DALITE Q8 - Logistic Regression. Solutions.

EPIB607 - Inferential Statistics[a]

[a]Fall 2018, McGill University

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This DALITE quiz will cover logistic regression.

Two sample proportions | Odds ratio | Logit transformation | Odds | Log odds | Risk calculator

FINRISK Calculator

There are now several risk calculators derived from epidemiological studies, such as the Framingham Heart Study. See, e.g., https://www.uptodate.com/home/medical-calculators and https://qxmd.com/calculate/.

Many of the online ones for 10 year risks are based on the proportional hazards model. One risk equation that is based on logistic regression (see Rothman chapter 12, 2012 or Chapter 10, 2002) is that described in the article Predicting Coronary Heart Disease and Stroke The FINRISK Calculator by Erkki Vartiainen et al. GLOBAL HEART, VOL. 11, NO. 2, 2016 June 2016: 213-216 [article in myCourses]

By applying the equation in Table 2 of the article for the 10 year risk of coronary heart disease for 55 year old females who don't smoke, but whose cholesterol is 6, systolic blood pressure is 140, LDL is 0.5, are NOT diabetic, and do not have a family history of MI, one obtains 9.3%.

The same equation applied to females with the same profile, except that they ARE diabetic, yields a 10 year risk of 22.3%.

Thus, with respect to the No Diabetes (ref. category) vs. Diabetes (index category) contrast, say if the following statement is TRUE or FALSE and explain why in your rationale:

1. The risk difference is 13%

a. TRUE
b. FALSE

1.1. Correct rationales.

1.2. Incorrect rationales.

2. The odds ratio is 2.4

a. TRUE
b. FALSE

2.1. Correct rationales.

2.2. Incorrect rationales.

3. The risk ratio is 2.8

a. TRUE
b. FALSE

3.1. Correct rationales.

3.2. Incorrect rationales.

4. The two risks can be connected via the equation: risk(%) = 22.3 - 13 * Diabetes

a. TRUE
b. FALSE

4.1. Correct rationales.

4.2. Incorrect rationales.

5. The two risks can be connected via the equation: log[risk] = -2.38 + 0.87 * Diabetes

a. TRUE
b. FALSE

5.1. Correct rationales.

5.2. Incorrect rationales.

6. The two risks can be connected via the equation: log[risk/(1-risk)] = -2.28 + 1.03 * Diabetes

a. TRUE
b. FALSE

6.1. Correct rationales.

6.2. Incorrect rationales.

7. The two risks can be connected via the equation: log[risk/(1-risk)] = 1.03 - 2.28 * Diabetes

a. TRUE
b. FALSE

7.1. Correct rationales.

7.2. Incorrect rationales.

8. 4 year risk for intermittent claudication

Using the coefficients in his Table 12.2, Rothman (2012) calculated a 4 year risk for intermittent claudication of 6.7% if the 70-year old man had the example profile, which included normal blood pressure, AND diabetes.

If the profile did NOT include diabetes, but was otherwise unchanged, then (ignoring small rounding errors) the single equation that connects/expresses/summarizes the risks for those without (reference category) and with diabetes (Index category) can be written as (select all that apply and justify your choices in the rationale)

a. %Risk[Diabetes] = 2.7 * (2.5 ^ Diabetes)
b. Odds[Diabetes] = (2.7/97.3) * (((6.7/93.3)/(2.7/97.3)) ^ Diabetes)
c. Odds[Diabetes] = (2.7/97.3) * (2.59 ^ Diabetes)
d. log[Odds[Diabetes]] = -3.58 + 0.95 * Diabetes
e. log[Risk[Diabetes]] = -3.58 + 0.95 * Diabetes

8.1. Correct rationales.

8.2. Incorrect rationales.