NPaCA
National Pancreatic Cancer Audit

NATCAN
National Cancer Audit Collaborating Centre

National Pancreatic Cancer Audit State of the Nation Report 2026: Methodology Supplement

An audit of care received by people diagnosed with pancreatic cancer between 1 January 2022 to 31 December 2023 in England and 1 January 2023 and 31 December 2024 in Wales.

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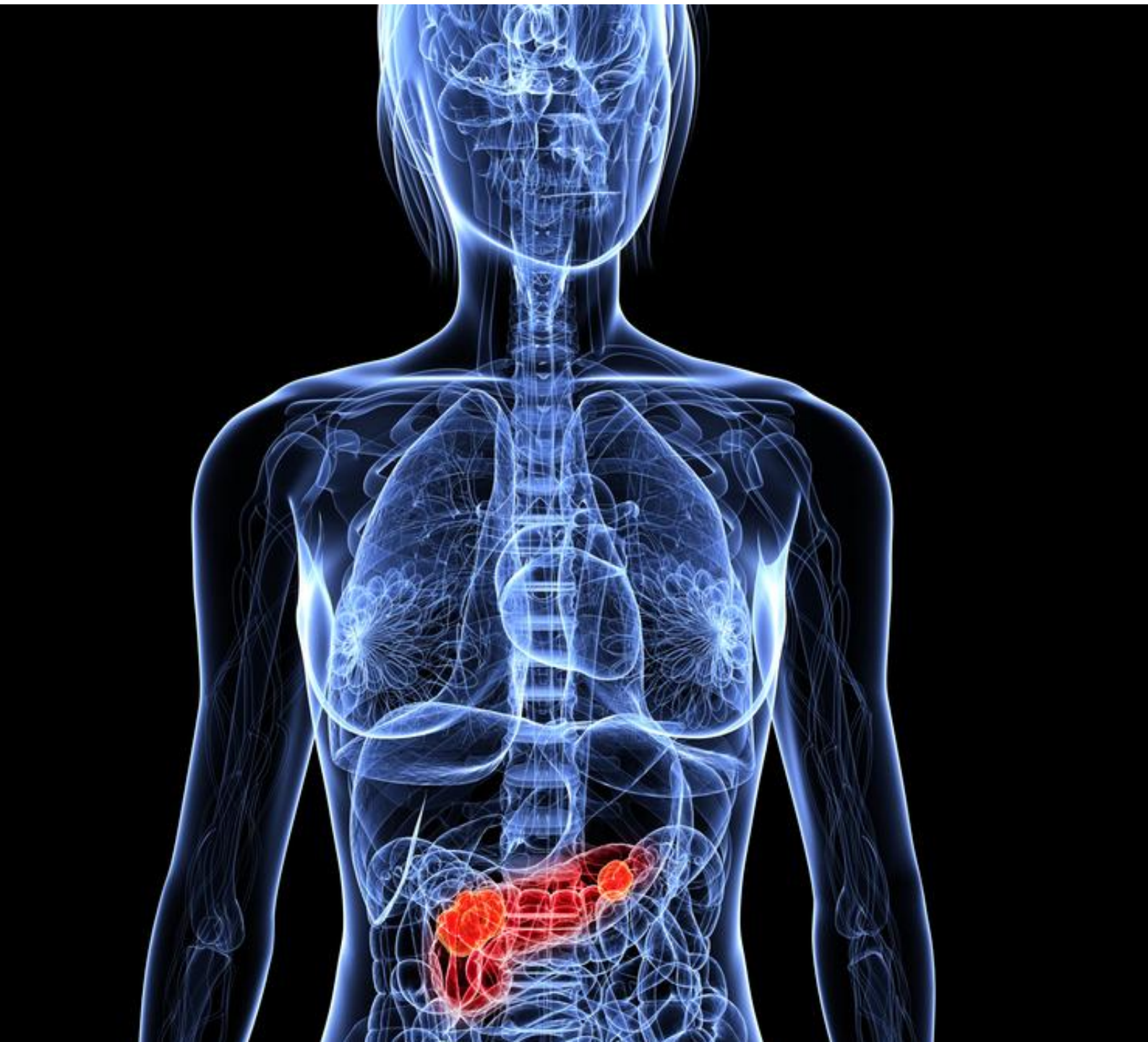

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The Association of Upper Gastrointestinal Surgery of Great Britain and Ireland is the speciality society that represents upper gastrointestinal surgeons. It is one of the key partners leading the Audit. Registered Charity no: 1093090

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Royal College of Radiologists is the professional body for clinical radiologists and clinical oncologists. It is one of the key partners leading the Audit. Registered Charity no: 211540

This work uses data that has been provided by patients and collected by the NHS as part of their care and support. For patients diagnosed in England, the data is collated, maintained and quality assured by the National Disease Registration Service (NDRS), which is part of NHS England. Access to the data was facilitated by the NHS England Data Access Request Service.

NHS Wales is implementing a new cancer informatics system. As a result, the quality and completeness of data from Wales is likely to have been impacted due to implementation of this new system across multiple NHS organisations (Health Boards), which has resulted in data being supplied by both old and new systems. Additionally, and reflecting the uncertainty of data quality, the data submitted to the audit may not have undergone routine clinical validation prior to submission to the Wales Cancer Network (WCN), Public Health Wales.

Contents

1. Introduction

This document provides supporting material to the 2026 State of the Nation (SotN) Report for the National Pancreatic Cancer Audit (NPaCA) and its data dashboard. The document describes the data used in the report with details on sources of data, criteria for inclusion and how data completeness, patient characteristics and performance indicators are derived and reported.

2. Sources of Data

The audit uses information from routine national health care datasets in England and Wales. These datasets capture details on the diagnosis, management, treatment and outcome of every patient diagnosed with a new cancer in the NHS in England and Wales.

For England, the audit cohort is based on the "gold standard" National Cancer Registration Data (NCRD) which is curated by the National Disease Registration Service (NDRS). The information held in the NCRD is compiled from a variety of sources including the Cancer Outcomes and Services Dataset (COSD), Hospital Episode Statistics admitted patient care (HES APC) records, the Systemic Anti-Cancer Therapy dataset (SACT), RTDS and data submitted by pathology laboratories. The audit also links information from several other routine national health care datasets: see Appendix 1: Routine data sources for more detail on the data sources analysed as part of the audit.

As with cancer registries in other countries, cancer registrations in England can take up to 5 years after the end of a given calendar year to reach approximately 100% completeness and stability. NDRS uses an active system of gathering information on cancer diagnoses from multiple sources across the patient pathway. Completeness varies by tumour type because different patient pathways provide different opportunities for data flows into NDRS. The "gold standard" cancer registration dataset that is used in cancer statistics bulletins and available for analysis outside of NDRS contains over 98% of all the people that will eventually be found by the registration process, and the completeness for a calendar year of data increases over time. More information about the cancer registration process can be found here and the timeliness of the NCRD here.

The English data received by the National Cancer Audit Collaborating Centre (NATCAN) included information on people diagnosed with cancer up to 31st December 2023.

For Wales, the audit was provided with a registration dataset at patient level for patients diagnosed with cancer during 1st January 2023 to 31st December 2024. Welsh cancer registration data are captured through a national system, previously the Cancer Information System for Wales (CaNISC) and now the new Welsh Clinical Portal. The audit also received linked datasets of records from the Patient Episode Database for Wales (PEDW) containing information on inpatient and day case activity, and mortality data from the Office for National Statistics (ONS).

English and Welsh data were managed and analysed separately due to the different reporting periods and availability of data items.

3. Inclusion and Exclusion Criteria

The data provided by NDRS and WCN are checked and filtered to identify eligible participants. Tables 3.1 and 3.2 explain the process in defining the final cohorts that are included in the audit.

People were included for analysis within the SotN Report if they met the following criteria:

Table 3.1: Audit Inclusion Criteria	
Inclusion Criteria	**Details**
Type of cancer	Malignant neoplasm of the pancreas; Malignant neoplasm of the extrahepatic bile duct or ampullary tumours. See diagnosis codes listed in Appendix 3: Table 1
Adults	Age >=18
First Diagnosis	Earliest diagnosis date in the extract of data received England In instances of multiple pancreatic cancer diagnoses on the same day, prioritised records based on: • Worst (most advanced) stage, then • Record with most complete information across variables Wales • Only included patients who had a patient ID • Within duplicated patient rows, we prioritised those who had a diagnosis date, followed by those who had TNM staging detail, followed by most complete treatment information • For patients with records in both cancer informatics systems (CDF and CaNISC), records were prioritised based on more complete treatment, imaging and performance status information
Valid Diagnosis Date	England: 1st January 2022 to 31st December 2023 Wales: 1st January 2023 to 31st December 2024

Table 3.2: Audit Exclusion Criteria	
Exclusion Criteria	**Details**
Neuroendocrine tumours of the pancreas	**For English data:** In NCRD: Tumour site = C254 (Endocrine pancreas) and/or histology_coded_desc contains word “neuroendocrine” or “carcinoid” and/or morph_icd10_o2 or morph_coded contain neuroendocrine morphology codes specified in Appendix 3: Table 2 In SACT: morphology_clean contains neuroendocrine morphology codes specified in Appendix 3: Table 2 and/or benchmark_group = lanreotide or octreotide and/or drug_group = lanreotide or octreotide and primary_diagnosis=”C24” or “C25” **For Welsh data:** Table 2 In CaNISC: MORPHOLOGY_DESCRIPTION contains word “Carcinoid” or “Neuroendocrine” and/or TUMOUR_SITE_ICD10_CODE (CaNISC) = C25.4 and/or MORPHOLOGY_CODE contains neuroendocrine morphology codes specified in Appendix 3: Table 2 In CDF: MorphologyDiagnosis contains word “Carcinoid” or “Neuroendocrine” and/or DiagnosisICD10 = C25.4

Reported by death certificate only or date of diagnosis corresponds to date of death	**For English data:** Using NCRD: final_route = DCO (Death Certificate Only) and/or basisofdiagnosis = 0 (Death certificate) and/or dco = Y (tumour registered from a death certificate only) and/or diagnosisdatebest = deathdatebest **For Welsh data:** In CaNISC: DIAGNOSIS_DATE (CaNISC) = date of death Note: Date of death derived from the earliest date of two variables: DATE_OF_DEATH (CaNISC) and date_of_death (ONS) In CDF: DateOfPrimaryDiagnosis (CDF) = date_of_death (ONS)
Diagnosed outside country of interest and no treatment of interest	**For English data:** Trust of diagnosis was a Welsh health board (code starting with 7) and No record of major resection in England (Note: Trust code starting with "R" is in England) Note on Wales: If a patient was diagnosed in Wales, they have been included in the main cohort. If they were diagnosed in Wales, but part of their treatment pathway included an English hospital (e.g. surgery in England), these they have still been included in the overall national figures, but they are removed from the denominator for surgery-related metrics.

4. Key Data Items

Details of the variables and datasets used to compile data completeness variables are shown below in Table 4.1

Table 4.1: Data Completeness Variables

Data Item	**Source**			
	England		**Wales**	
	Data field	**Dataset**	**Data field**	**Dataset**
Stage at Diagnosis	stage_best Derivation: stage recoded as stage 4 if basisofdiagnosis took values 6 or 7.2 (both "histology of a metastasis")	NCRD	CaNISC: Derived using 3 variablesT_STAGE_Final_Pretreatment, N_STAGE_Final_Pretreatment and M_STAGE_Final_Pretreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) staging for pancreatic cancer version 8[1] – see	CaNISC, CDF

[1] MB Amin, SB Edge, FL Greene, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York: Springer; 2017.

			Appendix 4: AJCC TNM staging of (exocrine) pancreatic cancer CDF: Derived using 3 variables T_Stag_FinalPreTreatment, N_Stag_FinalPreTreatment and M_Stag_FinalPreTreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) staging for pancreatic cancer version 8[2] – see Appendix 4: AJCC TNM staging of (exocrine) pancreatic cancer *Note on non-metastatic vs metastatic disease:* If the overall stage is unknown (e.g. Missing T and N stage) but the M stage is 0, then the person is considered to have non-metastatic cancer. Hence, more patients can be categorised as metastatic or non-metastatic than reflected in the individual stage groups.	
Performance status	performancestatus	COSD	CaNISC: PERFORMANCE_STATUS CDF: PerformanceStatus	CaNISC, CDF
CNS (Clinical Nurse Specialist) involved	Derived using clinicalnursespecialist, counting any "Yes" response option as CNS involved	Derived by NDRS from COSD	CDF: Derived using HasSeenClinicalNurseSpecialist variable, counting any "Yes" in options as CNS involved	CDF

[2] MB Amin, SB Edge, FL Greene, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York: Springer; 2017.

			NB. No CNS information available for patients with data from CaNISC	

Details of the variables and datasets used to compile the patient and tumour characteristics are shown below in Table 4.2.

Table 4.2: Patient and Tumour Characteristics Variables

Data Item	**Source**			
	England		**Wales**	
	Data field	**Dataset**	**Data field**	**Dataset**
Age at diagnosis	Age, categorised into 10 year groups	NCRD	CaNISC: Derived using Monthofbirth and Yearofbirth and DIAGNOSIS_DATE CDF: Derived using MonthofBirth, YearofBirth and DateOfPrimaryDiagnosis Calculated as the difference between date of diagnosis and date of birth	CaNISC, CDF
Diagnosis date	diagnosisdatebest Replaced diagnosis date with MDT meeting date when diagnosis date was equal to date of surgery. Note: not always possible as there were people with missing MDT meeting date	NCRD	CaNISC: DIAGNOSIS_DATE CDF: DateOfPrimaryDiagnosis	CaNISC, CDF
Ethnicity	ethnicity Grouped as: White = 0, A, B, or C Mixed = D, E, F, or G Asian or Asian British = H, J, K, L, or R Black or Black British = M, N, or P Other ethnic group = S Missing = any other entry	NCRD	EthnicGroupCategory	PEDW
Index of multiple deprivation	imd19_quintile_lsoas	NCRD	QuintileGroup For duplicate patient rows in the LSOA	LSOA

			dataset, the lowest recorded quintile (i.e the most deprived) was used.	
Sex	gender	NCRD	CaNISC: GENDER CDF: Gender	CaNISC, CDF
Performance status at diagnosis	performancestatus	COSD	CaNISC: PERFORMANCE_STATUS CDF: PerformanceStatus	CaNISC, CDF
Stage at Diagnosis	stage_best	NCRD	CaNISC: Derived using 3 variables T_STAGE_Final_Pretreatment, N_STAGE_Final_Pretreatment and M_STAGE_Final_Pretreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) staging for pancreatic cancer version 81 – see Appendix 4: AJCC TNM staging of (exocrine) pancreatic cancer CDF: Derived using 3 variables T_Stag_FinalPreTreatment, N_Stag_FinalPreTreatment and M_Stag_FinalPreTreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) staging for pancreatic cancer version 82 – see Appendix 4: AJCC TNM staging of (exocrine) pancreatic cancer Note on non-metastatic vs metastatic disease: If the overall stage is unknown (e.g. Missing T and N stage) but the M stage is 0, then the person is considered to have non-metastatic cancer. Hence, more patients can be categorised as	CaNISC, CDF

			metastatic or non-metastatic than reflected in the individual stage groups.	
Tumour site	Site_icd10	NCRD	CaNISC: TUMOUR_SITE_ICD10_CODE CDF: DiagnosisICD10	CaNISC, CDF

Details of the variables and datasets used to construct performance indicators are listed below in Table 4.3.

Table 4.3 Indicator construction variables

Data Item	**Source**			
	England		**Wales**	
	Data field	**Dataset**	**Data field**	**Dataset**
Diagnosis, staging, and treatment planning				
Biliary stent	Derived by searching variables opertn_1 – opertn_24 for biliary stent codes listed in Appendix 3: Table 5, up to 30 days before diagnosis date	HES-APC HES-OP	Derived by searching variables operation01 – operation12 for biliary stent codes listed in Table 5, up to 30 days before diagnosis date	PEDW
Biliary stent date	Earliest of opdate_01 – opdate_24 (HES-APC) or apptdate (HES-OP) associated with biliary stent record, up to 30 days before diagnosis date	HES-APC HES-OP	Corresponding procedure dates taken from operation01datestyleddmmyyy - operation12datestyle, up to 30 days before diagnosis date	PEDW
Imaging record	Derived by searching variables imagingcodesnomedct or imagingcodenicip for imaging codes listed in Appendix 3: Table 3 (DIDs) and searching variables opertn_1 – opertn_24 for imaging codes listed in Appendix 3: Table 9	DIDs HES-APC HES-OP	CaNISC: Patients who had a relevant scan were identified by the presence of a date in the variable: Imaging__PET CDF: Patients who had a relevant scan were identified by the presence of 'PET' in the variable: ImagingModality	CaNISC, CDF
Imaging date	Diagnostictestdate associated with imaging record	DIDs	CaNISC: Imaging__PET CDF: ImagingDate (selected date associated with imaging record)	CaNISC, CDF
MDT meeting record / date	firstmdtmeetingdate	Derived by NDRS from COSD	CDF: CancerCarePlanMDTDate NB: No MDT information available for patients with data from CaNISC	CDF
Organisation of diagnosis (Trust or local health board)	diag_trust	NCRD	CaNISC: ORGANISATION_CODE CDF: HospitalWhereDiagnosisWasMadeCod NB. SiteFirstSeenCode used if HospitalWhereDiagnosisWasMadeCod was missing	CaNISC, CDF
Diagnosis date	diagnosisdatebest	NCRD	From CaNISC: DIAGNOSIS_DATE From CDF: DateOfPrimaryDiagnosis	CaNISC, CDF

	Replaced diagnosis date with MDT meeting date when diagnosis date was equal to date of surgery. Note: not always possible as there were people with missing MDT meeting date			
Time from referral to start of treatment				
Referral date	crtp_date Data cleaning: replaced to missing any referral dates more than 183 days (6 months) before diagnosis date or more than 7 days after diagnosis date In instances of multiple records per patient, executed the following steps to select referral date: - Dropped records if duplicates in terms of: patient ID, referral date, referral source, priority type, and site ICD10 code - Sorted records based on patient ID and referral date. In instances of duplicates in terms of referral date, prioritised records in the order of: (1) Containing an audit-eligible tumour site ICD-10 code (C25 or C24), (2) Complete data on referral source and priority type, (3) GP referral source , (4) Urgent priority referral - Selected record with earliest referral date, dropping other records for the patient	CWT	CaNISC: DATE_OF_REFERRAL CDF: DateOfCancerReferral Data cleaning: replaced to missing any referral dates more than 183 days (6 months) before diagnosis date or more than 7 days after diagnosis date	CaNISC, CDF

Referral source	ref_source Grouped as follows: *Urgent GP referral:* 3 - "General medical practitioner", with priority_type of 2 (urgent) or 3 (two-week wait) *Following emergency admission or attendance:* 1 – "Consultant initiated following an emergency admission", 4 – "Consultant not initiated following a referral from an Emergency Care Department", or 10 – "Consultant initiated following an Emergency Care Attendance" *Secondary care:* 2 – "Consultant initiated following a Domiciliary Consultation" , 5 – "Consultant not initiated following a referral from a Consultant, other than in an Emergency Care Department", 11 – "Consultant initiated: Other (not listed)"	CWT	CaNISC: SOURCE_OF_REFERRAL Grouped as follows: *GP referral*: "Referral from a General Medical Practitioner" *Emergency*: "Following an A&E attendance", "Following an emergency admission" *Secondary referral*: "Referral of an IP by a Consultant", "Referral from OP by a Consultant, other than A&E" CDF: SourceOfReferral Grouped as follows: *GP referral*: "Referral from a general medical practitioner" *Emergency*: "Following an accident and emergency attendance (including minor injuries units and walk in centres)", "Following an emergency admission", "Referral from A&E department (including minor injuries units and walk in centres)" *Secondary referral*: "Referral from a consultant or independent nurse, other than in an A&E department", "Referral from a Specialist Nurse (Secondary Care)"	CaNISC, CDF
Treatment date	Derived as date of first record of disease-targeted treatment (see below)	Various – see below	Derived as date of first record of disease-targeted treatment (see below)	Various – see below
Disease-targeted treatment				
Surgery record	Derived by searching variable opcs4_code (NCRD) and opertn_1 – opertn_24 (HES-APC) for surgery codes listed in Appendix 3: Table 4	NCRD HES-APC	1. From PEDW: Derived by searching the variables operation01 – operation12 in PEDW for surgery codes listed in Table 4. 2. From CaNISC: Derived by searching for the surgery codes in the variable PROCEDURE_CODE 3. From CDF: Derived by searching TreatmentModality for "surgery" or searching for the surgery codes in the variable PrimaryProcedureOPCS	PEDW, CaNISC, CDF
Surgery date	eventdate (NCRD) or opdate_01 – opdate_24 (HES-APC) associated with surgery record	NCRD HES-APC	1. From PEDW: operation01datestyleddmmyyy – operation12datestyle 2. From CaNISC: DATE_OF_SURGERY 3. From CDF: TreatmentStartDate (selected date associated with surgery record) Nb: In cases of multiple surgery dates identified, or discordance between	PEDW, CaNISC, CDF

			datasets, the earliest date of surgery was used.	
Trust of surgery	trust_code (NCRD) or procode3 (HES-APC) associated with surgery record	NCRD HES-APC	1. From PEDW: ProviderOrganisationCode 2. From CaNISC: PLACE_OF_SURGERY_CODE 3. From CDF: TreatmentSite (selected site associated with surgery record) If datasets agreed on the date of the surgery, but there was a discrepancy in the location of the surgery location, then the location in the CaNISC or CDF dataset was used (as it has been more curated)	PEDW, CaNISC, CDF
SACT (Systemic Anti-Cancer Treatment)	Derived based on any record of anti-cancer treatment (except exclusions in Appendix 3: Table 6) in SACT and/or searching opertn_1 – opertn_24 (HES) for the chemotherapy administration codes in Appendix 3: Table 8	SACT HES-APC HES-OP	Derived based on a record of SACT in: 1. PEDW: Derived by searching the variables operation01 – operation12 in PEDW for SACT codes listed in Appendix 3 Table 8 and only SACT associated with a C24 or C25 diagnosis code in the variables Diagnosis01-Diagnosis14 were used. 2. CaNISC: the presence of a value in the variable START_DATE_OF_CHEMOTHERAPY 3. CDF: the presence of "chemotherapy" or "chemoradiotherapy" in the variable TreatmentModality 4. SACT dataset: the presence of a value in the variable DateofActivity.	PEDW, CaNISC, CDF, SACT dataset
SACT date	Earliest of start_date_of_cycle (SACT) or opdate_01 – opdate_24 (HES-APC), or apptdate (HES-OP) associated with SACT treatment record	SACT	Earliest of: 1. PEDW: operation01datestyleddmmyyy – operation12datestyle 2. CaNISC: START_DATE_OF_CHEMOTHERAPY 3. CDF: TreatmentStartDate (selected date associated with SACT record) 4. SACT dataset: DateofActivity	PEDW, CaNISC, CDF, SACT dataset
Radiotherapy treatment	Derived based on any record of radiotherapy (excluding brachytherapy (rttreatmentmodality=06)) Captured rtprescribeddose & prescribedfractions to flag palliative regimens of 30Gy/15 fractions; 26Gy/5 fractions; 20Gy/5 fractions; 8Gy/1 fractions	RTDS	1. CaNISC: Derived based on the presence of a value in the variable START_DATE_OF_RADIOTHERAPY 2. CDF: Derived based on the presence of "radiotherapy" or "chemoradiotherapy" in the variable TreatmentModality 3. RT dataset: Derived based on the presence of a value in the variable RTStartDate For RT fractionation information: a. From CaNISC: RADIOTHERAPY_PRESCRIBED_DOSE	CaNISC, CDF, RT dataset

			and RADIOTHERAPY_PRESCRIBED_FRACTION b. From RT dataset: PrescribedDoseTotal and PrescribedFractionTotal Nb: No RT fractionation information available from CDF	
Radiotherapy date	apptdate associated with radiotherapy treatment	RTDS	Earliest of: 1. CaNISC: START_DATE_OF_RADIOTHERAPY 2. CDF: TreatmentStartDate (selected date associated with radiotherapy treatment) 3. RT dataset: RTStartDate	CaNISC, CDF, RT dataset
Chemoradiotherapy treatment	Derived based on record of SACT and radiotherapy	Derived	Derived based on record of SACT and radiotherapy	Derived
Disease-targeted treatment	Any record of surgery, SACT, or radiotherapy up to 9 months (274 days) after diagnosis date Note: records of surgery up to 30 days before diagnosis date were also permitted	Derived	Any record of SACT or radiotherapy up to 9 months (274 days) after diagnosis date and any record of surgery up to 12 months (365 days) after diagnosis date Note: records of surgery up to 30 days before diagnosis date were also permitted	Derived
First treatment date	Earliest of surgery date, SACT date, and radiotherapy date up to 9 months (274 days) after diagnosis date Note: records of surgery up to 30 days before diagnosis date were also permitted	Derived	Earliest of surgery date, SACT date, and radiotherapy date up to 9 months (365 days) after diagnosis date for SACT and radiotherapy, and 12 months (365 days) after diagnosis date for surgery Note: records of surgery up to 30 days before diagnosis date were also permitted	Derived
Supportive care for pancreatic cancer				
CNS (Clinical Nurse Specialist) involved	Derived using clinicalnursespecialist, counting any "Yes" response option as CNS involved	Derived by NDRS from COSD	CDF: Derived using HasSeenClinicalNurseSpecialist variable, counting any "Yes" in options as CNS involved NB. No CNS data available for patients with data from CaNISC	CDF
PERT (Pancreatic Enzyme Replacement Treatment prescription)	Derived based on prescribedbnfcode=0109040 or prescribedbnfname of "Creon", "Pancrease", "Nutrizym", or "Pancrex"	Primary care prescribing data	Data not provided	
Survival outcomes				
Date of death	Derived based on vitalstatusdate when vitalstatus=D If vitalstatusdate missing, replace with deathdatebest if available	NCRD	Date of death derived from the earliest date of two variables: DATE_OF_DEATH (CaNISC) and date_of_death (ONS) NB. date of death not provided for CDF cohort, so date_of_death (ONS) was used	CaNISC, ONS

	Note: some people will not have a date of death if at the last known vitalstatusdate their vitalstatus=A (Alive)			
Survival at specific time points post-diagnosis	Derived based on difference between diagnosis date and vital status date Example: 30 days post diagnosis, person flagged as deceased if vitalstatusdate minus diagnosis date <30 & vitalstatus=D (dead); person flagged as alive if vitalstatusdate minus diagnosis date >30		CaNISC: Calculated as the difference between DIAGNOSIS_DATE (CaNISC) and the date of death. CDF: Calculated as the difference between DateOfPrimaryDiagnosis (CDF) and the date of death. Date of death derived from the earliest date of two variables: DATE_OF_DEATH (CaNISC) and date_of_death (ONS)	CaNISC, ONS

5. Indicator Definitions

The audit uses performance indicators to monitor progress against its quality improvement goals. These indicators have been selected to align with national guidelines and standards, where relevant. Definitions of how the indicators included in the SotN report were derived from data for England and Wales are described below.

Indicators were reported for people with a diagnosis code for pancreatic cancer (see inclusion criteria). A sub-set of indicators were also reported for people with an extrahepatic bile duct or ampullary tumour (supplementary results).

5.1 Performance Indicator 1: FDG-PET/CT scan prior to surgery

Percentage of people who had an FDG/PET-CT scan prior to surgery for pancreatic cancer.

Table 5.1: Percentage of people who had an FDG-PET/CT scan prior to surgery for pancreatic cancer

	England	**Wales**
Dates of diagnosis:	1/1/2021 to 31/12/2023	1/1/2022 to 31/12/2024
Numerator: Number of people with a record of an FDG-PET/CT or PET/CT prior to surgery	Number of people with an imaging record for an FDG-PET/CT or PET/CT scan up to 6 months prior to surgery record	Number of people with a record of a date of an FDG-PET/CT in the 6 months prior to any pancreatic surgery occurring in a Welsh local health board.
Denominator: Number of people with a record of any pancreatic surgery	Number of people with a record of any pancreatic surgery at an HPB specialist centre within 30 days prior to diagnosis date or up to 12 months after diagnosis date	Number of people with a record of any pancreatic surgery occurring in a Welsh local health board within 30 days prior to diagnosis date or up to 12 months after diagnosis date
Construction notes	Time restriction: only count imaging records on or before date of pancreatic surgery, and no more than 183 days (6 months) prior to date of pancreatic surgery	Time restriction: only count imaging records on or before date of pancreatic surgery, and no more than 183 days (6 months) prior to date of any pancreatic surgery.

	Liver MRI reported separately as additional information, but not included within the indicator	Details on the type of PET scan performed were not provided (eg. tracer used or anatomical site scanned). We have therefore included anyone with a record of any PET scan in this indicator.
Country reporting:	England & Wales separately	
Organisational Reporting level:	HPB specialist centre	National
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.2 Performance Indicator 2: Multidisciplinary team (MDT) meeting

Percentage of people who had a record of being discussed at an MDT (Multidisciplinary Team) meeting.

Table 5.2: Percentage of people who had a record of being discussed at a multidisciplinary team (MDT) meeting

	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	1/1/2024-31/12/2024
Numerator:	Number of people with a record of an MDT meeting date within 60 days before or after diagnosis date	Number of people with a record of an MDT meeting date within 60 days before or after diagnosis date
Denominator:	Number of people with a primary diagnosis of pancreatic cancer	Number of people with a primary diagnosis of pancreatic cancer
Construction notes		Only available for a subset of patients diagnosed in 2024 who had information recorded in CDF
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	National
Subgroup Reporting:	None	Not reported
Risk adjusted:	No	Not reported
Outlier reporting:	No	Not reported

5.3 Performance Indicator 3: Biliary stent prior to surgery

Percentage of people undergoing a Whipple procedure (without neoadjuvant chemotherapy) who had a biliary stent placed prior to surgery.

Table 5.3: Percentage of people undergoing a Whipple procedure (without neoadjuvant chemotherapy) who had a biliary stent placed prior to surgery

	England	**Wales**
Dates of diagnosis:	1/1/2021 to 31/12/2023	1/1/2022 to 31/12/2024
Numerator: Number of people with a record of biliary stent prior to Whipple procedure without record of SACT/RT before procedure	Number of people with a record of biliary stent prior to Whipple procedure without record of SACT/RT up to 14 weeks (98 days) before procedure	Number of people with a record of biliary stent prior to Whipple procedure in a Welsh health board without record of SACT/RT up to 14 weeks (98 days) before procedure

Denominator: Number of people who had a Whipple procedure without a record of SACT/RT before procedure	Number of people who had a Whipple procedure at an HPB specialist centre within 30 days prior to diagnosis date or up to 12 months after diagnosis date without a record of SACT/RT up to 14 weeks (98 days) before procedure	Number of people who had a Whipple procedure in a Welsh health board only, without a record of SACT/RT up to 14 weeks (98 days) before procedure
Construction notes	Neo-adjuvant chemo-radiotherapy: see approach as part of indicator #7	Neo-adjuvant chemo-radiotherapy: see approach as part of indicator #7
Country reporting:	England & Wales separately	
Organisational Reporting level:	HPB specialist centre	National
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.4 Performance Indicator 4: Time to treatment

Time from suspected cancer referral to first disease-targeted treatment, presented as:

- Time from referral to diagnosis
- Time from referral to first treatment
- Time from diagnosis to first treatment (for those with a referral date)
- % diagnosed within 21 days of referral

Table 5.4: Time from referral to first treatment (days)		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	1/1/2023 to 31/12/2024
Numerator: Median time (days) from urgent suspected cancer referral to first treatment	Median time (days) from referral to first disease-targeted treatment	Median time (days) from suspected cancer referral to first disease-targeted treatment
Denominator: N/A	N/A	N/A
Construction notes	Calculate median and IQR for the following time periods: • Referral date to diagnosis date • Referral date to date of first disease-targeted treatment date • Diagnosis date to first disease-targeted treatment date (for those with a referral) Calculate % with a diagnosis date within 21 days of referral date: Numerator: count of people with ≤21 days between date of referral and diagnosis date Denominator: count of people with a referral date	Calculate median and IQR for the following time periods (for each source of referral group and overall for patients with a date of referral): • Referral date to diagnosis date • Referral date to date of first disease-targeted treatment date • Diagnosis date to first disease-targeted treatment date Calculate % with a diagnosis date within 21 days of a referral date: Numerator: count of people with ≤21 days between date of referral and diagnosis date Denominator: count of people with a referral date

Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.5 Performance Indicator 5: Receipt of disease-targeted treatment (stage 1-3)

Percentage of people with non-metastatic (stage 1-3) pancreatic cancer who receive disease-targeted treatment (surgery, SACT, radiotherapy).

Table 5.5: Percentage of people with non-metastatic (stage 1-3) pancreatic cancer who received disease-targeted treatment		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	1/1/2023 to 31/12/2024
Numerator: Number of people with a record of disease-targeted treatment	Number of people with a record of disease-targeted treatment	Number of people with a record of disease-targeted treatment
Denominator: Number of people diagnosed with stage 1-3 (non-metastatic) pancreatic cancer	Number of people diagnosed with stage 1-3 (non-metastatic) pancreatic cancer	Number of people diagnosed with stage 1-3 or M0 pancreatic cancer
Construction notes		Surgeries of patients diagnosed in Wales were included regardless of whether the surgery took place in England or Wales.
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.6 Performance Indicator 6: Receipt of disease-targeted treatment (stage 4)

Percentage of people with metastatic (stage 4) pancreatic cancer who receive disease-targeted treatment (surgery, SACT, radiotherapy).

Table 5.6: Percentage of people with metastatic (stage 4) pancreatic cancer who received disease-targeted treatment		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	1/1/2023 to 31/12/2024
Numerator: Number of people with a record of disease-targeted treatment	Number of people with a record of disease-targeted treatment	Number of people with a record of disease-targeted treatment

Denominator: Number of people diagnosed with stage 4 (metastatic) pancreatic cancer	Number of people diagnosed with stage 4 (metastatic) pancreatic cancer	Number of people diagnosed with stage 4 or M1 pancreatic cancer
Construction notes		Surgeries of patients diagnosed in Wales were included regardless of whether the surgery took place in England or Wales.
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.7 Performance Indicator 7: Receipt of chemotherapy and/or radiotherapy alongside surgery

Percentage of people with pancreatic cancer receiving SACT/RT alongside surgery.

Table 5.7: Percentage of people with pancreatic cancer who received chemotherapy and/or radiotherapy alongside surgery

	England	**Wales**
Dates of diagnosis:	1/1/2021 to 31/12/2023	1/1/2022 to 31/12/2024
Numerator: Number of people who received SACT and/or radiotherapy (a) before surgery or (b) after Whipple procedure	a. Before surgery: number of people who received SACT and/or radiotherapy up to 14 weeks before any pancreatic surgery b. After surgery: Number of people who received SACT and/or radiotherapy up to 14 weeks after Whipple procedure	a. Before surgery: number of people who received SACT and/or radiotherapy up to 14 weeks (98 days) before any pancreatic surgery b. After surgery: Number of people who received SACT and/or radiotherapy up to 14 weeks (98 days) after Whipple procedure
Denominator: Number of people who underwent (a) any pancreatic surgery or (b) Whipple procedure	a. Before surgery: number of people with a record of any pancreatic surgery at an HPB specialist centre 30 days before or 12 months after diagnosis date b. After surgery: number of people with a record of a Whipple procedure at an HPB specialist centre 30 days before or 12 months after diagnosis date	a. Before surgery: number of people who underwent any pancreatic surgery 30 days before or 9 months after diagnosis date in England or Wales b. After surgery: number of people who underwent a Whipple procedure 30 days before or 9 months after diagnosis date in England or Wales
Construction notes	SACT/RT before surgery: count when at least one of the following is recorded: (1) any SACT treatment when SACT date <=98 days before pancreatic surgery date, (2) any radiotherapy treatment when radiotherapy date <=98 days before pancreatic surgery date	• SACT/RT before surgery: count when at least one of the following is recorded ○ Any SACT treatment when SACT date <=98 days before pancreatic surgery date

	SACT/RT after Whipple: count when at least one of the following is recorded: (1) any SACT treatment when SACT date <= 98 days after Whipple procedure date, (2) any radiotherapy treatment, excluding palliative doses*, when radiotherapy date <=98 days after Whipple procedure date * Following combinations of rtprescribeddose & prescribedfractions considered palliative: 30Gy/15 fractions; 26Gy/5 fractions; 20Gy/5 fractions; 8Gy/1 fractions	○ Any radiotherapy treatment when radiotherapy date <=98 days before pancreatic surgery date • SACT/RT after Whipple: count when at least one of the following is recorded: ○ Any SACT treatment when SACT date <= 98 days after Whipple procedure date ○ Any radiotherapy treatment, excluding palliative doses**, when radiotherapy date <=98 days after Whipple procedure date The following combinations of radiotherapy were considered palliative: 30Gy/15 fractions; 26Gy/5 fractions; 20Gy/5 fractions; 8Gy/1 fractions
Country reporting:	England & Wales separately	
Organisational Reporting level:	HPB specialist centre	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	
Outlier reporting:	No	

5.8 Performance Indicator 8: Clinical nurse specialist (CNS) involvement

Percentage of people with pancreatic cancer who were seen by a clinical nurse specialist (CNS).

Table 5.8: Percentage of people with pancreatic cancer who were seen by a clinical nurse specialist (CNS)

	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	1/1/2024-31/12/2024
Numerator: Number of people with CNS involved	Number of people with CNS involved	Number of people with CNS involved
Denominator: Number of people with a primary diagnosis of pancreatic cancer with complete information related to CNS	Number of people with a primary diagnosis of pancreatic cancer with complete information related to CNS	Number of people with a primary diagnosis of pancreatic cancer with complete information related to CNS
Construction notes:		Only available for a subset of patients diagnosed in 2024 who had information recorded in CDF
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	National

Subgroup Reporting:	None	Not reported
Risk adjusted:	No	Not reported
Outlier reporting:	No	Not reported

5.9 Performance Indicator 9: Pancreatic enzyme replacement therapy (PERT) use

Percentage of people who were prescribed pancreatic enzyme replacement therapy (PERT) in primary care.

Table 5.9: Percentage of people who were prescribed pancreatic enzyme replacement therapy (PERT) in primary care		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023	Not reported
Numerator: Number of people with a prescription of PERT	Number of people with a prescription of PERT in primary care up to 30 days before or 90 days after diagnosis date	Not reported
Denominator: Number of people with a primary diagnosis of pancreatic cancer	Number of people with a primary diagnosis of pancreatic cancer who survived at least 90 days after diagnosis	Not reported
Construction notes:		
Country reporting:	England only	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Not reported
Subgroup Reporting:	None	Not reported
Risk adjusted:	No	Not reported
Outlier reporting:	No	Not reported

5.10 Performance Indicator 10: Survival from diagnosis

Survival at 30- and 90 days, and 1- and 2 years after diagnosis.

Table 5.10: Survival at 30- and 90-days, and 1- and 2-years after diagnosis		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023 (for 30-, 90-day, and 1-year) 1/1/2021 to 31/12/2022 (for 2-year)	1/1/2023 to 31/12/2024
Numerator: Number of people alive at specific time points after diagnosis of pancreatic cancer	Number of people alive at 30 days, 90 days, 1 year, and 2 years after diagnosis of pancreatic cancer	Number of people alive more than 30 days, 90 days and 1 year after diagnosis of pancreatic cancer
Denominator: Number of people with a primary diagnosis of pancreatic cancer and a vital status date	Number of people with a primary diagnosis of pancreatic cancer and a vital status date	For overall survival: number of people with diagnosis of pancreatic cancer

Construction notes:		
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	By stage at diagnosis	By stage at diagnosis
Risk adjusted:	Yes: age group at diagnosis, sex, index of multiple deprivation quintile, stage at diagnosis, performance status at diagnosis, receipt of disease targeted treatment, RCS Charlson Comorbidity Index, and diagnosis year	
Outlier reporting:	Yes: 90-day and 1-year survival indicators	

6. NHS organisations

The audit presents organisation-level findings by the NHS organisation of diagnosis or treatment, as appropriate for the specific indicator:

- Organisation of surgery: for indicators concerned with surgery
- Organisation of diagnosis: for all other indicators (in England this includes trust of diagnosis and Cancer Alliance of diagnosis)

Details on allocation to NHS Trust in England:

- Organisation of surgery are the HPB specialist centres identified via the organisation codes listed in Appendix 3: Table 7
- Trust of diagnosis is identified using the trust of diagnosis variable in the NCRD.
- In instances where the trust of diagnosis is a tertiary centre (The Christie, The Clatterbridge, or The Royal Marsden), these cases are not reported at the trust-level for The Christie or The Clatterbridge (as they are not diagnosing trusts) but they are included in Cancer Alliance and National-level reporting.
- Cases where the organisation of diagnosis is not an NHS organisation are excluded from the Trust and Cancer Alliance-level analyses but are included in national-level results.
- Cases in the English data where the organisation of diagnosis is an NHS Wales organisation are excluded from the England analyses, unless the case had surgery in England.

For Wales, the local health board of diagnosis was identified using the organisation codes listed in Table 10.

A minimum of ten diagnoses in the audit period were required for reporting at trust or health board level. This was to ensure only trusts providing cancer services were included and also to avoid very small numbers which can lead to unreliable estimates and increase the risk of potential data disclosure.

7. Statistical Analysis

All statistical analyses were conducted using STATA version 17.0.

Most results in the SotN Report are descriptive. Categorical data items are reported as percentages (%). Results are typically provided as an overall figure with an indication of variation by organisational reporting level (see NHS organisations section). Note that within tables in the SotN Report, the total percentage may not equal 100%, due to rounding.

7.1 Small number Suppression

- Small numbers have not been suppressed for data quality and data completeness figures.
- For results presented at organisational level, cell values are suppressed when there are fewer than 25 diagnoses at the organisation and/or the denominator was <10.

7.2 Risk-adjustment of indicators

The tables of performance indicators state whether risk adjustment has been performed.

Multivariable logistic regression models were used to estimate the likelihood of survival for each individual who had a diagnosis of pancreatic cancer (based on their characteristics), and these probabilities have been summed to calculate the predicted number of people surviving for each organisation. The regression models include the following patient characteristics: age group at diagnosis, sex, index of multiple deprivation, stage at diagnosis, performance status at diagnosis, receipt of disease targeted treatment, RCS Charlson Comorbidity Index, and diagnosis year. Data for England and Wales were analysed separately.

Risk adjusted rates are presented only for organisations with at least 10 people diagnosed during the relevant period.

Table 7.1 below provides details on the datasets and variables used in the risk adjustment model. See Key Data Items for further details on construction notes for any of the variables listed.

Table 7.1: Risk Adjustment Variables

Data Item	**Additional detail**	
	England	**Wales**
Age at diagnosis	Categorised into age groups: <60 years, 60-69 years, 70-79 years, 80+ years	Categorised into age groups: <60 years, 60-69 years, 70-79 years, 80+ years
Sex	No additional detail	No additional detail
Index of multiple deprivation	No additional detail	No additional detail
Stage at diagnosis	No additional detail	No additional detail
Performance status at diagnosis	Categorised into the following groups: 0, 1, 2, 3/4	No additional detail
Receipt of disease targeted treatment	Binary variable, yes/no	Binary variable, yes/no
Charlson comorbidity index	The CCI is a commonly used scoring system for medical comorbidities, consisting of a grouped score calculated based on the absence (0) and presence (≥1) of 14 pre-specified medical conditions (Appendix 2 below). The CCI was calculated using information on secondary diagnoses (ICD-10 codes) recorded in HES APC (England) / PEDW (Wales) within the 24-month period prior to a patient's diagnosis. For the purpose of analysis, the CCI is grouped into four categories: • **0** none of the 14 pre-specified comorbidities. • **1** only 1 of the 14 pre-specified comorbidities.	

	• **2** only 2 of the 14 pre-specified comorbidities • **3+** 3 or more of the 14 pre-specified comorbidities In instances where there were no HES-APC records for a person included in the audit, the variable chrl_tot_27_03 from NCRD was used as the CCI value.	
Diagnosis year	Year extracted from diagnosis date	Year extracted from DIAGNOSIS_DATE (CaNISC) or DateOfPrimaryDiagnosis (CDF)

7.3 Handling of missing data

For the risk-adjustment, missing values for stage, performance status, Charlson score (England only), IMD quintile (Wales only) and age (Wales only) were imputed with multiple imputation using chained equations, creating ten data sets and pooling model estimates using Rubin's Rules. The imputation models included all the variables in the analysis models.

7.4 Calculation of control limits

Control limits are calculated as follows:

State of the Nation report: performance indicator results are presented using funnel plots. Exact two-sided 95% binomial confidence limits around the national average were calculated for each denominator by identifying the event counts corresponding to the lower (2.5%) and upper (97.5%) tail probabilities of the binomial distribution. Smooth funnel limits were obtained using linear interpolation between adjacent event counts.

Quarterly report: performance indicator results are displayed for each organisation in line charts, with control limits calculated by adding and subtracting two standard errors to the national average. Standard errors use the average volume of patients at the healthcare provider per quarter across all quarters in the graph.

8. Outlier Process

The outlier process can be found in the separate audit outlier policy.

Appendix 1: Routine data sources

Overview of the data sources used for the SotN Report.

Country	Data source	Content
England	Cancer registry (NCRD)	Data on all aspects of the cancer registration including information from hospital pathology systems.
England	COSD	Cancer Outcomes and Services dataset (COSD) items are submitted routinely by service providers via multidisciplinary team (MDT) electronic data collection systems to the National Cancer Data Repository (NCDR) on a monthly basis.
England	SACT	Systemic Anti-Cancer Therapy (SACT) data contains information on chemotherapy dates, regimen(s) and dose(s).
England	RTDS	Radiotherapy dataset (RTDS) contains information on radiotherapy treatment including dates, prescription region and dose.
England	HES	Hospital Episode Statistics (HES) is the administrative database of all NHS hospital admissions in England. The audit receives records from both admitted patient care (HES-APC) and outpatient care (HES-OP).
England	PCPD	Primary Care Prescription Database (PCPD) contains information on prescriptions in primary care.
England	CWT	Cancer Waiting Times (CWT) contains information on dates and sources of referrals, diagnoses, and treatments for cancer. This information is uploaded monthly by NHS providers and is used to monitor cancer waiting times.
England	DIDs	The Diagnostic Imaging Dataset (DID) contains detailed information about diagnostic imaging tests carried out for NHS patients, including details of the test (type of test and body site) and date of imaging. Information is extracted from local radiology information systems.
Wales	CaNISC	Cancer Network Information System Cymru (Canisc) contains data on all aspects of the cancer registration including investigations.
Wales	CDF	Clinical Dataset Form (CDF) contains data on all aspects of the cancer registration including investigations.
Wales	PEDW	Patient Episode Database for Wales (PEDW) is the administrative database of all NHS hospital admissions in Wales. Nb: not every person in the cancer registry had a linked PEDW record.
Wales	LSOA	Lower-layer Super Output Areas (LSOA) dataset contains information on deprivation in small areas (LSOAs) across Wales.
Wales	RTH	Radiotherapy data (RTH) contains information on radiotherapy treatment.
Wales	SACT	SACT data contains information on systemic anti-cancer treatment.
Wales	ONS	Office for National Statistics (ONS) death data including date of death and cause of death.

Appendix 2: Charlson Comorbidity Index

Reference:
Armitage JN, van der Meulen JH. Identifying co-morbidity in surgical patients using administrative data with the Royal College of Surgeons Charlson Score. Br J Surg 2010;97:772-81. doi https://doi.org/10.1002/bjs.6930

Pre-specified conditions included in the assignment of Charlson Comorbidity Index (CCI).

CCI Conditions
Myocardial infarction
Dementia
Diabetes mellitus
Metastatic solid tumour
Congestive cardiac failure
Chronic pulmonary disease
Hemiplegia or paraplegia
AIDS/HIV infection
Peripheral vascular disease
Rheumatological disease
Renal disease
Cerebrovascular disease
Liver disease
Any malignancy

Note: AIDS/HIV diagnoses cannot be identified in HES APC data because of legal requirements for NHS trusts to remove patient identifiers from legally restricted records, including those containing diagnoses of HIV/AIDS. These diagnoses are also not found in linked PEDW data.

Appendix 3: Code lists

Table 1. ICD-10 codes used to define pancreatic cancer audit cohort

Code	Description
Malignant neoplasm of pancreas	
C25.0	Head of pancreas
C25.1	Body of pancreas
C25.2	Tail of pancreas
C25.3	Pancreatic duct
C25.7	Other parts of pancreas: neck of pancreas
C25.8	Overlapping lesion of pancreas
C25.9	Pancreas, unspecified
Malignant neoplasm of extrahepatic bile duct and ampullary tumours	
C24.0	Extrahepatic bile duct: biliary duct or passage NOS, common bile duct, cystic duct, hepatic duct
C24.1	Ampulla of Vater

Source of ICD-10 codes: https://icd.who.int/browse10/2019

Table 2. Morphology codes for identification of neuroendocrine tumours

Code	Description
8013	Large cell neuroendocrine carcinoma
8041	Small cell carcinoma, NOS
8042	Oat cell carcinoma
8043	Small cell carcinoma, fusiform cell
8044	Small cell carcinoma, intermediate cell
8045	Combined small cell carcinoma
8150	Islet cell carcinoma
8151	Insulinoma
8152	Glucagonoma
8153	Gastrinoma
8154	Mixed islet cell & exocrine adenocarcinoma
8155	Vipoma
8156	Somatostatinoma
8157	Enteroglucagonoma
8158	ACTH-producing tumor
8240	Carcinoid tumour
8241	Enterochromaffin cell carcinoid
8242	Enterochromaffin-like cell tumour
8243	Goblet cell carcinoid
8244	Composite carcinoid
8245	Adenocarcinoid tumour
8246	Neuroendocrine carcinoma
8247	Merkel cell carcinoma
8249	Atypical carcinoid tumour
9091	Strumal carcinoid

Source of morphology codes: https://biobank.ndph.ox.ac.uk/ukb/ukb/docs/ICDcancermorph.pdf
Reference publication - neuroendocrine morphology codes: https://www.nature.com/articles/s41416-019-0606-3

Table 3. Codes used to identify scans in DIDS

SNOMED CT code / NICIP code	Description
FDG-PET/CT	
725928006 / NBMTF	Positron emission tomography with computed tomography fluorodeoxyglucose F18 imaging of base of brain to mid-thigh (procedure)
443271005 / NCGENW	Positron emission tomography with computed tomography using fluorodeoxyglucose (18-F) (procedure)
432675001 / NGENWO, NFDGWO	Positron emission tomography fluorodeoxyglucose imaging of whole body (procedure)
1097781000000108 / NSMTF	Positron emission tomography with computed tomography 18F fluorodeoxyglucose imaging of cranial vertex to mid-thigh (procedure)
PET/CT	
764692009 / NCF18W	Positron emission tomography with computed tomography of whole body using fluorocholine (18-F)
764693004 / NCGDW	Positron emission tomography with computed tomography of whole body using gallium (68-Ga) dotatate
979061000000105 / NDTNW	Positron emission tomography with computed tomography gallium 68 dotanoc whole body uptake study
764693004 / NDTTW	Positron emission tomography with computed tomography of whole body using gallium (68-Ga) dotatate
764691002 / NF18WO	Positron emission tomography of whole body using fluorocholine (18-F)
764705009 / NFACW	Positron emission tomography with computed tomography of whole body using 18F fluciclovine
764695006 / NGADWO	Positron emission tomography of whole body using gallium (68-Ga) dotatate
450436003 / NPET	Positron emission tomography with computed tomography
764820005 / NPSMW	Positron emission tomography with computed tomography of whole body using gallium-68
1098121000000107 / NSMTP	Positron emission tomography with computed tomography gallium 68 prostate specific membrane antigen imaging of cranial vertex to mid-thigh
Liver MRI	
910561000000103 / MDWLI	Diffusion weighted magnetic resonance imaging of liver
432551009 / MLIVE	Magnetic resonance imaging of liver and spleen
431839003 / MLIVEC	Magnetic resonance imaging of liver with contrast
432633002 / MLIVHC	Magnetic resonance imaging of liver and biliary tract with contrast
764569004 / MLIVSC	Magnetic resonance imaging of liver and spleen with contrast
911811000000107 / MRILT	Magnetic resonance imaging of transplanted liver
241622002 / MRLIV, MLIVC, MLIVM, MLIVI	Magnetic resonance imaging of liver

Source of SNOMED-CT codes for diagnostic imaging (Annex 5): https://www.england.nhs.uk/statistics/statistical-work-areas/diagnostic-imaging-dataset/

Table 4. OPCS-4 codes used to identify pancreatic surgery

OPCS-4 code	Description
Whipple procedure	
J56.1	Pancreaticoduodenectomy and excision of surrounding tissue

OPCS-4 code	Description
J56.2	Pancreaticoduodenectomy and resection of antrum of stomach
J56.3	Pancreaticoduodenectomy NEC
J56.4	Subtotal excision of head of pancreas with preservation of duodenum and drainage HFQ
All other pancreatic surgeries	
J55.1	Total pancreatectomy and excision of surrounding tissue
J55.2	Total pancreatectomy NEC
J55.8	Total excision of pancreas, other specified
J55.9	Total excision of pancreas, unspecified
J56.8	Excision of head of pancreas, other specified
J56.9	Excision of head of pancreas, unspecified
J57.1	Subtotal pancreatectomy
J57.2	Left pancreatectomy and drainage of pancreatic duct
J57.3	Left pancreatectomy NEC
J57.4	Excision of tail of pancreas and drainage of pancreatic duct
J57.5	Excision of tail of pancreas NEC
J57.8	Other partial excision of pancreas, other specified
J57.9	Other partial excision of pancreas, unspecified

Source of OPCS-4 codes: https://classbrowser.nhs.uk/#/book/OPCS-4.10/

Table 5. OPCS-4 codes used to identify biliary stents

OPCS-4 code	Description
J382	Endoscopic sphincterotomy of sphincter of Oddi and insertion of tubal prosthesis into bile duct
J394	Endoscopic sphincteroplasty of ampulla of Vater and insertion of tubal prosthesis into bile duct
J401	Endoscopic retrograde insertion of tubal prosthesis into both hepatic ducts
J402	Endoscopic retrograde insertion of tubal prosthesis into bile duct NEC
J403	Endoscopic retrograde renewal of tubal prosthesis in bile duct NEC
J405	Endoscopic retrograde insertion of expanding covered metal stent into bile duct
J406	Endoscopic retrograde insertion of expanding metal stent into bile duct NEC
J407	Endoscopic retrograde renewal of expanding metal stent in bile duct
J408	Other specified endoscopic retrograde placement of prosthesis in bile duct
J409	Unspecified endoscopic retrograde placement of prosthesis in bile duct
J418	Other specified other therapeutic endoscopic retrograde operations on bile duct
J431	Endoscopic retrograde cholangiopancreatography and biopsy of lesion of ampulla of Vater
J432	Endoscopic retrograde cholangiopancreatography and biopsy of lesion of biliary or pancreatic system NEC
J433	Endoscopic retrograde cholangiopancreatography and collection of bile
J438	Other specified diagnostic endoscopic retrograde examination of bile duct and pancreatic duct
J439	Unspecified diagnostic endoscopic retrograde examination of bile duct and pancreatic duct
J441	Endoscopic retrograde cholangiography and biopsy of lesion of bile duct
J448	Other specified diagnostic endoscopic retrograde examination of bile duct
J449	Unspecified diagnostic endoscopic retrograde examination 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

OPCS-4 code	Description
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
J488	Other specified other therapeutic percutaneous operations on bile duct
J489	Unspecified other therapeutic percutaneous operations on bile duct
J502	Percutaneous cholangiography NEC
J505	Percutaneous transhepatic cholangiography

Source of OPCS-4 codes: https://classbrowser.nhs.uk/#/book/OPCS-4.10/

Table 6. Excluded regimens in Systemic Anti-Cancer Therapy (SACT) dataset

Regimens excluded from SACT analyses
benchmark_group= "NOT CHEMO" & none in drug_group are systemic anti-cancer treatments
benchmark_group= "LUTETIUM-177"
benchmark_group= "ZOLEDRONIC ACID" & none in drug_group are systemic anti-cancer treatments
benchmark_group= "DENOSUMAB" & none in drug_group are systemic anti-cancer treatments
benchmark_group= "HORMONES" & drug_group contains “hormones”
benchmark_group= "PAMIDRONATE" & no other drugs listed in drug_group
benchmark_group= "STREPTOZOCIN" & none in drug_group are systemic anti-cancer treatments

Table 7. Trust codes for HPB specialist centres

Trust code	Trust name
RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
REM	Liverpool University Hospitals NHS Foundation Trust
RJE	University Hospitals of North Midlands NHS Trust
RKB	University Hospitals Coventry and Warwickshire NHS Trust
RRK	University Hospitals Birmingham NHS Foundation Trust
RJZ	King’s College Hospital NHS Foundation Trust
RA2	Royal Surrey County Hospital NHS Foundation Trust
RTH	Oxford University Hospitals NHS Foundation Trust
RK9	University Hospitals Plymouth NHS Trust
RA7	University Hospitals Bristol and Weston NHS Foundation Trust
RHM	University Hospital Southampton NHS Foundation Trust
RXR	East Lancashire Hospitals NHS Trust
R0A	Manchester University NHS Foundation Trust
RPY	The Royal Marsden NHS Foundation Trust
RYJ	Imperial College Healthcare NHS Trust
RGT	Cambridge University Hospitals NHS Foundation Trust
RWE	University Hospitals of Leicester NHS Trust
RX1	Nottingham University Hospitals NHS Trust
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
RWA	Hull University teaching Hospitals NHS Trust
RAL	Royal Free London NHS Foundation Trust
R1H	Barts Health NHS Trust

RR8	Leeds Teaching Hospitals NHS Trust

Source: https://www.pancreaticcancer.org.uk/support-for-you/your-care/your-local-pancreatic-cancer-specialist-centre/

Table 8. Codes used to identify SACT in HES and PEDW (OPCS-4 codes)

OPCS-4 code	Description
X701	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 1
X702	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 2
X703	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 3
X704	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 4
X705	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 5
X708	Procurement of drugs for chemotherapy for neoplasm in Bands 1-5: Other specified
X709	Procurement of drugs for chemotherapy for neoplasm in Bands 1-5: Unspecified
X711	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 6
X712	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 7
X713	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 8
X714	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 9
X715	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 10
X718	Procurement of drugs for chemotherapy for neoplasm in Bands 6-10: Other specified
X719	Procurement of drugs for chemotherapy for neoplasm in Bands 6-10: Unspecified
X721	Delivery of complex chemotherapy for neoplasm including prolonged infusional treatment at first attendance
X722	Delivery of complex parenteral chemotherapy for neoplasm at first attendance
X723	Delivery of simple parenteral chemotherapy for neoplasm at first attendance
X724	Delivery of subsequent element of cycle of chemotherapy for neoplasm
X728	Delivery of chemotherapy for neoplasm: Other specified
X729	Delivery of chemotherapy for neoplasm: Unspecified
X731	Delivery of exclusively oral chemotherapy for neoplasm
X738	Delivery of oral chemotherapy for neoplasm: Other specified
X739	Delivery of oral chemotherapy for neoplasm: Unspecified
X748	Other chemotherapy drugs: Other specified
X749	Other chemotherapy drugs: Unspecified
X352	Intravenous chemotherapy
X353	Intravenous immunotherapy
X373	Intramuscular chemotherapy
X374	Intramuscular immunotherapy
X384	Subcutaneous chemotherapy
X385	Subcutaneous immunotherapy

Table 9. Codes used to identify PET/CT scans in HES (OPCS-4 codes)

OPCS-4 code	Description
U213	Positron emission tomography NEC
U362	Positron emission tomography with computed tomography NEC

Table 10. Organisation codes for Wales Health Boards

Organisation code	Hospital code	Trust name
7A1	7A1A1	Glan Clwyd Hospital
7A1	7A1A4	Wrexham Maelor Hospital
7A1	7A1AU	Ysbyty Gwynedd

7A2	7A2AG	Glangwili General Hospital
7A2	7A2AJ	Bronglais General Hospital
7A2	7A2AL	Prince Philip Hospital
7A2	7A2BL	Withybush General Hospital
7A3	7A3C4	Singleton Hospital
7A3	7A3C7	Morriston Hospital
7A3	7A3CJ	Neath Port Talbot Hospital
7A4	7A4BV	University Hospital of Wales
7A4	7A4C1	University Hospital Llandough
7A5	7A3B7	Princess of Wales Hospital
7A5	7A5B1	Royal Glamorgan Hospital
7A5	7A5B3	Prince Charles Hospital
7A6	7A6AM	Nevill Hall Hospital
7A6	7A6AR	Royal Gwent Hospital
7A6	7A6G9	The Grange University Hospital
RQF		VELINDRE NHS TRUST

Appendix 4: AJCC TNM staging of (exocrine) pancreatic cancer

Stage	T	N	M
1	1	0	0
	2	0	0
2	3	0	0
	1-3	1	0
3	4	0-2	0
	1-4	2	0
4	1-4	0-2	1

Reference: MB Amin, SB Edge, FL Greene, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York: Springer; 2017

Appendix 5: World Health Organisation Performance Status

Performance status	Definition
0	Able to carry out all normal activity without restriction
1	Restricted in strenuous activity but ambulatory and able to carry out light work
2	Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
3	Symptomatic and in a chair or in bed for greater than 50% of the day but not bedridden
4	Completely disabled; cannot carry out any self-care; totally confined to bed or chair

Reference: Definition in COSD Core (Performance Status (Adult)), COSD v10.0 downloads - NDRS.