Name: …………………………………………………………………………………

Student ID: ……………………………………………………………………………

Qualifying Examination

for Doctor of Philosophy (Epidemiology and Biostatistics)

28 January 2020

(Duration: 09.00 – 16.00; Total score: 100)

*Students can use books or internet. Communication with anybody else is strictly prohibited.*

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**Part A: Epidemiology** (30 scores)

**Based on the attached article, please answer the following questions:**

<The paper will be given on the exam date>

1) What is the main conclusion of this paper? (2 scores)

2). What is the magnitude of effect that the author used for answering the primary research question? If there was none or inappropriately reported, please specify what should be reported for the research question? (8 scores)

3). What are biases that could make the results invalid? Please specify name and roles of each bias, i.e., the conclusion could be distorted in what ways and by what mechanisms. (10 scores)

4). Please summarize in one paragraph of less than 10 lines the main points that will improve the quality of this paper- pretending you are writing a letter to the editor of this journal your opinion on this paper. (10 scores)

**Part B: Biostatistics** (30 scores)

5). Based on the article in Part A:

5.1) Please describe methods that were used to obtain the magnitude of effect and comment on their appropriateness. (5 scores)

5.2) Please describe the other alternatives for statistical analysis and suggestion on their advantages or disadvantages. (5 scores)

6) Based on the data set with a description attached at the end of this material, please answer the following questions:

6.1) Plan for data analysis: Please provide a dummy table, the table without number being presented, that is the main finding to answer the research question for this study. (10 scores)

6.2) Perform the analysis: Please provide Stata or R commands (Stata do file or R scripts) to obtain the results for the dummy table you’ve provided. (5 scores)

6.3) Communicate the results: Please write an abstract to report the results. Note that this must be presented with real results obtained from your own analysis. (5 scores)

**Part C: Dissertation in brief** (40 scores)

**Based on your own dissertation, please answer the following questions:**

8) Summarize your dissertation in one paragraph of no more than 300 words (5 scores)

9). How to improve external and internal validity of the study? Please select only the main paper to answer this question. (5 scores)

10) Describe all possible alternative statistical methods that could be efficiently applied to your main paper as well as their advantages and disadvantages and justify why the one you selected is the best choice. (10 scores)

11) What is the main weakness of your thesis and how it affects the main conclusion? (10 scores)

12) What is/are the impact(s) that would be expected from the findings of your thesis? (10 scores)

Attachment

**Description**

Patients with malignant melanoma had their tumor removed by surgery. They were followed to investigate if there were factors that increase their chance of death from melanoma.

**Data dictionary**

age Age in years at the time of the operation.

sex Patients sex; 1=male, 0=female.

year Year of operation.

thickness Tumor thickness in mm.

ulcer Indicator of ulceration; 1=present, 0=absent.

time Time in days since the operation.

cause Patients cause of dead at the end of the study;

1 = died from melanoma,

2 = died from causes unrelated to their melanoma;

3 = still alive.

died Patients survival at the end of the study; 1=dead, 0=alive.

**Data table**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| id | age | sex | year | thickness | ulcer | time | cause | died |
| 1 | 76 | 1 | 2012 | 6.76 | 1 | 10 | 2 | 1 |
| 2 | 56 | 1 | 2008 | 0.65 | 1 | 30 | 2 | 1 |
| 3 | 41 | 1 | 2017 | 1.34 | 0 | 35 | 3 | 0 |
| 4 | 71 | 0 | 2008 | 2.9 | 1 | 99 | 2 | 1 |
| 5 | 52 | 1 | 2005 | 12.08 | 1 | 185 | 1 | 1 |
| 6 | 28 | 1 | 2010 | 4.84 | 1 | 204 | 1 | 1 |
| 7 | 77 | 1 | 2012 | 5.16 | 1 | 210 | 1 | 1 |
| 8 | 60 | 0 | 2014 | 3.22 | 1 | 232 | 2 | 1 |
| 9 | 49 | 1 | 2008 | 12.88 | 1 | 232 | 1 | 1 |
| 10 | 68 | 0 | 2010 | 7.41 | 1 | 279 | 1 | 1 |
| 11 | 53 | 0 | 2008 | 4.19 | 1 | 295 | 1 | 1 |
| 12 | 64 | 0 | 2012 | 0.16 | 1 | 355 | 2 | 1 |
| 13 | 68 | 0 | 2005 | 3.87 | 1 | 386 | 1 | 1 |
| 14 | 63 | 1 | 2010 | 4.84 | 1 | 426 | 1 | 1 |
| 15 | 14 | 0 | 2008 | 2.42 | 1 | 469 | 1 | 1 |
| 16 | 72 | 1 | 2010 | 12.56 | 1 | 493 | 2 | 1 |
| 17 | 46 | 1 | 2010 | 5.8 | 1 | 529 | 1 | 1 |
| 18 | 72 | 1 | 2012 | 7.06 | 1 | 621 | 2 | 1 |
| 19 | 95 | 1 | 2008 | 5.48 | 1 | 629 | 1 | 1 |
| 20 | 54 | 1 | 2012 | 7.73 | 1 | 659 | 2 | 1 |
| 21 | 89 | 0 | 2008 | 13.85 | 1 | 667 | 1 | 1 |
| 22 | 25 | 1 | 2007 | 2.34 | 1 | 718 | 2 | 1 |
| 23 | 37 | 1 | 2013 | 4.19 | 1 | 752 | 2 | 1 |
| 24 | 43 | 1 | 2007 | 4.04 | 1 | 779 | 1 | 1 |
| 25 | 68 | 1 | 2010 | 4.84 | 1 | 793 | 1 | 1 |
| 26 | 67 | 0 | 2008 | 0.32 | 1 | 817 | 2 | 1 |
| 27 | 86 | 0 | 2005 | 8.54 | 1 | 826 | 2 | 1 |
| 28 | 56 | 0 | 2010 | 2.58 | 1 | 833 | 1 | 1 |
| 29 | 16 | 0 | 2007 | 3.56 | 0 | 858 | 1 | 1 |
| 30 | 42 | 0 | 2005 | 3.54 | 0 | 869 | 1 | 1 |
| 31 | 65 | 0 | 2008 | 0.97 | 0 | 872 | 1 | 1 |
| 32 | 52 | 1 | 2010 | 4.83 | 1 | 967 | 1 | 1 |
| 33 | 58 | 1 | 2007 | 1.62 | 1 | 977 | 2 | 1 |
| 34 | 60 | 0 | 2010 | 6.44 | 1 | 982 | 2 | 1 |
| 35 | 68 | 1 | 2007 | 14.66 | 0 | 1041 | 1 | 1 |
| 36 | 75 | 0 | 2007 | 2.58 | 1 | 1055 | 1 | 1 |
| 37 | 19 | 1 | 2008 | 3.87 | 1 | 1062 | 2 | 1 |
| 38 | 66 | 1 | 2010 | 3.54 | 1 | 1075 | 1 | 1 |
| 39 | 56 | 0 | 2010 | 1.34 | 1 | 1156 | 2 | 1 |
| 40 | 46 | 1 | 2013 | 2.24 | 1 | 1228 | 1 | 1 |
| 41 | 58 | 0 | 2010 | 3.87 | 1 | 1252 | 1 | 1 |
| 42 | 74 | 0 | 2010 | 3.54 | 1 | 1271 | 1 | 1 |
| 43 | 65 | 0 | 2010 | 17.42 | 1 | 1312 | 1 | 1 |
| 44 | 64 | 1 | 2012 | 1.29 | 1 | 1427 | 2 | 1 |
| 45 | 27 | 1 | 2008 | 3.22 | 1 | 1435 | 1 | 1 |
| 46 | 73 | 1 | 2013 | 1.29 | 0 | 1499 | 3 | 0 |
| 47 | 56 | 1 | 2010 | 4.51 | 1 | 1506 | 1 | 1 |
| 48 | 63 | 1 | 2013 | 8.38 | 1 | 1508 | 3 | 0 |
| 49 | 69 | 0 | 2013 | 1.94 | 0 | 1510 | 3 | 0 |
| 50 | 77 | 0 | 2013 | 0.16 | 0 | 1512 | 3 | 0 |
| 51 | 80 | 1 | 2008 | 2.58 | 1 | 1516 | 1 | 1 |
| 52 | 76 | 0 | 2010 | 1.29 | 1 | 1525 | 2 | 1 |
| 53 | 65 | 0 | 2013 | 0.16 | 0 | 1542 | 3 | 0 |
| 54 | 61 | 0 | 2012 | 1.62 | 1 | 1548 | 1 | 1 |
| 55 | 26 | 0 | 2013 | 1.29 | 0 | 1557 | 3 | 0 |
| 56 | 57 | 0 | 2013 | 2.1 | 0 | 1560 | 1 | 1 |
| 57 | 45 | 0 | 2013 | 0.32 | 0 | 1563 | 3 | 0 |
| 58 | 31 | 1 | 2010 | 0.81 | 0 | 1584 | 1 | 1 |
| 59 | 36 | 0 | 2013 | 1.13 | 0 | 1605 | 3 | 0 |
| 60 | 46 | 0 | 2012 | 5.16 | 1 | 1621 | 1 | 1 |
| 61 | 43 | 0 | 2013 | 1.62 | 0 | 1627 | 3 | 0 |
| 62 | 68 | 0 | 2013 | 1.37 | 0 | 1634 | 3 | 0 |
| 63 | 57 | 1 | 2013 | 0.24 | 0 | 1641 | 3 | 0 |
| 64 | 57 | 0 | 2013 | 0.81 | 0 | 1641 | 3 | 0 |
| 65 | 55 | 0 | 2013 | 1.29 | 0 | 1648 | 3 | 0 |
| 66 | 58 | 0 | 2013 | 1.29 | 0 | 1652 | 3 | 0 |
| 67 | 20 | 1 | 2013 | 0.97 | 0 | 1654 | 3 | 0 |
| 68 | 67 | 0 | 2013 | 1.13 | 0 | 1654 | 3 | 0 |
| 69 | 44 | 0 | 2010 | 5.8 | 1 | 1667 | 1 | 1 |
| 70 | 59 | 0 | 2013 | 1.29 | 0 | 1678 | 3 | 0 |
| 71 | 32 | 0 | 2013 | 0.48 | 0 | 1685 | 3 | 0 |
| 72 | 83 | 1 | 2010 | 1.62 | 1 | 1690 | 1 | 1 |
| 73 | 55 | 0 | 2013 | 2.26 | 0 | 1710 | 3 | 0 |
| 74 | 15 | 1 | 2013 | 0.58 | 0 | 1710 | 3 | 0 |
| 75 | 58 | 0 | 2010 | 0.97 | 1 | 1726 | 1 | 1 |
| 76 | 47 | 0 | 2013 | 2.58 | 1 | 1745 | 3 | 0 |
| 77 | 54 | 0 | 2013 | 0.81 | 0 | 1762 | 3 | 0 |
| 78 | 55 | 1 | 2013 | 3.54 | 1 | 1779 | 3 | 0 |
| 79 | 38 | 1 | 2013 | 0.97 | 0 | 1787 | 3 | 0 |
| 80 | 41 | 0 | 2013 | 1.78 | 1 | 1787 | 3 | 0 |
| 81 | 56 | 0 | 2013 | 1.94 | 0 | 1793 | 3 | 0 |
| 82 | 48 | 0 | 2013 | 1.29 | 0 | 1804 | 3 | 0 |
| 83 | 44 | 1 | 2013 | 3.22 | 1 | 1812 | 3 | 0 |
| 84 | 70 | 0 | 2012 | 1.53 | 0 | 1836 | 3 | 0 |
| 85 | 40 | 0 | 2012 | 1.29 | 0 | 1839 | 3 | 0 |
| 86 | 53 | 1 | 2012 | 1.62 | 1 | 1839 | 3 | 0 |
| 87 | 65 | 0 | 2012 | 1.62 | 1 | 1854 | 3 | 0 |
| 88 | 54 | 1 | 2012 | 0.32 | 0 | 1856 | 3 | 0 |
| 89 | 71 | 1 | 2008 | 4.84 | 1 | 1860 | 2 | 1 |
| 90 | 49 | 0 | 2012 | 1.29 | 0 | 1864 | 3 | 0 |
| 91 | 55 | 0 | 2012 | 0.97 | 0 | 1899 | 3 | 0 |
| 92 | 69 | 0 | 2012 | 3.06 | 0 | 1914 | 3 | 0 |
| 93 | 83 | 1 | 2012 | 3.54 | 0 | 1919 | 3 | 0 |
| 94 | 60 | 1 | 2012 | 1.62 | 1 | 1920 | 3 | 0 |
| 95 | 40 | 1 | 2012 | 2.58 | 1 | 1927 | 3 | 0 |
| 96 | 77 | 0 | 2012 | 1.94 | 1 | 1933 | 1 | 1 |
| 97 | 35 | 0 | 2012 | 0.81 | 0 | 1942 | 3 | 0 |
| 98 | 46 | 0 | 2012 | 7.73 | 1 | 1955 | 3 | 0 |
| 99 | 34 | 0 | 2012 | 0.97 | 0 | 1956 | 3 | 0 |
| 100 | 69 | 0 | 2012 | 12.88 | 0 | 1958 | 3 | 0 |
| 101 | 60 | 0 | 2012 | 2.58 | 0 | 1963 | 3 | 0 |
| 102 | 84 | 1 | 2012 | 4.09 | 1 | 1970 | 3 | 0 |
| 103 | 66 | 0 | 2012 | 0.64 | 0 | 2005 | 3 | 0 |
| 104 | 56 | 1 | 2012 | 0.97 | 0 | 2007 | 3 | 0 |
| 105 | 75 | 0 | 2012 | 3.22 | 1 | 2011 | 3 | 0 |
| 106 | 36 | 0 | 2012 | 1.62 | 0 | 2024 | 3 | 0 |
| 107 | 52 | 1 | 2012 | 3.87 | 1 | 2028 | 3 | 0 |
| 108 | 58 | 0 | 2012 | 0.32 | 1 | 2038 | 3 | 0 |
| 109 | 39 | 0 | 2012 | 0.32 | 0 | 2056 | 3 | 0 |
| 110 | 68 | 1 | 2012 | 3.22 | 1 | 2059 | 3 | 0 |
| 111 | 71 | 1 | 2008 | 2.26 | 0 | 2061 | 1 | 1 |
| 112 | 52 | 0 | 2005 | 3.06 | 0 | 2062 | 1 | 1 |
| 113 | 55 | 1 | 2012 | 2.58 | 1 | 2075 | 3 | 0 |
| 114 | 66 | 0 | 2010 | 0.65 | 0 | 2085 | 2 | 1 |
| 115 | 35 | 1 | 2012 | 1.13 | 0 | 2102 | 3 | 0 |
| 116 | 44 | 1 | 2008 | 0.81 | 0 | 2103 | 1 | 1 |
| 117 | 72 | 0 | 2012 | 0.97 | 0 | 2104 | 3 | 0 |
| 118 | 58 | 0 | 2008 | 1.76 | 1 | 2108 | 1 | 1 |
| 119 | 54 | 0 | 2012 | 1.94 | 1 | 2112 | 3 | 0 |
| 120 | 33 | 0 | 2012 | 0.65 | 0 | 2150 | 3 | 0 |
| 121 | 45 | 0 | 2012 | 0.97 | 0 | 2156 | 3 | 0 |
| 122 | 62 | 1 | 2012 | 5.64 | 0 | 2165 | 3 | 0 |
| 123 | 72 | 0 | 2010 | 9.66 | 0 | 2209 | 3 | 0 |
| 124 | 51 | 0 | 2010 | 0.1 | 0 | 2227 | 3 | 0 |
| 125 | 77 | 1 | 2010 | 5.48 | 1 | 2227 | 3 | 0 |
| 126 | 43 | 0 | 2010 | 2.26 | 1 | 2256 | 1 | 1 |
| 127 | 65 | 0 | 2010 | 4.83 | 1 | 2264 | 3 | 0 |
| 128 | 63 | 0 | 2010 | 0.97 | 0 | 2339 | 3 | 0 |
| 129 | 60 | 1 | 2010 | 0.97 | 0 | 2361 | 3 | 0 |
| 130 | 50 | 0 | 2010 | 5.16 | 1 | 2387 | 3 | 0 |
| 131 | 40 | 1 | 2008 | 0.81 | 0 | 2388 | 1 | 1 |
| 132 | 67 | 0 | 2010 | 2.9 | 1 | 2403 | 3 | 0 |
| 133 | 69 | 0 | 2010 | 3.87 | 0 | 2426 | 3 | 0 |
| 134 | 74 | 0 | 2010 | 1.94 | 1 | 2426 | 3 | 0 |
| 135 | 49 | 0 | 2010 | 0.16 | 0 | 2431 | 3 | 0 |
| 136 | 47 | 0 | 2010 | 0.64 | 0 | 2460 | 3 | 0 |
| 137 | 42 | 0 | 2005 | 2.26 | 1 | 2467 | 1 | 1 |
| 138 | 54 | 0 | 2010 | 1.45 | 0 | 2492 | 3 | 0 |
| 139 | 72 | 1 | 2010 | 4.82 | 1 | 2493 | 3 | 0 |
| 140 | 45 | 0 | 2010 | 1.29 | 1 | 2521 | 3 | 0 |
| 141 | 67 | 1 | 2010 | 7.89 | 1 | 2542 | 3 | 0 |
| 142 | 48 | 0 | 2010 | 0.81 | 1 | 2559 | 3 | 0 |
| 143 | 34 | 1 | 2010 | 3.54 | 1 | 2565 | 1 | 1 |
| 144 | 44 | 0 | 2010 | 1.29 | 0 | 2570 | 3 | 0 |
| 145 | 31 | 0 | 2010 | 0.64 | 0 | 2660 | 3 | 0 |
| 146 | 42 | 0 | 2010 | 3.22 | 1 | 2666 | 3 | 0 |
| 147 | 24 | 0 | 2010 | 1.45 | 1 | 2676 | 3 | 0 |
| 148 | 58 | 0 | 2010 | 0.48 | 0 | 2738 | 3 | 0 |
| 149 | 78 | 1 | 2008 | 1.94 | 0 | 2782 | 1 | 1 |
| 150 | 62 | 1 | 2010 | 0.16 | 0 | 2787 | 3 | 0 |
| 151 | 70 | 1 | 2008 | 0.16 | 0 | 2984 | 3 | 0 |
| 152 | 35 | 0 | 2008 | 1.29 | 0 | 3032 | 3 | 0 |
| 153 | 61 | 0 | 2008 | 1.94 | 0 | 3040 | 3 | 0 |
| 154 | 54 | 0 | 2007 | 3.54 | 1 | 3042 | 1 | 1 |
| 155 | 29 | 0 | 2008 | 0.81 | 0 | 3067 | 3 | 0 |
| 156 | 64 | 1 | 2008 | 0.65 | 0 | 3079 | 3 | 0 |
| 157 | 47 | 1 | 2008 | 7.09 | 0 | 3101 | 3 | 0 |
| 158 | 62 | 1 | 2008 | 0.16 | 0 | 3144 | 3 | 0 |
| 159 | 32 | 0 | 2008 | 1.62 | 0 | 3152 | 3 | 0 |
| 160 | 49 | 1 | 2008 | 1.62 | 0 | 3154 | 2 | 1 |
| 161 | 25 | 0 | 2008 | 1.29 | 0 | 3180 | 3 | 0 |
| 162 | 49 | 1 | 2008 | 6.12 | 0 | 3182 | 2 | 1 |
| 163 | 64 | 0 | 2008 | 0.48 | 0 | 3185 | 3 | 0 |
| 164 | 36 | 0 | 2008 | 0.64 | 0 | 3199 | 3 | 0 |
| 165 | 58 | 0 | 2008 | 3.22 | 1 | 3228 | 3 | 0 |
| 166 | 37 | 0 | 2008 | 1.94 | 0 | 3229 | 3 | 0 |
| 167 | 54 | 1 | 2008 | 2.58 | 0 | 3278 | 3 | 0 |
| 168 | 61 | 0 | 2008 | 2.58 | 1 | 3297 | 3 | 0 |
| 169 | 31 | 1 | 2008 | 0.81 | 0 | 3328 | 3 | 0 |
| 170 | 61 | 1 | 2008 | 0.81 | 1 | 3330 | 3 | 0 |
| 171 | 60 | 0 | 2007 | 3.22 | 1 | 3338 | 1 | 1 |
| 172 | 43 | 0 | 2008 | 0.32 | 0 | 3383 | 3 | 0 |
| 173 | 68 | 0 | 2008 | 3.22 | 1 | 3384 | 3 | 0 |
| 174 | 4 | 0 | 2008 | 2.74 | 0 | 3385 | 3 | 0 |
| 175 | 60 | 1 | 2008 | 4.84 | 1 | 3388 | 3 | 0 |
| 176 | 50 | 1 | 2008 | 1.62 | 0 | 3402 | 3 | 0 |
| 177 | 20 | 0 | 2008 | 0.65 | 0 | 3441 | 3 | 0 |
| 178 | 54 | 0 | 2007 | 1.45 | 0 | 3458 | 2 | 1 |
| 179 | 29 | 0 | 2008 | 0.65 | 0 | 3459 | 3 | 0 |
| 180 | 56 | 1 | 2008 | 1.29 | 1 | 3459 | 3 | 0 |
| 181 | 60 | 0 | 2008 | 1.62 | 0 | 3476 | 3 | 0 |
| 182 | 46 | 0 | 2008 | 3.54 | 0 | 3523 | 3 | 0 |
| 183 | 42 | 0 | 2007 | 3.22 | 0 | 3667 | 3 | 0 |
| 184 | 34 | 0 | 2007 | 0.65 | 0 | 3695 | 3 | 0 |
| 185 | 56 | 0 | 2007 | 1.03 | 0 | 3695 | 3 | 0 |
| 186 | 12 | 1 | 2007 | 7.09 | 1 | 3776 | 3 | 0 |
| 187 | 21 | 0 | 2007 | 1.29 | 1 | 3776 | 3 | 0 |
| 188 | 46 | 1 | 2007 | 0.65 | 0 | 3830 | 3 | 0 |
| 189 | 49 | 0 | 2007 | 1.78 | 0 | 3856 | 3 | 0 |
| 190 | 35 | 0 | 2007 | 12.24 | 1 | 3872 | 3 | 0 |
| 191 | 42 | 1 | 2007 | 8.06 | 1 | 3909 | 3 | 0 |
| 192 | 47 | 0 | 2007 | 0.81 | 0 | 3968 | 3 | 0 |
| 193 | 69 | 0 | 2007 | 2.1 | 0 | 4001 | 3 | 0 |
| 194 | 52 | 0 | 2008 | 3.87 | 0 | 4103 | 3 | 0 |
| 195 | 52 | 1 | 2008 | 0.65 | 0 | 4119 | 3 | 0 |
| 196 | 30 | 0 | 2008 | 1.94 | 1 | 4124 | 3 | 0 |
| 197 | 22 | 1 | 2008 | 0.65 | 0 | 4207 | 3 | 0 |
| 198 | 55 | 1 | 2008 | 2.1 | 0 | 4310 | 3 | 0 |
| 199 | 26 | 0 | 2005 | 1.94 | 1 | 4390 | 3 | 0 |
| 200 | 19 | 0 | 2005 | 1.13 | 1 | 4479 | 3 | 0 |
| 201 | 29 | 1 | 2005 | 7.06 | 1 | 4492 | 3 | 0 |
| 202 | 40 | 0 | 2005 | 6.12 | 0 | 4668 | 3 | 0 |
| 203 | 42 | 0 | 2005 | 0.48 | 0 | 4688 | 3 | 0 |
| 204 | 50 | 0 | 2004 | 2.26 | 0 | 4926 | 3 | 0 |
| 205 | 41 | 0 | 2002 | 2.9 | 0 | 5565 | 3 | 0 |
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