Supplementary Table 1 Responded regions and hospitals

Region (province or municipality directly under the Central Government) (26)	hospital (188)
Anhui (1)	The PLA Navy Anqing Hospital
Beijing (22)	Beijing Cancer Hospital
	Beijing Chaoyang Hospital
	Beijing Chaoyang Integrative Medicine Rescue and First Aid Hospital
	Beijing Friendship Hospital
	Beijing Hospital
	Beijing Hospital of Traditional Chinese Medicine
	Beijing Luhe Hospital
	Beijing South Region Oncology Hospital
	Cancer Hospital, Chinese Academy of Medical Sciences
	China-Japan Friendship Hospital
	Chinese People's Liberation Army General Hospital
	Civil Aviation General Hospital
	Guang'anmen Hospital, China Academy of Chinese Medical Sciences
	Nanyuan Hospital, Beijing Fengtai District
	Peking Union Medical College Hospital
	Peking University First Hospital
	Peking University People's Hospital
	Peking University Third Hospital
	People's Hospital of Beijing Daxing District

	Western Beijing Cancer Hospital
	Xiyuan Hospital, China Academy of Chinese Medical Sciences
	Xuanwu Hospital
Fujian (4)	Fujian Cancer Hospital
	Longyan First Hospital
	The First Affiliated Hospital of Xiamen University
	The Second Affiliated Hospital of Fujian Medical University
Gansu (3)	The 940th Hospital of Joint Logistics Support Force of Chinese People's Liberation Army
	The First People's Hospital of Longnan
Guangdong (7)	Dongguan Kanghua Hospital
	Guangdong Provincial People's Hospital
	Nanfang Hospital
	The First Affiliated Hospital of Guangzhou Medical University
	The Sixth Affiliated Hospital of Sun Yat-sen University
	Yuebei People's Hospital
	Cancer Hospital, Chinese Academy of Medical Sciences, Shenzhen Center
Guizhou (1)	The Affiliated Hospital of Guizhou Medical University
Hebei (26)	The Affiliated Hospital of Chengde Medical University
	The Affiliated Hospital of Hebei University
	Cangzhou Central Hospital
	Cangzhou Hospital of Integrated Traditional Chinese and Western Medicine

	Cangzhou People's Hospital
	Dingzhou People's Hospital
	Handan First Hospital
	Hebei Petro China Central Hospital
	Hebei Provincial Hospital of Traditional Chinese Medicine
	Hejian People's Hospital
	Hengshui Eighth People's Hospital
	Hengshui People's Hospital
	Kailuan General Hospital
	Luannan County Hospital
	Qinghe County Hospital of Traditional Chinese Medicine
	Tangshan People's Hospital
	The First Affiliated Hospital of Hebei North University
	The Fourth Central Hospital of Baoding City
	The Fourth Hospital of Hebei Medical University
	The No. 2 Hospital of Baoding
	The Second Hospital of Hebei Medical University
	The Third Hospital of Hebei Medical University
	Xingtai Third Hospital
	Zhuozhou Hospital
	General Hospital of North China Petroleum Administration Bureau
	Yuzhou Hospital of Yuxian County
Henan (1)	Henan Provincial Cancer Hospital
Heilongjiang (7)	Daqing Oilfield General Hospital
	Daqing People's Hospital

	Harbin Traditional Chinese Medicine Hospital
	Hegang People's Hospital
	Jiamusi Center Hospital
	Jixi People's Hospital
	Mudanjiang First People's Hospital
Hubei (1)	Yichang No.1 Hospital
Hunan (1)	Xiangya Hospital Central South University
Jilin (23)	Antu County People's Hospital
	Baishan Central Hospital
	China-Japan Union Hospital of Jilin University
	Fuyu People's Hospital
	Gongzhuling Central Hospital
	Jilin Cancer Hospital
	Jilin People's Hospital
	Changchun Jiutai People's Hospital
	Longjing People's Hospital
	Nong'an County People's Hospital
	Panshi Hospital
	Qianwei Hospital of Jilin Province
	Shuangliao Central Hospital
	Siping Central People's Hospital
	Songyuan Jilin Oilfield Hospital
	Qianguo Country Hospital
	The First Norman Bethune Hospital of Jilin University
	The Second Norman Bethune Hospital of Jilin University
	Tonghua Central Hospital
	Yanbian University Hospital
	Dunhua City Hospital

	The Second People’s Hospital in Liaoyuan
	Songyuan Hospital of Integrated Traditional Chinese and Western Medicine
Jiangsu (5)	Nanjing Drum Tower Hospital
	The First Affiliated Hospital of Soochow University
	The Second Affiliated Hospital of Soochow University
	Xinyi People’s Hospital
	Zhangjiagang First People’s Hospital
Jiangxi (2)	The First People's Hospital of Nankang
	The Jiangxi Provincial People's Hospital
Liaoning (52)	PLA Joint Logistics Support Force No. 967 Hospital
	The Affiliated Zhongshan Hospital of Dalian University
	Anshan Hospital of the First Hospital of China Medical University
	Ansteel Group General Hospital
	Benxi Central Hospital
	Benxi Hospital of Traditional Chinese Medicine
	The Affiliated Central Hospital of Shenyang Medical College
	Central Hospital of Jinzhou
	Dandong Central Hospital
	Dandong First Hospital
	Dashiqiao Central Hospital
	Dashiqiao Chinese Medicine Hospital
	Dashiqiao Luhe Hospital
	Dawa People’s Hospital of Panjin City
	Dengta Central Hospital
	Donggang Center Hospital

Fengcheng Phoenix Hospital

Fushun Central Hospital

Fuxin Central Hospital

Gaizhou Central Hospital

General Hospital of Benxi Iron and Steel Co.

General Hospital of Fushun Mining Bureau

Haicheng Central Hospital

Huludao Central Hospital

Liaoning Cancer Hospital

Liaoyang City Central Hospital

Liaoyang Zhongxin Xincheng Hospital

Panjin Liaoyou Gemstone Flower Hospital

Northeast International Hospital

Panjin Central Hospital

Panshan County People's Hospital

The Eleventh People's Hospital of Shenyang

The First Affiliated Hospital of Jinzhou Medical University

The First Affiliated Hospital of Dalian Medical University

The First Affiliated Hospital of Liaoning University of Traditional Chinese Medicine

The First Hospital of China Medical University

The Fourth People's Hospital of Shenyang

The Second Hospital of Dalian Medical University

The Second People's Hospital of Huludao

The Tenth People's Hospital of Shenyang

Third Hospital of Anshan City

Yingkou Central Hospital

	Yingkou Hospital of Integrated Traditional Chinese and Western Medicine
	The Third Hospital of Benxi
	Benxi Railway Hospital
	The Second People's Hospital in Donggang
	Donggang Hospital of Traditional Chinese Medicine
	Gaizhou Hospital of Integrated Traditional Chinese and Western Medicine
	Shenyang No. 245 Hospital
	Xiuyan Hospital of Traditional Chinese Medicine
	Shenyang Red Cross Hospital
	Fumeng County People's Hospital
Inner Mongolia (8)	The Affiliated Hospital of Inner Mongolia Minzu University
	Chifeng Songshan Hospital
	Chifeng Municipal Hospital
	Horqin Right Middle Banner People's Hospital
	Huhhot First Hospital
	Xing'an League People's Hospital
	General Hospital of Pingzhuang Mining Area Medical Group Co.
	The Second People's Hospital of Tongliao
Qinghai (2)	The Fifth People's Hospital of Qinghai Province
	The Affiliated Hospital of Qinghai University
Shandong (6)	Linyi Cancer Hospital
	Qingdao Municipal Hospital
	Shandong Cancer Hospital
	Taian City Central Hospital
	The Affiliated Hospital of Qingdao University

	Muping Hospital of Traditional Chinese Medicine
Shanxi (2)	Changzhi People's Hospital
	Shanxi Bethune Hospital
Shaanxi (2)	The First Affiliated Hospital Xi'an Jiaotong University
	Xijing Hospital-Air Force Medical University
Shanghai (4)	Changhai Hospital of Shanghai
	Fudan University Shanghai Cancer Center
	Ruijin Hospital-Shanghai Jiao Tong University School of Medicine
	Shanghai Ninth People’s Hospital
Sichuan (1)	Sichuan Cancer Hospital
Tianjin (1)	Tianjin First Central Hospital
Tibet (1)	Tibet Autonomous Region People's Hospital
Xinjiang (1)	The First Affiliated Hospital of Xinjiang Medical University
Zhejiang (4)	The First Affiliated Hospital of Wenzhou Medical University
	The Second Affiliated Hospital of Wenzhou Medical University
	Zhejiang Provincial Cancer Hospital
	Zhejiang Provincial People's Hospital

Supplementary Table 2 Content of the questionnaire

PERSONAL INFORMATION

1. Hospital classification

a. Tertiary general hospitals

b. Tertiary specialized hospitals

c. Secondary hospitals and below

2. Department

a. General surgery

b. Gastrointestinal surgery

c. Surgical oncology

d. Other departments involved in stoma creation

3. Professional title of surgeon

a. Chief surgeon

b. Associate chief surgeon

c. Attending surgeon

d. Resident surgeon

4. Working years

a. > 15 years

b. 5-15 years.

c. < 5 years

PERSONNEL QUALIFICATION AND TRAINING

5. Stoma creation is most commonly performed by

a. Operator

b. First assistant

c. Second assistant or lower

6. Surgeon responsible for enterostomy

a. Associate chief surgeon or above

b. Attending surgeon (guided by superior surgeon)

c. Resident surgeon (guided by superior surgeon)

7. Source of ostomy-related knowledge (multiple answers)

a. Mentorship by senior surgeon

b. Mentorship by attending/resident surgeon

c. Learning based on surgical atlases

d. Mentorship combined with surgical atlases

e. Self-education

f. Have not been exposed to the relevant knowledge

8. Departmental attitude toward training in the prevention of stoma-related complications

a. Attach great importance

b. Attach moderate importance

c. Attach little importance

9. Have you received training related to stoma creation?

a. Yes

b. No

CONCEPTS AND ATTITUDES TOWARD STOMA-RELATED COMPLICATIONS

10. How concerned are you about the correlation between surgical procedures and stoma-related complications?

a. Closely related

b. Related

c. Slightly related

11. In your view, which of the following complications are related to surgical procedures (multiple answers)?

a. Irritant dermatitis

b. Stomal bleeding

c. Stomal necrosis

d. Stomal stenosis

e. Parastomal hernia

f. Stomal prolapse

g. Ileus

h. All the above

12. Which complications have you encountered that required unplanned surgery (multiple answers)?

a. Stomal bleeding

b. Stomal necrosis

c. Stomal retraction

d. Stomal prolapse

e. Necrotizing fasciitis

f. Abdominal wall abscess

g. Stenosis or ileus

h. None

13. What is your perception of stoma-related complications (multiple answers)?

a. Not uncommon, but should be managed by an enterostomal therapist

b. Not uncommon, and surgeons should participate in treatment

c. Closely related to surgical procedures and most complications can be avoided

d. Probably related to surgical procedures and should be managed exclusively by an enterostomal therapist postoperatively

e. Have never paid much attention

14. Have you participated in discussions or training on prevention or treatment of stoma-related complications?

a. Yes

b. No

15. What is your perception of joint training and discussions on stoma-related complications between surgeons and enterostomal therapists?

a. Necessary

b. Unnecessary

CONCEPT AND ATTITUDE TOWARD PREOPERATIVE STOMA SITE MARKING

16. What do you think of preoperative stoma site marking?

a. Meaningful and should be strictly observed

b. Meaningful, and the area around the marking site is also appropriate

c. Meaningful, but the judgment of surgeon should be the primary consideration

d. Meaningful, but not all marked sites (identified by enterostomal therapists) are suitable for stoma creation

e. Meaningless and can be omitted

17. In your impression, the rate of preoperative stoma site marking in your department is approximately:

a. 80-100%

b. 60-80%

c. 40-60%

d. < 40%

18. In your impression, what are the reasons for not choosing the preoperatively marked stoma site by an enterostomal therapist as the primary site (multiple answers)?

a. Inappropriate marking

b. The stoma site marked preoperatively is not a suitable trocar site

c. Defunctioning stoma marking according to standards for permanent stoma

d. Prior site marking is inconsistent with the surgeon's operating habits

19. Which temporary ileostomy skin site position do you prefer?

a. Right umbilical level, trocar site

b. Right lower quadrant, McBurney point (trocar site)

c. Right rectus abdominis muscle, specimen incision

d. Hypogastrium region, specimen incision

e. No fixed position

20. Which permanent colostomy skin site position do you prefer?

a. Left umbilical level, trocar site (outer margin of the rectus abdominis muscle)

b. Lower left quadrant of the umbilicus, outer margin of the rectus abdominis muscle

c. Lower left quadrant of the umbilicus, through the rectus abdominis muscle

d. Lower left quadrant of the umbilicus, lateral rectus abdominis muscle

e. No fixed position

21. Which transverse colostomy skin site position do you prefer?

a. Right subcostal margin

b. Left subcostal margin

c. Linea alba above the umbilicus

d. No fixed position

TECHNICAL MANEUVERS IN STOMA CREATION

22. Shape of skin incision

a. Straight

b. Subcircular

c. Other

23. What do you think about the correlation between skin incision length and the size of the exteriorized intestine?

a. Incision size should be larger than the diameter of the intestine

b. Incision size should be close to the diameter of intestine

c. Incision size should be smaller than the diameter of intestine

24. Management of subcutaneous tissue

a. Excision

b. Preservation

c. Selective management

25. Shape of the obliquus externus abdominis aponeurosis incision

a. Cruciform

b. Cross shape, random direction

c. Straight shape, along the long axis

d. Straight shape, along the abdominal fascia

e. Flexible performance

26. Management of rectus abdominis/ abdominal wall muscle

a. Blunt dissection without complete muscle rupture

b. Partial dissection until the posterior sheath or peritoneum is exposed

c. Sharp dissection of the muscle in the projection region of the stoma

d. Selective management

27. Retention length of the proximal intestine in permanent stoma

a. Preserve the shortest possible length while ensuring adequate exteriorization of the bowel

b. Preserve as long as possible

c. Selectively performance

28. Layers for suturing and fixation in defunctioning stoma creation (multiple answers)

a. Peritoneum (or posterior rectus abdominis sheath)

b. Muscle

c. Anterior rectus abdominis sheath

d. Subcutaneous tissue

e. Skin

f. No suture or fixation

29. Layers for suturing and fixation in permanent stoma creation (multiple

answers)

a. Peritoneum (or posterior rectus abdominis sheath)

b. Muscle

c. Anterior rectus abdominis sheath

d. Subcutaneous tissue

e. Skin

f. No suture or fixation

30. Opening direction of loop stomas

a. Along the long axis of the intestine

b. Perpendicular to the long axis of the intestine

c. Selective orientation

Awareness and utilization of relevant procedures and instruments					
Relevant procedure and instrument	Awareness		Utilization		
	Known	Unknown	Regular use	Occasional use	Rare use or non-use
31. Application of support rod in loop ileostomy					
32. Application of iodoform gauze in intestine and skin					
33. Application of circular stapler in permanent stoma creation					
34. Application of extraperitoneal ostomy in permanent stoma creation					
35. Application of mucosal eversion suture (Brooke) in loop ileostomy					
36. Application of mucosal					

eversion suture in permanent end colostomy					
37. Application of protective negative-pressure wound therapy (NPWT)					

Supplementary Table 3 Total attitude and technical maneuvers split by grade of surgeon

Items	Senior surgeons (n=285, %)	Junior surgeons (n=116, %)	X^2	Cramér's V	*P* Value
Source of ostomy-related knowledge (multiple answers)			31.591	-	[a] 0.000
Mentorship by senior surgeon	238 (83.5)	100 (86.2)			
Mentorship by attending/resident surgeon	27 (9.5)	42 (36.2)			
Learning based on surgical atlases	83 (29.1)	39 (33.6)			
Mentorship combined with surgical atlases	130 (45.6)	57 (49.1)			
Self-education	127 (44.6)	47 (40.5)			
Have not been exposed to the relevant knowledge	0	1 (0.9)			
Have you received training related to stoma creation?			3.240	0.090	0.091
Yes	164 (57.5)	78 (67.2)			
No	121 (42.5)	38 (32.8)			
How concerned are you about the correlation between surgical procedures and stoma-related complications?			0.996	0.050	0.608
Closely related	232 (81.4)	93 (80.2)			
Related	51 (17.9)	23 (19.8)			
Slightly related	2 (0.7)	0			
What is your perception of stoma-related complications			2.568	-	0.632

(multiple answers)?					
Not uncommon, but should be managed by an enterostomal therapist	51 (17.9)	26 (22.4)			
Not uncommon, and surgeons should participate in treatment	180 (63.2)	76 (65.5)			
Closely related to surgical procedures and most complications can be avoided	238 (83.5)	83 (71.6)			
Probably related to surgical procedures and should be managed exclusively by an enterostomal therapist postoperatively	56 (19.6)	25 (21.6)			
Have never paid much attention	3 (1.1)	1 (0.9)			
Have you participated in discussions or training on prevention or treatment of stoma-related complications?			1.189	0.054	0.318
Yes	155 (54.4)	70 (60.3)			
No	130 (45.6)	46 (39.7)			
What do you think of preoperative stoma site marking?			2.604	0.081	0.626
Meaningful and should be strictly observed	130 (45.6)	56 (48.3)			
Meaningful, and the area around the marking site is also appropriate	21 (7.4)	12 (10.3)			
Meaningful, but the judgment of the surgeon should be the primary consideration	84 (29.5)	27 (23.3)			

Meaningful, but not all marked sites (identified by enterostomal therapists) are suitable for stoma creation	49 (17.2)	21 (18.1)			
Meaningless and can be omitted	1 (0.4)	0			
In your impression, what are the reasons for not choosing the preoperatively marked stoma site by an enterostomal therapist as the primary site (multiple answers)?			12.506	-	[a] 0.006
Inappropriate marking	137 (48.1)	42 (36.2)			
The stoma site marked preoperatively is not a suitable trocar site	141 (49.5)	78 (67.2)			
Defunctioning stoma marking according to standards for permanent stoma	163 (57.2)	46 (39.7)			
Prior site marking is inconsistent with the surgeon's operating habits	74 (26.0)	34 (29.3)			
Which temporary ileostomy skin site position do you prefer?			10.224	0.160	[a] 0.037
Right umbilical level, trocar site	63 (22.1)	27 (23.3)			
Right lower quadrant, McBurney point (trocar site)	126 (44.2)	33 (28.4)			
Right rectus abdominis muscle, specimen incision	70 (24.6)	43 (37.1)			
Hypogastrium region, specimen incision	9 (3.2)	4 (3.4)			
No fixed position	17 (6.0)	9 (7.8)			

Which permanent colostomy skin site position do you prefer?			1.744	0.066	0.783
Left umbilical level, trocar site (outer margin of the rectus abdominis muscle)	55 (19.3)	19 (16.4)			
Lower left quadrant of the umbilicus, outer margin of the rectus abdominis muscle	88 (30.9)	36 (31.0)			
Lower left quadrant of the umbilicus, through the rectus abdominis muscle	113 (39.6)	47 (40.5)			
Lower left quadrant of the umbilicus, lateral rectus abdominis muscle	21 (7.4)	8 (6.9)			
No fixed position	8 (2.8)	6 (5.2)			
Which transverse colostomy skin site position do you prefer?			14.449	0.190	[a] 0.002
Right subcostal margin	90 (31.6)	30 (25.9)			
Left subcostal margin	83 (29.1)	41 (35.3)			
Linea alba above the umbilicus	105 (36.8)	33 (28.5)			
No fixed position	7 (2.5)	12 (10.3)			
Shape of skin incision			6.778	0.130	[a] 0.034
Straight	69 (24.2)	41 (35.3)			
Subcircular	211 (74.0)	75 (64.7)			
Other	5 (1.8)	0			
What do you think about the correlation between skin incision length and the size of the exteriorized intestine?			5.027	0.112	0.081

Incision size should be larger than the diameter of the intestine	79 (27.7)	32 (27.6)			
Incision size should be close to the diameter of intestine	167 (58.6)	77 (66.4)			
Incision size should be smaller than the diameter of intestine	39 (13.7)	7 (6.0)			
Management of subcutaneous tissue			13.278	0.182	[a] 0.001
Excision	163 (57.2)	44 (37.9)			
Preservation	66 (23.2)	44 (37.9)			
Selective management	56 (19.6)	28 (24.1)			
Shape of the obliquus externus abdominis aponeurosis incision			36.096	0.300	[a] 0.000
Cruciform	173 (60.7)	44 (37.9)			
Cross shape, random direction	38 (13.3)	6 (5.2)			
Straight shape, along the long axis	53 (18.6)	50 (43.1)			
Straight shape, along the abdominal fascia	17 (6.0)	12 (10.3)			
Flexible performance	4 (1.4)	4 (3.4)			
Management of rectus abdominis/ abdominal wall muscle			0.786	0.044	0.853
Blunt dissection without complete muscle rupture	151 (53.0)	63 (54.3)			
Partial dissection until the posterior sheath or peritoneum is exposed	106 (37.2)	39 (33.6)			
Sharp dissection of the muscle in the projection region of the stoma	7 (2.5)	3 (2.6)			
Selective management	21 (7.4)	11 (9.5)			
Retention length of the proximal intestine in permanent stoma			5.884	0.121	0.053

Preserve the shortest possible length while ensuring adequate exteriorization of the bowel	79 (27.7)	44 (37.9)			
Preserve as long as possible	73 (25.6)	19 (16.4)			
Selectively performance	133 (46.7)	53 (45.7)			
Layers for suturing and fixation in defunctioning stoma creation (multiple answers)			8.215	-	0.145
Peritoneum (or posterior rectus abdominis sheath)	200 (70.2)	74 (63.8)			
Muscle	9 (3.2)	9 (7.8)			
Anterior rectus abdominis sheath	154 (54.0)	64 (55.2)			
Subcutaneous tissue	70 (24.6)	35 (30.1)			
Skin	234 (82.1)	89 (76.7)			
No suture or fixation	6 (2.1)	6 (5.2)			
Layers for suturing and fixation in permanent stoma creation (multiple answers)			5.721	-	0.334
Peritoneum (or posterior rectus abdominis sheath)	255 (89.5)	94 (81.0)			
Muscle	16 (5.6)	13 (11.2)			
Anterior rectus abdominis sheath	218 (76.5)	86 (74.1)			
Subcutaneous tissue	95 (33.3)	36 (31.0)			
Skin	245 (86.0)	94 (81.0)			
No suture or fixation	3 (1.1)	3 (2.6)			
Opening direction of loop stomas			1.243	0.056	0.537
Along the long axis of the intestine	197 (69.1)	80 (69.0)			
Perpendicular to the long axis of the intestine	68 (23.9)	31 (26.7)			

Selective orientation	20 (7.0)	5 (4.3)			
Application of support rod in loop ileostomy			0.602	0.039	0.606
Known	270 (94.7)	112 (96.6)			
Unknown	15 (5.3)	4 (3.4)			
Application of iodoform gauze in intestine and skin			0.028	0.008	0.868
Known	216 (75.8)	87 (75.0)			
Unknown	69 (24.2)	29 (25.0)			
Application of circular stapler in permanent stoma creation			0.145	0.019	0.732
Known	181 (70.4)	104 (72.2)			
Unknown	76 (29.6)	40 (27.8)			
Application of extraperitoneal ostomy in permanent stoma creation			3.397	0.092	0.065
Known	251 (88.1)	94 (81.0)			
Unknown	34 (11.9)	22 (19.0)			
Application of mucosal eversion suture (Brooke) in loop ileostomy			2.319	0.076	0.146
Known	216 (75.8)	96 (82.8)			
Unknown	69 (24.2)	20 (17.2)			
Application of mucosal eversion suture in permanent end colostomy			1.109	0.053	0.383
Known	250 (87.7)	106 (91.4)			
Unknown	35 (12.3)	10 (8.6)			
Application of protective negative-pressure wound therapy (NPWT)			3.808	0.097	0.051
Known	117 (41.1)	60 (51.7)			

Unknown	168 (58.9)	56 (48.3)			
Application of support rod in loop ileostomy			6.921	0.131	[a] 0.031
Regular use	168 (58.9)	58 (50.0)			
Occasional use	63 (22.1)	22 (19.0)			
Rare use or non-use	54 (18.9)	36 (31.0)			
Application of iodoform gauze in intestine and skin			1.339	0.058	0.512
Regular use	97 (34.0)	34 (29.3)			
Occasional use	56 (19.6)	21 (18.1)			
Rare use or non-use	132 (46.3)	61 (52.6)			
Application of circular stapler in permanent stoma creation			0.307	0.028	0.858
Regular use	39 (13.7)	15 (12.9)			
Occasional use	65 (22.8)	24 (20.7)			
Rare use or non-use	181 (63.5)	77 (66.4)			
Application of extraperitoneal ostomy in permanent stoma creation			1.699	0.065	0.428
Regular use	101 (35.4)	38 (32.8)			
Occasional use	109 (38.2)	40 (34.5)			
Rare use or non-use	75 (26.3)	38 (32.8)			
Application of mucosal eversion suture (Brooke) in loop ileostomy			0.499	0.035	0.779
Regular use	131 (46.0)	49 (42.2)			
Occasional use	76 (26.7)	34 (29.3)			
Rare use or non-use	78 (27.4)	33 (28.4)			
Application of mucosal eversion suture in permanent end colostomy			0.234	0.024	0.890
Regular use	189 (66.3)	74 (63.8)			

Occasional use	62 (21.8)	27 (23.3)			
Rare use or non-use	34 (11.9)	15 (12.9)			
Application of protective negative-pressure wound therapy (NPWT)			0.948	0.049	0.622
Regular use	19 (6.7)	11 (9.5)			
Occasional use	60 (21.1)	24 (20.7)			
Rare use or non-use	206 (72.3)	81 (69.8)			

Percentages may not sum to 100% due to rounding.

For multiple-answer items, percentages indicate the response rate for each option and therefore do not sum to 100%.

[a] $P < 0.05$.

Cramér's V was used to assess effect size (V < 0.10, negligible; 0.10–0.29, weak; 0.30–0.49, moderate; ≥ 0.50, strong).

Supplementary Table 4 Total attitude and technical maneuvers split by grade of hospital

Items	Tertiary general hospital (310，%)	Tertiary specialized hospital (50，%)	Secondary and below (41，%)	X^2	Cramér's V	*P* Value
Stoma creation is most commonly performed by				28.181	0.187	[a] 0.000
Operator	163 (52.6)	14 (28.0)	34 (82.9)			
First assistant	141 (45.5)	35 (70.0)	6 (14.6)			
Second assistant or lower	6 (1.9)	1 (2.0)	1 (2.4)			
Surgeon responsible for enterostomy				11.956	0.173	[a] 0.003
Associate chief surgeon or above	160 (51.6)	14 (28.0)	25 (61.0)			
Attending surgeon or below (guided by superior surgeon)	150 (48.4)	36 (72.0)	16 (39.0)			
Departmental attitude toward training in the prevention of stoma-related complications				10.480	0.187	[a] 0.033
Attach great importance	222 (71.6)	42 (84.0)	22 (53.7)			
Attach moderate importance	83 (26.8)	8 (16.0)	18 (43.9)			
Attach little importance	5 (1.6)	0	1 (2.4)			
Have you received training related to stoma creation?				8.997	0.150	[a] 0.011
Yes	189 (61.0)	36 (72.0)	17 (41.5)			

No	121 (39.0)	14 (28.0)	24 (58.5)			
Source of ostomy-related knowledge (multiple answers)				14.466	-	0.153
Mentorship by senior surgeon	265 (85.5)	40 (80)	33 (80.5)			
Mentorship by attending/resident surgeon	45 (14.5)	19 (38)	5 (12.2)			
Learning based on surgical atlases	92 (29.7)	15 (30)	15 (36.6)			
Mentorship combined with surgical atlases	143 (46.1)	25 (50)	19 (46.3)			
Self-education	129 (41.6)	30 (60)	15 (36.6)			
Have not been exposed to the relevant knowledge	1 (0.3)	0	0			
How concerned are you about the correlation between surgical procedures and stoma-related complications?				9.803	0.111	[a] 0.044
Closely related	247 (79.7)	43 (86.0)	35 (85.4)			
Related	63 (20.3)	6 (12.0)	5 (12.2)			
Slightly related	0	1(2.0)	1(2.4)			
What is your perception of stoma-related complications (multiple answers)?				4.347	-	0.825
Not uncommon, but should be managed by an	65 (21.0)	8 (16)	4 (9.8)			

enterostomal therapist						
Not uncommon, and surgeons should participate in treatment	203 (65.5)	27 (54)	26 (63.4)			
Closely related to surgical procedures and most complications can be avoided	248 (80.0)	39 (78)	34 (82.9)			
Probably related to surgical procedures and should be managed exclusively by an enterostomal therapist postoperatively	61 (19.7)	11 (22)	9 (22.0)			
Have never paid much attention	4 (1.3)	0	0			
Have you participated in discussions or training on prevention or treatment of stoma-related complications?				7.198	0.134	[a] 0.027
Yes	182 (58.7)	28 (56.0)	15 (36.6)			
No	128 (41.3)	22 (44.0)	26 (63.4)			
What do you think of preoperative stoma site marking?				3.700	0.068	0.883
Meaningful and should be strictly observed	141 (45.5)	26 (52.0)	19 (46.3)			
Meaningful, and the area around the marking site is	27 (8.7)	3 (6.0)	3 (7.3)			

also appropriate						
Meaningful, but the judgment of the surgeon should be the primary consideration	87 (28.1)	15 (30.0)	9 (22.0)			
Meaningful, but not all marked sites (identified by enterostomal therapists) are suitable for stoma creation	54 (17.4)	6 (12.0)	10 (24.4)			
Meaningless and can be omitted	1 (0.3)	0	0			
In your impression, the rate of preoperative stoma site marking in your department is approximately:				13.294	0.129	[a] 0.039
80-100%	103 (33.2)	24 (48.0)	7 (17.0)			
60-80%	94 (30.3)	13 (26.0)	11 (26.8)			
40-60%	48 (15.5)	6 (12.0)	8 (19.5)			
< 40%	65 (21.0)	7 (14.0)	15 (36.6)			
In your impression, what are the reasons for not choosing the preoperatively marked stoma site by an enterostomal therapist as the primary site (multiple answers)?				9.647	-	0.140
Inappropriate marking	142 (45.8)	21 (42)	16 (39.0)			
The stoma site marked	172 (55.5)	34 (68)	13 (31.7)			

preoperatively is not a suitable trocar site						
Defunctioning stoma marking according to standards for permanent stoma	163 (52.6)	21 (42)	25 (61.0)			
Prior site marking is inconsistent with the surgeon's operating habits	77 (24.8)	17 (34)	14 (34.1)			
Which temporary ileostomy skin site position do you prefer?				15.993	0.141	[a] 0.042
Right umbilical level, trocar site	69 (22.3)	12 (24.0)	9 (22.0)			
Right lower quadrant, McBurney point (trocar site)	117 (37.7)	16 (32.0)	26 (63.4%)			
Right rectus abdominis muscle, specimen incision	90 (29.0)	19 (38.0)	4 (9.8)			
Hypogastrium region, specimen incision	11 (3.6)	1 (2.0)	1 (2.4)			
No fixed position	23 (7.4)	2 (4.0)	1 (2.4)			
Which permanent colostomy skin site position do you prefer?				9.008	0.106	0.342
Left umbilical level, trocar site (outer margin of the rectus abdominis muscle)	53 (17.1)	10 (20.0)	11 (26.8)			
Lower left quadrant of the umbilicus, outer margin of	92 (29.7)	16 (32.0)	16 (39.0)			

the rectus abdominis muscle						
Lower left quadrant of the umbilicus, through the rectus abdominis muscle	132 (42.6)	18 (36.0)	10 (24.4)			
Lower left quadrant of the umbilicus, lateral rectus abdominis muscle	22 (7.1)	3 (6.0)	4 (9.8)			
No fixed position	11 (3.5)	3 (6.0)	0			
Which transverse colostomy skin site position do you prefer?				10.341	0.114	0.111
Right subcostal margin	94 (30.3)	16 (32.0)	10 (24.4)			
Left subcostal margin	88 (28.4)	17 (34.0)	19 (46.3)			
Linea alba above the umbilicus	116 (37.4)	13 (26.0)	9 (22.0)			
No fixed position	12 (3.9)	4 (8.0)	3 (7.3)			
Shape of skin incision				10.771	0.116	[a] 0.029
Straight	94 (30.3)	11 (22.0)	5 (12.2)			
Subcircular	214 (69.0)	37 (74.0)	35 (85.4)			
Other	2 (0.6)	2 (4.0)	1 (2.4)			
What do you think about the correlation between skin incision length and the size of the exteriorized intestine?				8.678	0.104	0.070
Incision size should be larger than the diameter of the intestine	91 (29.4)	10 (20.0)	10 (24.4)			
Incision size should be close to the diameter of intestine	185 (59.7)	37 (74.0)	22 (53.7)			

Incision size should be smaller than the diameter of intestine	34 (11.0)	3 (6.0)	9 (22.0)			
Management of subcutaneous tissue				3.800	0.069	0.434
Excision	158 (51.0)	24 (48.0)	25 (61.0)			
Preservation	87 (28.1)	12 (24.0)	11 (26.8)			
Selective management	65 (21.0)	14 (28.0)	5 (12.2)			
Shape of the obliquus externus abdominis aponeurosis incision				4.549	0.069	0.919
Cruciform	169 (54.5)	26 (52.0)	22 (53.7)			
Cross shape, random direction	36 (11.6)	3 (6.0)	5 (12.2)			
Straight shape, along the long axis	78 (25.2)	15 (30.0)	10 (24.4)			
Straight shape, along the abdominal fascia	20 (6.5)	5 (10.0)	4 (9.8)			
Flexible performance	7 (2.3)	1 (2.0)	0			
Management of rectus abdominis/ abdominal wall muscle				4.800	0.077	0.570
Blunt dissection without complete muscle rupture	170 (54.8)	25 (50.0)	19 (46.3)			
Partial dissection until the posterior sheath or peritoneum is exposed	106 (34.2)	21 (42.0)	18 (43.9)			
Sharp dissection of the muscle in the projection	8 (2.6)	2 (4.0)	0			

region of the stoma						
Selective management	26 (8.4)	2 (4.0)	4 (9.8)			
Retention length of the proximal intestine in permanent stoma				5.420	0.082	0.247
Preserve the shortest possible length while ensuring adequate exteriorization of the bowel	96 (31.0)	18 (36.0)	9 (22.0)			
Preserve as long as possible	74 (23.9)	6 (12.0)	12 (29.3)			
Selectively performance	140 (45.2)	26 (52.0)	20 (48.8)			
Layers for suturing and fixation in defunctioning stoma creation (multiple answers)				6.384	-	0.782
Peritoneum (or posterior rectus abdominis sheath)	220 (71.0)	26 (52.0)	28 (68.3)			
Muscle	14 (4.5)	2 (4)	2 (4.9)			
Anterior rectus abdominis sheath	165 (53.2)	22 (44)	31 (75.6)			
Subcutaneous tissue	81 (26.1)	11 (22)	15 (36.6)			
Skin	255 (82.3)	35 (70)	33 (80.5)			
No suture or fixation	7 (2.3)	2 (4)	3 (7.3)			
Layers for suturing and fixation in permanent stoma creation (multiple answers)				10.506	-	0.397
Peritoneum (or posterior rectus abdominis sheath)	278 (89.7)	36 (72)	35 (85.4)			
Muscle	21 (6.8)	3 (6)	5 (12.2)			

Anterior rectus abdominis sheath	237 (76.5)	33 (66)	34 (82.9)			
Subcutaneous tissue	99 (31.9)	10 (20)	22 (53.7)			
Skin	266 (85.8)	38 (72)	35 (85.4)			
No suture or fixation	4 (1.3)	2 (4)	0			
Opening direction of loop stomas				1.734	0.046	0.785
Along the long axis of the intestine	217 (70.0)	35 (70.0)	25 (61.0)			
Perpendicular to the long axis of the intestine	75 (24.2)	12 (24.0)	12 (29.3)			
Selective orientation	18 (5.8)	3 (6.0)	4 (9.8)			
Application of support rod in loop ileostomy				0.984	0.050	0.611
Known	297 (95.8)	47 (94.0)	38 (92.7)			
Unknown	13 (4.2)	3 (6.0)	3 (7.3)			
Application of iodoform gauze in intestine and skin				3.128	0.088	0.209
Known	233 (75.2)	42 (84.0)	28 (68.3)			
Unknown	77 (24.8)	8 (16.0)	13 (31.7)			
Application of circular stapler in permanent stoma creation				5.086	0.113	0.079
Known	199 (64.2)	37 (74.0)	21 (51.2)			
Unknown	111 (35.8)	13 (26.0)	20 (48.8)			
Application of extraperitoneal ostomy in permanent stoma creation				4.160	0.102	0.125
Known	270 (87.1)	44 (88.0)	31 (75.6)			

Unknown	40 (12.9)	6 (12.0)	10 (24.4)			
Application of mucosal eversion suture (Brooke) in loop ileostomy				7.493	0.137	[a] 0.024
Known	247 (79.7)	40 (80.0)	25 (61.0)			
Unknown	63 (20.3)	10 (20.0)	16 (39.0)			
Application of mucosal eversion suture in permanent end colostomy				9.016	0.150	[a] 0.011
Known	282 (91.0)	43 (86.0)	31 (75.6)			
Unknown	28 (9.0)	7 (14.0)	10 (24.4)			
Application of protective negative-pressure wound therapy (NPWT)				0.969	0.049	0.616
Known	133 (42.9)	25 (50.0)	19 (46.3)			
Unknown	177 (57.1)	25 (50.0)	22 (53.7)			
Application of support rod in loop ileostomy				17.779	0.149	[a] 0.001
Regular use	186 (60.0)	16 (32.0)	24 (58.5)			
Occasional use	61 (19.7)	13 (26.0)	11 (26.8)			
Rare use or non-use	63 (20.3)	21 (42.0)	6 (14.6)			
Application of iodoform gauze in intestine and skin				16.271	0.142	[a] 0.003
Regular use	106 (34.2)	6 (12.0)	19 (46.3)			
Occasional use	55 (17.7)	12 (24.0)	10 (24.4)			
Rare use or non-use	149 (48.1)	32 (64.0)	12 (29.3)			
Application of circular stapler in permanent stoma creation				5.523	0.083	0.238

Regular use	43 (13.9)	3 (6.0)	8 (19.5)			
Occasional use	64 (20.6)	14 (28.0)	11 (26.8)			
Rare use or non-use	203 (65.5)	33 (66.0)	22 (53.7)			
Application of extraperitoneal ostomy in permanent stoma creation				1.327	0.041	0.857
Regular use	107 (34.5)	16 (32.0)	16 (39.0)			
Occasional use	117 (37.7)	17 (34.0)	15 (36.6)			
Rare use or non-use	86 (27.7)	17 (34.0)	10 (24.4)			
Application of mucosal eversion suture (Brooke) in loop ileostomy				4.138	0.072	0.388
Regular use	146 (47.1)	18 (36.0)	16 (39.0)			
Occasional use	78 (25.2)	18 (36.0)	14 (34.1)			
Rare use or non-use	86 (27.7)	14 (28.0)	11 (26.8)			
Application of mucosal eversion suture in permanent end colostomy				4.949	0.079	0.293
Regular use	207 (66.8)	29 (58.0)	27 (65.9)			
Occasional use	68 (21.9)	15 (30.0)	6 (14.6)			
Rare use or non-use	35 (11.3)	6 (12.0)	8 (19.5)			
Application of protective negative-pressure wound therapy (NPWT)				7.831	0.099	0.098
Regular use	23 (7.4)	3 (6.0)	4 (9.8)			
Occasional use	59 (19.0)	10 (20.0)	15 (36.6)			
Rare use or non-use	228 (73.5)	37 (74.0)	22 (53.7)			

Percentages may not sum to 100% due to rounding.

For multiple-answer items, percentages indicate the response rate for each

option and therefore do not sum to 100%.

[a] $P < 0.05$.

Cramér's V was used to assess effect size (V < 0.10, negligible; 0.10–0.29, weak; 0.30–0.49, moderate; ≥ 0.50, strong).