fishers_odds_ratio4combined

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[1]:
```
import numpy as np
from scipy.stats import fisher_exact, norm
```

[2]:
```
def calc_odds_ratio(a, b, c, d):
    odds_ratio = (a * d) / (b * c)
    p_value = fisher_exact([[a, b], [c, d]])[1]
    se = np.sqrt(1/a + 1/b + 1/c + 1/d)
    z = np.log(odds_ratio) / se
    confint = np.exp(norm.ppf(0.025) * se), np.exp(norm.ppf(0.975) * se)
    return odds_ratio, p_value, confint
```

[3]:
```
#Age
odds_ratio, p_value, confint = calc_odds_ratio(182, 71, 305, 882)

print("The Fisher's Exact Association for age =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for age =
Odds ratio:  7.413
P-value:  5.538e-43
confint_lower 0.738
confint_upper 1.355
```

[4]:
```
#Sex
odds_ratio, p_value, confint = calc_odds_ratio(64, 189, 314, 873)

print("The Fisher's Exact Association for sex =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for sex =
Odds ratio:  0.941
P-value:  7.531e-01
```

```
confint_lower 0.732
confint_upper 1.365
```

not significant

[5]:
```
#presence of cat
odds_ratio, p_value, confint = calc_odds_ratio(228, 25, 220, 967)

print("The Fisher's Exact Association for Presence of Cat =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Presence of Cat =
Odds ratio:  40.087
P-value:  7.700e-107
confint_lower 0.645
confint_upper 1.550
```

[6]:
```
#cat in contact with combineds
odds_ratio, p_value, confint = calc_odds_ratio(230, 23, 121, 1066)

print("The Fisher's Exact Association for Cat in Contact with combineds =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Cat in Contact with combineds =
Odds ratio:  88.099
P-value:  1.151e-145
confint_lower 0.626
confint_upper 1.597
```

[7]:
```
#Cat with contact in drinking water
odds_ratio, p_value, confint = calc_odds_ratio(194, 59, 129, 1058)

print("The Fisher's Exact Association for Cat with combined Contact in Drinking␣
  ↪Water =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Cat with combined Contact in Drinking Water =
Odds ratio:  26.968
P-value:  8.717e-98
confint_lower 0.709
confint_upper 1.411
```

[8]:
```
#Presence of rats
odds_ratio, p_value, confint = calc_odds_ratio(204, 13, 837, 350)

print("The Fisher's Exact Associatio for Presence of Rats =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for Presence of Rats =
Odds ratio:  6.562
P-value:  7.838e-16
confint_lower 0.563
confint_upper 1.776
```

[9]:
```
#House type
odds_ratio, p_value, confint = calc_odds_ratio(225, 28, 922, 265)

print("The Fisher's Exact Associatio for House Type =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for House Type =
Odds ratio:  2.310
P-value:  3.210e-05
confint_lower 0.660
confint_upper 1.516
```

[10]:
```
#Water source
odds_ratio, p_value, confint = calc_odds_ratio(140, 113, 787, 400)

print("The Fisher's Exact Associatio for Water Source =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for Water Source =
Odds ratio:  0.630
P-value:  1.126e-03
confint_lower 0.759
confint_upper 1.317
```