

Supplementary Table 1 List of OPCS4 codes used to define potentially curative surgery and stenting procedures

OPCS-4 code	Description
Potentially curative surgery	
J02*	Partial excision of liver
J03*	Extirpation of lesion of liver
J078	Other specified other open operations on liver
J088	Other specified therapeutic endoscopic operations on liver using laparoscope
J101	Percutaneous transluminal embolisation of hepatic artery
J124	Percutaneous radiofrequency ablation of lesion of liver (stage I only)
J127	Percutaneous microwave ablation of lesion of liver (stage I only)
J18*	Excision of gall bladder
J231	Excision of lesion of gall bladder
J238	Other specified other open operations on gall bladder
J27*	Excision of bile duct
J28*	Extirpation of lesion of bile duct
J291	Anastomosis of hepatic duct to transposed jejunum and insertion of prosthesis
J292	Anastomosis of hepatic duct to jejunum NEC
J301	Anastomosis of common bile duct to duodenum
J302	Anastomosis of common bile duct to transposed jejunum
J303	Anastomosis of common bile duct to jejunum NEC
J553	Excision of transplanted pancreas
J561	Pancreaticoduodenectomy and excision of surrounding tissue
J562	Pancreaticoduodenectomy and resection of antrum of stomach
J563	Pancreaticoduodenectomy NEC
J568	Other specified excision of head of pancreas
J569	Unspecified excision of head of pancreas
J571	Subtotal pancreatectomy

J578	Other specified other partial excision of pancreas
J579	Unspecified other partial excision of pancreas
J582	Excision of lesion of pancreas NEC
X53*	Extirpation of unspecified organ

Stent insertion

	Open insertion of tubal prosthesis into both hepatic ducts and common
J311	bile duct
	Open insertion of tubal prosthesis into one hepatic duct and common
J312	bile duct
J313	Open renewal of tubal prosthesis in bile duct
J314	Open removal of tubal prosthesis from bile duct
J318	Other specified open introduction of prosthesis into bile duct
J319	Unspecified open introduction of prosthesis into bile duct
	Endoscopic sphincterotomy of sphincter of oddi and insertion of tubal
J382	prosthesis into bile duct
	Endoscopic retrograde insertion of tubal prosthesis into both hepatic
J401	ducts
J402	Endoscopic retrograde insertion of tubal prosthesis into bile duct NEC
J403	Endoscopic retrograde renewal of tubal prosthesis in bile duct NEC
J404	Endoscopic retrograde removal of tubal prosthesis from bile duct
	Endoscopic retrograde insertion of expanding covered metal stent into
J405	bile duct
	Endoscopic retrograde insertion of expanding metal stent into bile duct
J406	NEC
J407	Endoscopic retrograde renewal of expanding metal stent in bile duct
	Other specified endoscopic retrograde placement of prosthesis in bile
J408	duct
J409	Unspecified endoscopic retrograde placement of prosthesis in bile duct
	Percutaneous dilation of anastomosis of bile duct and insertion of tubal
J461	prosthesis
J462	Percutaneous dilation of anastomosis of bile duct NEC

J468 Other specified therapeutic percutaneous attention to connection of bile duct
 J469 Unspecified therapeutic percutaneous attention to connection of bile duct
 J471 Percutaneous insertion of tubal prosthesis into both hepatic ducts
 J472 Percutaneous insertion of tubal prosthesis into right hepatic duct NEC
 J473 Percutaneous insertion of tubal prosthesis into left hepatic duct NEC
 J474 Percutaneous insertion of tubal prosthesis into hepatic duct NEC
 J475 Percutaneous insertion of tubal prosthesis into common bile duct
 J478 Other specified therapeutic percutaneous insertion of prosthesis into bile duct
 J479 Unspecified therapeutic percutaneous insertion of prosthesis into bile duct
 J481 Renewal of percutaneously inserted tubal prosthesis in bile duct
 J483 Attention to percutaneously inserted tubal prosthesis in bile duct nec
 J485 Percutaneous transhepatic biliary drainage multiple
 J486 Percutaneous transhepatic biliary drainage single
 Y141 Insertion of expanding covered metal stent into organ NOC
 Y142 Insertion of expanding metal stent into organ NOC
 Y143 Insertion of metal stent into organ NOC
 Y144 Insertion of plastic stent into organ NOC
 Y145 Insertion of stent graft into organ NOC
 Y148 Other specified placement of stent in organ NOC
 Y149 Unspecified placement of stent in organ NOC
 Y151 Maintenance of stent in organ NOC
 Y152 Renewal of stent in organ NOC
 Y153 Correction of displacement of stent NOC
 Y154 Other resiting of stent in organ NOC
 Y155 Conversion to stent in organ NOC
 Y156 Adjustment to stent in organ NOC
 Y158 Other specified attention to stent in organ NOC

Y159 Unspecified attention to stent in organ NOC

Supplementary Table 2 Estimated percentage that received

	A: Surgical resection§ (n=4832)		B: Systemic therapy† (n=3925)		C: Stent insertion¶¶ (n=3925)	
	Adjusted*	Stage-Adjusted**	Adjusted*	Stage-Adjusted**	Adjusted*	Stage-Adjusted**
	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)
Population average (intercept)	18.77 (17.75, 19.79)	18.77 (17.84, 19.7)	28.69 (27.41, 29.96)	28.69 (27.41, 29.96)	28.56 (27.21, 29.92)	28.56 (27.21, 29.91)
Cheshire and Merseyside	5.56 (0.01, 11.11)	5.06 (-0.13, 10.24)	4.20 (-2.77, 11.17)	4.25 (-2.70, 11.19)	3.00(-4.29, 10.29)	2.94 (-4.35, 10.24)
East Midlands	-1.53 (-5.08, 2.02)	0.75 (-2.40, 3.90)	2.45 (-2.37, 7.27)	2.28 (-2.51, 7.08)	-5.10 (-9.74, -0.46)	-4.56 (-9.23, 0.10)
East of England - North	-5.82 (-9.03, -2.60)	-7.12 (-10.07, -4.17)	-1.51 (-5.55, 2.53)	-1.39 (-5.45, 2.67)	10.26 (5.36, 15.15)	9.50 (4.60, 14.39)
East of England - South	1.38 (-2.57, 5.32)	2.21 (-1.40, 5.83)	-4.29 (-8.61, 0.02)	-4.39 (-8.72, -0.06)	7.94 (2.53, 13.35)	8.23 (2.82, 13.64)
Greater Manchester	-4.73 (-8.13, -1.33)	-8.19 (-11.45, -4.92)	0.02 (-4.24, 4.27)	0.58 (-3.74, 4.90)	-3.14 (-7.69, 1.42)	-4.38 (-8.95, 0.19)
Humber, Coast and Vale	4.21 (-1.57, 10.00)	2.46 (-2.24, 7.16)	0.94 (-6.33, 8.25)	0.98 (-6.27, 8.23)	-9.87 (-16.43, -3.31)	-9.78 (-16.23, -3.33)

	10.00)		8.21)	8.23)	3.31)	3.32)
Kent and Medway	-2.09 (-8.24, 4.07)	0.26 (-5.34, 5.86)	-0.35 (-7.92, 7.22)	-0.68 (-8.27, 6.92)	5.29 (-3.27, 13.85)	6.04 (-2.40, 14.48)
Lancashire and South Cumbria	4.03 (-1.03, 9.09)	2.56 (-2.02, 7.14)	5.78 (-0.55, 12.11)	5.85 (-0.47, 12.17)	7.27 (0.21, 14.34)	7.22 (0.25, 14.19)
North Central London	1.10 (-6.60, 8.81)	0.97 (-6.02, 7.96)	4.19 (-5.56, 13.93)	4.20 (-5.50, 13.89)	2.28 (-8.07, 12.62)	2.01 (-8.22, 12.23)
North East London	0.56 (-7.10, 8.22)	0.01 (-7.51, 7.53)	11.19 (0.85, 21.53)	11.43 (1.13, 21.72)	11.71 (0.88, 22.55)	11.00 (0.04, 21.96)
North West and South West London	2.95 (-2.43, 8.34)	2.51 (-2.14, 7.15)	7.11 (0.55, 13.67)	7.00 (0.47, 13.54)	-0.67 (-7.40, 6.07)	-0.28 (-6.91, 6.35)
Northern	-1.37 (-4.54, 1.79)	-0.14 (-2.84, 2.55)	1.37 (-2.87, 5.60)	1.16 (-3.09, 5.40)	-11.89 (-15.67, -8.10)	-11.31 (-15.07, -7.54)
Peninsula	3.54 (-1.25, 8.33)	0.81 (-3.51, 5.12)	0.06 (-5.53, 5.64)	0.30 (-5.26, 5.86)	8.60 (1.66, 15.54)	7.90 (1.07, 14.74)
Somerset, Wiltshire, Avon and Gloucestershire	-1.67 (-6.65, 3.32)	-2.04 (-6.80, 2.72)	-0.94 (-7.69, 5.81)	-0.85 (-7.61, 5.91)	5.37 (-1.88, 12.62)	5.16 (-2.13, 12.44)
South East London	1.19 (-7.41, 9.79)	3.89 (-3.67, 11.44)	-0.96 (-10.96, 9.03)	-1.33 (-11.31, 8.66)	-3.42 (-13.24, 6.40)	-2.31 (-12.00, 7.38)

South Yorkshire and Bassetlaw	8.47 (-0.33, 17.27)	10.23 (2.70, 17.77)	-0.90 (-10.33, 8.53)	-1.06 (-10.47, 8.36)	-0.99 (-12.43, 10.44)	-0.36 (-11.53, 10.82)
Surrey and Sussex	-2.79 (-7.37, 1.79)	0.37 (-3.87, 4.61)	-1.81 (-7.67, 4.06)	-2.08 (-7.94, 3.78)	12.24 (5.53, 18.95)	13.06 (6.35, 19.77)
Thames Valley	2.60 (-4.30, 9.51)	2.13 (-4.06, 8.33)	-0.35 (-9.15, 8.45)	-0.35 (-9.16, 8.45)	-6.12 (-14.57, 2.33)	-6.59 (-15.05, 1.87)
Wessex	-0.20 (-4.44, 4.05)	-1.50 (-5.51, 2.51)	-3.13 (-8.35, 2.09)	-2.99 (-8.19, 2.20)	3.10 (-2.71, 8.92)	2.71 (-3.10, 8.52)
West Midlands	2.29 (-0.61, 5.20)	3.26 (0.61, 5.91)	-5.13 (-8.60, -1.66)	-5.27 (-8.76, -1.78)	-10.40 (-13.80, -7.00)	-10.05 (-13.46, -6.64)
West Yorkshire and Harrogate	-2.76 (-7.90, 2.39)	-1.77 (-6.22, 2.68)	0.60 (-5.68, 6.89)	0.61 (-5.72, 6.95)	-5.76 (-12.33, 0.80)	-5.71 (-12.28, 0.86)

A: potentially curative surgery B: systemic therapy amongst those who did not receive surgery C: stent insertion amongst those who did not receive surgery across Cancer Alliances in England in those with known stage at diagnosis, with and without adjustment for stage; results from sensitivity analyses

The cohort contains cholangiocarcinoma patients diagnosed between January 2014 and December 2017 inclusive with known stage at diagnosis.

§ Potentially curative surgery - potentially curative surgery between one month prior and 12 months following diagnosis.

† Systemic therapy - (excludes patients who received potentially curative surgery), any SACT between one month prior and 15 months following diagnosis.

¶¶ Stent insertion - (excludes patients who received potentially curative surgery), any stenting procedure two months prior to or 15 months following diagnosis.

*Adjustment for: Age, gender, income deprivation quintile, Charlson comorbidity index, underlying liver disease at diagnosis, diagnosis year, tumour morphology, tumour sub-type, route to diagnosis

**Adjustment for above covariates plus stage at diagnosis.

Apart from intercept, estimates represent the percentage-point difference from the weighted cohort average probability of each treatment modality. CI: Confidence Interval.