1. [4/4 Points] DETAILS PREVIOUS ANSWERS ROSBIOSTAT8 10.E.015.S. 1/3 Submissions Used

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Ophthalmology

Retinitis pigmentosa is a disease that manifests itself via different genetic modes of inheritance. Cases have been documented with a dominant, recessive, and sex-linked mode of inheritance. It has been conjectured that mode of inheritance is related to the ethnic origin of the individual. Cases of the disease have been surveyed in an English and a Swiss population with the following results: Of 118 English cases, 43 had sex-linked disease, 23 had recessive disease, and 52 had dominant disease. Of 111 Swiss cases, 1 had sex-linked disease, 95 had recessive disease, and 15 had dominant disease.

USE SALT

Do these data show a significant association between ethnic origin and genetic type? (Use $\alpha = 0.05$.)

Select the appropriate null and alternative hypotheses.

- ○ H_0: The proportions falling into each of the three disease categories are not the same for both countries.
  H_1: The proportions falling into each of the three disease categories are the same for both countries.
- ● H_0: The proportions falling into each of the three disease categories are the same for both countries.
  H_1: The proportions falling into each of the three disease categories are not the same for both countries. ✓

Calculate the test statistic. (Round your answer to two decimal places.)

104.34 ✓

Use technology to calculate the p-value. (Round your answer to four decimal places.)

p-value = 0.0000 ✓

State the conclusion in the problem context.

- ● Reject H_0. There is a significant association between ethnicity and genetic type.
- ○ Fail to reject H_0. There is not a significant association between ethnicity and genetic type.
- ○ Fail to reject H_0. There is a significant association between ethnicity and genetic type.
- ○ Reject H_0. There is not a significant association between ethnicity and genetic type. ✓

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Otolaryngology

Many children have tympanostomy tubes surgically inserted in their ears to reduce hearing loss associated with persistent otitis media and prevent recurrences of episodes of otitis media after tubes are inserted. However, acute otorrhea (a discharge from the external ear indicating inflammation of the external or middle ear), where middle ear fluid drains through the tube, is a common side effect with tympanostomy tubes.

A clinical trial was conducted among children 1–10 years of age with prior symptoms of otorrhea comparing efficacy of (i) antibiotic eardrops, (ii) oral antibiotics, and (iii) observation without treatment, referred to below as observation, were seen at home by study physicians at 2 weeks and 6 months after randomization. The primary outcome was the presence of otorrhea at 2 weeks observed by study physicians. The results are given in the table below.

Number of children with otorrhea at 2 weeks of follow-up

Group	Number of children	Number of children with otorrhea at 2 weeks
Antibiotic ear drops	79	4
Oral antibiotics	78	33
Observation	76	42

You can use SALT to answer parts of this question. Please note that the Inferential Statistics page in SALT does not use the continuity-corrected version of the test statistic.

(a) Provide a point estimate of the prevalence of otorrhea at 2 weeks in the observation group. (Round your answer to three decimal places.)

0.553 ✔

Provide a 95% confidence interval for the prevalence of otorrhea at 2 weeks in the observation group. (Enter your answer using interval notation. Round your numerical values to three decimal places.)

0.441,0.664 ✔

(b) Provide a point estimate of the prevalence of otorrhea at 2 weeks in the ear drop group. (Round your answer to three decimal places.)

0.051 ✔

Provide a 95% confidence interval for the prevalence of otorrhea at 2 weeks in the ear drop group. (Enter your answer using interval notation. Round your numerical values to three decimal places.)

0.014,0.125 ✔

(c) What test can be used to compare the prevalence of otorrhea for the ear drop group vs. the observation group?

- ○ McNemar's test for correlated proportions (normal theory test)
- ◉ Yates-corrected chi-square test for 2 × 2 contingency table
- ○ McNemar's test for correlated proportions (exact test)
- ○ Mantel-Haenszel test

✔

State the hypotheses to be tested. (Enter != for ≠ as needed.)

H_0: $p_1 = p_2$ ✔

H_1: $p_1 != p_2$ ✔

(d) Perform the test in (c) and report a p-value (two-tailed). (Use $\alpha = 0.05$.)

Find the test statistic. (If the test does not have a defined test statistic, enter DNE. Round your answer to two decimal places.)

44.40 ✔

Use technology to find the p-value. (Round your answer to four decimal places.)

(b) Provide a point estimate of the prevalence of otorrhea at 2 weeks in the ear drop group. (Round your answer to three decimal places.)

0.051 ✔

Provide a 95% confidence interval for the prevalence of otorrhea at 2 weeks in the ear drop group. (Enter your answer using interval notation. Round your numerical values to three decimal places.)

0.014,0.125 ✔

(c) What test can be used to compare the prevalence of otorrhea for the ear drop group vs. the observation group?

- ○ McNemar's test for correlated proportions (normal theory test)
- ◉ Yates-corrected chi-square test for 2 × 2 contingency table
- ○ McNemar's test for correlated proportions (exact test)
- ○ Mantel-Haenszel test

✔

State the hypotheses to be tested. (Enter != for ≠ as needed.)

H_0: $p_1 = p_2$ ✔

H_1: $p_1 != p_2$ ✔

(d) Perform the test in (c) and report a *p*-value (two-tailed). (Use $\alpha = 0.05$.)

Find the test statistic. (If the test does not have a defined test statistic, enter DNE. Round your answer to two decimal places.)

44.40 ✔

Use technology to find the *p*-value. (Round your answer to four decimal places.)

p-value = 0.0000 ✔

Interpret the results in words.

- ○ Fail to reject H_0. There is not a significant difference in prevalence between the two groups.
- ◉ Reject H_0. There is a significant difference in prevalence between the two groups.
- ○ Reject H_0. There is not a significant difference in prevalence between the two groups.
- ○ Fail to reject H_0. There is a significant difference in prevalence between the two groups.

✔

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3. [6/6 Points] DETAILS PREVIOUS ANSWERS ROSBIOSTAT8 10.E.023-024.S. 2/3 Submissions Used

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Cancer

The data below summarize the stage of disease at diagnosis for women with breast cancer by age and race.

stage of breast cancer at diagnosis by age and race

	Female Caucasians		Female African Americans	
Stage	**< 50 (n = 52,000)**	**50+ (n = 175,000)**	**< 50 (n = 10,600)**	**50+ (n = 14,300)**
Localized	54%	64%	46%	53%
Regional	41%	29%	46%	35%
Distant	3%	5%	6%	9%
Unstaged	2%	2%	2%	3%

You can use the Distribution Calculators page in SALT to find critical values and/or p-values to answer parts of this question. Please note that the Inferential Statistics page does not use the continuity-corrected version of the test statistic.

(a) Test whether the distribution of stage of disease is significantly different between Caucasian and African American women with breast cancer who are younger than 50 years of age. Please provide a p-value (two-tailed). Ignore the unstaged cases in your analysis. (Let female African Americans who are younger than 50 years of age be population 1 and female Caucasians who are younger than 50 years of age be population 2.)

Select the appropriate null and alternative hypotheses.

- ○ H_0: The proportions for at least one of the stage categories is different for female Caucasians and female African Americans.
  H_1: The proportions falling into each of the three stage categories are the same for both female Caucasians and female African Americans.
- ● H_0: The proportions falling into each of the three stage categories are the same for both female Caucasians and female African Americans.
  H_1: The proportions for at least one of the stage categories is different for female Caucasians and female African Americans. ✓

Calculate the test statistic. (Round your answer to two decimal places.)

385.55 ✓

Use technology to calculate the p-value. (Round your answer to four decimal places.)

p-value = 0.0000 ✓

State the conclusion in the problem context. (Use $\alpha = 0.05$.)

- ○ Fail to reject H_0. There is sufficient evidence to conclude that the distribution of stage of disease is significantly different between Caucasian and African American women with breast cancer who are younger than 50 years of age.
- ○ Fail to reject H_0. There is not sufficient evidence to conclude that the distribution of stage of disease is significantly different between Caucasian and African American women with breast cancer who are younger than 50 years of age.
- ○ Reject H_0. There is not sufficient evidence to conclude that the distribution of stage of disease is significantly different between Caucasian and African American women with breast cancer who are younger than 50 years of age.
- ● Reject H_0. There is sufficient evidence to conclude that the distribution of stage of disease is significantly different between Caucasian and African American women with breast cancer who are younger than 50 years of age.

(b) The 5-year survival rates by stage of disease, age at diagnosis, and race are provided in the table below.

five—year survival rates for breast cancer by stage at diagnosis, age at diagnosis, and race

	Female Caucasians		Female African Americans	
Stage	**< 50 (*n* = 52,000)**	**50+ (*n* = 175,000)**	**< 50 (*n* = 10,600)**	**50+ (*n* = 14,300)**
Localized	96.5%	99.6%	91.6%	94.9%
Regional	84.6%	85%	71.3%	72.6%
Distant	33.2%	22.5%	15%	16.4%
Unstaged	76.7%	53.5%	49.7%	42.2%

Test whether the 5-year survival rate for breast cancer is significantly different between female African Americans and female Caucasians who are younger than 50 years of age and have localized disease. Provide a *p*-value (two-tailed). (Let female African Americans who are younger than 50 years of age be population 1 and female Caucasians who are younger than 50 years of age be population 2.)

State the hypotheses to be tested. (Enter != for ≠ as needed.)

H_0: $p_1 = p_2$ ✔

H_1: $p_1 ! = p_2$ ✔

Find the test statistic. (If the test does not have a defined test statistic, enter DNE. Round your answer to two decimal places.)

15.66 ✔

Use technology to find the *p*-value. (Round your answer to four decimal places.)

p-value = 0.0000 ✔

Interpret the results in words. (Use $\alpha = 0.05$.)

- ○ Fail to reject H_0. The 5-year survival rate for breast cancer is not significantly different between female African Americans and female Caucasians who are younger than 50 years of age and have localized disease.
- ● Reject H_0. The 5-year survival rate for breast cancer is significantly different between female African Americans and female Caucasians who are younger than 50 years of age and have localized disease.
- ○ Reject H_0. The 5-year survival rate for breast cancer is not significantly different between female African Americans and female Caucasians who are younger than 50 years of age and have localized disease.
- ○ Fail to reject H_0. The 5-year survival rate for breast cancer is significantly different between female African Americans and female Caucasians who are younger than 50 years of age and have localized disease.

✔

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