

Supplement 1. Complete Codebook			
Domain	Sub-domain	Code	Definition
Patient communication and resources	Pre-operative counseling	Face-to-face education	Educational information provided in-person to the patient before surgery
		Expectation setting	Preparation of the patient and/or their family for the surgical episode of care
		Patient activation	Extent to which the patient is engaged with their own care and management before surgery
		Education materials	Written or electronic educational materials and resources provided to the patient before surgery
	Discharge counseling	Face-to-face education	Educational information provided in-person to the patient after surgery
		Expectation setting	Preparation of the patient and/or their family for recovery after discharge
		Patient activation	Extent to which the patient is engaged with their own care and management after surgery
		Discharge planning	Processes in place to transition care from inpatient to the post-discharge setting
		Discharge materials	Written or electronic educational materials and resources provided to the patient before discharge
	Patient support system	Caregiver help/engagement	Extent to which the patient's caregiver(s) are engaged with the patient's care and management
		Caregiver burden	The physical, emotional, professional and financial stress on the patient's caregivers
		Post-operative home support	Healthcare supplies and resources provided after discharge
		Social support/interaction	Social interaction and support available to the patient
	Post-discharge communication	Phone call	Communication between patients and clinicians by telephone
		Telemedicine	Communication between patients and clinicians by video call
		Health application	Communication between patients and clinicians by computer or smartphone application
		Pictures	Sharing of clinical photographs between patients and clinicians
		Email	Communication between patients and clinicians by e-mail
		MyChart messaging	Communication between patients and clinicians by MyChart (Epic® electronic medical record based system)
		Follow-up protocol	Defined post-discharge patient monitoring and follow-up protocol
Patient activation		Patient engagement and participation in their own care	
In person visit		In-person clinic encounter for care after discharge	
Reponse burden		Time and effort patients are willing to dedicate to completion of follow-up materials	
Patient experiences	-	Symptom trends	Changes over time in patient signs and symptoms
		Symptom timing	The time at which the patient experiences a symptom
	Subjective symptoms	Anxiety	Feelings of anxiety or fear
		Depression	Feelings of depression or sadness
		Cognitive function	Changes in a patient's mental acuity noticed by the patient or another individual
		Fatigue	Reduced energy, feelings of sleepiness or exhaustion
		Pain	Physical pain
		Physical function	Limitations in physical function or ability to complete activities of daily living
		Shortness of breath	Feeling short of breath or difficulty catching breath
		Sleep disturbance	Difficulty falling or staying asleep, oversleeping
		Sexual dysfunction	Changes in libido or ability to engage in or enjoy sexual activity
		Bowel issues	Constipation, diarrhea, or problems with ostomy management
		Urinary complaint	Pain with urination, difficulty urinating, or incontinence

		Nausea/vomiting	Feelings of nausea, vomiting, or retching
		Gas/bloating	Feelings of gastrointestinal bloating, increased belching or flatus
		Appetite and hydration	Changes in a patient's appetite, ability to stay hydrated, or the taste of foods
		Reflux	Heartburn or other symptoms of gastrointestinal reflux
		Medication issues	Difficulty obtaining or taking medications, side effects, of ineffectiveness
		Lightheadedness	Lightheadedness, dizziness, or fainting
		Fever/chills	Subjective sensation of fever or chills
	Objective signs	Temperature	Measurement of temperature with a thermometer
		Blood pressure	Measurement of blood pressure
		Respiratory rate	Measurement of respiratory rate
		Wound problem	Drainage, opening, redness, or other complications related to a surgical wound
		Steps/pedometer	Measurement of step count after patient discharge
		Weight change	Measurement or change in body weight
		Bleeding	Bleeding, including bleeding from surgical sites and gastrointestinal tract
		Heart rate	Measurement of heart rate or pulse
	Medical devices	Extremity swelling	Swelling of arms or legs
		Surgical drains	Maintenance of surgical drains
		Ostomy appliance	Maintenance of ostomy appliance and bag
		Foley catheter	Maintenance of indwelling urinary catheter
Feeding tube		Maintenance of enteric feeding device	
Health system factors	Patient factors	Patient access	The ability of patient to be seen and evaluated by a clinician after discharge from the hospital
		Financial burden	Financial burden of surgery-related supplies and care
		General resource burden	Non-financial burden of surgery-related care
		Technology/tech literacy	Ability of patients, and their caregivers, to use and understand health technology
		Discharge process	Discharge process from the hospital, including nursing protocols
		Communication	Communication between clinicians, patients, and caregivers
	Clinician factors	Staffing model	Organization of clinical staff including nurses, APPs, MA's, schedulers and their respective responsibilities
		Real-time data management	Availability and utility of monitoring patient data in real-time.
		Scheduling	Process of scheduling patients for follow-up appointments
		Established protocols/procedures	Standard protocols and clinical pathways for patient management before or after surgery
		Task sharing/personnel	Division of responsibility for tasks related to patient monitoring and follow-up among clinicians
		System efficiency	Efficiency of current perioperative care and communication systems
		Staff education	Education and training of clinical staff
		Knowledge of staff	Clinical knowledge and expertise of clinicians
	Time management	Approaches to and challenges with time management among clinicians	
	Access to diagnostic tools	Access to diagnostic laboratory or imaging tests after discharge	
	Process customization	Tailoring follow-up practices to individual patient or clinician needs and preferences	
	Data trends	Trends in patient data	
Workaround	Methods employed by clinicians to overcome or bypass systemic barriers		

Other		Barrier	Barrier to post-discharge care, communication, or monitoring
		Facilitator	Facilitator for post-discharge care, communication, or monitoring

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431 **Supplement 2. Clinician Interview Protocol**

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433 Introduction and informed consent

434

435 Questions

436 1. We would like to better understand your experience managing patients after they are
437 discharged from the hospital following GI cancer surgery.

438 a. How do you know how patients are doing during this period of time? Do you have a
439 standard routine or practice?

440 b. What are some of the things you think we are doing well in identifying problems that
441 arise?

442 c. What are some of the biggest barriers you see in identifying problems that arise?

443 2. Based on your personal experience with GI cancer surgery patients and their recovery after
444 leaving the hospital, what are the clinical problems or issues you hear about and/or
445 manage?

446 a. How do you currently approach managing problems that patients are experiencing
447 while at home?

448 b. Are there any early warning signs, buzz words and/or triggers which make you
449 particularly concerned? What about among patients with complications?

450 c. What are the number of days after discharge do you typically hear from patients? Are
451 there any patterns with respect to certain problems and number of days after
452 discharge?

453 d. Do you feel some of these issues could be identified earlier, or prevented?

454 3. Please see this list of patient reported outcomes. Assuming we can adequately / accurately
455 measure these symptoms, can you please indicate the PROs you feel would be important to
456 monitor in GI surgery patients? Why?

- 457 a. What is missing from this list, please also consider rare complications and
458 bothersome symptoms.
- 459 b. Is there additional information you would find helpful to know (e.g., heart rate,
460 temperature).
- 461 4. [IF TIME ASK] Although we will focus more extensively on this in future work, we would like
462 to know your initial thoughts on a system to more proactively monitor patients while at home
- 463 a. Is this something you feel would be beneficial to you and your patients?
- 464 b. Do you have ideas about how we could best monitor patients during this high risk
465 time period?
- 466 c. What barriers or concerns do you have about using PROs in this setting?
- 467 d. What other items, in addition to PROs, do you feel is important to include to monitor
468 patients?

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470 Conclusion:

471 Is there anything else that you would like to tell us about, or make sure that we learn about while
472 we are here today?

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474 Thanks for agreeing to take time to meet with us today.

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476 **Supplement 3. Patient Interview Protocol**

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478 Introduction and informed consent

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480 Post-operative, Post-discharge Recovery Review

481 We will ask questions to better understand the patients experience recovering from surgery

482 while recovering at home:

- 483 • Did you receive any information from your health care team about your recovery at home
- 484 and what to expect?
- 485 ○ Before surgery?
- 486 ○ At discharge?
- 487 • What concerns about your recovery at home did you have when you were being discharged
- 488 from the hospital?
- 489 ○ Did you feel you were ready for discharge?
- 490 ○ What went well during the discharge process?
- 491 ○ What could have been done differently during the discharge process?
- 492 ○ **What concerned you the most about your recover at home?
- 493 • We would like to discuss any bothersome symptoms, problems, and/or potential
- 494 complications you experienced while at home
- 495 ○ Did you experience symptoms that concerned you while at home?
- 496 ○ What other problems / issues were concerns of yours?
- 497 ○ Did you experience a complication? How was it managed?
- 498 ○ **What were the first symptoms you experienced before the complication? Were
- 499 there any early warning signs (sentinel symptoms) you experienced?

- 500 • As mentioned, we are designing a tool to help the health care team monitor patients after
501 discharge from the hospital while recovering at home. Concerning findings would lead to an
502 intervention by your health care team, potentially decreasing the severity of the issue, or
503 preventing a major complication. A special questionnaire that asks questions about your
504 symptoms would be sent to you and tracked over time, kind of like how vital signs and labs
505 were measured during your hospital stay. Changes would indicate to your care team a
506 problem might exist.
- 507 ○ Show list of symptoms
 - 508 ■ Did you experience any of these symptoms? Please describe what bothered
509 you, even a little bit.
 - 510 ○ Would it be helpful to you if we were able to remotely monitor these symptoms?
 - 511 ○ What other symptoms would be helpful to monitor?
 - 512 ○ Would you be willing to report your daily temperature or heart rate for example?
 - 513 ○ Would you be interested in other forms of communication such as sending pictures,
514 doing video calls?
- 515 • We would like to ask you about communication with your health care team
- 516 ○ Did you know how to contact your health care team to communicate your concerns?
517 How did you know?
 - 518 ○ Did you contact your health care team while at home? Tell us what your experience
519 was like.
 - 520 ○ Was there a delay in communication?
 - 521 ○ **How do you/would you prefer to communicate with your health care team?
 - 522 ■ Phone, email, MyChart/MyNM, text message, video call
 - 523 ○ **How often would you prefer to be in contact with your health care team?
 - 524 ■ Daily, every couple days, weekly, as needed
- 525

526 Conclusion

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