
بسم الله الرحمن الرحيم

# Early onset pancreatic cancer

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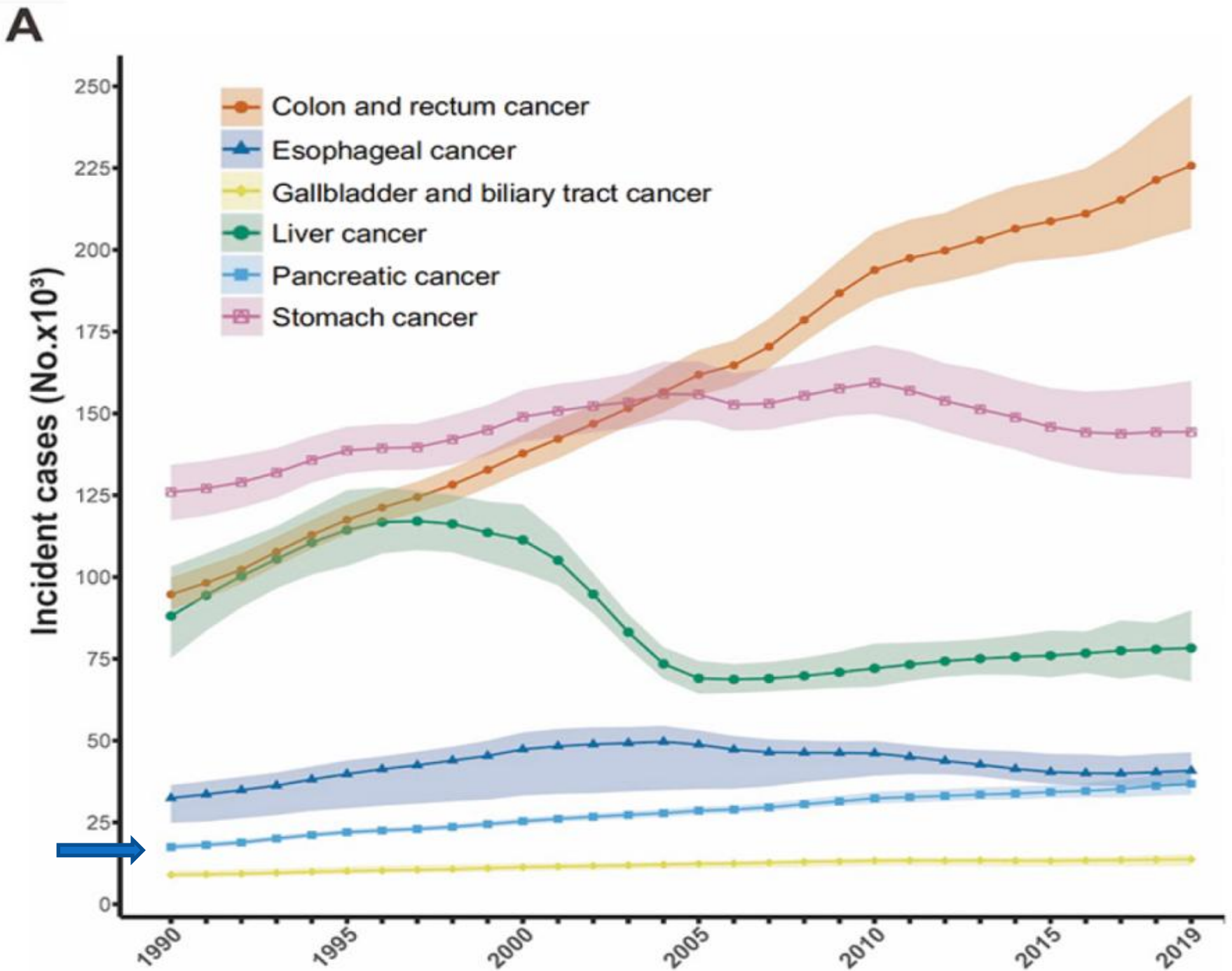
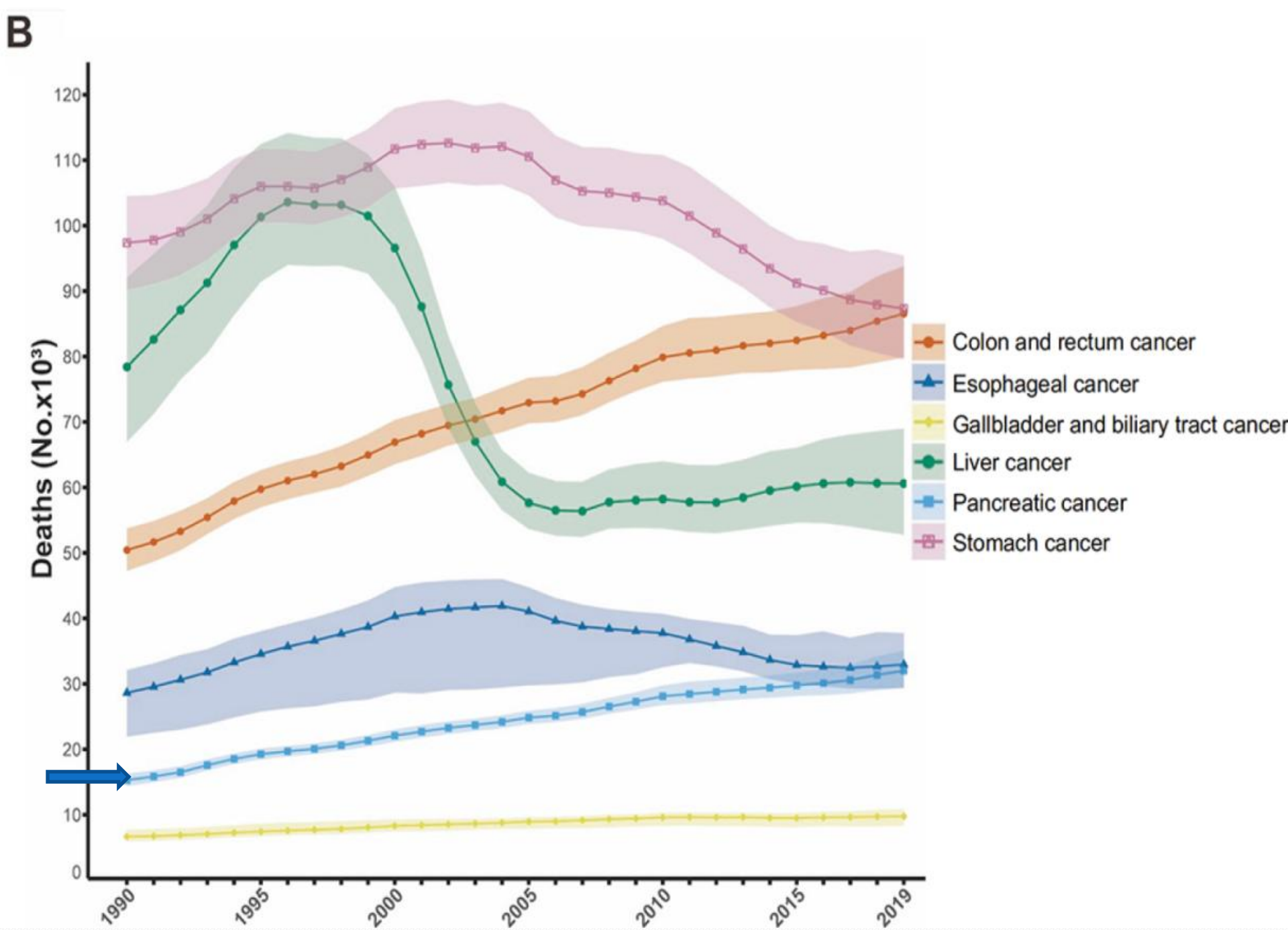
# Definition

- Early-onset pancreatic cancer **(EOPC)** < 50 years
  - 45
  - 55
  - 60
  - 65
- 11.4 % of patients diagnosed with pancreatic cancer are under 55 years of age . (varies in different studies, from 4.4 % to 17 %)

# Incidane & Death Estimated Annual Percentage Change




Trends in incidence and mortality of early-onset gastrointestinal cancers: a comprehensive study Xia *et al. BMC Gastroenterology* (2025)

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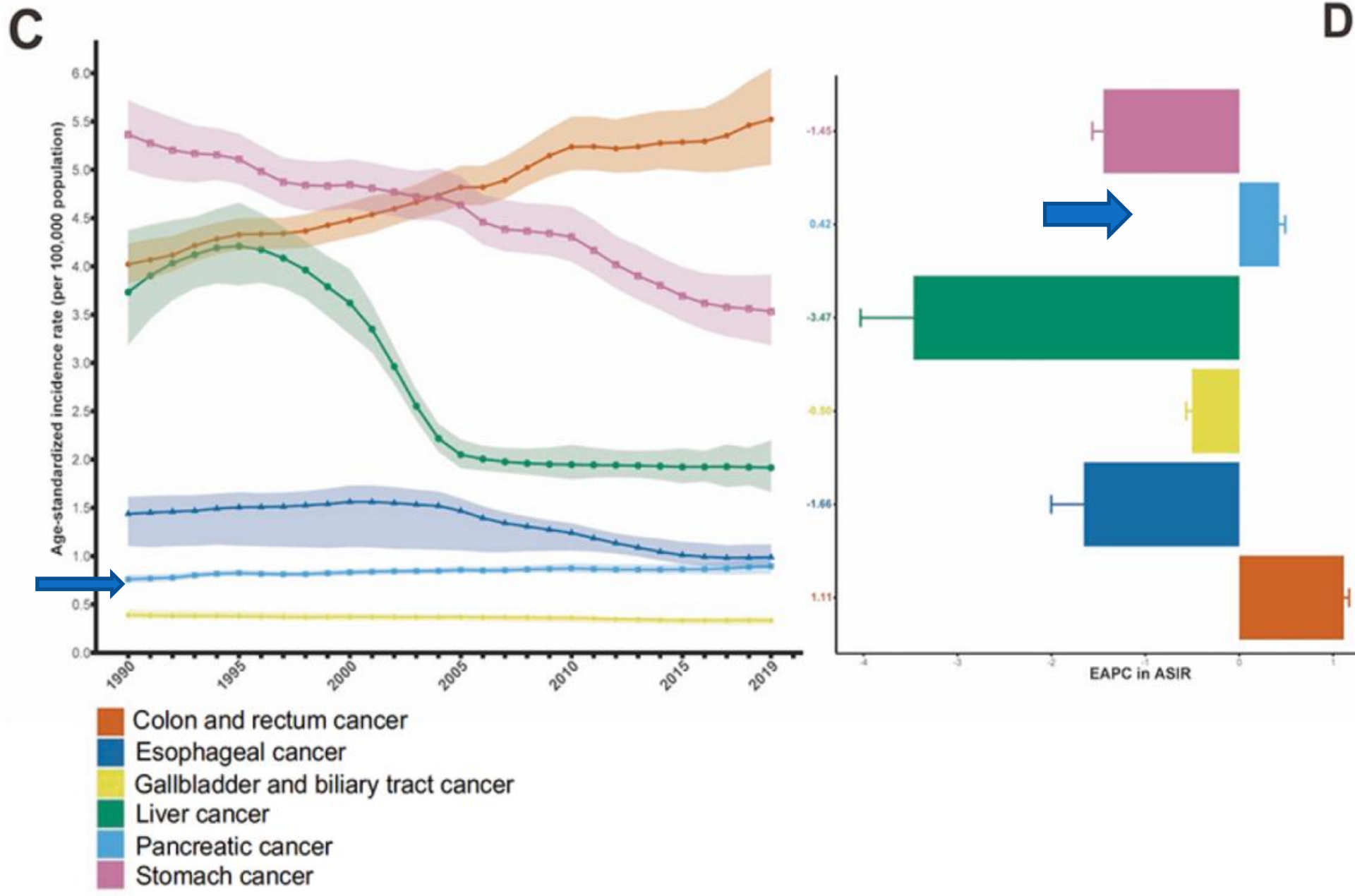


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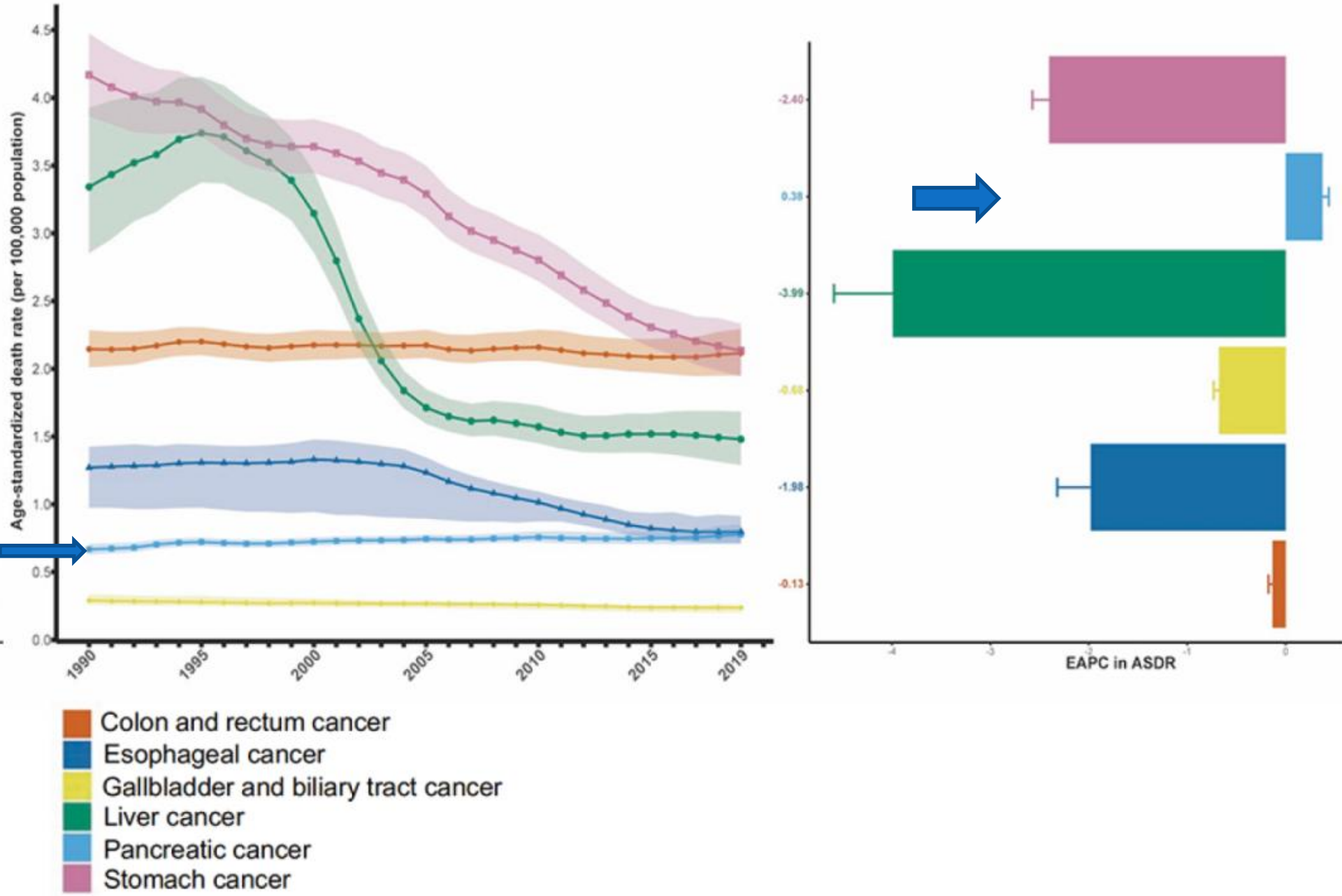


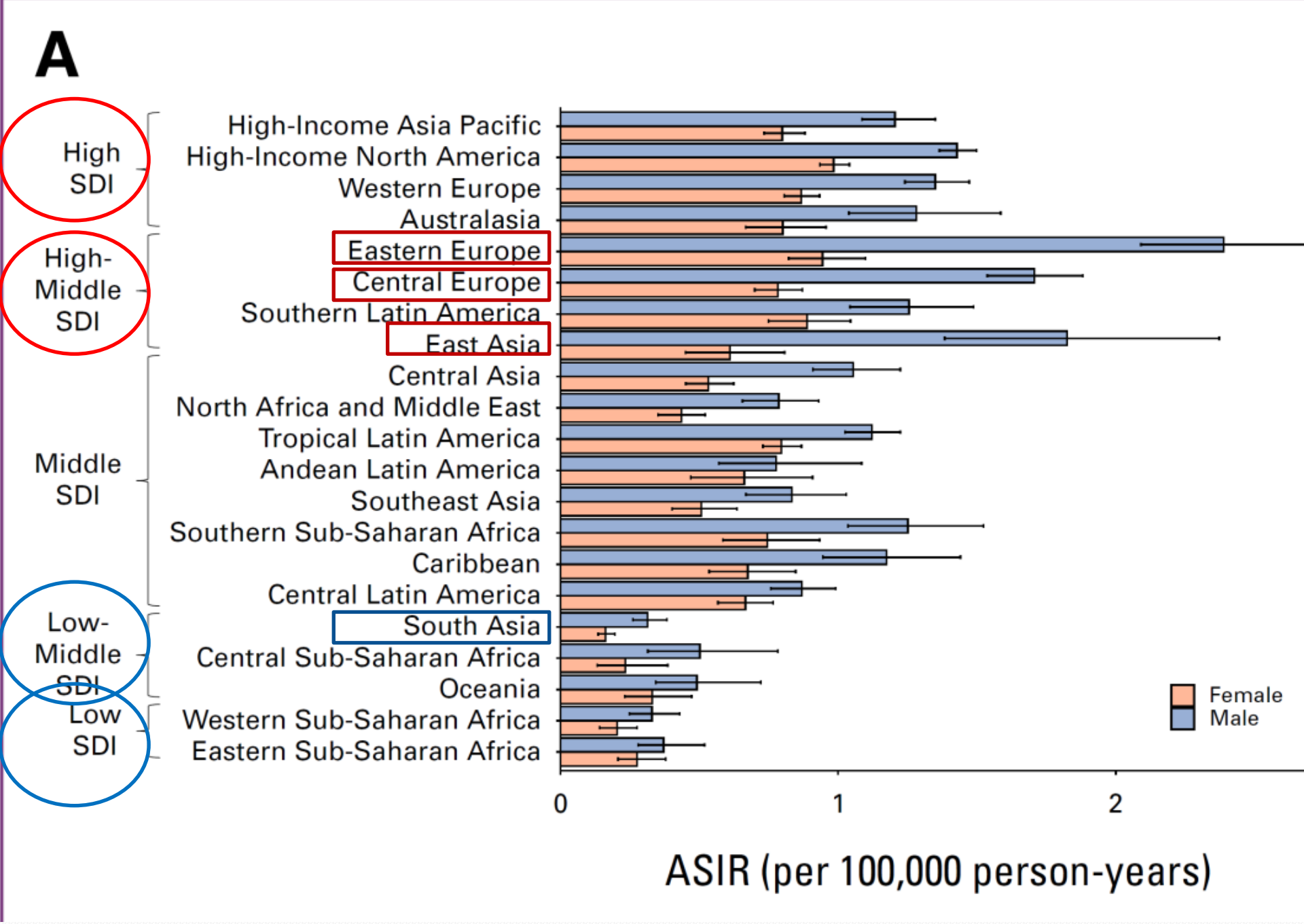

Trends in incidence and mortality of early-onset gastrointestinal cancers: a comprehensive study Xia *et al. BMC Gastroenterology* (2025)

**Table 1** The global incident cases, deaths, and their change trends of early-onset Gastrointestinal cancers from 1990 to 2019

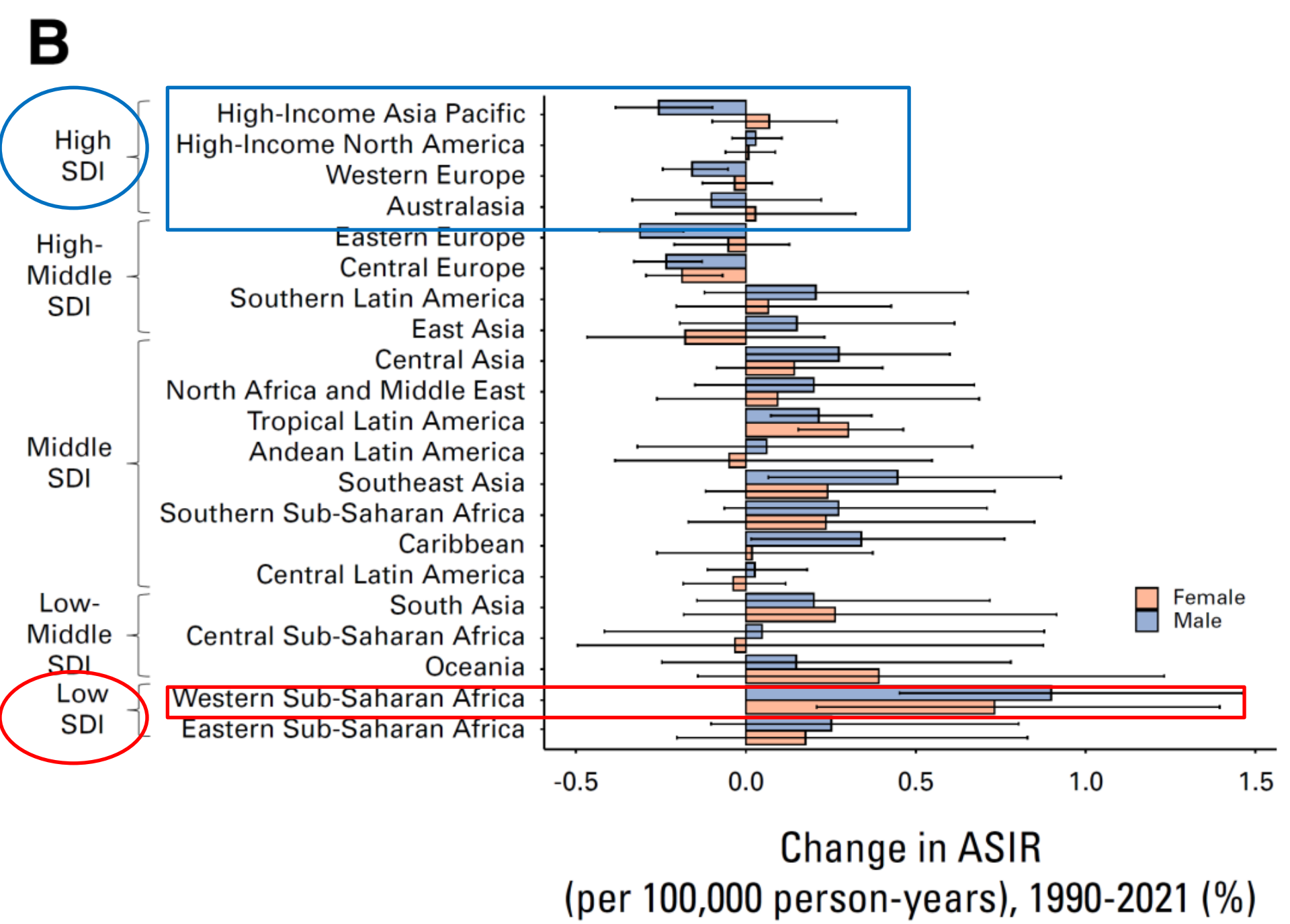
| Type | Incidence (95% UI) | | | | 1990–2019 | Deaths (95% UI) | | | | 1990–2019 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | | 2019 | | | 1990 | | 2019 | | |
| | Incident cases, No. × $10^3$ | ASR per 100,000 | Incident cases, No. × $10^3$ | ASR per 100,000 | EAPC (95% CI) | Deaths, No. × $10^3$ | ASR per 100,000 | Deaths, No. × $10^3$ | ASR per 100,000 | EAPC (95% CI) |
| Overall EO-GI cancer | 367.74 (332.13 to 402.6) | 15.7 (14.19 to 17.19) | 539.75 (486.18 to 599.43) | 13.19 (11.88 to 14.64) | -0.89 (-0.99 to -0.79) | 276.82 (246.63 to 306.4) | 11.89 (10.59 to 13.15) | 309.2 (279.34 to 341.82) | 7.54 (6.81 to 8.34) | -1.98 (-2.13 to -1.82) |
| Colon and rectum cancer | 94.71 (89.99 to 99.86) | 4.02 (3.83 to 4.23) | 225.74 (206.57 to 247.43) | 5.52 (5.05 to 6.05) | 1.11 (1.05 to 1.17) | 50.44 (47.25 to 53.75) | 2.14 (2.01 to 2.28) | 86.55 (79.85 to 93.81) | 2.11 (1.95 to 2.29) | -0.13 (-0.17 to -0.09) |
| Esophageal cancer | 32.45 (24.9 to 36.4) | 1.44 (1.1 to 1.61) | 40.82 (36.17 to 46.42) | 0.99 (0.88 to 1.12) | -1.66 (-2 to -1.31) | 28.63 (21.93 to 32.11) | 1.27 (0.97 to 1.42) | 32.96 (29.38 to 37.75 | 0.8 (0.71 to 0.91) | -1.98 (-2.32 to -1.64) |
| Gallbladder and biliary tract cancer | 9.01 (8.05 to 10.29) | 0.39 (0.35 to 0.45) | 13.72 (11.73 to 15.27) | 0.33 (0.29 to 0.37) | -0.5 (-0.56 to -0.44) | 6.66 (5.92 to 7.73) | 0.29 (0.26 to 0.34) | 9.76 (8.32 to 10.84) | 0.24 (0.2 to 0.26) | -0.68 (-0.73 to -0.62) |
| Liver cancer | 88.18 (75.28 to 103.24) | 3.73 (3.19 to 4.37) | 78.3 (68.04 to 89.88) | 1.92 (1.67 to 2.2) | -3.47 (-4.03 to -2.9) | 78.42 (66.96 to 92.05) | 3.34 (2.85 to 3.93) | 60.6 (52.79 to 68.99) | 1.48 (1.29 to 1.68) | -3.99 (-4.59 to -3.39) |
| Pancreatic cancer | 17.48 (16.51 to 18.52) | 0.76 (0.72 to 0.8) | 36.85 (33.5 to 40.44) | 0.9 (0.82 to 0.98) | 0.42 (0.36 to 0.49) | 15.29 (14.39 to 16.25) | 0.67 (0.63 to 0.71) | 32 (29.39 to 35.03) | 0.78 (0.71 to 0.85) | 0.38 (0.31 to 0.44) |
| Stomach cancer | 125.97 (117.39 to 134.29) | 5.37 (5 to 5.72) | 144.32 (130.1 to 159.99) | 3.53 (3.19 to 3.91) | -1.45 (-1.56 to -1.33) | 97.38 (90.17 to 104.522) | 4.17 (3.86 to 4.47) | 87.33 (79.61 to 95.4) | 2.13 (1.95 to 2.33) | -2.4 (-2.57 to -2.23) |

ASR: age-standardized rate; CI: confidence interval; EAPC: estimated annual percentage change; UI: uncertainty interval

# EOPC Burden by Regions




Current and Future Global Burden of Early-Onset Pancreatic Cancer: A Population-Based Study . Diniz da Conceição et al. Gastrointestinal Cancer.2025

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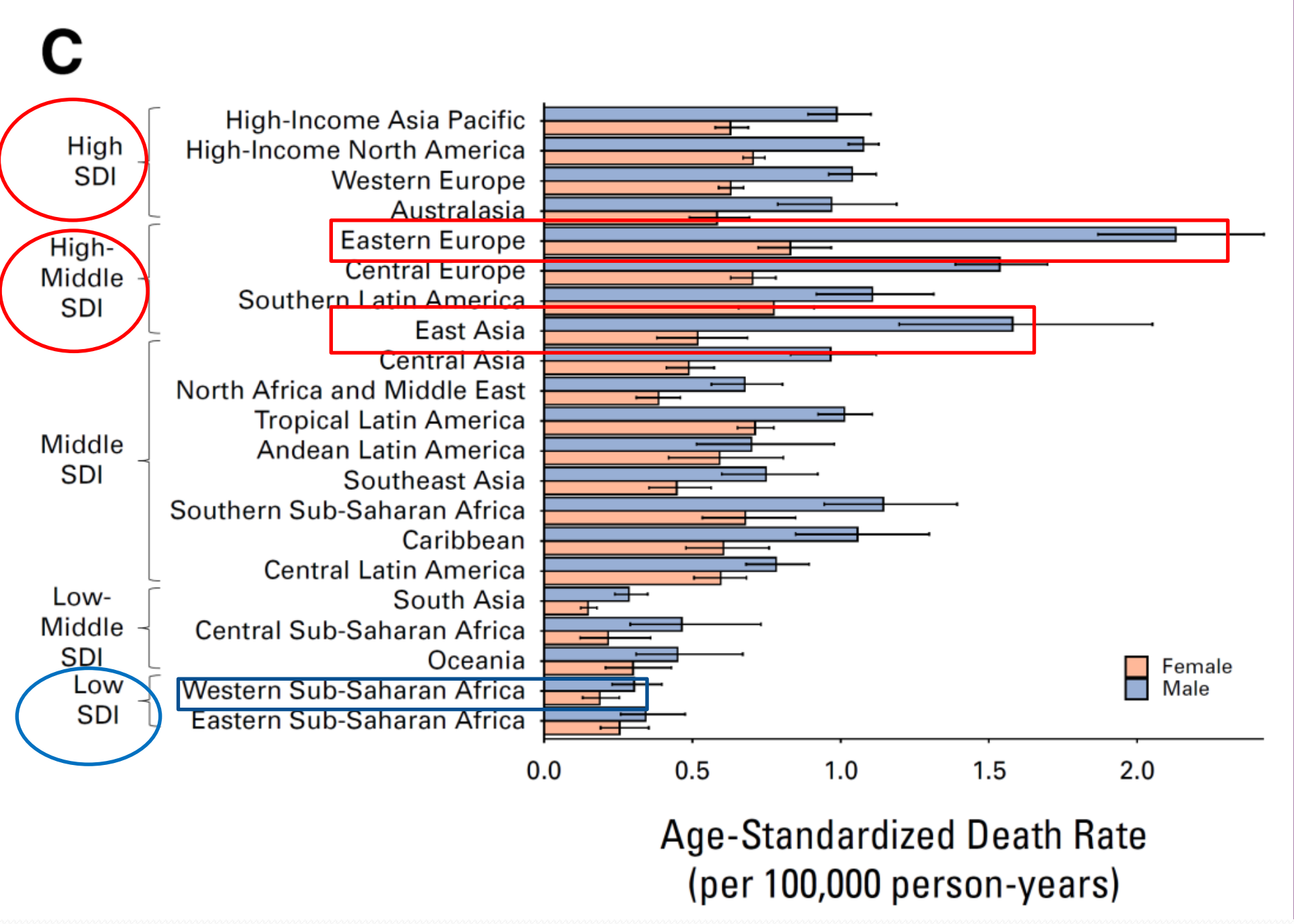


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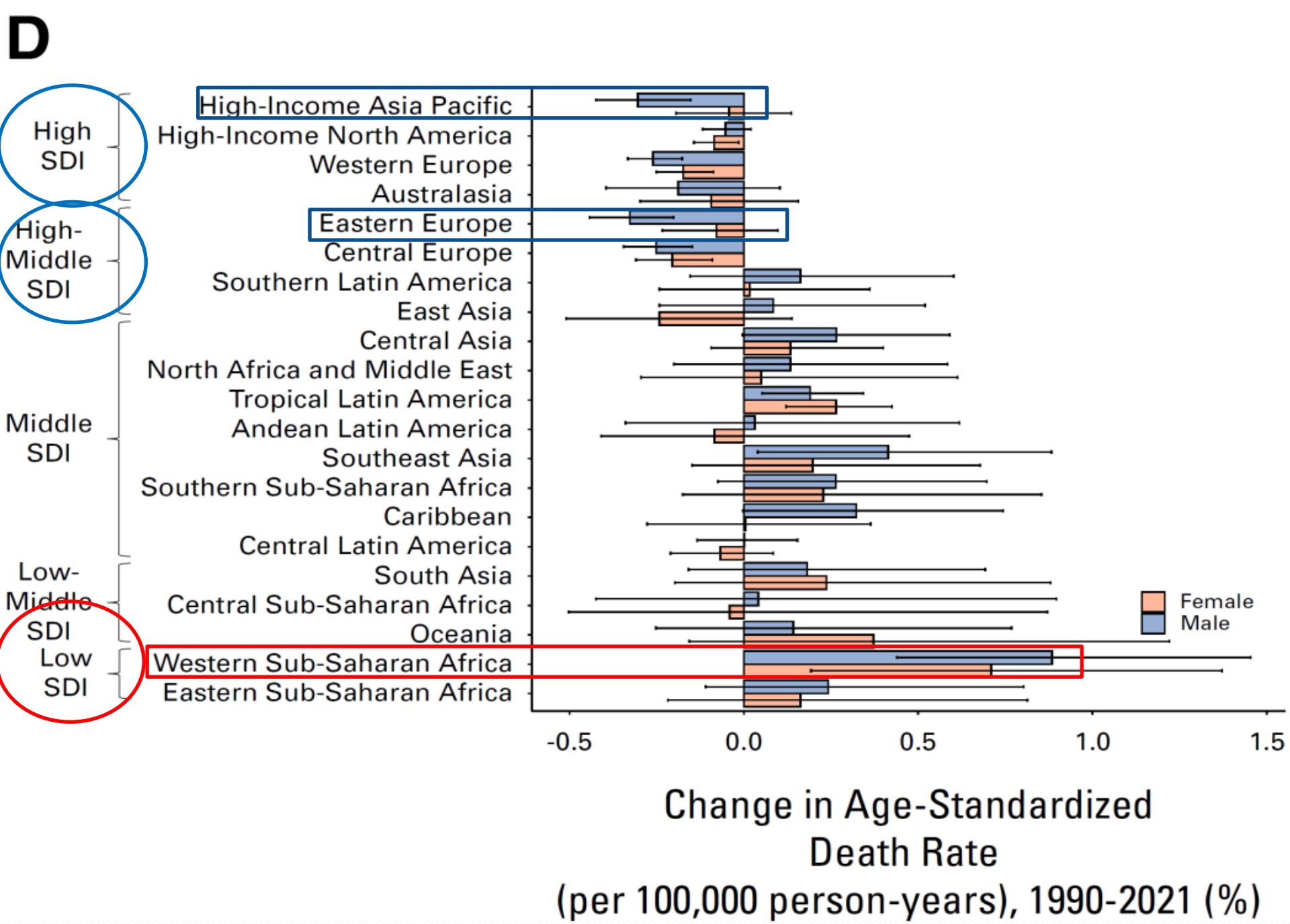


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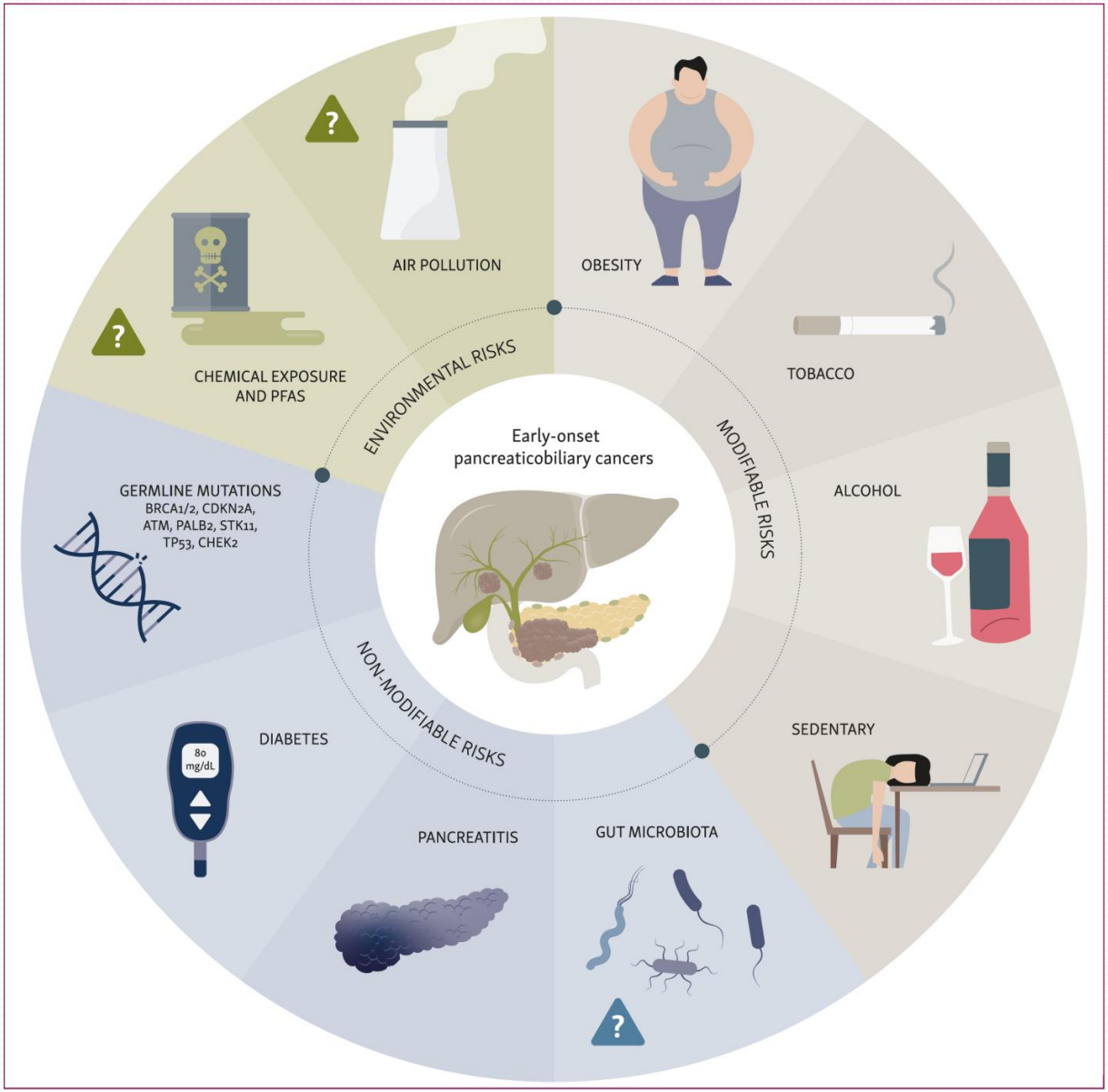
# CLINICAL RISK FACTORS




The increasing burden of early-onset pancreatic and biliary tract cancers: a review of risk factors . A. Boilève et al. ESMO Gastrointestinal Oncology . 2025

| Category Risk | Type of study | Authors | Number of patients | Measure of Association | Comment |
|---|---|---|---|---|---|
| | | | Hereditary factors | | |
| **Germline mutation** | Pancreatic Cancer Genetic Epidemiology | Petersen et al. | 379 familial PDAC | NA | **7.4%** of familial PDAC cases harbor pathogenic mutations in BRCA1, BRCA2, or CDKN2A |
| | USA National Familial Pancreas Tumor Registry | Beeghly-Fadiel et al. | 1407 PDAC | NA | **31.9%** of EOPC tested had pathogenic variants |
| | | | Environmental and lifestyle risk factors in PDAC | | |
| **Alcohol consumption** | Retrospective Chinese cohort | Huang et al. | 331 PDAC | *P* = 0.022 | Younger age at diagnosis in case of Alcohol consumption (57.96 years vs 61.37 years) |
| | Retrospective Romanian cohort | Bunduc et al. | 148 PDAC | *P* = 0.01 | Higher proportions of people consuming alcohol among younger PDAC (≤45 years VS ≥45 years) |
| | United States case-control study | McWilliams et al. | 1954 PDAC 3278 controls | ≥26 g/day HR 2.18, 95% CI 1.17-4.09 | No interaction between alcohol and age at PDAC onset (<45 years VS<60 years), P = 0.20 |
| | Retrospective Chinese cohort | Jiang et al. | 1789 PDAC, 156 EOPC | *P* = 0.697 | No significant differences in alcohol consumption were noted between patients diagnosed with PDAC at younger ages |
| | Retrospective Japanese cohort | Eguchi et al. | 36145 PDAC, 526 EOPC | *P* = 0.623 (frequency) *P* = 0.8530 (quantity) | No differences between EOPC and non-EOPC (≤40 years versus ≥40 years) |

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| CategorY Risk | Type of study | Authors | Number of patients | Measure of association | Comment |
|---|---|---|---|---|---|
| Environmental and lifestyle risk factors in PDAC | | | | | |
| **Cigarette smoking** | United States case-control study | Rulyak et al. | 251 individuals of 28 families | HR 3.7,95% CI 1.8-7.6 | Smokers developed PDAC **10 years younger** than nonsmokers |
| | Retrospective Chinese cohort | Huang et al. | 331 PDAC | *P = 0.026* | Mean PDAC diagnosis age of 59.0 years for smokers compared with 61.5 years for nonsmokers |
| | Retrospective Chinese cohort | Jiang et al. | 1789 PDAC, 156 EOPC | *P = 0.024* | Higher proportions of ever smokers among younger PDAC patients (≤45 years versus >45 years) |
| | Retrospective US cohort | Salem et al. | 1789 PDAC, 156 EOPC | *P = 0.03* | Higher proportions of ever smokers among younger PDAC patients (≤50 years versus ≥70 years) |
| | Retrospective Japanese cohort | Eguchi et al. | 36145 PDAC, 526 EOPC | *P = 0.293* | No difference in smoking exposure between EOPC and non-EOPC |
| | Retrospective Romanian cohort | Bunduc et al. | 148 PDAC | *P = 0.06* | No different proportion of ever smokers among younger PDAC patients (≤45 years versus ≥45 years) |
| | Retrospective Japanese cohort | Ohmoto et al. | 908 PDAC, 17 >40 years old | *P = 0.475* | No difference in smoking exposure between EOPC and non-EOPC |
| | United States case-control study | McWilliams et al. | 1954 PDAC and 3278 control | *P = 0.20* | No interaction between smoking and age |

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| Category Risk | Type of study | Authors | Number of patients | Measure of Association | Comment |
|---|---|---|---|---|---|
| **Pancreatitis** | Retrospective United States cohort | Dzeletovic et al. | 2573 PDAC | *P* = 0.005 | Patients with a pancreatitis history were younger at diagnosis than those without (63 years vs 65 years) |
| | Pooled analysis of 10 case-control studies | Duell et al. | 4674 PDAC, 10 703 controls with history of pancreatitis | *P* = 0.006 | **Patients < 65 years** were more likely to have a history of pancreatitis than older patients |
| | Cohort study | Augustine et al. | 98 PDAC, 82 tropical pancreatitis | *P* = 0.0035 | Patients with **tropical pancreatitis** were diagnosed at a significantly **younger age (47.5 years)** compared with those with PDAC alone |
| | Retrospective Romanian cohort | Bunduc et al. | 148 PDAC | *P* = 0.59 | No significant differences in chronic pancreatitis frequency between younger age (≤45 years) and older age (>45 years) patients |
| | Retrospective Japanese cohort | Eguchi et al. | 36145 PDAC, 526 EOPC | *P* = 0.600 | No differences between those diagnosed before 40 years of age and those aged ≥40 years |
| | United States case-control study | McWilliams et al. | 1954 PDAC and 3278 controls | HR 2.66, 95% CI 0.19-37.9 | No significant correlation with diagnoses before age 45 years after adjustments |

The increasing burden of early-onset pancreatic and biliary tract cancers: a review of risk factors . A. Boilève et al. ESMO Gastrointestinal Oncology . 2025

| Category Risk | Type of study | Authors | Number of patients | Measure of Association | Comment |
|---|---|---|---|---|---|
| Environmental and lifestyle risk factors in PDAC | | | | | |
| Diabetes | Retrospective United States cohort | Gupta et al. | 149 PDAC and 36 482 controls with diabetes | *P = 0.07* | **No** trend in rate ratio between increasing age and rate of PDAC in case of diabetes |
| | Prospective Italian cohort | Dugnani et al. | 296 PDAC | *P = 0.8* | No different mean age at diagnosis in case of diabetes |
| | United States case-control study | McWilliams et al. | 1954 PDAC and 3278 control | HR 0.85, 95% CI 0.25-2.93 | No interaction between diabetes and age at diagnosis |
| Obesity | United States case-control study | Li et al. | 841 PDAC and 754 controls | *P < 0.001* | **Younger age at diagnosis in case of obesity at age 20-49 years** (56 years vs 63 years, p = 0.003) |
| | United States case-control study | McWilliams et al. | 1954 PDAC and 3278 control | *P = 0.52* | No interaction of obesity with age at PDAC onset (<45 years VS<60 years |
| Physical activity | European case-control study | Noor et al. | 88 PDAC and 3970 controls | HR 4.0, 95% CI 1.1-14.3 | Physical inactivity before the age of 60 years was associated with a significantly increased risk of PDAC compared with active individuals |

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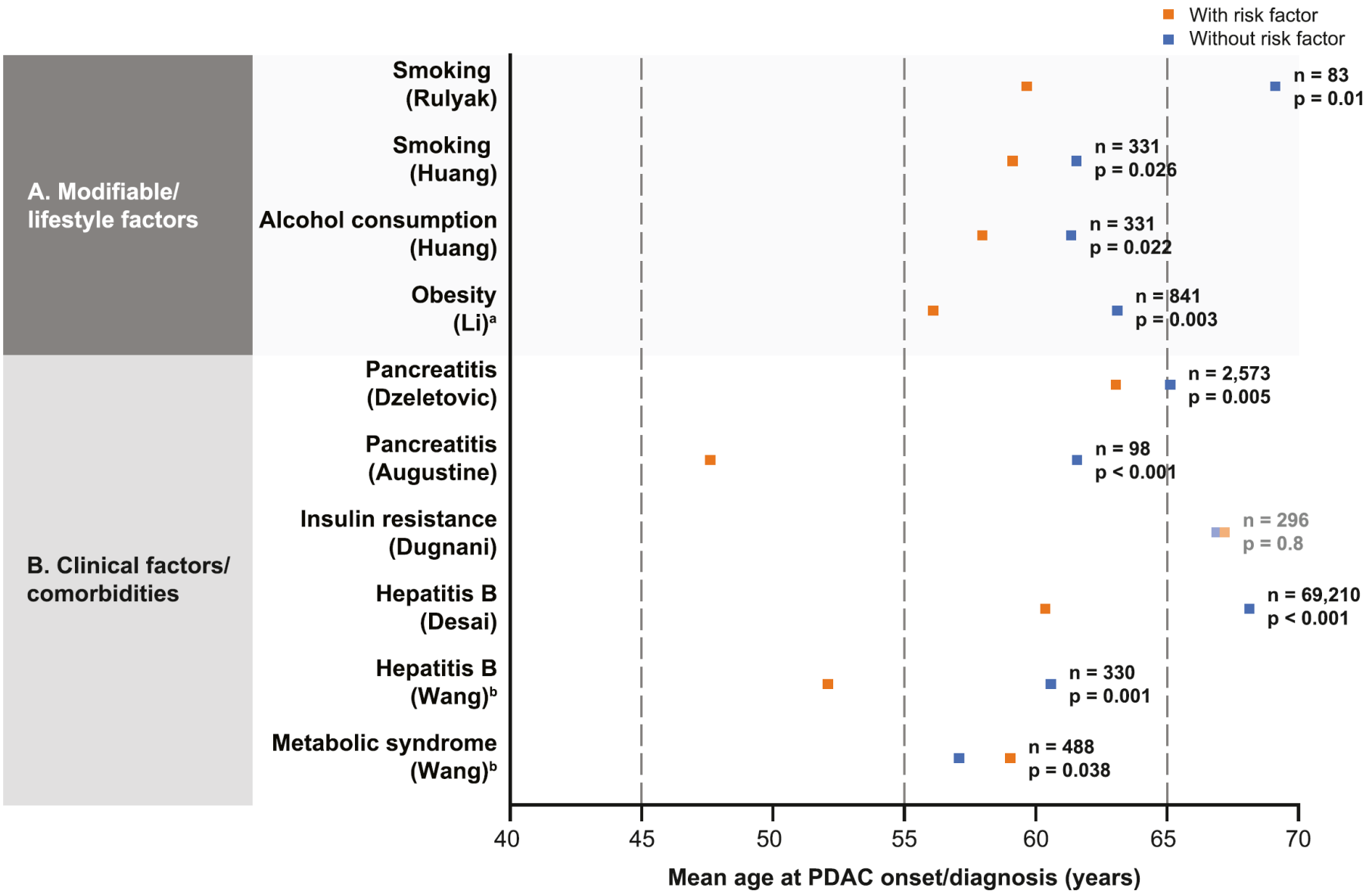
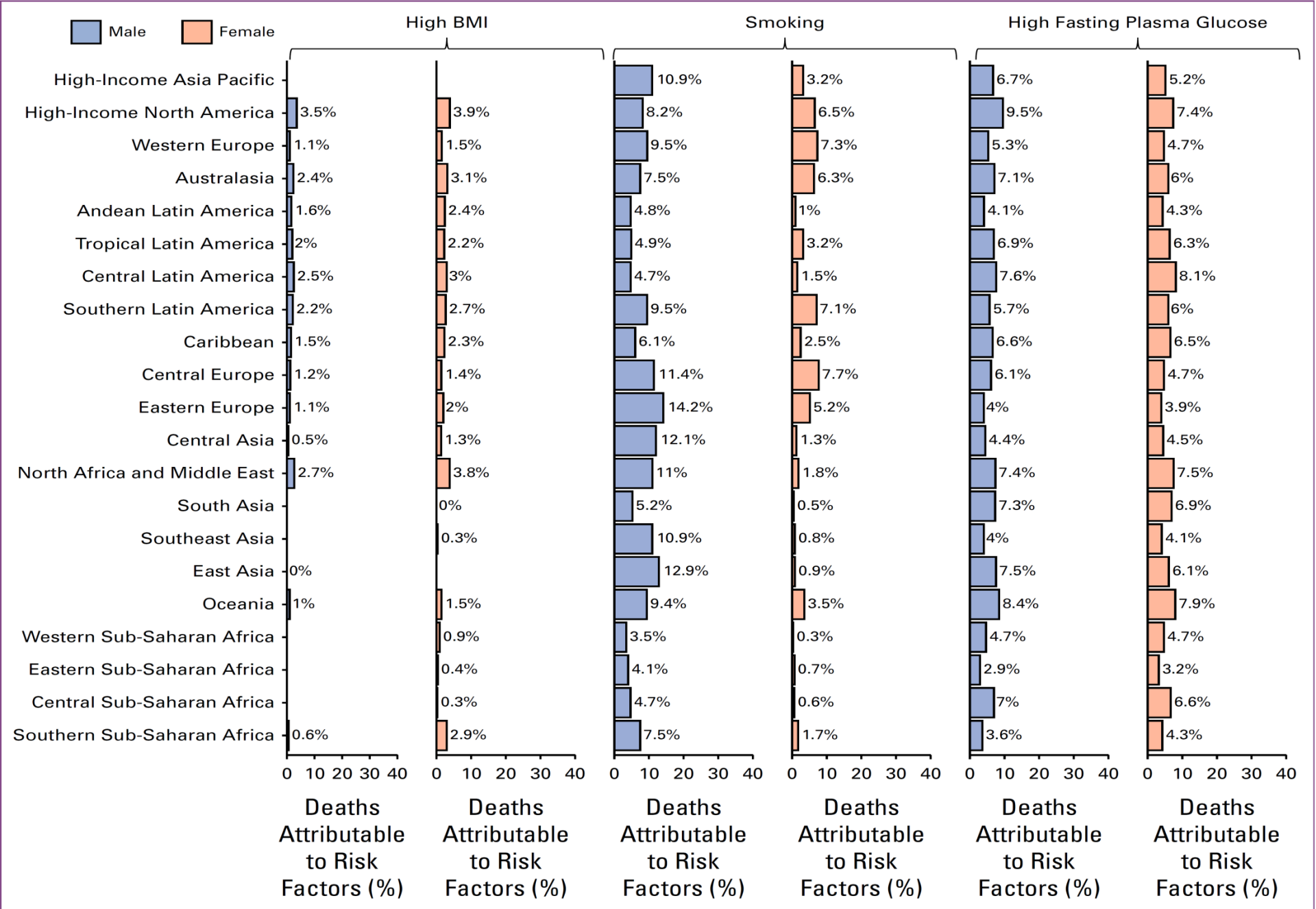



**Fig. 2.** Mean age at PDAC onset/diagnosis in patients with and without specific modifiable/lifestyle factors (A) and clinical factors/comorbidities (B). Statistically significant data in bold. [a]Obesity at 20–29 years of age vs never overweight/obese. [b]Median age. PDAC, pancreatic adenocarcinoma.




Current and Future Global Burden of Early-Onset Pancreatic Cancer: A Population-Based Study . Diniz da Conceição et al. Gastrointestinal Cancer.2025

# EOPAC comparison to AOPAC

**Table 1** Patient demographics, risk factors and tumor characteristics for all study participants, EOPAC compared to average onset PAC

| | EOPAC ($n=84$) | Average onset PAC($n=328$) | *P* |
|---|---|---|---|
| Age (mean, SD)y. | 43.6 ± 6.6 | 64.7 ± 8.2 | |
| **Sex** | | | |
| Male | 51 (60.7%) | 204 (62.2%) | |
| Female | 33 (39.3%) | 124 (37.8%) | 0.803 |
| **Performance status at presentation.** | | | |
| ECOG PS ≤1 | 70 (83.3%) | 202 (61.5%) | |
| ECOG PS >1 | 14 (16.7%) | 126 (38.6%) | 0.001 |
| **BMI mean ± SD** | 23.6 ± 5.1 | 23.2 ± 4.9 | 0.247 |
| **Comorbidity** | | | |
| Yes | 27 (32.1%) | 168 (51.2%) | 0.01 |
| No | 27 (32.1%) | 62 (18.9%) | |
| Missing | 30 (35.8%) | 98 (29.8%) | |
| **Type of comorbidity** | | | |
| Diabetes. | 20 (23.8%) | 135 (41.1%) | 0.83 |
| Hypertension. | 6 (7.1%) | 29 (34.5%) | |
| Cardiac disease. | 1 (1.1%) | 4 (1.2%) | |
| **Family history of malignancy.** | | | |
| No family history of cancer. | 64 (76.19%) | 257 (78.3%) | 0.81 |
| 1st degree relative with PAC. | 1 (1.2%) | 5 (1.5%) | |
| 1st degree relative with any type of cancer. | 9 (10.7%) | 28 (8.5%) | |
| Missing. | 10 (11.9%) | 38 (11.5%). | |
| **Weight and BMI** | | | |
| Weight mean ± SD | 66.2 ± 14.7 | 62.1 ± 14.1 | 0.021 |
| Height mean ± SD | 167.5 ± 8.7 | 163.8 ± 9.3 | 0.001 |
| BMI mean ± SD | 23.6 ± 5.1 | 23.2 ± 4.9 | 0.247 |
| **BMI classification** | | | |
| Underweight | 18 (21.4%) | 80 (24.3%) | |
| Normal | 39 (46.4%) | 157 (47.8%) | |
| Overweight | 27 (32.2%) | 91 (27.7%) | 0.821 |
| **Smoking** | | | |
| Yes | 27 (32.1%) | 91(27.7%) | |
| No | 57 (67.9%) | 237 (72.3%) | 0.780 |
| **Alcohol intake** | | | |
| No | 24 (28.5%) | 75 (22.8%) | |
| Missing | 60 (71.5%) | 253 (77.2%) | 0.87 |
| **Duration of symptoms before diagnosis (months)** Median (range) | 2 (0.5–12) | 1 (0.3–12) | 0.030 |
| **Presenting symptoms.** | | | |
| Jaundice | 31 (36.9%) | 110 (33.6%) | 0.67 |
| Weight loss | 8 (9.5%) | 17 (5.2%) | |
| Abdominal pain | 39 (46.5%) | 164 (50%) | |
| Missing | 6 (7.1%) | 37 (11.2%) | |

**Table 2** Tumor stage and pathological characteristics in EOPAC compared to AOPAC

| | EOPAC ($n=84$) | AOPAC ($n=328$) | *p* |
|---|---|---|---|
| **Stage at diagnosis.** | | | 0.003 |
| Localized (resectable). | 20 (23.8%) | 47 (14.4%) | |
| Locally advanced/borderline resectable. | 24 (28.6%) | 58 (17.7%) | |
| Metastatic | 38(45.2%) | 210 (64%) | |
| Missing. | 2(2.4%) | 13 (3.9%) | |
| **CA19-9 (Median-range)** | 135.5 (0.3-145851) | 248 (0.4-600000) | 0.120 |
| **Tumor site.** | | | 0.803 |
| Head | 53 (63%) | 208(63.4%) | |
| Body | 12 (14.8%) | 67 (20.4%) | |
| Tail | 8 (9.3%) | 35 (10.7%) | |
| Non specified. | 11(13%) | 18 (5.4%) | |
| **Tumour size (cm)** | | | |
| Median (range) | 4.2 (1.4–13) | 4.2 (0.7–19) | 0.699 |
| **Histopathological subtype.** | | | |
| Adenocarcinoma | 58 (69% | 280(85.3%) | |
| Others (tubular, papillary and acinar). | 19 (22.6%) | 26 (7.9%) | 0.001 |
| unknown | 7 (8.3%) | 22 (6.7%) | |
| **Grade.** | | | 0.233 |
| Well differentiated | 5 (5.9%) | 18(5.4%) | |
| Moderate differentiated | 47 (55.9%) | 188 (57.4%) | |
| Poorly differentiated | 11 (13.1%) | 57 (17.4%) | |
| Not reported | 21(25%) | 65(19.8%) | |
| **Neuroendocrine differentiation.** | | | 0.269 |
| Yes | 4 (4.7%) | 8 (2.4%) | |
| No | 71 (84.6%) | 292 (89%) | |
| Missing | 9 (10.7%) | 28 (8.5%) | |

Early Onset Pancreatic Adenocarcinoma (EOPAC): presentation, clinical course and treatment outcomes in comparison to Average Onset Pancreatic Adenocarcinoma (AOPAC): a retrospective cohort study. Rashad *et al. BMC Cancer* (2024) 24:1289

**Table 3** Therapeutic interventions for pancreatic cancer according to age group and stage at diagnos

| | EOPAC ($n=84$) | AOPAC ($n=328$) | $p$ |
|---|---|---|---|
| **Treatment for patients presenting with localized resectable disease** ($n=67$). | | | |
| **Upfront surgery** | | | 0.17 |
| Yes | 19 (95%) | 41(89.3%) | |
| No | 0 - | 6 (10.7%) | |
| unknown | 1 (5%) | 0 | |
| **Adjuvant chemotherapy.** | | | 0.573 |
| Yes. | 11 (55%) | 24 (51%) | |
| No. | 4(20%) | 7 (14.9%) | |
| Missing | 5(25%) | 16 (34.1%) | |
| **Number of cycles** | | | |
| Median (range) | 6 (1–8) | 6 (1–6) | 0.9 |
| ***Treatment for patients with locally advanced and borderline resectable disease at diagnosis*** ($n=82$). | | | |
| **Preoperative treatment.** | | | 0.257 |
| Neoadjuvant chemotherapy. | 24 (100%) | 48 (82.7%) | |
| Pre-operative CCRTH | 0 | 4 (6.8%) | |
| BSC | 0 | 6 (10.2%) | |
| **Type of neoadjuvant chemotherapy** | | | 0.57 |
| Gemcitabine single agent. | 11 (45.8%) | 26 (54.1%) | |
| FOLFIRINOX | 9 (37.5%) | 12 (25%) | |
| Gemcitabine/cisplatin. | 4(16.75) | 7 (14.5%) | |
| unknown | - | 3 (6.45%) | |
| **Conversion to resectability.** | 4 (19%) | 2 (5.3%) | 0.112 |
| **Treatment for patients with metastatic disease.** | | | |
| **First line systemic therapy for mets disease** ($n=273$). | | | |
| Chemotherapy. | 43 (84.3%) | 183 (82.4%) | |
| BSC | 1 (2%) | 13 (5.8%) | 0.001 |
| Missing | 7 (13.7%) | 26 (11.7%) | |
| Median duration of treatment (in months). | 3 (1–11) | 3 (1–7) | 0.278 |
| **Types of chemotherapy used in first line treatment.** | | | |
| Gemcitabine. | 5 (11.6%) | 122(62.2%) | <0.001 |
| Gem/cisplatin | 11(25.6%) | 18(9.25) | |
| Gem/cap | 2 (4.7%) | 7 (3.6%) | |
| FOLFIRINOX | 15 (34.9%) | 14(7.1%) | |
| GEMOX | 2(4.7%) | 4(2%) | |
| BSC | 1(2.35) | 13(6.6%) | |
| **Second line systemic therapy for mets disease** ($n=99$). | | | ----- |
| Chemotherapy. | 16 (66.6%) | 55 (73.4%) | |
| BSC | 1 (4.2%) | 10 (13.3%) | |
| Missing | 7 (29.2%) | 10 (13.3%) | |
| **Third line systemic therapy for mets disease** ($n=32$). | | | |
| Chemotherapy | 3 (27.3%) | 8 (38.1%) | ---- |
| BSC | 7 (63.6%) | 6 (28.6%) | |
| Missing | 1 (9.1%) | 7 (33.3%) | |

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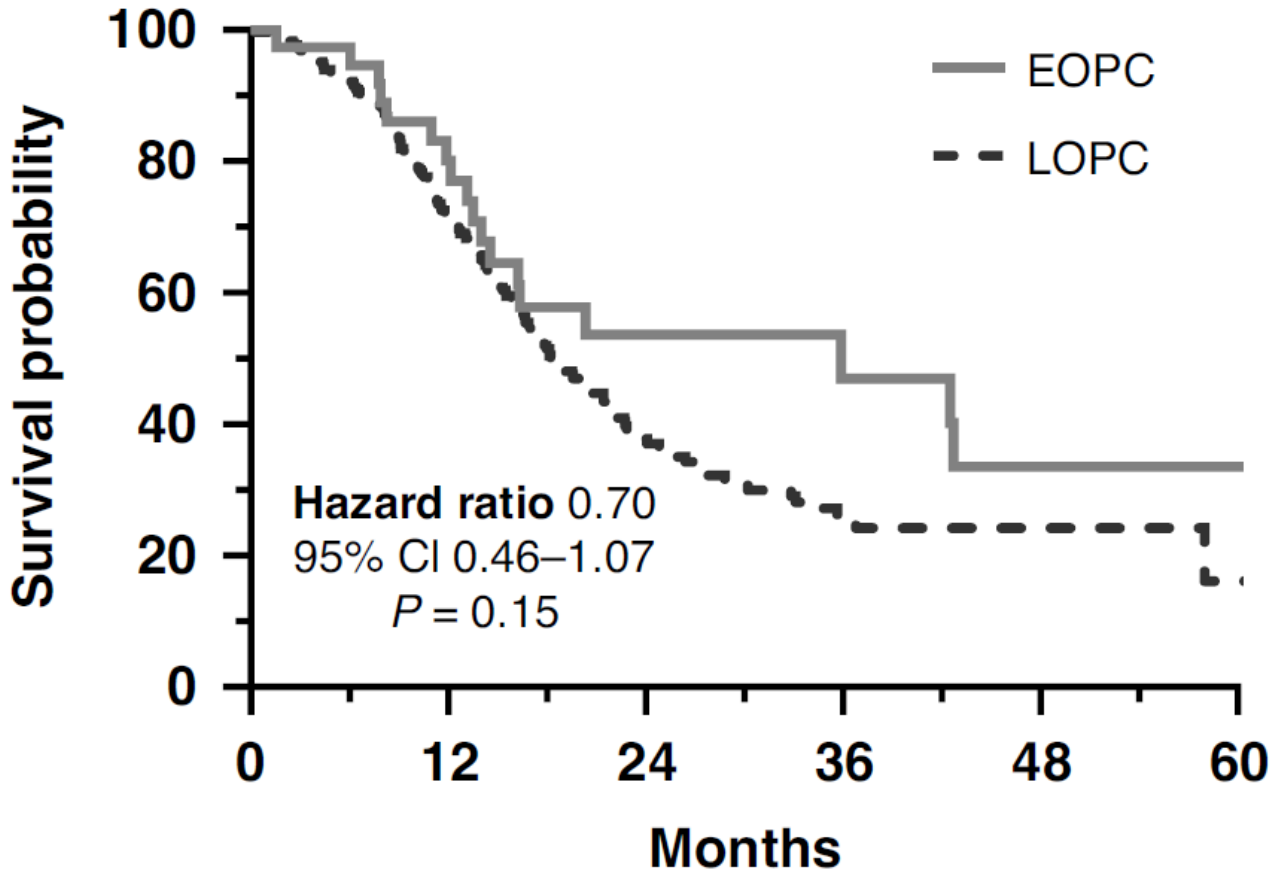
# EOPC & treatment Outcomes

a

## Recurrence-free survival in resected patients



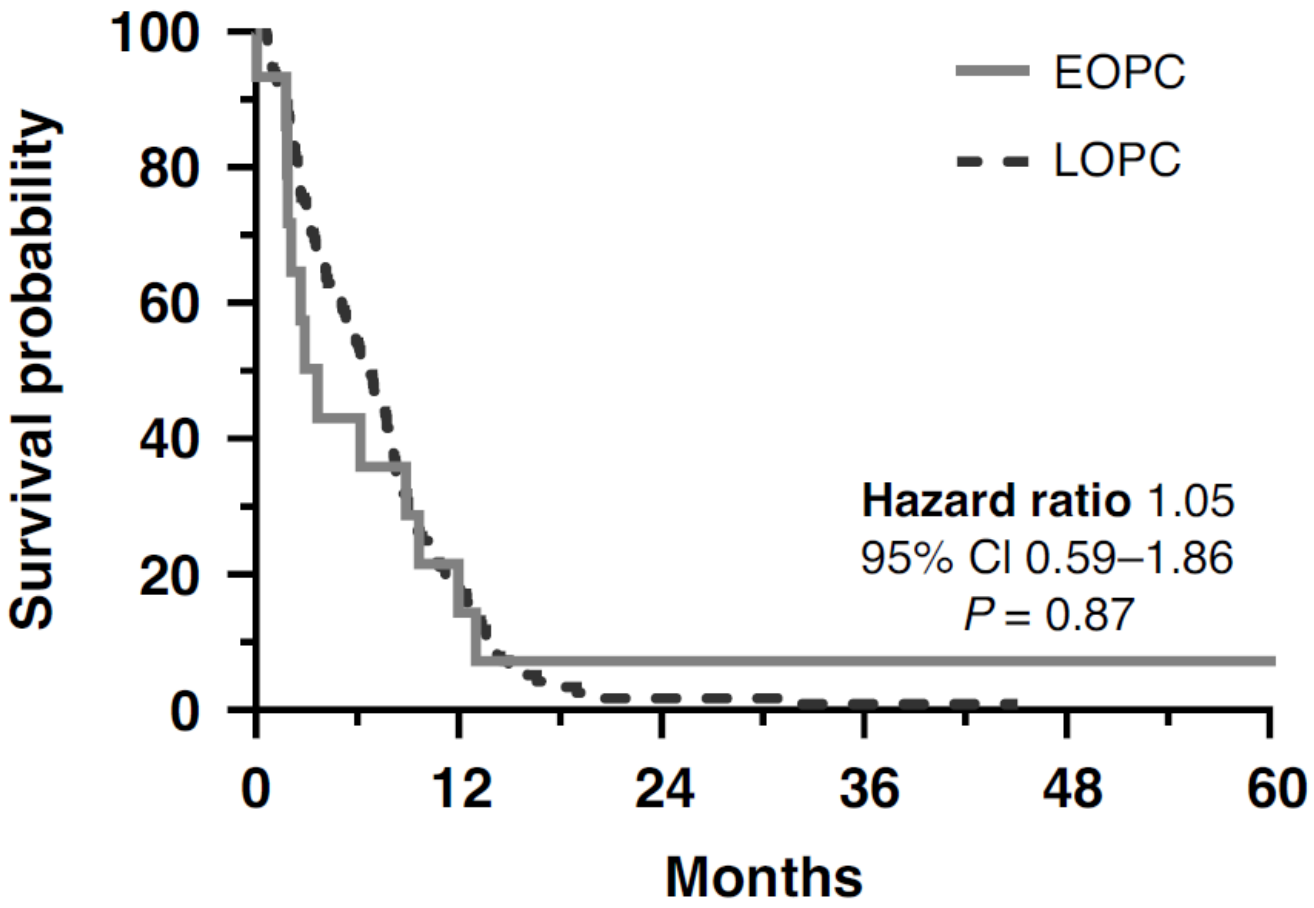

Number at risk

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 39 | 27 | 12 | 8 | 5 | 2 |
| ***LOPC*** | 364 | 206 | 56 | 26 | 12 | 3 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

b

## Progression-free survival in locally advanced patients



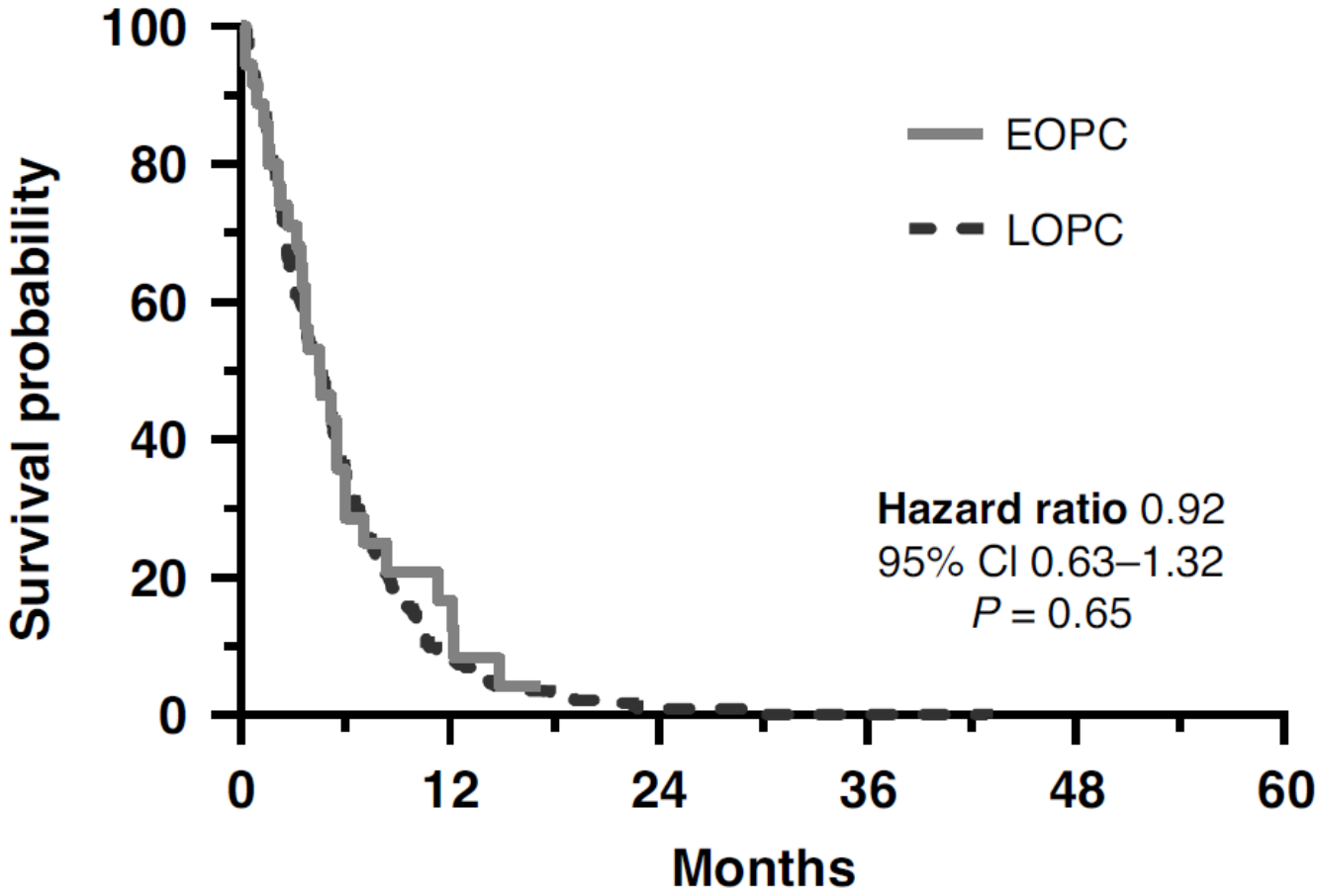

Number at risk

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 15 | 3 | 2 | 2 | 2 | 2 |
| ***LOPC*** | 192 | 28 | 3 | 2 | 0 | 0 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

c

## Progression-free survival in metastatic patients



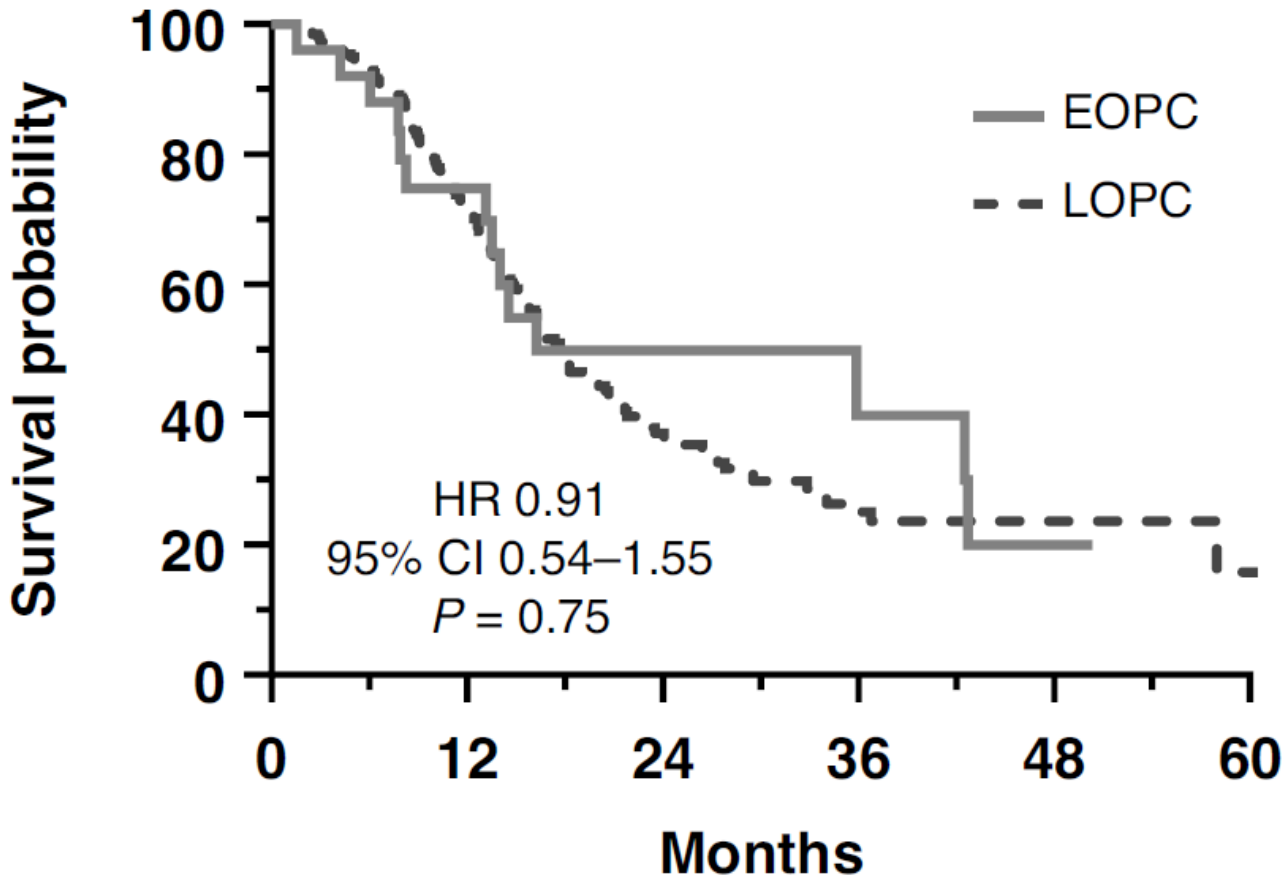

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 36 | 5 | 0 | 0 | 0 | 0 |
| ***LOPC*** | 359 | 25 | 5 | 2 | 0 | 0 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

**a**

## Recurrence-free survival in patients with head of pancreas tumours



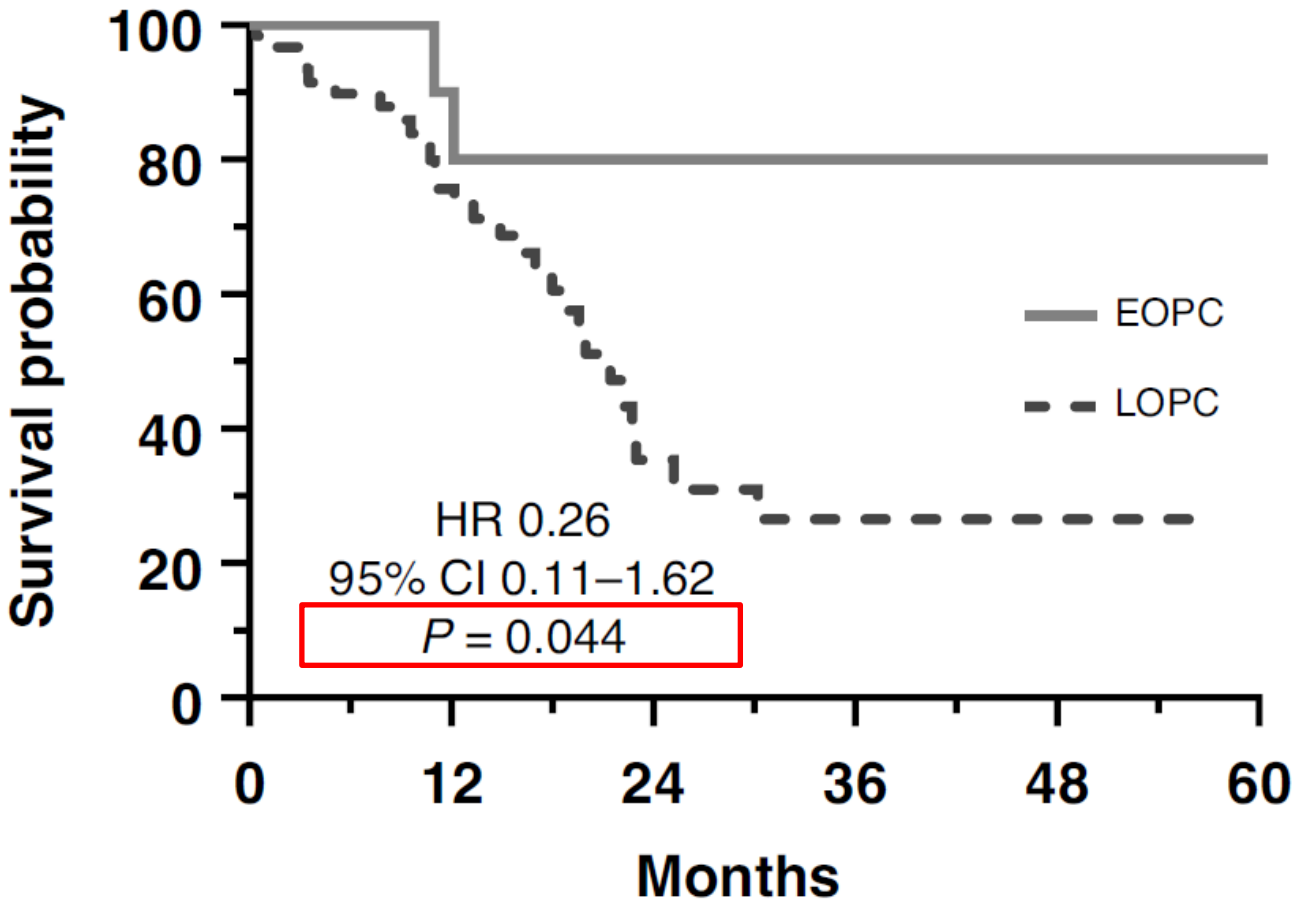

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 26 | 16 | 8 | 5 | 2 | 1 |
| ***LOPC*** | 275 | 154 | 43 | 20 | 8 | 3 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

**b**

## Recurrence-free survival in patients with body and tail tumours



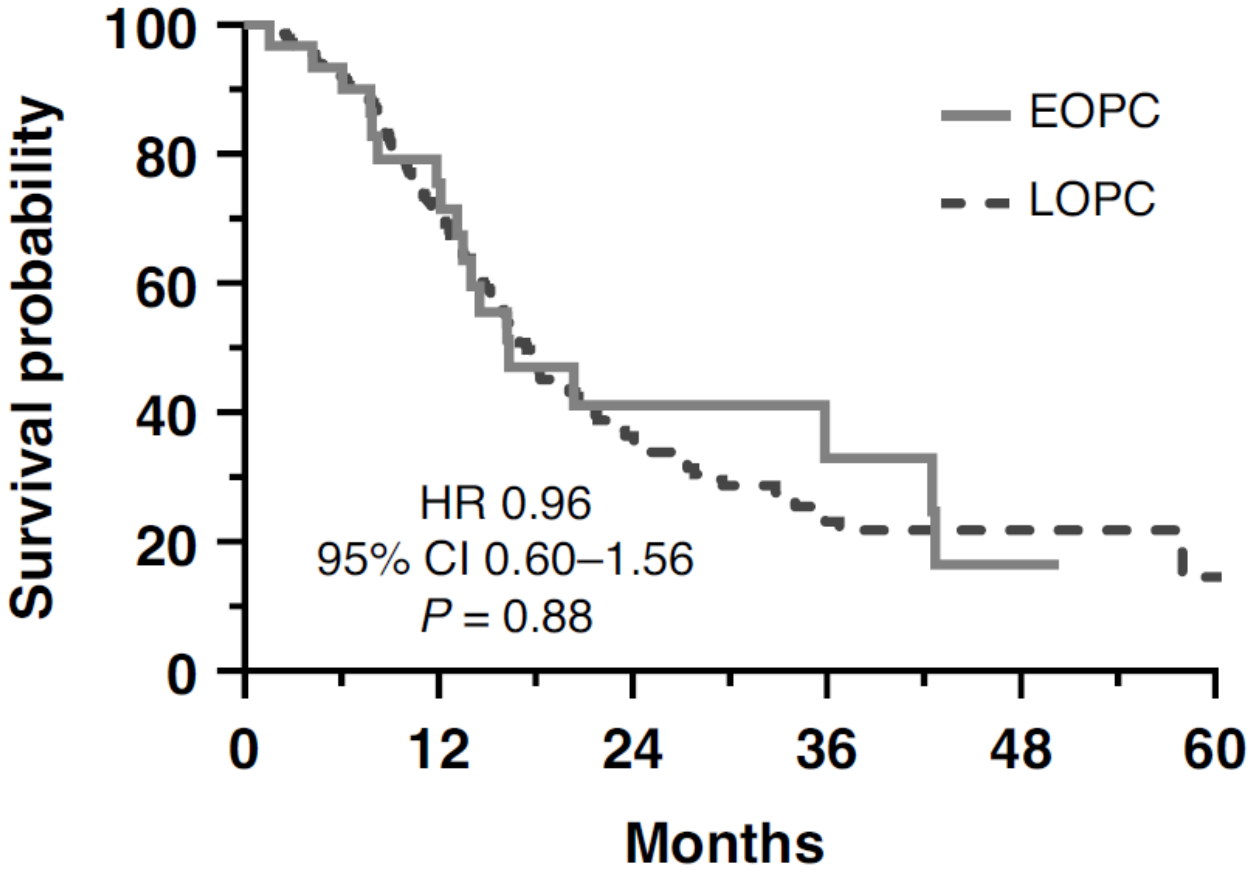

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 11 | 10 | 5 | 4 | 4 | 2 |
| ***LOPC*** | 60 | 36 | 9 | 5 | 4 | 1 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

**c**

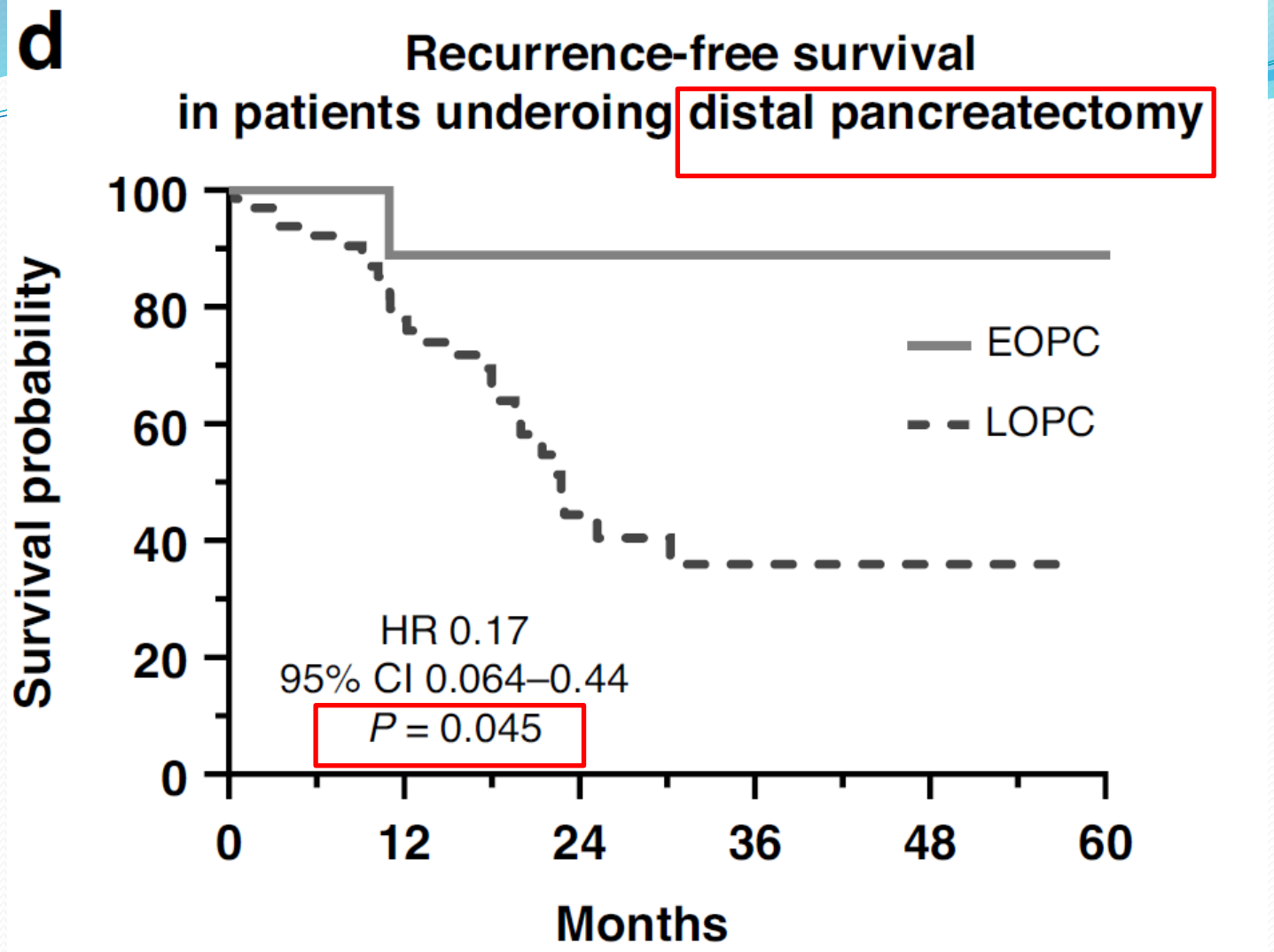
## Recurrence-free survival in patients undergoing whipples




Number at risk

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 31 | 20 | 8 | 5 | 2 | 1 |
| ***LOPC*** | 297 | 165 | 45 | 20 | 8 | 3 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)



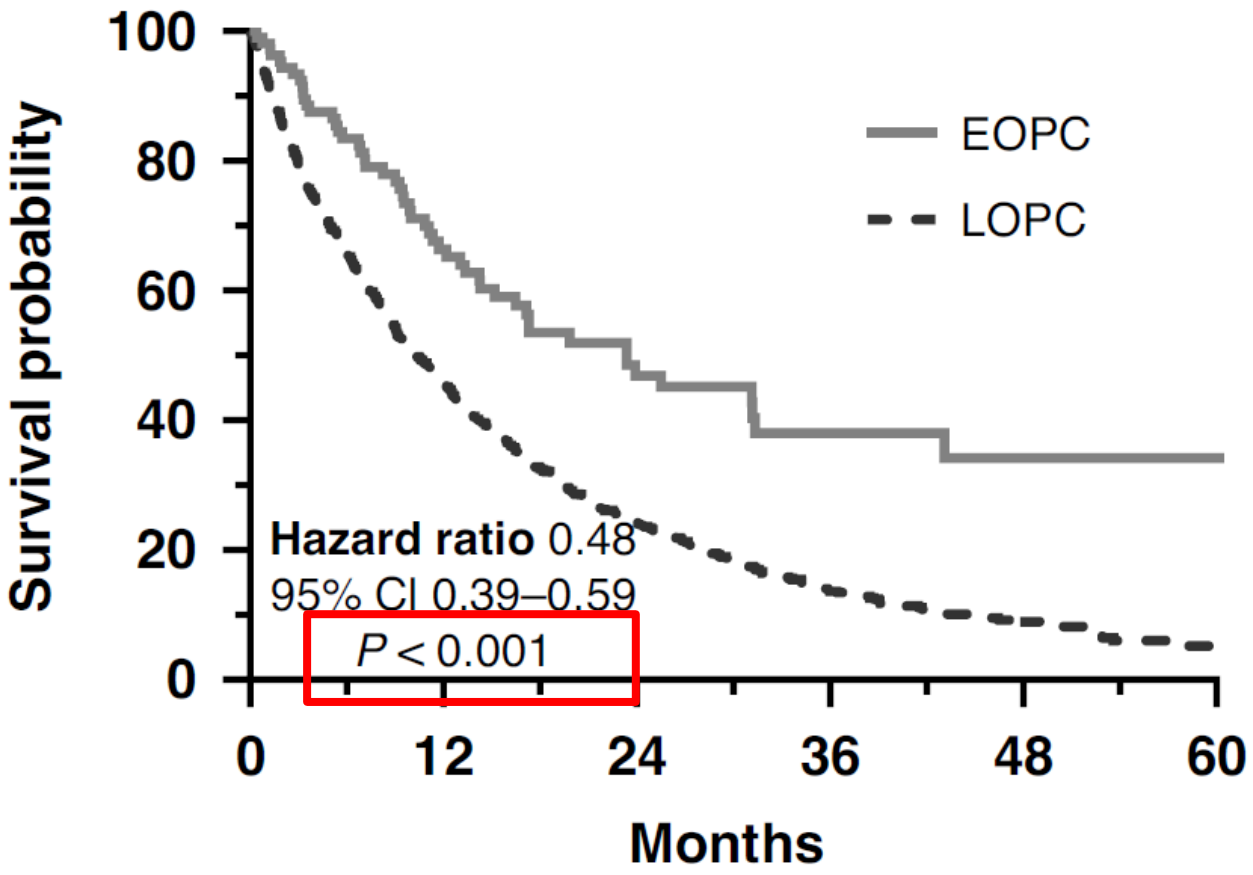

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 10 | 9 | 5 | 4 | 4 | 2 |
| ***LOPC*** | 67 | 42 | 12 | 7 | 5 | 1 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

a

## Overall survival in all patients



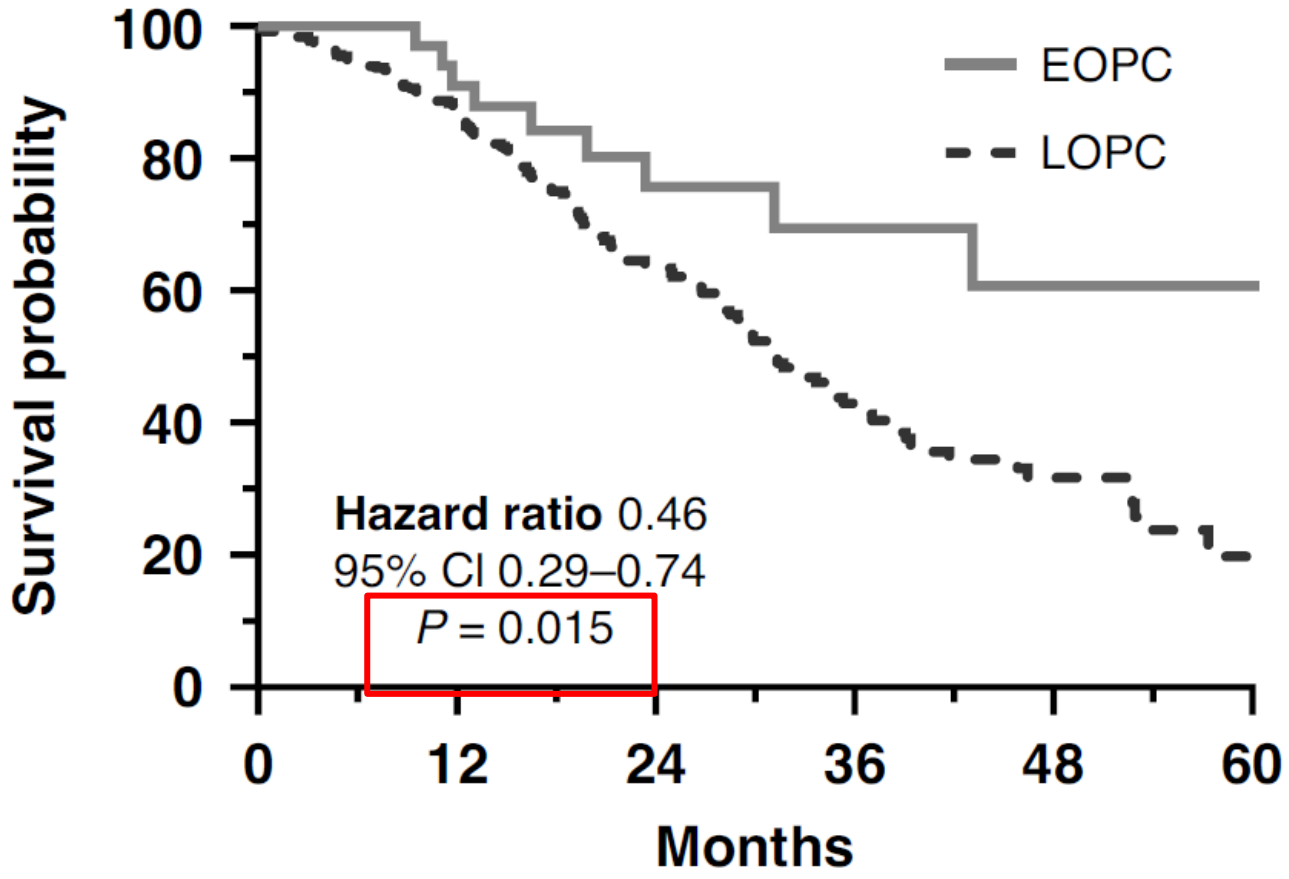

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 110 | 55 | 27 | 14 | 8 | 4 |
| ***LOPC*** | 1563 | 547 | 183 | 72 | 28 | 6 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

b

## Overall survival in resected patients



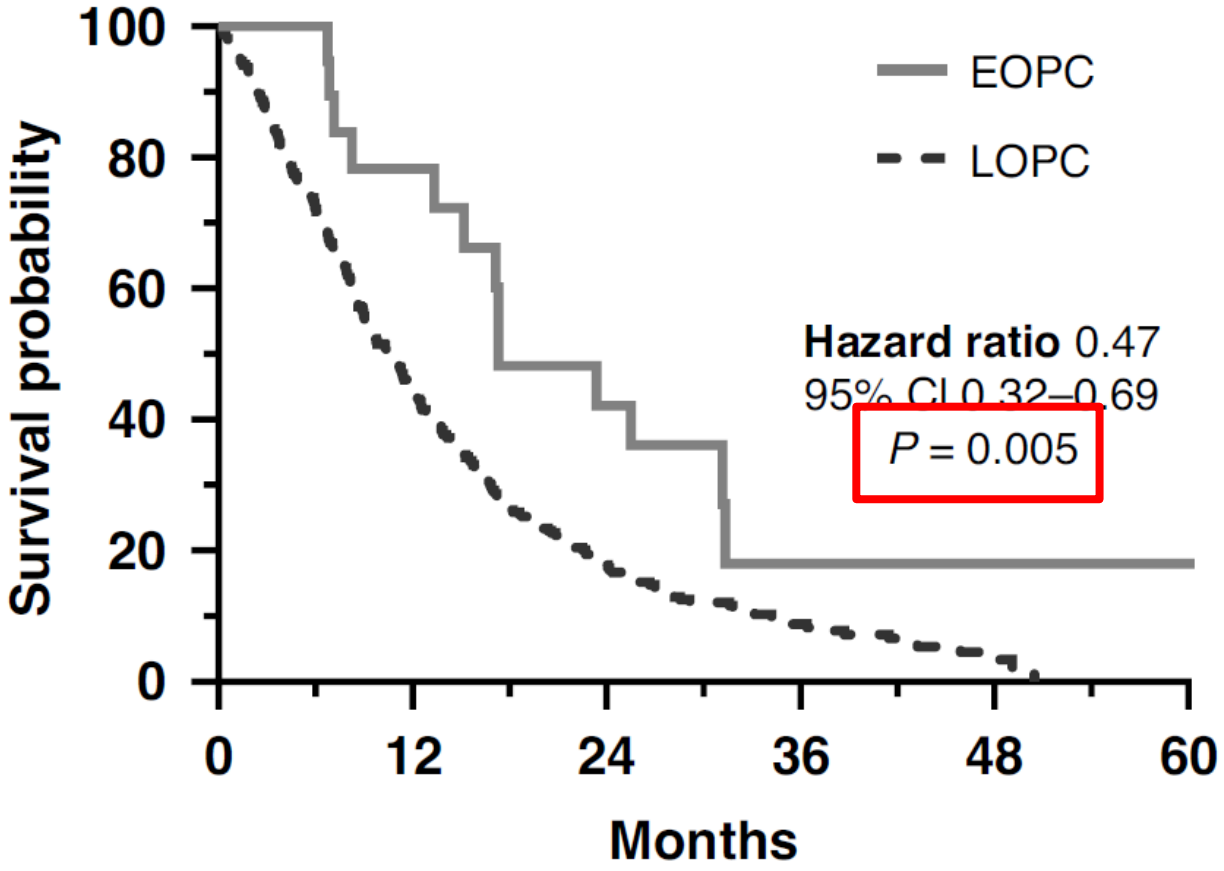

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 39 | 30 | 17 | 9 | 7 | 4 |
| ***LOPC*** | 364 | 260 | 108 | 51 | 23 | 6 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

c

## Overall survival in locally advanced patients



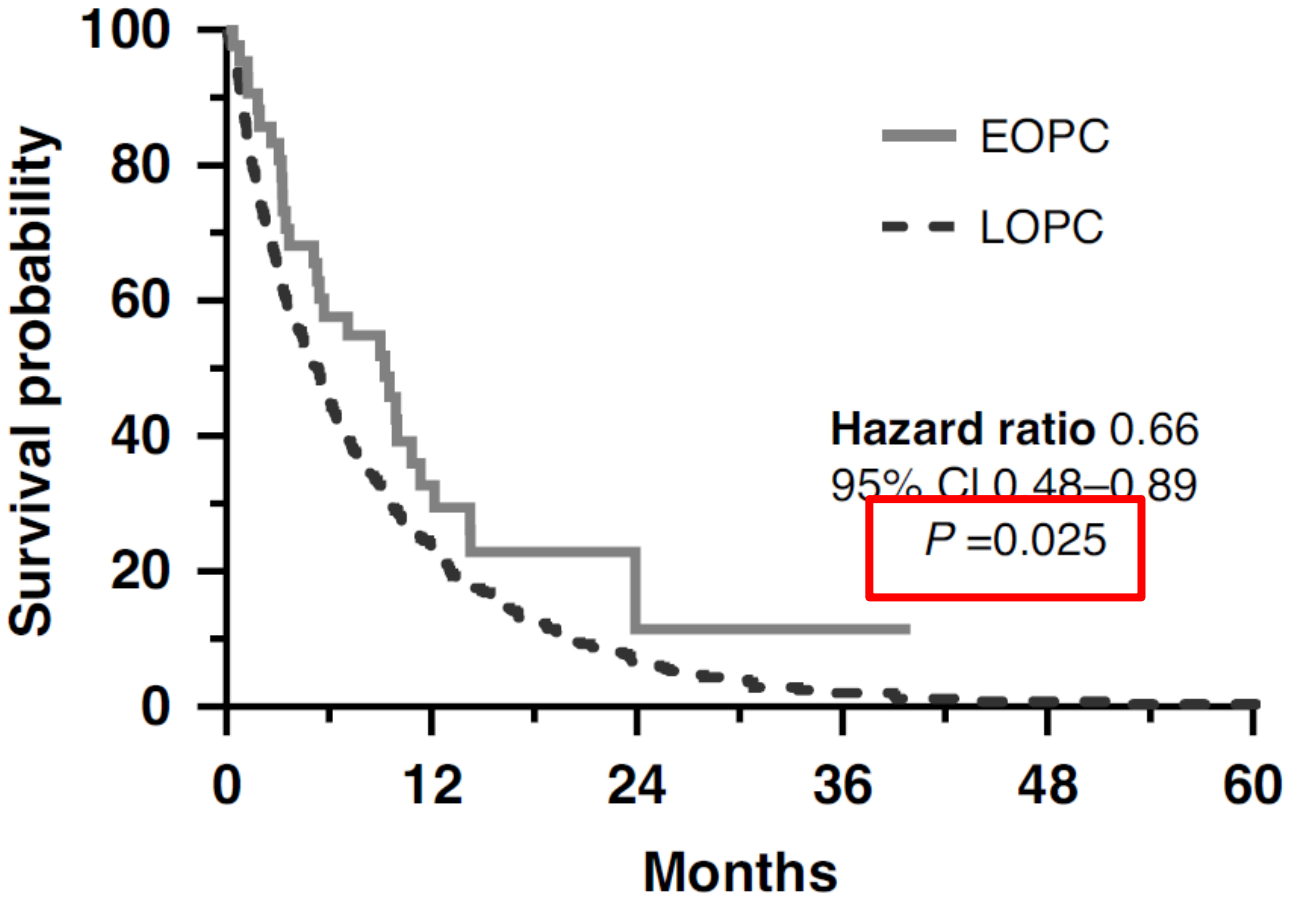

**Number at risk**

| *Months* | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 23 | 14 | 8 | 3 | 2 | 1 |
| ***LOPC*** | 478 | 163 | 52 | 18 | 4 | 0 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

d

## Overall survival in metastatic patients




**Number at risk**

| ***Months*** | *0* | *12* | *24* | *36* | *48* | *60* |
|---|---|---|---|---|---|---|
| ***EOPC*** | 45 | 11 | 2 | 2 | 0 | 0 |
| ***LOPC*** | 696 | 121 | 25 | 5 | 2 | 1 |

Early onset pancreatic cancer—exploring contemporary treatment and outcomes using real-world data. Shehara Mendis . British Journal of Cancer (2024)

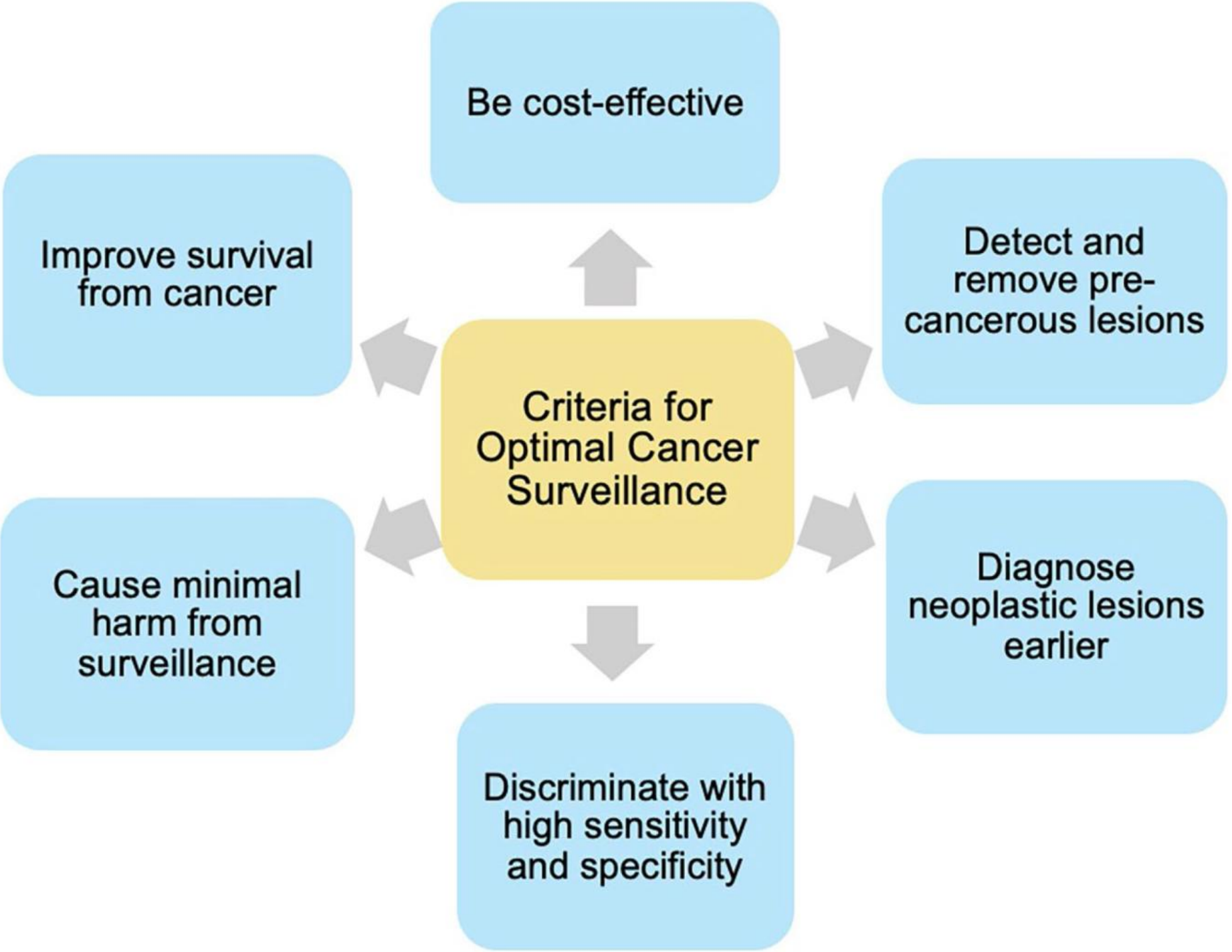
| Source | Country (study design) | stage | Study population | | Survival outcome, early-onset vs later-onset GI cancer |
|---|---|---|---|---|---|
| | | | EOPC | LOPC | |
| Mendis et al, 2024 | Australia, New Zealand, and Singapore (prospective database analysis) | ALL | 112 | 1571 | • Overall survival:median, 23.4 mo vs 10.3 mo<br>• Resected cancer group: median, 65.6 mo vs 31.3 mo<br>• Locally advanced unresectable group: median, 17.3 mo vs 10.6 mo<br>• Metastatic disease group: median, 9.3 mo vs 5.4 mo |
| Whitley et al, 2023 | Czech Republic (national registry analysis) | All | 1324 | 17 564 | Overall survival: median, 5.9 mo vs 4.5 mo ($P$ < .01) |
| Castet et al, 2023 | Spain (retrospective cohort study) | All | Aged ≤50 y: 139 | Aged ≥70 y: 197 | Overall survival: median, 18.7 mo vs 17.6 mo |
| Takeda et al, 2022 | Japan (single-institution retrospective analysis) | All | 127 | 1519 | Progression-free survival: median, 4.4 mo vs 5.3 mo ($P$ = .65)<br>Overall survival: median, 11.5 mo vs 9.5 mo ($P$ = .18) |
| Saadat et al, 2021 | US (National Cancer Database analysis) | All | 15710 | 232924 | 1-Year overall survival: stage 0/I/II, 72% vs 53%; stage III, 48% vs 38%; stage IV, 25% vs 15% |

Early-Onset Gastrointestinal Cancers: A Review. JAMA.2025

Oncologic outcomes in EOPC patients are satisfactory even in locally advanced cancers, justifying aggressive surgical approaches

# Prevention is Better than Treat

# Screening


Be cost-effective
Improve survival from cancer
Detect and remove pre-cancerous lesions
Criteria for Optimal Cancer Surveillance
Cause minimal harm from surveillance
Diagnose neoplastic lesions earlier
Discriminate with high sensitivity and specificity

# Surveillance : EUS vs MRI

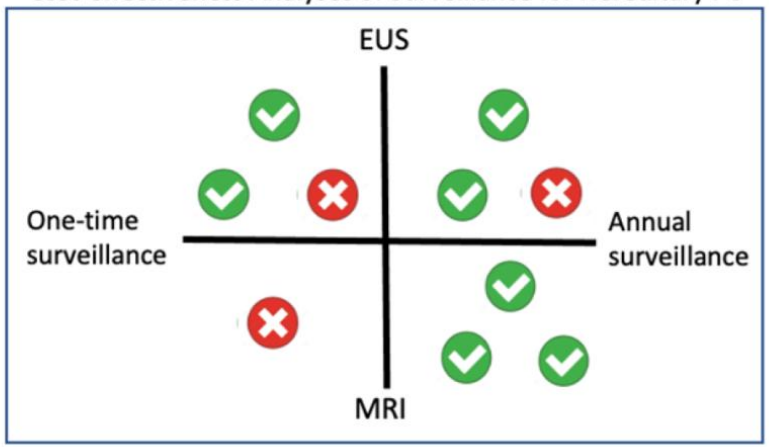
**Review of the cost-effectiveness of surveillance for hereditary pancreatic cancer**

**Question**

What surveillance intervals, age range, and surveillance modalities are cost-effective for pancreatic cancer (PC) surveillance?

**Review**

Cost-effectiveness Analyses of Surveillance for Hereditary PC




**Future Directions**

Evaluate cost-effectiveness of varying the surveillance interval and modality based on PC risk. Directly compare cost-effectiveness of EUS vs. MRI.

**Research highlight**: Most studies found that MRI and EUS could be cost-effective for both index and annual surveillance between ages 40-75, though the risk thresholds for cost-effectiveness were often higher than the risk reported for moderate PC risk groups (e.g. *BRCA1*, *BRCA2*, *ATM*, *PALB2,* Lynch syndrome). Surveillance costs and PC risk influenced the level of cost-effectiveness.

# Recommendations

**PC screening using**

- MRI
- EUS

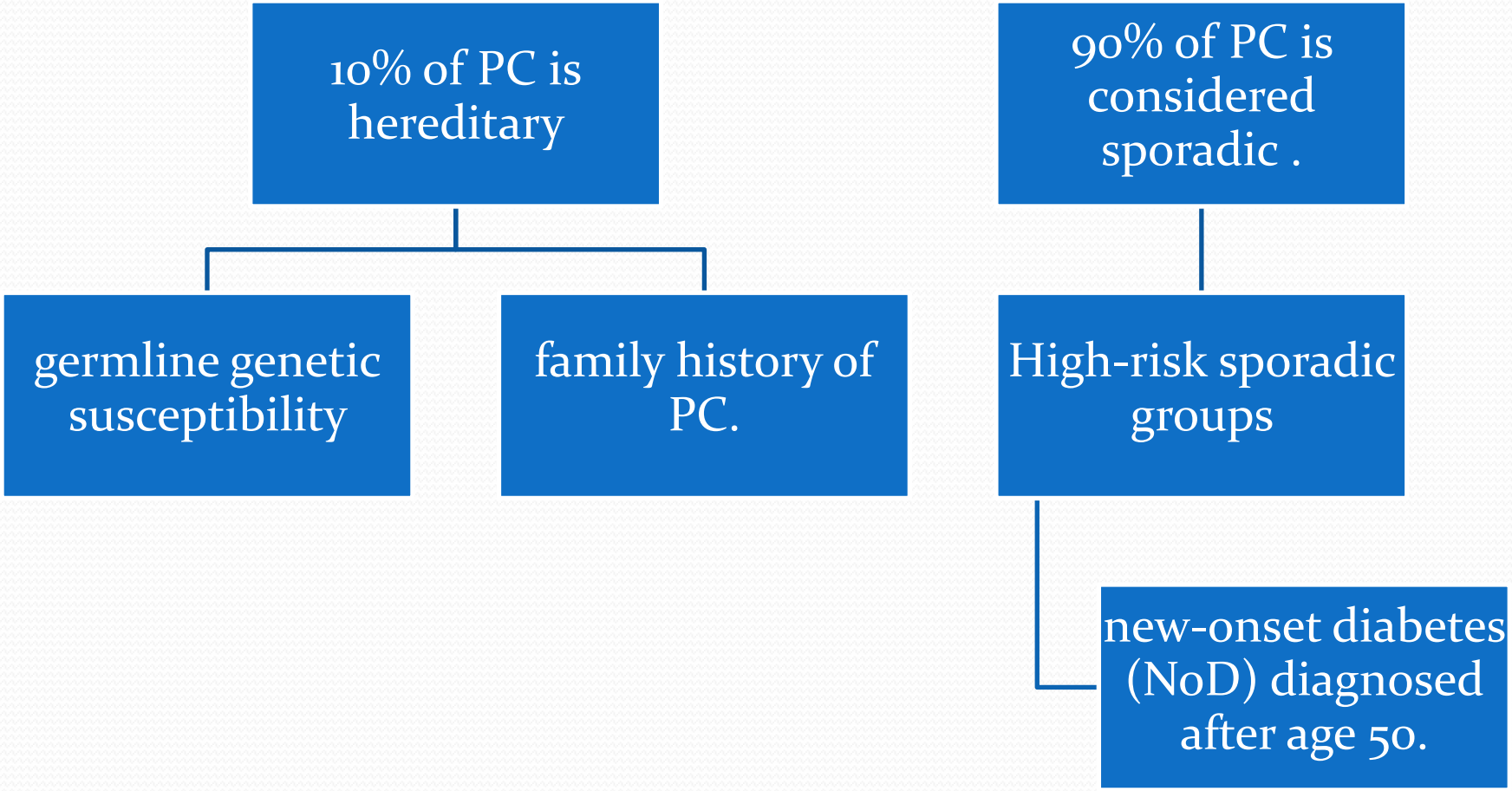
**only for high-risk individuals**

- Inherited genetic syndromes
- Familial pancreatic cancer

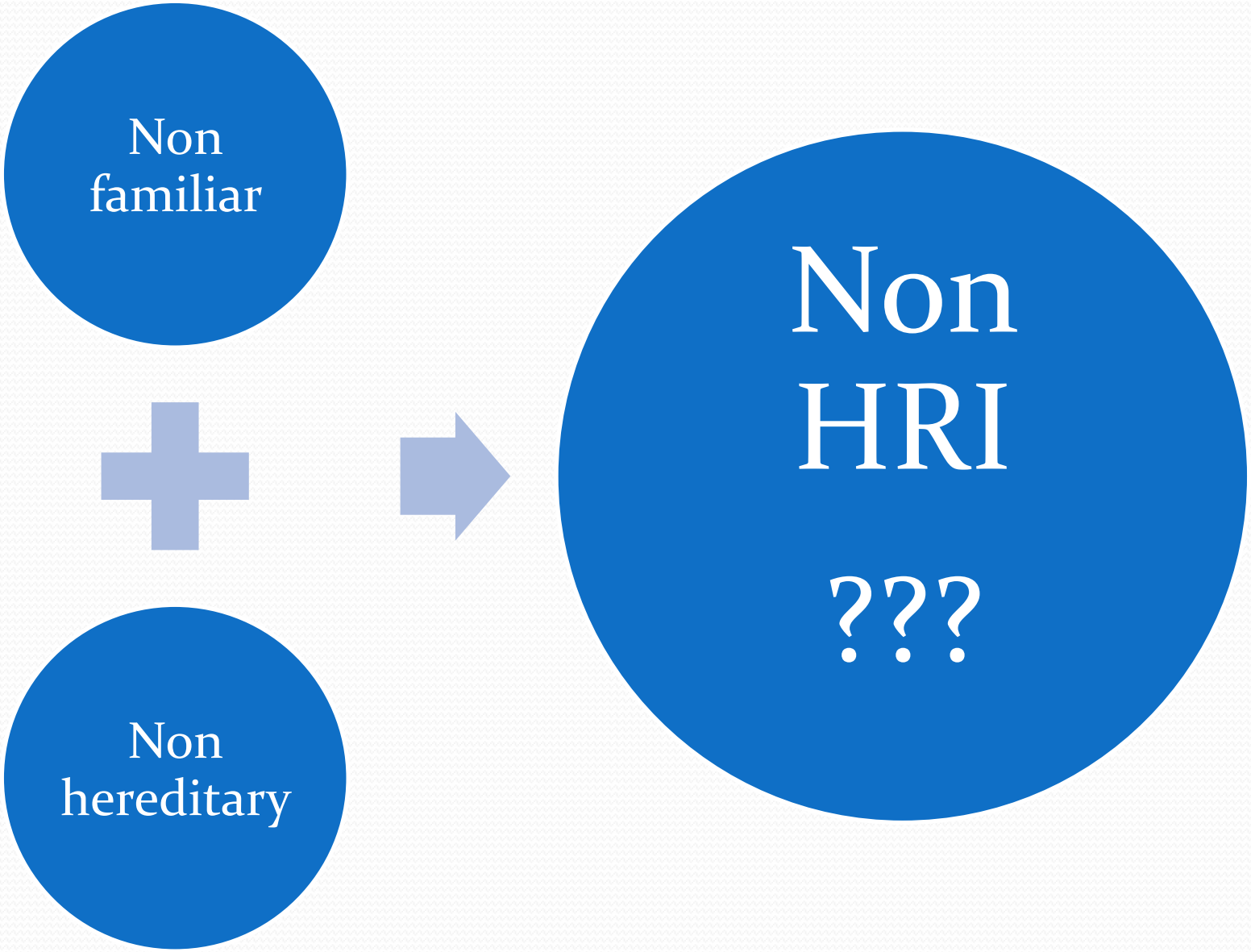
**Starting age varies by risk factors**

- age 50 years or 10 years younger than the initial age of familial onset
- Age 40 years in *CKDN2A* and *PRSS1* gene variant carriers with hereditary pancreatitis
- Age 35 years with Peutz-Jeghers syndrome

Early-Onset Gastrointestinal Cancers: A Review. JAMA.2025




Early-Onset Gastrointestinal Cancers: A Review. JAMA.2025


Non familiar
Non hereditary
Non HRI
???

# Take home massages

**EOPC** < 50 years

↑EAPC, ASIRs , ASDRs, per 100 000 population.

↑ASIR+ASDR in high &high middle SDI

↑Change in ASIR+ASDR per 100 000 person-years ( 1990-2021 ) % in low SDI

Risk Fators : somking , alcohol, pancreatitis

EOPC more aggressive but better outcomes than LOPC (better PS & lower comorbidity & more aggressive treatment )

Screening only in HRI using MRI or EUS


شكراً لاصغائكم