Recent Advances in Cancer Care — New Paradigms, Novel Agents and What It Means for the Oncology Nurse

A Complimentary NCPD Symposium Series Held During the 51st Annual ONS Congress

Pancreatic Cancer

Friday, May 15, 2026

6:00 AM – 7:30 AM

Faculty

Caroline Kuhlman, MSN, APRN-BC
Philip A Philip, MD, PhD
Amanda K Wagner, APRN-CNP, AOCNP

Moderator

Eileen M O'Reilly, MD

RTP
RESEARCH TO PRACTICE

Faculty

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Tucker Gosnell Center for Gastrointestinal Cancers
Massachusetts General Brigham Cancer Institute
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Medical Director, Cancer Clinical and Translational Research Office
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Wayne State University Department of Oncology
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Moderator

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Winthrop Rockefeller Endowed Chair in Medical Oncology
Section Head, Hepatopancreaticobiliary and Neuroendocrine Cancers
Co-Director, Medical Initiatives
David M Rubenstein Center for Pancreatic Cancer Research
Chair, Human Research Protection Program and IRB
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Memorial Sloan Kettering Cancer Center
Professor of Medicine, Weill Cornell Medical College
New York, New York

RTP RESEARCH TO PRACTICE

Ms Kuhlman — Disclosures

No relevant financial relationships to disclose.

Dr Philip — Disclosures

Advisory Committees	Corcept Therapeutics Inc, Ipsen Biopharmaceuticals Inc, Jazz Pharmaceuticals Inc, Novocure Inc, Revolution Medicines Inc
Consulting Agreements	Novocure Inc
Contracted Research	Bristol Myers Squibb, Novartis, Revolution Medicines Inc, Taiho Oncology Inc
Data and Safety Monitoring Boards/Committees	J-Pharma Co Ltd, Oncolytics Biotech Inc

Ms Wagner — Disclosures

No relevant financial relationships to disclose.

Dr O'Reilly — Disclosures

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Contracted Research	Agenus Inc, Amgen Inc, Arcus Biosciences, AstraZeneca Pharmaceuticals LP, BioNTech SE, Digestive Care Inc, Elicio Therapeutics, Genentech, a member of the Roche Group, Incyte Corporation, Revolution Medicines Inc, Tango Therapeutics
Nonrelevant Financial Relationships	American Association of Cancer Research (Editor), American Society of Clinical Oncology (Editor), Break Through Cancer, Imedex, National Cancer Institute (Cancer Center Support Grant/Core Grant), National Institutes of Health (research grant), Stand Up 2 Cancer

Commercial Support

This activity is supported by educational grants from Ipsen Biopharmaceuticals Inc and Revolution Medicines Inc.

Research To Practice NCPD Planning Committee Members, Staff and Reviewers

Planners, scientific staff and independent reviewers for Research To Practice have no relevant financial relationships to disclose.

This educational activity contains discussion of non-FDA-approved uses of agents and regimens. Please refer to official prescribing information for each product for approved indications.

Clinicians in the Meeting Room

Networked iPads are available.

Review Program Slides: Tap the Program Slides button to review speaker presentations and other program content.

Answer Survey Questions: Complete the pre- and postmeeting surveys. Survey questions will be discussed throughout the meeting.

Ask a Question: Tap Ask a Question to submit a challenging case or question for discussion. We will aim to address as many questions as possible during the program.

For assistance, please raise your hand. Devices will be collected at the conclusion of the activity.

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Clinicians Attending via Zoom

Review Program Slides: A link to the program slides will be posted in the chat room at the start of the program.

Answer Survey Questions: Complete the pre- and postmeeting surveys. Survey questions will be discussed throughout the meeting.

Ask a Question: Submit a challenging case or question for discussion using the Zoom chat room.

Get NCPD Credit: An NCPD credit link will be provided in the chat room at the conclusion of the program.

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About the Enduring Program

- The live meeting is being video and audio recorded.
- The proceedings from today will be edited and developed into an enduring web-based program. An email will be sent to all attendees when the activity is available.
- To learn more about our education programs, visit our website, **www.ResearchToPractice.com**

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ONCOLOGY NURSING UPDATE WITH NEIL LOVE, MD

NONMELANOMA SKIN CANCERS
Check out our recent program with Dr Nikhil I Khushalni from Moffitt Cancer Center in Tampa, Florida. Published May 7, 2026.

Overview of nonmelanoma skin cancers (12 min)

Systemic therapy for nonmelanoma skin cancers (8 min)

Immune checkpoint inhibitors for special patient populations (12 min)

Hedgehog inhibitors for basal cell carcinoma (6 min)

New developments in therapy for nonmelanoma skin cancers (5 min)

CASE: A man in his early 70s with cutaneous squamous cell carcinoma receives cemiplimab (8 min)

CASE: A man in his mid 70s with a history of basal cell carcinoma presents with disease of the ocular surface and receives immunotherapy (6 min)

CASE: A man in his early 70s with recurrent metastatic basal cell carcinoma receives vismodegib followed by cemiplimab on disease progression (6 min)

Subscribe to our Oncology Nursing Update podcast

Feedback (Please!)

RTP RESEARCH TO PRACTICE

“Recent Advances in Cancer Care — New Paradigms, Novel Agents and What It Means for the Oncology Nurse”
Eighteenth Annual RTP-ONS NCPD Symposium Series

Wednesday May 13	Antibody-Drug Conjugates	11:15 AM – 12:45 PM CT
	Ovarian Cancer	6:00 PM – 7:30 PM CT
Thursday May 14	Immunotherapeutic Approaches for Endometrial Cancer	6:00 AM – 7:30 AM CT
	Prostate Cancer	12:15 PM – 1:45 PM CT
	Non-Muscle-Invasive and Muscle-Invasive Bladder Cancer	6:00 PM – 7:30 PM CT
Friday May 15	Pancreatic Cancer	6:00 AM – 7:30 AM CT
	Targeting the PI3K/AKT/mTOR Pathway in HR-Positive Metastatic BC	12:15 PM – 1:45 PM CT
	Non-Hodgkin Lymphoma and Chronic Lymphocytic Leukemia	6:00 PM – 8:00 PM CT
Saturday May 16	CDK4/6 Inhibitors for HR-Positive Breast Cancer	6:00 AM – 7:30 AM CT
	Relapsed/Refractory Multiple Myeloma	12:15 PM – 1:45 PM CT
	Oral SERDs for Breast Cancer	6:00 PM – 7:30 PM CT

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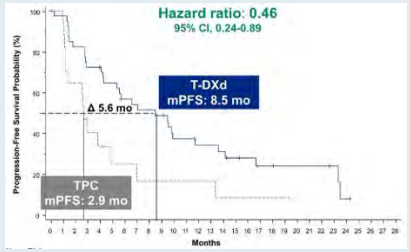
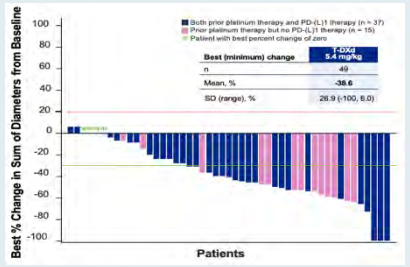
Recent Advances in Cancer Care — New Paradigms, Novel Agents and What It Means for the Oncology Nurse

New Agents, Therapies and Regimens

- When should it be used, for whom and why?
- How to prevent and manage side effects: dose holds and reductions
  - Kaplan Meier curves — HR and absolute benefit



  - Waterfall plots



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Agenda

Introduction: Clinical Presentation and Prognosis of Pancreatic Adenocarcinoma (PAD)

Module 1: Recent Advances in Up-Front Treatment for Metastatic PAD

Module 2: Selection and Sequencing of Therapy for Relapsed/Refractory Metastatic PAD

Module 3: Novel Strategies Targeting RAS Mutations in Advanced PAD

Module 4: Utility of Tumor Treating Fields in PAD Management

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Mass General Brigham

Clinical Presentation and Prognosis of Pancreatic Cancer

Caroline Kuhlman, MSN, APRN-BC

Tucker Gosnell Center for Gastrointestinal Cancer

Mass General Brigham Cancer Institute

May, 2026

5-Year Relative Survival by SEER Summary Stage (U.S.)

Stage at Diagnosis	% of Cases	5-Year Survival
Localized (confined to pancreas)	~14%	44–46%
Regional (spread to regional lymph nodes/adjacent structures)	~29%	16%
Distant (metastatic)	~53%	3%

Key Trends (2004–2015, SEER Data)

- Overall 5-year survival doubled: 6% → 12%
- Localized disease survival nearly doubled: 24% → 46%
- Distant disease survival essentially unchanged: 2% → 3%
- 1-year survival for metastatic disease improved: 14% → 22%

Pancreatic cancer by the numbers

- Pancreatic cancer accounts for about 3% of all cancers in the US and about 7% of all cancer deaths.
- The average lifetime risk of pancreatic cancer is about 1 in 58 in men and about 1 in 60 in women

5-year relative survival rates for pancreatic cancer

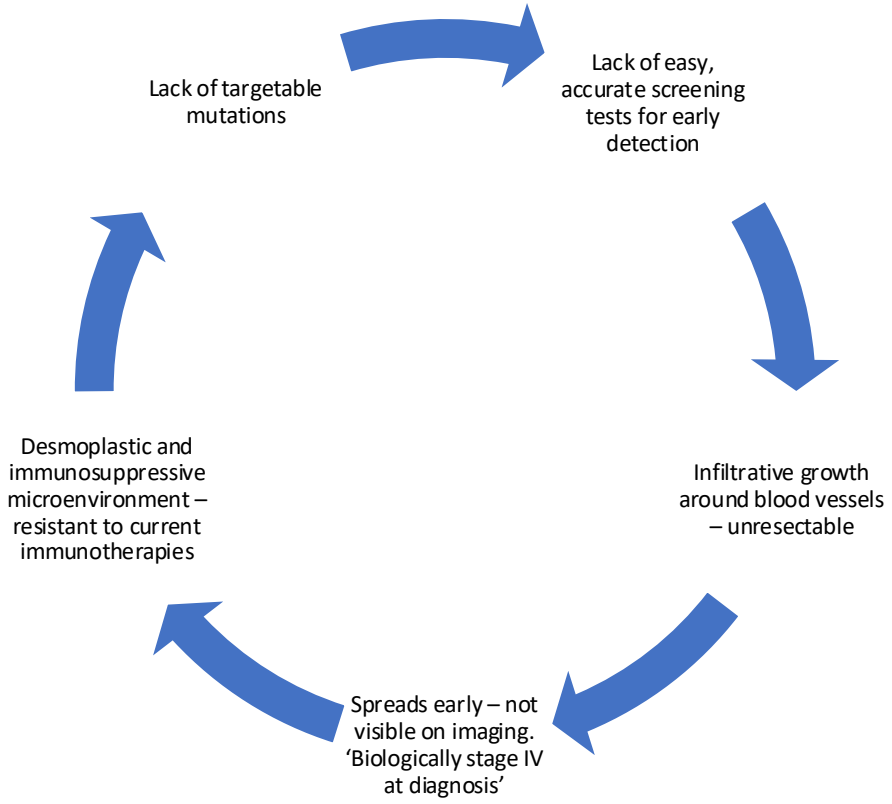
Based on people diagnosed with pancreatic cancer between 2013 and 2019.

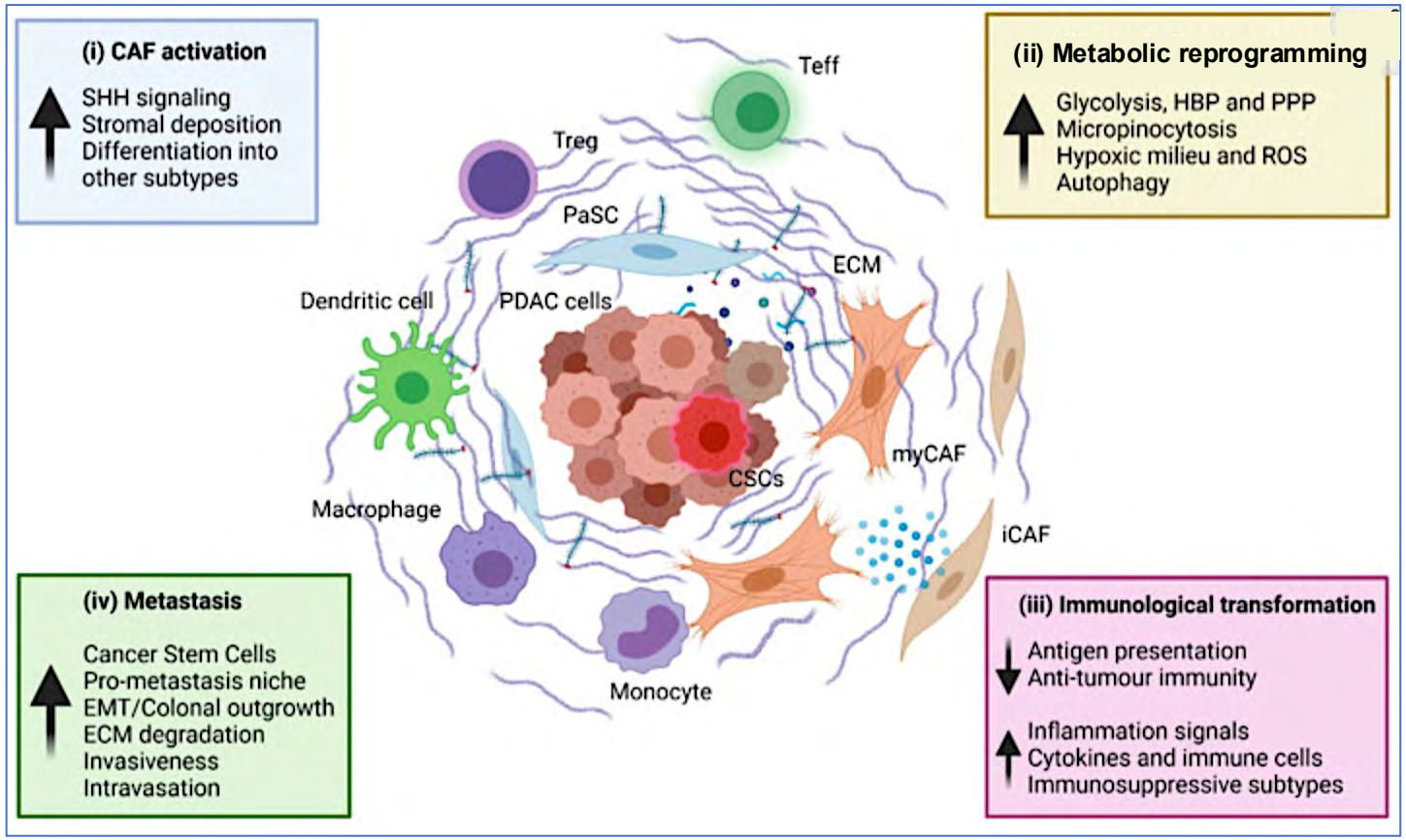
SEER* Stage	5-year Relative Survival Rate
Localized	44%
Regional	16%
Distant	3%
All SEER stages combined	13%

* SEER = Surveillance, Epidemiology, and End Results

American Cancer Society

Why is pancreatic cancer so challenging?





Truong et al, Cancers (Basel) 2021

Risk factors

- Tobacco use

- Smoking one of the most important risk factors

- risk twice as high in smokers vs never smoker

-cigars, smokeless tobacco products also increase risk

- Obesity

-BMI>30 20% more likely to develop panc ca

- Diabetes

-More common in people with DM, esp type 2

- ?Cause or effect

- Chronic pancreatitis

-often seen with heavy alcohol use and smoking

Risk factors

- IPMN

- 2-9% develop invasive cancer

- Inherited genetic syndromes (~10-15% PDAC)

Hereditary breast and ovarian cancer syndrome - BRCA1, BRCA2, PALB2

Familial atypical multiple mole melanoma (FAMMM) syndrome - p16/CDKN2A

Familial pancreatitis - PRSS1, SPINK1, CFTR

Lynch syndrome - MLH1, MSH2, MSH6, PMS2 genes

Peutz-Jeghers syndrome - STK11

Familial Pancreatic Cancer - unknown gene. ≥2 first-degree relatives with pancreatic cancer. Median age at dx 40-60 yrs (vs 60-80 yrs sporadic)

Risk factors: Unclear effect on risk

- Diet

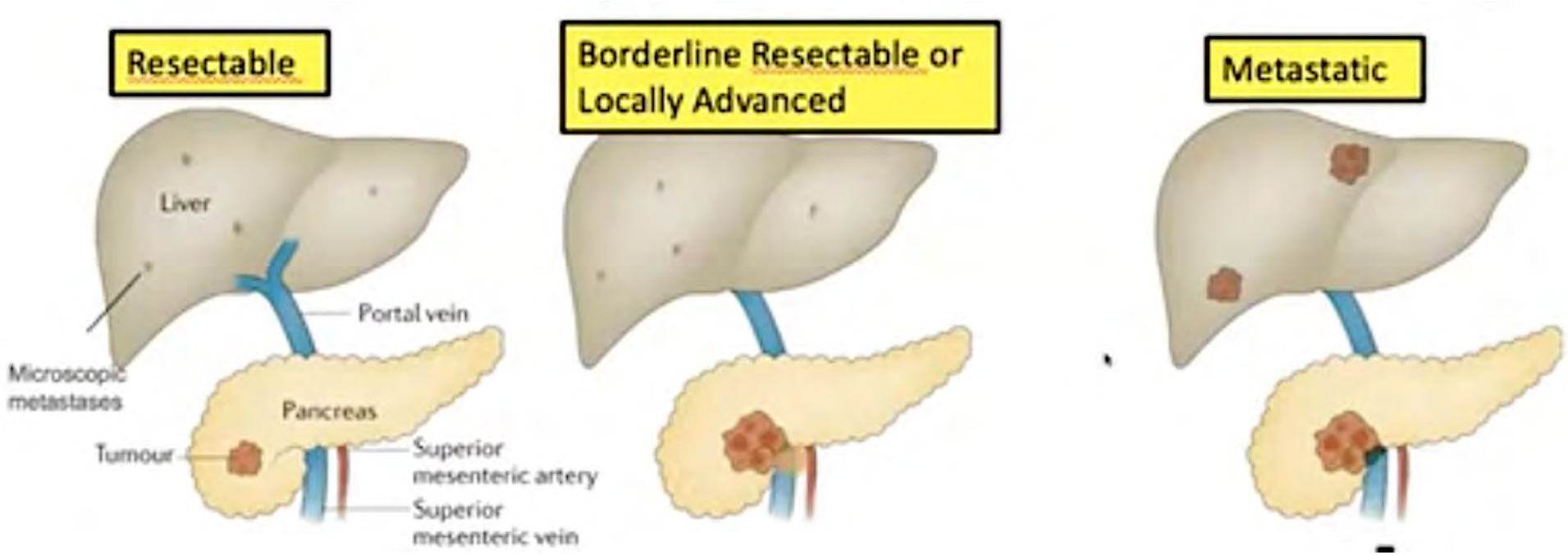
- Red processed meats, saturated fats, sugary drinks

- Physical Inactivity
- Alcohol
- Coffee - conflicting
- Aspirin, NSAID use - conflicting
- H pylori - conflicting

Clinical Presentation:

- Jaundice, dark urine
- Progressive back pain radiating around the abdomen
- Anorexia, weight loss, nausea, vomiting
- Gastric outlet / duodenal obstruction
- Diarrhea
- Worsening diabetes mellitus
- VTE

Staging: Resectability



20%

25% -30%

50% - 55%

HARVARD MEDICAL SCHOOL

Assaad Endosc Ultrasound 2017

Mass General Brigham

Importance of Palliative Care in Advanced PDAC

Caroline Kuhlman, MSN, APRN-BC

Mass General Brigham
Mass General Cancer Center

Patient Case

69 yo man presented with abdominal pain, weight loss. CT demonstrates pancreatic head mass, left adrenal mass, multiple liver lesions and bilateral pulmonary nodules. Biopsy c/w invasive ductal adenocarcinoma. CA 19-9 1024

He is married with 2 adult children. Retired as a high school English teacher. Lives in New Hampshire. Enjoys working on the land, being outdoors, gardening, tending to chickens and dogs. Loves to cook and entertain.

9/2024 started FOLFIRINOX. Abdominal pain, makes moving around, eating and sleeping difficult. Loose stools, difficulty gaining weight. Expressed feelings of depression, lost interest in activities, avoids seeing family and friends. Moody and angry at home. Tearful during initial visits.

Supportive interventions: A team approach

Referral to social work

Referral nutrition

Referral to Palliative care team- pain management, goal setting symptom management

Interventional Radiology for para/thoracentesis

GI- stent changes

Early involvement with palliative care

2010 NEJM paper from MGH supportive oncology group.

Randomized study- randomized patients with newly diagnosed met lung cancer to standard management vs. early intervention with palliative care.

QOL and mood assessed at baseline and at 12 weeks

151 patients randomized.

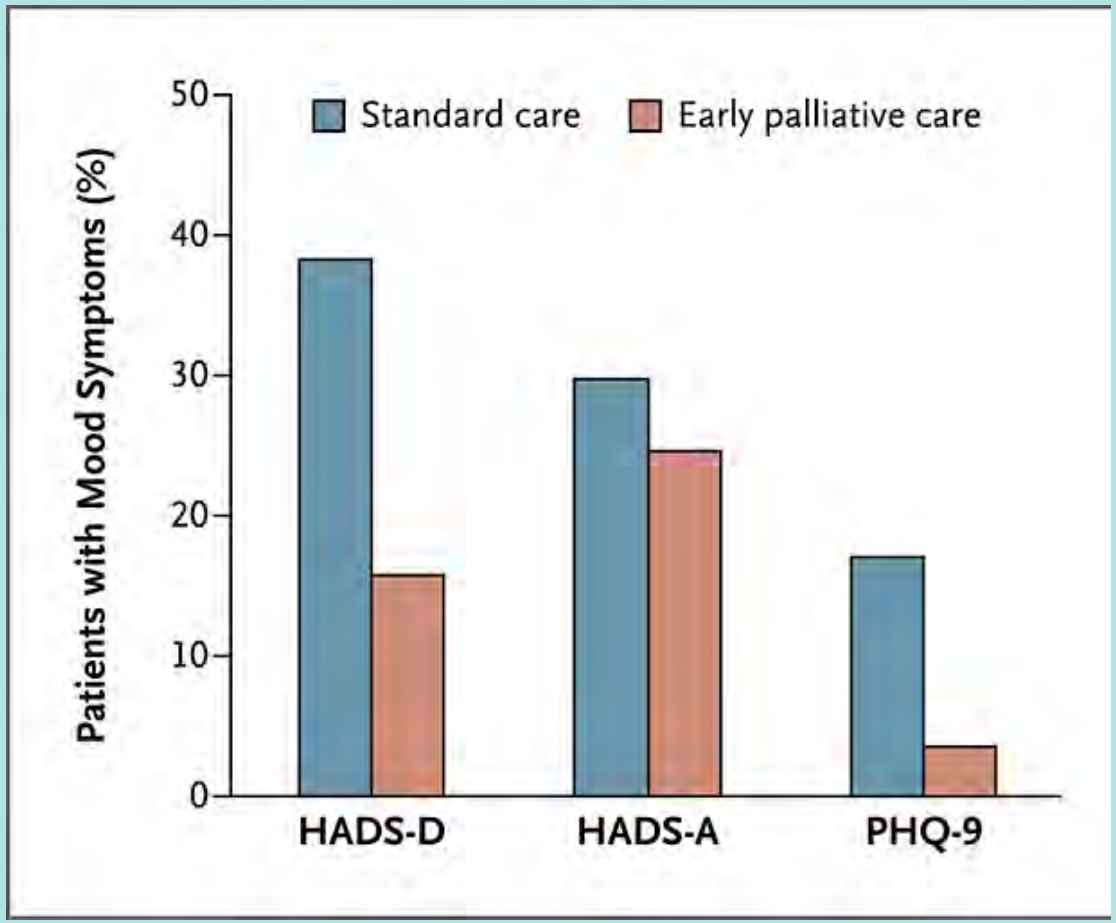
JS Temel, et al NEJM 2010; 363: 733-742

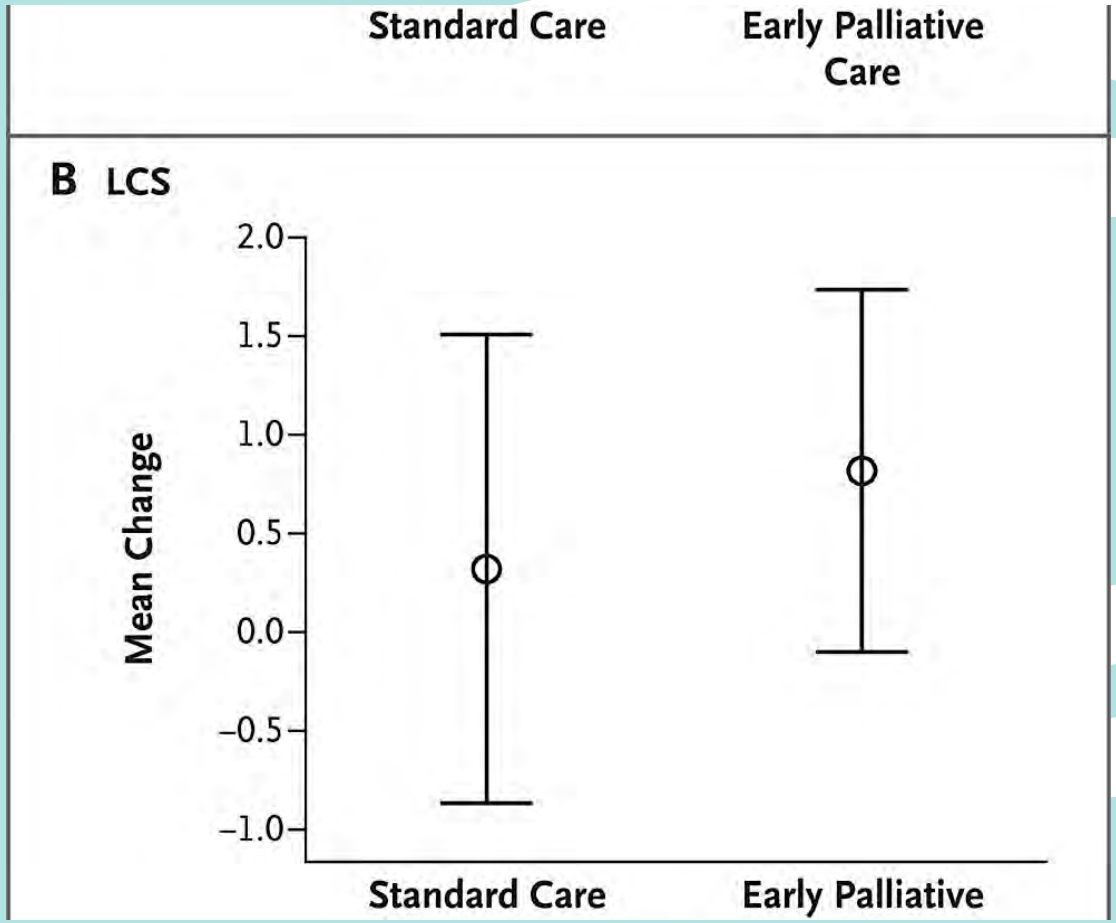
Mass General Brigham
Mass General Cancer Center

Results of Early Palliative Care

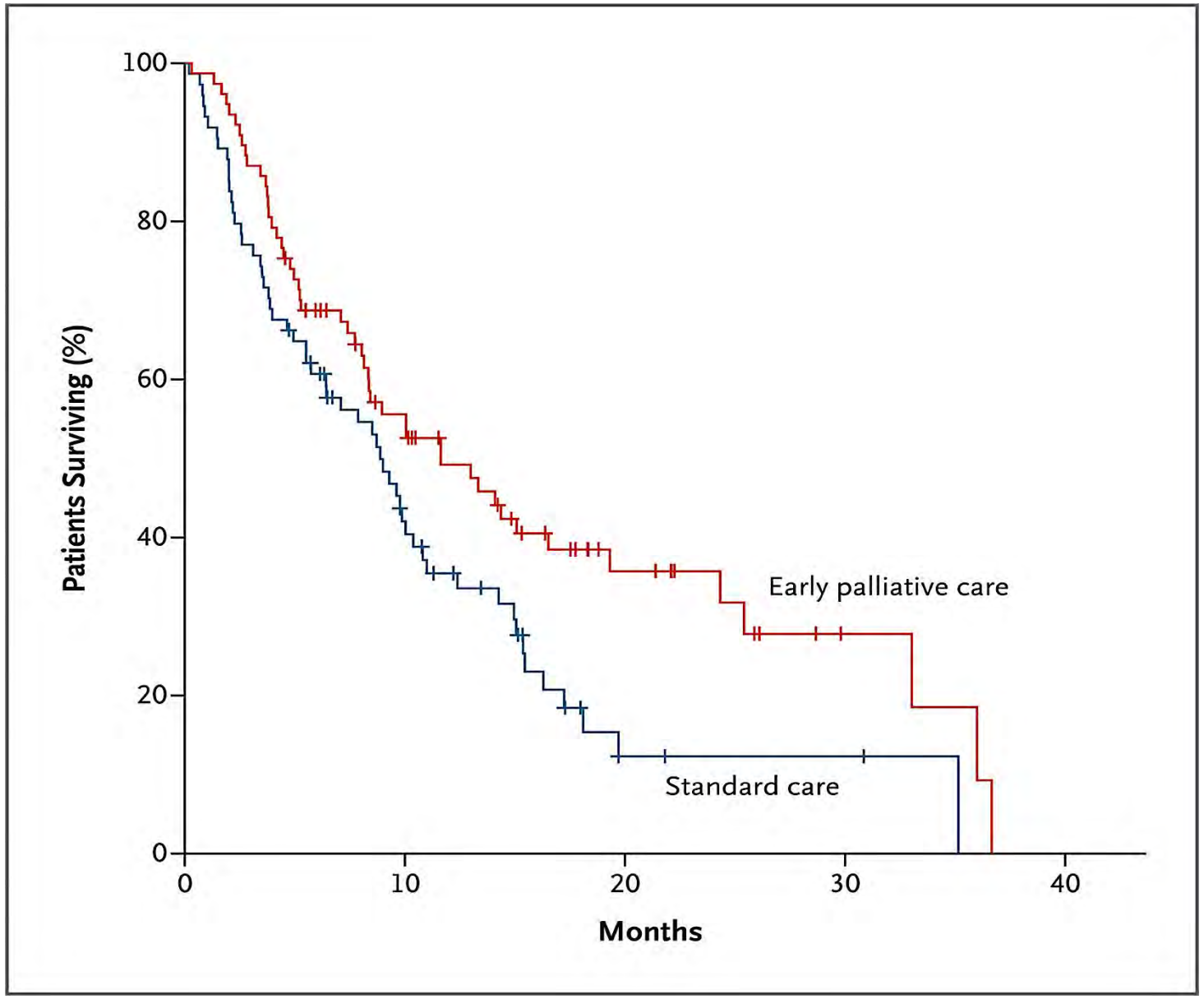
- Palliative care group reported better QOL and less depressive symptoms
- Fewer patients in the pall care group received aggressive end of life care, despite this the median survival in this group was longer (11.6 months vs. 8.9 months p=0.02)
- Subsequent studies have validated this outcome

QOL and Depression Scores





Survival Data



Serious Illness Conversation

Assess “what are your goals”

Sharing our hopes and worries

"Tell me what is important to you"

"If you know your time is limited - how do you want to spend this time?"

Supportive care: The hardest work we do

- Aggressive pain management with LA opioids, breakthrough, thoughtful about delivery mode
- Coordination with GI/IR for management of biliary stents and drains, paracentesis, thoracentesis
- Delayed gastric emptying: metoclopramide, erythromycin
- Weight loss- small, frequent, protein rich, calorie dense meals and snacks. Supplements - commercial shakes and drinks
- Manage pancreatic insufficiency with pancreatic enzymes to address chronic diarrhea, gas and bloating with meals

Case Study Outcomes

- Involvement with palliative care to assist in pain management
- Start pancreatic enzymes to help with diarrhea, gas, bloating and weight loss
- With improved supportive care able to work in his garden, get out to see friends, entertain at his home
- Initiate antidepressant that improved mood and engagement with others

Mass General Brigham
Mass General Cancer Center

Conclusions

- Supportive care, with chemotherapy or without, is the hardest work we do.
- In metastatic PDAC supportive care is as important as any treatment we give patients.
- Early involvement of supportive care in patients with metastatic PDAC, can not only alleviate suffering, help patients live better, it can help people live longer.

Agenda

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Research To Practice: Oncology Nursing Society

Pancreas Adenocarcinoma Current Standards

Eileen M. O'Reilly, MD, FASCO

Winthrop Rockefeller Endowed Chair, Memorial Sloan Kettering Cancer Center

Chair, Human Research Protection Program and IRB

Professor of Medicine, Weill Cornell Medicine

May 15th, 2026

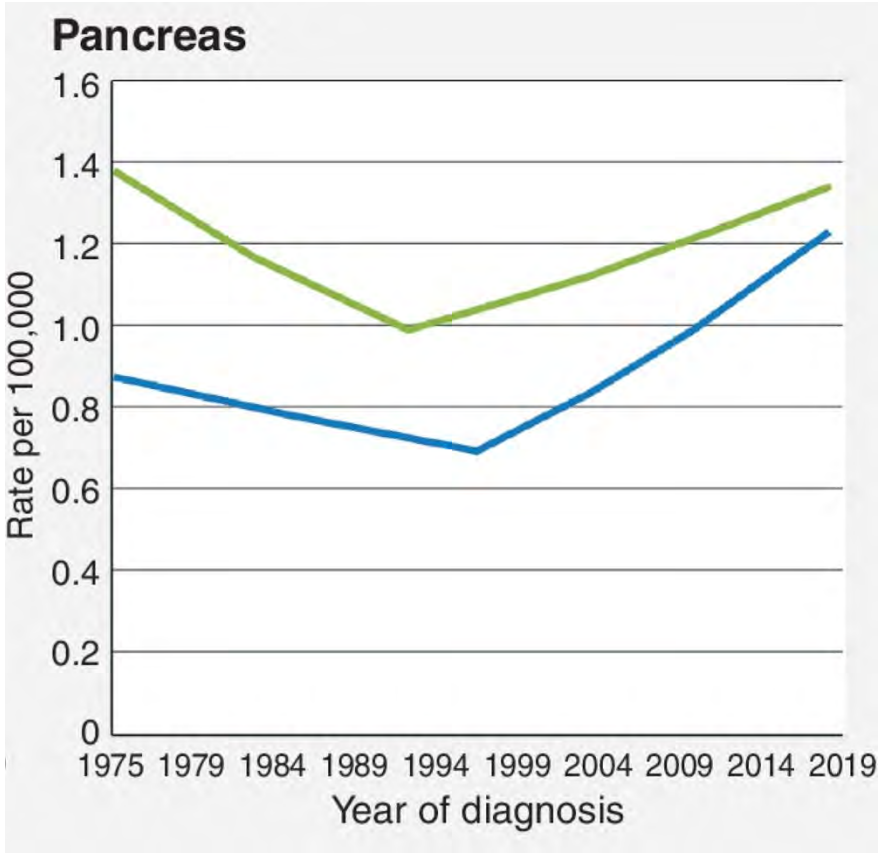
Memorial Sloan Kettering Cancer Center

Pancreas Cancer: Epidemiology

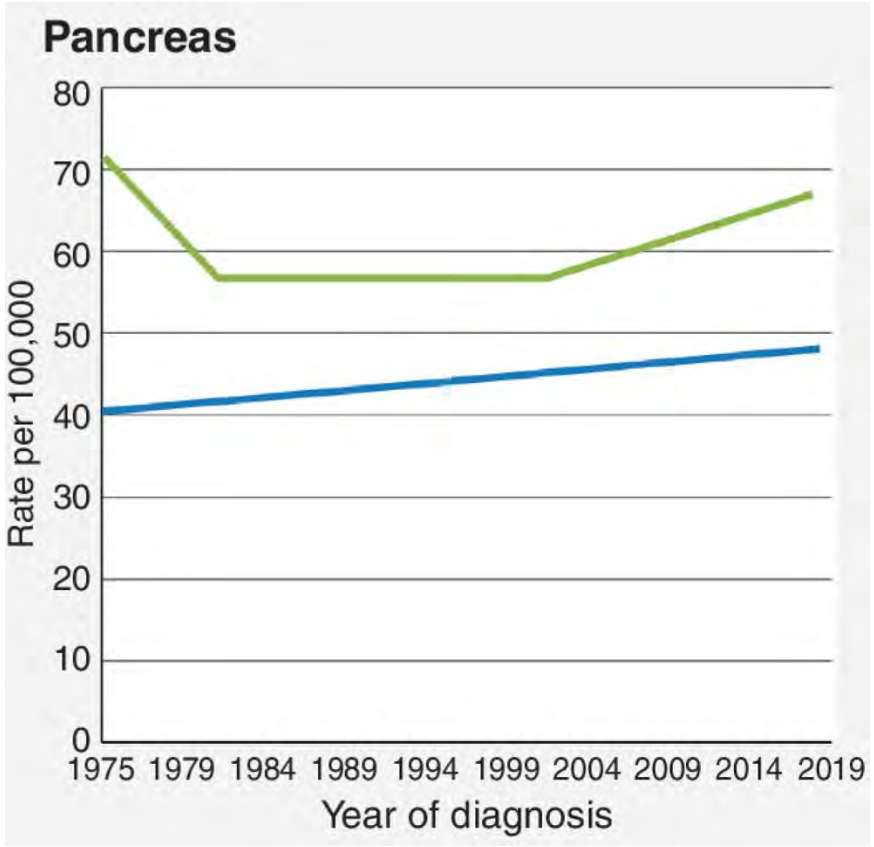
Early Onset Pancreas Cancer (5-10%) on the Rise

Trends More Pronounced in Younger Women – Reasons Unclear

Ages < 50



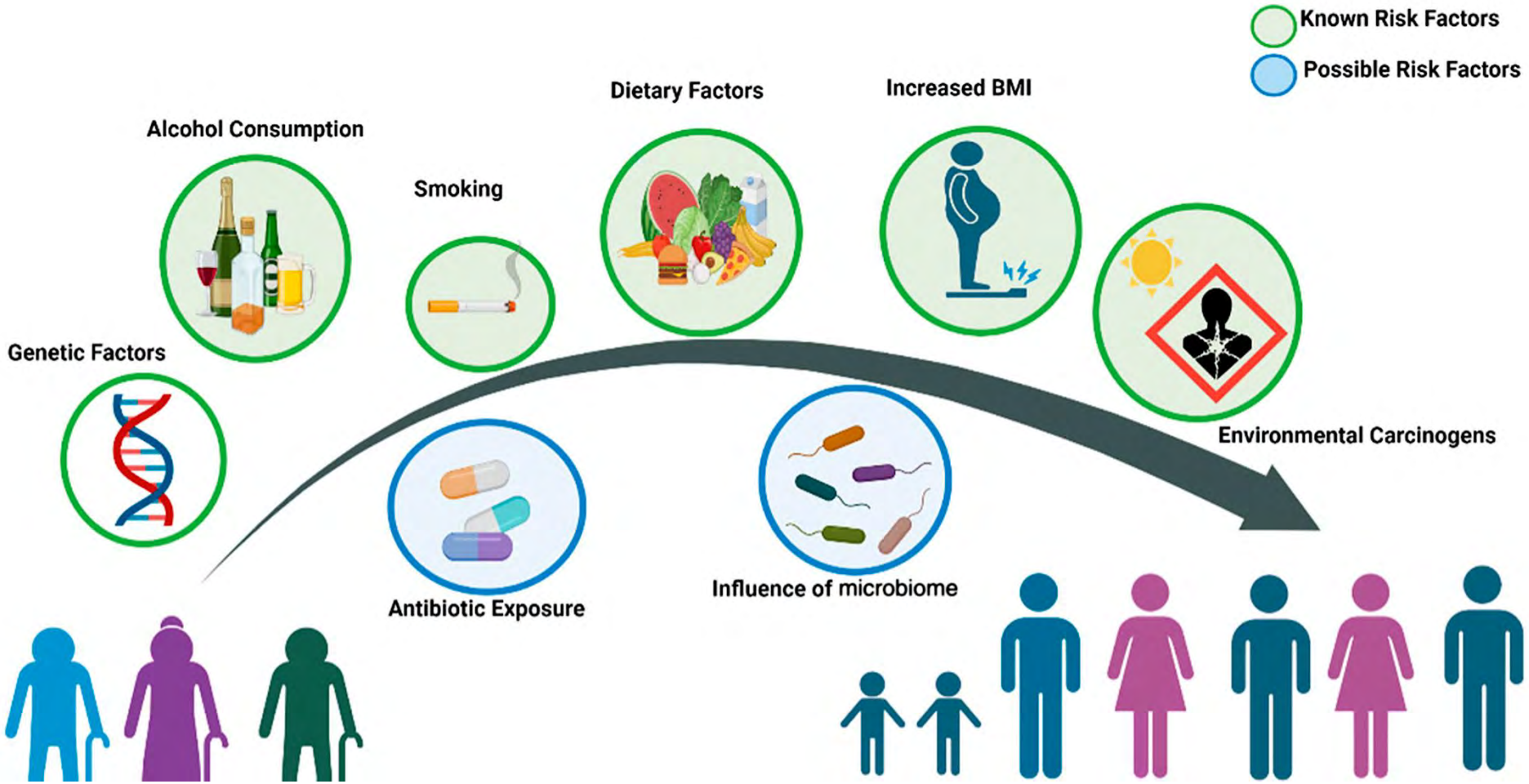
Ages ≥ 50



Ben-Aharon I et al. Cancer Discovery, 2023

Pancreas Cancer: Epidemiology

Factors Associated with Early Onset Cancers



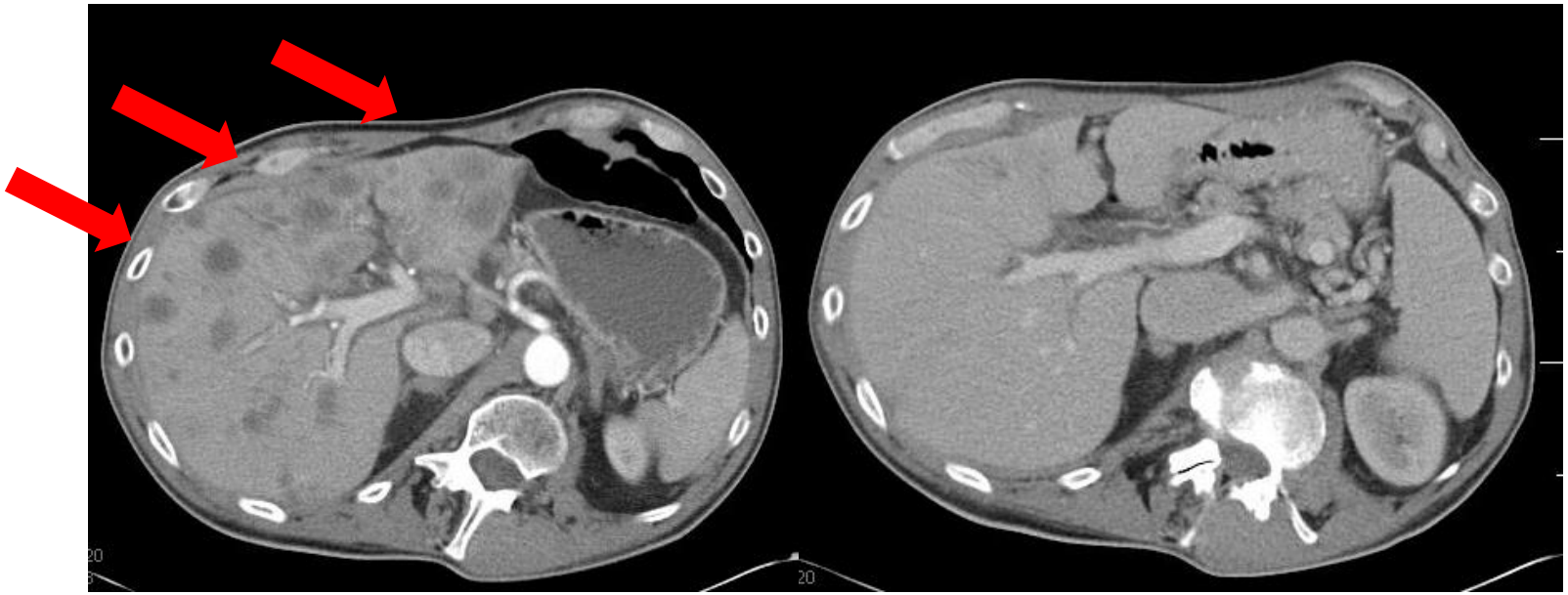
Harrold et al. ASCO Educational Book. 2023

Metastatic Pancreas Cancer: NALIRIFOX

67-Year-old Male; Retired Electrician; 20-Pack Year Cigarettes

Pre-treatment

6 months later



Ca 19-9 13,652

Ca 19-9 349

NALIRIFOX:
Liposomal irinotecan/
leucovorin/ 5-FU

Dose #1
Diarrhea
Dehydration
Electrolytes abnormal

Dose reduction #2
Excellent tolerance
Excellent cancer control

Factors for Treatment Selection in Metastatic PDAC

- Performance status, co-morbidities, age, major organ function
- Patient preferences
- Comparative efficacy, toxicity, cost
- Logistics
- Treatment sequencing
- Genomic context

Pancreas Cancer: Current Standards

Current State of Therapy Advanced PDAC 2026

First & Second-Line Practice-Changing Phase III Trials for Unselected Disease

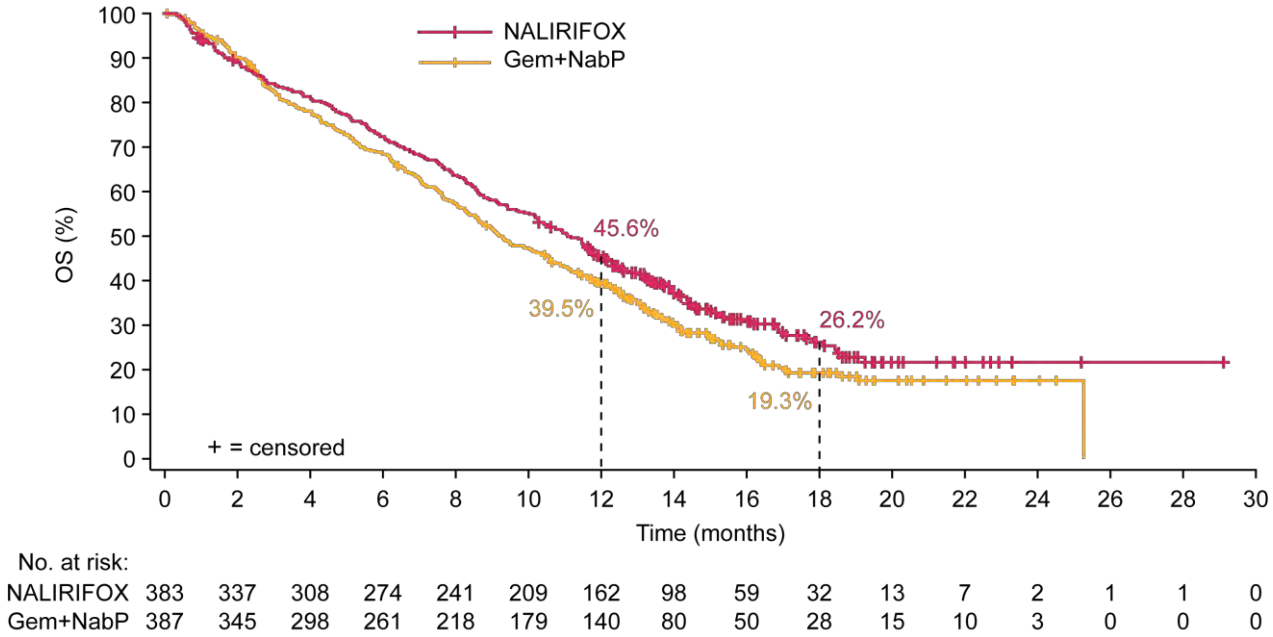
	N	Median OS	Overall RR	Reference
First-Line				
mFOLFIRINOX (vs Gem) PRODIGE/ ACCORD 11	171	**11.1 m**	31.6%	2011
Gemcitabine, nab-Paclitaxel (vs Gem) MPACT	431	**8.5 m**	23%	2013
NALIRIFOX (vs Gem/Nab-P) NAPOLI-3	383	**11.1m**	41.8%	2023
Second-Line				
Liposomal irinotecan/5-FU vs 5-FU NAPOLI-1	117	**6.1 m**	16%	2016

Conroy T et al. N Engl J Med. 2011
Von Hoff DD et al. N Engl J Med. 2013
Wainberg ZA et al. Lancet. 2023
Wang-Gillam A et al. Lancet Oncol. 2016

Pancreas Cancer: First-Line Therapy

NAPOLI 3: NALIRIFOX vs Gemcitabine/Nab-Paclitaxel

Triplet Superior to Doublet Chemotherapy



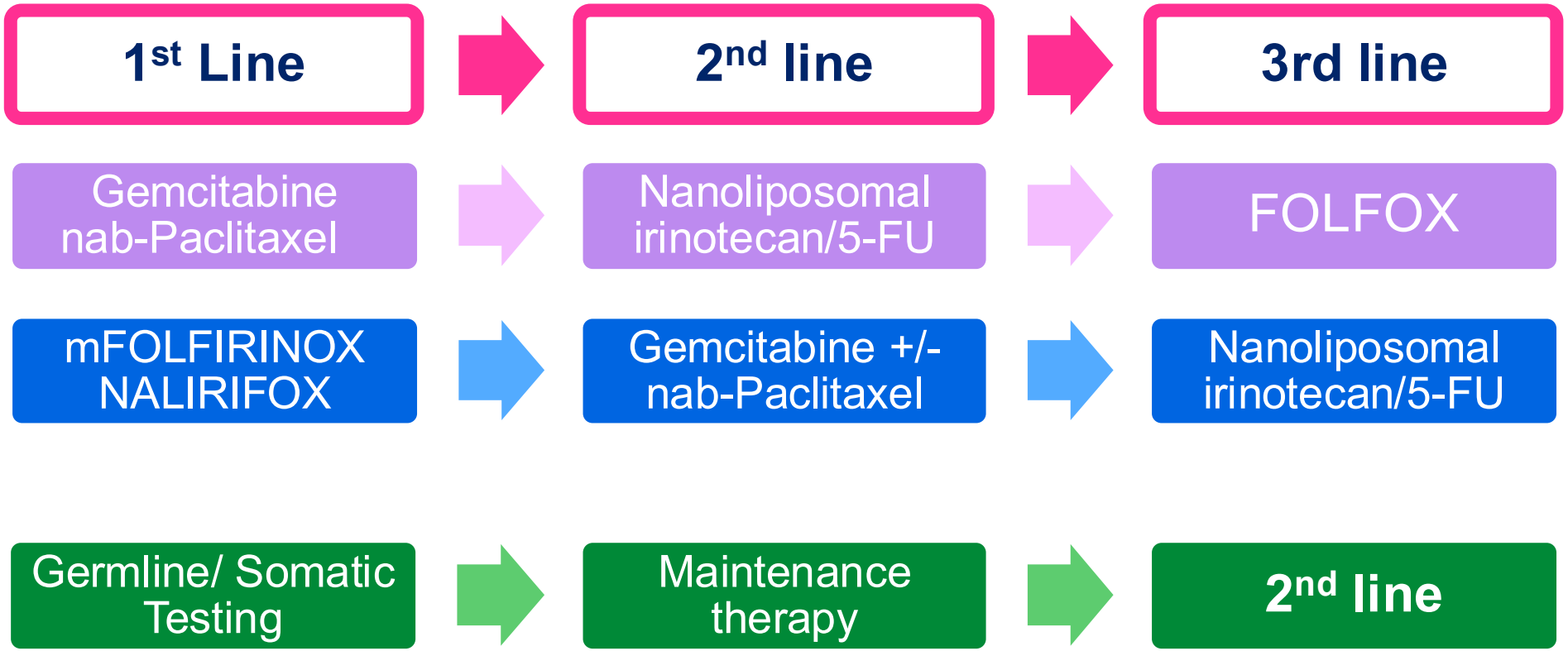
Characteristic	NALIRIFOX N= 383	Gem/Nab-P N= 387
Median OS (HR 0.83, p= 0.04)	**11.1 m**	**9.2 m**
Median PFS (HR 0.69, p <.0001)	7.4 m	5.6 m
Objective RR (95% CI)	41.8%	36.2%

- Practice implication: NALIRIFOX (vs mFOLFIRINOX) over Gem/nab-P for ECOG 0-1

Wainberg, Z.…O'Reilly, EM. Gastrointestinal Cancers Symposium, 2023
Wainberg, Z…O'Reilly, EM. Lancet, 2023

Pancreas Cancer: Treatment Sequence

Sequencing Therapy in Advanced PDAC 2026



Adapted NCCN Guidelines 2026

Select Second-Line Negative Trials in PDAC (Control Arms)

Response Rates < 10%; Median OS 6-7 m: Outcomes Poor

Study	Regimen	N	ORR (%)	Median OS (m)
NAPOLI 1	Nal-IRI + 5-FU/LV	117	8	6.1
SWOG S1513	FOLFIRI	58	10	6.5
SWOG S1115	FOLFOX	62	7	6.7
SEQUOIA	FOLFOX	284	6	6.3
QUILT-3.010	Gem + nab-paclitaxel	40	3	6.6
Trybeca-1	Gem + nab-paclitaxel	148	NA	6.9
GEMPAX	Gem + paclitaxel	140	17	6.4

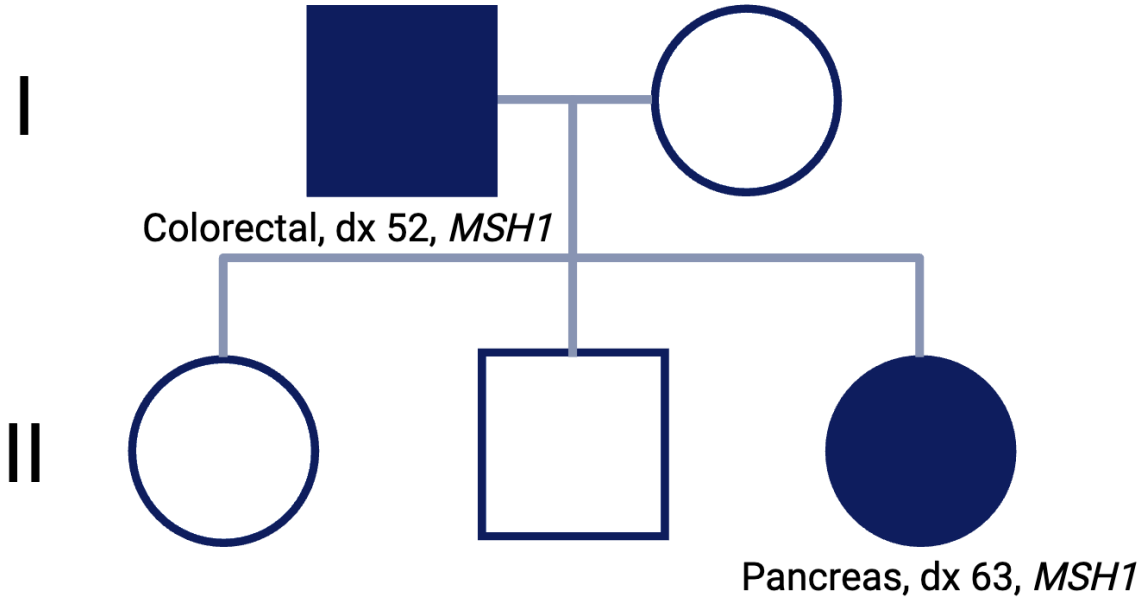
Experimental agents:
Veliparib, selumetinib/MK-2206, peg-IL10, ensituximab (NPC1C), eryaspase

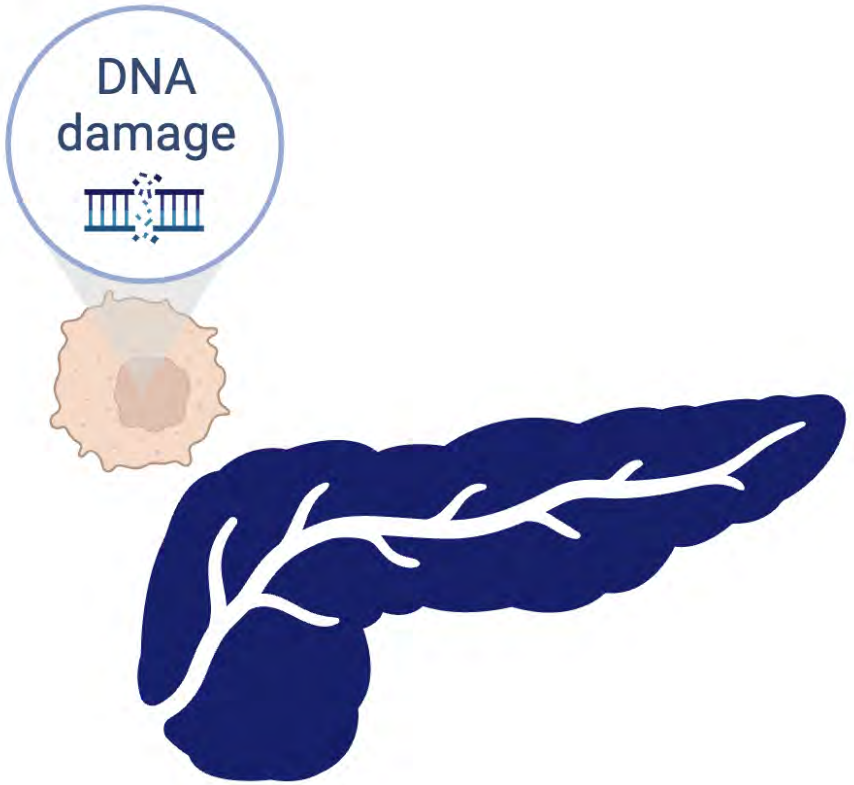
Wang-Gillam, A. Lancet, 2016
Chiorean, EG. Clin Can Res, 2021
Chung, V. JAMA Oncol, 2017
Hecht, JR. J Clin Oncol, 2021
Huffman, BM. JAMA Network Open, 2024
Hammel, P. J Clin Oncol, 2025
Fouchardiere, C. J Clin Oncol, 2024

Biomarker Selection & Therapy

Genetics

Germline and Somatic Variants





- **Germline variants** inherited
- Present in all cells

- **Somatic variants** arise sporadically
- Present only in affected areas

Adapted Catherine O'Connor

Genomics

Models of Genetic Testing

Somatic & Germline Testing
N= 505+ somatic genes
N= 90+ germline genes

Pre-test Educational Video tool
In clinic counseling

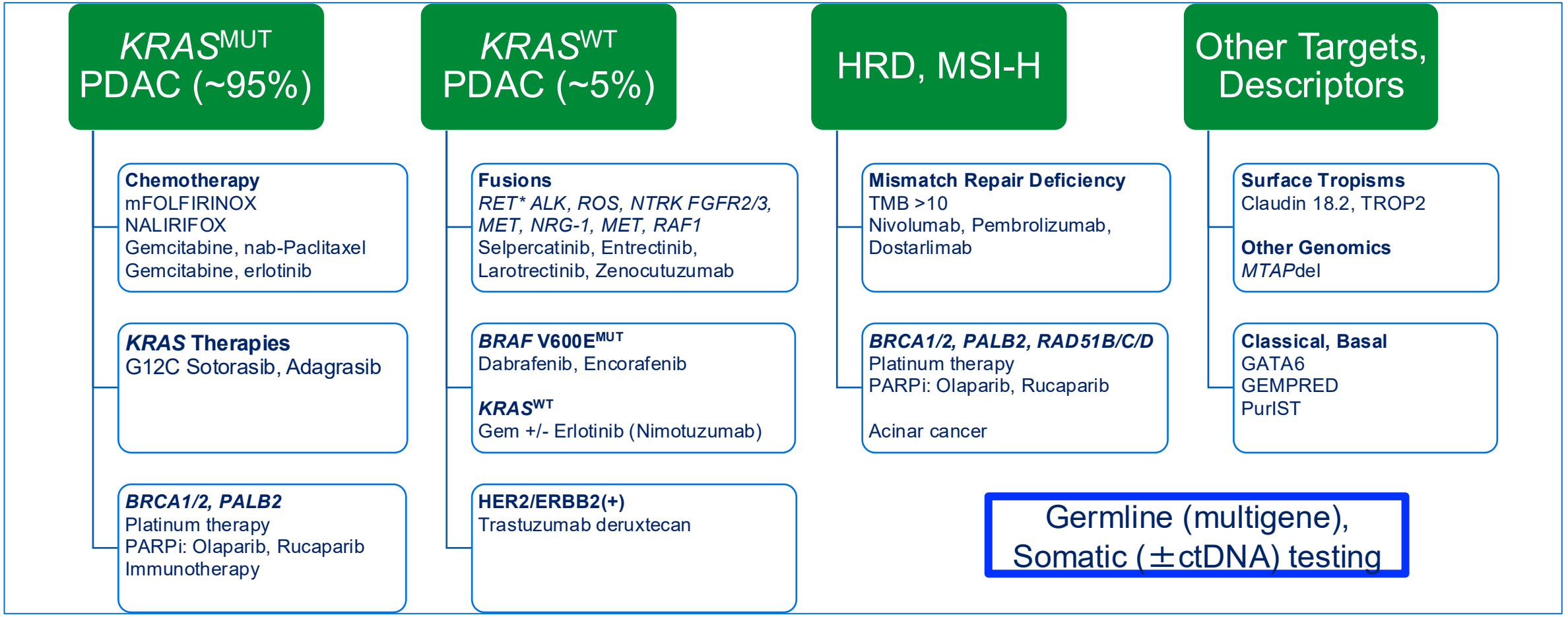
Results communicated by MD
Genetics referral if germline(+)

Rainone, M…Stadler, ZK, O'Reilly, EM. JAMA Onc, 2020. Lincoln, S, et al. JAMA Open Netw. 2020

Pancreas Cancer: Genomic Testing

Genomic Subsets for Therapeutic Actionability: Today

Increasing Biomarker Selected Options for PDAC

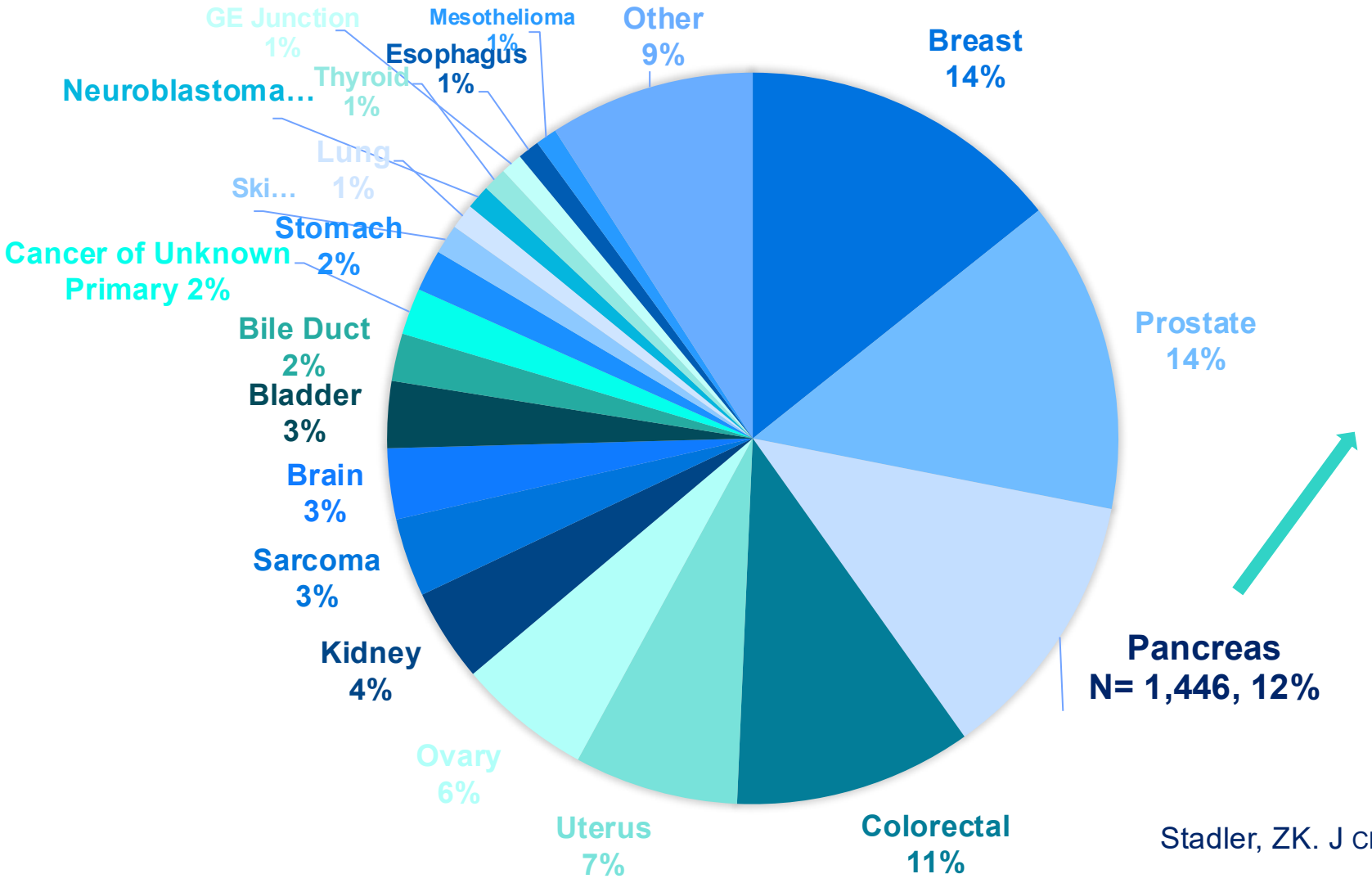


All referenced drugs either FDA approved, guideline endorsed

Pan Cancer: Germline Genetics

Germline Variants Pan-Cancer Cohort (N= 11,974)

Multiple Cancers Germline Alterations – Germline Testing in all Cancers?



PDAC Germline

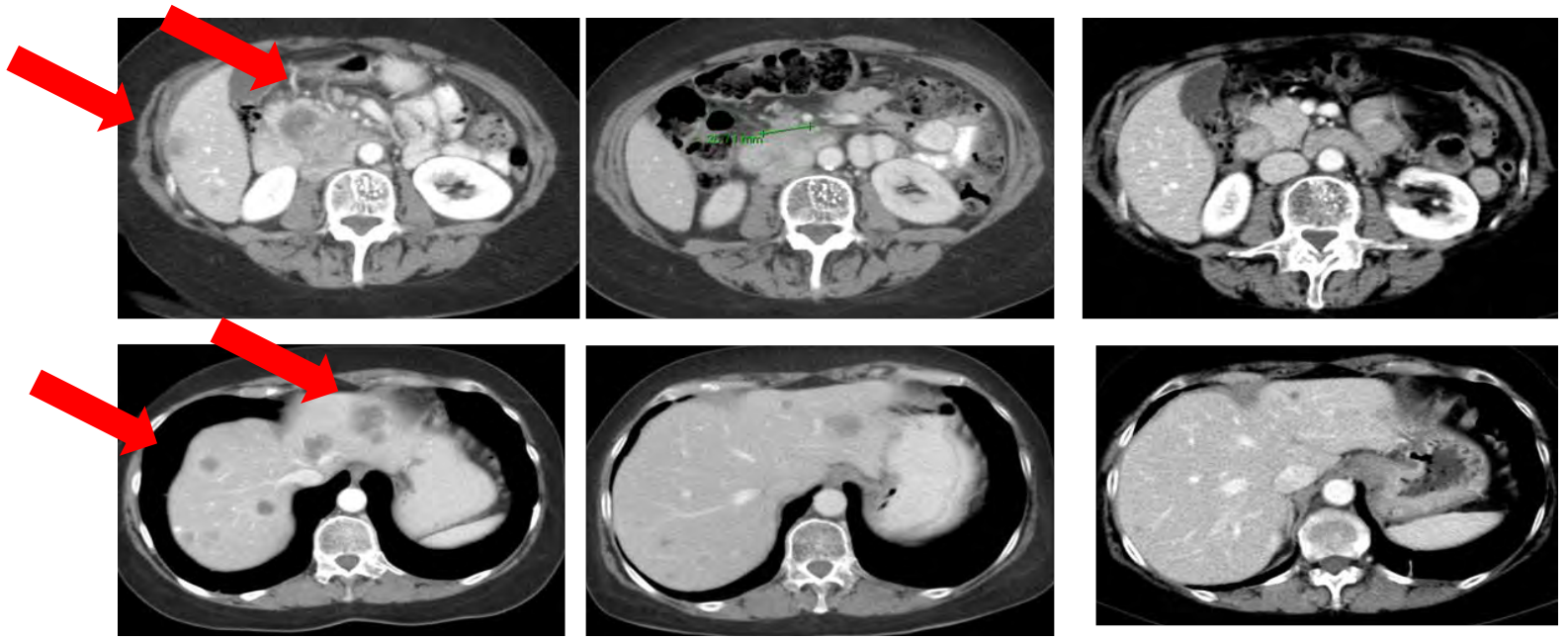
BRCA2
BRCA1
ATM
CDKN2A
PALB2
MLH1
MSH2
MSH6
PMS2
TP53

Stadler, ZK. J Clin Oncol, 2021; ASCO, 2020

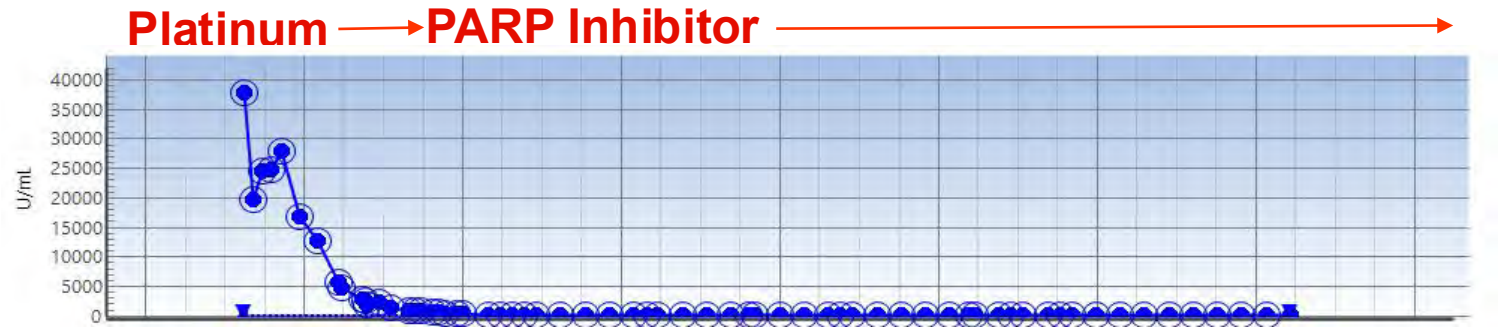
Pancreas Cancer: *BRCA* Targeting

Platinum → PARPi g*BRCA2* Metastatic PDAC

62-Year-old Woman: Excellent Cancer Control on Platinum – PARP Inhibitor



Ca 19-9 37,500+



Ca 19-9 <ULN

Pancreas Cancer & Therapy 2026 – Changing….

Pancreas Cancer	• Changing epidemiology • Germline, somatic testing for all at diagnosis
Current Therapies	• Cytotoxic-based 3 vs 2 drug combinations for most • Targeted therapy: *BRCA*/HRD, RAS-wild-type – fusions
RAS	• *RAS* – new 2L 2026; rapidly moving to 1L

Discussion Questions

For which patients are you currently prioritizing the use of first-line NALIRIFOX?

Would you consider front-line NALIRIFOX for a patient who has received FOLFIRINOX in the localized setting and then progressed? What about for a patient who had tolerability issues on prior mFOLFIRINOX?

Comparisons in tolerability/toxicity profiles of treatment regimens used in mPDAC

The James

THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

Amanda K Wagner, APRN-CNP, AOCNP
GI Malignancies
The James Cancer Hospital
The Ohio State University
Columbus, Ohio

Gemcitabine/Nab-Paclitaxel

MPACT Trial (vs Gemcitabine alone)

Grade 3 Toxicities

- Neutropenia: 38%
- Febrile Neutropenia: 3%
- Peripheral Neuropathy: 17%
- Fatigue: 17%
- Diarrhea: 6%
- Nausea/vomiting: <10%

In Practice, consider bi-weekly dosing for patients with advanced disease to decrease risk of toxicity (specifically myelosuppression and peripheral neuropathy)

MPACT Trial (Von Hoff, D., Ervin, T., Arena F., et al, *The New England Journal of Medicine*, 2013)
Ahn, D., Krishna, K., Blazer, M. et.al, *Therapeutic advances in medical oncology*, 2017

FOLFIRINOX

ACCORD 11 Trial (vs Gemcitabine alone)

Grade 3 Toxicities

- Neutropenia: 45-50%
- Febrile Neutropenia: 5-6%
- Diarrhea: 12-13%
- Peripheral Neuropathy: 9%
- Fatigue: 23%
- Vomiting: 15%

modified FOLFIRINOX is commonly used in practice (no 5FU Bolus and irinotecan at 150 mg/m2 vs 180 mg/m2, per PRODIGE 24 Trial)

ACCORD 11 trial (Conroy T, Desseigne, F, Ychou, M. et.al, *The New England Journal of Medicine*, 2011)
PRODIGE 24 Trial (Conroy T., Hammel, P., Hebbar, M., et. al, *The New England Journal of Medicine*, 2018)

NALIRIFOX

NAPOLI-3 Trial (compared to Gem/Nab-paclitaxel)

Grade 3 Toxicities

- Neutropenia: 14-20%
- Febrile Neutropenia: 2-3%
- Diarrhea: 10-13%
- Nausea: 10-12%
- Vomiting: 6-8%
- Peripheral neuropathy: 1-3%
- Fatigue: 10-14%

NAPOLI-3 trial (Wainberg Z, Melisi D, Macarulla T et. Al, *The Lancet*, 2023)

Key Takeaways

- If neuropathy risk matters most:

  -consider **NALIRIFOX** or **mFOLFIRINOX** (with early oxaliplatin drop) over **Gemcitabine/nab-paclitaxel**

- If GI toxicity (especially diarrhea) would be hard to manage:

  -Gemcitabine/nab-paclitaxel would be easier

- If marrow reserve is limited:

  -consider **NALIRIFOX, mFOLFIRINOX** over **Gemcitabine/nab-paclitaxel**

- Older, frail patients with decreased PS

  -Gemcitabine/nab-paclitaxel tends to be tolerated better

Nal-IRI side effects

- **Monitoring, mitigation, and management**

DIARRHEA

- ASSESS-timing (early vs late onset), stool frequency over baseline, monitor electrolytes, creatinine. Watch for symptoms of dehydration
- MITIGATION-atropine (0.25-1 mg IV/SC) PRN or pre-med, consider low soluble diet, patient EDUCATION (loperamide IN HAND and clear instructions for use, call with fever >/=104, diarrhea >24 hours, unable to keep fluids down)
- MANAGEMENT-loperamide (4 mg at first loose stool, then 2 mg q2 hrs until diarrhea free x 12 hours), add diphenoxylate/atropine. IV fluids, electrolyte replacement as needed

NCCN Guidelines Palliative Care Version 2.2026; Irinotecan liposome injection Prescribing Information; available via FDA: https://www.accessdata.fda.gov

Nal-IRI side effects, cont.

- **Monitoring, mitigation, and management**

NAUSEA/VOMITING

- ASSESS-timing, impact on weight/PO intake, risk (moderately to highly emetogenic in combination regimens)
- MITIGATION-pre-medicate with 5-HT3 antagonist, dexamethasone, NK1 antagonist. Consider delayed dexamethasone vs olanzapine. Patient education (ondansetron, prochlorperazine rx PRN, call if uncontrolled, unable to maintain hydration)
- MANAGEMENT-PRN anti-emetics, IV hydration if needed

ASCO Antiemetic Guidelines (Hesketh PJ, *JCO*, 2020)

Nal-IRI side effects, cont.

- **Monitoring, mitigation, and management**

NEUTROPENIA

- ASSESS-CBC d/p prior to each cycle, risk factors (age, prior treatment, UGT1A1 *28 homozygosity)
- MITIGATION-consider G-CSF in older patients, prior neutropenia. Start at lower dose in known UGT1A1 *28 homozygotes.
- MANAGEMENT- hold treatment if ANC <1500. Add G-CSF if recurrent grade 3 or 4 neutropenia or febrile neutropenia

FATIGUE

- ASSESS-Pattern (post infusion vs cumulative), other causes (anemia, dehydration, sleep disruption, pain)
- MITIGATION/MANAGEMENT-treat reversible causes, add IV hydration, encourage activity, PT referrals. Dose adjustments if needed

ASCO G-CSF Guidelines (Gyawali B, *JCO,* 2026)
Irinotecan liposome injection Prescribing Information; available via FDA: https://www.accessdata.fda.gov

Nal-IRI Dosing

- NALIRIFOX -1st Line metastatic pancreatic cancer
  - Nanoliposomal Irinotecan **50 mg/m2**
  - Oxaliplatin **60 mg/m2**
  - Fluorouracil (5-FU) **2400** mg/m2
  - Leucovorin **400 mg/m2**

- Nal-IRI with 5-FU-2nd line after progression following Gemcitabine-based therapy
  - Nanoliposomal Irinotecan **70 mg/m2**

Irinotecan liposome injection Prescribing Information; available via FDA: https://www.accessdata.fda.gov

Do dose reductions impact efficacy?

- NAPOLI-3 Trial reported high rates of dose delays and reductions (in both arms); despite this, NALIRIFOX improved OS, PFS, and ORR
- No convincing evidence that clinically appropriate dose reductions compromised efficacy as long as patients maintain adequate treatment exposure

- **Key takeaway**—in practice, dose adjustments is often what preserves efficacy by preventing early discontinuation

NAPOLI-3 trial (Wainberg Z, Melisi D, Macarulla T et. Al, *The Lancet*, 2023)

NALIRIFOX Dose Modification Strategies

- **Implications for practice**

- Medically fit patients, PS O-1, no co-morbidities
  - Start with full dose→ assess patients after 1st treatment to monitor for toxicity, dose adjust as necessary
- Borderline Performance status, frailty, baseline neuropathy
  - Pre-emptively start with dose reductions (20-25%) and consider escalating as tolerated
- Stepwise adjustments based on side effects
- After initial disease control, consider de-escalating treatment to maintenance

Case Presentation

Case Study

- 54 yo female hx of HLD, HTN, DM2 (no neuropathy)
- Presented with abdominal pain; found to have a pancreatic head mass with numerous pulmonary and chest lymph node metastases. Biopsy showed adenocarcinoma
- PS 0; UGT1A1 *28 INDETERMINATE
- Treatment with NALIRIFOX recommended; nal-IRI dose reduced to 40 mg/m2
- Significant n/v with C1; improved with addition of PRN Haloperidol
- Imaging after 3 cycles showed interval improvement in pulmonary nodules and pancreatic mass
- C4-oxaliplatin dose reduced by 20% d/t neuropathy; eventually discontinued after 6 months d/t stable disease and worsening neuropathy
- Patient continues on 5FU/nal-IRI with ongoing disease control

Discussion Questions

How do the tolerability profiles of first-line gemcitabine/*nab* paclitaxel versus FOLFIRINOX versus NALIRIFOX affect your selection among them for individual patients? Do you find that one of these regimens is fundamentally better tolerated than the others?

Do you proactively test for homozygosity for UGT1A1*28 in patients about to begin treatment with irinotecan-containing regimens, including NALIRIFOX? Do you approach dosing of nal-IRI any differently in patients homozygous for UGT1A1*28? Do you approach AE mitigation, monitoring and/or management any differently?

Agenda

Introduction: Clinical Presentation and Prognosis of Pancreatic Adenocarcinoma (PAD)

Module 1: Recent Advances in Up-Front Treatment for Metastatic PAD

Module 2: Selection and Sequencing of Therapy for Relapsed/Refractory Metastatic PAD

Module 3: Novel Strategies Targeting RAS Mutations in Advanced PAD

Module 4: Utility of Tumor Treating Fields in PAD Management

Selection and Sequencing of Therapy for Relapsed/Refractory (R/R) Metastatic PAD

Philip Agop Philip, MD, PhD, FRCP

Henry Ford Health
Wayne State University School of Medicine
Detroit, Michigan
USA

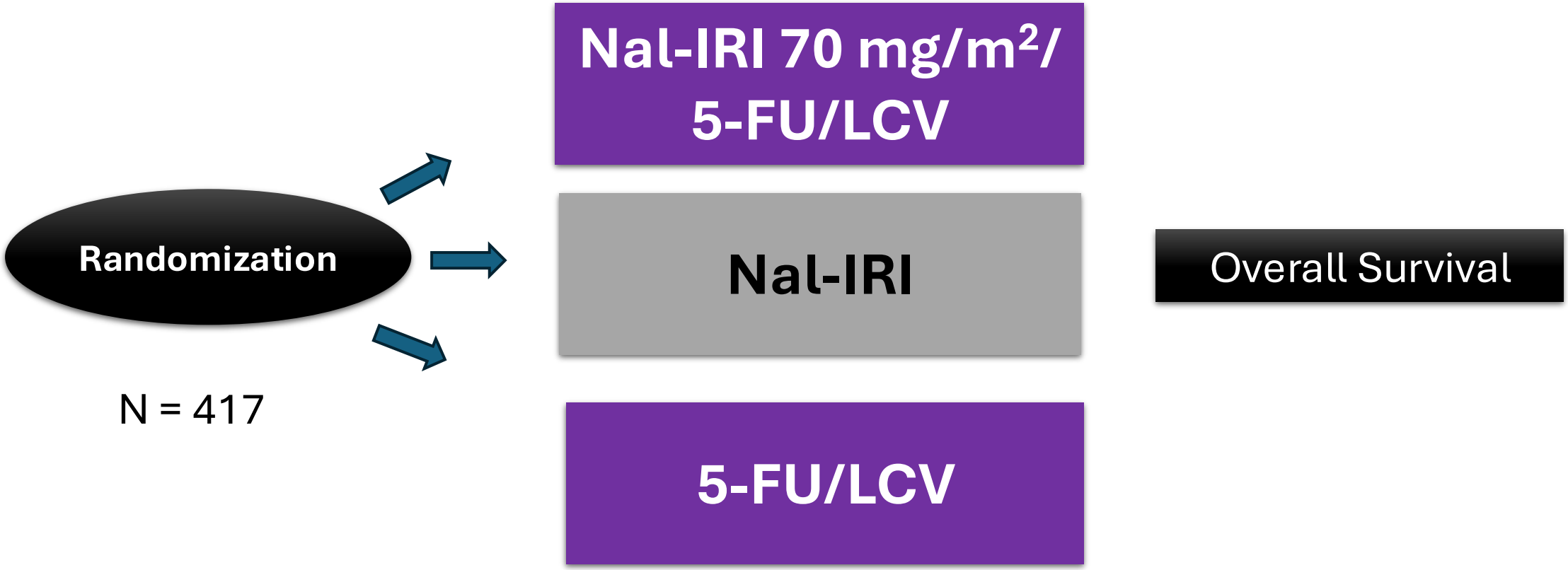
Key factors that determine the selection of therapy in patients who fail initial treatment

- Age
- Performance status (0-2)
- Organ function
  - Liver
  - Bone marrow
  - Nervous system
- Access to clinical trials
- Patient/caregiver preferences
  - Understanding treatment goals and benefit vs. risks

NAPOLI-1 clinical trial established the benefit of liposomal irinotecan plus 5-FU and got FDA approval

- Global Phase 3 trial
- Unresectable or metastatic pancreatic cancer
- Progression or intolerance to previous chemotherapy
- Favorable performance status (0-1)
- Adequate organ function
  - Bilirubin $\leq$ 1.5 x upper limit of normal for the lab
- No major comorbidities
- No age limit!

NAPOLI-1: design of the trial



Wang-Gillam et al, Lancet, 2015

NAPOLI-1: Nal-IRI/5FU/LCV significantly improved overall survival compared to 5FU/LCV and delayed worsening of disease

	Nal-IRI/5-FU/LCV	5-FU/LCV
Median overall survival in months	6.1	4.2
Median progression free survival in months	3.1	1.5

Wang-Gillam et al, Lancet, 2015; Wang-Gillam et al, ASCO, 2016

NAPOLI-1: Side effects of Nal-IRI/5FU/LCV

		Grade 3 or 4 toxicities %	
		Nal/5FU/LCV	5FU/LCV
Gastro-intestinal	Diarrhea	13	4
	Vomiting	11	3
	Nausea	8	3
General	Appetite	4	2
	Fatigue	14	4
Hematological	Neutropenia	27	1
	Anemia	9	7
	Hypokalemia	3	2

Wang-Gillam et al, Lancet, 2015; Wang-Gillam et al, ASCO, 2016

Mitigating side effects of Nal-IRI plus 5-FU

- Proper patient selection
  - Performance status
  - Organ function (e.g., liver)
- Pre-treatment genetic testing
  - DYPD – predicts 5-FU side effects
  - UGT1A1 – predicts Nal-IRI side effects
- Close clinical monitoring first and second cycles

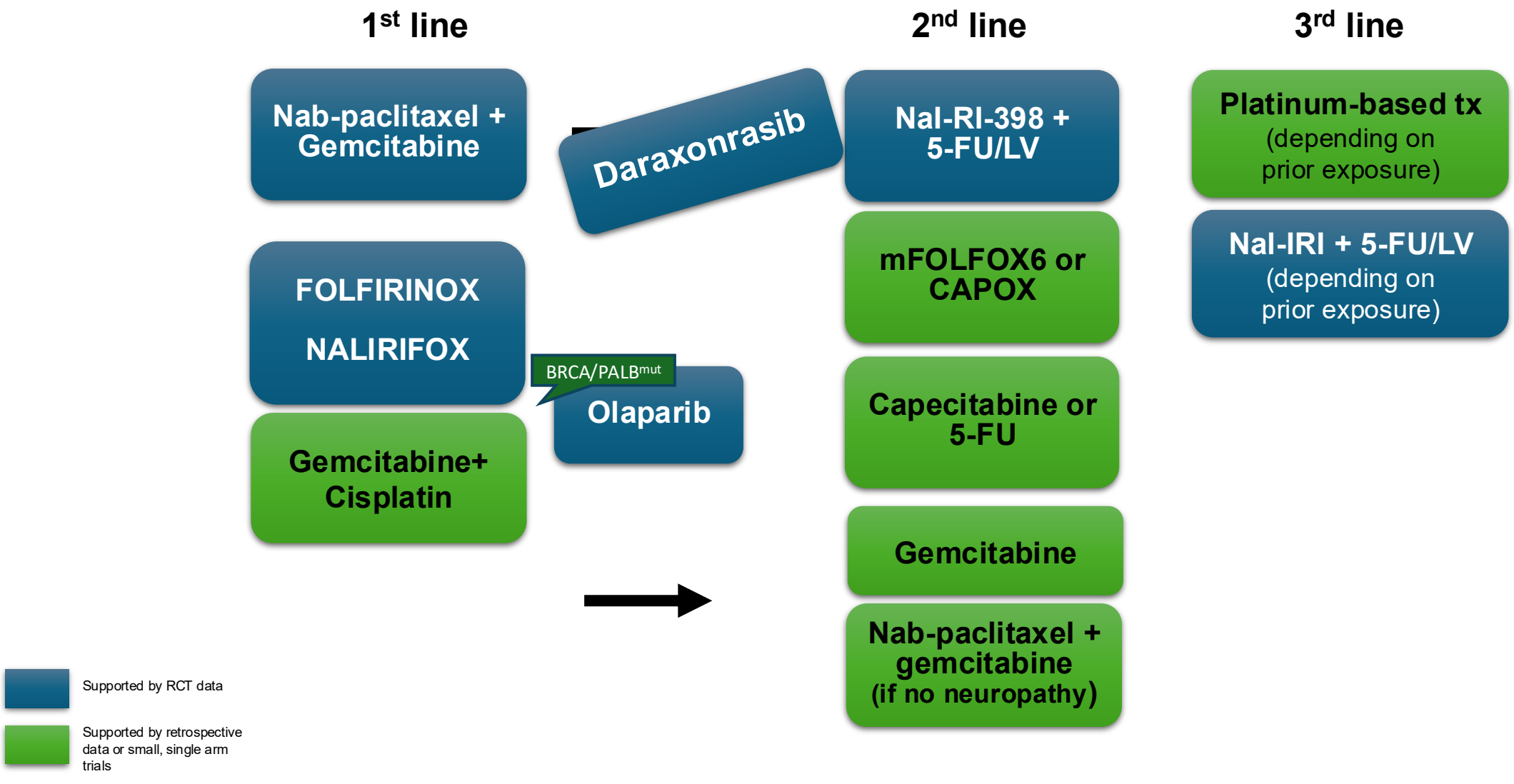
Apply dose reductions if Necessary!

I do not start all patients with same 70 mg/m^2 dose of Nal-IRI that was used in the trial

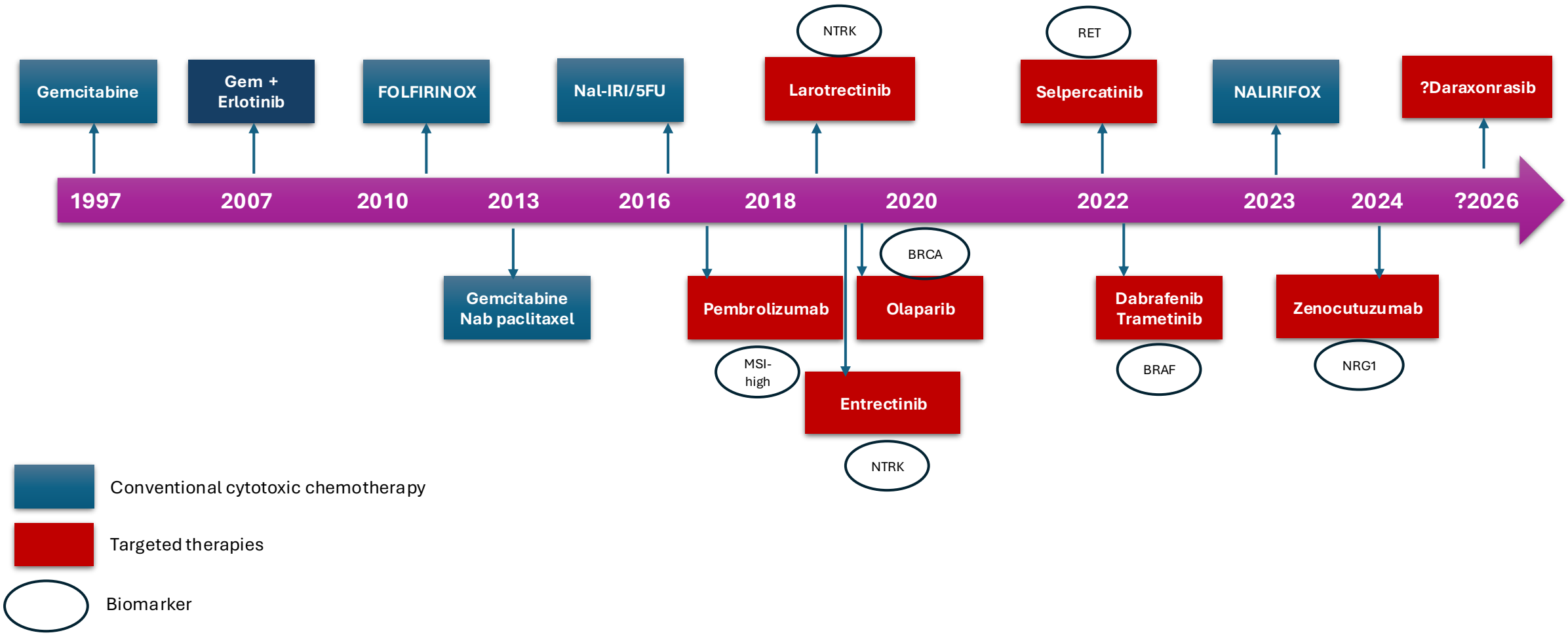
- Older patients
- Patients who are frail with performance status of 2
- UGT1A1 intermediate or poor metabolizers
- Borderline liver function
- REDUCED DOSES BETTER THAN MISSED DOSES!

Treatment Sequencing Approach For mPDAC In 2026:

A Clinical Trial Must Always Be Considered Before Starting Therapy



Development of drugs in pancreatic cancer



Case Presentation

Case:

- 72-year-old grandmother
- 3/2024 - diagnosed with diabetes
- 8/2025-
  - Epigastric and back pain
  - Weight loss of 18 pounds
  - CT Scan
    - Pancreatic body mass 3.1 x 4.1 cm involving the SMA and SMV
    - Multiple lesions in the liver >6, both lobes

Case:

- Liver biopsy = adenocarcinoma, pancreaticobiliary type
- CA19-9 = 2,239
- NGS = $KRAS^{G12D}$ and p53 mutations
- Germline testing = no BRCA/PALB mutations
- Liquid biopsy = $KRAS^{G12D}$ and p53 mutations
- DYPD and UGT1A1 normal alleles
- Performance status 1

Case:

- 9/2025
  - Started on gemcitabine nab-paclitaxel
- 11/2025
  - CT scan = partial response
  - CA19-9 down to less than 1,000
- 2/2026
  - CT scan = disease worsening
  - CA19-9 trending up
- Grandson graduating from college in May 2026
- 3/2026
  - Started on Nal-IRI/5-FU/LCV at reduced dose of Nal-IRI 50 mg/m^2
  - Well tolerated
  - CT scan after the graduation

Discussion Questions

Do you employ nal-IRI as second-line therapy for all patients who did not receive the agent in the first-line setting?

For patients with advanced PAD who have received nal-IRI as a component of first-line NALIRIFOX, how is the therapeutic algorithm for R/R disease impacted?

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Research To Practice: Oncology Nursing Society

Pancreas Adenocarcinoma The Coming Future!

Eileen M. O'Reilly, MD, FASCO

Winthrop Rockefeller Endowed Chair, Memorial Sloan Kettering Cancer Center

Chair, Human Research Protection Program and IRB

Professor of Medicine, Weill Cornell Medicine

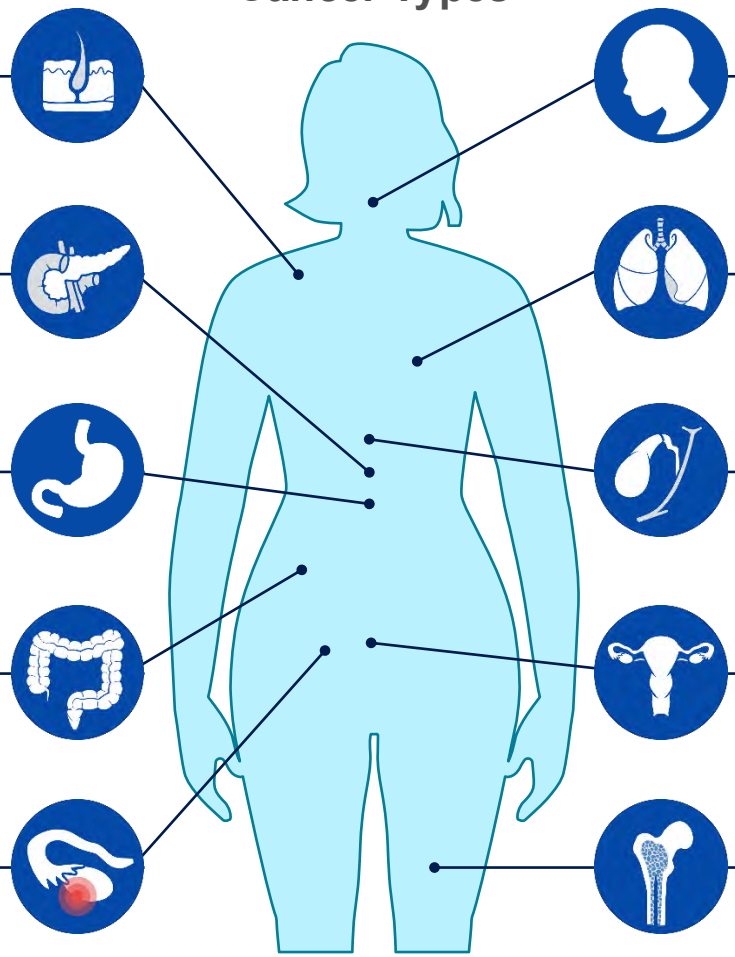
May 15th, 2026

Memorial Sloan Kettering Cancer Center

KRAS Genomics

RAS Mutations in ~20% of All Cancers

RAS Mutations Across Cancer Types



Melanoma
KRAS 1%, *HRAS* 2%, *NRAS* 17%

Pancreas
***KRAS* 88%**

Esophagogastric
KRAS 3%, *KRAS*-amp 6%

Colorectal
KRAS 42%, *NRAS* 4%

Ovarian
KRAS 9%, *NRAS* 2%

Head and neck
KRAS 2%, *HRAS* 5%, *NRAS* 2%

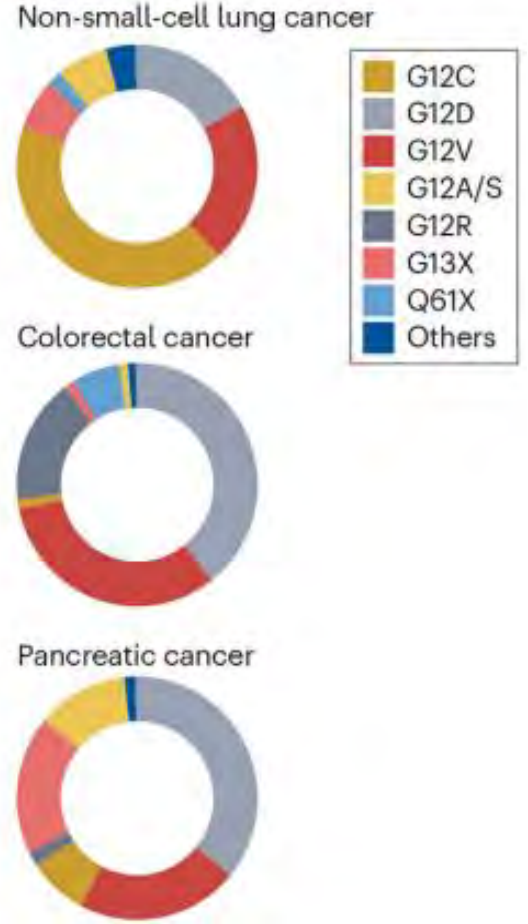
Non-small cell lung cancer
KRAS 32%

Gallbladder, cholangiocarcinoma
KRAS 21%, *NRAS* 2%

Endometrial
KRAS 17%, *NRAS* 3%

Leukemia
KRAS 5%, *NRAS* 14%

KRAS Alleles in NSCLC, CRC, and Pancreatic Cancers



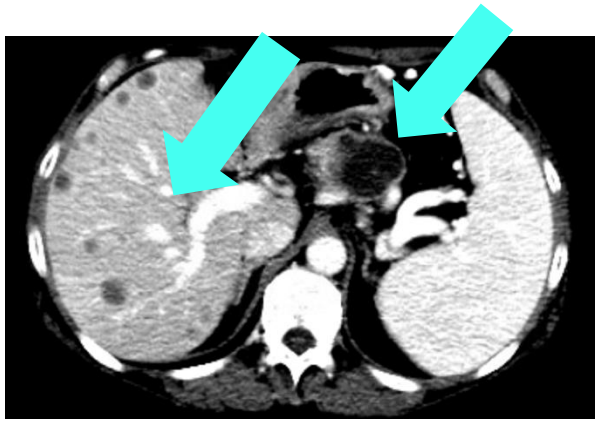
Yang, X. J Haematol Oncol, 2024
Singhal, A… O'Reilly, EM. Nat Med, 2024

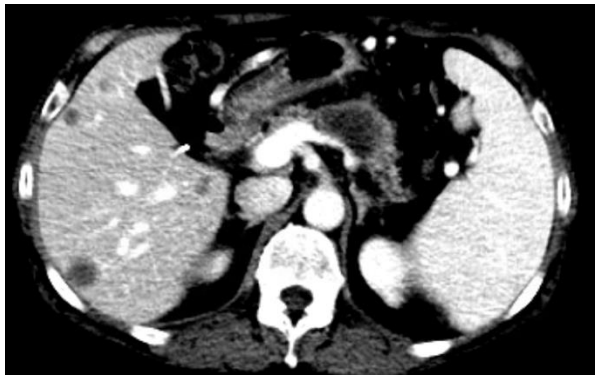
Pancreas Cancer: Targeted Therapy

Case: *RAS*i Targeting in Metastatic Pancreas Cancer

Ms. XY, 63 years, human resources manager, non-smoker; occasional alcohol

Metastatic pancreas adenoca(+); Germline NEG





Somatic:

MICROSATELLITE STABLE (MSS). MSIsensor score 1.14; TMB 4.1 mt/Mb.

1. ***KRAS* (NM_004985) exon2 p.G12V (c.35G>T)**
2. NOTCH2 (NM_024408 - 1p11.2) Amplification (Fold Change: 4.2)
3. RAC2 (NM_002872 - 22q13.1) Amplification (Fold Change: 2.2)
4. NF2 (NM_000268 - 22q12.2) Amplification (Fold Change: 2.0)
5. KMT2A (MLL1) (NM_001197104) exon12 p.N1513Tfs*16 (c.4533_4555delinsCCCAAC)
6. PHOX2B (NM_003924) exon3 p.A254_A260del (c.741_761delCGCGGCAGCGGCGGCGGCGGC)
7. SMAD4 (NM_005359) exon11 p.Q455* (c.1363C>T)
8. TP53 (NM_000546) exon11 p.M384Ffs*38 (c.1150_1152delinsTT)
9. CDKN2A (NM_058195) rearrangement: c.194-3832:CDKN2A_chr9:g.30910251inv

4 lines systemic therapy

#1: 10 m Gemcitabine, nab-paclitaxel, ipilimumab, nivolumab (trial) PR

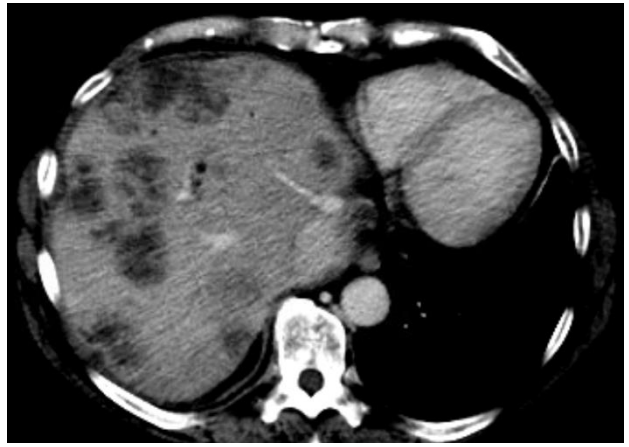
#2: 5 m mFOLFIRINOX + mAb Ca 19-9 (trial) – SD

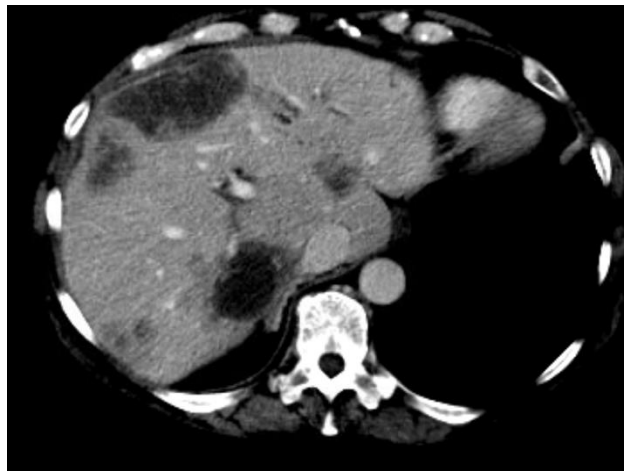
#3: 2 m Cisplatin/gemcitabine/nab-paclitaxel – PD

#4: 1 m Nano-liposomal irinotecan/5-FU – PD

Pancreas Cancer: Targeted Therapy

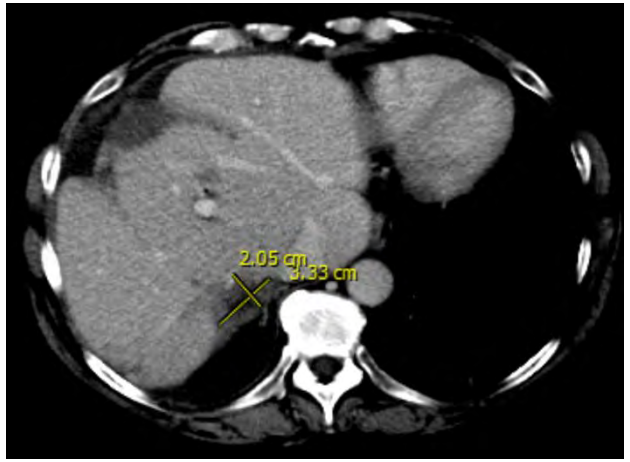
Pre-RAS Targeting

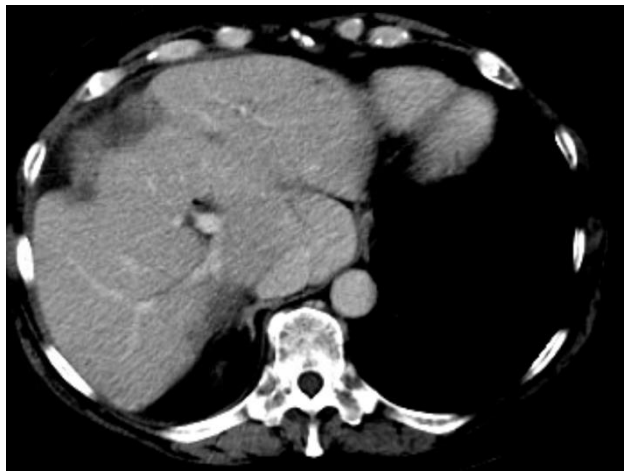




Ca 19-9 320,362 U/ml

Post-RAS Targeting





Ca 19-9 22,956 U/ml

- Marked symptom improvement
- Decreased pain
- Off narcotics
- Weight gain 5 kg

Pancreas Cancer: Targeted Therapy

Case: Tumor Marker Profile and Outcome

T0 **4 lines systemic therapy (2 trials) 18 m** **5th line therapy**

RAS agent **RIP**

Subsequent course

Ras agent (5th line): 6 m excellent clinical, radiologic (SD), biomarker, symptom control

Response as 5th line; disease control > prior 3 lines

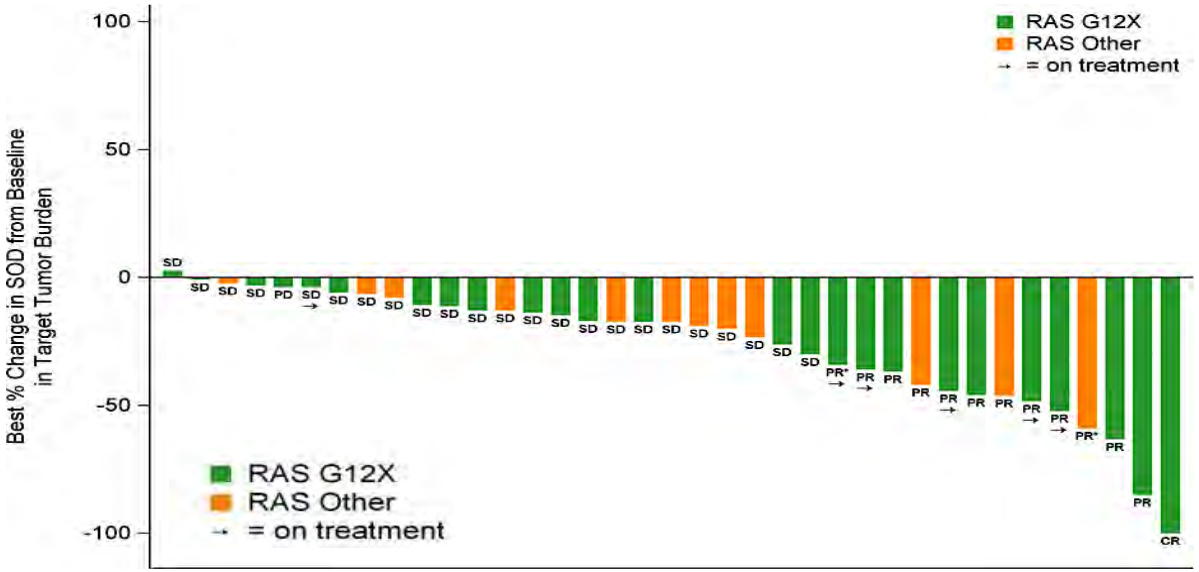
RIP 27 m post diagnosis

RAS Therapeutics: PanRas Inhibitor

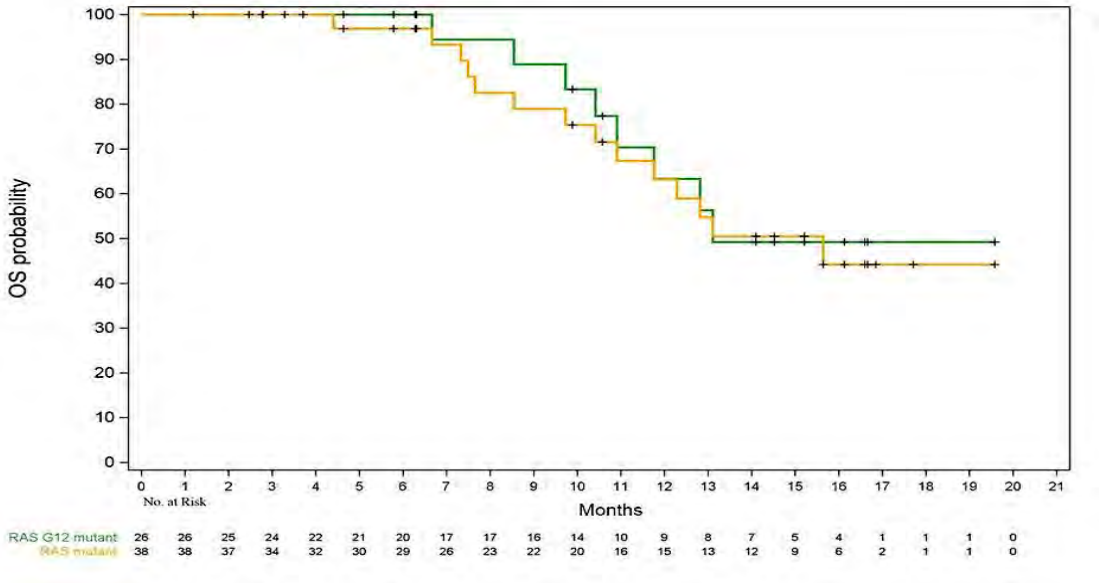
Daraxonrasib: Early Outcomes in 2L PDAC 300 mg PO

Multi-RAS(ON) Tri-Complex Inhibitor (*KRAS* H, N, Wild-Type)

Response Rate (N= 38)



Overall Survival (N= 38)



	Overall RR	DCR Rate	PFS (m)	OS (m)
RAS G12X (N= 26)	35%	92%	8.5 (6.7- 10.5)	13.1 (10.9- NE)
RAS mutant (N= 38)	29%	29%	8.1 (5.9- 10.1)	15.6 (10.9- NE)

**RAS* mutant: G12X, G13X, Q61X; Median f/up > 16 m*

Data cut off 06-30-2025
Courtesy Revolution Medicine website 09 2025

Pancreas Cancer: PanRAS Inhibitor

Daraxonrasib 300 mg: Safety, Adjustments 2L+ (N= 83)

Toxicity: Primarily Cutaneous/GI

Toxicity	Any Grade	Grade > 3
Rash	75 (90%)	6 (7%)
Mucositis	45 (54%)	3 (4%)
Diarrhea	43 (52%)	3 (4%)
Nausea/Vomiting	~39%/ 26%	-
Paronychia	15 (18%)	--
Fatigue	14 (17%)	1 (1%)
Platelets	8 (10%)	3 (4%)
Anemia	7 (8%)	6 (7%)
AST/ALT	10%/ 7%	4%/ 2%

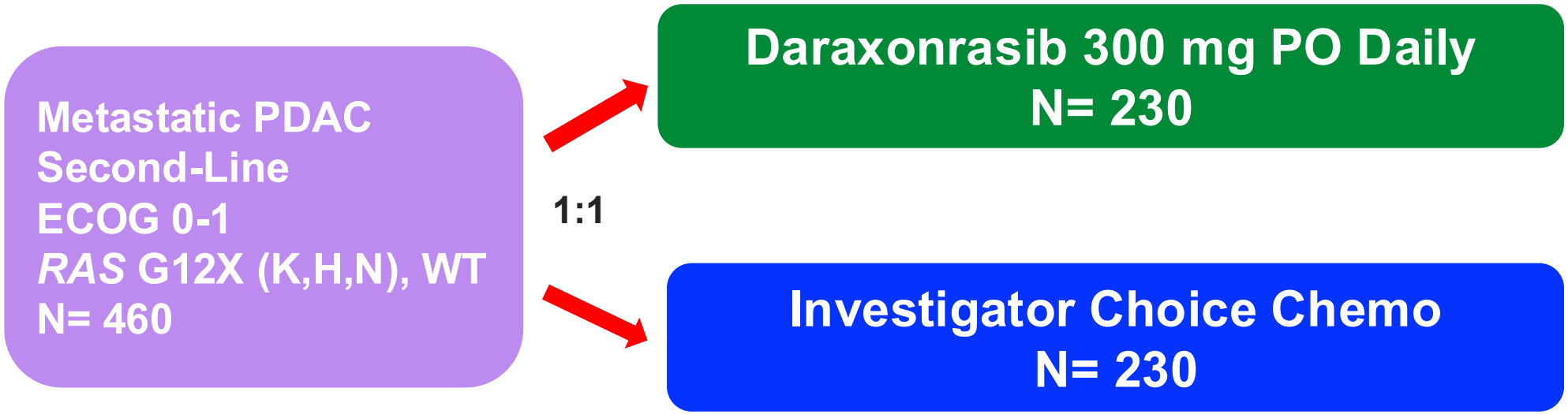
Dose Adjustments	N= 83
Dose modifications	40 (48%)
Dose interruption	36 (43%)
Dose reduction	25 (30%)
Discontinuation AE	-

Data cut off 06-30-2025
Courtesy Revolution Medicine website 09 2025

Pancreas Cancer: PanRAS Inhibitor

RASolute 302: Phase III PDAC 2L Daraxonrasib vs Chemo

ASCO 2026 Plenary Session



Co-primary endpoints: Progression-free survival; OS (G12X)

Secondary endpoints: PFS, OS (all), Overall response rate, duration of response, safety, QoL

HR 0.7 OS (G12X 7.1 → 10.1 m)
HR 0.54 PFS (G12X 3.5 → 6.5 m)

NCT06625320

Pancreas Cancer: PanRAS Inhibitor

RASolute 302: Phase III PDAC 2L Daraxonrasib vs Chemo

- Trial met all primary and key secondary endpoints

- In overall (intent-to-treat) study population:

  Daraxonrasib median OS 13.2 vs 6.7 m for chemotherapy
  Hazard ratio 0.40, p < 0.0001

https://ir.revmed.com/news-releases/news-release-details/daraxonrasib-demonstrates-unprecedented-overall-survival-benefit

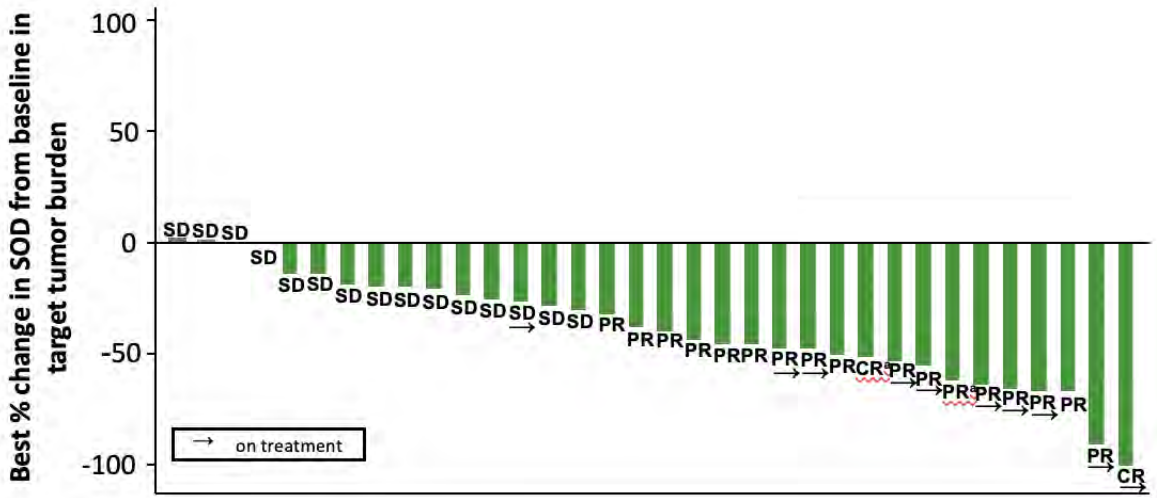
RAS Therapeutics: PanRAS Inhibitor

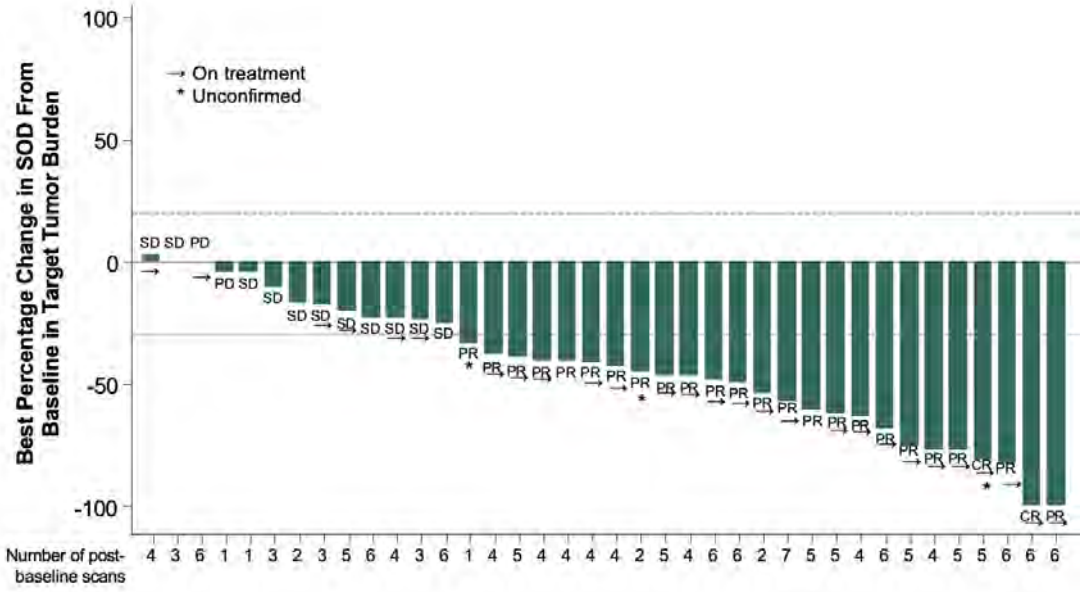
Daraxonrasib +/- Gem/nab-Paclitaxel: 1L Pancreas Cancer

Promising Single Agent, Combination Signals in First Line PDAC (AACR 2026)

Daraxonrasib	N= 38
Overall RR	47% (31, 64)
Disease control Rate	89% (79, 98)
6-month OS	83% (67, 92)

Daraxonrasib+Gem/nab-P	N= 40
Overall RR	58% (41, 73)
Disease control Rate	90% (76, 97)
6-month OS	90% (76, 96)



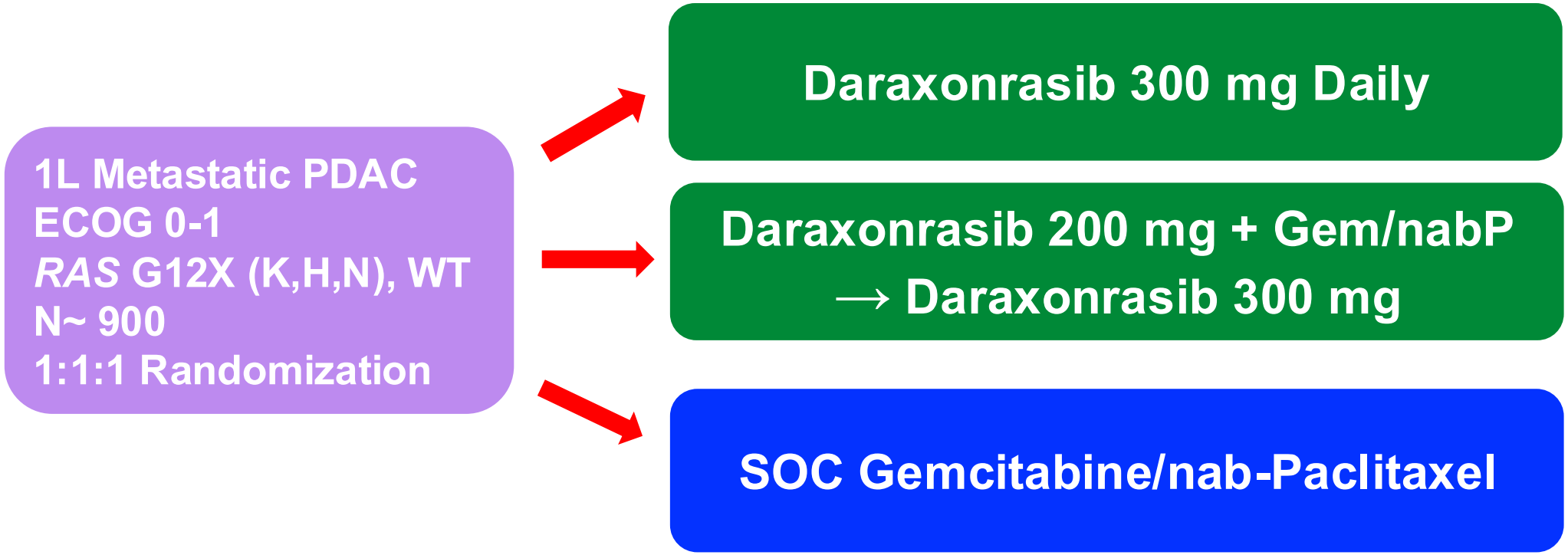


O'Reilly, EM…Garrido-Laguna, I. AACR, 2026
Wolpin, B.…Sohal, D. AACR, 2026

Pancreas Cancer: PanRAS Inhibitor

RASolute 303: Phase III 1L Metastatic PDAC

Accruing



Co-primary endpoints: Progression-free survival; OS

Secondary endpoints: PFS, OS, Overall response rate, duration of response, safety, QoL

NCT07491445

RAS/MAPK Inhibitors: Pancreas Cancer

Selected Phase III Trials Activated / Announced in PDAC

Trial Name	Therapeutic	Target	N	Disease Setting	Status
RASolute 302	Daraxonrasib vs Chemo	PanRAS	460	2nd line metastatic	**ASCO 2026**
RASolute 303	Gem/nabP +/- Daraxonrasib, D	PanRAS	~900	1st line metastatic	Activated Q1 2026
RASolute 304	Daraxonrasib	PanRAS	500	Adjuvant	Activated Q4 2025
RASolute 305	Zoldonrasib + chemo/Z	KRAS G12D		1st line metastatic	Activated Q1 2026
RASolute 309	Zoldonrasib + Daraxonrasib	KRAS G12D, panRAS		1st line metastatic	Pending 2026
Pending	mFOLFIRINOX +/- Setigrasib	KRAS G12D		1st line metastatic	Activated Q1 2026
DAWN 303	Chemo +/- INCB161734	KRAS G12D		1st line metastatic	Activated Q2 2026
MAPKeeper 301	Gem/nabP +/- Atebimetinib	MEK		1st line metastatic	Pending 2026
HRS-4642-302 China	Chemo +/- HRS-4642	KRAS G12D		1st line metastatic	Activated Q4 2025
GFH375-X1301 China	VS-7375 vs Chemo	KRAS G12D		2nd line metastatic	Activated Q4 2025

Pancreas Cancer & Therapy 2026 – Changing….

Pancreas Cancer Current 2026	• Cytotoxic-based 3 or 2 drug combinations for most • Targeted: *BRCA*/HRD, *RAS*-wild-type – fusions
RAS Therapies	• RAS inhibitors – new 2L standard 2026 - daraxonrasib • Rapidly moving to 1L, Adjuvant • Multiple agents, multiple mechanisms in development
Other Targets	• *MTAP*-loss: PRMT5 inhibitors, Claudin • Immunotherapy: Adenosine modulation, CD40 • Vaccines: Personalized neoantigen, RAS immunotherapy

Discussion Questions

Do you actively assess for RAS mutations in patients with metastatic PAD in your current practice? If so, when in the course of the disease do you typically test, and what testing platform(s) do you employ?

Do you believe daraxonrasib will soon enter clinical practice? Would you like to have access to it at the current time? For which patients would you prioritize its use?

Mass General Brigham

Tolerability of RAS-Targeted Therapies in Advanced PDAC

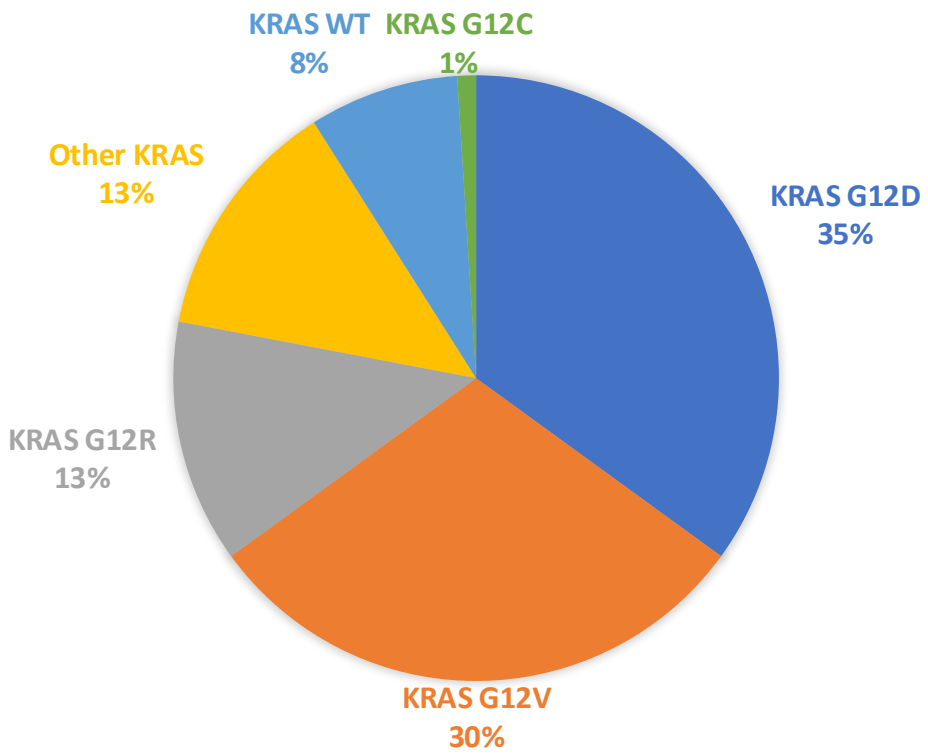
Caroline Kuhlman, MSN, APRN-BC

Tucker Gosnell Center for Gastrointestinal Cancer

Mass General Brigham Cancer Institute

May, 2026

Precision Medicine
Targeting KRAS – Holy Grail in Pancreatic Cancer



- KRAS mutations present in >90% of pancreatic cancer - key ‘driver mutation’
- Traditionally considered ‘undruggable’ due to intrinsic characteristics of KRAS protein
- Discovery of new allosteric site of KRAS G12C led to irreversible covalently binding inhibitors of G12C
- Multiple new KRASG12D (MRTX1133, ASP3082 etc) and other KRAS inhibitors in clinical trials

Case Study

- Presented to the ED with a few weeks of left flank and abdominal pain
- CT abdomen/pelvis: 3.5 cm hypodense lesion in pancreatic tail, consistent with primary pancreatic cancer. Multiple liver metastases, up to 1.7 cm. Mild hepatic steatosis. Liver biopsy demonstrates Adenocarcinoma, moderately differentiated, consistent with primary pancreatic biliary tumor. Mismatch repair proteins are intact.
- **24-325 subprotocol A (FOLFIRINOX + RMC 6236 (daraxonrasib)** start 2/6/2025
- Best response after 11 cycles with significant improvement in hepatic metastasis. RECIST - 83.22% compared to baseline
- Various holds and adjustments for rash, mucositis and thrombocytopenia
- 3/17/2026 CT CAP: POD TIMC

Daraxonrasib

Daraxonrasib is an investigational oral RAS(ON) inhibitor for RAS-mutant cancers (NSCLC, PDAC) .

Not yet FDA-approved; in Phase 3 trials showing significant survival benefit in PDAC .

May 2026 UPDATE: Revolution Medicines has opened expanded access to drug

Safety profile differs from chemotherapy — less myelosuppression, but notable dermatologic and GI toxicities

Common Adverse Events (AEs)

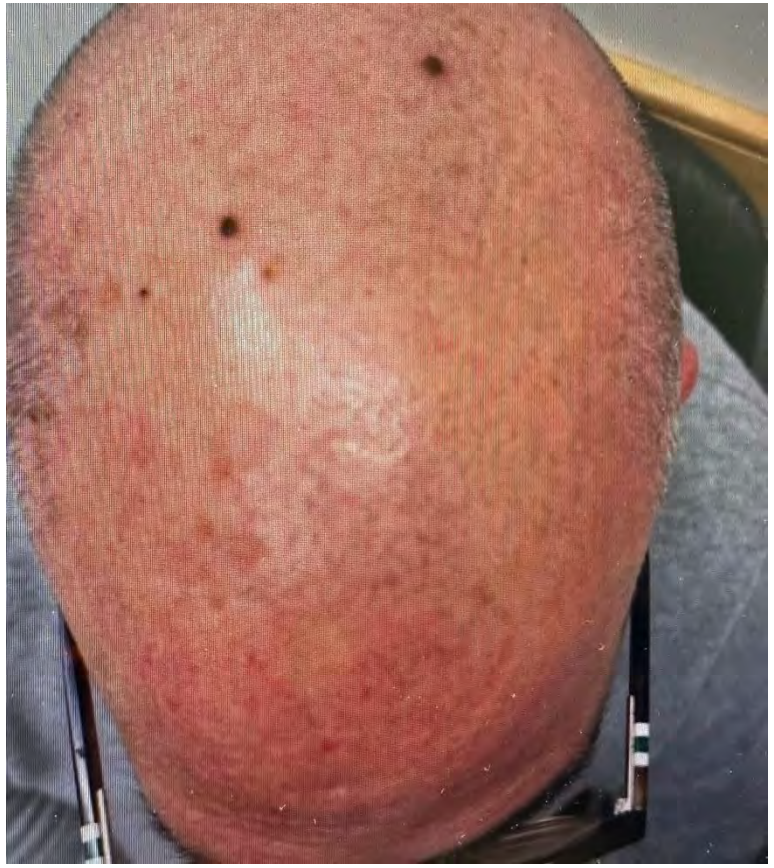
Dermatologic: Rash (≥90% of patients) — most common

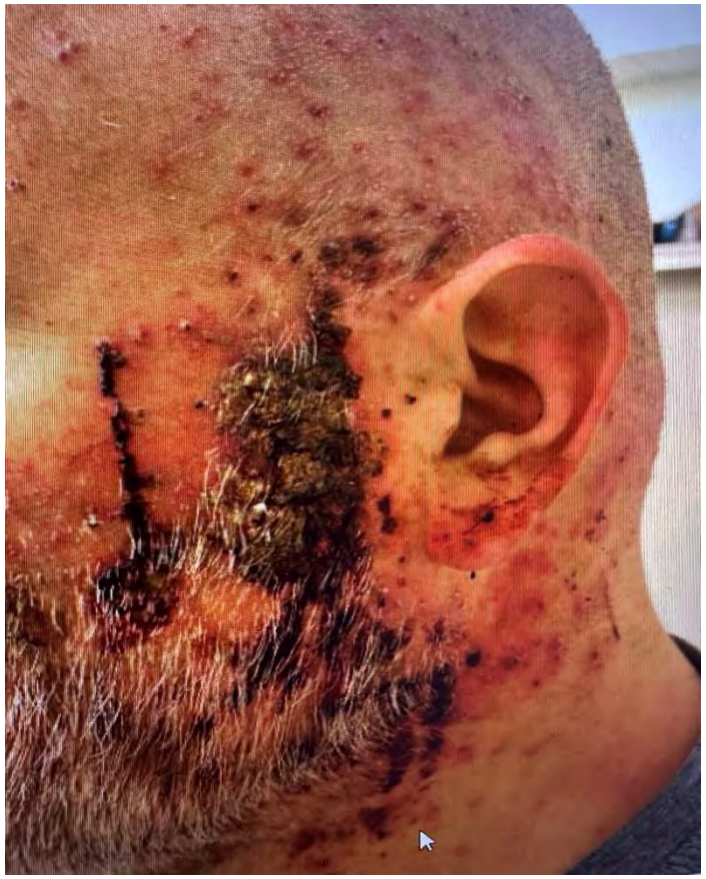
Gastrointestinal: Diarrhea, nausea, vomiting, stomatitis.

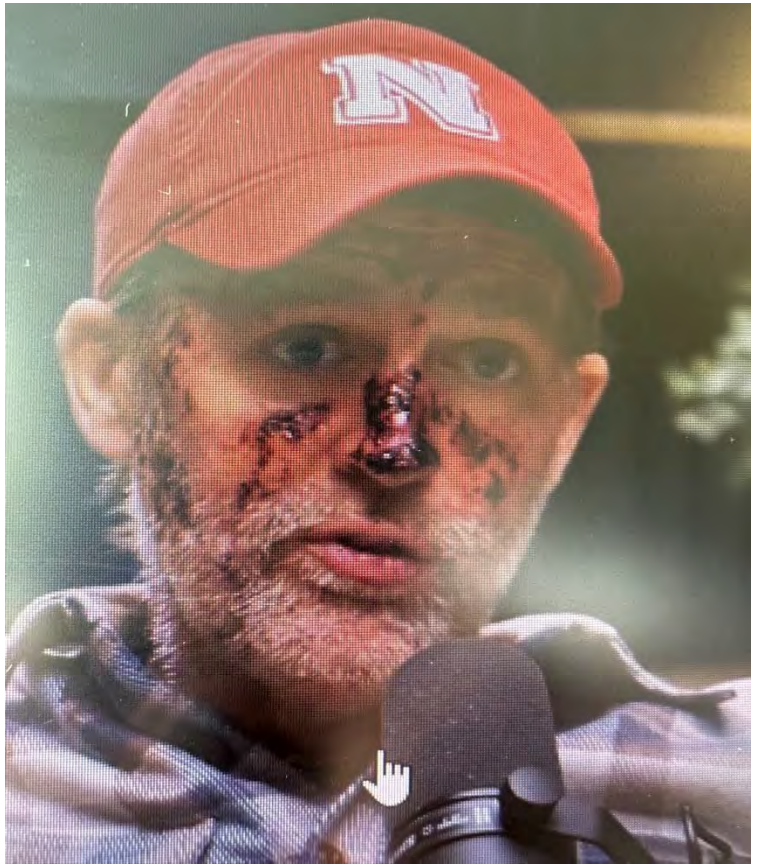
Other: Fatigue, taste changes, elevated liver enzymes

Most AEs are **Grade 1–2**; discontinuations due to AEs are relatively low

Rash Management







Grading acneiform skin rash

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Papule and/or pustules covering <10% BSA*, which may or may not be associated with symptoms of pruritus or tenderness	Papules and/or pustules covering 10–30% BSA, which may or may not be associated with symptoms of pruritus or tenderness; associated with psychosocial impact; limiting instrumental ADL; papules and/or pustules covering >30% BSA with or without mild symptoms.	Papules and/or pustules covering >30% BSA with moderate or severe symptoms; limiting self-care ADL; associated with local superinfection with oral antibiotics indicated	Life-threatening consequences; papules and/or pustules covering any % BSA, which may or may not be associated with symptoms of pruritus or tenderness and are associated with extensive superinfections with IV antibiotics indicated	Death

Abbreviations: BSA, body surface area; ADL, activities of daily living; IV, intravenous.

NCI CTCAE Guidelines V.5.0

Rash management

Oral antibiotics ppx: Doxycycline 100-200mg/day or Minocycline 100mg/day prior to first dose of Dara continue at least 8 weeks
Topical steroids Start hydrocortisone 1%, clobetasol or triamcinolone, oral steroids
Perfume-free moisturizing creams/lotions
Sun protection ≥ 30SPF at least 30minutes prior to sun exposure
Dose hold and adjustment along with referral to dermatology for grade 2-4 rash for management-resistant to standard treatment

Mucositis

Warm salt water/baking soda water rinses

"Magic/ Miracle" mouthwash

E.g. diphenhydramine, viscous lidocaine, Maalox

Dexamethasone oral solution

Diarrhea

At first sign of diarrhea: Loperamide 4mg, then 2 mg every 2 hours, 4mg prior to bedtime (Overnight dosing) Continue regimen as long as diarrhea persists. STOP if no BM for >= 12 hrs

Diphenoxylate-Atropine: IF not controlled with loperamide after 4 hours, initiate 1 pill every 6 hours, continue if diarrhea persists. STOP if no BM for >= 8hrs.

Encourage fluids (Gatorade, lemonade, ginger ale)

Assess for signs of BRB, black stools, etc.

Nausea

Day 1: PREMEDICATION: Palonosetron, Dexamethasone, Olanzapine

Days 2,3: dexamethasone 8mg in am with olanzapine 5mg at HS

Day 4 Dexamethasone 4mg in am, olanzapine 5mg at HS

Day 5 Dexamethasone 4mg in am

PRN nausea prochlorperazine 10mg, q 6PRN, ondansetron 8mg q 8PRN, olanzapine 5mg at HS

Conclusion: Daraxonrasib

Generally well tolerated with a **manageable safety profile** across several clinical trials. As of early 2026, data from Phase 1/2 and Phase 3 trials

Grade ≥3 Events: In first-line monotherapy trials, Grade 3 or higher TRAEs occurred in approximately **38%** of patients. The most frequent Grade 3 events were rash, diarrhea, and stomatitis.

Comparison to Chemotherapy: The incidence of Grade ≥3 TRAEs was significantly lower with daraxonrasib monotherapy (38%) compared to standard chemotherapy (73%) in comparative studies.

Discontinuations: Permanent discontinuation due to toxicity is relatively rare; one first-line study reported only a 3% discontinuation rate.

Dose Modifications: To manage toxicities, dose interruptions and reductions are common, with modifications required in 60-70% of patients in some trial arms. The mean relative dose intensity remained favorable at approximately 84-89%.

Fatalities: No Grade 4 or Grade 5 (fatal) TRAEs were reported at the standard 300 mg daily dose in several clinical updates.

Safety in Combination Therapy: When combined with chemotherapy (such as gemcitabine/nab-paclitaxel), the safety profile was consistent with the known toxicities of each individual agent, with **no new safety signals** identified for the combination regimen

Agenda

Introduction: Clinical Presentation and Prognosis of Pancreatic Adenocarcinoma (PAD)

Module 1: Recent Advances in Up-Front Treatment for Metastatic PAD

Module 2: Selection and Sequencing of Therapy for Relapsed/Refractory Metastatic PAD

Module 3: Novel Strategies Targeting RAS Mutations in Advanced PAD

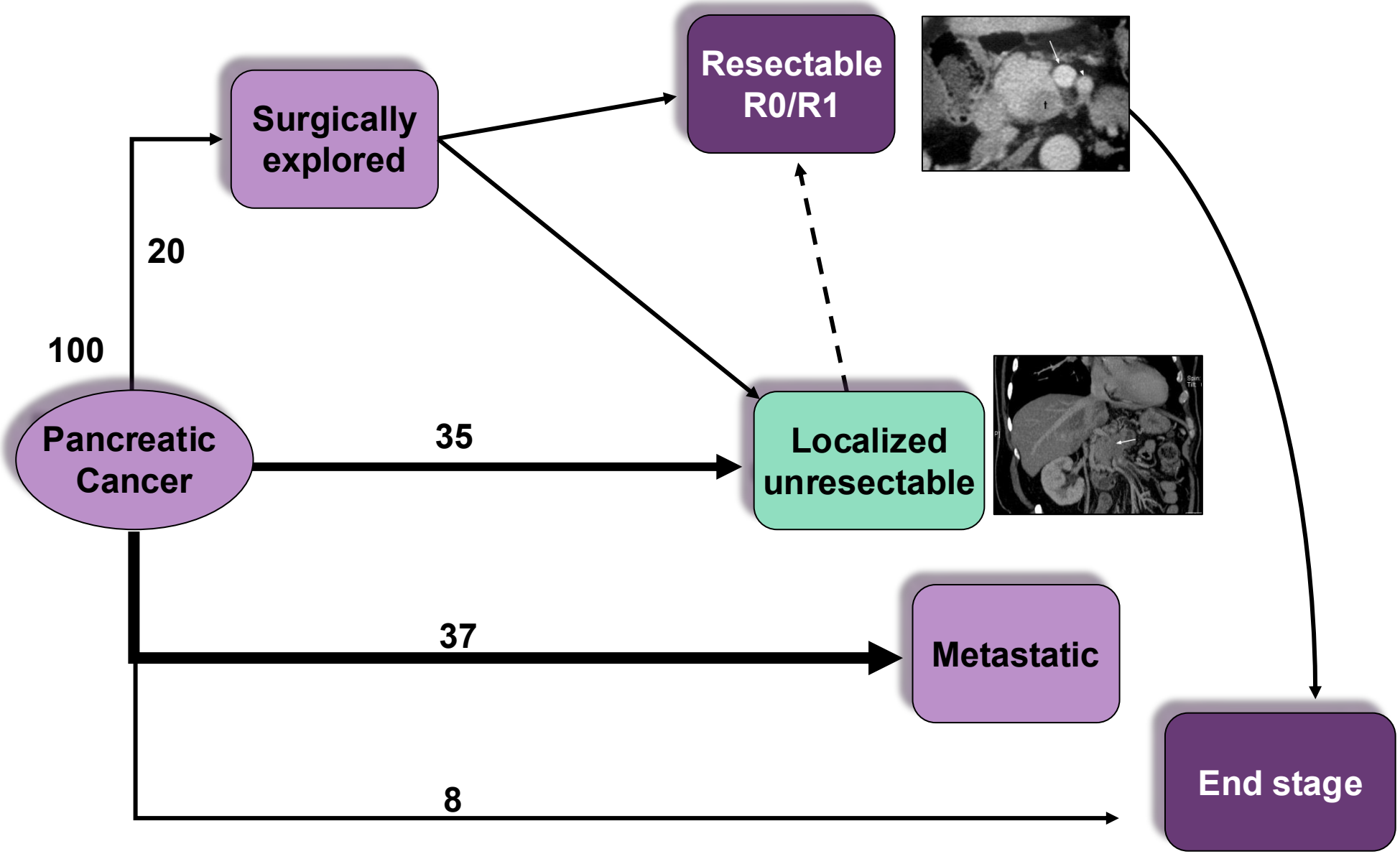
Module 4: Utility of Tumor Treating Fields in PAD Management

Utility of Tumor Treating Fields (TTFields) in PAD Management

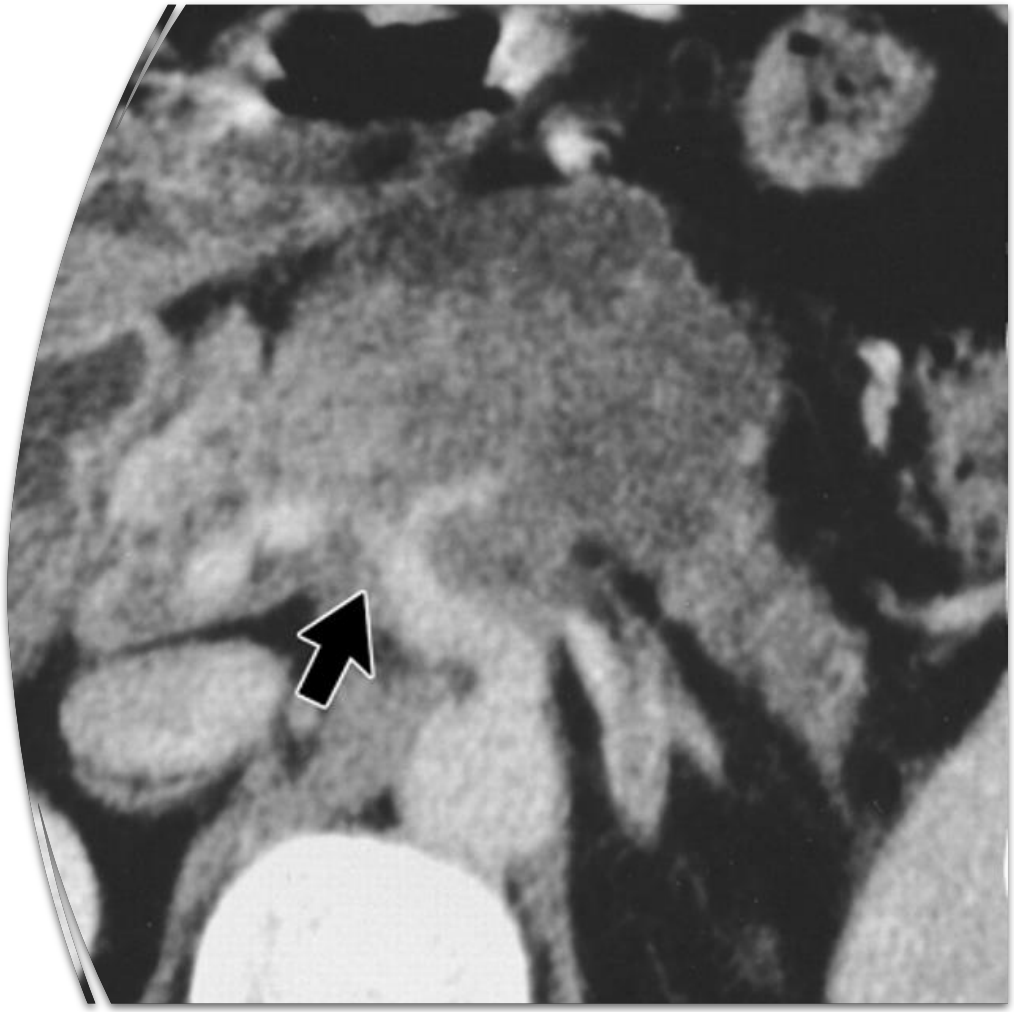
Philip Agop Philip, MD, PhD, FRCP

Henry Ford Health
Wayne State University School of Medicine
Detroit, Michigan
USA

Most patients are diagnosed with advanced non-curable disease



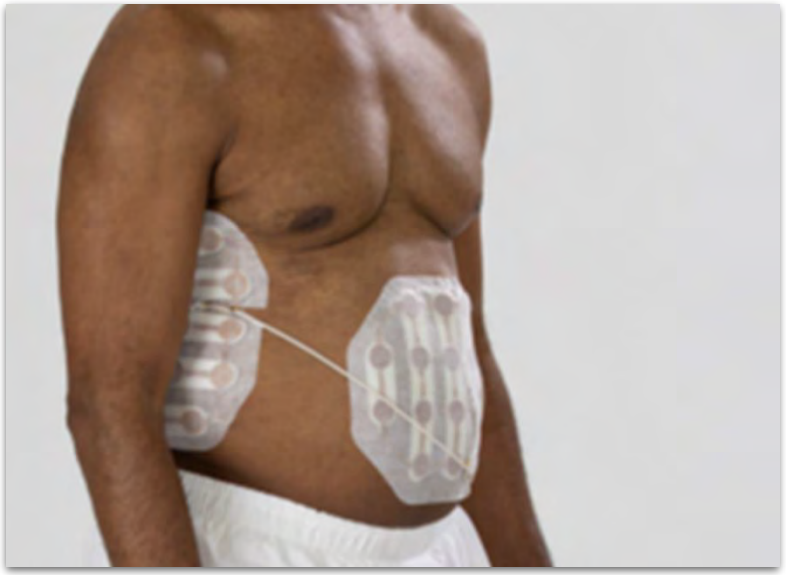
Extensive involvement of blood vessels by tumor in LAPC

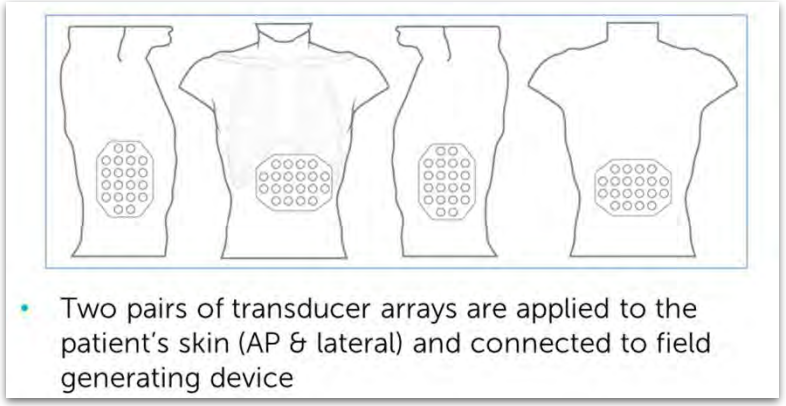


Locally advanced unresectable pancreatic cancer

- Unlikely to undergo curative surgery
- Suffer from local effects of an expanding and invasive tumor
  - Abdominal +/- back pain
  - Bile duct blockage
- Chemotherapy with or without radiation has been the only treatment option for palliation
  - Radiation therapy produces modest local benefit but does not improve survival

Tumor Treating Fields (TTFields) is a non-invasive application of alternating electric fields in treating pancreatic cancer

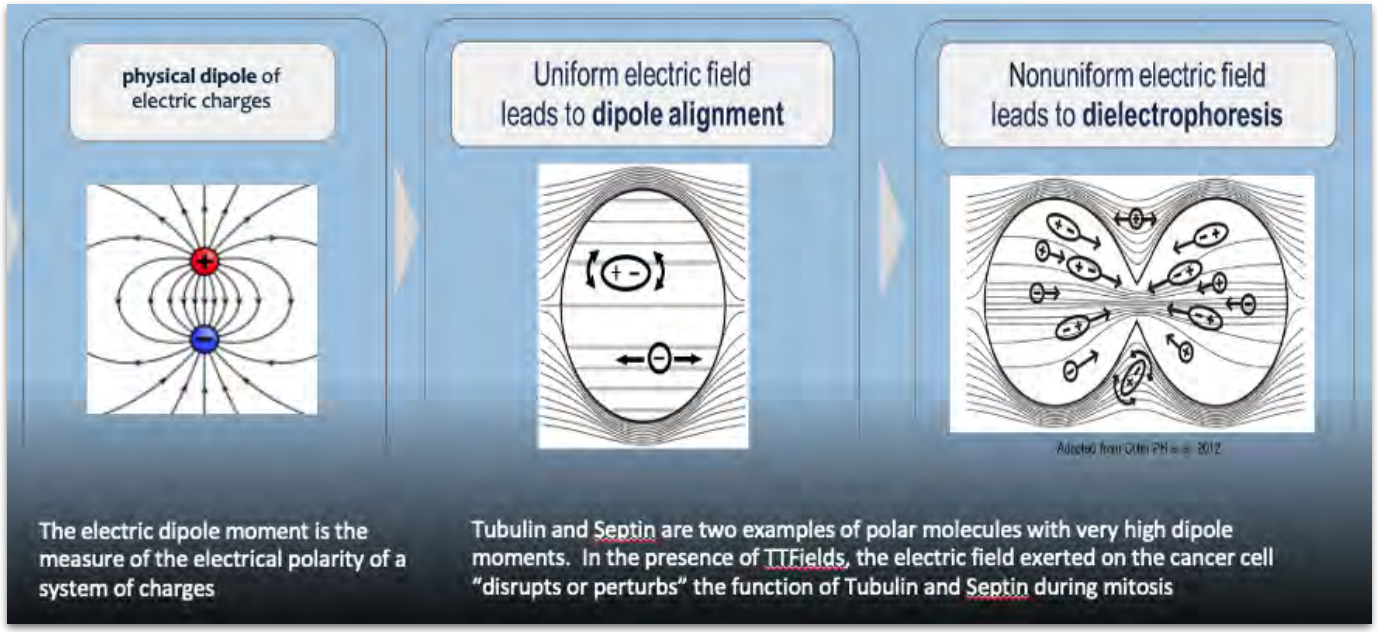


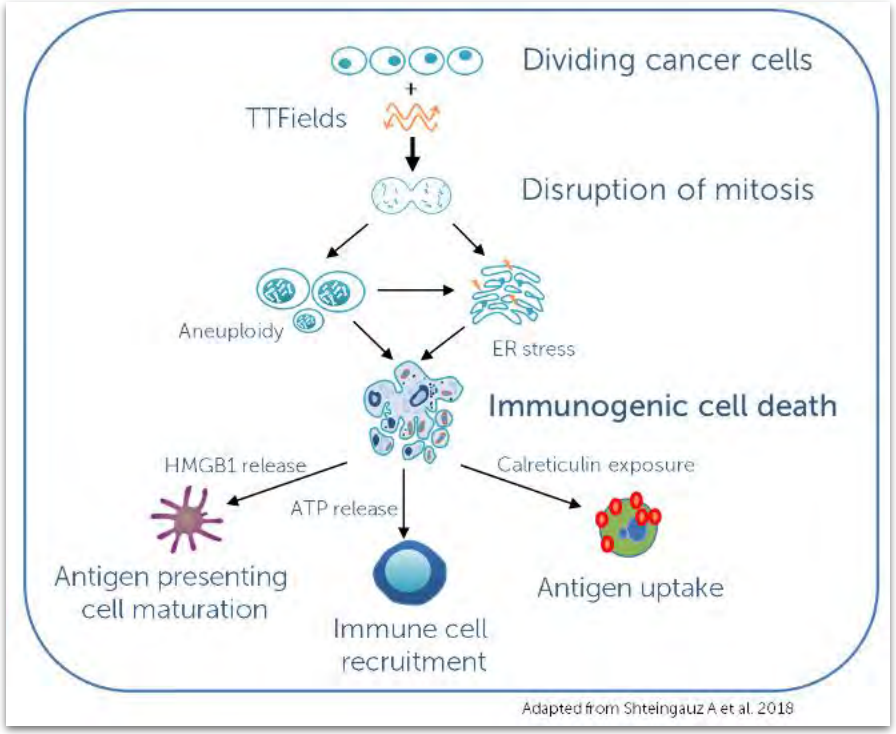


- Two pairs of transducer arrays are applied to the patient's skin (AP & lateral) and connected to field generating device

Courtesy of Philip A Philip, MD, FACP

TTFields disrupts internal structures in cancer cells and leads to cell death and arresting cell multiplication

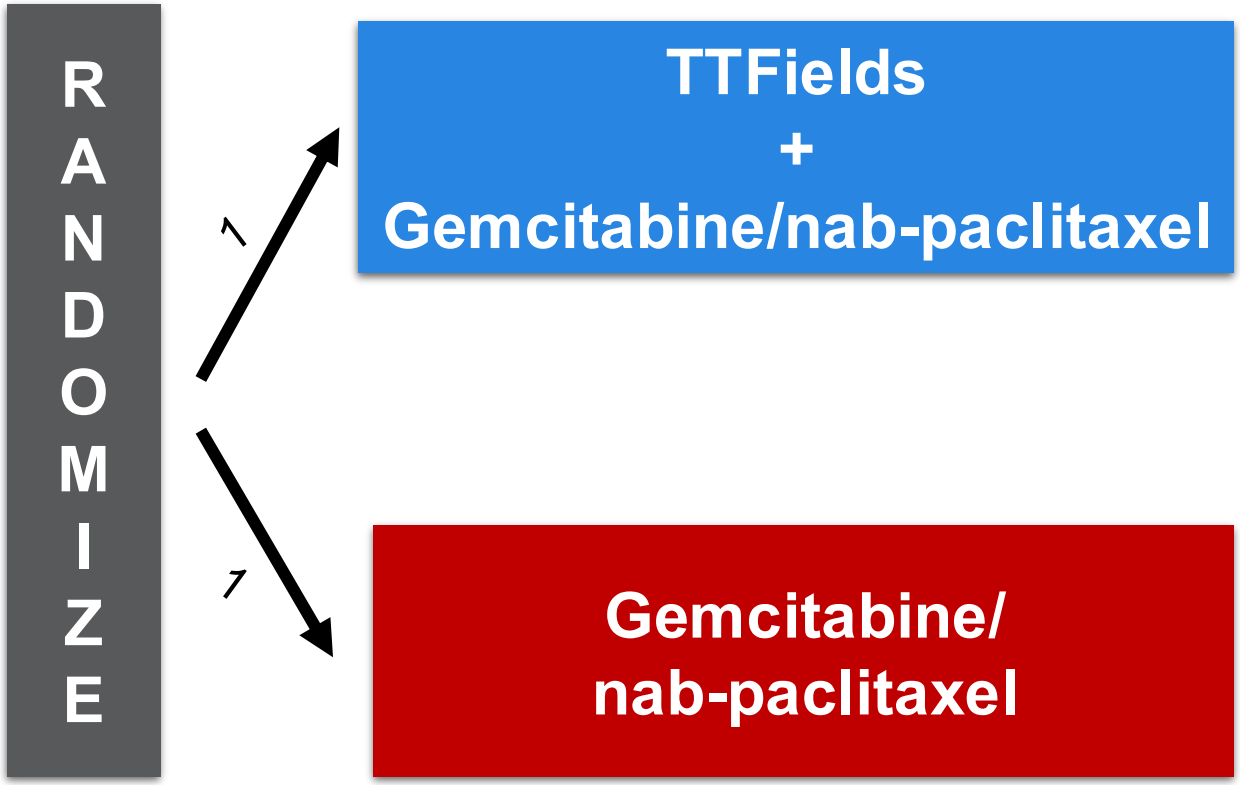




Courtesy of Philip A Philip, MD, FACP

PANOVA-3: Phase 3 International Study of TTFields plus Chemotherapy in Locally Advanced Pancreatic Cancer

571 patients



Overall survival

NCT03377491

Babiker et al, JCO, 2025

PANOVA-3: eligible patients

- Patients with locally advanced unresectable pancreatic cancer
- ECOG performance status of 0, 1, or 2
- Able to receive gemcitabine plus nab paclitaxel
- Able to operate the device or have help
- No upper age limit

NCT03377491

Babiker et al, JCO, 2025

PANOVA-3: Patients on TTF added to chemotherapy did better

	TTF + Chemo	Chemo alone
Median overall survival in months	16.2	14.2
Median pain-free survival in months	15.2	9.1
Median distant progressive free survival in months	13.9	11.5

Babiker et al, JCO, 2025

PANOVA-3: patients on TTF added to chemotherapy did better

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Median distant progressive free survival in months	13.9	11.5

Babiker et al, JCO, 2025

TTF-related side effects were mainly skin related (mild to moderate)

	%
Skin reactions	76.3
Dermatitis	27.7
Rash	17.5
Pruritus	15.0
Maculopapular rash	12.0
Erythema	10.6
TTFields discontinuations	8.4

Babiker et al, JCO, 2025

FDA Approves Tumor Treating Fields to Treat Pancreatic Cancer

Press Release: February 12, 2026

"The US Food and Drug Administration has approved a first-of-its-kind device for the treatment of adult patients with locally advanced pancreatic cancer. Optune Pax is a portable, non-invasive device that delivers alternating electrical fields, known as tumor treating fields (TTFields), to the abdomen. TTFields work by physically disrupting the rapid cell division that is characteristic of cancer cells, while minimizing damage to healthy tissue.

The FDA's approval of Optune Pax is based on data from a pivotal clinical study conducted under an Investigational Device Exemption. The randomized and controlled study followed adult patients with locally advanced pancreatic cancer for up to five years. The results showed that the addition of TTFields to standard of care chemotherapies gemcitabine and nab-paclitaxel (GnP) improved Overall Survival by approximately two months compared to GnP alone. Localized skin reactions were the most common device-related risks observed in the study."

https://www.fda.gov/news-events/press-announcements/fda-approves-first-its-kind-device-treat-pancreatic-cancer

RTP RESEARCH TO PRACTICE

Case Presentation

Case

- 69 year old male – retired engineer
- Well controlled hypertension and diabetes
- Abdominal pain (7/10), unintentional weight loss 20 lb.
- CT scan = pancreatic head mass, 4.1 x 3.9 cm, full circumference involvement of the superior mesenteric artery and superior mesenteric vein, no distant metastases
- Endoscopic ultrasound and biopsy = adenocarcinoma
- Germline testing for BRCA/PALB mutations was negative
- Tumor NGS = $KRAS^{G12V}$ and SMAD4 mutations
- CA19-9 = 865

Case

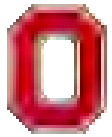
- Wants to stay active as long as possible!
- Referred to palliative/supportive care
  - Experienced opioid side effects - constipation and mild drowsiness
- Started treatment with TTF and gemcitabine and nab paclitaxel
  - Reduction in requirement of opiates
  - CT scan after 2 months showed 15% reduction
  - Mild skin irritation
  - CA19-9 trending down
- Will continue treatment until disease progression and/or intolerable side effects

Discussion Questions

Given the recent FDA approval of TTFields in combination with gemcitabine/*nab* paclitaxel for unresectable locally advanced PAD, to which specific patients will you offer this strategy?

Tolerability and Other Practical Considerations with TTFields

The James



THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

Amanda K Wagner, APRN-CNP, AOCNP
GI Malignancies
The James Cancer Hospital
The Ohio State University
Columbus, Ohio

TTF Device

- Electric Field Generator
- Transducer Arrays; total of 4 (to be replaced q3-4 days)
- Portable power supply, batteries, charger

The James

The Ohio State University
Comprehensive Cancer Center

Slide courtesy of Ashish Manne MD; images reused with permission from Novocure GmbH. Actor portrayal

TTF Device Logistical considerations

- Device is to be worn at least 12 hours daily
- Comes with a provided bag that is designed to allow for proper air flow; do not use a different bag
- If the patient is away from home for more than 1 hour, should carry an extra battery and/or power supply. Provided with 4 rechargeable batteries, device uses 1 at a time
- Should have 12 extra transducer arrays at all times (available in 2 sizes to accommodate different body sizes)
- Device will activate metal detectors
- Arrays should not get wet (take them off completely for a shower vs wrap abdomen with a towel and sponge bathe)
- Should not be used by patients with electrical implants or a known sensitivity to gels used on ECGs stickers or TENS electrodes or patients who are pregnant or plan to become pregnant

Summary of Safety and Effectiveness Data. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034B.pdf;
Patient Information and Operation Manual. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034C.pdf;
Physician Instructions for Use. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034D.pdf

Skin Preparation Instructions

Array Placement

- Wash hands before handling arrays/skin
- Shave the abdomen using a clean electric shaver
- Wash the skin with mild, fragrance-free soap and pat the skin dry
- Apply topical skin products (moisturizing cream, skin barrier film, corticosteroid, antibiotic cream) and leave on for 20 min before placing arrays
- Patient may need assistance with array that goes on the back

Array Removal

- Avoid pulling or rubbing the skin
- Thoroughly wet the arrays until fully saturated while showering, apply even tension and slowly pull back
- Evaluate the skin for signs/symptoms of skin breakdown

Summary of Safety and Effectiveness Data. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034B.pdf;
Patient Information and Operation Manual. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034C.pdf;
Physician Instructions for Use. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034D.pdf

TTF Dermatologic Toxicities

- **Management and Mitigation Strategies**

76% of patients experienced mild to moderate skin irritation on PANOVA-3 trial

7% of patients on study experienced more severe skin toxicity requiring break from treatment

Prevention

- Cleanse skin daily with lukewarm water and mild fragrance-free soap
- Avoid skin products containing alcohol, fragrances, solvents, petroleum-based products
- Moisturize daily with water-based lotions
- Wear loose fitting clothing
- Avoid sun exposure; wear SPF/sun protective clothing when outdoors
- Shift arrays by ~2 cm at each array change

Summary of Safety and Effectiveness Data. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034B.pdf;
Patient Information and Operation Manual. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034C.pdf;
Physician Instructions for Use. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034D.pdf

TTF Dermatologic Toxicities

- **Management and Mitigation Strategies, cont.**

- Monitor patient closely for skin issues within the first 4 weeks of treatment
- Consider prescribing prophylactic water or silicone based wipes, skin barrier films, and low potency topical corticosteroids

If patient develops skin toxicity:

Grade 1 (asymptomatic or mild, no impact on ADLs) -moisturizing creams, topical corticosteroids, continue treatment

Grade 2 (symptomatic redness, localized erosions, or pruritis interfering with ADLs) -add moderate-potency topical steroids (triamcinolone 0.1%), consider adding topical antibiotics if secondary infection, antihistamines. Continue treatment if tolerated, consider 2-7 day treatment break

Grade 3 (skin ulceration, bleeding, widespread erosions)-add wound care, topical/systemic antibiotics based on culture, systemic corticosteroids, derm consult. Interrupt treatment, may resume once re-epithelialized and resolves to </=Grade 1

Grade 4 (full thickness ulceration, infection, necrosis)-hospitalization, permanently discontinue

Anadkat et al. *Frontiers of Oncology*. 2023; Summary of Safety and Effectiveness Data. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034B.pdf; Patient Information and Operation Manual. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034C.pdf; Physician Instructions for Use. https://www.accessdata.fda.gov/cdrh_docs/pdf25/P250034D.pdf

Case Presentation

Case Study

- 59 yo male presented with abdominal pain, n/v. found to have acute cholecystitis and incidental finding of a pancreatic head mass (resectable). Medical management attempted for treatment of cholecystitis, but ultimately required surgery. Upfront chemo recommended before surgery for pancreatic cancer once recovered
- Enrolled on a clinical trial using gem/nab-paclitaxel with TTF device
- C1D15 skipped d/t neutropenia; required dose reduction with C2
- C2D15 developed thrombocytopenia, required 2nd dose reduction
- Developed mild skin reaction to TTF device which improved with barrier wipes and hydrocortisone cream
- Developed significant fatigue despite dose reductions and ultimately chose to stop treatment on trial after 3 months.
- Received bi-weekly Gem/nab-paclitaxel with prior dose reductions for another 2 months, followed by chemoRT and then surgical resection. R0 resection
- Now on surveillance

Recent Advances in Cancer Care — New Paradigms, Novel Agents and What It Means for the Oncology Nurse

A Complimentary NCPD Symposium Series Held During the 51st Annual ONS Congress

Targeting the PI3K/AKT/mTOR Pathway in HR-Positive Metastatic Breast Cancer

Friday, May 15, 2026

12:15 PM – 1:45 PM

Faculty

Reva Basho, MD
Kelly Fischer, MSN, FNP-BC
Melissa Rikal, FNP-BC, AOCNP

Moderator

Seth Wander, MD, PhD

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