# Table 1.

QUALITY OF THE INCLUDED STUDIES BASED ON THE NEWCASTLE-OTTAWA SCALE (NOS)
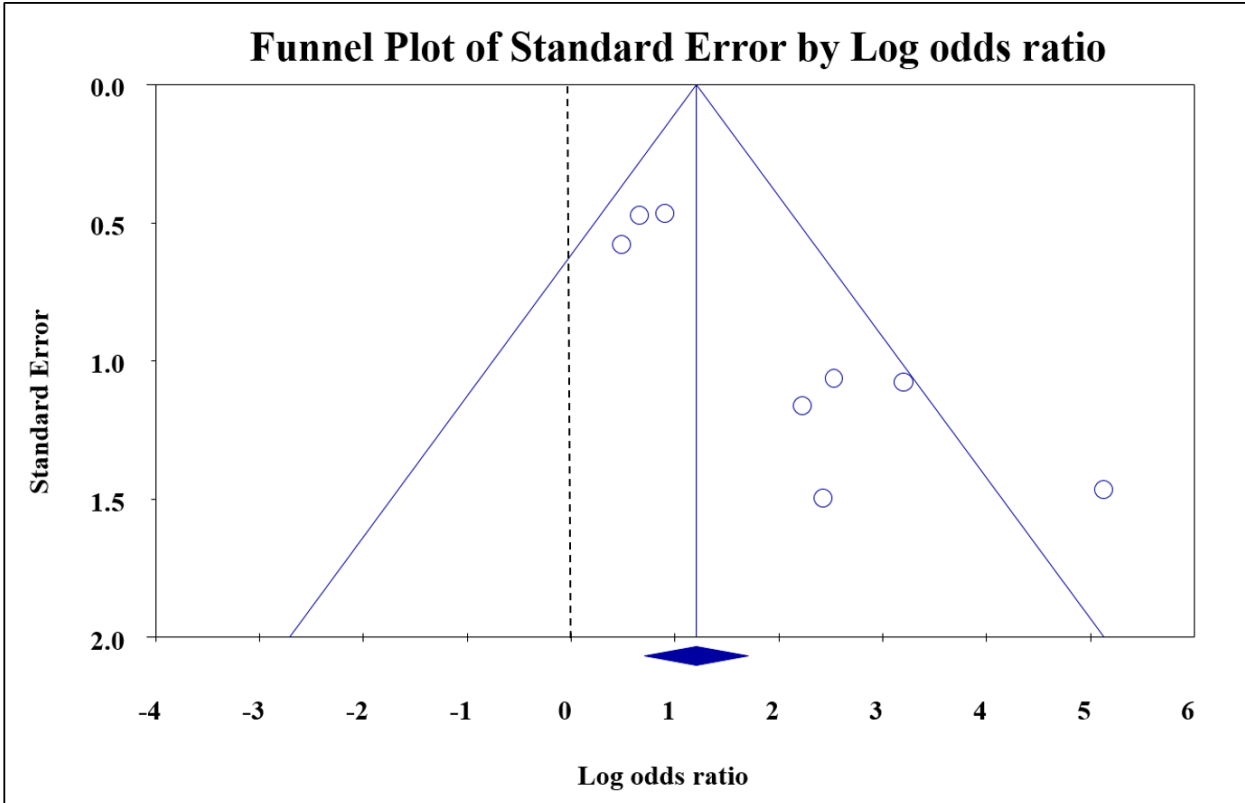
| AUTHORS | Selection | | | | Comparability | Exposure | | | Score |
|---|---|---|---|---|---|---|---|---|---|
| **CASE-CONTROL** | case definition adequacy(1) | Representativeness of the cases(1) | Selection of controls(1) | Definition of controls(1) | Comparability of cases and controls(2) | Ascertainment of exposure(2) | Same method for cases and controls(1) | Non-response rate(1) | |
| NÍ CHONCHUBHAIR | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 6 |
| KIM | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 6 |
| THERRIEN | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 6 |
| KUMAR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 7 |
| SIGNORETTI | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 7 |
| MANCILLA | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 6 |
| MADSEN | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 6 |
| TRESPI | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 4 |
| CASELLAS | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 5 |
| JORGENSEN | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 4 |
| **CROSS-SECTIONAL** | | Representativeness of the sample(1) | Sample size(1) | Non-respondent(1) | Comparability(2) | Ascertainment of exposure(2) | Assessment of outcome(2) | Statistical test(1) | |
| LEMBCKE | - | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 4 |
| GRIGOREVA | - | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 8 |
| LEE | | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 8 |

| **Supplementary table 2. CP diagnostic criteria adopted** | |
|---|---|
| **Ní Chonchubhair** | Two of the following criteria: 1) Patient history (abdominal pain typical of pancreatitis), 2) functional deficits (exocrine/endocrine impairment) 3) findings of radiologic/ endoscopic studies (computed tomography/endoscopic ultrasonography). |
| **Casellas** | CP was confirmed by: CT scan or pancreatography and abnormal secretin stimulation test |
| **Therrein** | CP confirmed by: abdominal computed tomodensitometry (according to Cambridge criteria), a magnetic resonance imaging (MRI), or an endoscopic ultrasound (Rosemont criteria). |
| **Kim** | CP was diagnosed in all the patients by typical clinical and imaging studies according to the M-ANNHEIM criteria. |
| **Kumar** | Diagnosis of chronic pancreatitis was based on relevant clinical history in the presence of imaging features suggestive of chronic pancreatitis. |
| **Lembcke** | Dx was based on relevant history, clinical course, pancreatic calcifications on abdominal x-ray and functional tests including abnormal secretin-pancreozymin test and 72-hr fecal fat excretion. |
| **Madsen** | chronic pancreatitis was diagnosed according to the Marseille classification |
| **Mancilla** | CP was diagnosed based on both clinical history and ERCP findings suggestive of CP |
| **Signoretti** | CP was diagnosed based on typical clinical and imaging features, and a functional test according to the Marseille classification |
| **Trespi** | CP was diagnosed based on CT and ERCP findings suggestive of CP in addition to abnormal fecal fat excretion |
| **Jorgensen** | CP was diagnosed based on clinical history, and imaging findings suggestive of CP |
| **Gregoris** | CP was diagnosed based on clinical history, CT scan, Abd US findings and ERCP findings |
| **Lee** | CP diagnosed based on the Mayo clinical diagnostic criteria |

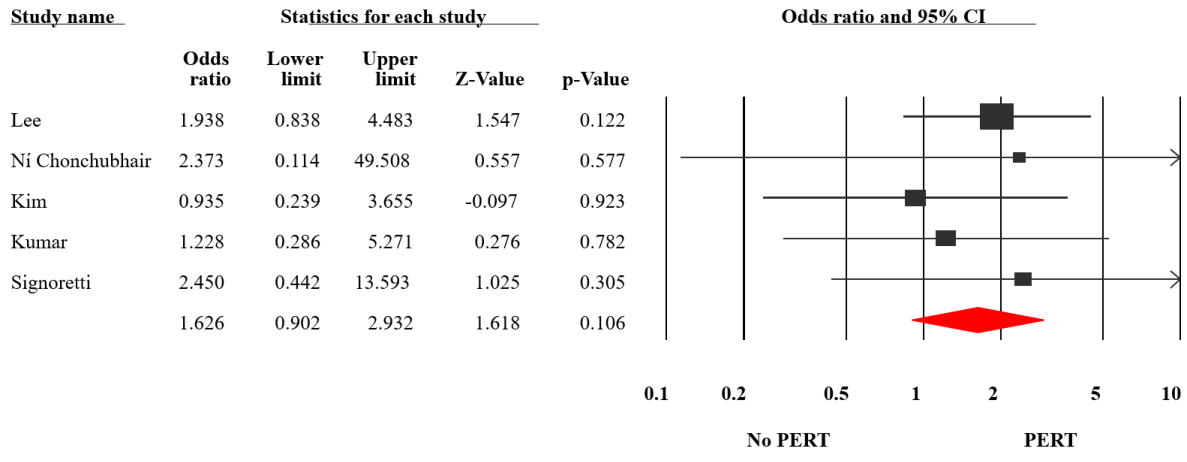**Funnel Plot of Standard Error by Logit event rate**
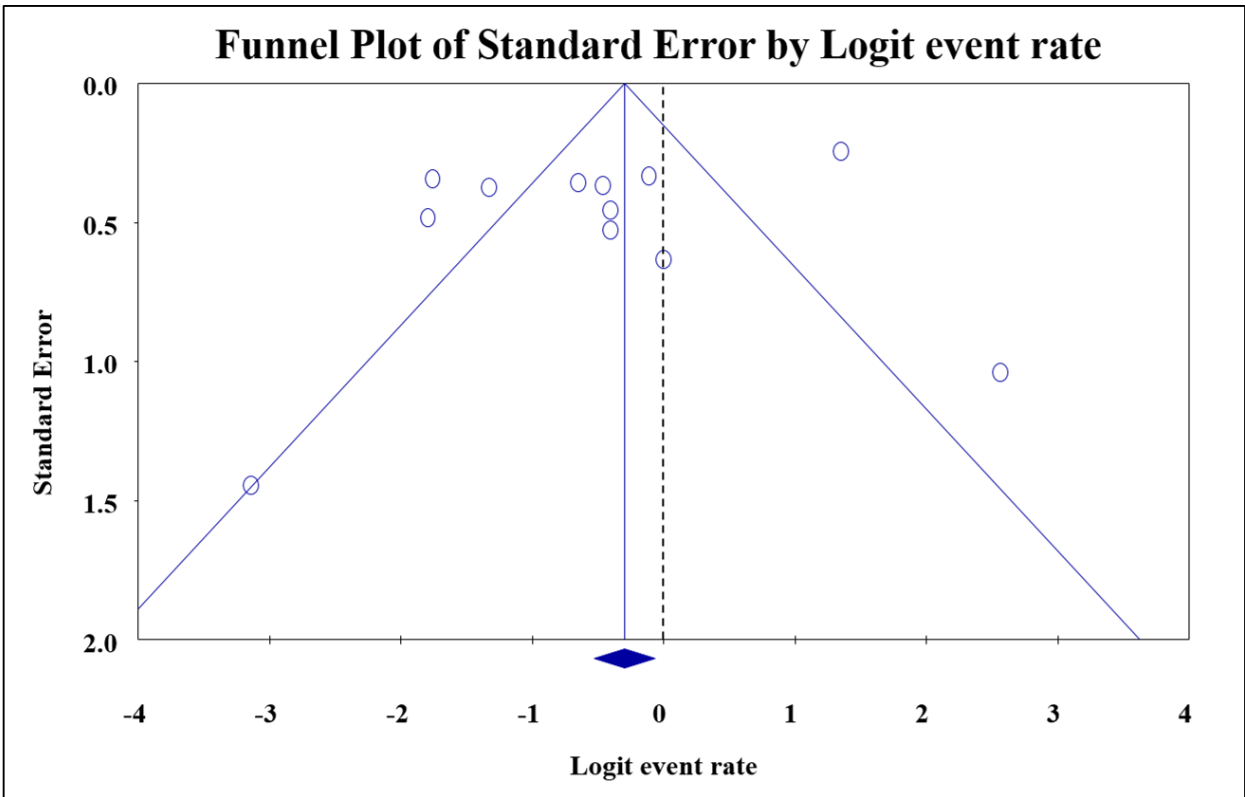
Supplementary figure 1.A) publication bias assessment for PP analysis.



**Funnel Plot of Standard Error by Log odds ratio**

Supplementary figure 1.B) publication bias assessment for comparative analysis.

## A. PERT association to SIBO in CP

| Study name | Statistics for each study | | | | | Odds ratio and 95% CI |
|---|---|---|---|---|---|---|
| | Odds ratio | Lower limit | Upper limit | Z-Value | p-Value | |
| Lee | 1.938 | 0.838 | 4.483 | 1.547 | 0.122 | |
| Ní Chonchubhair | 2.373 | 0.114 | 49.508 | 0.557 | 0.577 | |
| Kim | 0.935 | 0.239 | 3.655 | -0.097 | 0.923 | |
| Kumar | 1.228 | 0.286 | 5.271 | 0.276 | 0.782 | |
| Signoretti | 2.450 | 0.442 | 13.593 | 1.025 | 0.305 | |
| | 1.626 | 0.902 | 2.932 | 1.618 | 0.106 | |

0.1   0.2   0.5   1   2   5   10

No PERT          PERT

**Random effects analysis**

## B. PPI association to SIBO in CP

| Study name | Statistics for each study | | | | | Odds ratio and 95% CI |
|---|---|---|---|---|---|---|
| | Odds ratio | Lower limit | Upper limit | Z-Value | p-Value | |
| Lee | 1.607 | 0.711 | 3.633 | 1.140 | 0.254 | |
| Ní Chonchubhair | 5.231 | 0.521 | 52.551 | 1.406 | 0.160 | |
| Signoretti | 0.598 | 0.134 | 2.675 | -0.673 | 0.501 | |
| | 1.435 | 0.597 | 3.447 | 0.808 | 0.419 | |

0.1   0.2   0.5   1   2   5   10

No PPI          PPI

**Random effects analysis**

## C. Opiates association to SIBO in CP

| Study name | Statistics for each study | | | | | Odds ratio and 95% CI |
|---|---|---|---|---|---|---|
| | Odds ratio | Lower limit | Upper limit | Z-Value | p-Value | |
| Lee | 3.462 | 1.443 | 8.301 | 2.783 | 0.005 | |
| Ní Chonchubhair | 0.177 | 0.009 | 3.526 | -1.134 | 0.257 | |
| Kumar | 1.059 | 0.269 | 4.162 | 0.082 | 0.935 | |
| | 1.419 | 0.367 | 5.490 | 0.508 | 0.612 | |

0.1   0.2   0.5   1   2   5   10

No Opiates          Opiates
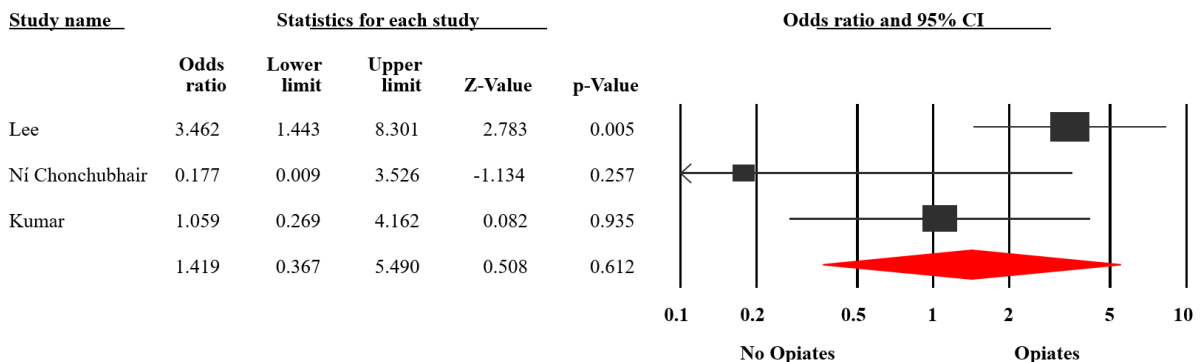
**Random effects analysis**

Supplementary Figure 3.

| Main results for Model 1, Random effects (MM), Z-Distribution, Logit event rate | | | | | | |
|---|---|---|---|---|---|---|
| Covariate | Coefficient | Std Error | 95% Lower | 95% Upper | Z-value | 2-sided P-value |
| Intercept | -2.30 | 0.48 | -3.23 | -1.37 | -4.84 | 0 |
| PEI | 0.05 | 0.01 | 0.03 | 0.07 | 4.04 | 0.0001 |

$R^2$ for Model 1, Random effects (MM), Z-Distribution, Logit event rate

Total variance in true effects (a)
1.2947

$R^2 = \dfrac{\text{Explained (c)}}{\text{Total (a)}} = \dfrac{1.0810}{1.2947} = 0.83$

$R^2 = 0.83$

Not explained by model (b)     Explained by model (c)
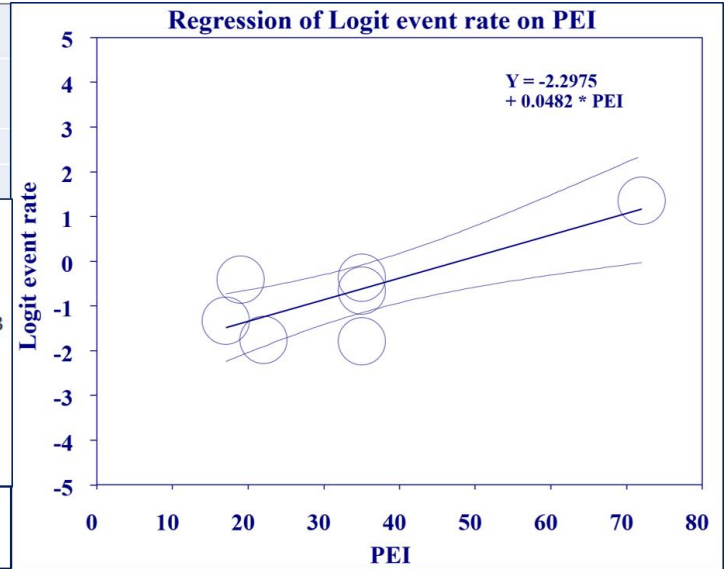0.2137                                    1.0810

Figure 3. The effect of number of patients with PEI on SIBO event rate upon exclusion of studies including less than 20 patients.



Regression of Logit event rate on PEI

$Y = -2.2975 + 0.0482 * PEI$