Supplementary Table 1. Baseline clinical characteristics of pancreatic cancer patients
in the training cohort of the diagnostic model.

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Variable	levels	Training cohort (N= 22306)	Validation cohort (N= 11153)	X^2	P-value
Age at diagnosis (years)	≤70	13815 (61.9%)	6865 (61.6%)	0.441	0.506
	>70	8491 (38.1%)	4288 (38.4%)		
Sex	Female	10878 (48.8%)	5512 (49.4%)	1.249	0.264
	Male	11428 (51.2%)	5641 (50.6%)		
Race	White	17638 (79.1%)	8821 (79.1%)	0.759	0.684
	Black	2777 (12.4%)	1362 (12.2%)		
	Other	1891 (8.5%)	970 (8.7%)		
Primary site	Head	11942 (53.5%)	6008 (53.9%)	0.329	0.848
	Body/tail	6816 (30.6%)	3384 (30.3%)		
	Other	3548 (15.9%)	1761 (15.8%)		
Histology	Adenocarcinoma	15261 (68.4%)	7687 (68.9%)	1.316	0.518
	Neuroendocrine carcinoma	1051 (4.7%)	534 (4.8%)		
	Other	5994 (26.9%)	2932 (26.3%)		
Pathological grade	Well/Moderate	5526 (24.8%)	2767 (24.8%)	0.092	0.955
	Poor/Anaplastic	3395 (15.2%)	1710 (15.3%)		
	Unspecific	13385 (60%)	6676 (59.9%)		
T stage	T1	1376 (6.2%)	687 (6.2%)	1.845	0.764
	T2	5554 (24.9%)	2829 (25.4%)		
	T3	9727 (43.6%)	4799 (43%)		
	T4	4430 (19.9%)	2205 (19.8%)		
	TX	1219 (5.5%)	633 (5.7%)		

Variable	levels	Training cohort (N= 22306)	Validation cohort (N= 11153)	X^2	P-value
LN metastasis	No	12259 (55%)	6210 (55.7%)	1.537	0.215
	Yes	10047 (45%)	4943 (44.3%)		
Tumor size (cm)	<2	2426 (10.9%)	1191 (10.7%)	0.464	0.793
	2-4	9739 (43.7%)	4905 (44%)		
	>4	10141 (45.5%)	5057 (45.3%)		
Surg Prim	No	16085 (72.1%)	8015 (71.9%)	0.212	0.645
	Yes	6221 (27.9%)	3138 (28.1%)		
Surg Dis	No	21593 (96.8%)	10815 (97%)	0.619	0.431
	Yes	713 (3.2%)	338 (3%)		
Radiation	No	18320 (82.1%)	9163 (82.2%)	0.002	0.964
	Yes	3986 (17.9%)	1990 (17.8%)		
Chemotherapy	No	8844 (39.6%)	4312 (38.7%)	2.99	0.084
	Yes	13462 (60.4%)	6841 (61.3%)		
Liver metastasis	No	14608 (65.5%)	7393 (66.3%)	7.856	0.005
	Yes	7698 (34.5%)	3760 (33.7%)		
Bone metastasis	No	21723 (97.4%)	10801 (96.8%)	0.161	0.688
	Yes	583 (2.6%)	352 (3.2%)		
Brain metastasis	No	22241 (99.7%)	11124 (99.7%)	2.067	0.15
	Yes	65 (0.3%)	29 (0.3%)		
Lung metastasis	No	20348 (91.2%)	10198 (91.4%)	0.407	0.524
	Yes	1958 (8.8%)	955 (8.6%)		
Vital status	Alive	4004 (18%)	2021 (18.1%)	0.135	0.713
	Dead	18302 (82%)	9132 (81.9%)		

Supplementary Table 2. Baseline clinical characteristics of pancreatic cancer patients with liver metastasis in the training cohort of the prognostic model.

Variable	levels	Training cohort (N=7698)	Validation cohort (N=3760)	X^2	P-value
Age at diagnosis	≤70	5032 (65.4%)	2520 (67%)	3.001	.083
	>70	2666 (34.6%)	1240 (33%)		
Sex	Female	3485 (45.3%)	1710 (45.5%)	0.036	.850
	Male	4213 (54.7%)	2050 (54.5%)		
Race	White	6048 (78.6%)	3000 (79.8%)	2.322	.313
	Black	1047 (13.6%)	486 (12.9%)		
	Other	603 (7.8%)	274 (7.3%)		
Primary site	Head	3003 (39%)	1438 (38.2%)	2.596	.273
	Body/tail	3212 (41.7%)	1550 (41.2%)		
	Other	1483 (19.3%)	772 (20.5%)		
Histology	Adenocarcinoma	5867 (76.2%)	2879 (76.6%)	0.345	.841
	Neuroendocrine carcinoma	411 (5.3%)	204 (5.4%)		
	Other	1420 (18.4%)	677 (18%)		
Pathological grade	Well/Moderate	799 (10.4%)	386 (10.3%)	0.039	.981
	Poor/Anaplastic	919 (11.9%)	448 (11.9%)		
	Unspecific	5980 (77.7%)	2926 (77.8%)		
T stage	T1	245 (3.2%)	117 (3.1%)	2.828	.587
	T2	2653 (34.5%)	1281 (34.1%)		

Variable	levels	Training cohort (N=7698)	Validation cohort (N=3760)	X^2	P-value
	T3	2402 (31.2%)	1139 (30.3%)		
	T4	1411 (18.3%)	705 (18.8%)		
	TX	987 (12.8%)	518 (13.8%)		
LN metastasis	No	4046 (52.6%)	1998 (53.1%)	0.317	.573
	Yes	3652 (47.4%)	1762 (46.9%)		
Tumor size (cm)	<2	460 (6%)	204 (5.4%)	2.986	.225
	2-4	2939 (38.2%)	1399 (37.2%)		
	>4	4299 (55.8%)	2157 (57.4%)		
Surg Prim	No	7429 (96.5%)	3625 (96.4%)	0.043	.835
	Yes	269 (3.5%)	135 (3.6%)		
Surg Dis	No	7450 (96.8%)	3652 (97.1%)	0.911	.340
	Yes	248 (3.2%)	108 (2.9%)		
Radiation	No	7325 (95.2%)	3584 (95.3%)	0.116	.733
	Yes	373 (4.8%)	176 (4.7%)		
Chemotherapy	No	2934 (38.1%)	1364 (36.3%)	3.56	.059
	Yes	4764 (61.9%)	2396 (63.7%)		
Bone metastasis	No	7289 (94.7%)	3523 (93.7%)	4.471	.034
	Yes	409 (5.3%)	237 (6.3%)		
Brain metastasis	No	7663 (99.5%)	3742 (99.5%)	0.001	.975
	Yes	35 (0.5%)	18 (0.5%)		
Lung metastasis	No	6510 (84.6%)	3191 (84.9%)	0.152	.696
	Yes	1188 (15.4%)	569 (15.1%)		

Variable	levels	Training cohort (N=7698)	Validation cohort (N=3760)	X^2	P-value
Vital status	Alive	553 (7.2%)	251 (6.7%)	0.923	.337
	Dead	7145 (92.8%)	3509 (93.3%)		

LN, lymph node; Surg Prim, surgical treatments of the primary site; Surg Dis, *surgical treatments of the distant site*

Supplementary Figure 1. Patient selection

Patients with pancreatic cancer between 2010 and 2015
selected by Site record="Pancreas" from SEER database
(N=61151)

Exclusion (N=15524)
1. Younger than 18 years (n=47)
2. Without being histologically confirmed (n=10027)
3. With multiple primary malignant tumors (n=5450)

Patients aged 18 years or older with histologically
confirmed and one primary pancreatic cancer
(N=45627)

Exclusion (N=2182)
1. With unknown liver metastases status (n=1863)
2. With carcinoma in situ (n=319)

Adult patients with histologically confirmed and one
primary malignant pancreatic cancer with or
without liver metastasis
(N=43445)

Exclusion (N=9986)
1. Diagnosed at autopsy or via death certificates (n=420)
2. With an unknown follow-up or survival months less than
   one month (n=4965)
3. With incomplete information about demographic and
   clinicopathological characteristics (n=4601)

33459 malignant pancreatic cancer patients meeting the
requirements in the final cohort for further analysis, among
whom there were 11458 PCLM patients at initial diagnosis