING INFORMATION



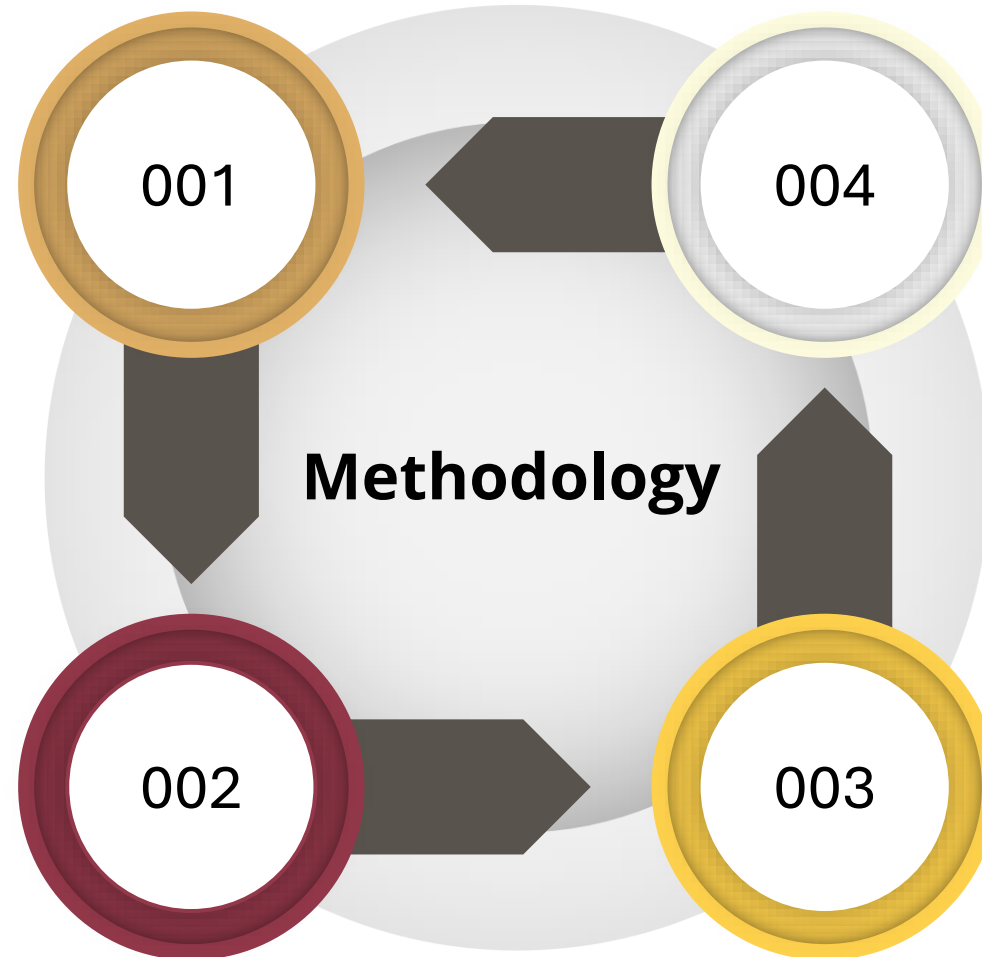
# METHODOLOGY

## STUDY SAMPLE

Patients prescribed with PEG-4000 powder for bowel cleansing and scheduled for colonoscopy

## STUDY DESIGN

A quality improvement study



## SAMPLING METHOD

Convenience Sampling

## DATA COLLECTION TECHNIQUE

Patient registry for elective colonoscopy, PhIS drug usage report, patient interview

# METHODOLOGY (CONT.)

## INCLUSION CRITERIA

All patients scheduled for colonoscopy and prescribed with PEG-4000 powder for bowel cleansing

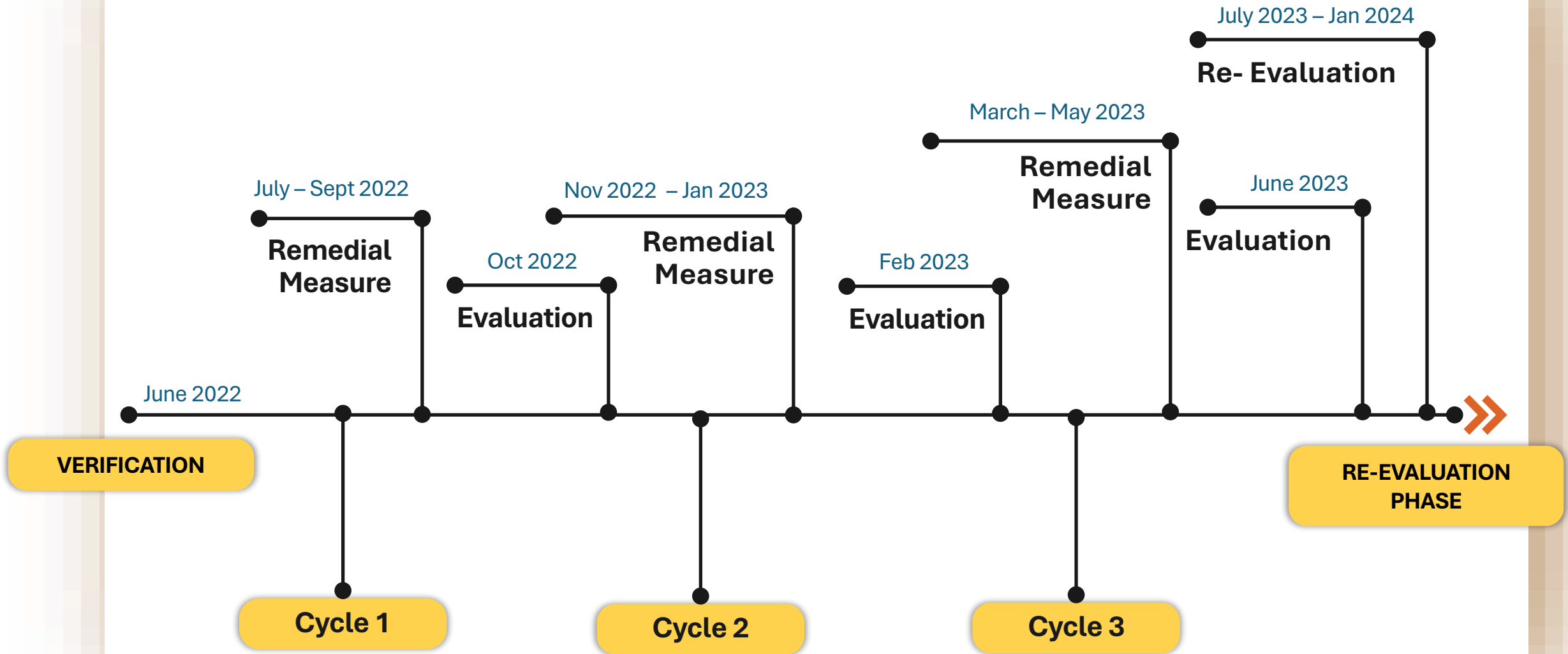
## EXCLUSION CRITERIA

Patients prescribed with combined bowel cleansing agents

Patients with language barrier

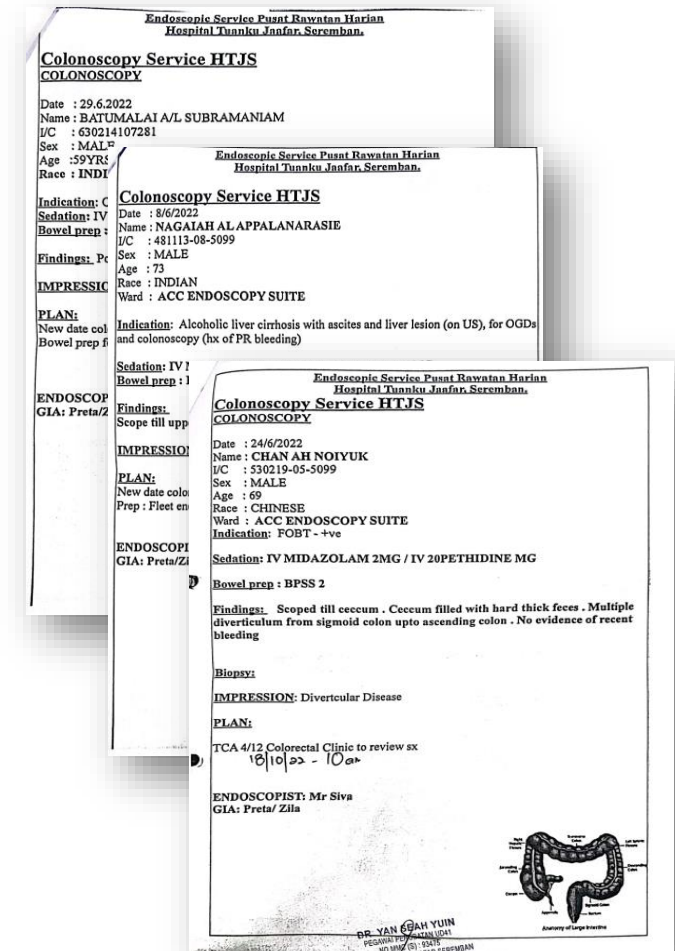


# METHODOLOGY (CONT.)



# DATA COLLECTION PLAN

Variables	Data Collection Tools	Location	Samples
<b>Percentage of successful bowel cleansing</b>			
BBPS Score	BBPS report	Endoscopy unit	Patients scheduled for colonoscopy
	Data collection form		
	Patient database		
<b>Factors of unsuccessful bowel cleansing</b>			
Patient forgot to consume PEG-4000 powder	Interview question Data collection form	Pharmacy	Patients scheduled for colonoscopy
Non-compliance with diet Restriction			
Non-compliance to PEG-4000 powder instruction			
Unstandardized bowel cleansing counselling	PEG-4000 powder counselling checklist	Pharmacist	
	Data collection form for observation		

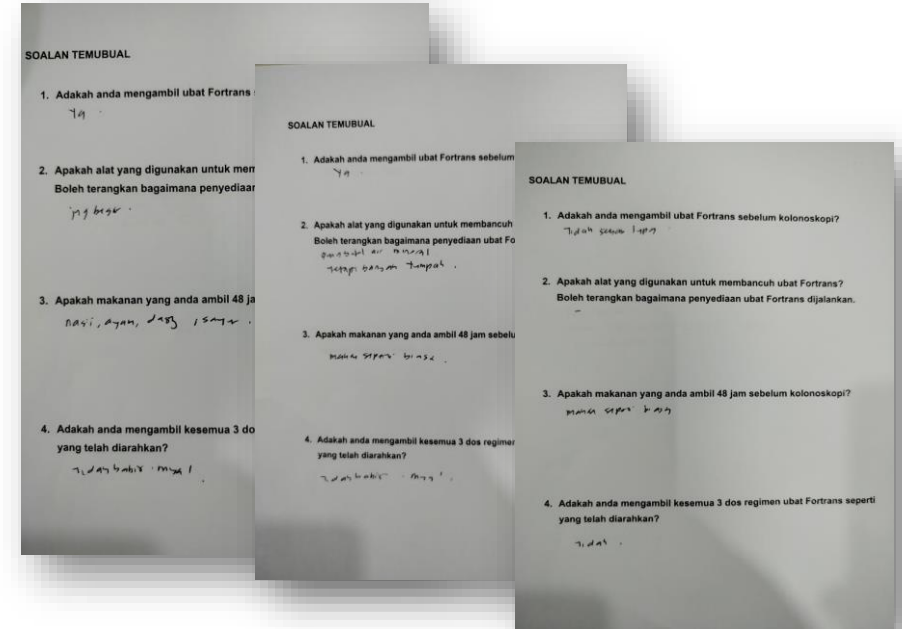


**BBPS SCORE**



# DATA COLLECTION PLAN

Variables	Data Collection Tools	Location	Samples
<b>Percentage of successful bowel cleansing</b>			
BBPS Score	BBPS report	Endoscopy unit	Patients scheduled for colonoscopy
	Data Collection Form		
	Patient database		
<b>Factors of unsuccessful bowel cleansing</b>			
Patient forgot to consume PEG-4000 powder	Interview question	Pharmacy	Patients scheduled for colonoscopy
	Data Collection Form		
Non-compliance with diet Restriction			
Non-compliance to PEG-4000 powder instruction			
Unstandardized bowel cleansing counselling	PEG-4000 powder counselling checklist	Pharmacist	
	Data collection form for observation		



RUMUSAN KAJIAN TEMURAMAH UNTUK MENGETAHUI PUNCA KEGAGALAN PEMBERSIHAN UBAT FORTRANS

Sebelum inovasi (N=30) gagal pembersihan usus

Terlupa ambil Fortrans	Isipadu bancuhan tidak tepat	Tidak patuh makanan yang dilarang	Tidak habis minum Fortrans

Data collection form / Interview form



# DATA COLLECTION PLAN

Variables	Data Collection Tools	Location	Samples
<b>Percentage of successful bowel cleansing</b>			
BBPS Score	BBPS report	Endoscopy unit	Patients scheduled for colonoscopy
	Data collection form		
	Patient Database		
<b>Factors of unsuccessful bowel cleansing</b>			
Patient forgot to consume PEG-4000 powder	Interview question Data collection form	Pharmacy	Patients scheduled for colonoscopy
Non-compliance with diet Restriction			
Non-compliance to PEG-4000 powder instruction			
Unstandardized bowel cleansing counselling	PEG-4000 powder counselling checklist	Pharmacist	
	Data collection form for observation		

23	24/9/22	Cheng You Huet	63	1	1	Fortrans	surveillance post AR	Rectosigmoid ca	Mr Siva
24	24/9/22	Mohamad Mokhtar	73	1	1	Fortrans	screening	NC	Mr Siva
25	20/9/22	Gen Tiong Seng	80	2+2+2	0	Fortrans	-	Grade 1 internal hemorrhoid	Mr Vimal, Dr Mohan
26	20/9/22	Rudzita binti Mohamad Jaari	47	1	1	Fortrans	pr bleeding	Abdominal mass TRO malignancy	Mr Vimal, Dr Mohan
27	20/9/22	No Ping Ping	52	1	1	Fortrans	surveillance colonoscopy	Distal rectal sessile polyp	Ms Farhan
28	20/9/22	Norjaly binti Sharif	53	2+2+2	0	Fortrans	hemorrhoid grade 1	Small hemorrhoid	Ms Hayati
29	24/9/22	Nordin bin Daud	66	2+2+2	0	Fortrans	TRO GI malignancy	NC	
30	13/9/22	Pang Kok Heng	80	3+3+3	0	Fortrans	iFOBT +ve, pr bleed	Constricting sigmoid tumour	Ms Jasiah
31	13/9/22	Goh Tian Tao	71	1	1	Fortrans	post lap AR with anastomotic st	Anastomotic stricture with tiny fistula	Ms Jasiah
32	22/9/22	Rakiah bt Syed	70	1	1	Fortrans	altered bowel habit, loose stool	NC	Ms Jasiah
33	22/9/22	Rozayah binti Basim	82	2+2+2	0	Fortrans	-	Rectal polyp	Ms Jasiah
34	22/9/22	Lau Thiam Chei	65	1	1	Fortrans	surveillance colonoscopy	Unsed colitis	Ms Jasiah
35	20/9/22	Juliah bt Abbas	46	3	3	Fortrans	surveillance colonoscopy	Incomplete colonoscopy	Ms Jasiah, Dr Moh, Acute anastomosis
36	15/9/22	Ramiah binti Pitas	83	1	1	Fortrans	Adhesion in pelvis with sigmoid	Hepatic flexure polyp	Ms Zainna
37	19/9/22	Tanah bin Huan	66	2+2+2	0	Fortrans	left sided diverticular abscess	Pandiverticulum	Ms Zainna
38	19/9/22	Muhammad Akmal in Kassim	30	2	2	Fortrans	pr bleed & mucus mixed with fa	Rectal ulcer	Ms Zainna
39	7/9/22	Shamugam A/L, Pajumal	39	2+2+2	0	Fortrans	FOBT +ve	NC	Ms Zainna
40	14/9/22	Wong Fat Sin@Wong Fat Sin	78	2	2	Fortrans	altered bowel habit	Sigmoid diverticulum TRO Malignancy	Ms Zainna
41	15/9/22	Sayamuthu AL, Remaganay	73	2+2+2	0	Fortrans	surveillance colonoscopy	Mild rectal polyp TRO malignancy	Ms Zainna
42	7/9/22	Chong Ching Yew	65	3+3+3	0	Fortrans	anemia for investigation	Colonic polyp	Ms Zainna
43	7/9/22	Halimah bt Shamsudin	71	3+3+3	0	Fortrans	iFOBT +ve	right colon diverticular disease	Ms Zainna
44	7/9/22	Sakhar AL, G S Paramasivam	66	3+3+3	0	Fortrans	constipation for 20 years, const	Rectal polyp with hemorrhoid grade 1	Ms Zainna
45	21/9/22	Nooran bt Mat Ali	38	3+3+3	0	Fortrans	pr bleed secondary to hemorrhoid	Internal hemorrhoid	Ms Zainna
46	21/9/22	Che Tom bt Wanah	61	3+3+2	0	Fortrans	iFOBT +ve	Internal hemorrhoid	Ms Zainna
47	28/9/22	Fazlah bt Mohamed Yusoff	50	3+3+3	0	Fortrans	iFOBT +ve	Hemorrhoid grade 1	Ms Zainna
48	15/9/22	Kannamah A/P Ponnaya	67	3+3+3	0	Fortrans	rx of admission for colitis	NC	Ms Zainna, Dr Mohan
49	15/9/22	Ahmad Sukri bin Ramli	67	2	2	Fortrans	perianal swelling	Colitis	Ms Zainna, Syakir

Patients with score >5 = 19  
Total patients = 49  
% successful bowel prep = 19/49 = 38.8%

Successful	28.87%		
26	18/1/2023 ABU HASSAN BIN SHARIP	6011008055481	8
27	7/2/2023 LIM NYOK LAN	430405055078	9
28	3/2/2023 MASHITAH BINTI MOHAMAD SUHAIMY	941012055362	8
29	3/2/2023 ABD LATIF BIN MAMAT	510917065085	2
30	31/1/2023 THEN SUM YUEN	590918106187	2

Jumlah pesakit yang menjalani kolonoskopi mendapat BBPS >5 = 26  
Jumlah pesakit yang menjalani kolonoskopi = 30  
% Pesakit yang berjaya pembersihan usus = 26/30 = 86.7%

Bilangan pesakit yang perlu menjalani kolonoskopi = 4/30 = 13.3%

## Patient Database

# DATA COLLECTION PLAN

Variables	Data Collection Tools	Location	Samples
<b>Percentage of successful bowel cleansing</b>			
BBPS Score	BBPS report	Endoscopy unit	Patients scheduled for colonoscopy
	Data collection form		
	Patient database		
<b>Factors of unsuccessful bowel cleansing</b>			
Patient forgot to consume PEG-4000 powder	Interview question Data collection form	Pharmacy	Patients scheduled for colonoscopy
Non-compliance with diet Restriction			
Non-compliance to PEG-4000 powder instruction			
Unstandardized bowel cleansing counselling			
	PEG-4000 powder counselling checklist	Pharmacist	
	Data collection form for observation		

Borang Penilaian Kemahiran Kaunseling Pegawai Farmasi  
 Bahagian Amalan & Perkembangan Farmasi, KKM

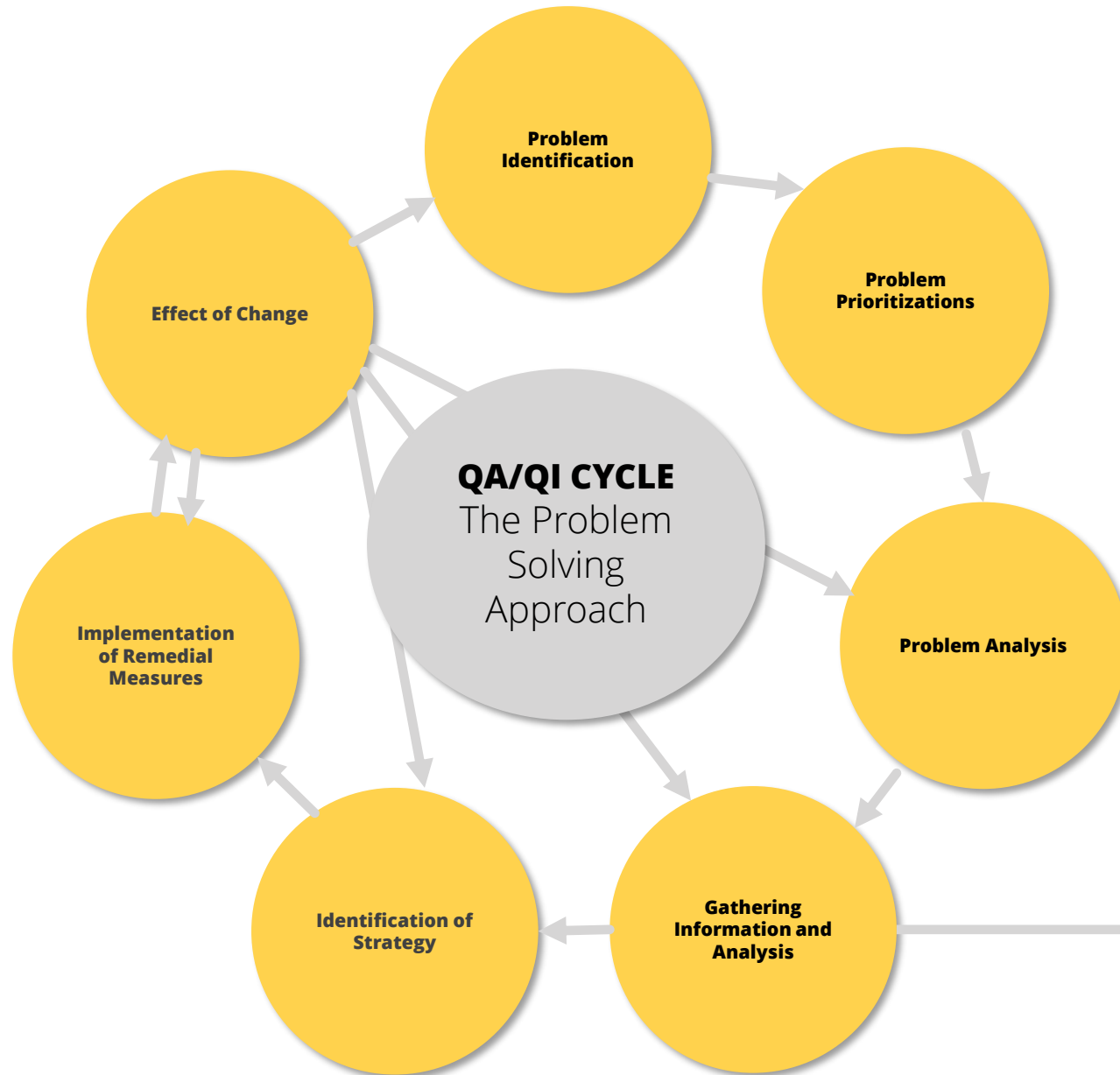
### BOWEL CLEANSING PROCEDURE

Name :	Unit:		
<b>Education On Pathophysiology</b> • Please tick (✓) YES for correct instruction or sequence. • Please tick (✗) NO for incorrect instruction or sequence.			
	Yes (1)	No (0)	Remarks
<b>GENERAL</b>			
1.	Check patient's case note and medication chart for medicine(s) prescribed.		
2.	Confirm the date & time for colonoscopy		
3.	Check expiry date and follow the 5 Rights of administration of medication (Know Your Medicine).		
<b>Indication</b>			
4.	This medicine is used as part of a bowel cleansing procedure before x-ray of the bowel or colonoscopy or before a bowel operation. It works by producing bowel motions. It usually works within 30 minutes, however, it may take as long as 6 hours to produce the effect. Expect frequent liquid stools. The patient needs to stay close to a toilet until the cleansing effect is complete.		
<b>7 DAYS BEFORE PROCEDURE</b>			
5.	a) Stop taking iron preparation b) Persons taking antiplatelet agents, e.g. aspirin, ticlopidine, should discontinue them upon a prior consultation with the prescribing physician c) Persons taking anticoagulants, e.g. warfarin, should contact their attending physician and change the drugs to low-molecular-weight heparin.		
6.	<b>2 days before procedure</b> Eat a low residue and low fiber diet. Avoid fruits and vegetables, particularly those with fine seeds, red meat, high fiber breads or high fibre cereals.		
7.	<b>1 day before procedure</b> a) Milk or milk products, red/purple-coloured drink or meal, alcohol and carbonated drink should not be taken. b) No solid food after lunch. c) Drink plenty of clear water before midnight. Avoid taking food and drink after midnight.		
8.	<b>On the day of procedure</b> Continue taking other medication except for anti diabetic medication.		
9.	<b>Clear fluid list</b> • Water, tea • are accept • Carbonated (coloured), • Fruit flavo • Strained fl • Do not dri • Clear soups • Strained so	<b>FORTRANS</b> Dilute 1 sachet (3 in total) of FORTRANS with 1 L of water (3 L in total). This should be drunk within 5-6 hours	
10.	<b>Special precauti</b> • Frequent to reach to the • Some peop • It is advisa before and	To improve the flavour, the solution may be chilled or lemon juice added.  Dosing time: Early morning procedure: First dose taken at 4 pm, second dose at 6 pm, and third dose at 8 pm, one day before procedure.  Afternoon (or later) procedure: First dose taken at 6 pm, second dose at 8 pm, one day before procedure and third dose at 6 am on the day of procedure.	

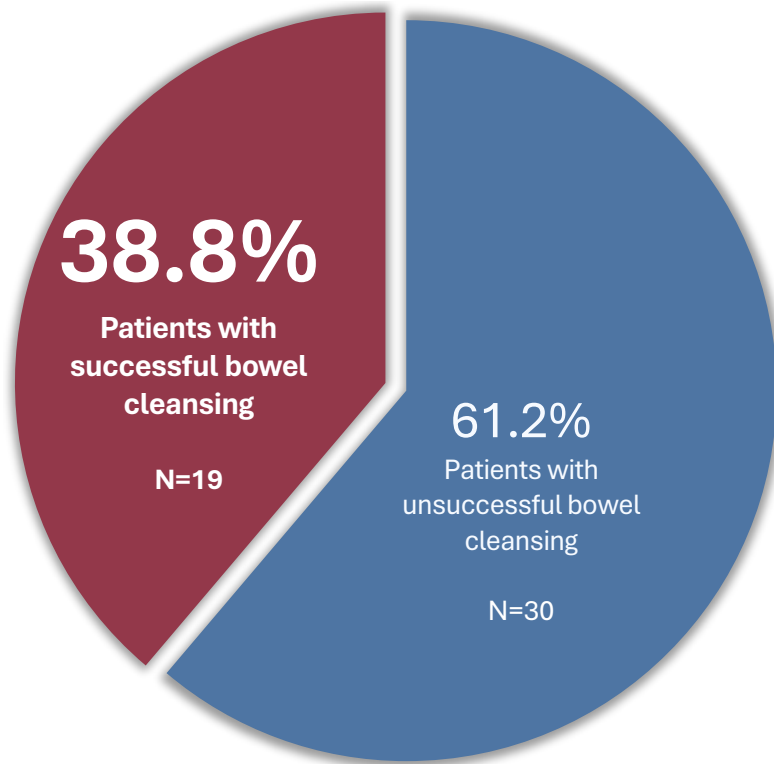
## Counselling Checklist



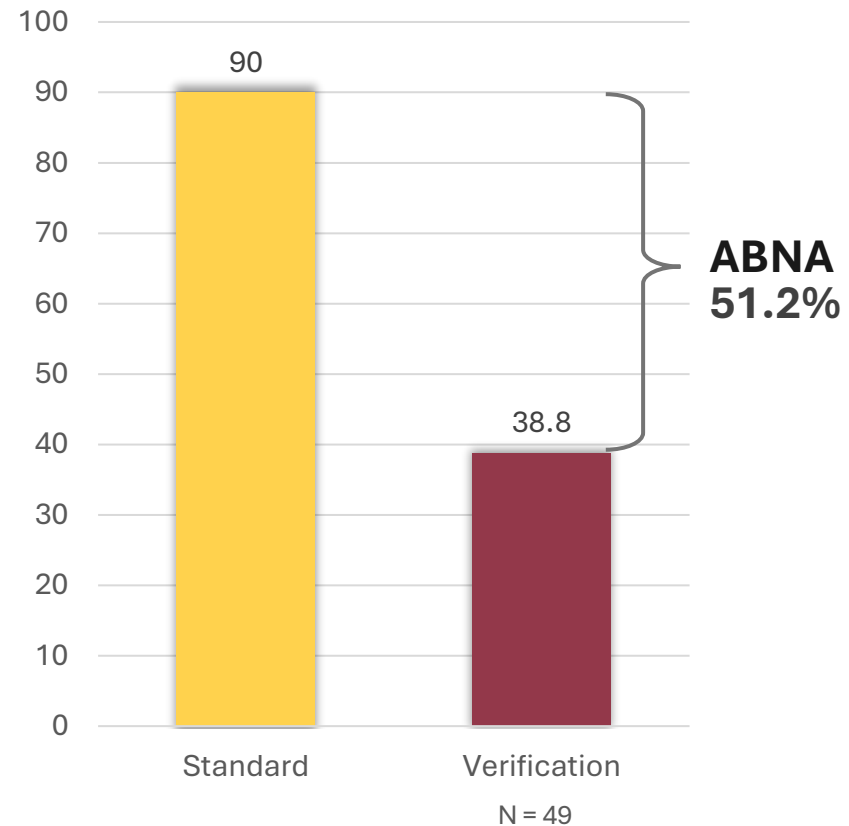
# ANALYSIS AND INTERPRETATION



# VERIFICATION DATA



VERIFICATION STUDY  
MAY – JUNE 2022



**GOAL**

To Improve the Percentage of Successful Bowel Cleansing among Patients Prescribed with PEG-4000 powder for colonoscopy in HTJS

38.8%



90.0%



# IDENTIFIED CONTRIBUTING FACTORS

47%

Non-compliance to PEG-4000 powder instructions



27%

Non-compliance to diet restriction



26%

Forgot to consume PEG-4000 powder



70%

Unstandardized bowel cleansing counselling





# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## SURGICAL OUTPATIENT CLINIC/WARD

STEP		CRITERIA	STANDARD	VERIFICATION
1.	Plan patient for colonoscopy	<ul style="list-style-type: none"> <li>Identify patient indicated for colonoscopy</li> <li>Provide patient with information about colonoscopy and bowel cleansing for colonoscopy</li> <li>Obtain patient's agreement for colonoscopy</li> </ul>	100% 100% 100%	100% 100% 100%
2.	<b>Prescribe bowel cleansing agent for colonoscopy</b>	<ul style="list-style-type: none"> <li>Prescribe the appropriate choice of bowel cleansing agent</li> <li>Ensure complete prescription details as below:               <ul style="list-style-type: none"> <li>- Correct patient</li> <li>- Correct bowel cleansing agent</li> <li>- Correct dose</li> <li>- Correct frequency</li> <li>- Correct date and dosing time for bowel cleansing</li> <li>- Correct date and time for colonoscopy</li> <li>- Prescriber's sign and stamp</li> </ul> </li> <li>Provide patient with bowel cleansing agent product information</li> </ul>	100%  100% 100% 100% 100% 100% 100% 100%	100%  100% 100% 100% 100% 100% 100% <b>0%</b>
3.	Set colonoscopy appointment date	Provide patient with the date and time details of the scheduled colonoscopy	100%	100%



# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## PHARMACY (1)

STEP		CRITERIA	STANDARD	VERIFICATION
1.	Screening prescription	Ensure prescription is valid	100%	100%
		Ensure complete prescription details as below:	100%	100%
		- Correct patient	100%	100%
		- Correct bowel cleansing agent	100%	100%
		- Correct dose	100%	100%
		- Correct frequency	100%	100%
		- Correct date and dosing time for bowel cleansing	100%	100%
		- Correct date and time for colonoscopy	100%	100%
		- Prescriber's sign and stamp	100%	100%
		Provide serial number for identification	100%	100%
2.	Transcribing prescription in PhIS	Contact prescriber for prescription deemed for pharmacist's intervention	100%	100%
		Transcribe correct patient, correct bowel cleansing agent, correct dose, correct frequency in PhIS system	100%	100%
		Print label for the correct patient from the PhIS system	100%	100%
3.	<b>Filling bowel cleansing agent prescription</b>	Fill according to correct patient, dose, frequency	100%	100%
		Fill Polyethylene-Glycol (PEG)-4000 Powder into a designated pouch	100%	<b>0%</b>



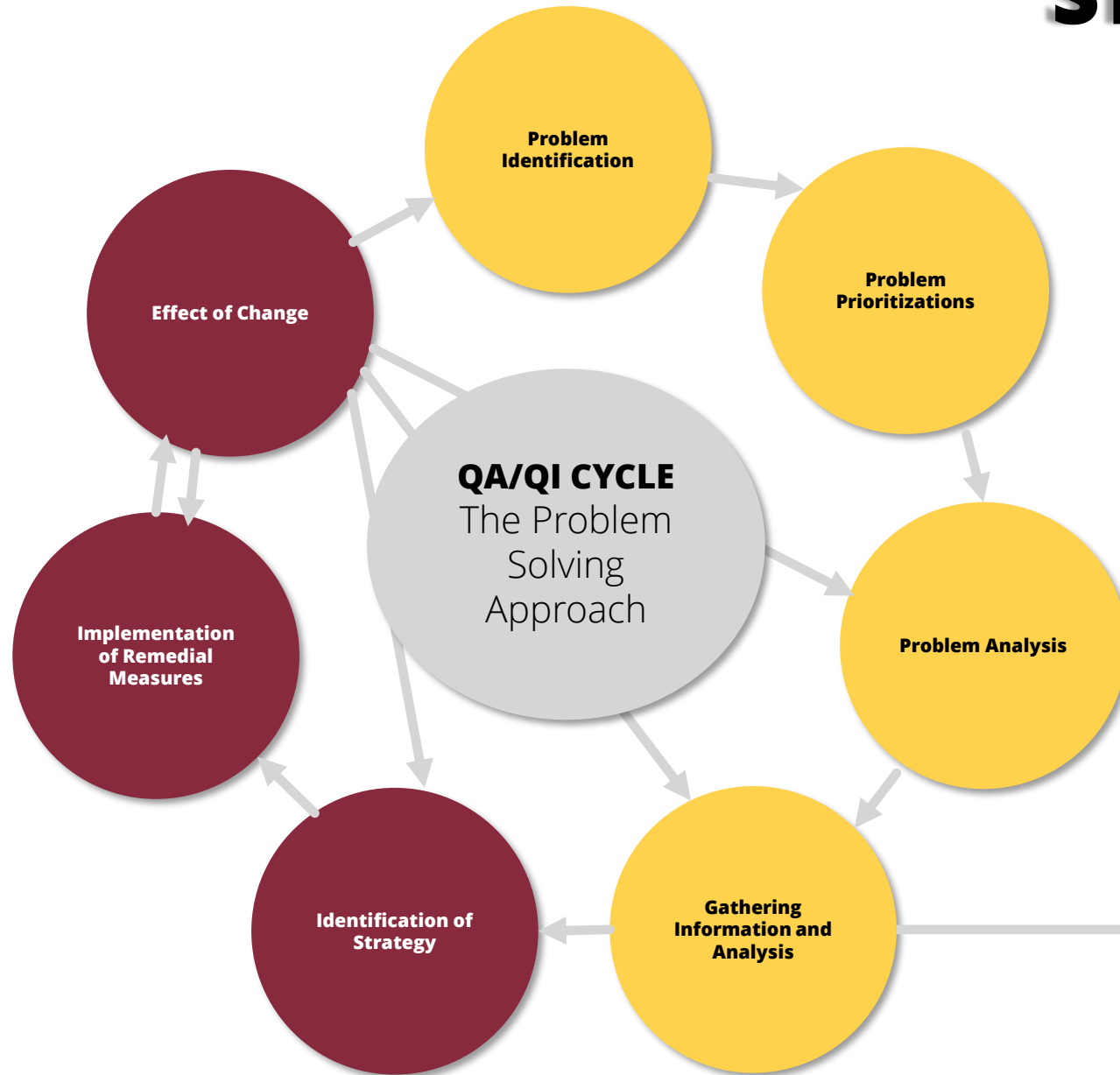
# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## PHARMACY (2)

STEP		CRITERIA	STANDARD	VERIFICATION
4.	<b>Labeling bowel cleansing agent</b>	Label according to correct patient, dose, frequency	100%	100%
		Label date and time for bowel cleansing, date and time for colonoscopy for Polyethylene-Glycol (PEG)-4000 Powder on the designated pouch	100%	0%
5.	Dispensing bowel cleansing agent to patient	Obtain serial number from patient for identification	100%	100%
		Countercheck to ensure correct patient, correct bowel cleansing agent, correct dose, correct frequency, date and time for bowel cleansing, date and time for colonoscopy	100%	100%
		Dispense Polyethylene-Glycol (PEG)-4000 Powder at a specifically assigned counter	100%	100%
6.	<b>Counsel patient on bowel cleansing instructions</b>	Provide structural counselling on indication of bowel cleansing, diet restriction, how to consume bowel cleansing agent, date and time for bowel cleansing, date and time for colonoscopy	100%	100%
		Counselled on how to take Polyethylene-Glycol (PEG)-4000 Powder using the designated pouch	100%	0%
		Counsel patient prescribed with Polyethylene-Glycol (PEG)-4000 Powder on bowel cleansing instructions using comprehensive counselling video	100%	0%



# STRATEGY FOR CHANGE & EFFECT OF CHANGE



1. Formulate Study Objectives
2. Measure Quality
  - 2.1 Identify Indicator
  - 2.2 Identify Variables
  - 2.2 Identify Criteria
  - 2.2 Set Standard
3. Review Process of Care
4. Develop MOGC
5. Plan of Data Collection
6. Plan for Data Analysis



# REMEDIAL MEASURES

- EZY FORTTRANS COUNSELLING VIDEO
- INTERACTIVE FOCUS GROUP COUNSELING
- CONTINUOUS PROFESSIONAL EDUCATION (CPE)
- MEMO

**CYCLE 1**

**CYCLE 2**

**CYCLE 3**

- CLEAR2GOPOUCH
- CLEAR2GO COMPREHENSIVE COUNSELLING VIDEO (COOV)

**CLEAR2GO REMINDER SYSTEM (CRES) & CLEAR2GO ALERT DATABASE (CRAD)**





**BEFORE**

When and how to do<sup>1,2</sup>?  
 Day before procedure | Date: \_\_\_\_\_

TIME	DOSE/RECOMMENDATION	REMARK
6:00 pm / 8:00 pm	1 <sup>st</sup> dose of Fortrans® pure isotonic solution	No dietary restriction (encourage low fibre and residue diet)
8:00 pm / 10:00 pm	2 <sup>nd</sup> dose of Fortrans® pure isotonic solution	
Procedure day   Date: _____		
6:00 am / 9:00 am	3 <sup>rd</sup> dose of Fortrans® pure isotonic solution	Colonoscopies shall be performed within 4-6 hours after last intake of fluid

Your doctor may advise you to take ONE (1) additional dose of Fortrans® pure isotonic solution. Strictly comply with your doctor's prescription.

Can I continue to have my food<sup>3</sup>?  
 Not Allowed | Allowed

Milk product, red meat, fruits, vegetables, whole-meal bread, oat, cereals, seeds, nuts, coloured beverage.	<b>Low fibre food:</b> Plain porridge, white fish, skinless chicken, white bread, egg, potato without skin and clear liquid.  <b>Clear liquid:</b> Plain water, strained fruit juices without pulp, tea or coffee (without milk or creamer), clear soup, glucose drinks.
---	--

**AFTER**

- Simple counselling video
- Can be accessed through scanning QR code on PEG-4000 powder envelope



- Pharmacists provided scheduled group counselling for patients prescribed with PEG-4000 powder for bowel cleansing
- Interactive
- More time spent for patients instead of limited time at dispensing counter
- Improved patient's understanding
- To increase patient's awareness



# Continuous Professional Education (CPE)

- For health care providers
- To increase awareness and to standardize practice of the implemented strategy
- To improve knowledge & understanding

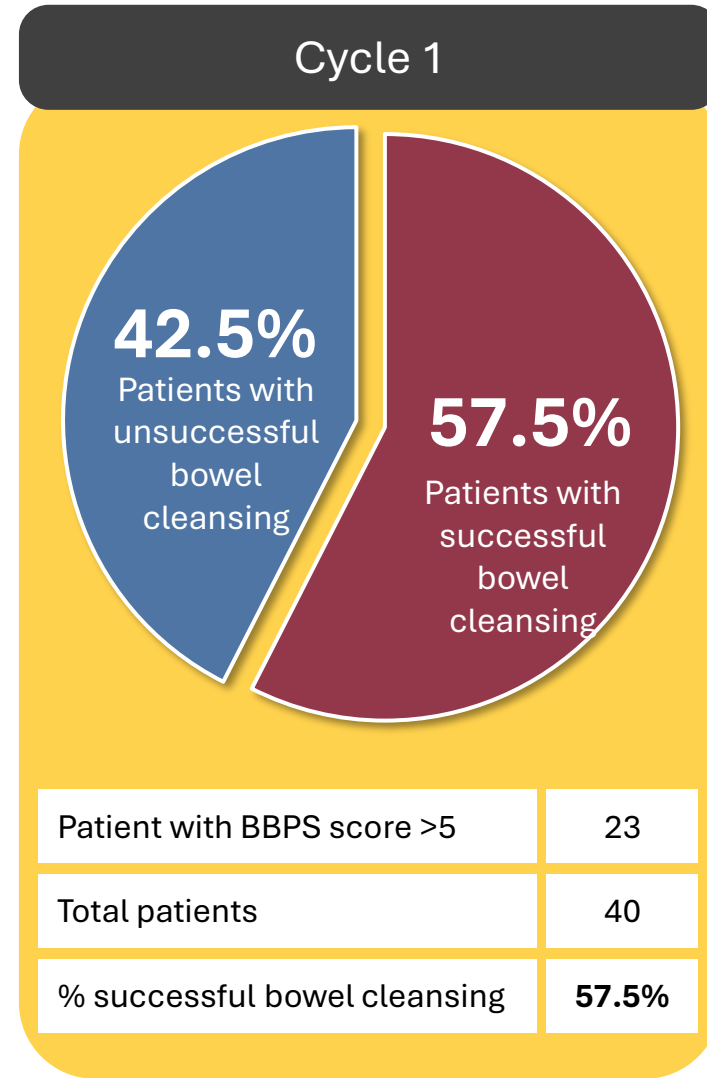
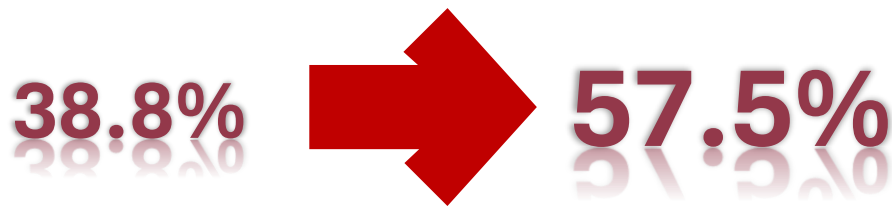
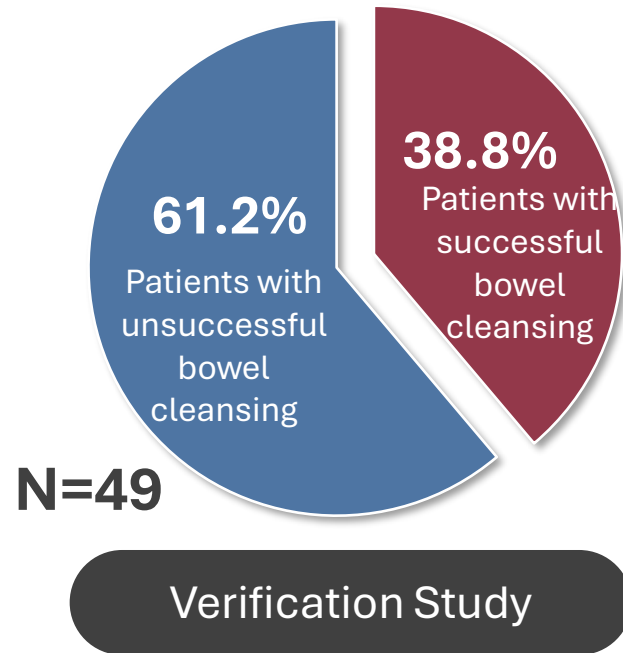
## CYCLE 1 (CONT.)

### Awareness Memo

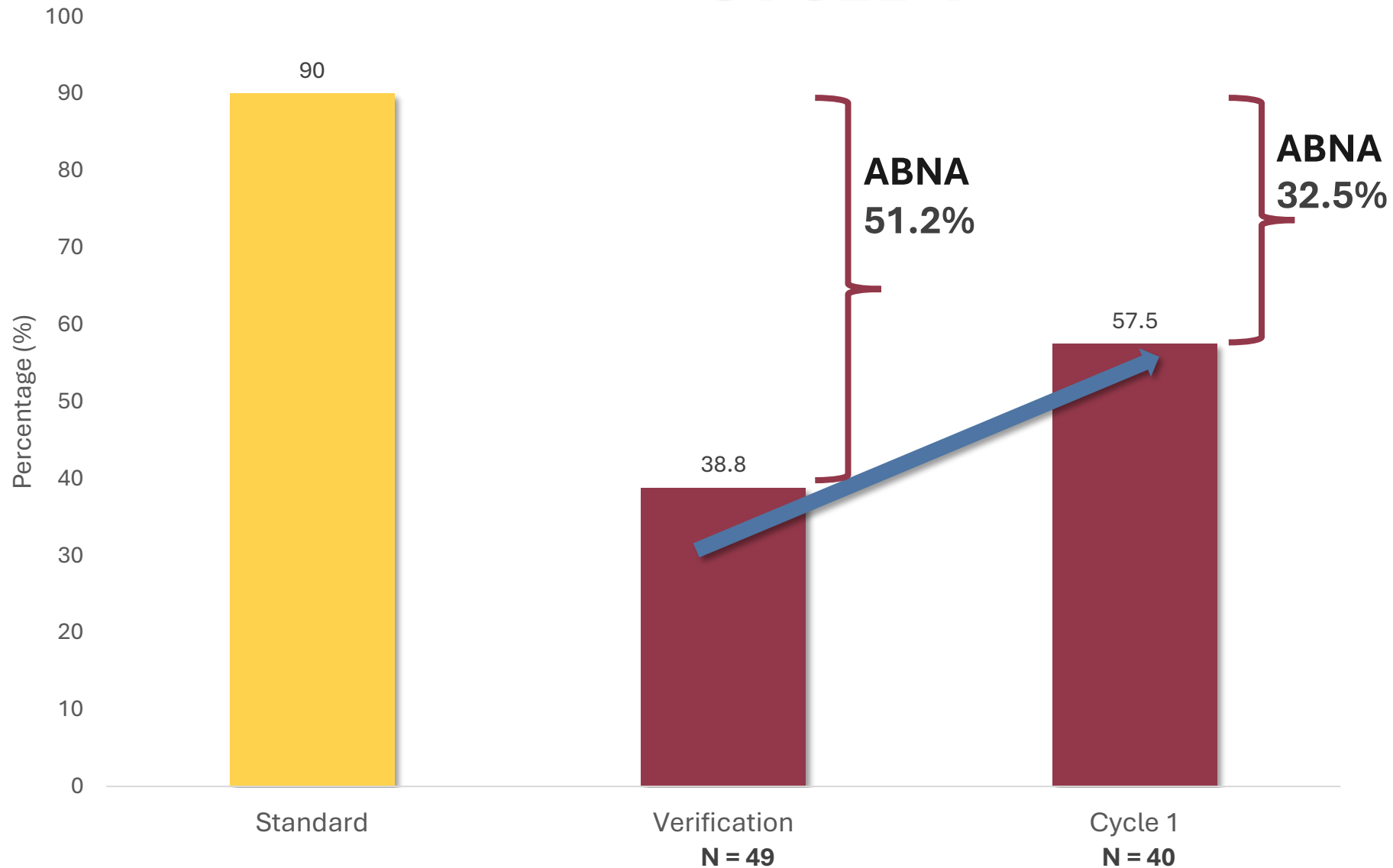
- Memo was distributed to all departments in HTJS
- To increase the awareness about the implemented strategy



# EFFECT OF CHANGE: **CYCLE 1**



# ACHIEVEABLE BENEFIT NON-ACHIEVABLE (ABNA): CYCLE 1





## Designated Pouch (CLEAR2GO)

**BEFORE**



**CYCLE 2**

- Round corner for safety
- Strong sealing :prevent leaking accidents
- Made from food grade (BPA free material)
- User friendly

**AFTER**



## BEFORE



- Patient does not have an accurate tool to measure 1L
- Use jug /bottle : risk of spillage, not accurate
- Lack of awareness on the important of taking PEG-4000 powder

If PEG-4000 powder is diluted less than 1L, a hypertonic solution will be formed, which will lead to poor clearance of the bowel.

## Designated Pouch (CLEAR2GO)

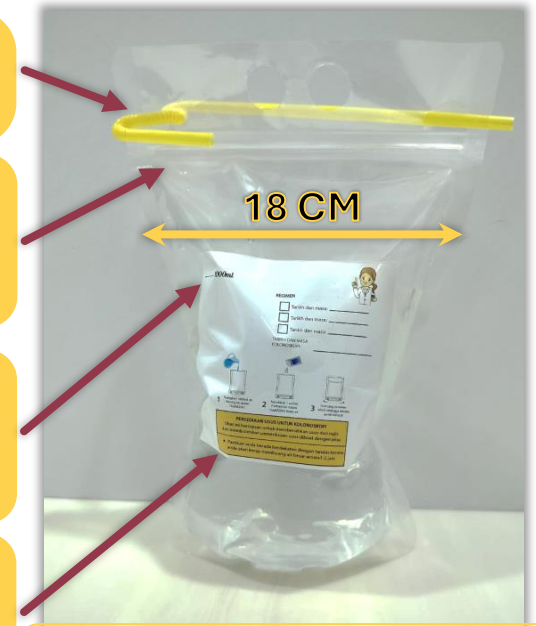
### CYCLE 2 (CONT.)

Provided straw: **Easy to drink** from the pouch & avoid nausea

Strong Ziplock opening: **EASY POURING WITHOUT SPILLAGE & LEAKAGE** accidents

**CALIBRATED** marking **1000ML** for volume of water required

Clear instruction on administration of PEG-4000 powder

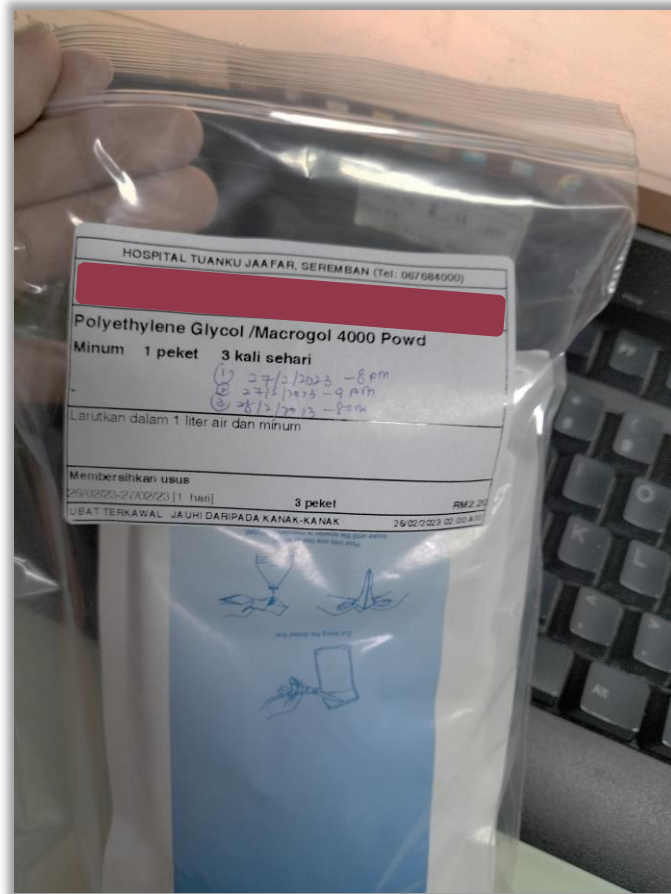


**Transparent Stand Pouch for drinking PEG-4000 powder solution**

- PEG-4000 powder need to be diluted with 1L of water to form an isotonic solution.
- Exert an osmotic effect in the colon and sequesters water to the bowel.
- Increase volume of fecal mass - trigger propulsive peristalsis via distension of the colonic wall - soften the feaces & ease defecation.

## AFTER

**BEFORE**



**Unclear handwriting** of the date and timing of dose to be administered

## Designated Pouch (CLEAR2GO)

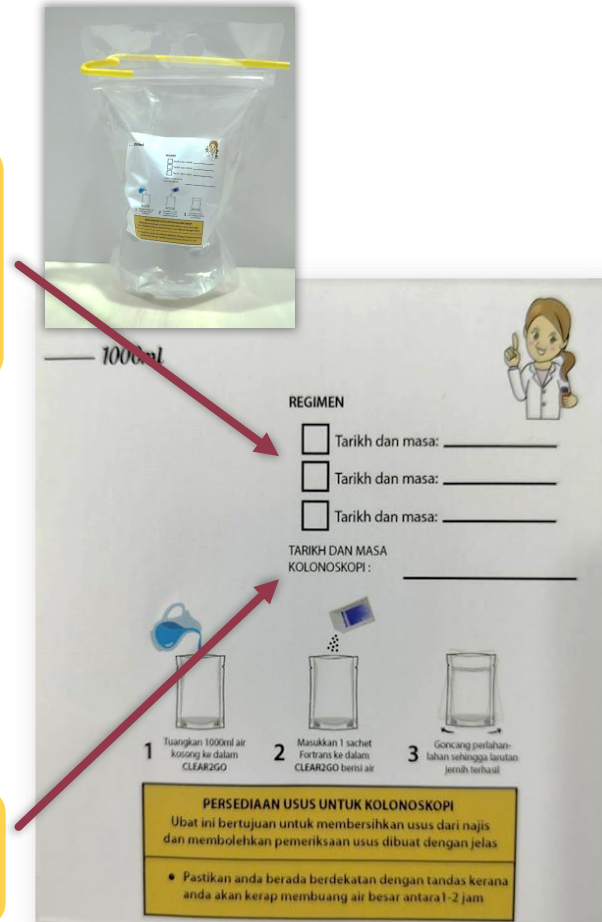
Section of timing of dose to be administered:  
**REMINDER TOOL** to enhance adherence and compliance

# CYCLE 2 (CONT.)

**Date and time** of colonoscopy date

Water-resistant, glossy and clearly written information labelling sticker

**AFTER**



# Designated Pouch (CLEAR2GO)

**BEFORE**

## When and how to do<sup>1,2?</sup>

Day before procedure | Date: \_\_\_\_\_

TIME	DOSE/RECOMMENDATION	REMARK
6:00 pm / 8:00 pm	1 <sup>st</sup> dose of Fortrans® pure isotonic solution	No dietary restriction (encourage low fiber and residue diet)
8:00 pm / 10:00 pm	2 <sup>nd</sup> dose of Fortrans® pure isotonic solution	

Procedure day | Date: \_\_\_\_\_

6:00 am / 9:00 am	3 <sup>rd</sup> dose of Fortrans® pure isotonic solution	Colonoscopies shall be performed within 4-6 hours after last intake of fluid
-------------------	--	--

Your doctor may advise you to take ONE (1) additional dose of Fortrans® pure isotonic solution. Strictly comply with your doctor's prescription.

## Can I continue to have my food<sup>3?</sup>

NOT ALLOWED	ALLOWED
Milk product, red meat, fruits, vegetables, whole-meal bread, oat, cereals, seeds, nuts, coloured beverage.	<b>Low fibre food:</b> Plain porridge, white fish, skinless chicken, white bread, egg, potato without skin and clear liquid. <b>Clear liquid:</b> Plain water, strained fruit juices without pulp, tea or coffee (without milk or creamer), clear soup, glucose drinks.

- Lack of visual-aid education material
- Black and white photocopy leaflet
- Unattractive product information

# CYCLE 2 (CONT.)

**AFTER**

- Information on **DO's and DON'Ts** with coloured-image icon
- Improve compliance to diet restrictions



# CLEAR2GO Comprehensive Counselling Video (COOV)

## BEFORE

## CYCLE 2

### When and how to do<sup>1,2</sup>?

Day before procedure | Date: \_\_\_\_\_

TIME	DOSAGE/RECOMMENDATION	REMARK
6:00 pm / 8:00 pm	1 <sup>st</sup> dose of Fortrans® pure isotonic solution	No dietary restriction (encourage low fibre and residue diet)
8:00 pm / 10:00 pm	2 <sup>nd</sup> dose of Fortrans® pure isotonic solution	

Procedure day | Date: \_\_\_\_\_

6:00 am / 9:00 am	3 <sup>rd</sup> dose of Fortrans® pure isotonic solution	Colonoscopies shall be performed within 4-6 hours after last intake of fluid
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NOT ALLOWED	ALLOWED
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## CYCLE 1

- Simple counselling video
- Accessible through scanning QR code on PEG-4000 powder envelope

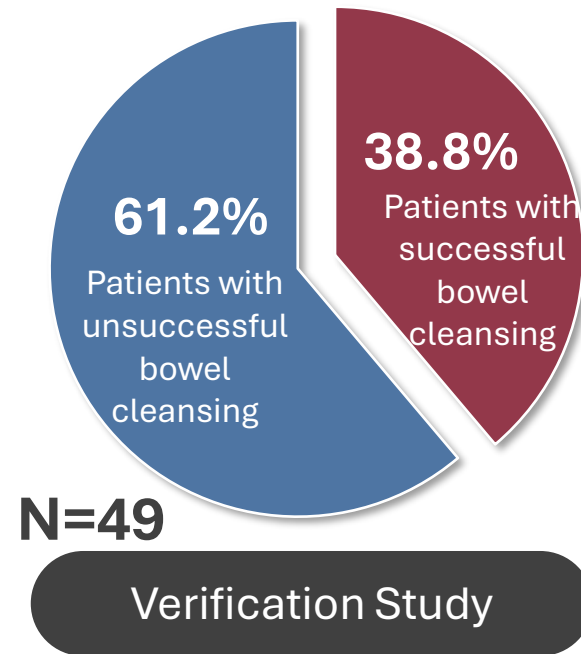
# CYCLE 2 (CONT.)

- Improvised, attractive video
- With 3D-illustration and commercial voice-over
- Accessible by scanning the QR code on CLEAR2GO
- Virtual counselling at any time, any place
- Increase knowledge & understanding of patients

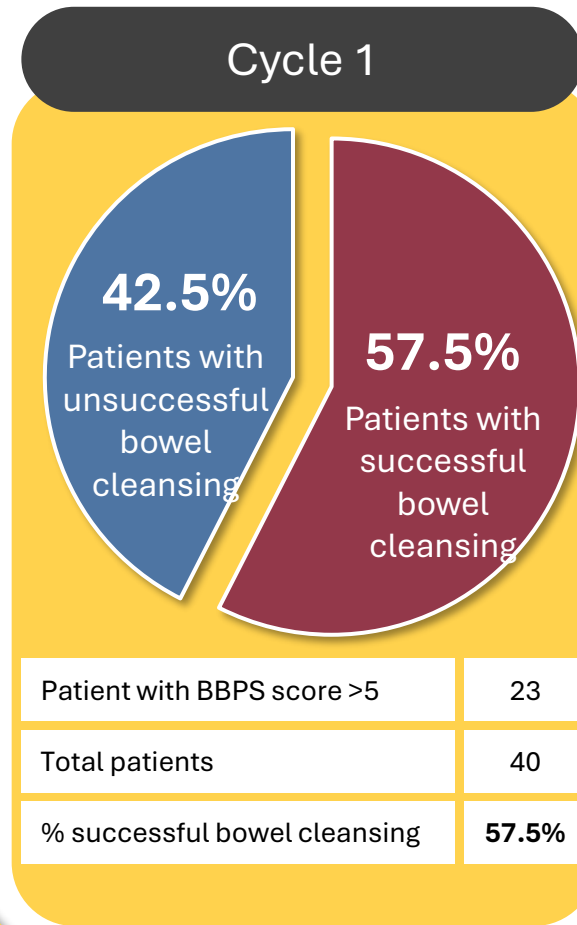




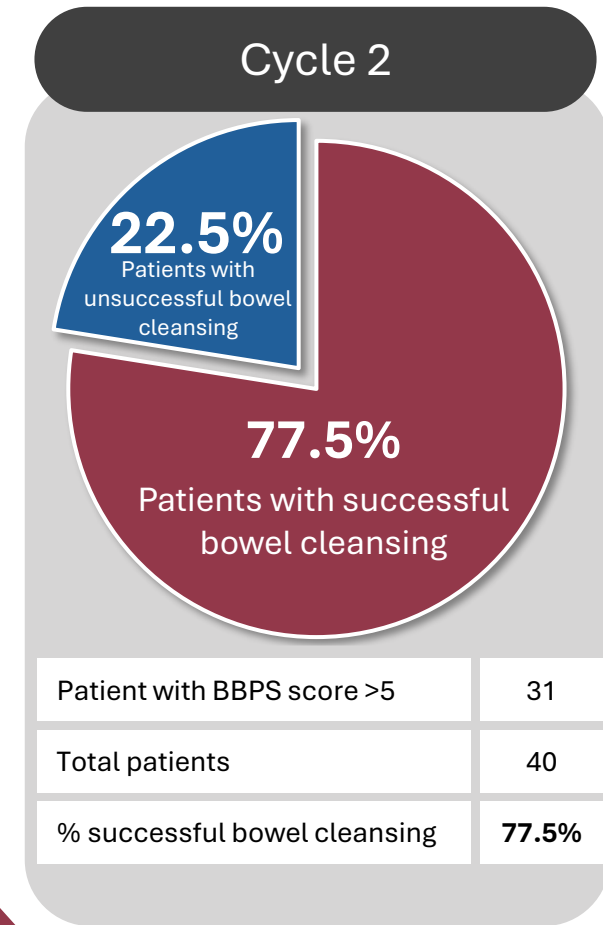
# EFFECT OF CHANGE: **CYCLE 2**



**38.8%**



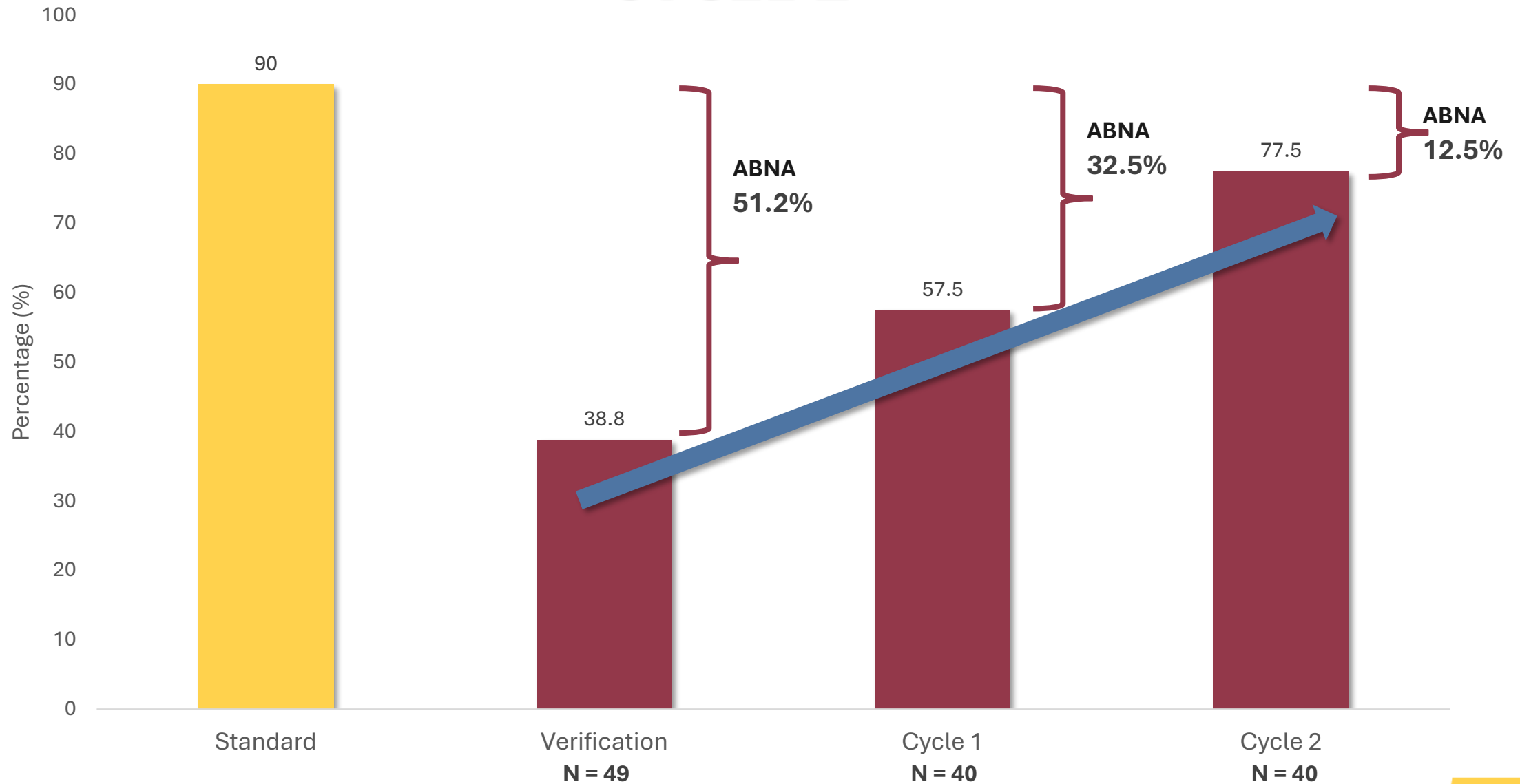
**57.5%**



**77.5%**



# ACHIEVEABLE BENEFIT NON-ACHIEVABLE (ABNA): CYCLE 2





# CLEAR2GO REMINDER SYSTEM (CRES) & CLEAR2GO ALERT DATABASE (CRAD)

## CLEAR2GO Reminder System (CRES)

- Patient would sign up for CRES
- SMS reminding patient to consume PEG-4000 powder and light diet 48 hours before colonoscopy

Date	Name	COMPILER LIST	SEND SMS	Planned date colonoscopy	BBPS	Endoscopist	Findings/Outcome
2/3/23	SECK CHOY FOONG		1/7/1900	4/3/2023			
6/3	lee hoo sing		1/7/1900	4/3/2023			
9/3/23	NG KOK CHAI @ NG KIOK CHAI		1/7/1900	4/4/2023			
17/3/23	ABDUL AZIZ BIN ABDUL RASHID		1/7/1900	4/4/2023			
21/3	Selvarajah gopal		1/7/1900	4/4/2023			
3/3/23	Tan En @ Tan Choon Ing		1/7/1900	4/5/2023			
15/3/23	A THANGAVELU A/L ARUNASALAM		1/7/1900	4/6/2023			
8/3/23	YAP OMN TIU		1/7/1900	4/9/2023			
8/3/23	SEW YAU TEK		1/7/1900	4/10/2023			
21/3	Muhammad syafiq bon Abdul aziz		1/7/1900	4/10/2023			
3/4	muniamah a/p murugiah		1/7/1900	4/10/2023			
3/3/23	RAJESWARY A/P C. KARTIGEYAN		1/7/1900	4/11/2023			
8/3/23	DATARAN A/L M. RAMAKSAMU		1/7/1900	4/11/2023			
21/3	Lee Leng hoi		1/7/1900	4/11/2023			
8/3/23	LOW SIEW KEAN		1/7/1900	4/12/2023			
14/3/23	BAHARI BIN SIONG		1/7/1900	4/12/2023			
14/3/23	MUSA BIN LUKUM		1/7/1900	4/13/2023			
8/3/23	LEE SIT WAJ		1/7/1900	4/14/2023			
27/3	Lee swee hua		1/7/1900	4/17/2023			
8/3/23	YONG NYUK TSU		1/7/1900	4/18/2023			
9/3/23	GO CHIN CHAI		1/7/1900	4/20/2023			
14/3/23	PURANI A/P MUTTY		1/7/1900	4/20/2023			
14/3/23	YAZRI BIN AHMAD		1/7/1900	4/20/2023			

**CYCLE 3**

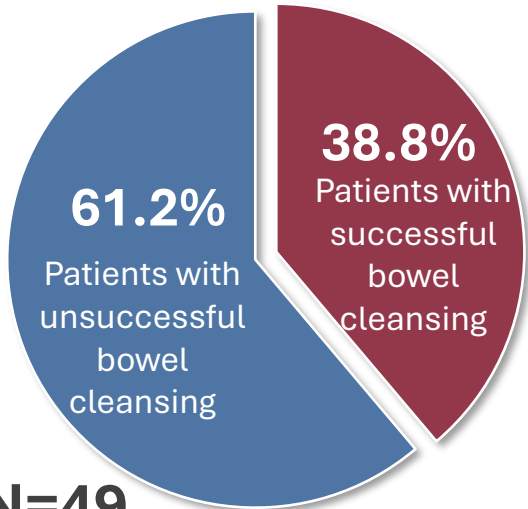


## CLEAR2GO Alert Database (CRAD)

- Colour-coded database highlights patients requiring SMS reminder
- SMS would be sent on weekly basis

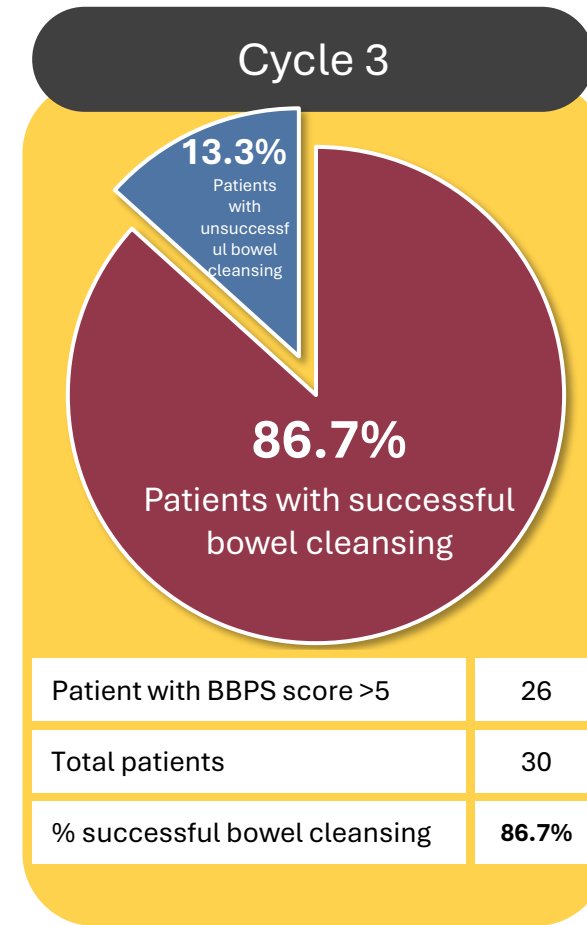
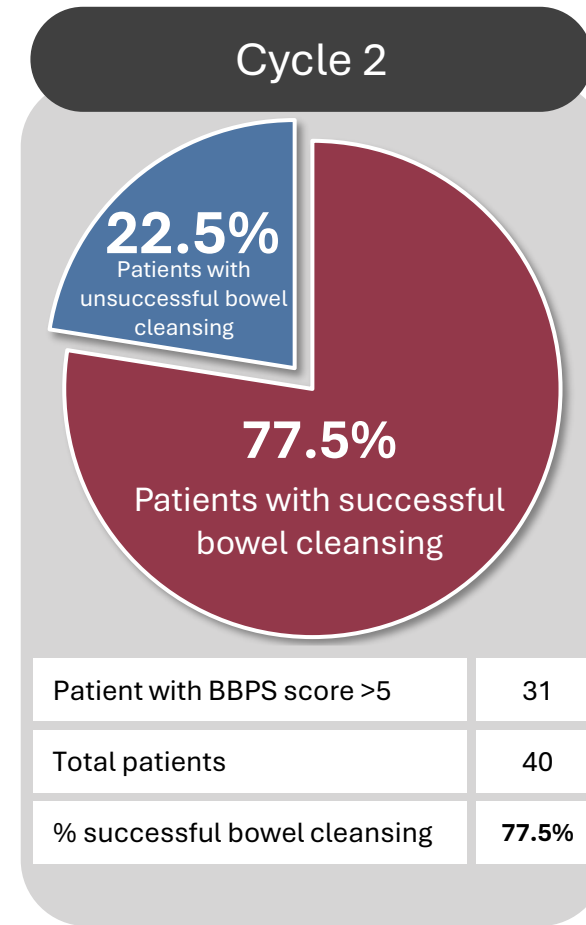
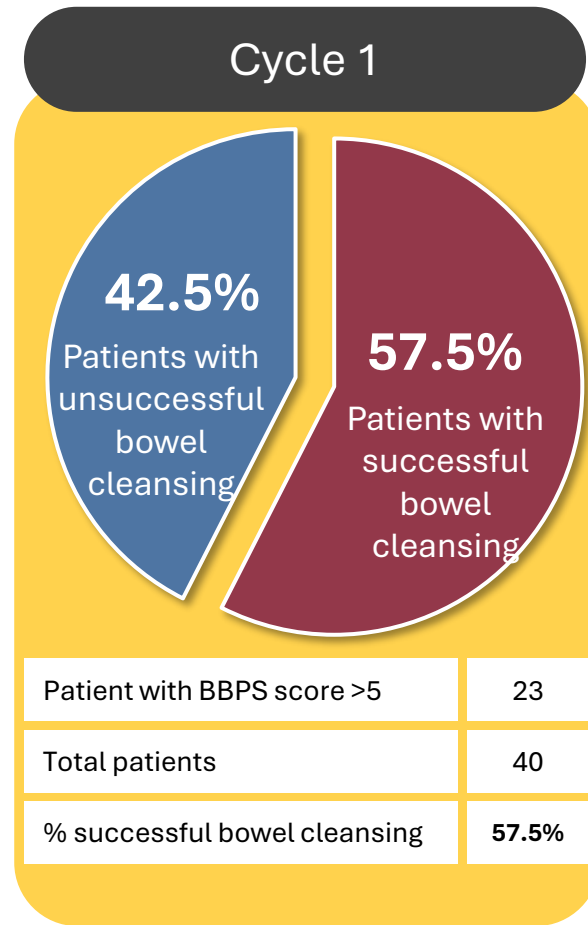
WARNA	Indikator
Red	Hantar SMS (Minggu kolonoskopi)
Yellow	Kumpul maklumat pesakit (2 minggu sebelum kolonoskopi)
Green	Selesai

# EFFECT OF CHANGE: **CYCLE 3**



**N=49**

Verification Study



**38.8%**



INCREASE

**57.5%**



INCREASE

**77.5%**

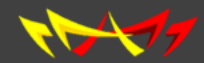
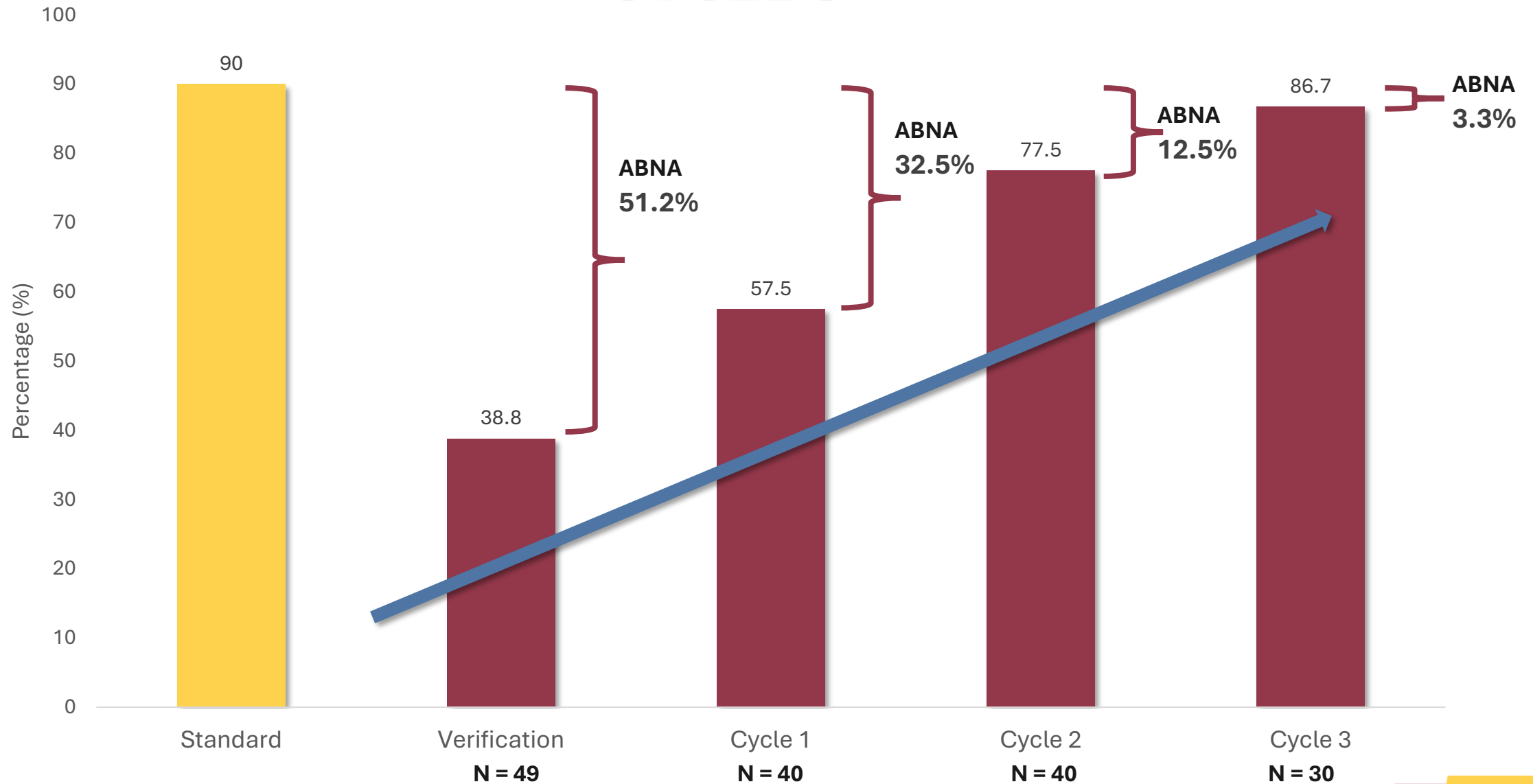


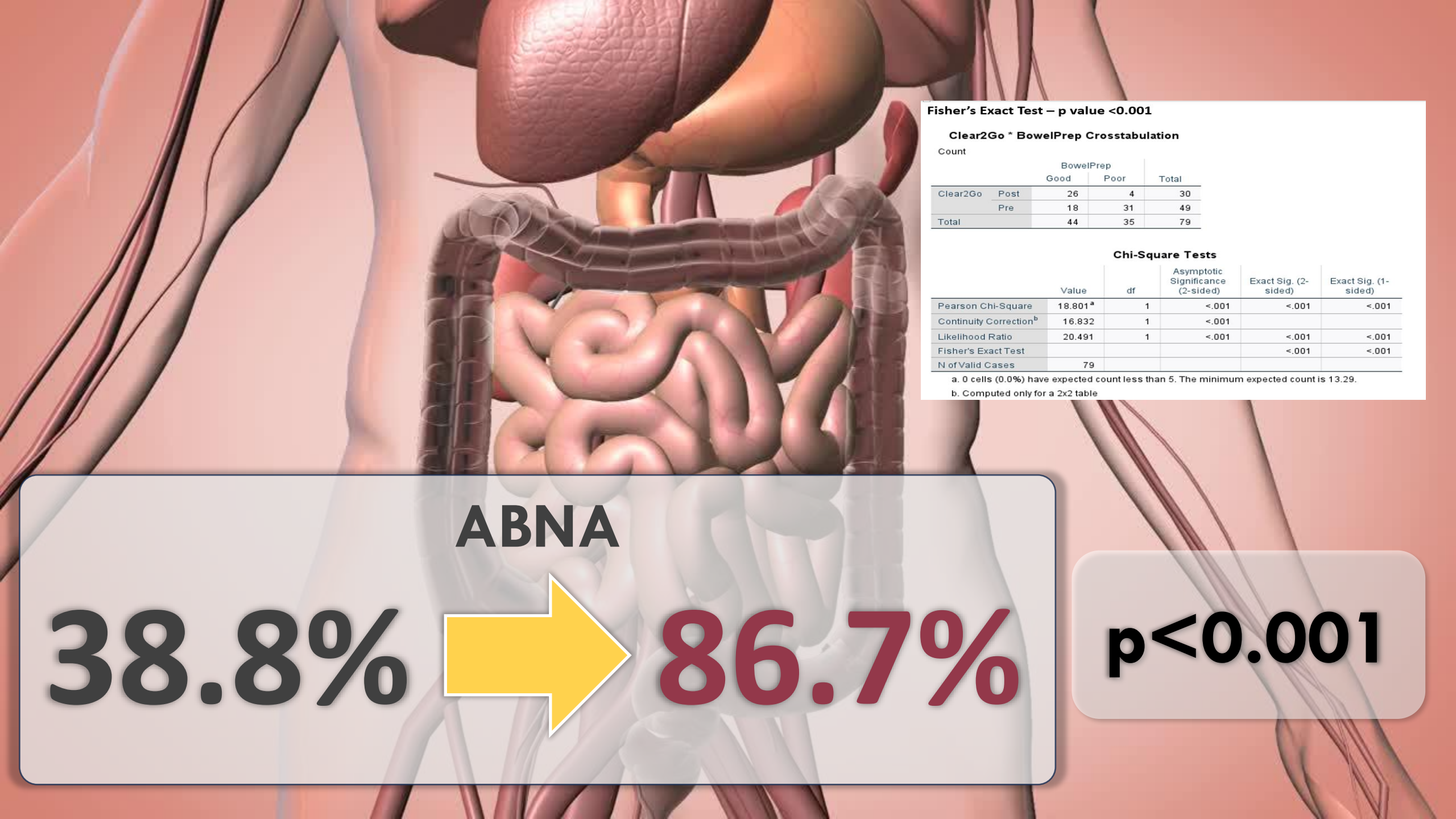
INCREASE

**86.7%**



# ACHIEVEABLE BENEFIT NON-ACHIEVABLE (ABNA): CYCLE 3





Fisher's Exact Test – p value <0.001

**Clear2Go \* BowelPrep Crosstabulation**

Count		BowelPrep		Total
		Good	Poor	
Clear2Go	Post	26	4	30
	Pre	18	31	49
Total		44	35	79

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	18.801 <sup>a</sup>	1	<.001	<.001	<.001
Continuity Correction <sup>b</sup>	16.832	1	<.001		
Likelihood Ratio	20.491	1	<.001	<.001	<.001
Fisher's Exact Test				<.001	<.001
N of Valid Cases	79				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.29.

b. Computed only for a 2x2 table

**ABNA**

**38.8%**



**86.7%**

**p < 0.001**

# CONTRIBUTING FACTORS PERCENTAGE REDUCTION

**47% to 0%**

**Non-compliance to  
PEG-4000 powder  
instructions**



**27% to 2%**

**Non-compliance to  
diet restriction**



**26% to 0%**

**Forgot to consume  
PEG-4000 powder**



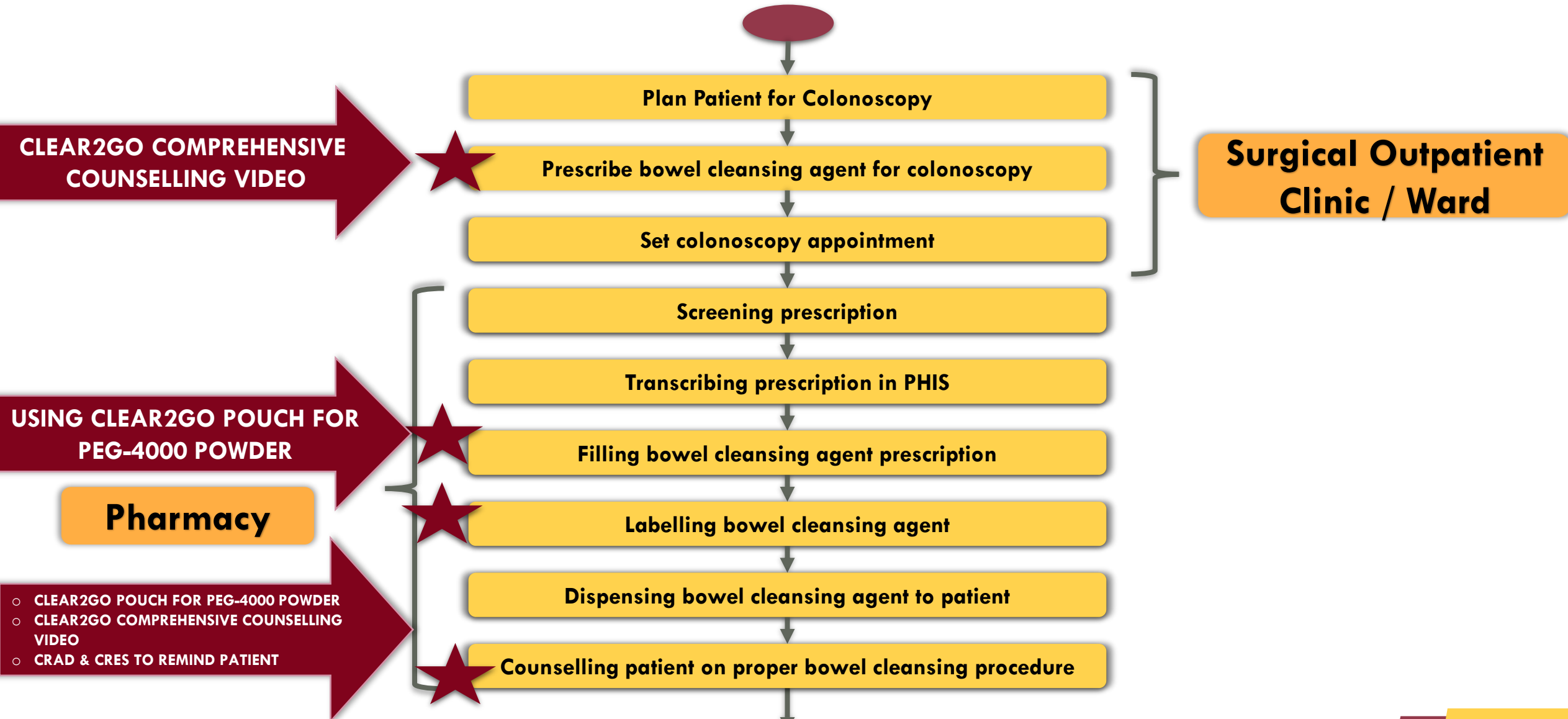
**70% to 10%**

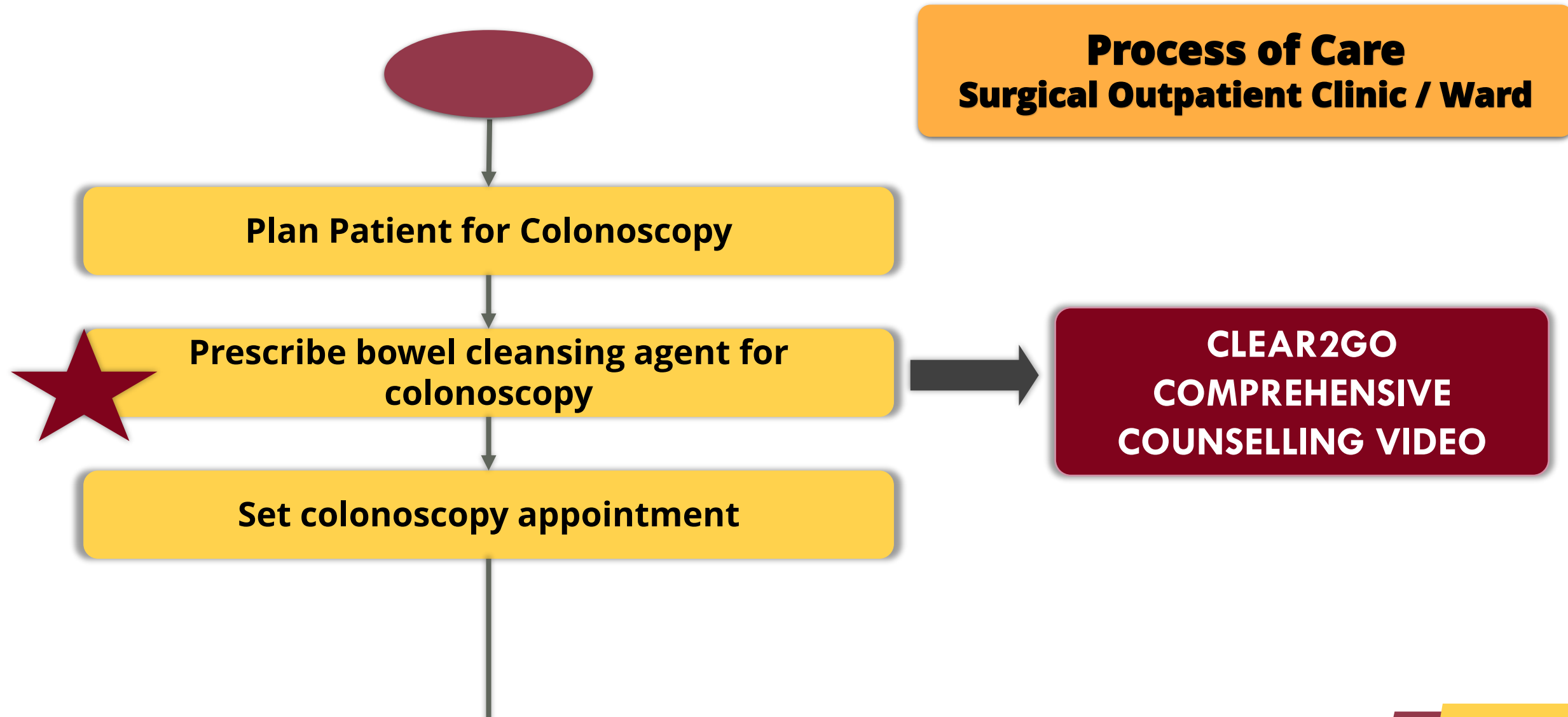
**Unstandardized  
bowel cleansing  
counselling**





# IMPROVED PROCESS OF CARE





Screening prescription

Transcribing prescription in PHIS

★ Filling bowel cleansing agent prescription

★ Labelling bowel cleansing agent

Dispensing bowel cleansing agent to patient

★ Counselling patient on proper bowel cleansing procedure

**Process of Care  
Pharmacy**

**USING CLEAR2GO POUCH  
FOR PEG-4000 POWDER**

- USING CLEAR2GO POUCH FOR PEG-4000 POWDER
- CLEAR2GO COMPREHENSIVE COUNSELLING VIDEO
- CRAD & CRES TO REMIND PATIENT



# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## SURGICAL OUTPATIENT CLINIC/WARD

STEP		CRITERIA	STANDARD	VERIFICATION	CYCLE 1	CYCLE 2	CYCLE 3
1.	Plan patient for colonoscopy	<ul style="list-style-type: none"> <li>Identify patient indicated for colonoscopy</li> <li>Provide patient with information about colonoscopy and bowel cleansing for colonoscopy</li> <li>Obtain patient's agreement for colonoscopy</li> </ul>	100%	100%	100%	100%	100%
2.	<b>Prescribe bowel cleansing agent for colonoscopy</b>	<ul style="list-style-type: none"> <li>Prescribe the appropriate choice of bowel cleansing agent</li> <li>Ensure complete prescription details as below:                             <ul style="list-style-type: none"> <li>- Correct patient</li> <li>- Correct bowel cleansing agent</li> <li>- Correct dose</li> <li>- Correct frequency</li> <li>- Correct date and dosing time for bowel cleansing</li> <li>- Correct date and time for colonoscopy</li> <li>- Prescriber's sign and stamp</li> </ul> </li> <li>Provide patient with bowel cleansing agent product information</li> </ul>	100%	100%	100%	100%	100%
			100%	100%	100%	100%	100%
			100%	100%	100%	100%	100%
			100%	100%	100%	100%	100%
			100%	100%	100%	100%	100%
			100%	<b>0%</b>	<b>69%</b>	<b>87%</b>	<b>100%</b>
3.	Set colonoscopy appointment date	Provide patient with the date and time details of the scheduled colonoscopy	100%	100%	100%	100%	100%



# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## PHARMACY (1)

STEP		CRITERIA	STANDARD	VERIFICATION	CYCLE 1	CYCLE 2	CYCLE 3				
1.	Screening prescription	Ensure prescription is valid	100%	100%	100%	100%	100%				
		Ensure complete prescription details as below: <ul style="list-style-type: none"> <li>- Correct patient</li> <li>- Correct bowel cleansing agent</li> <li>- Correct dose</li> <li>- Correct frequency</li> <li>- Correct date and dosing time for bowel cleansing</li> <li>- Correct date and time for colonoscopy</li> <li>- Prescriber's sign and stamp</li> </ul>	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Provide serial number for identification	100%	100%	100%	100%	100%				
2.	Transcribing prescription in PhIS	Contact prescriber for prescription deemed for pharmacist's intervention	100%	100%	100%	100%	100%				
		Transcribe correct patient, correct bowel cleansing agent, correct dose, correct frequency in PhIS system	100%	100%	100%	100%	100%				
		Print label for the correct patient from the PhIS system	100%	100%	100%	100%	100%				
3.	<b>Filling bowel cleansing agent prescription</b>	Fill according to correct patient, dose, frequency	100%	100%	100%	100%	100%				
		Fill Polyethylene-Glycol (PEG)-4000 Powder into a designated pouch	100%	<b>0%</b>	<b>0%</b>	<b>87%</b>	<b>100%</b>				



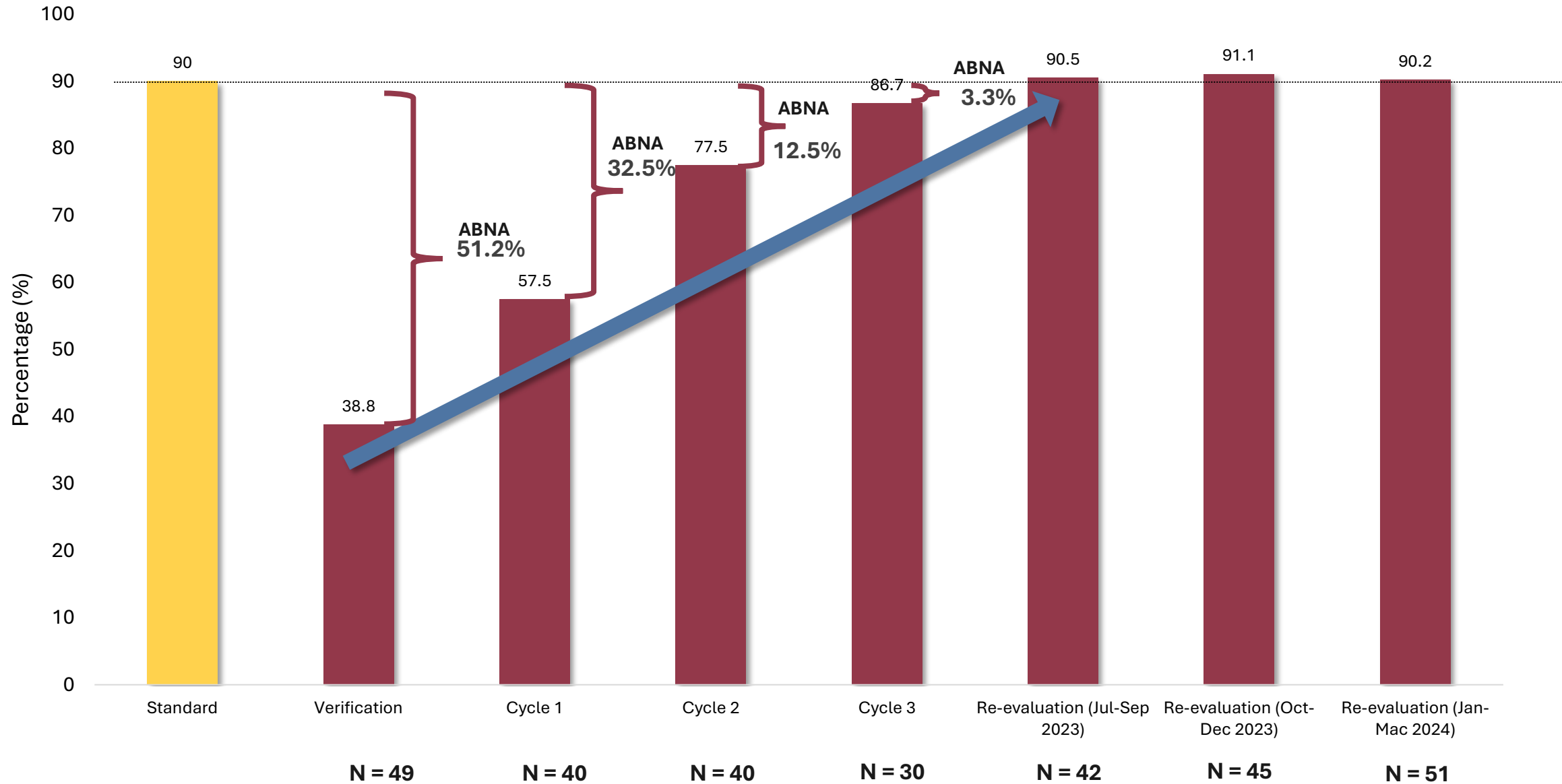
# CONFORMATION TO MODEL OF GOOD CARE (MOGC)

## PHARMACY (2)

STEP		CRITERIA	STANDARD	VERIFICATION	CYCLE 1	CYCLE 2	CYCLE 3
4.	<b>Labeling bowel cleansing agent</b>	Label according to correct patient, dose, frequency	100%	100%	100%	100%	100%
		Label date and time for bowel cleansing, date and time for colonoscopy for Polyethylene-Glycol (PEG)-4000 Powder on the designated pouch	100%	0%	0%	87%	100%
5.	Dispensing bowel cleansing agent to patient	Obtain serial number from patient for identification	100%	100%	100%	100%	100%
		Countercheck to ensure correct patient, correct bowel cleansing agent, correct dose, correct frequency, date and time for bowel cleansing, date and time for colonoscopy	100%	100%	100%	100%	100%
		Dispense Polyethylene-Glycol (PEG)-4000 Powder at a specifically assigned counter	100%	100%	100%	100%	100%
6.	<b>Counsel patient on bowel cleansing instructions</b>	Provide structural counselling on indication of bowel cleansing, diet restriction, how to consume bowel cleansing agent, date and time for bowel cleansing, date and time for colonoscopy	100%	100%	100%	100%	100%
		Counselled on how to take Polyethylene-Glycol (PEG)-4000 Powder using the designated pouch	100%	0%	0%	87%	100%
		Counsel patient prescribed with Polyethylene-Glycol (PEG)-4000 Powder on bowel cleansing instructions using comprehensive counselling video	100%	0%	69%	87%	100%

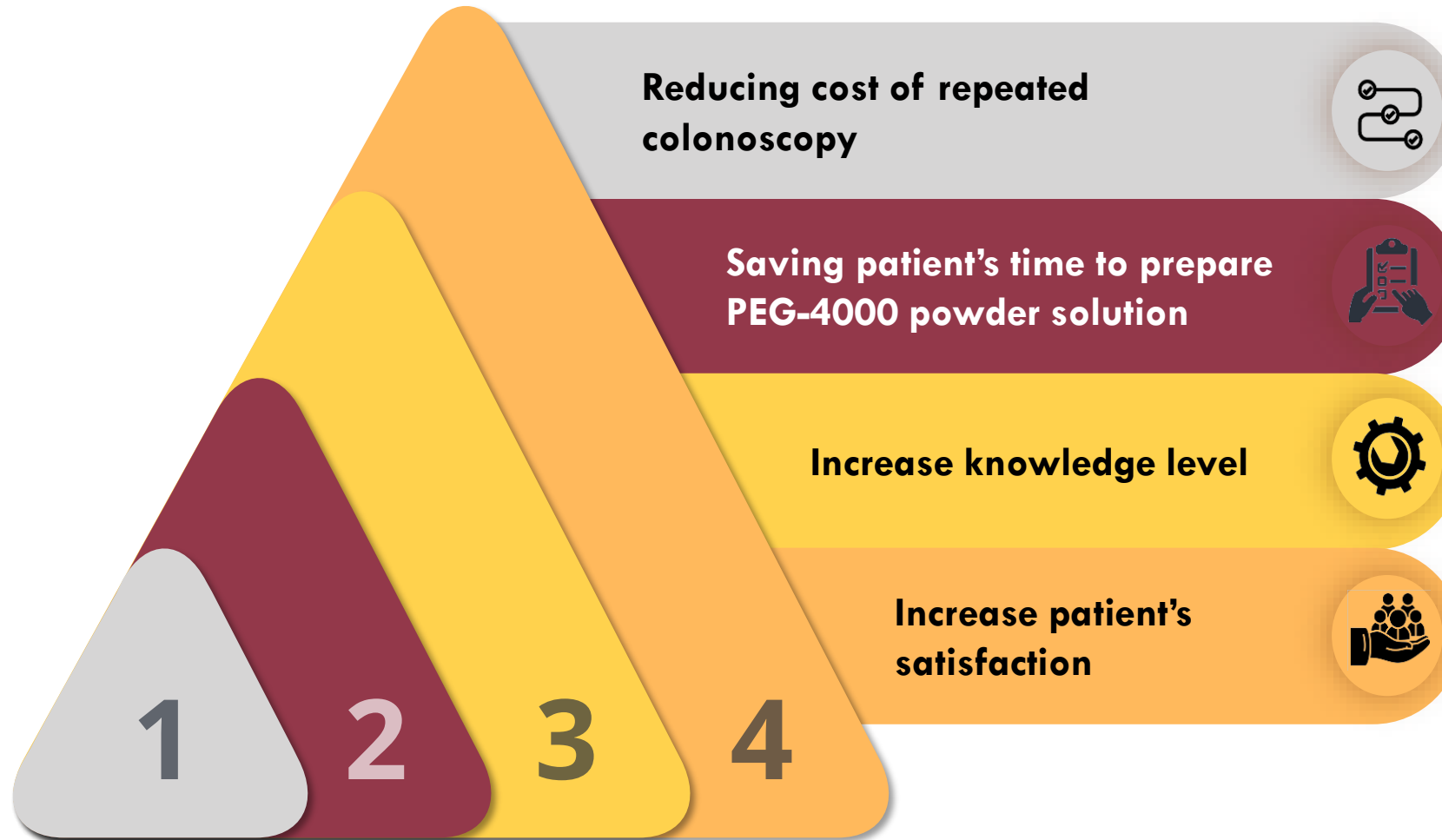


# SUSTAINABILITY OF PROJECT



# IMPACT

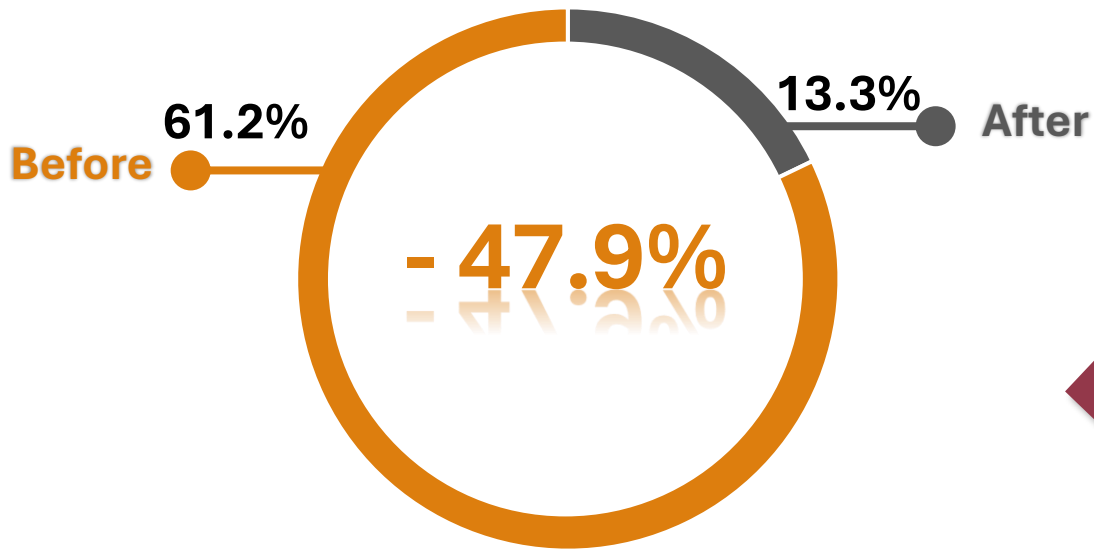
IMPROVING PERCENTAGE OF SUCCESSFUL BOWEL CLEANSING AMONG PATIENTS PRESCRIBED WITH PEG-4000 POWDER FOR COLONOSCOPY IN HTJS



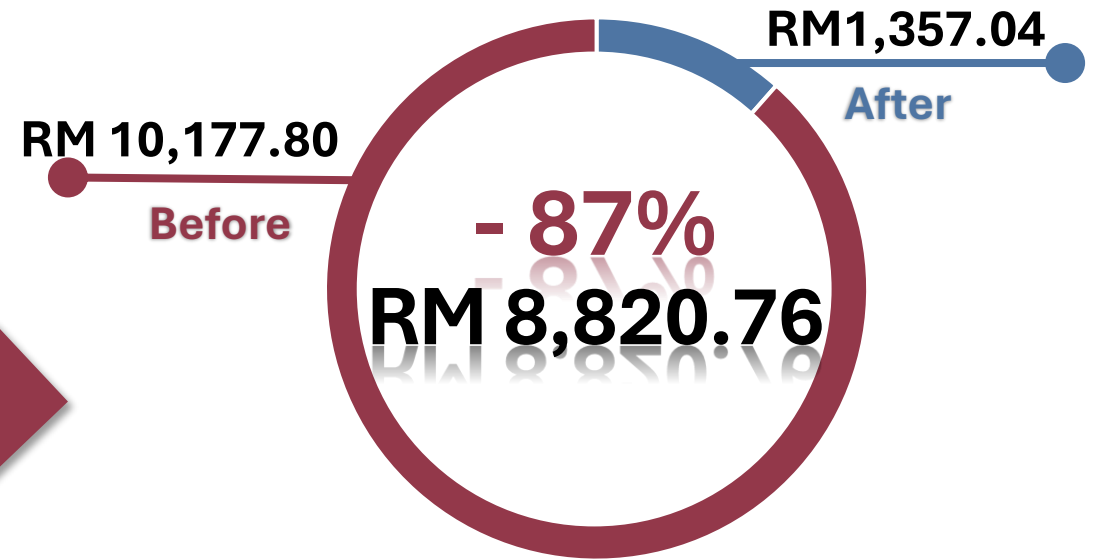


# COST - SAVING

## Percentage of Repeated Colonoscopy



## Cost of Repeated Colonoscopy



	Cost per patient	Pre (30 patients)	Post (4 patients)
PEG-4000 powder	RM 39.26	RM1,177.80	RM157.04
Colonoscopy	RM 300.00	RM 9,000.00	RM 1,200.00
<b>Total</b>		<b>RM 10,177.80</b>	<b>RM 1,357.04</b>

# PREPARATION TIME - SAVING

Saving patient's time to prepare PEG-4000 powder solution



BEFORE

AFTER

900 secs

SAVING

60 secs



-840sec  
~~-900sec~~  
**93.3%**



p<0.001



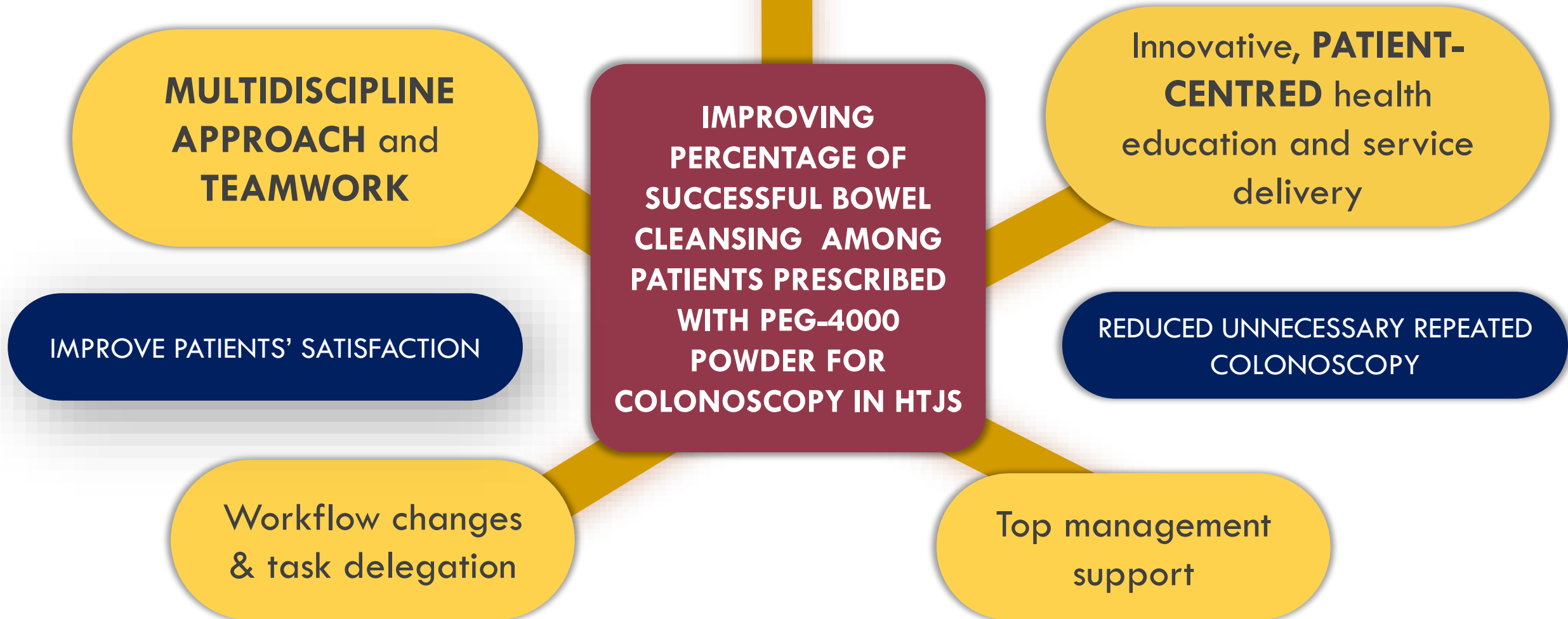
# IMPROVE KNOWLEDGE

71%





# LESSONS LEARNT



**MULTIDISCIPLINE APPROACH and TEAMWORK**

**IMPROVING PERCENTAGE OF SUCCESSFUL BOWEL CLEANSING AMONG PATIENTS PRESCRIBED WITH PEG-4000 POWDER FOR COLONOSCOPY IN HTJS**

**Innovative, PATIENT-CENTRED health education and service delivery**

**IMPROVE PATIENTS' SATISFACTION**

**REDUCED UNNECESSARY REPEATED COLONOSCOPY**

**Workflow changes & task delegation**

**Top management support**



# THE NEXT STEP

Expansion to  
Negeri  
Sembilan  
hospitals



HOSPITAL TUANKU JA'AFAR  
(TUANKU JA'AFAR HOSPITAL)  
Jalan Rasah  
70300 Seremban  
NEGERI SEMBILAN  
MALAYSIA



Tel : 06-788 4000 (40 talian / lines)  
Faks : 06-762 5771  
Laman Web : www.htjs.moh.gov.my

Ruj. Kami : JF/HTJS/ 1/4 Bk. (07)  
Tarikh : 9 Mei 2023

## SENARAI EDARAN (Seperti di Lampiran A)

Tuan/Puan,

## MESYUARAT JAWATANKUASA PROJEK KOLABORASI QA/PENYELIDIKAN KLUSTER-2

Adalah saya dengan segala hormatnya menujuk kepada perkara di atas.

2. Adalah dimaklumkan bahawa mesyuarat di atas akan diadakan pada ketetapan seperti berikut:

Tarikh : 29 Mei 2023 (Isnin)  
Masa : 9.00 am – 4.30 pm  
Tempat : Bilik Mesyuarat Azalea, Hospital Rembau

3. Agenda mesyuarat adalah seperti berikut.

- 3.1 Kata-kata aluan Pengerusi Mesyuarat
- 3.2 Perbincangan pemilihan tajuk penyelidikan (R&D) Kluster 2
- 3.3 Carta Gantt kajian
- 3.4 Agihan tugas
- 3.5 Isu-isu lain

4. Kerjasama dan perhatian tuan/puan berhubung perkara ini amatlah dihargai dan didahului dengan ucapan terima kasih.

Sekian.

"MALAYSIA MADANI"  
"BERKHIDMAT UNTUK NEGARA"

Saya yang menjelarkan amanah,

DR. NOOR FAHREH AZMAN BIN MOHD ALI  
NO. MPM : 35490  
Timbalan Pengerah Perubatan (IV)  
Hospital Tuanku Ja'afar Seremban

(DATO<sup>®</sup> DR. ZALEHA BINTI MD NOOR, D.B.N.S., D.S.M.)

NO. MPM 30155

Pengarah,

Hospital Tuanku Ja'afar, Seremban

E-mail: ahmad\_ridza@moh.gov.my rasah\_l@langkaran@moh.gov.my  
+606- 766 2610



# THE NEXT STEP

Expansion to  
Negeri  
Sembilan  
hospitals

Publication  
in initiative  
quality journals  
for sharing  
purpose

CLEAR2GO  
Siti Nabilah Md Yazid<sup>1\*</sup>, Siti Rabia'tul 'Adawiyah Nasri<sup>1</sup>, Adibah Murayadi<sup>1</sup>, Marzirah  
Ibrahim<sup>1</sup>, Tien Ja She<sup>1</sup>

<sup>1</sup>Hospital Tuanku Jaa'far, Seremban

CLEAR2GO

ABSTRAK

Setinggi-tinggi  
Kesihatan (Far  
Jabatan Farmasi  
dan semua ah  
artikel ini.

1. Johan I  
Tahun ;
2. Penyer  
Sembil:

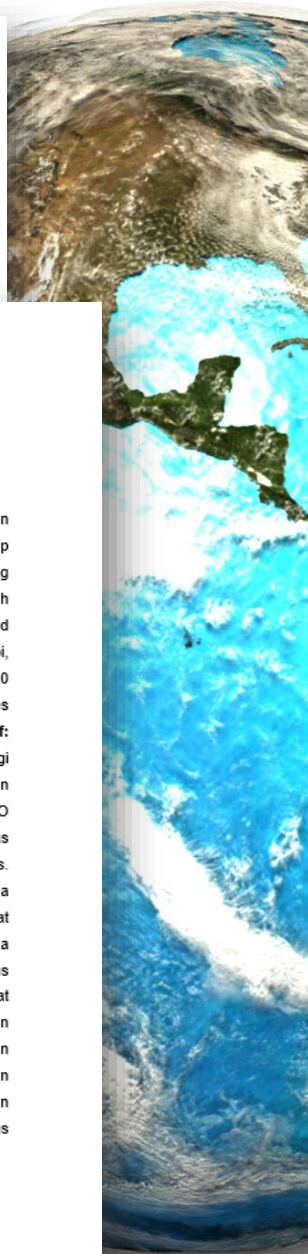
KONFLIK K

Projek ini dibi  
sepenuhnya. C

**Pengenalan:** CLEAR2GO merupakan Inovasi Produk yang meningkatkan peratus kejayaan pembersihan usus bagi memastikan perkhidmatan penentuan penyakit dan perawatan cekap dan berkualiti. Pembersihan usus merupakan pra-syarat yang menentukan kualiti imej yang dihasilkan oleh prosedur kolonoskopi. Prosedur kolonoskopi pula merupakan sebuah prosedur yang dapat mengesan sebarang keabnormalan di usus besar dan merupakan 'gold standard' untuk saringan kanser kolorektal. Berdasarkan kajian verifikasi di klinik Endoskopi, Hospital Tuanku Ja'afar, Seremban, didapati pesakit yang dipreskrib ubat polymacrogol 4000 (Fortrans®) atas faktor komorbiditi merupakan golongan yang paling kerap gagal proses pembersihan usus dan terpaksa mengulang semula prosedur kolonoskopi. **Objektif:** CLEAR2GO dihasilkan untuk memudahkan penyediaan larutan polymacrogol 4000 bagi meningkatkan kejayaan kolonoskopi kali pertama dan menjimatkan kos dengan mengurangkan kekerapan pesakit untuk mengulangi kolonoskopi **Kaedah:** CLEAR2GO merupakan pouch minuman ubat Fortrans® pertama di Malaysia. Ia dilengkapi tanda aras 1000ml yang telah dikalibrasi dan maklumat lengkap mengenai pembersihan usus. Rekabentuknya boleh berdiri sendiri, dengan paparan maklumat berwarna dan akses kepada video kaunseling interaktif melalui imbasan kod QR. Peringatan tarikh pengambilan ubat diwujudkan bagi meningkatkan kepatuhan pesakit. **Keberhasilan:** CLEAR2GO berjaya meningkatkan peratus kejayaan prosedur kolonoskopi pada kali pertama dengan peratus pesakit mendapat skor skala pembersihan usus (Boston Score) melebihi 5 meningkat daripada 38% kepada 87%. Ini membantu mejimatkan kos operasi sebanyak 47.9% dengan penjimatan sehingga RM8,820.76 (86.7%). Masa sediaan larutan Fortrans® juga diijmatkan sebanyak 93%. **Pengembangan projek:** Projek ini sangat berpotensi untuk dikomersialkan ke seluruh Malaysia mahupun pasaran antarabangsa. **Kesimpulan:** CLEAR2GO merupakan sebuah produk seragam yang membantu meningkatkan kejayaan proses pembersihan usus yang menjadi pra-syarat kejayaan prosedur kolonoskopi.

[249 patah perkataan]

**Kata kunci:** pembersihan usus, kolonoskopi, kanser kolorektal,



# THE NEXT STEP

Expansion to  
Negeri  
Sembilan  
hospitals

Publication  
in initiative  
quality journals  
for sharing  
purpose

Replication by  
other hospitals  
in Malaysia



## JABATAN KESIHATAN NEGERI

NEGERI SEMBILAN DARUL KHUSUS  
JALAN RASAH, 70300 SEREMBAN

TELEFON: 06-7664 800  
FAKS: 06-7648 613 (Am)  
06-7638 543 (Pengaruh)  
WEB: <http://jknns.moh.gov.my>



Ruj. Kami : JKNNS.BPF.100-2/1 (57)  
Tarikh: 17 Ogos 2023

Ketua Jabatan Farmasi, Hospital Tuanku Ampuan Najihah  
Ketua Jabatan Farmasi, Hospital Port Dickson  
Ketua Jabatan Farmasi, Hospital Tampin  
Ketua Jabatan Farmasi, Hospital Jelebu  
Ketua Jabatan Farmasi, Hospital Kuala Lumpur  
Ketua Jabatan Farmasi, Hospital Pahang

Tuan/Puan,

### SOKONGAN PERLU HOSPITAL NEGERI

Dengan segala hormat,  
JF/HTJS 1/16(18) berhubung perkara di atas.

2. Sukacita dimohonkan agar pihak tuan/puan berkenaan dapat menyokong projek inovasi "CLEAR2GO" mengenai persediaan dan pengambilan ubat-ubatan tersebut.

3. Sehubungan dengan itu, terdapat maklumat mengenai projek ini yang disertakan dalam lampiran ini. Jika ada sebarang pertanyaan, sila hubungi Pegawai Farmasi Ulu Klang (Pegawai Farmasi Ulu Klang) melalui telefon atau emel.

"MALAYSIA MADANI"

"BERKHIDMAT UNTUK NEGARA"

"FARMASI PROAKTIF"

Saya yang menjalankan amanah,

(EZATUL RAHAYU)

Timbalan Pengarah  
b.p. Pengarah Kesihatan Negeri Sembilan  
Jabatan Kesihatan Negeri Sembilan Darul Khusus

AMAM/TSC

adibah@moh.gov.my  
+606-766 4810/4861

s.k Ketua Jabatan Farmasi



JABATAN FARMASI  
HOSPITAL KUALA LUMPUR  
JALAN PAHANG,  
50586 KUALA LUMPUR

Tel : 03-2616 5555  
Portal Rasmi : [www.hkl.gov.my](http://www.hkl.gov.my)

Ruj. Kami: HKL/FAR/98/100-3/5/3 (30)  
Tarikh : 28 Ogos 2023

YBRS. DR. AZUWANA BT SUPIAN  
Ketua Jabatan Farmasi  
Hospital Tuanku Ja'afar Seremban

YBrs. Dr.,

### PERMOHONAN UNTUK REPLIKASI PRODUK INOVATIF 'CLEAR2GO'

Dengan segala hormatnya saya merujuk kepada perkara di atas.

2. Jabatan Farmasi Hospital Kuala Lumpur mengucapkan setinggi-tinggi tahniah di atas kejayaan yang telah dicapai dalam pelbagai pertandingan bagi produk yang berinovasi tinggi seperti Clear2Go. Sehubungan dengan itu, pihak kami berminat dan bercadang untuk mereplikasi produk tersebut memandangkan kami juga menjalankan sesi kaunseling *bowel preparation* di kalangan pesakit yang bakal menjalani prosedur kolonoskopi setiap bulan. Dengan adanya produk ini pastinya dapat memanfaatkan pesakit dan meningkatkan kompians pesakit.

3. Justeru itu, pihak kami amat berbesar hati dan berharap permohonan ini mendapat pertimbangan daripada pihak YBrs. Dr. Jika ada sebarang pertanyaan, pihak YBrs. Dr. boleh menghubungi Puan Tay Chan Yen melalui emel di [taychanyen@moh.gov.my](mailto:taychanyen@moh.gov.my) / nombor telefon 012-3166595.

Sekian, terima kasih

"MALAYSIA MADANI"

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(NORAINI BINTI MOHAMAD) RPh. 1689  
Timbalan Pengarah Farmasi  
Hospital Kuala Lumpur

10y/FAG  
Emel: [taychanyen@moh.gov.my](mailto:taychanyen@moh.gov.my) / [farisan\\_ag@moh.gov.my](mailto:farisan_ag@moh.gov.my)  
Tel: +603-26165555 (ext: 1182/ 5144)

PENYAYANG, KERJA BERPASUKAN, DAN PROFESIONALISME  
ADALAH BUDAYA KERJA KITA



# THE NEXT STEP

Expansion to  
Negeri Sembilan  
hospitals

Publication  
in initiative  
quality journals  
for sharing  
purpose

Replication by  
other hospitals  
in Malaysia

Commercialization of  
**CLEAR2GO** through  
collaboration with  
Ministry of Science,  
Technology and  
Innovation of  
Malaysia

Ruj. Tuan : JF HTJ05 1/18 (S) Bn 5 Apr 2023  
Ruj. Kami : KP/STRIDE/PIB/800-101/19 (2)  
Tarikh : 9 Mei 2023

Dr Azwana Sinti Septan  
Hospital Tuanku Ja'afar  
Jalan Rasah  
70300 Seremban  
Negeri Sembilan

No. Tel : 06 788 4000  
No. Faks : -

YBrs Dr,

LAPORAN PENGUJIAN MAKMAL MENENTUKAN BAHAN PRODUK INOVASI  
'CLEAR2GO'


Dengan segala hormatnya saya menjuak kepada perkara tersebut di atas.

1. Dimaklumkan bahawa Laporan Pengujian Material Menentukan Bahan Produk Inovasi 'Clear2go' telah disediakan untuk insidkan pihak YBrs Dr selarasnya.
2. Segala perhatian dan kerjasama dari pihak YBrs Dr dalam hal ini amat dihargai.

Sekian, terima kasih.

"MALAYSIA MADANI"  
"BERKHIDMAT UNTUK NEGARA"  
"PERTAHANAN NEGARA TANGGUNGJAWAB BERSAMA"

Saya yang menjalankan urusan,

  
(SITI HAJJAR BINTI ZULKIFLI)  
Pegawai  
Bahagian Teknologi Pelindungan dan Bioteknologi  
b.p. Ketua Pegawai STRIDE



This is to certify that

**SITI NABILAH BINTI MD YAZID**

POUCH CLEAR2GO UNTUK MENINGKATKAN KEJAYAAN PESAKIT MENJALANI  
PROSEDUR KOLONOSKOPI

Is hereby awarded this certificate in recognition of their  
participation of MySI Akar Umbi organized by Yayasan Inovasi Malaysia

08/04/2023

Date of Participation

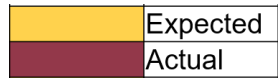


# CONCLUSION

GENERAL OBJECTIVE	FINDINGS
To improve the percentage of successful bowel cleansing among patients prescribed with PEG-4000 powder for colonoscopy in HTJS	<b>Improved from 38.8% to 86.7% and ultimately 90.2% during re-evaluation</b>
SPECIFIC OBJECTIVES	FINDINGS
To verify the magnitude of patients with successful bowel cleansing among patients prescribed with PEG-4000 powder for colonoscopy in HTJS	<b>Verification study: 38.8%</b> <b>Cycle 1: 57.5%</b> <b>Cycle 2: 77.5%</b> <b>Cycle 3: 86.7%</b> <b>Re-evaluation phase: 90.2%</b>
To determine the probable causes contributing to unsuccessful bowel cleansing among patients prescribed with PEG-4000 powder for colonoscopy.	Patient's <b>non-compliance to PEG-4000 powder instructions</b> (47%) Patient's <b>non-compliance to diet restrictions</b> (27%) Patient <b>forgot to consume PEG-4000 powder</b> (26%). 70% pharmacists performed <b>unstandardized bowel cleansing counselling</b>
To formulate remedial measures and implement them.	Cycle 1: EZY FORTRANS counselling video, interactive focus group counseling, continuous education, memo Cycle 2: CLEAR2GO pouch, CLEAR2GO Comprehensive Counseling Video (COOV) Cycle 3: CLEAR2GO Reminder System (CRES) and CLEAR2GO Alert Database (CRAD)
To re-evaluate the effectiveness of the remedial measures	<b>ABNA gap was narrowed down from 51.2% to 0%</b> Cost saving of repeated colonoscopies: <b>MYR 8,820.76</b>



# GANTT'S CHART



Research Activities	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	July 2023 – Mar 2024
Proposal development	Expected Actual														
Verification study		Expected Actual													
Data collection		Expected Actual													
Data analysis		Expected Actual													
Remedial measures			Expected Actual	Expected Actual	Actual										
Evaluation					Expected	Actual									
Remedial measures						Expected Actual	Expected Actual	Actual							
Evaluation									Expected	Actual					
Remedial measures										Expected Actual	Expected Actual	Actual			
Evaluation													Expected	Actual	
Report Write Up														Expected Actual	
Re-evaluation															Expected Actual
Report Write Up															Expected Actual



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# THANK YOU