

PACT-UK - Pancreatic Cancer reporting Template- UK

A national pan-specialty collaborative consensus project to develop a standardised radiological reporting proforma for pancreatic cancer

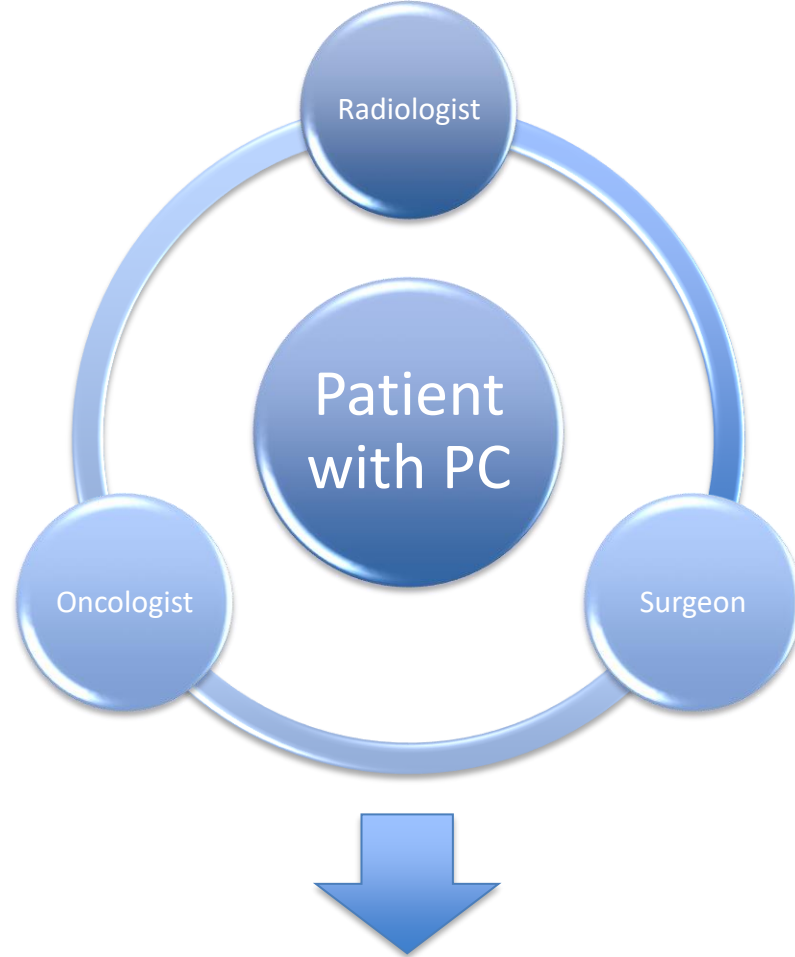
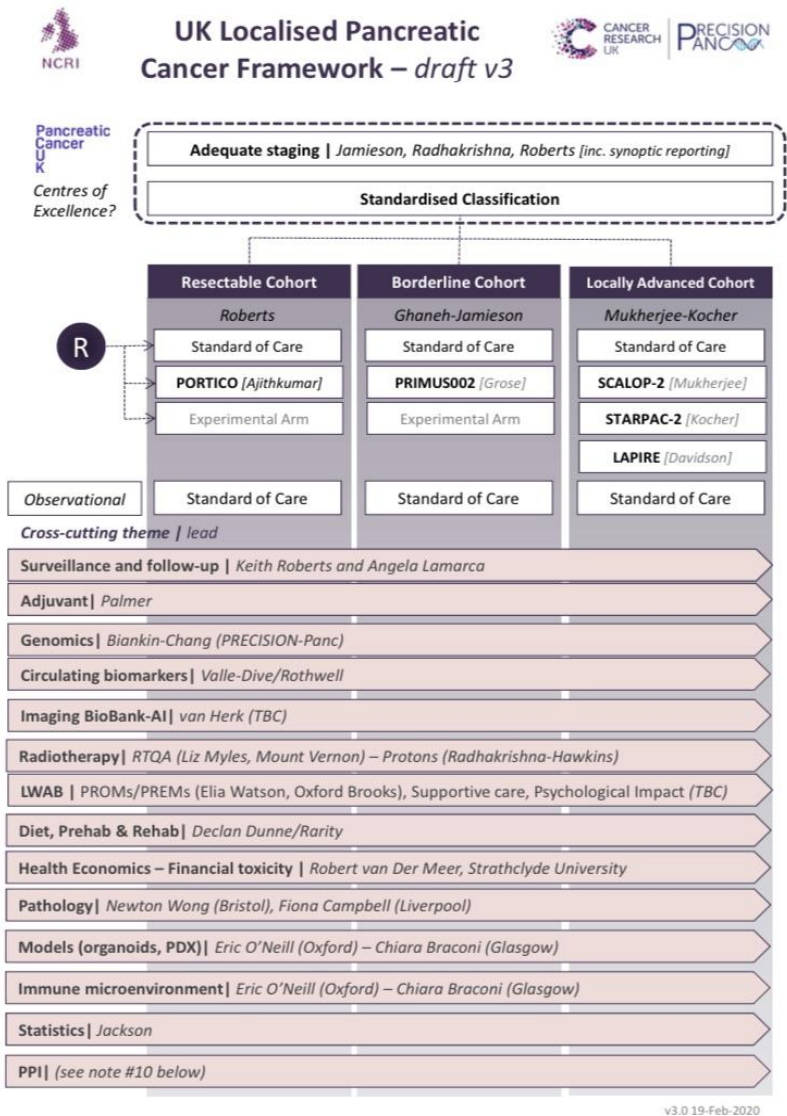
John Moir

Consultant HPB/transplant surgeon - Freeman Hospital, Newcastle Upon Tyne

Associate lecturer – Newcastle University

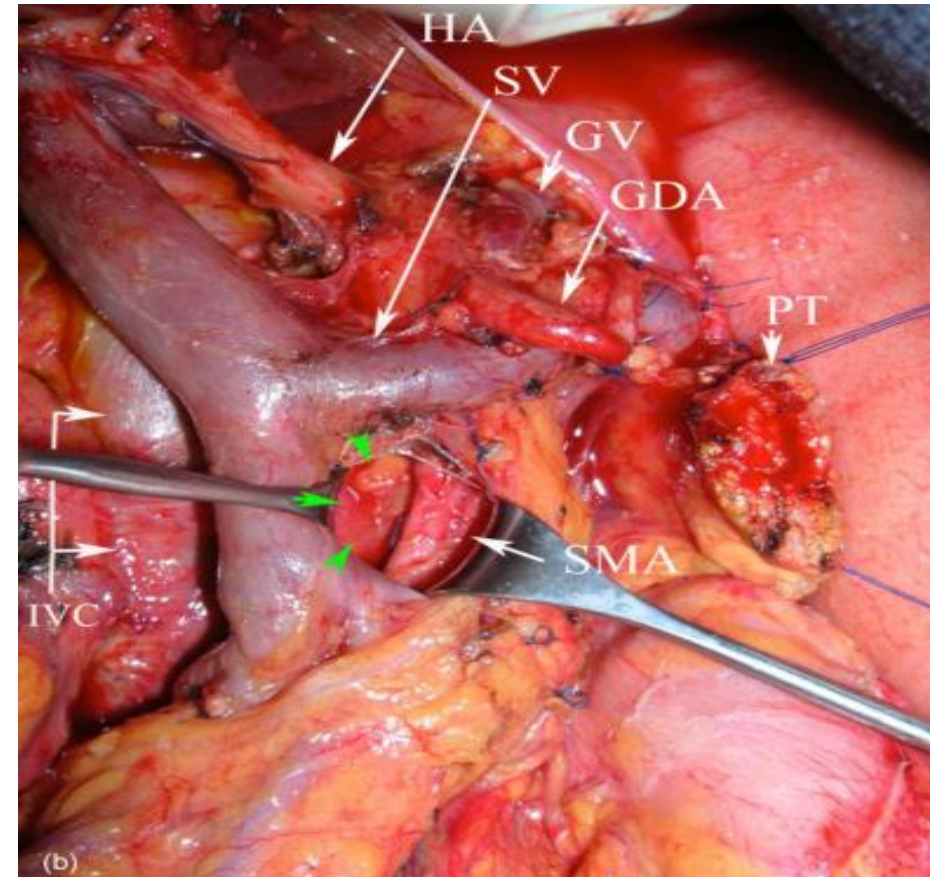
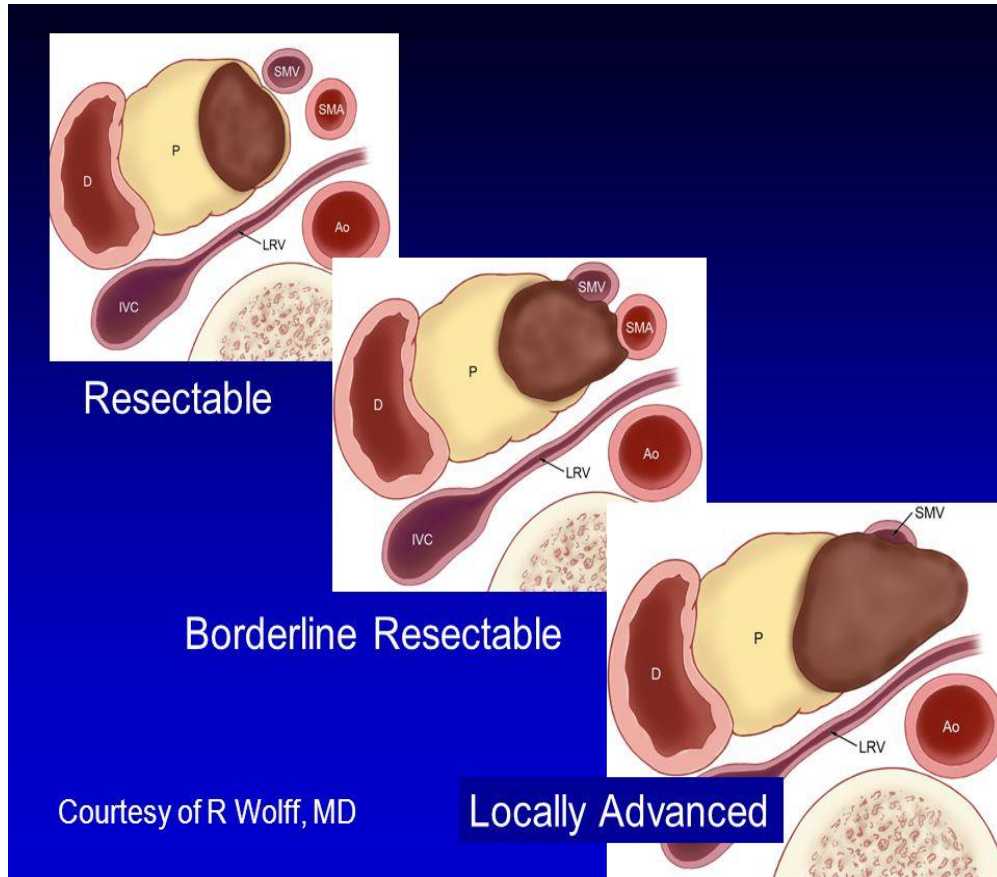


Background - NCRI framework



Improved standardisation of pancreatic tumour staging/classification

Tumour classification – vascular involvement is key



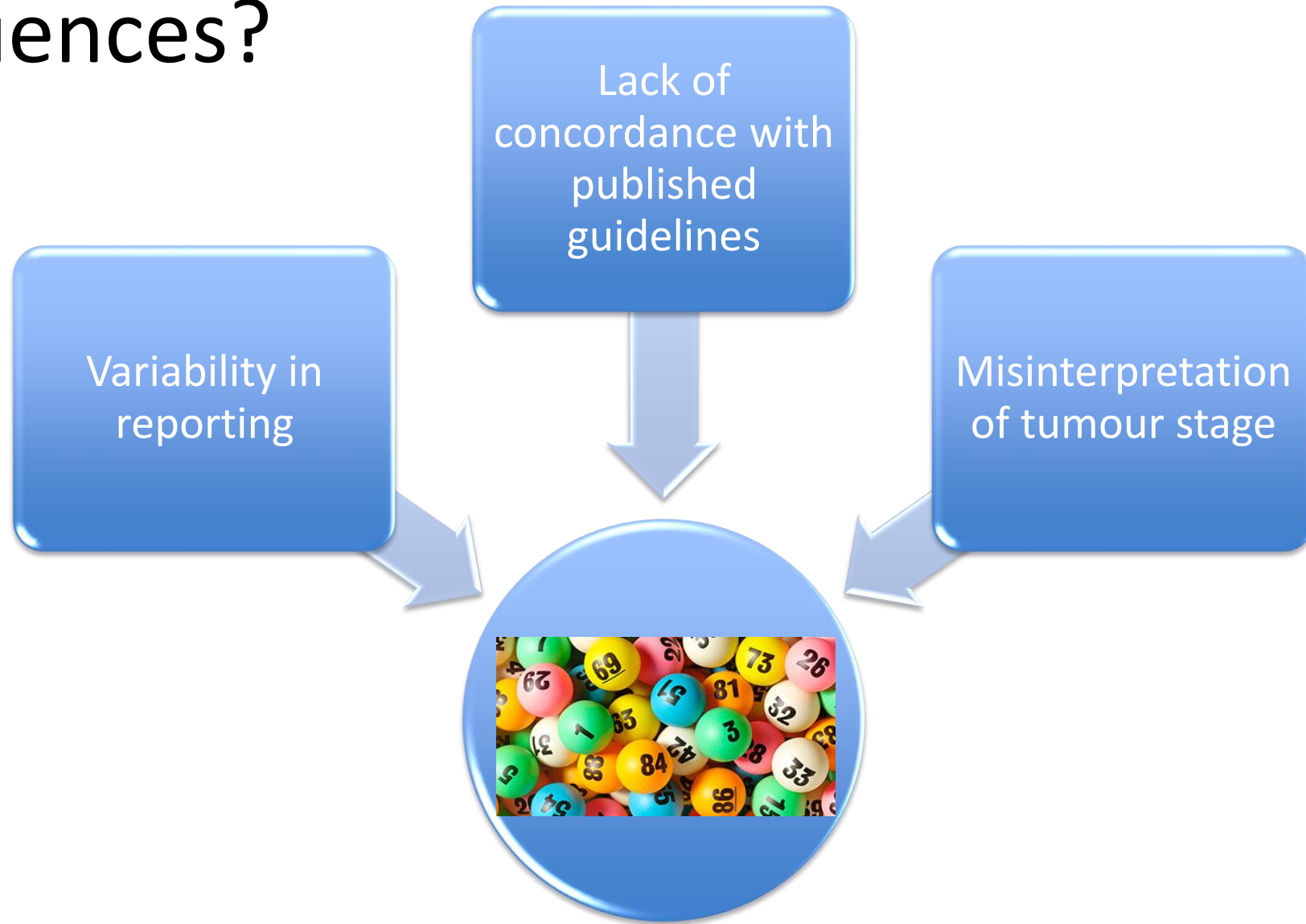
Current landscape of reporting

- descriptive > quantitative

Enclose
Encroach
Compress Surround
Invasion Nip
Abutment
Impingement **Pinch**
Contact Involvement
Distortion **Touch**
Encasement

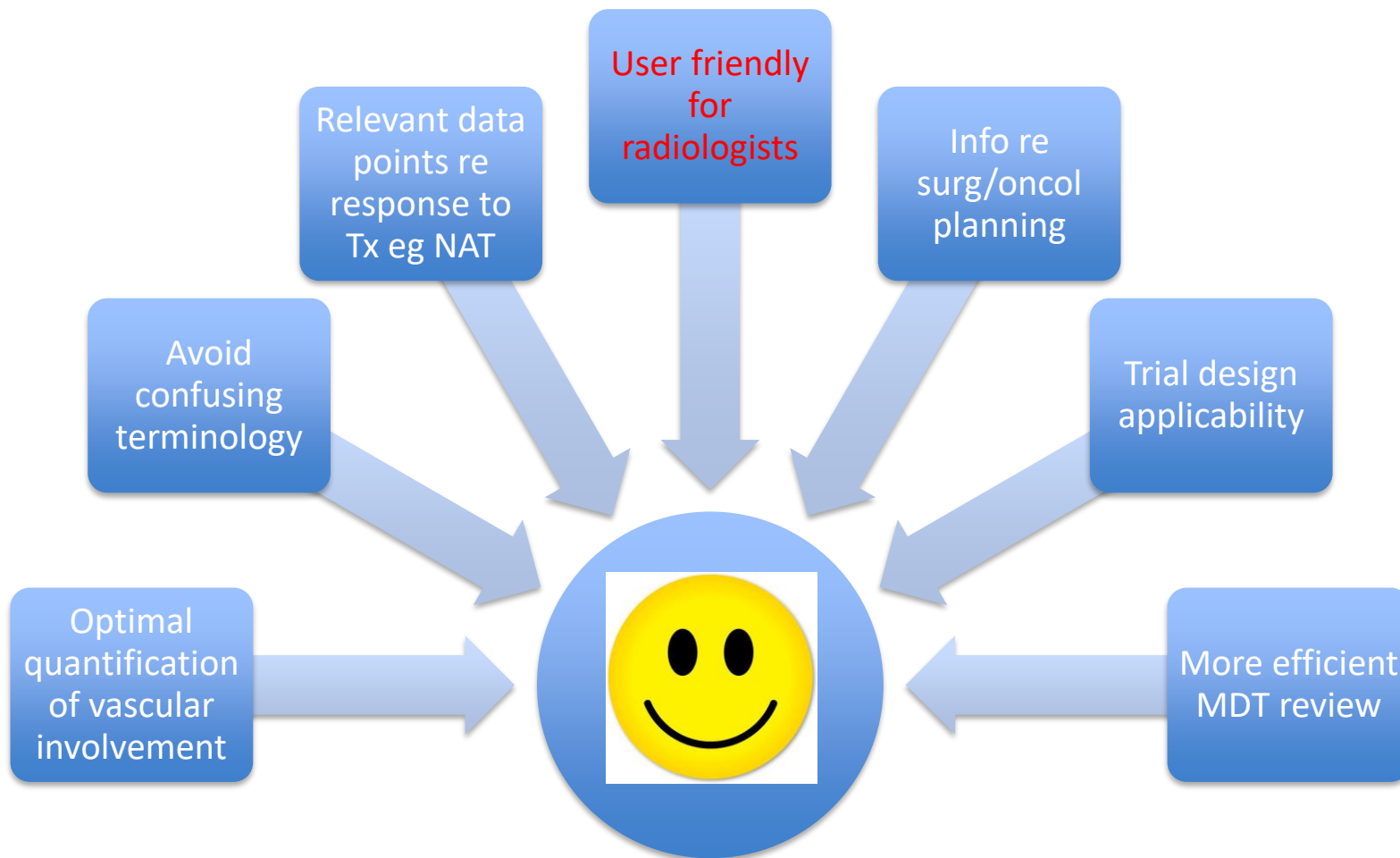


Consequences?

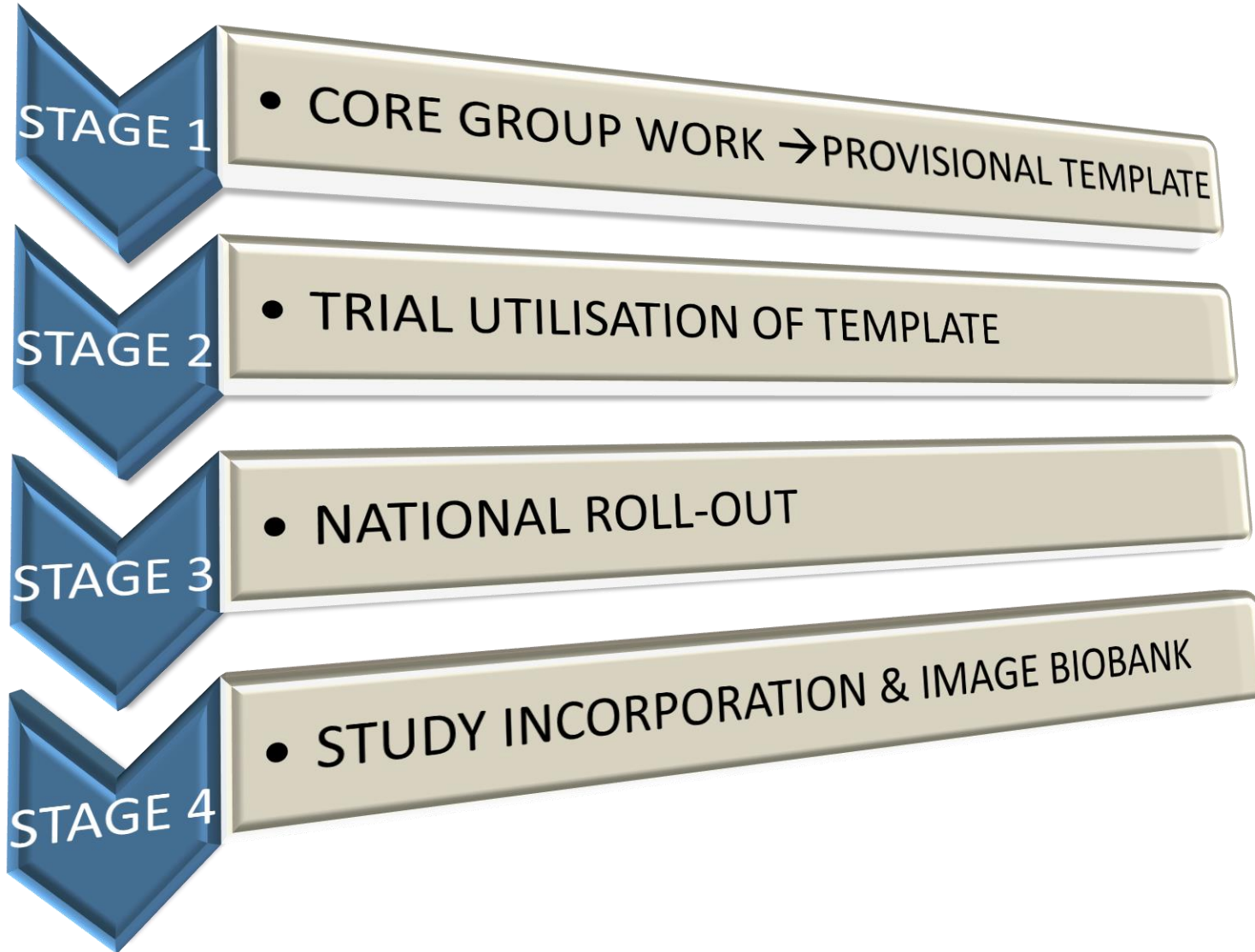




Standardised synoptic reporting template



The story so far



Current radiological reporting templates in use

Figure 1
Pancreatic tumor table

- Pancreatic tumor present: yes/no
 - Location: head/neck/body/tail
 - Size: ___ x ___ cm
 - Enhancement relative to pancreas: hypo/iso/hyper
 - Confined to pancreas with clear fat plane: yes/no
 - Biliary involvement: yes/no
 - Remaining pancreas: yes/no ductal dilation
- Adenopathy present: yes/no
- Metastatic disease: yes/no
- Ascites/peripancreatic fluid: yes/no

Pancreatic vascular table

- Vascular tumor involvement and degree (90°, 180°, 360°): no/___°
 - Celiac involvement: ___% /no
 - SMA involvement: ___% /no
 - SMV involvement: ___% /no
 - Other vascular involvement: yes/no
Specify: _____
- Thrombosed accessory vessels
- Major accessory or other replaced arteries/veins, collaterals, dilated vessels: yes/no
Specify: _____
 - Atherosclerotic origins of celiac axis/SMA: yes/no
- Distance to SMV: ___ mm

Figure 1: Template for structured reporting of pancreatic multiphase CT results that was implemented at Beth Israel Deaconess Medical Center, Boston, Mass.

Beth Israel

Vessel Assessment on CT	Tick then Specify	Specify: C (Contact) D (Distorted/narrow) O (Occluded) T (thrombosis)	Length of contact (mm)	Contact Circumference
1) 0-900				
2) 90-1800				
3) >180-270				
4) >270				
VESEL INVOLVEMENT	Yes <input type="checkbox"/> No <input type="checkbox"/>			
PV/ SMV	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Extension to Tributaries	Yes <input type="checkbox"/> No <input type="checkbox"/>			
IVC	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Superior Mesenteric Artery	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Extension to 1st branch	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Coeliac Axis	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Common Hepatic Artery	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Ext. to Coeliac	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Ext. to R/L hepatic artery	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Aorta	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Other _____	Yes <input type="checkbox"/> No <input type="checkbox"/>			
VENOUS COLLATERALS	No <input type="checkbox"/>			
Porta Hepatis	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Root of mesentery				
Left upper quad				
VARIANT ARTER				
Accessory RHA				
Replaced RHA				
Replaced CHA	Yes <input type="checkbox"/> No <input type="checkbox"/>			
Other _____	Yes <input type="checkbox"/> No <input type="checkbox"/>			

**Glasgow/
PRECISION PANC**

Part 1 Tumour details										
Location (tick all that apply) Head <input type="checkbox"/> Neck <input type="checkbox"/> Body <input type="checkbox"/> Tail <input type="checkbox"/>										
Size (mm) AP - Transverse - Craniocaudal -										
Composition Solid <input type="checkbox"/> Cystic <input type="checkbox"/> Mixed <input type="checkbox"/>										
Lymphadenopathy Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, site: T N M										
TNM Stage (8 th edition – see appendix 1):										
Part 2 Vessel Involvement - complete only for involved vessels										
* See appendix 2										
** Use far right box to document accessory vessel involvement										
	PV	SMV	SV	SMA	Coeliac axis	Splenic A	GDA	CHA	**	
Longitudinal length vessel involvement (cm)										
Circumferential degree of tumour involvement (°)										
"Compass" position of involvement: X° from A° to B° app 2°										
Stricture (y/n – complete below if applicable)										
• Max reduction in luminal area										
• Lesion extent (cm)										
Occlusion (y/n)										
Luminal involvement (y/n)										
Document replaced or accessory vessels:										
Other comment:										

**PROTRACT
Newcastle**

Venous Evaluation	
MPV contact	Degree of solid soft tissue contact Degree of increased hazy attenuation/stranding contact Focal vessel narrowing or contour irregularity (tethering or tear drop)
SMV contact	Degree of solid soft tissue contact Degree of increased hazy attenuation/stranding contact Focal vessel narrowing or contour irregularity (tethering or tear drop) Length of contact
others	Venous collaterals Thrombus within vein Length of contact with MPV
Extra Pancreatic findings	
Liver lesions	Suspicious
Peritoneal or omental nodules	
Ascites	
Lung lesions	
Suspicious lymph nodes	
Invasion of adjacent structures	
Impression	
Tumour location	
Tumour size:	Uncinate process
Resectability criteria	
Metastasis	
if Present (location):	
Vessel Contact	
if present, extent of contact: vessel involved	
NCCN	National Comprehensive Cancer Network* NCCN Guidelines Version 1.2020 Pancreatic Adenocarcinoma
	NCCN Guidelines Index Table of Contents Discussion

Plymouth

PRINCIPLES OF DIAGNOSIS, IMAGING AND STAGING PANCREATIC CANCER RADIOLOGY REPORTING TEMPLATE ⁶			
Arterial Evaluation			
SMA Contact	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Degree of solid soft-tissue contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Degree of increased hazy attenuation/stranding contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Focal vessel narrowing or contour irregularity	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Extension to first SMA branch	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Celiac Axis Contact			
Degree of solid soft-tissue contact	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Degree of increased hazy attenuation/stranding contact	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Focal vessel narrowing or contour irregularity	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
CHA Contact			
Degree of solid soft-tissue contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Degree of increased hazy attenuation/stranding contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Focal vessel narrowing or contour irregularity	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Extension to celiac axis	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Extension to bifurcation of right/left hepatic artery	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Arterial Variant			
Variant anatomy	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	
Accessory right hepatic artery	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	<input type="checkbox"/> Replaced common hepatic artery
Replaced right hepatic artery	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	<input type="checkbox"/> Others (origin of replaced or accessory artery)
Variant vessel contact			
Degree of solid soft-tissue contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Degree of increased hazy attenuation/stranding contact	<input type="checkbox"/> ≤180	<input type="checkbox"/> >180	
Focal vessel narrowing or contour irregularity	<input type="checkbox"/> Present	<input type="checkbox"/> Absent	

NCCN

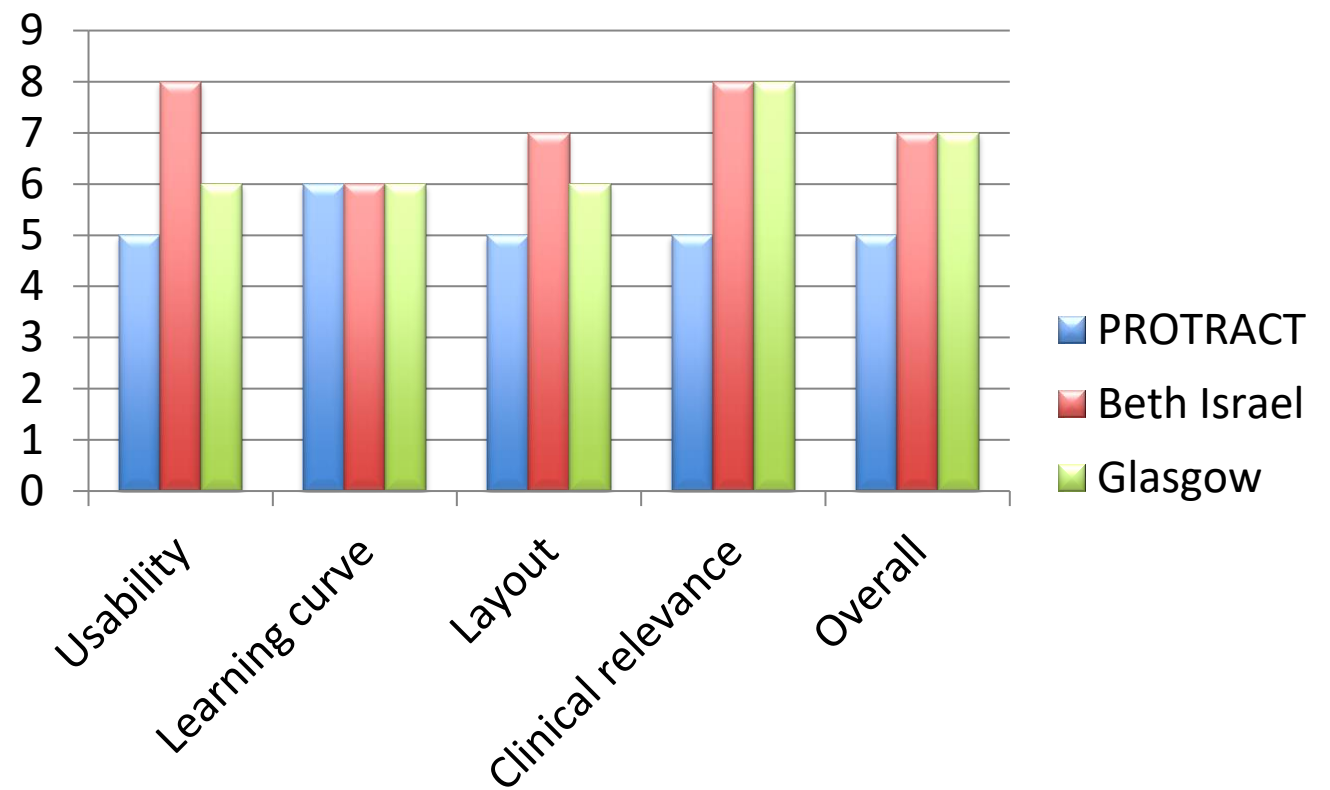
⁶ Adapted from: Al-Hawary MM, Francis IR, Chan ST, et al. Pancreatic ductal adenocarcinoma radiology reporting template: consensus statement of the Society of Abdominal Radiology and the American Pancreatic Association. *Radiology* 2014 Jan;270(1):248-260.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

Version 1.2020, 11/20/19 © 2019 National Comprehensive Cancer Network® (NCCN®). All rights reserved. NCCN Guidelines® and this illustration may not be reproduced in any form without the express written permission of NCCN.

Radiology review

Case	Vessel involvement y:n
1	8:3
2	11:0
3	3:8
4	11:0
5	9:2
6	4:7
7	8:3
8	4:7
9	11:0
10	9:2



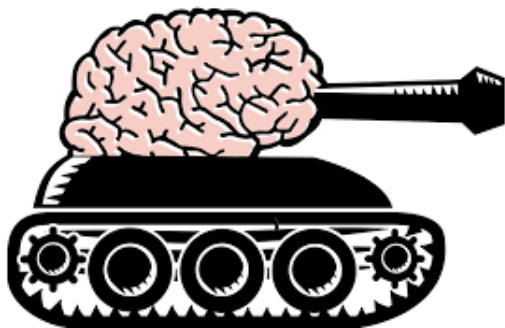
	Usability	Learning curve	Layout	Clinical relevance	Overall
PROTRACT	5	6	5	5	5
Beth Israel	8	6	7	8	7
Glasgow	6	6	6	8	7

Question	Median	Range
On a scale of 1-5, how important is it to know...		
Exact CBD diameter if dilated	2	1-4
PD size	3	2-5
Whether there is local lymphadenopathy	5	2-5
Specific sites of local lymphadenopathy	4	2-5
Presence of venous collaterals	5	2-5
Duodenal involvement	3	1-5
Specific length of PV/SMV involvement	5	3-5
Specific length of SMA involvement	5	1-5
Presence of SMV tributary involvement	5	2-5
Involvement of 1 st jejunal branch of SMA	5	2-5
Major vessel distortion/narrowing	5	3-5
Major vessel occlusion	5	3-5
Major vessel thrombosis	5	2-5
Compass position of vessel involvement	4	1-5
Presence of arterial atherosclerosis (without significant stenosis)?	3	1-5
Presence of coeliac axis stenosis?	4	2-5
Presence of SMA origin stenosis?	4	2-5
Re degrees of involvement, would you prefer range or specific degrees?	Range (66%)	
How would you like range expressed?	90 degree increments (63%)	
Preferred layout	Tabular (76%)	

Stage 1→2 - Template development



- Consensus panel development methodology
 - Incorporating stage 1 outcomes/feedback
- Draft new template
- Trial use in clinical practice
- Feedback and refinements
- Develop final version

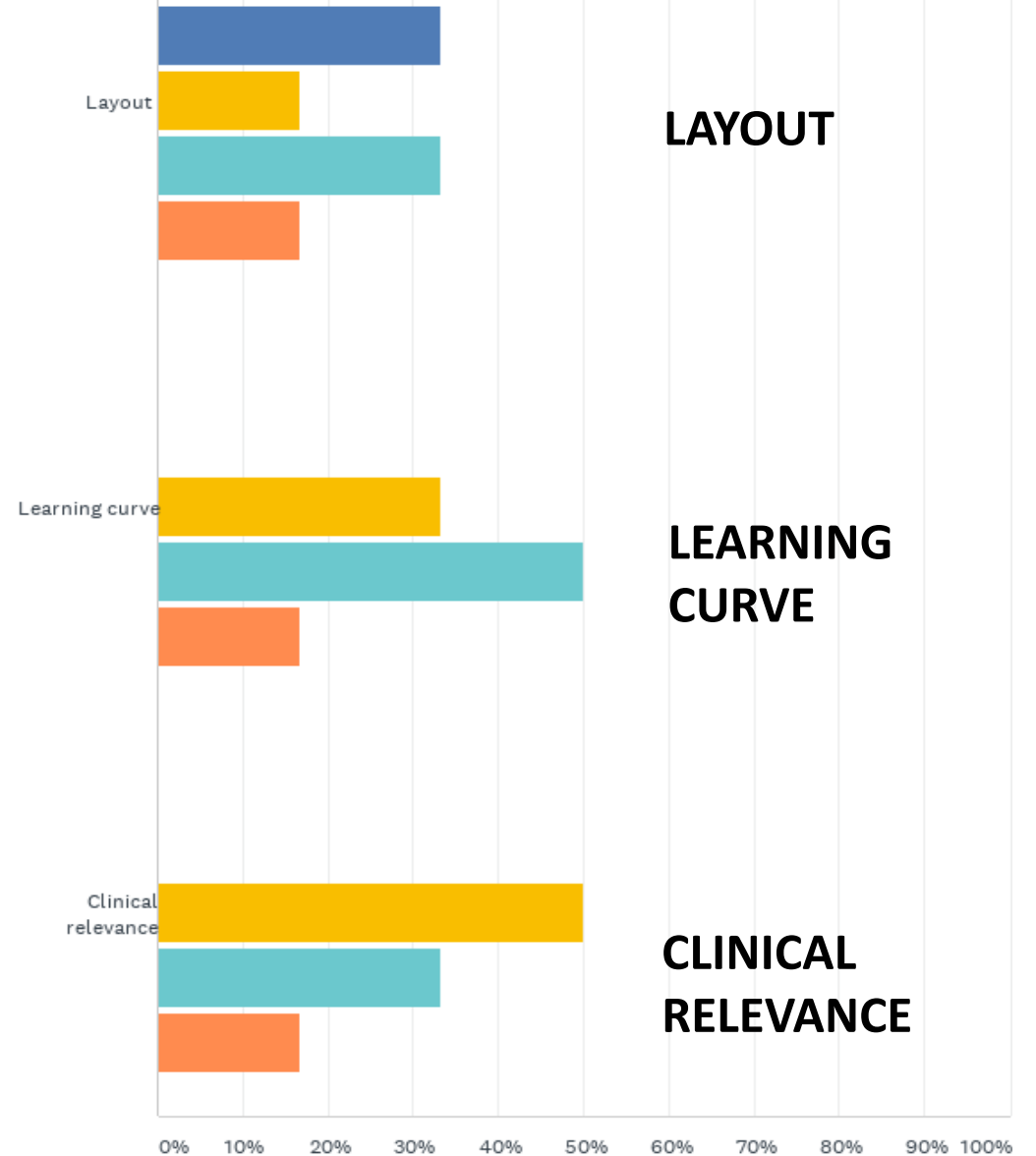
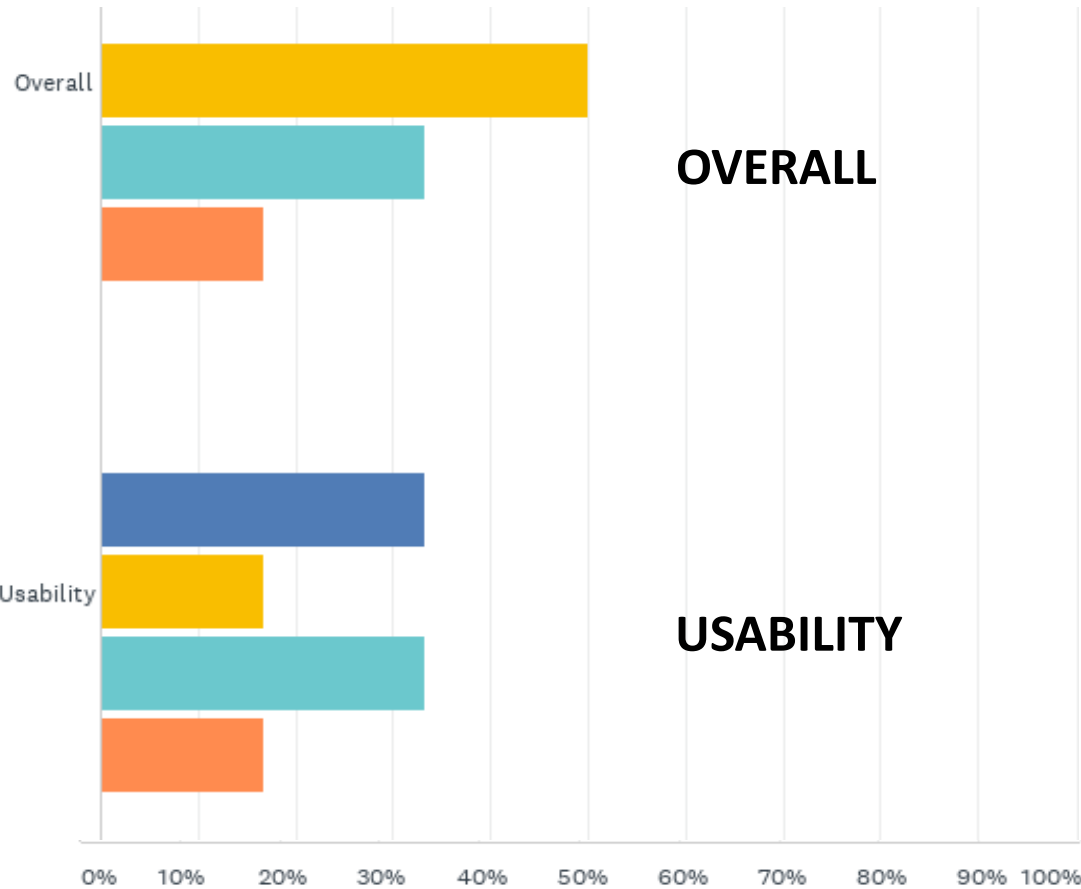


Centres (27)	Surgeons (27)	Radiologists (41)	Oncologists (7)
Manchester	Nicola Deliguoricarino	Stephen Lee, Jana Suntharanathan , Rishi Sethi	Ganesh Radhakrishna , Juan Valle
Newcastle	John Moir	John Scott, Samantha Saikia, Paul Turner	
Leeds	Andy Smith	Raneem Albazaz , Claire Smith	Rebecca Goody Alison Cairns (Pathologist)
Glasgow	Nigel Jamieson	Abdullah Al-adhami , Jonathan Platt	Derek Grose
Birmingham	Keith Roberts	Rania Ghaffar , Arvind Pallan , Sharan Wadhvani	
Bristol	James Skipworth	Hedi Karteszi	
Cambridge	Siong-Seng Liau	Edmund Godfrey	
Southampton	Dimitrios Karavias	Liam Ingram	
Aberdeen	James Milburn	Lokesh Saraswat	
Plymouth	Somaiah Aroori	Mark Puckett	
Guildford	Adam Frampton	Shelley Chapman	
Liverpool	Declan Dunne, Paula Ghaneh	Jonathan Evans, Catriona Farrell	Dan Palmer
Sheffield	Nehal Shah		
Coventry	Gabriele Marangoni	Lye-Quen Hon, James Harding , Praveen Varra , Manpreet Dhillon, Nikhil Rao, Vincent Leung, Syed Abbas Hasan	Martin Scott-Brown
Blackburn	Asma Sultana		Catherine Mitchell
Stoke	Damien Durkin		
Leicester	Giuseppe Garcea		
Barts	Hemant Kocher	Mahrukh Qureshi	
Swansea	Bilal Al-Sarireh	Kieran Foley, Peter Chowdhury, Toby Wells, Derrian Markham	
Royal Free	Brian Davidson, Kito Fusai		
Kings	Krishna Menon		
Royal Marsden	Ricky Bhogal	Gina Brown, Joshua Shur, Angela Riddell, Svetlana Balyasnikova	
Nottingham	Glen Irving	Christopher Clarke	
Oxford	Michael Silva	Helen Bungay	
Belfast		Mark Love	
NW London		Rebecca Greenhalgh	
Edinburgh	Sarah Thomasset		

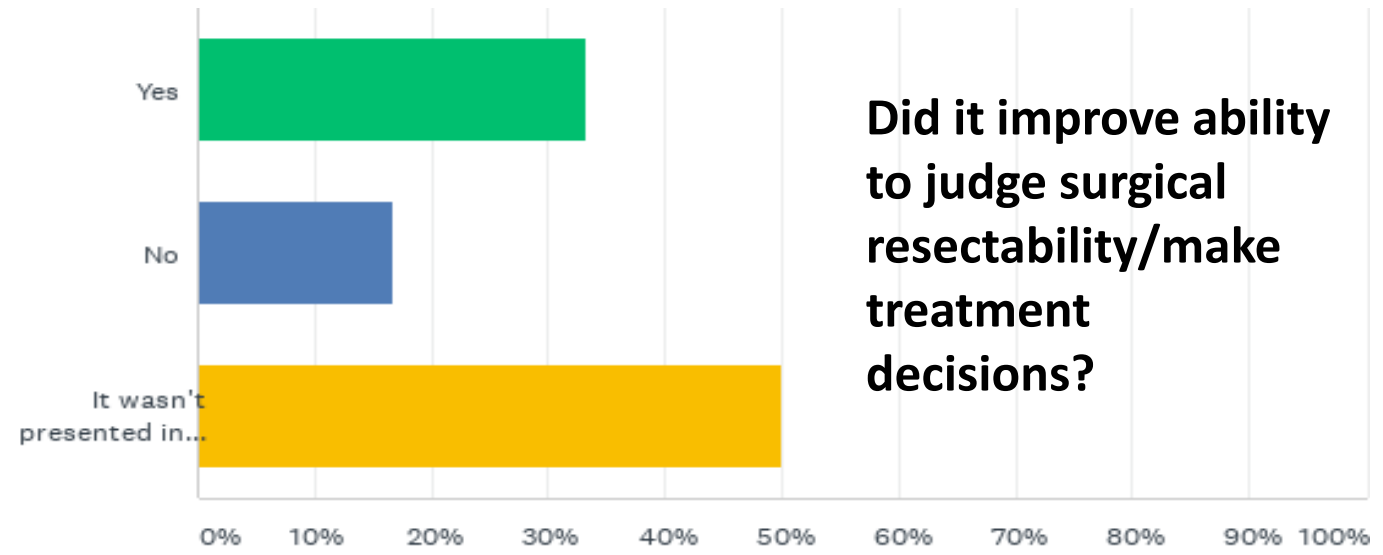
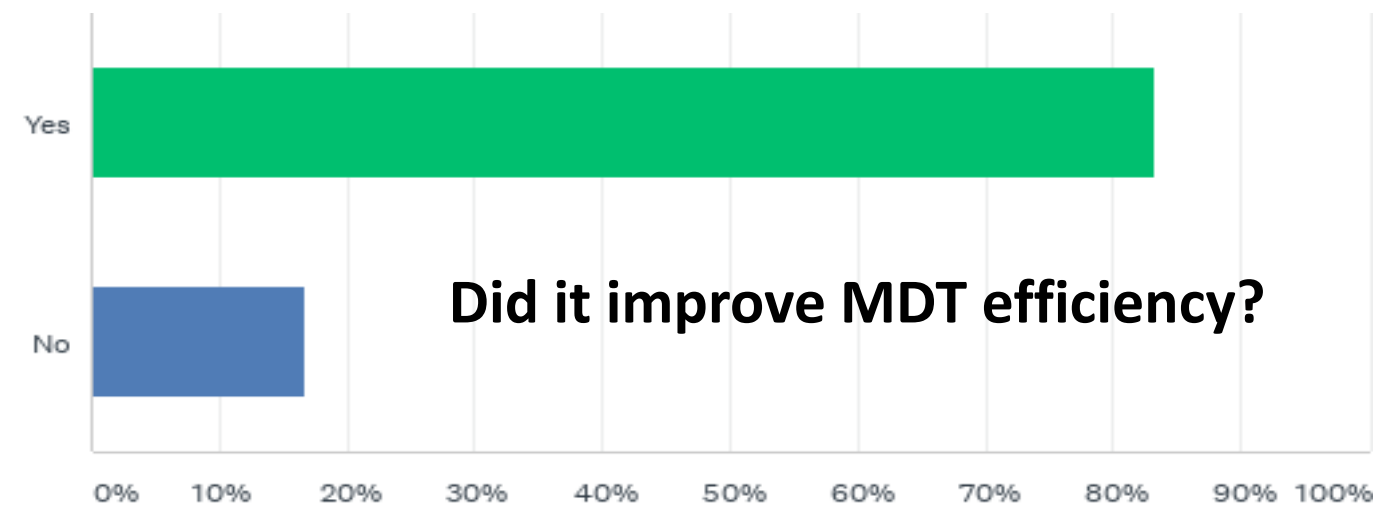
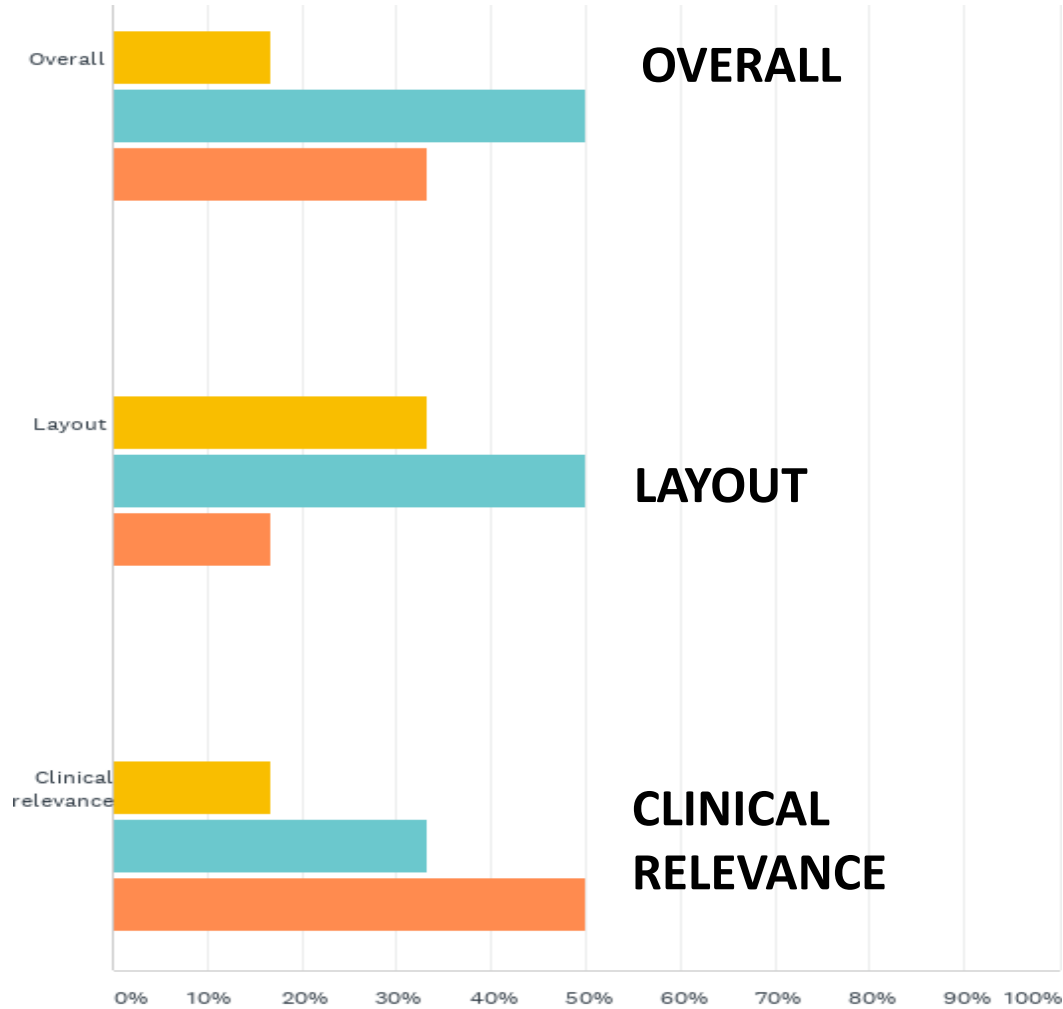
Radiology feedback

On a scale of 1 - 5, how would you rate the report:

1 (Low) 2 3 4 5 (High)

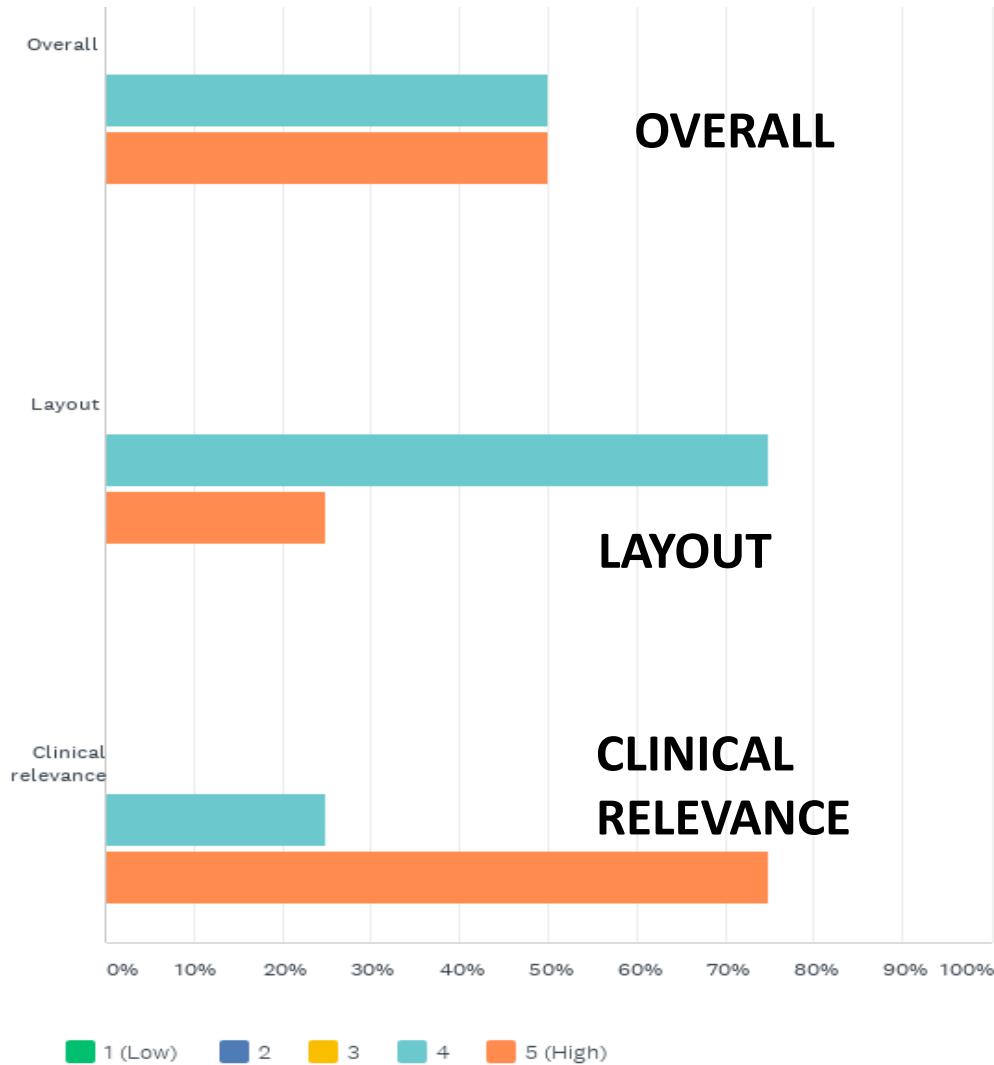


Surgeon feedback

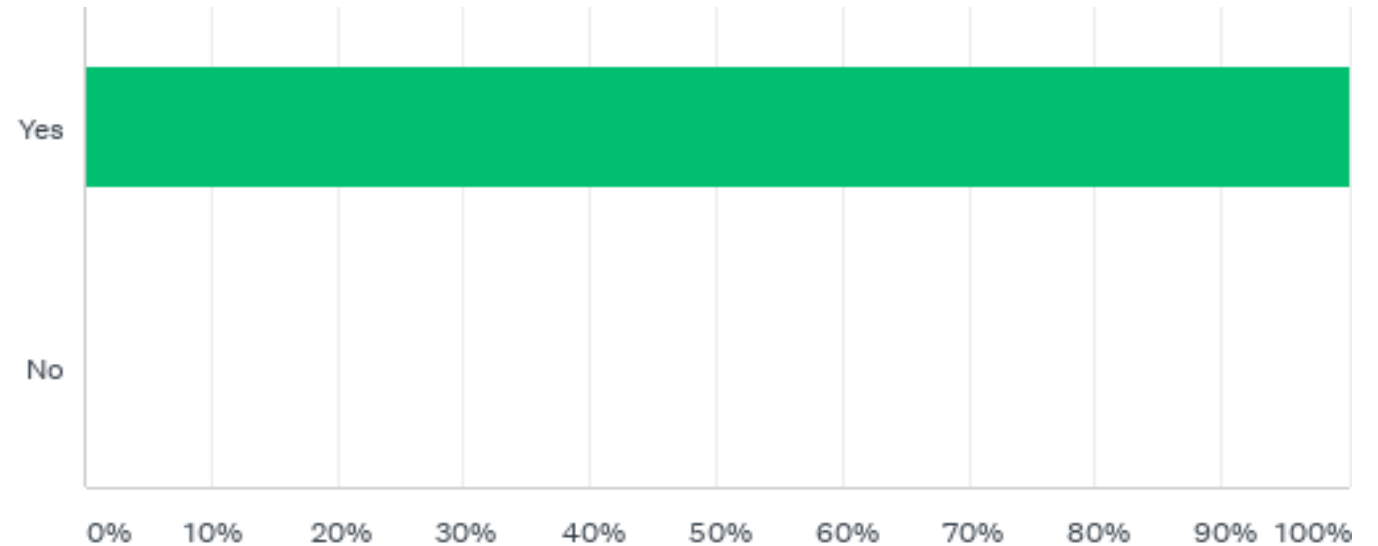


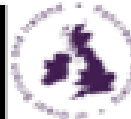
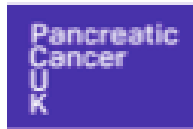
1 (Low) 2 3 4 5 (High)

Oncologist feedback



Did it offer an improvement in the reporting of radiological response?





PACT-UK

PAncreatic Cancer reporting Template-UK

Imaging reviewed:

Radiologist:

Clinical details:

*If clear metastatic disease complete only part A. If post neo-adjuvant treatment, complete only part D.
Delete the irrelevant parts accordingly.*

Summary (optional - key positive findings):

--

Part A Initial staging		
1	Tumour information	
	Location (tick all that apply)	Uncinate <input type="checkbox"/> Head <input type="checkbox"/> Neck <input type="checkbox"/> Body <input type="checkbox"/> Tail <input type="checkbox"/>
	Maximum diameter	___ mm / isodense precluding ability to estimate size
	Biliary involvement	Yes (stented) <input type="checkbox"/> Yes (un-stented) <input type="checkbox"/> No <input type="checkbox"/>
	Pancreatic duct size	___ mm
2	Adjacent organ involvement (including duodenum):	No <input type="checkbox"/> Yes <input type="checkbox"/> Specify -
3	Regional lymphadenopathy	No <input type="checkbox"/> Yes <input type="checkbox"/> Specify -
4	Metastatic disease	No <input type="checkbox"/> Indeterminate <input type="checkbox"/> Yes <input type="checkbox"/> Specify location and volume -
5	Predicted tumour type	PDAC <input type="checkbox"/> Ampullary <input type="checkbox"/> Cholangiocarcinoma <input type="checkbox"/> Other -
6	Predicted radiological staging	T [...] N [...] M [...]

Part B Vessel Involvement				
1	Variant vascular anatomy	Accessory RHA <input type="checkbox"/> Replaced RHA <input type="checkbox"/> Replaced CHA <input type="checkbox"/> Other -		
2	Venous contact			
		Contact	Degrees	Length (mm)
				Narrowing/occlusion / thrombosis?
	PV	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	SMV	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	
	Other vein Specify -	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	Jejunal/colic tributary	No <input type="checkbox"/> Yes <input type="checkbox"/>		
	Collaterals in context of PV/SMV occlusion	No <input type="checkbox"/> Yes <input type="checkbox"/> n/a <input type="checkbox"/>		

3 Arterial Contact				
		Contact	Degrees	Length (mm)
				Narrowing/occlusion / thrombosis?
	SMA	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	CHA	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	Coeliac axis	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	Other artery Specify -	No <input type="checkbox"/> Yes <input type="checkbox"/>	0-90 <input type="checkbox"/> 90-180 <input type="checkbox"/> 180-270 <input type="checkbox"/> 270-360 <input type="checkbox"/>	N <input type="checkbox"/> O <input type="checkbox"/> T <input type="checkbox"/>
	Jejunal/colic branch	No <input type="checkbox"/> Yes <input type="checkbox"/>		
	GDA	No <input type="checkbox"/> Yes <input type="checkbox"/>		
4	Arterial origin stenosis	Coeliac axis <input type="checkbox"/> SMA origin <input type="checkbox"/>		

Part C Additional findings

Part D Post-neoadjuvant treatment

If Answer to 1 is Yes, do not complete the remaining questions

Baseline CT date for comparison –

		Response	Specify
1	New metastases	No <input type="checkbox"/> Indeterminate <input type="checkbox"/> Yes <input type="checkbox"/>	
2	Tumour size	Decreased <input type="checkbox"/> Stable <input type="checkbox"/> Increased <input type="checkbox"/>	____ mm to ____ mm
3	Venous involvement	Decreased <input type="checkbox"/> Stable <input type="checkbox"/> Increased <input type="checkbox"/> Nil <input type="checkbox"/>	PV <input type="checkbox"/> SMV <input type="checkbox"/> Other -
4	Arterial involvement	Decreased <input type="checkbox"/> Stable <input type="checkbox"/> Increased <input type="checkbox"/> Nil <input type="checkbox"/>	SMA <input type="checkbox"/> CHA <input type="checkbox"/> Coeliac <input type="checkbox"/> Other -
5	Increased local invasion	No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable <input type="checkbox"/>	
6	Other findings	No <input type="checkbox"/> Yes <input type="checkbox"/>	
7	Subjective overall response	Partial <input type="checkbox"/> Stable <input type="checkbox"/> Progression <input type="checkbox"/>	

CRIS compatible format

Pancreatic Cancer Synoptic Report

Imaging reviewed:

Radiologist:

Clinical details:

*If clear metastatic disease complete only part A. If post neo-adjuvant treatment, complete only part D.
Delete the irrelevant parts accordingly, including instructions in italics.*

Summary (optional - key positive findings):

PART A - Initial Staging

1) Tumour

Location: Uncinate/head/neck/body/tail

Maximum diameter: [.....] mm / isodense precluding ability to estimate size

Biliary involvement: Yes stented/ Yes un-stented/ No

Pancreatic duct size: [.....] mm

2) Adjacent organ involvement (including duodenum): No / Yes [.....]

3) Regional lymphadenopathy: No / Yes [.....]

4) Metastatic disease: No / Indeterminate / Yes

Specify location and volume: [.....]

5) Predicted tumour type: PDAC / Ampullary / Cholangiocarcinoma / Other [.....]

6) Predicted radiological staging T[.....] N[.....] M[.....]

PART B – Vessel Involvement*

1) Variant vascular anatomy (including accessory/replaced RHA/CHA)? No / Yes [.....]

2) Venous contact:

PV: No / Yes [.....°] [.....]

SMV: No / Yes [.....°] [.....]

PV/SMV total contact length: [.....] mm

Other vein contact: No/ Yes [specify vessel.....] [.....°] [.....]

Jejunal tributary: No / Yes

Presence of venous collaterals if PV/SMV occlusion? No / Yes

3) Arterial contact:

SMA: No / Yes [.....°] [.....]

SMA total contact length: [.....] mm

CHA: No / Yes [.....°] [.....]

Coeliac axis: No / Yes [.....°] [.....]

1st jejunal branch: No / Yes

GDA: No / Yes

Other arterial contact (including accessory/replaced): No / Yes [specify vessel.....] [.....°] [.....]

4) Stenosed coeliac axis/SMA origin: No / Yes [.....]

**For each involved vessel, state degrees of contact in first box (state range 0-90,90-180,180-270,270-360)
and presence of narrowing, occlusion or thrombosis in second box.*

Stage 3 - National rollout & dissemination

- National body ratification
 - RCR/BSGAR
 - Radiology workshops
- Publication
 - BMJ Oncology
 - BSGAR website
 - includes template + workshop recordings + radiology trouble-shooting guide



Stage 4 – Study incorporation and ongoing review

- Optimal Care Pathway (OCP) initiative
- Research protocols
- National audit
- Imaging biobank
- Follow-up meetings
 - 6 mthly → Feedback +/- refinements



Imaging biobank

- Link in with NHS England & NHSX
 - Graham Robinson – NHSE Clinical Lead for Imaging Digital and IT transformation
 - National COVID-19 Chest Imaging Database (NCCID)
 - Centralised image repository, link to clinical data
 - Secure – Image Exchange Portal (IEP), de-identified
 - NHS AI lab – test/validate algorithms
- Aim for an open, well governed database
 - Accessible for research studies
- Evolve/develop process/collaboration towards national data registry

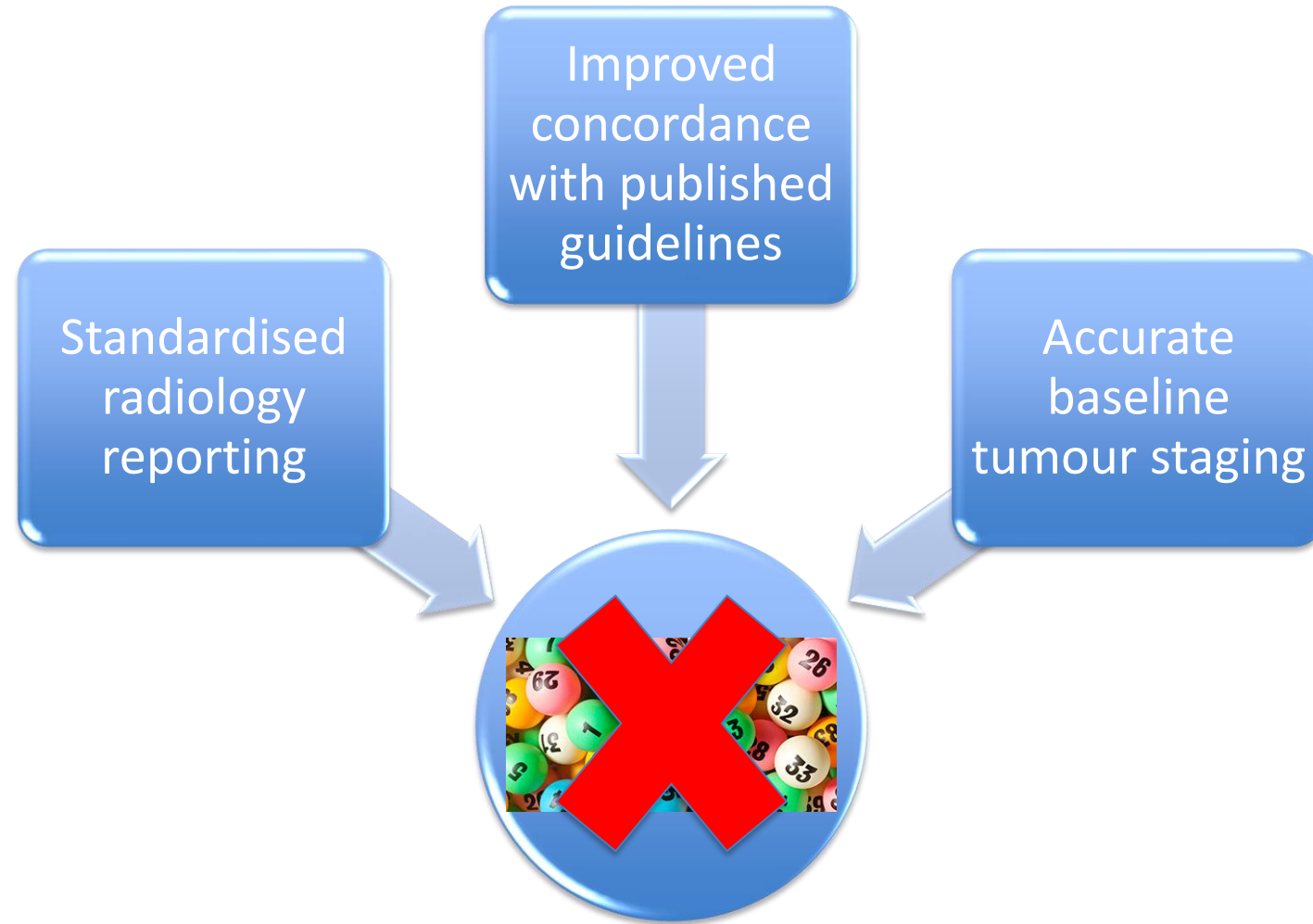


Challenges

- Clinician buy-in
 - “is it really needed”
- Radiology buy-in
 - Time constraints, learning curve
- IT perspectives
 - Template embeddability in NHS systems



OCP adoption → national guidance



Acknowledgements

- Raneem Albazaz & Abdullah Al-Adhami (Radiol)
- Juan Valle and Ganesh Radhakrishna (Oncol)
- PCUK team
 - Harriet Smith/Abi Lester – Events and project manager
 - Alice Clarkson – Policy and Health improvement manager
 - Georgia Papacleovoulou – Health Intelligence and Improvement Lead
 - Chris McDonald – Head of research

Pancreatic
Cancer
UK



Endorsing a PACT-UK Consensus statement

PACT-UK should be implemented as the standard radiology reporting tool across all specialist pancreatic cancer multidisciplinary meetings in the UK to promote more consistent and reliable radiology reporting of pancreatic cancer.

- **To endorse this statement:**
- Visit <https://www.menti.com/>
- Enter the code - **8753 6158**
- You'll be asked to submit your name, job title and organisation.