

The Effect Of Depression on Diagnosis, Treatment, and Survival in Pancreatic Cancer

Casey B. Duncan, Jaime Benarroch,
Kristin M. Sheffield, Yimei Han,
Yong-Fang Kuo, Taylor S. Riall

Department of Surgery
The University of Texas Medical Branch, Galveston, Texas
CERCIT Meeting
April 20, 2012

The logo for utmb Health, featuring the text "utmb" in white lowercase letters on a red rectangular background, followed by the word "Health" in black uppercase letters on a white rectangular background.

DEPRESSION AND PANCREATIC CANCER

INTRODUCTION

- Depression is commonly associated with poor outcomes and increased mortality in a variety of disease processes
- Associated with worse outcomes in patients with breast and colon cancer
- Patients with cancer have co-existing rates of depression ranging from 25-58%

DEPRESSION AND PANCREATIC CANCER

INTRODUCTION

- Depression is more common in pancreatic cancer patients than in those with other malignancies
- Symptoms of depression may overlap with those of cancer, making the diagnosis of depression unclear or delayed
- Patients with depression:
 - More likely to partake in high-risk behaviors
 - Have less social support
 - Less likely to adhere to screening guidelines or seek appropriate medical care

INTRODUCTION

- Pre-existing depression in cancer patients has been associated with:
 - Advanced or unstaged disease
 - Decreased likelihood of receiving definitive treatment
 - Poor survival
- No population-based studies of pre-existing depression and pancreatic cancer patients

DEPRESSION AND PANCREATIC CANCER

METHODS

- Surveillance, Epidemiology, and End Results (SEER) data and linked Medicare claims
- Patients age 67 years and 3 months and older diagnosed with adenocarcinoma of the pancreas between 1992-2005
- Depression:
 - 3-27 months prior to pancreatic cancer diagnosis
 - ICD-9 codes from Medicare claims: 296.2, 296.3, 296.5, 296.6, 296.7, 298.0, 301.10, 301.12, 301.13, 309.0, 309.1, 31

DEPRESSION AND PANCREATIC CANCER

METHODS

- Charlson comorbidity index
- Stage at diagnosis based on SEER historic staging (locoregional vs. distant)
- Physician visits (surgeon, medical oncologist)
- Curative-intent surgical resection with or without adjuvant chemoradiation for locoregional disease
- Chemotherapy for distant disease

METHODS

- Comparisons performed between groups:
 - Analyses stratified by stage
 - Chi-square tests used to compare categorical variables and t-tests used to compare continuous variables
 - Logistic regression model used to assess the odds of receiving definitive treatment between groups
 - A Kaplan-Meier time-to-event analysis was performed to examine unadjusted survival
 - Cox Proportional Hazards models used to determine the effect of depression on survival

DEPRESSION AND PANCREATIC CANCER

RESULTS: PATIENT DEMOGRAPHICS

Demographic	Depression (N=1,868)	No Depression (N=21,877)	P value
Age, mean \pm SD (yrs)	79.5 \pm 7.0	78.1 \pm 7.0	<0.0001
Female	1,351 (72.3%)	12,616 (57.7%)	<0.0001
White	1,608 (86.1%)	18,060 (82.6%)	<0.0001
Married	653 (36.2%)	10,499 (49.5%)	<0.0001
Comorbidities			<0.0001
0	6258 (33.6%)	11,459 (52.4%)	
1	546 (29.2%)	5,906 (27.0%)	
2	321 (17.2%)	2,620 (12.0%)	
≥ 3	373 (20.0%)	1,892 (8.6%)	

DEPRESSION AND PANCREATIC CANCER

RESULTS: TUMOR CHARACTERISTICS AND TREATMENT

Characteristic	Depression (N=1,868)	No Depression (N=21,877)	P value
Stage			0.00352
Locoregional	540 (28.89%)	7,027 (32.1%)	
Distant	1,328 (71.1%)	14,850 (67.9%)	
Locoregional Disease (N=7,567)			
Tumor Size, mean ± SD, cm	3.8 ± 1.8	4.0 ± 2.4	0.0788
Positive Lymph Nodes	58 (51.3%)	1,241 (56.0%)	0.1675
Surgery	81 (15.0%)	1,712 (24.4%)	<0.0001
Chemotherapy	152 (28.1%)	2,733 (38.9%)	<0.0001
Radiation	134 (24.8%)	2,531 (36.0%)	<0.0001
Visit with Surgeon	196 (36.3%)	3,407 (48.5%)	<0.0001
Visit with Medical Oncologist	240 (44.4%)	3,721 (53.0%)	<0.0001
Distant Disease (N=16,178)			
Chemotherapy	221 (16.6%)	4,150 (27.9%)	<0.0001
Visit with Medical Oncologist	501 (37.7%)	6,915 (46.6%)	<0.0001

DEPRESSION AND PANCREATIC CANCER

RESULTS: ODDS OF RECEIVING DEFINITIVE TREATMENT

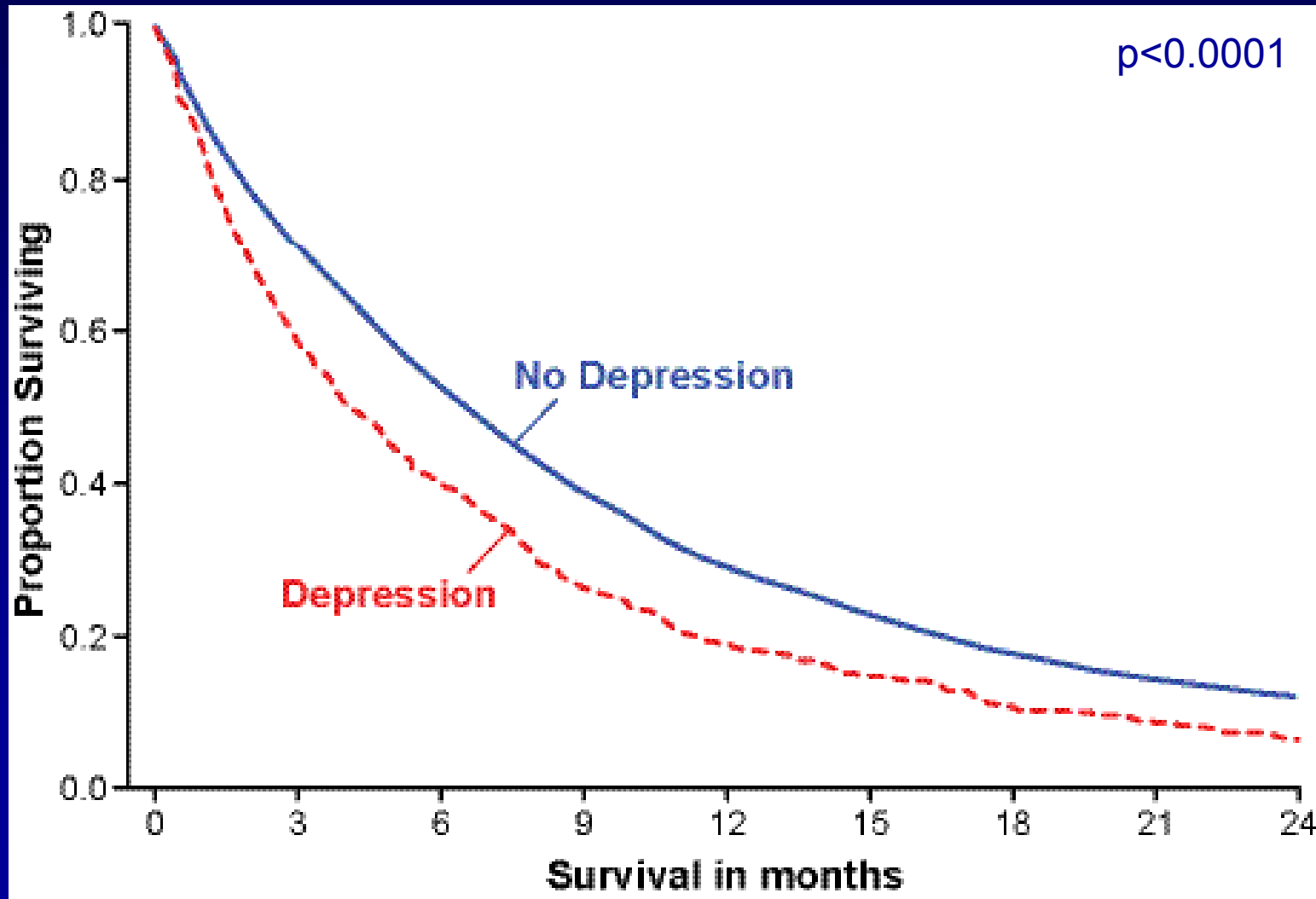
Characteristic (reference group)	Odds Ratio	95% CI
Locoregional (N=7,567)		
Depression	0.63	0.52, 0.76
Age (5 year increments)	0.91	0.90, 0.92
Black race (vs. white)	0.57	0.48, 0.69
Married (vs. single)	1.28	1.10, 1.49
Comorbidities (vs. 0)		
1	0.88	0.79, 0.99
2	0.69	0.56, 0.80
≥3	0.55	0.46, 0.66
Distant (N=16,178)		
Depression	0.79	0.70, 0.90
Age (5 year increments)	0.91	0.90, 0.91
Married (vs. single)	1.67	1.51, 1.86
Comorbidities (vs. 0)		
1	0.92	0.85, 1.00
2	0.82	0.74, 0.92
≥3	0.56	0.50, 0.63

*Model controls for age, gender, race, marital status, SEER region, and comorbidities

*Significant variables only included in table

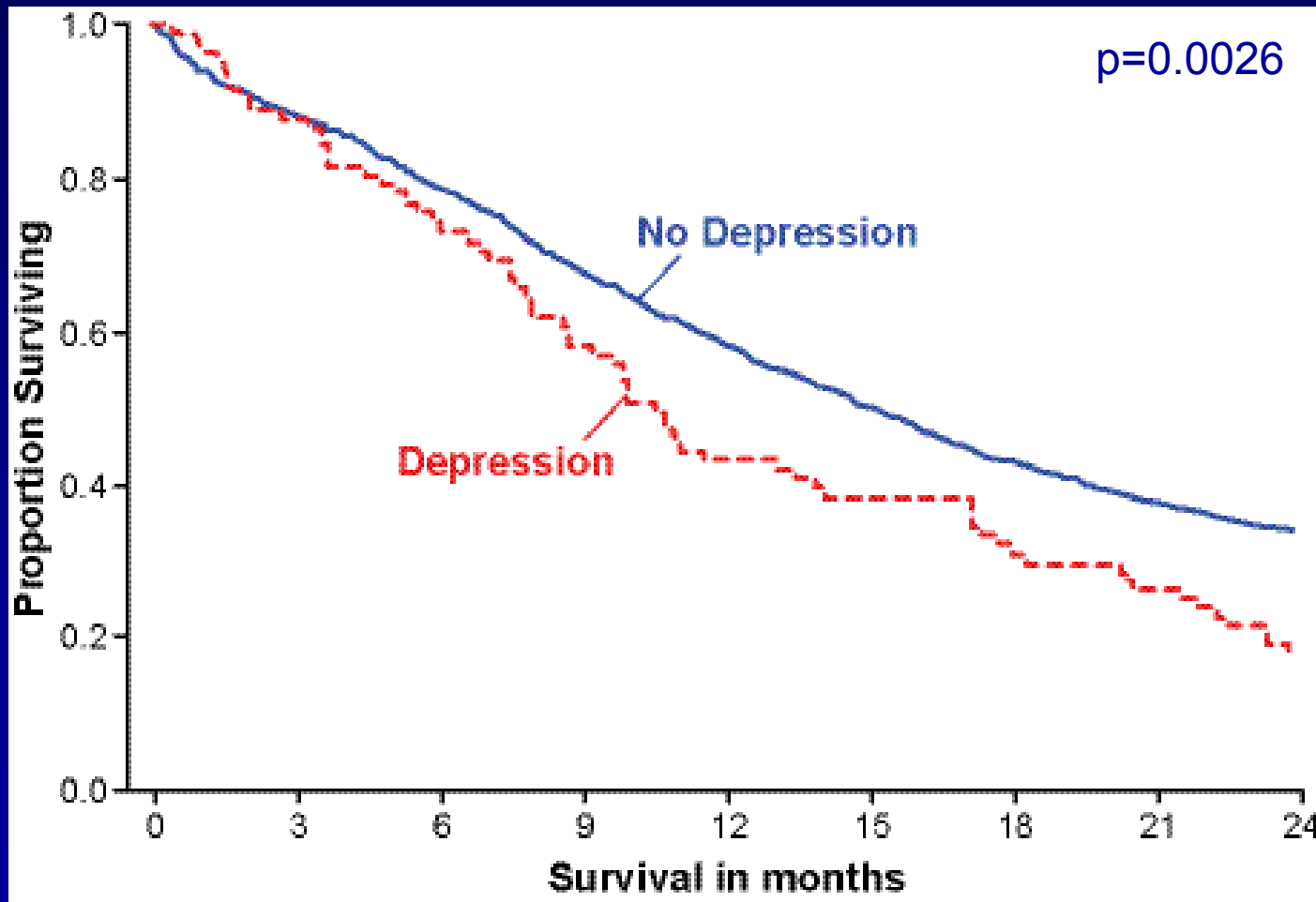
DEPRESSION AND PANCREATIC CANCER

RESULTS: UNADJUSTED SURVIVAL FOR LOCOREGIONAL PANCREATIC CANCER



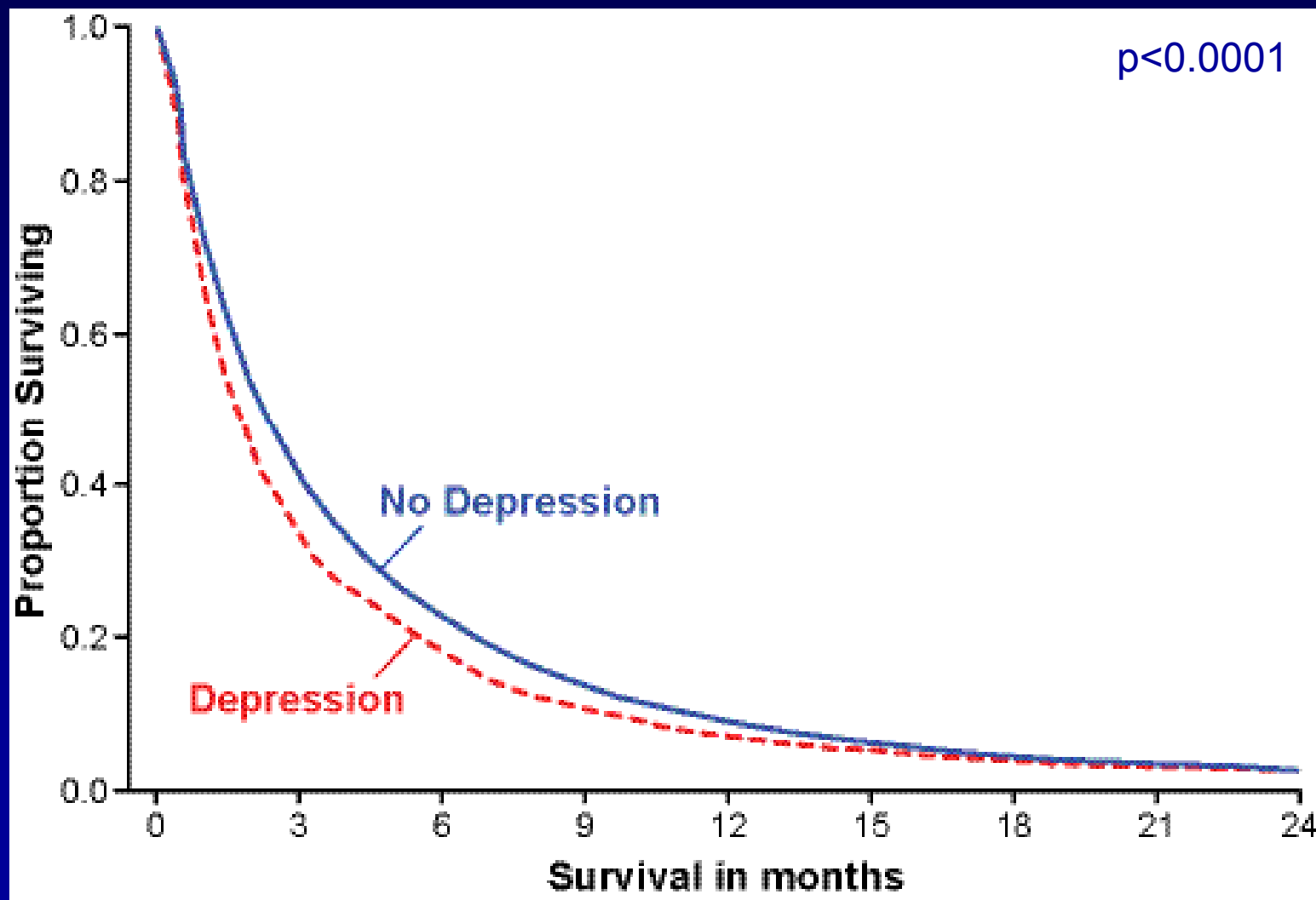
DEPRESSION AND PANCREATIC CANCER

RESULTS: UNADJUSTED SURVIVAL FOR
RESECTED LOCOREGIONAL
PANCREATIC CANCER



DEPRESSION AND PANCREATIC CANCER

RESULTS: UNADJUSTED SURVIVAL FOR DISTANT PANCREATIC CANCER



DEPRESSION AND PANCREATIC CANCER

RESULTS: MULTIVARIATE SURVIVAL ANALYSIS FOR LOCOREGIONAL PANCREATIC CANCER

Characteristic	Model 1		Model 2 (includes surgery)	
	Hazard Ratio	P value	Hazard Ratio	P value
Locoregional (N=7,567)				
Depression	1.20	1.09, 1.32	1.14	1.04, 1.26
Age (5 year increments)	1.04	1.04, 1.05	1.03	1.02, 1.03
Male	1.07	1.02, 1.13	1.06	1.01, 1.12
Black race	1.25	1.14, 1.36	1.13	1.03, 1.23
Married	0.84	0.78, 0.90	0.84	0.78, 0.91
Comorbidities				
1	1.00	0.94, 1.06	0.98	0.92, 1.04
2	1.25	1.15, 1.35	1.19	1.10, 1.29
≥3	1.54	1.41, 1.69	1.42	1.30, 1.55
Surgery			0.40	0.37, 0.43

*Model controls for age, gender, race, marital status, SEER region, and comorbidities

DEPRESSION AND PANCREATIC CANCER
**RESULTS: MULTIVARIATE SURVIVAL
 ANALYSIS FOR RESECTED
 LOCOREGIONAL PANCREATIC CANCER**

Characteristic	Model 1		Model 2 (includes chemotherapy)	
	Hazard Ratio	P value	Hazard Ratio	P value
Locoregional + Surgery (N=1,793)				
Depression	1.34	1.04, 1.73	1.32	1.02, 1.70
Age (5 year increments)	1.02	1.00, 1.03	1.00	0.99, 1.02
Male	1.22	1.07, 1.38	1.22	1.07, 1.39
Black race	1.45	1.13, 1.87	1.35	1.05, 1.73
Married	1.00	0.83, 1.20	1.06	0.88, 1.27
Comorbidities				
1	0.96	0.83, 1.13	0.93	0.81, 1.07
2	1.25	1.03, 1.52	1.19	0.98, 1.45
≥3	1.66	1.27, 2.18	1.45	1.11, 1.91
Tumor Size	1.01	1.00, 1.01	1.01	1.00, 1.01
Lymph Node Status	1.62	1.43, 1.83	1.76	1.55, 2.00
Adjuvant Chemotherapy			0.60	0.52, 0.68

*Model controls for age, gender, race, marital status, SEER region, and comorbidities

DEPRESSION AND PANCREATIC CANCER
**RESULTS: MULTIVARIATE SURVIVAL
 ANALYSIS FOR
 DISTANT PANCREATIC CANCER**

Characteristic	Model 1		Model 2 (includes chemotherapy)	
	Hazard Ratio	P value	Hazard Ratio	P value
Distant (N=16,178)				
Depression	1.08	1.01, 1.14	1.03	0.97, 1.09
Age (5 year increments)	1.02	1.02, 1.02	1.00	1.00, 1.00
Male	1.11	1.07, 1.15	1.11	1.07, 1.15
Black race	1.01	0.95, 1.07	0.97	0.92, 1.03
Married	0.86	0.82, 0.91	0.95	0.90, 0.99
Comorbidities				
1	1.07	1.03, 1.11	1.07	1.03, 1.11
2	1.18	1.12, 1.24	1.14	1.09, 1.20
≥3	1.41	1.33, 1.49	1.30	1.23, 1.37
Chemotherapy			0.49	0.47, 0.51

*Model controls for age, gender, race, marital status, SEER region, and comorbidities

LIMITATIONS

- Under-recognition and undercoding of depression in cancer patients
 - Not a priority for physicians treating cancer patients
 - Not captured in claims data
- “Cause and effect” timeline of depression and pancreatic cancer unclear
- Selection bias
 - Treatment of patients
 - Severely depressed patients identified in claims data

DEPRESSION AND PANCREATIC CANCER

SUMMARY

- Patients with depression and pancreatic cancer:
 - More likely to present with distant or unknown stage disease
 - Less likely to see a surgeon or medical oncologist
 - Less likely to receive definitive treatment for their pancreatic cancer

SUMMARY

- Patients with depression and pancreatic cancer:
 - Have worse survival compared to patients without depression
 - Decreased survival in patients with pre-existing depression is partially mediated by failure to receive definitive therapy

CONCLUSION

- Identification and treatment of depression in cancer patients is not a priority
- Improved screening and recognition of depression can increase treatment rates and survival in patients with pancreatic cancer

THANK YOU!

Jaime Benarroch, M.D., M.S.

Kristin M. Sheffield, Ph.D.

Yimei Han, M.S.

Yong-Fang Kuo, Ph.D.

Kimberly M. Brown, M.D.

Taylor S. Riall, M.D., Ph.D.



DEPRESSION AND PANCREATIC CANCER

QUESTIONS

- 6.5% of patients without a prior diagnosis of depression subsequently had a code for depression after pancreatic cancer diagnosis
- Sheibani-Rad et al.
 - 254 patients with pancreatic cancer
 - Single-institution study
 - No difference in survival between depression groups