RR_OR_RD_sheep

April 15, 2023

[ ]:
```python
import math
from scipy.stats import norm

def calculate_statistics(a, b, c, d, alpha=0.05):
    # Calculate the risk ratio
    RR = (a / (a + b)) / (c / (c + d))

    # Calculate the odds ratio
    OR = (a * d) / (b * c)

    # Calculate the risk difference
    RD = (a / (a + b)) - (c / (c + d))

    # Calculate the standard errors for RR and OR
    SE_RR = math.sqrt(1/a + 1/b + 1/c + 1/d)
    SE_OR = math.sqrt((1/a) + (1/b) + (1/c) + (1/d))

    # Calculate the confidence intervals for RR and OR
    z = abs(norm.ppf(alpha/2))
    CI_RR = (math.exp(math.log(RR) - z*SE_RR), math.exp(math.log(RR) + z*SE_RR))
    CI_OR = (math.exp(math.log(OR) - z*SE_OR), math.exp(math.log(OR) + z*SE_OR))

    # Calculate the p-values for RR and OR using the two-tailed z-test
    z_RR = (math.log(RR) - 0) / SE_RR
    p_RR = 2 * (1 - norm.cdf(abs(z_RR)))

    z_OR = (math.log(OR) - 0) / SE_OR
    p_OR = 2 * (1 - norm.cdf(abs(z_OR)))

    # Create a dictionary to store the results
    results = {
        'Risk Ratio': RR,
        'Odds Ratio': OR,
        'Risk Difference': RD,
        '95% CI for Risk Ratio': CI_RR,
        '95% CI for Odds Ratio': CI_OR,
        'p-value for Risk Ratio': p_RR,
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        'p-value for Odds Ratio': p_OR
    }

    return results
```

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#age
results = calculate_statistics(47, 24, 78, 331)
results
```

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{'Risk Ratio': 3.47110870350307,
 'Odds Ratio': 8.310363247863247,
 'Risk Difference': 0.4712627845311478,
 '95% CI for Risk Ratio': (2.002384221335934, 6.017124737177704),
 '95% CI for Odds Ratio': (4.794012997719618, 14.405913656113814),
 'p-value for Risk Ratio': 9.2638343216489e-06,
 'p-value for Odds Ratio': 4.551914400963142e-14}
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#sex
results = calculate_statistics(29, 42, 108, 301)
results
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{'Risk Ratio': 1.5468179447052688,
 'Odds Ratio': 1.9243827160493827,
 'Risk Difference': 0.14439202451875066,
 '95% CI for Risk Ratio': (0.9179757061479817, 2.6064369002773224),
 '95% CI for Odds Ratio': (1.1420455708515844, 3.242645418315675),
 'p-value for Risk Ratio': 0.10132039397590753,
 'p-value for Odds Ratio': 0.013937276070091098}
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#Presence of Cat
results = calculate_statistics(63, 8, 73, 336)
results
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{'Risk Ratio': 4.971445109010226,
 'Odds Ratio': 36.24657534246575,
 'Risk Difference': 0.7088398360825098,
 '95% CI for Risk Ratio': (2.2836061934323686, 10.822910948035867),
 '95% CI for Odds Ratio': (16.64966667192011, 78.90934094631531),
 'p-value for Risk Ratio': 5.336983986725663e-05,
 'p-value for Odds Ratio': 0.0}
```

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#Cat Contact with Sheep
results = calculate_statistics(114, 5, 30, 331)
results
```

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{'Risk Ratio': 11.527731092436976,
 'Odds Ratio': 251.56,
 'Risk Difference': 0.8748807002025187,
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 '95% CI for Risk Ratio': (4.368294290569739, 30.421161052820466),
 '95% CI for Odds Ratio': (95.32561984002855, 663.8554641050116),
 'p-value for Risk Ratio': 7.89770913334209e-07,
 'p-value for Odds Ratio': 0.0}
```

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#Contact with sheep in Driking Water
results = calculate_statistics(57, 14, 37, 372)
results
```

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{'Risk Ratio': 8.874381423677198,
 'Odds Ratio': 40.93436293436294,
 'Risk Difference': 0.7123523537311891,
 '95% CI for Risk Ratio': (4.517415543512244, 17.433562375285945),
 '95% CI for Odds Ratio': (20.837230062040756, 80.41481827734057),
 'p-value for Risk Ratio': 2.3426327544484593e-10,
 'p-value for Odds Ratio': 0.0}
```

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```
#Presence of Rats
results = calculate_statistics(68, 3, 304, 105)
results
```

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{'Risk Ratio': 1.2885470719051149,
 'Odds Ratio': 7.828947368421052,
 'Risk Difference': 0.2144701952546575,
 '95% CI for Risk Ratio': (0.39698583704170376, 4.182399979021981),
 '95% CI for Odds Ratio': (2.412004413321843, 25.41140329552475),
 'p-value for Risk Ratio': 0.6730059838168518,
 'p-value for Odds Ratio': 0.0006133081077011049}
```

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```
#Housing Type
results = calculate_statistics(64, 7, 309, 100)
results
```

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{'Risk Ratio': 1.1931263959159488,
 'Odds Ratio': 2.9588534442903374,
 'Risk Difference': 0.14590722821033786,
 '95% CI for Risk Ratio': (0.5296119162210606, 2.6879127017927402),
 '95% CI for Odds Ratio': (1.313393155839864, 6.665798177690692),
 'p-value for Risk Ratio': 0.6700246802149894,
 'p-value for Odds Ratio': 0.008848998478095949}
```

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```
#Water Souce
results = calculate_statistics(37, 34, 268, 141)
results
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{'Risk Ratio': 0.7953016607105318,
 'Odds Ratio': 0.5725417032484635,
 'Risk Difference': -0.13412996315300119,
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'95% CI for Risk Ratio': (0.4783798904078404, 1.3221808529403085),
'95% CI for Odds Ratio': (0.3443881118130944, 0.9518447086714676),
'p-value for Risk Ratio': 0.37717817127773134,
'p-value for Odds Ratio': 0.03153461194061169}
```