National Institute for Health and Care Excellence

Observational Data Unit

Commissioning through Evaluation Project Report

Selective internal radiation therapy (SIRT)

1 Background

1.1 This project report is prepared by NICE for NHS England, based on the work of, and advised by, Cedar External Assessment Centre (EAC), which was commissioned by NICE to collaborate on this Commissioning through Evaluation (CtE) project. The EAC prepares an evaluation report which contains results of the analysis of evidence compiled during the CtE project, alongside relevant evidence published during the project and de novo economic modelling where this is carried out by the EAC. The evidence referred to in section 2 below is a summary of the full evidence base analysed by the EAC, which appears in the evaluation report. The full evaluation report, including detailed references for all of the studies referred to in this project report, is available at Appendix A, and the project report should be read in conjunction with it.

1.2 The objective of this CtE project is to evaluate the clinical and cost-effectiveness of SIRT in patients with unresectable colorectal cancer liver metastases or primary intrahepatic cholangiocarcinoma which has progressed following standard chemotherapy.

1.3 The CtE project proposals supported in principle by the NHS England Clinical Panel for potential investment are further developed and refined, in partnership with NICE. A set of evaluation questions is agreed between NHS England, NICE and the EAC at the start of the project. The questions

are set out in a table at section 3 of this project report, with respective answers derived from the CtE work.

2 The evidence

Populations

2.1 People with unresectable, liver-dominant, metastatic colorectal cancer which has progressed following at least 2 lines of standard chemotherapy (i.e. irinotecan and oxaliplatin based chemotherapy) or those for whom standard chemotherapy is not suitable.

2.2 People with unresectable intrahepatic cholangiocarcinoma which has progressed following at least 1 line of standard chemotherapy or those for whom standard chemotherapy is not suitable.

Intervention

2.3 Selective internal radiation therapy (SIRT).

SIRT CtE register study

2.4 The single-arm SIRT CtE registry study was carried out in 10 NHS centres in England between December 2013 and March 2017. Two adult populations were eligible to receive SIRT: i) patients with unresectable, chemotherapy-refractory colorectal cancer liver metastases; and ii) patients with unresectable, chemotherapy-refractory primary intrahepatic cholangiocarcinoma. Data on patients' baseline characteristics, the SIRT procedure, safety, survival, health-related quality of life were collected in a registry. Patients were followed-up for a median of 14.3 months (95% confidence intervals 9.2-19.4).

Patients with unresectable colorectal cancer liver metastases

2.5 A total of 399 patients with colorectal cancer treated with SIRT were included in the analysis. 93% of patients had an ECOG performance status of 0 or 1, 60% did not have extrahepatic disease, and 78% of

patients received 2 or 3 lines of chemotherapy prior to SIRT. Patients required a hospital stay of 1 or 2 nights for the SIRT procedure.

Survival

2.6 Median overall survival was 7.6 months (95% CIs 6.9-8.3) and survival at 12 months following SIRT was 30%. Median progression-free survival was 3.0 months (95% CIs 2.8-3.1) and median liver-specific progression-free survival was 3.7 months (95% CIs 3.2-4.3). Subgroup analyses showed that absence of extrahepatic disease, fewer liver tumours, smaller tumour to liver volume percentage, and being male, were factors associated with a survival benefit.

Health related quality of life

2.7 Health related quality of life measured using EQ-5D-5L and EQ-VAS remained relatively high and constant before and after the SIRT procedure. A statistically significant reduction in health related quality of life was observed 3 months following SIRT but this was small and not clinically relevant. No significant change was observed at 6 and 9 months, although the number of respondents was small.

Safety

2.8 Severe complications on the day of treatment were reported in 11 patients (3%). During the follow-up period, 36% of patients experienced an adverse event, of which 8% of the events were grade 3 and above (severe). The most frequently reported adverse events were mild fatigue and abdominal pain.

Unresectable primary intrahepatic cholangiocarcinoma

2.9 A total of 61 patients with intrahepatic cholangiocarcinoma treated with SIRT were included in the analysis. 91% of patients had an ECOG performance status of 0 or 1, and 81% of patients received 1 or 2 lines of chemotherapy prior to SIRT. Patients required a hospital stay of 1 or 2 nights for the SIRT procedure.

Survival

2.10 Median overall survival was 8.7 months (95% CIs 5.3-12.1) and survival at 12 months following SIRT was 37%. Median progression-free survival was 2.8 months (95% CIs 2.6-3.1) and median liver-specific progression-free survival was 3.1 months (95% CIs 1.3-4.8).

Health related quality of life

2.11 Changes in EQ-5D-5L scores and EQ-VAS from baseline to 3 months post SIRT were not statistically significant. There were too few respondents at later time points to carry out a comparison.

Safety

2.12 One patient (2%) had a severe complication on the day of treatment. During the follow-up period, 49% of patients experienced an adverse event, of which 7% of the events were grade 3 and above (severe). The most frequently reported adverse events were mild fatigue and abdominal pain.

Published evidence

Unresectable colorectal cancer liver metastases

2.13 A systematic review of published evidence included three systematic reviews and 24 primary studies.

2.14 Published evidence on the clinical efficacy of SIRT compared to best supportive care in patients with unresectable, chemotherapy-refractory colorectal cancer is of limited quality and at risk of bias. Two retrospective comparative studies showed a statistically significant improvement in overall survival when SIRT was compared to best supportive care (Bester et al. 2012; Seidensticker et al. 2012). In one study of 224 patients treated with SIRT and 29 patients treated with best supportive care, median overall survival was improved by 5.3 months in the SIRT group (11.9 vs 6.6 months; HR 0.5; p=0.001) (Bester et al. 2012). In the second study of 29 patients treated with SIRT and 29 patients treated with best supportive

care, median overall survival was improved by 4.8 months in the SIRT group (8.3 vs 3.5 months; HR 0.26; p<0.001) (Seidensticker et al. 2012).

2.15 In a small randomised controlled trial of 44 patients comparing SIRT plus fluorouracil chemotherapy to chemotherapy alone, progression-free survival was improved by 2.4 months in the SIRT arm (4.5 vs 2.1 months; HR 0.51; p=0.03) and liver-specific progression-free survival was improved by 3.4 months in the SIRT arm (5.5 vs 2.1 months; HR 0.38; p=0.003) (Hendlisz et al. 2010). No statistically significant improvement in overall survival was observed (10.0 vs 7.3 months; HR: 0.92; p=0.80) but a cross-over design meant that this trial was not designed to detect a change in this outcome.

2.16 Severe adverse event rates were low in the RCT and not significantly different between groups (grade 3 or 4 toxicities were reported in 1 patients in the SIRT plus chemotherapy group and in 6 patients in the chemotherapy only group; p=0.10). Mild abdominal pain, nausea, and fatigue were the most common events in patients treated with SIRT in comparative studies.

2.17 Overall survival results from 23 comparative and non-comparative studies of 2,517 patients were pooled using a weighted mean. Median overall survival ranged from 6.0 to 12.7 months, and a weighted mean 9.6 months (95% CIs 8.9-10.4) was calculated. Progression-free survival was reported in 9 studies of 437 patients and ranged from 2.8 to 9.2 months (weighted mean 4.0 months). Liver-specific progression-free survival was reported in 8 studies of 376 patients and ranged from 2.0 to 9.0 months (weighted mean 4.4 months).

2.18 Health related quality of life was an outcome in one study and was poorly reported (Cosimelli et al. 2010).

Unresectable primary intrahepatic cholangiocarcinoma

2.19 A systematic review of published evidence included two systematic reviews and 10 non-comparative primary studies comprising a total of 247 patients were included. No comparative studies were identified.

2.20 Median overall survival ranged from 9.0 to 22.0 months across the included studies and a weighted mean of 15.3 months (95% CIs 12.0-18.7) was calculated. Median progression free survival was not reported in any of the studies. No studies reported health related quality of life.

Costs and cost effectiveness

Systematic review of cost effectiveness evidence

2.21 A systematic review of economic literature on the cost-effectiveness of SIRT in patients with unresectable colorectal cancer identified one relevant study (Pennington et al. 2015). The cost-effectiveness model calculated an increase in QALYs in the SIRT group of 0.81 compared to best supportive care (1.50 vs 0.69), and an ICER of £28,216. The model showed a total cost of £35,487 for SIRT and £12,730 for best supportive care; the difference was driven primarily by the initial cost of the SIRT procedure, the monthly costs for monitoring and treatment during the additional survival time in patients who received SIRT, and the additional QALYs gained in that time.

Economic analysis

Model structure

2.22 A new model was created by the external assessment centre to estimate the cost-effectiveness of SIRT compared with best supportive care in patients with unresectable, chemotherapy-refractory colorectal cancer. The model used a 3-state partitioned survival analysis where the three health states were progression-free, progressed, and death. The time horizon was five years, the cycle length was one month, the perspective was from the NHS and personal social services, and a 3.5% discount rate was applied.

Model inputs

2.23 The SIRT CtE registry data, published studies, and clinical opinion were used as sources of model inputs. Kaplan-Meier curves from the SIRT CtE registry data for overall survival and progression-free survival were extrapolated and hazard ratios were taken from available published comparative studies to create a survival curve for the best supportive care arm of the model.

Costs

2.24 A SIRT procedure cost of £21,870 was used to reflect the NHS England tariff used in the CtE project. Costs for chemotherapy, patient monitoring, and treating adverse events were applied to both SIRT and best supportive care arms.

Health related quality of life and QALY decrements

2.25 Published utility values of 0.75 for the progression-free state and 0.69 for the progressed state were applied.

Base-case results

2.26 The ICER for SIRT compared to best supportive care was £85,350 in the base case. Treatment with SIRT resulted in an increase in QALYs of 0.32 (0.58 vs 0.26). The model showed that SIRT was £27,406 more expensive than best supportive care (£31,028 vs £3,623 discounted costs). This was primarily due to high initial procedure costs in the SIRT arm.

Analysis of alternative scenarios

2.27 The cost of the SIRT procedure and the survival time were the main drivers in the model. Scenario analysis where a longer survival estimate and a lower procedure cost were used with a longer time horizon, based on the published model by Pennington et al. (2015), resulted in a lower ICER of £31,888. This demonstrates the impact of the overall survival and the procedure cost on the model outcomes.

Sensitivity analyses

2.28 Probabilistic sensitivity analysis showed that all simulations resulted in additional benefits in QALYs from SIRT compared to best supportive care for additional costs. From 3,000 simulations, 0.7% fell under a £30K willingness to pay threshold and 11.0% fell under the £50K threshold.

3 Responses to Commissioning Through Evaluation Questions

3.1 The following table lists the questions agreed by NHS England for the CtE project, and summarises the answers derived from the project, along with comments from NICE.

Table: CtE questions with responses

Q no.	CtE project question	Conclusions/results from project	NICE comments
1.	What is the estimated overall survival following SIRT treatment, in total and by indication?	Patients with unresectable, chemotherapy-refractory colorectal cancer liver metastases treated with SIRT as part of the CtE scheme had a median overall survival of 7.6 months (95% CIs 6.9 – 8.3). Patients with unresectable, chemotherapy-refractory primary intrahepatic cholangiocarcinoma treated with SIRT as part of the CtE scheme had a median overall survival of 8.7 months (95% CIs 5.3-12.1).	Validation of the mortality data was planned through data linkage to ONS mortality data. Unfortunately this was not possible because of data protection restrictions. Alternative techniques to validate the data were undertaken by hospital staff including communication with referral hospitals and checks against 3 monthly ONS mortality extracts sent to the specialist centres.

Q no.	CtE project question	Conclusions/results from project	NICE comments
2.	Do the data suggest any differential benefit for particular cohorts of patients within the wider clinical indications covered within the scheme?	Subgroup analyses of overall survival data from patients with colorectal cancer treated under the CtE scheme identified several factors associated with a survival benefit. These were: absence of extrahepatic disease, fewer liver tumours, smaller tumour to liver volume percentage, and being male.	In practice the process used by hospitals for baseline characterisation of patients varied between hospitals (use of PET scans or not to identify extra hepatic disease). Because of this and the limited numbers in the CtE scheme it would be inappropriate to undertake more detailed subgroup analysis.
3.	How does overall survival of patients treated with SIRT under CtE by indication compare with comparable groups reported in peer reviewed literature or included in randomised control trials?	A pooled analysis of overall survival estimates in published studies from 2,517 patients with unresectable colorectal cancer treated with SIRT indicates a weighted mean overall survival of 9.6 months (95% CIs 8.9-10.4). The estimate of 7.6 months from the CtE cohort fitted within the lower end of the range of previously published data. A pooled analysis of overall survival estimates in published studies from 247 patients with unresectable intrahepatic cholangiocarcinoma treated with SIRT indicates a weighted mean overall survival 15.3 months (95% CIs 12.0-18.7). The estimate of 8.7 months from the CtE cohort was much lower than previously published data. This may be due to the inclusion of chemotherapy naive patients in several previous studies. Many of the identified studies were small and had wide confidence intervals around their survival estimates.	

Q no.	CtE project question	Conclusions/results from project	NICE comments
4.	What is the progression free survival (PFS) and liver-specific PFS for patients undergoing SIRT treatment?	Patients with unresectable, chemotherapy-refractory colorectal cancer liver metastases treated with SIRT as part of the CtE scheme had a median progression free survival of 3.0 months (95% CIs 2.8-3.1) and a median liver-specific progression free survival of 3.7 months (95% CIs 3.2-4.3). Patients with unresectable, chemotherapy-refractory intrahepatic cholangiocarcinoma treated with SIRT as part of the CtE scheme had a median progression free survival 2.8 months (95% CIs 2.6-3.1) and a median liver-specific progression free survival of 3.1 months (95% CIs 1.3-4.8).	
5.	How does SIRT PFS compare with comparable groups in peer reviewed literature?	In a small randomised controlled trial of 44 patients comparing SIRT plus fluorouracil chemotherapy to chemotherapy alone in patients with colorectal cancer, progression free survival and liver-specific progression-free survival were improved in the SIRT arm. Progression free survival was improved by 2.4 months (4.5 vs 2.1 months; HR 0.51; p=0.03) and liver-specific progression-free survival was improved by 3.4 months (2.1 vs 5.5 months; HR 0.38; p=0.003). Progression-free survival was reported in 9 studies on patients with colorectal cancer with a weighted mean of 4.0 months. Liver-specific progression-free survival was reported in 8 studies with a weighted mean of 4.4 months. The results from the CtE cohort were within the lower range of published studies. No published studies reported progression-free survival in the intrahepatic cholangiocarcinoma population.	
6.	What is the Health Related Quality of Life associated with SIRT treatment for the clinical indications covered within the CtE programme?	Health related quality of life measured using EQ-5D-5L and EQ-VAS remained relatively high and constant between baseline and follow-up time points in the colorectal cancer group. A statistically significant reduction in health related quality of life was observed between baseline and 3-months after SIRT but this was small and not clinically relevant. Methodological weaknesses (in particular, a poor response rate) meant that	Clinicians cited a potential improvement in quality of life resulting from reduction in tumour burden as a main objective of the intervention. The QOL tools used in the CtE project are not disease specific and therefore were unlikely

Q no.	CtE project question	Conclusions/results from project	NICE comments
		reliable conclusions about the impact of SIRT on patients' quality of life cannot be drawn from the CtE study. One published study on patients with colorectal cancer had health related quality of life as an outcome although reporting quality was poor; anxiety levels, but not depression, reduced following SIRT. No studies on patients with intrahepatic cholangiocarcinoma reported health related quality of life as an outcome.	to pick up improvements related to reduced liver tumour burden. This could be considered a shortcoming of the project but the disease-specific QOL tools are labour intensive to complete and the Steering Group considered it unlikely that sufficient data would be submitted to be useful. A decision was made to use the EQ-5D-5L and EQ-VAS because a better response rate was expected and output could be used in health economic modelling. Despite commissioning support for data entry, our experience is that observational data submission other conflicting priorities are met by NHS staff and it is impossible to get high data completeness. Instructions for data flow must be simple, clear and consistent and plenty of support is needed at a local level. It is easy to be over ambitious when designing the study.

Q no.	CtE project question	Conclusions/results from project	NICE comments
7.	What are the hospital costs associated with treatment with SIRT for the clinical indications covered within the CtE programme?	The cost-effectiveness model created by the external assessment centre calculated a total cost of £31,028 for SIRT vs £3,623 for best supportive care.	
8.	What is the cost-effectiveness of SIRT compared to the current standard of care?	The ICER for SIRT compared to best supportive care is £85,350 in the model base case. The cost of the SIRT procedure and the survival time were the main drivers in the model. Probabilistic sensitivity analysis with 3,000 simulations showed that 0.7% fell under a £30K willingness to pay threshold and 11.0% fell under the £50K threshold.	

Q no.	CtE project question	Conclusions/results from project	NICE comments
9.	What are the total rates for recruitment to target, technical failure, procedure related complications, 30 day mortality, median and overall survival and HRQoL and QALYs associated with the SIRT CtE service in total and by indication?	543 patients were treated under the CtE scheme over approximately 40 months from December 2013 until March 2017. These estimates are based on self reported numbers. Data from 460 patients (valid entries only) were added to the SIRT registry up to the close of data entry in February 2017. 1 product incident was reported where the procedure was cancelled due to product spillage. A total of 12 “severe day of treatment complications” were recorded in the registry.	Recruitment to the CtE schemes has been slow initially in all the CtE projects. This is due to practical difficulties in establishing new referral pathways to tertiary services, availability of skilled staff and in this project, teething problems with the database. SIRT was the first CtE project and procedures started being undertaken before proper information governance arrangements had been established. ‘Active surveillance’ (i.e. data monitoring, validation and ongoing communication with data submitters) of observational data gathering was disabled by the Data Protection requirements subsequently applied. The analysis plan developed and agreed by the steering group did not include 30 day mortality (Progression Free Survival was considered more important).

10.	What are the rates by centre for recruitment to target, technical failure, procedure related complications, 30 day mortality, median and overall survival and HRQoL and QALYs associated with the SIRT CtE service in total and by indication?	Name of SIRT CtE provider hospital in England	Number of patient entries added to the registry (%) – only valid entries recorded			Analysis of the indicators listed by centre would be subject to such wide confidence intervals that the analysis was not considered to be helpful. The lack of power to detect significant difference in efficacy and safety between centres was exacerbated by the lower patient recruitment than initially planned (n=750).
			CRC	ICC	Total	
		Churchill Hospital (Oxford)	108 (27%)	12 (20%)	120 (26%)	
		Christie's Hospital (Manchester)	63 (16%)	16 (26%)	79 (17%)	
		Royal Free Hospital (London)	47 (12%)	10 (16%)	57 (12%)	
		Nottingham City Hospital (Nottingham)	47 (12%)	5 (8%)	52 (11%)	
		Freeman Hospital (Newcastle)	29 (7%)	6 (10%)	35 (8%)	
		Southampton General Hospital (Southampton)	35 (10%)	1 (3%)	36 (8%)	
		Addenbrooke's Hospital (Cambridge)	28 (7%)	5 (8%)	33 (7%)	
		Queen Elizabeth Hospital (Birmingham)	18 (5%)	1 (2%)	19 (4%)	
		King's College Hospital (London)	12 (3%)	2 (3%)	14 (3%)	
		St James's Hospital (Leeds)	12 (3%)	3 (5%)	15 (3%)	
		Total	399 (100%)	61 (100%)	460 (100%)	

Q no.	CtE project question	Conclusions/results from project	NICE comments
		For information relevant to the indicators requested please refer to the Evaluation Report; Technical failure and procedural complications pp.98–100 Progression free survival p.88 HRQoL and QALYs p.89 Section 7.3.6 and pp.96-97	
11.	Are there any research findings that have become available during the course of the CtE scheme that should be considered alongside the evaluative findings of the CtE scheme?	Nine ongoing or recently completed and unpublished studies were identified which were related to the SIRT CtE evaluation. Of these, 7 were RCTs and 2 were registries. No studies were identified which matched the chemotherapy-refractory CRC or ICC populations, and therefore none were directly relevant to the decision problem. A conference abstract recently reported results from a large combined analysis of RCT data (pooled analysis of SIRFLOX, FOXFIRE, and FOXFIRE-global trials) from chemotherapy-naive patients. This indicated that SIRT does not provide an additional survival benefit to first-line chemotherapy in this population. Generalisability of these results in generally chemotherapy-sensitive patients to the CtE decision problem is limited since the CtE population is chemotherapy-refractory or chemotherapy-intolerant.	

4 Issues for consideration

4.1 The following issues should be considered when reviewing the evidence on SIRT and the answers to the specific questions in section 3.

New evidence and conclusions from the project

4.2 The aim of the project was to generate new evidence from real-world settings to enable a judgement on clinical and cost-effectiveness of SIRT in the identified populations. The additional register-derived evidence is at risk of bias because of the study design (particular problems being incomplete data submission, lack of validation because of data protection requirements and lack of real world comparators). Outcomes data (progression free and overall survival) from SIRT procedures done in the CtE scheme are comparable to those in published evidence and do not show significant benefit compared with best supportive care. New cost modelling showed an ICER of £85,350 for SIRT compared with best supportive care, by contrast with an earlier economic study where the ICER was £28,000.

Project process and oversight

4.3 NHS England commissions CtE projects from NICE, and NICE conducts the projects to a timescale, process and methods devised by NHS England. In June 2017 NHS England published a policy document governing these projects (https://www.england.nhs.uk/publication/methods-commissioning-through-evaluation/), but the majority of the SIRT project was developed, conducted and concluded before this document was

published. Generally, however, the process followed was similar to the currently published process.

4.4 This project did not follow the planned timeline because there was a 6 month delay due to the handover of the project from Birmingham and Brunel consortium EAC to Cedar EAC. This happened in April 2015. An existing register (SIRT register hosted by BSIR) was used, and it took an additional 6 months (which was not planned into the timeline) to ensure that data governance was sufficient for a CtE project. This extended the duration of the project from 3 to 4 years, which was agreed by NHS England.

4.5 A SIRT Steering Group was established by NHS England to oversee the project and involve clinical leads and other stakeholders. NICE and the EAC worked closely with this group, and with the Data Working Group, to ensure all parties were aware of data collection requirements and to reinforce clinical ownership of the project. Companies and patient groups did not play a role in the Steering Group (in contrast with more recent projects). Early in the project there were some uncertainties around the Steering Group frequency of meetings etc, which improved as the project progressed.

4.6 NICE is accountable to Ann Jarvis, Head of Acute Programmes for Specialised Services at NHS England, for delivery of the CtE projects. For this project, NICE reported on a quarterly basis via standard reports and monitoring meetings with NHS England.

Clinical effectiveness

4.7 Published evidence on the clinical efficacy of SIRT compared to best supportive care in patients with unresectable, chemotherapy-refractory colorectal cancer is of limited quality and at risk of bias. Two retrospective comparative studies show an improvement in overall survival in patients treated with SIRT. These are at risk of bias from imbalanced prognostic factors, poor standardisation of

control arm treatments, and variability in outcome measures. A higher quality randomised controlled trial showed an improvement in both progression-free survival and liver-specific progression-free survival. Evidence on the efficacy of SIRT in patients with intrahepatic cholangiocarcinoma is based on single arm studies with no comparator group.

4.8 The SIRT CtE registry was a large, pragmatic study which is likely to reflect real-life practice in the NHS. Analysis and reporting of the study's findings was carried out by an independent research group. Interpretation of the study's results is limited by the absence of a comparator treatment group. The reliability of the study's findings is limited by high levels of missing data for certain outcomes. The absence of external data validation in the form of triangulation with routinely collected data sources or independent data validation against source documents limits the reliability of the findings. Inconsistency in outcome measurements and treatment techniques may introduce variability to the data. The impact of SIRT on patients' health related quality of life could not be reliably determined due to high levels of missing data and an insensitive measurement tool.

Cost effectiveness

4.9 Reliability of the cost model created by the external assessment centre was limited by a paucity of comparative survival data in the SIRT CtE registry or from high quality RCTs (overall survival results from the available RCT were confounded by cross-over). Hazard ratios derived from retrospective observational studies were applied which may introduce bias. Data on chemotherapy, adverse events data, monitoring, treatment during the progressed state, and utilities were not captured accurately enough during the CtE

registry study to reliably inform the model and were supplemented using published evidence, clinical advice, and assumptions.

4.10 The treatment pathway for patients receiving best supportive care is poorly defined, and likely to vary depending on patients' preference and characteristics as well as clinician preference. This introduces uncertainty to the best supportive care arm of the model.

4.11 There is a high degree of uncertainty in the overall cost of chemotherapy in both SIRT and best supportive care arms, however where both arms are being treated the impact is not great. Scenario analysis explored the impact of a lower initial procedure cost and longer survival and showed that the ICER was reduced.

4.12 The higher base case ICER of £85K in the external assessment centre model compared to £28K in the published study by Pennington et al. can be attributed to a higher cost for the SIRT procedure and a shorter survival time used in the external assessment centre model.

4.13 The generalisability of the cost-effectiveness model to the intrahepatic cholangiocarcinoma population is limited. There is insufficient evidence on whether SIRT confers a survival benefit in these patients, and the costs associated with best supportive care in this group.

5 Equality considerations

5.1 People with cancer are protected under the Equality Act 2010 from the point of diagnosis. No particular equalities issues relating to these patients were identified in CtE data or in the literature presented. If this intervention were being evaluated by NICE under Technology Appraisals Programme methods and processes, there would be the potential to apply NICE end of life criteria to the

decision-making. This consideration does not exist in NHS England decision-making criteria.

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Appendix A: Sources of evidence considered in the preparation of the project report

- Commissioning through Evaluation: Selective internal radiation therapy (SIRT) Evaluation Report - Cedar Healthcare Technology Research Centre, July 2017