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► To cite this version:

Q. Denost, V. Bousser, C. Morin-Porchet, C. Vincent, E. Pinon, et al.. The development of a regional referral pathway for locally recurrent rectal cancer: A Delphi consensus study. *EJSO - European Journal of Surgical Oncology*, In press, 46 (3), pp.470-475. <10.1016/j.ejso.2019.12.001>. <hal-03117509>

HAL Id: hal-03117509

<https://hal.science/hal-03117509v1>

Submitted on 22 Aug 2022

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Title: The development of a regional referral pathway for Locally Recurrent Rectal Cancer: A Delphi Consensus Study

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48 **Declaration of Interest:** None
49 **Funding source:** None

Abstract

Background

The management of patients with locally recurrent rectal cancer (LRRC) is often complex and requires multidisciplinary input whereas only few patients are referred to a specialist centre. The aim of this study was to design a regional referral pathway for LRRC, in Nouvelle Aquitaine (South-West, France).

Methods

In 2016, we conducted with a Study Steering Committee (SC) a three phase mixed-methods study including identification of key factors, identification of key stakeholders and Delphi voting consensus. During three rounds of Delphi voting, a consensus was defined as favorable, if at least 80% of participating experts rate the factor, below or equal to 3/10 using a Likert scale, or consider it as “useful” using a binary scale (third round only). Finally, the SC drafted guidelines.

Results

Among the 423 physicians involved in 29 regional digestive Multi-Disciplinary Team (MDT) meeting, 59 participants (from 26 MDT meeting) completed all three rounds of Delphi voting. Thirteen out of twenty initially selected factors reached a favorable consensus. All patients with a LRRC need to be included into a referral pathway. Patients with a central pelvic recurrence offered curative treatment in their local hospital and patients with unresectable metastatic disease were excluded of the referral. Key performance indicators were also agreed including the time to referral and completion of pelvic MRI-, CT-, PET-scan prior to MDT referral.

Conclusion

73 The development of this referral pathway represents an innovative health service, which will
74 improve the management of patients with LRRC in France.

75 **Keywords:** Locally Recurrent Rectal Cancer; referral pathway; Delphi consensus.

Introduction

The incidence of rectal cancer in the European Union is about 35% of the total colorectal cancer incidence, i.e. 15–25/100 000 cases per year. The standardisation of rectal cancer surgery with Total Mesorectal Excision (TME) and the use of neoadjuvant and adjuvant therapies has seen a significant reduction in the incidence of locally recurrent rectal cancer (LRRC) from 30-40% to 5-10% [1,2]. The management of these patients is often complex and requires multidisciplinary surgical and oncological input. Surgical resection is acknowledged to be the only potential curative option in this cohort of patients, with reported 5 year survival rates of 50% [3].

However, despite these promising oncological results only a small proportion of patients are referred to a specialist centre in LRRC [4-6]. Furthermore, when patients are referred to specialist centres, there is significant variability in practice, leading to resectional rates of 30 to 68% [4, 7-10]. This is part due to the lack of established European guidelines in LRRC highlighting referral and clinical pathways. Standardising clinical referral pathways in primary rectal cancer has been associated with improved time to diagnosis and treatment [11]. Clinical referral pathways provide clarity for referring clinicians, improve cross-speciality communication and are a more cost-effective method of treating complex patients [12]. It is hypothesised that a similar clinical referral pathway dedicated for patients with LRRC may be associated with the same benefits, as those seen in primary rectal cancer.

A structural approach is required to develop a clinical pathway specifically for patients with LRRC. The development of a new clinical pathway must follow standardised guidance, include all key factors which may influencing the implementation of new practices within health care organization [13]. To ensure inclusivity all regional clinicians involved in the

99 management of patients with LRRC should be involved in designing the optimal clinical
100 pathway and drafting the appropriate guidelines.

101 The aim of this study was to design, through a regional consensus, a standardized
102 referral care pathway of patients with LRRC, in Nouvelle Aquitaine (South-west of France).

Materials and methods

We conducted a three phase mixed-methods study to underpin the structure of a regionally agreed referral pathway for patients with LRRC between February and November 2016. An initial study steering and management committee was convened to provide project oversight.

Phase I: Identification of key factors

We performed a systematic review of the current published literature to identify important factors to consider when developing quality improvement programmes and implementing new health care systems. Identified factors were categorised as patient-related, disease or organizational characteristics. These factors were discussed with the study steering committee and were appropriately ratified.

Phase II: Identification of Key Stakeholders

Key stakeholders involved in the management of rectal cancer were identified through the Regional Networks of Oncology. This is a network of all the physicians working in public hospitals and private clinics in Nouvelle Aquitaine (South-west of France), involved in the management of rectal cancer care and participating in a colorectal Multi-Disciplinary Team (MDT) meeting. Clinicians from all specialty groups, including, surgeons, oncologists, radiotherapists and gastroenterologists, were invited to participate.

Phase III: Delphi Consensus Voting

The aim of the Delphi study was to achieve consensus amongst all key stakeholders on the importance of different factors to be included within a referral pathway for LRRC using sequential questionnaires [14]. We conducted three rounds of Delphi voting. During voting

rounds 1-3 all factors were scored on a 10 point Likert scale, with 1 being ‘the most useful’ to 10 being ‘the most useless’ for consideration of incorporation into a referral pathway. Additional pathway design questions were asked including: “Is the factor useful to design an effective pathway?” and “Can this factor help to prioritize an effective management strategy in locally recurrent rectal cancer?” For factors that did not reach a favorable consensus after 2 rounds and in order to improve the process, a binary scale (useful/useless) was used instead of the Likert scale. For each factor consensus was defined as:

- Favorable, if at least 80% of participating experts rate this factor, below or equal to 3/10 using the Likert scale (first two rounds), or consider it as “useful” using the binary scale (third round). The factor was then considered as useful for the referral pathway.
- Unfavorable, if at least 80% of participating experts rate this factor above or equal to 7/10 using the Likert scale (first two rounds), or consider it as “useless” (third round). The factor was then considered as useless for the referral pathway.

If the level of consensus was neither favorable nor unfavorable during the first two rounds, the usefulness of the factor was sought during the following round. In the final round, if the level of consensus was neither favorable nor unfavorable, we considered that the factor did not reach any consensus. Each selected factor and the associated Likert scale were included in a single form. Factors that did not reach a favorable or unfavorable consensus in the previous round were included in an updated form that was used for the next round. Participants were provided with their individual scores from the previous round.

Participants were given four weeks to complete each Delphi voting round. All completed forms were sent back centrally to the Delphi coordinators. To reduce attrition between rounds,

149 participants were sent electronic email reminders and a telephone reminder in the four week
150 voting period had elapsed.

151 Finally, based on these results, the Study Steering Committee drafted guidelines in referral
152 pathway for patients with LRRC.

Results

Phase I: Identification of Key Factors

A systematic review identified a total of twenty factors that were categorised into three domains of patient characteristics, cancer recurrence and health care organization:

- Patient characteristics: age, general condition, life expectancy, comorbidities, psychological or physical discomfort, patient cooperative attitude, patient consciousness of his own health status.
- Cancer recurrence: recurrence location (central, lateral, anterior or posterior), presence of distant cancer locations, curative or palliative treatment.
- Health care organization: distance between the local center and the referral center, MDT meeting in the requested center before referral, specialty of the referral physician, place of MRI/CT/PET-scans and pre-/post-operative treatment, requirement for a referral MDT meeting (composed of all surgeons involved in pelvic surgery for both resection and reconstruction (colorectal surgeons, urologists, gynaecologists, vascular surgeons, orthopedists, plastic surgeons) and radiologist for the CT-scan, PET-scan and pelvic MRI assessment. Oncological strategy is previously discussed with oncologist and radiotherapist before the Complex Pelvic surgery MDT) able to discuss complex surgery cases, time to referral (medical appointment in the referral center or referral MDT meeting).

Phase II: Key Stakeholder Identification

Among the 423 physicians involved in 29 oncologic MDT meeting in Nouvelle Aquitaine, 79 (19%) were agreed to participate and 59 participants completed all three rounds of the study. There was no participant attrition between rounds. These 59 participants were involved in 26 digestive regional MDT meeting. All specialties were represented (Table 1).

Table 1. Distribution of selected experts, volunteers and participants according to their specialty, Nouvelle Aquitaine, Feb-Nov 2016

	Selected experts n (%)	Participants n (%)	Final Delphi Participants n (%)
Surgeon	151 (36)	37 (47)	28 (47)
Gastroenterologist	181 (43)	20 (25)	13 (22)
Radiotherapist	53 (12)	14 (18)	11 (19)
Oncologist	38 (9)	8 (10)	7 (12)
Total	423 (100)	79 (100)	59 (100)

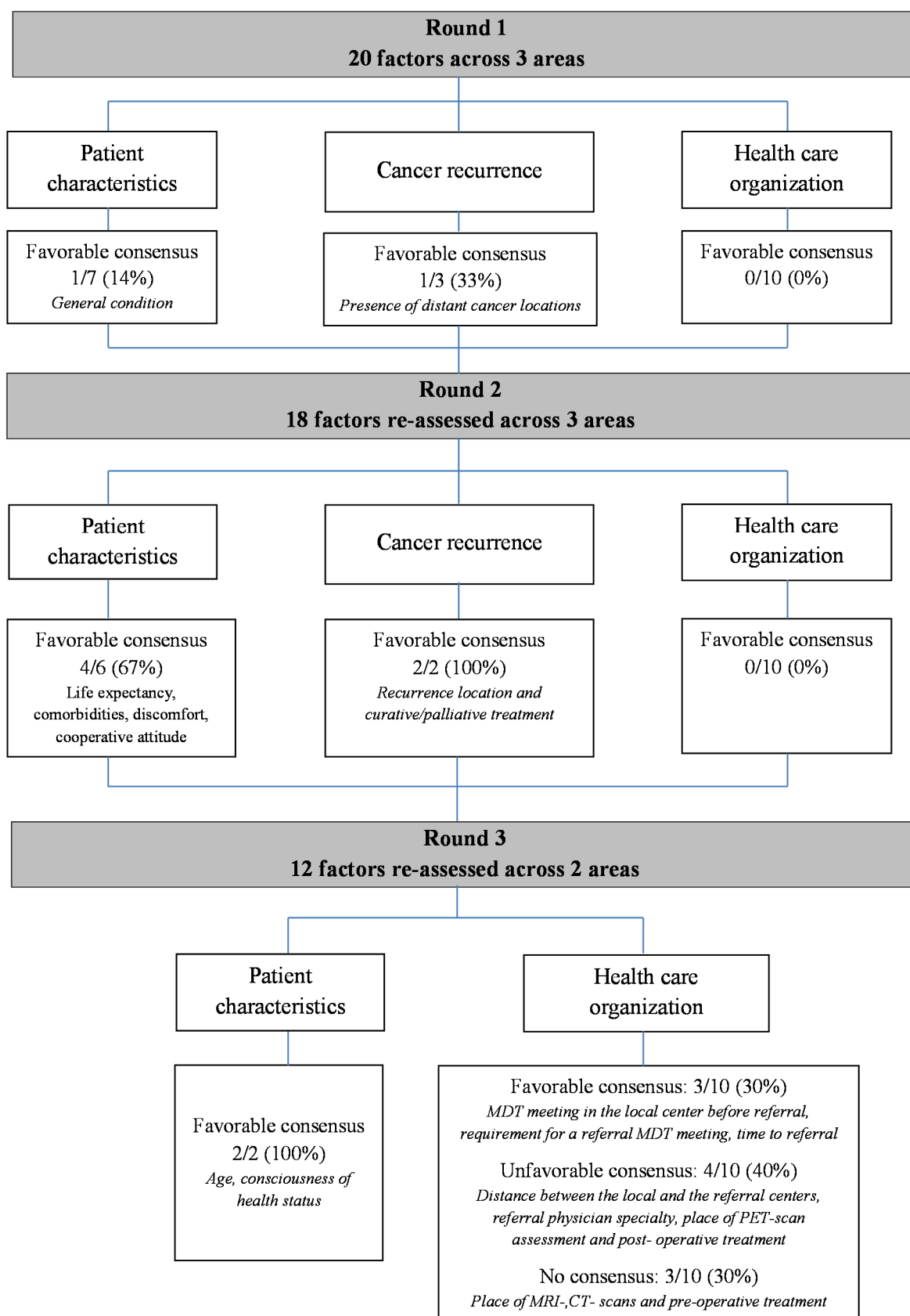
Phase III: Delphi Consensus Voting

A total of thirteen out of twenty factors reached a favorable consensus (Figure 1):

- Patient general condition and presence of distant cancer locations, after the first round
- Life expectancy, comorbidities, psychological or physical discomfort, patient cooperative attitude, recurrence location and curative/palliative treatment, after the second round
- Age, patient consciousness of health status, MDT meeting in the local center before referral, requirement for a referral MDT meeting (including description and frequency), time to referral (medical appointment or referral MDT meeting) after the third round.

Four factors (distance between the local and the referral centers, referring physician specialty, place of PET-scan assessment and post-operative treatment) were considered as

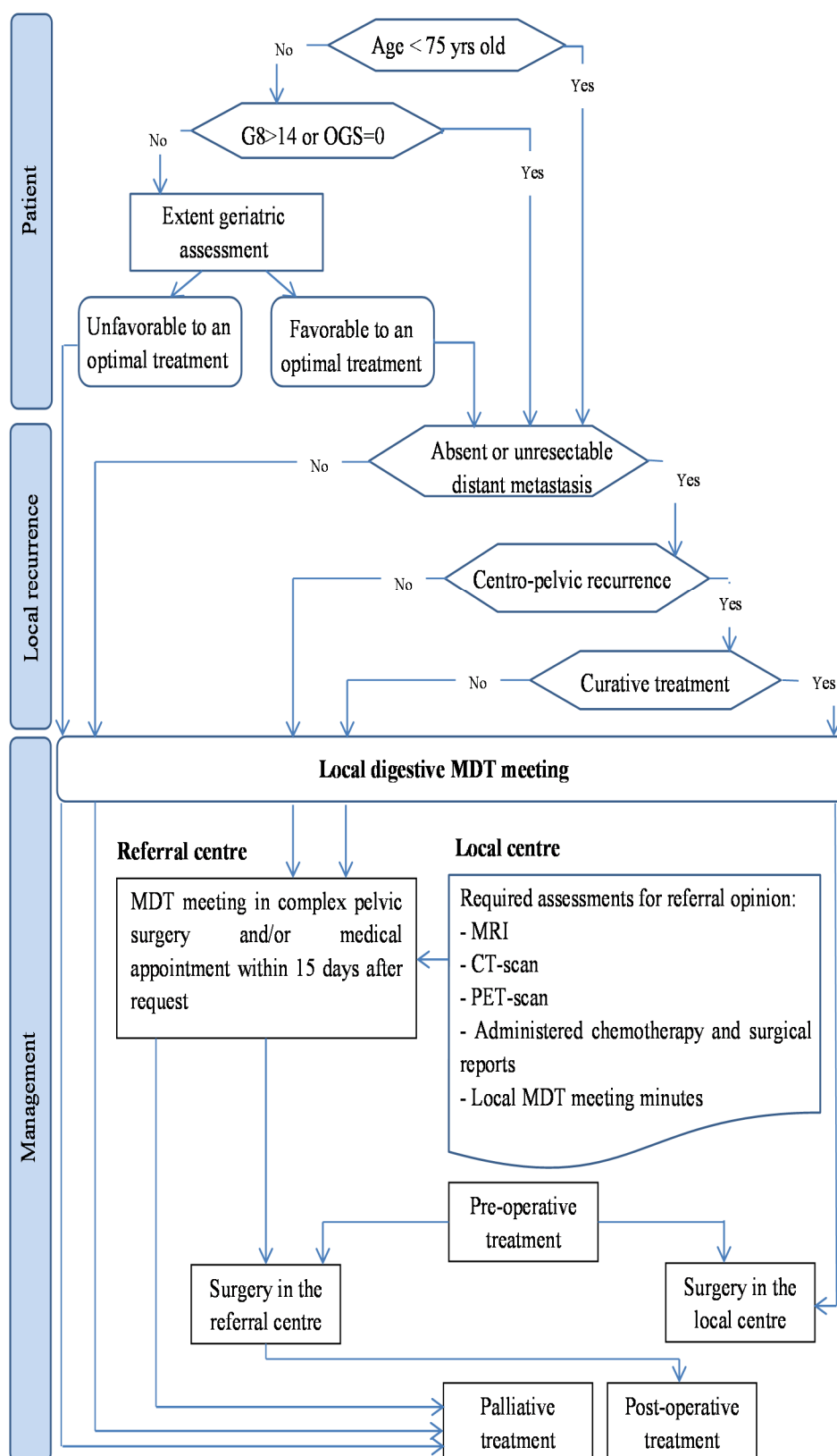
193 useless after the third round (Figure 1). Three factors (place of MRI- or CT- scans and pre-
194 operative treatment) did not reach any consensus after the three rounds.



Note: MDT meeting = Multi-Disciplinary Team Meeting, MRI= Magnetic resonance imaging; CT= computerized tomography; PET= positron emission tomography

Figure 1. Delphi consensus process in referral pathway for patients with LRRC, Nouvelle Aquitaine, Feb-Nov 2016

Following the completion of the Delphi study, the study steering committee convened to discuss the results of the Delphi study and to design a LRRC referral pathway. Based on the results of the Delphi, the steering committee felt it was appropriate to include all patients with a diagnosis of LRRC into the referral pathway, patients with a central pelvic recurrence offered curative treatment in their local hospital were excluded and patients with unresectable metastatic disease were also excluded. Key performance indicators were also agreed including the time to referral has to be less than 15 days with completion of all radiological staging, including, pelvic MRI-, CT-, PET-scan prior to MDT referral and discussion. The LRRC referral pathway is highlighted in Figure 2.



Note: G8 scale score; OGS=OncoGeriatric Screening tool

Figure 2. Guidelines in referral pathway for patients with LRRC, Nouvelle Aquitaine, Feb-
Nov 2016

Discussion

There are currently no established guidelines or a referral pathway in France for LRRC, therefore, management is very variable with high variation in quality of care. Our study proposes a regional referral pathway with the development of a central MDT meeting specifically focused on LRRC using Delphi consensus methodology amongst key stakeholders. The development and introduction of a centralised, referral clinical pathway is widely recognized as a complex process. Our study identified 13 key factors important to our service users and stakeholders, and incorporated these into a regionally agreed guideline. The development of this new referral pathway represents an innovative health service, which will improve the management of complex patients with LRRC, improve communication between healthcare professionals and the quality of health care delivered. It is hoped this will improve clinical and patient reported outcomes for patients with LRRC.

The Delphi technique is an efficient and effective method of generating consensus in complex clinical scenarios. Our Delphi study had broad geographical and clinical representation; with physicians representing 90 percent (n=26) of the regional MDTs throughout Nouvelle Aquitaine. The experts were mainly coming from general oncologic MDT and only practitioners involved in rectal cancer management agreed to participate, with a good balance of different specialties (surgeon, oncologist, radiotherapist or gastroenterologist) and types of institution (private or public). There was good engagement with all three Delphi rounds with no participant attrition. This suggests the consensus opinions generated in our study were representative of all stakeholders involved in the management of patients with LRRC. Ensuring good engagement from all key stakeholders from the onset is essential in the development of regional pathway; ensuring the pathway is

accessible and generalisable to all its service users. Ensuring generalisability and accessibility for all service users is crucial when implementing new clinical services.

Our referral pathway takes into account a number of important factors; including patient-related, disease-related and logistical related to hospital organization and services. Patient and disease related factors achieved consensus within the first two Delphi rounds, suggesting these are of most importance when considering complex management decisions in LRRC, and have appropriately been incorporated into our referral algorithm. Surgical treatment of LRRC is associated with significant morbidity, therefore objective thresholds of age and frailty using the G8 scale score [15] have been incorporated into our referral pathway to facilitate decision making for the referring physician. The pattern of recurrence has also been considered as a key point for referral, considering that pelvic location of LRRC has an important influence on resectability and survival, with central recurrence being associated with a greater incidence of curative resection than posterior and/or lateral location [16-18]. Logistical factors such as distance between referring centres were considered to be unimportant, in comparison, time to referral was considered to be important. Subsequently, we have stipulated a time to referral with completion of all appropriate imaging to be less than two weeks. Previous works have demonstrated patients' willingness to travel to access cancer services. Vallejo-Torres et al [19] used a discrete-choice experiment to identify patient preferences with advanced cancer; they demonstrated patients were willing to travel further and longer, in a bid to access specialist cancer care and to reduce overall complications and the risk of mortality.

There is a recent increase in the number of regional advanced cancer colorectal MDTs for patients with metastatic colorectal cancer. The development of these MDTs has led to timely referral and decision-making, whilst minimizing the risk of disease progression. Advanced cancer MDTs have been shown to provide coordination and continuity of care,

provide better patient care, are cost-effective and reduce post-operative morbidity and mortality. LRRC is of similar complexity to metastatic cancer, and often requires an extensive MDT, including involvement of oncologists, urologists, gynaecologists, vascular surgeons, orthopaedics and plastic surgeons. By adopting a similar model in LRRC we hope to see improvements in the delivery of clinical care, time to definitive decision-making and improved patient outcomes.

The obvious limitation of our work is the lack of patient involvement in the development of this referral pathway. The developed referral pathway is for clinicians to refer patients with LRRC for consideration of potentially curative treatment options including surgery to a centralized, regional service. This is the first step towards providing high quality clinical care to patients with advanced cancer in France. Clinician agreement of referral pathways is essential in ensuring patients are appropriately referred. Implementation of our proposed referral pathway across our region is a key secondary step, followed by service evaluation by all users including patients. Patients opinions and perspectives will be sought regarding the referral pathway in an iterative manner, with appropriate changes made to improve patient user satisfaction. These changes will be incorporated into our referral pathway prior to national dissemination, thus ensuring patient opinion is appropriately represented on a wider scale.

LRRC is a complex clinical entity, which requires multidisciplinary input and tertiary level care. At present there is significant variation in the management of this cohort of patients. Standardising clinical practice through the use of regionally agreed clinical pathways will ensure healthcare equity and will enable the delivery of high quality specialist clinical care. This Delphi study makes a significant contribution to the standardisation of care in LRRC in France, alongside other initiatives such as the Benchmark trial [20].

286 **Acknowledgement**

287

288 Authors thank the steering committee (MDT meeting of Bordeaux, Limoges and Poitiers
289 University Hospital and Bergonié institution) and all participants in the Delphi consensus:

290 Aleba A; Barthes T; Barussaud ML; Bazin T; Becouarn Y; Benhami A; Bernard A; Blanc B;
291 Blondeau V; Bouet C; Boutillier P; Burgevin-Tropet AL; Cany L; Clavere P; De Lustrac M;
292 Desolneux G; Durand-Fontanier S; El Khourge G; Etchechoury L; Forestier D; Fredon F;
293 Gainant A; Garcia-Ramirez M; Gontier R; Guarnieri S; Guichard F; Henriques B; Kikolski F;
294 Laharie Mineur H; Langlois D; Louri Larivière I; Manouvrier JL; Martenot M; Mathe N;
295 Mathe Bessalem V; Mathieu A; Mathonnet M; Mauriac E; Moulin V; Ofrim O; Opsahl S;
296 Palumbo B; Parent S; Pigot F; Pinel B; Richer JP; Seillan S; Smith D; Szerzyna N; Tardat E;
297 Teboul F; Thaury J; Tougeron D; Vayre L; Vignal JC; Villar F; Zaranis C; Zasadny X.

298

299 **Funding source:** None

References

- [1] Van Gijn W, Dutch colorectal cancer group. Preoperative radiotherapy combined with total mesorectal excision for resectable rectal cancer: 12-year follow-up of the multicenter, randomized controlled TME trial. *Lancet Oncol* 2011;12(6):575-82. doi: 10.1016/S1470-2045(11)70097-3
- [2] Jayne DG, Thorpe HC, Copeland J, Quirke P, Brown JM, Guillou PJ. Five-year follow-up of the Medical Research Council CLASICC trial of laparoscopically assisted versus open surgery for colorectal cancer. *Br J Surg* 2010;97:1638-1645. doi: 10.1002/bjs.7160.
- [3] McDermott FT, Hughes ESR, Pihl E, Johnson WJR, Price AB. Local recurrence after potentially curative resection for rectal cancer in a series of 1 008 patients. *Br J Surg* 1985;72:34–37. doi:10.1002/bjs.1800720115
- [4] Lopez-Kostner F, Fazio VW, Vignali A, Rybicki LA, Lavery IC. Locally recurrent rectal cancer: Predictors and success of salvage surgery. *Dis Colon Rectum* 2001;44:173-8.
- [5] Harji DP, Griffiths B, McArthur DR, Sagar PM. Current UK management of locally recurrent rectal cancer. *Colorectal Dis* 2012;14:1479-82. doi: 10.1111/j.1463-1318.2012.03070.x
- [6] Denost Q, Faucheron JL, Lefevre JH, Panis Y, Cotte E, Rouanet P, et al. French current management and oncological results of locally recurrent rectal cancer. *Eur J Surg oncol* 2015;41:1645-1652. doi: 10.1016/j.ejso.2015.09.019
- [7] Suzuki K, Dozois RR, Devine RM, Nelson H, Weaver AL, Gunderson LL, et al. Curative reoperations for locally recurrent rectal cancer. *Dis Colon Rectum* 1996;39:730-6.
- [8] Salo JC, Paty PB, Guillem J, Minsky BD, Harrison LB, Cohen AM. Surgical salvage of recurrent rectal carcinoma after curative resection : A 10-year experience. *Ann Surg Oncol* 1999;6:171-7.

324 [9] Boyle KM, Sagar PM, Chalmers AG, Sebag-Montefiore D, Cairns A, Eardley I. Surgery
 325 for locally recurrent rectal cancer. *Dis Colon Rectum* 2005;48:929-37. doi: 10.1007/s10350-
 326 004-0909-0

327 [10] Hahnloser D, Nelson H, Gunderson LL, Hassan I, Haddock MG, O'Connell MJ, et al.
 328 Curative potential of multimodality therapy for locally recurrent rectal cancer. *Ann Surg*
 329 2003;4:502-8. doi:10.1097/01.SLA.0000059972.90598.5F

330 [11] van Hooft JE, Elferink MAG, Klaase JM, Kouwenhoven EA, Schiphorst PP, Sieling S.
 331 Long-term effects of a regional care pathway for patients with rectal cancer. *Int J Colorectal*
 332 *dis* 2015 ;30 :787-95. doi: 10.1007/s00384-015-2209-7

333 [12] Hoverman JR, Cartwright TH, Patt DA, Espirito JL, Clayton MP, Garey JS et al.
 334 Pathways, outcomes and costs in colon cancer: Retrospective evaluation in two distinct
 335 databases. *J Oncol Pract*. 2011 May;7(3 Suppl):52s-9s. doi: 10.1200/JOP.2011.000318.

336 [13] Fleuren M, Wiefferink K, Paulussen T. Determinants of innovation within health care
 337 organizations: literature review and Delphi study. *Int J Qual Health Care*. 2004;16(2):107-23.
 338 doi:10.1093/intqhc/mzh030

339 [14] Linstone H.A, Turoff M. *The Delphi Method: Techniques and Application*. Boston, MA:
 340 Addison-Wesley Publishing Co, Advanced Book Program: 2002.

341 [15] Bellera CA, Rainfray M, Mathoulin-Pélissier S, Mertens C, Delva F, Fonck M, et al.
 342 Screening older cancer patients: first evaluation of the G-8 geriatric screening tool. *Ann*
 343 *Oncol*. 2012 Aug;23(8):2166-72. doi: 10.1093/annonc/mdr587

344 [16] Moore HG, Shoup M, Riedel E, Minsky BD, Alektiar KM, Ercolani M, et al. Colorectal
 345 cancer pelvic recurrences: determinants of resectability. *Dis Colon Rectum* 2004; 47: 1599–
 346 606.

- 347 [17] Asoglu O, Karanlik H, Muslumanoglu M, Igci A, Emek E, Ozmen V, et al. Prognostic
348 and predictive factors after surgical treatment for locally recurrent rectal cancer: a single
349 institute experience. *Eur J Surg Oncol* 2007; 33: 1199–206. doi: 10.1016/j.ejso.2007.02.026
- 350 [18] Kanemitsu Y, Hirai T, Komori K, Kato T. Prediction of residual disease or distant
351 metastasis after resection of locally recurrent rectal cancer. *Dis Colon Rectum* 2010; 53: 779–
352 89. doi: 10.1007/DCR.0b013e3181cf7609.
- 353 [19] Vallejo-Torres L, Melnychuk M, Vindrola-Padros C, Aitchison M, Clarke CS, Fulop NJ,
354 et al. Discrete-choice experiment to analyse preferences for centralizing specialist cancer
355 surgery services. *Br J Surg*. 2018 Apr;105(5):587-596. doi: 10.1002/bjs.10761.
- 356 [20] Denost Q, Saillour F, Masya L, Martinaud HM, Guillon S, Kret M, et al. Benchmarking
357 trial between France and Australia comparing management of primary rectal cancer beyond
358 TME and locally recurrent rectal cancer (PelviCare Trial): rationale and design. *BMC Cancer*.
359 2016 Apr 4;16:262. doi: 10.1186/s12885-016-2286-1.