

3/15/2022

Sample Selection for MMR/Autism Study

| Selection Criteria | Controls | | | Cases | | |
|--------------------------------|----------|-----|-----|-------|----|-----|
| | Yes | No | No% | Yes | No | No% |
| Available Sample | 2143 | | | 706 | | |
| Valid CASENUM | 2113 | 30 | 1% | 706 | 0 | 0% |
| Confirmed Autism Case | 2113 | 0 | 0% | 660 | 46 | 7% |
| Matched Cases and Controls | 1912 | 201 | 10% | 647 | 13 | 2% |
| Original 3 Controls | 1891 | 21 | 1% | 647 | 0 | 0% |
| Missing Age Data | 1890 | 1 | 0% | 647 | 0 | 0% |
| Missing MMR Vaccine Date (1,2) | 1876 | 14 | 1% | 629 | 18 | 3% |

1) 11 controls were missing their entire vaccination record

2) 14 cases were missing their entire vaccination record

Table 1: Preliminary Descriptive Statistics For Entire Sample *

| | Category | Controls | | Cases | |
|---|----------------------------|----------|---------|-------|---------|
| | | N | Percent | N | Percent |
| Age 1996 | 3 - 5 yrs | 635 | 34% | 215 | 34% |
| | 6 - 8 yrs | 973 | 52% | 321 | 51% |
| | 9 - 10 yrs | 268 | 14% | 93 | 15% |
| | Total | 1876 | 100% | 629 | 100% |
| Sex | Male | 1506 | 80% | 505 | 80% |
| | Female | 370 | 20% | 124 | 20% |
| | Total | 1876 | 100% | 629 | 100% |
| Race | White | 930 | 52% | 336 | 55% |
| | Black | 674 | 38% | 232 | 38% |
| | Other | 175 | 10% | 40 | 7% |
| | Total | 1779 | 100% | 608 | 100% |
| Co-Existing DD | CP | NA | NA | 31 | 5% |
| | MR | NA | NA | 378 | 60% |
| | VI | NA | NA | 8 | 1% |
| | HI | NA | NA | 7 | 1% |
| | Epilepsy | NA | NA | 49 | 8% |
| | Non-Isolated Autism | NA | NA | 400 | 64% |
| Pre-existing Condition | Yes | NA | NA | 79 | 13% |
| Delay < 1 | Yes | NA | NA | 186 | 30% |
| Pre-existing Condition or Delay < 1 | Yes | NA | NA | 222 | 35% |
| | No | NA | NA | 407 | 65% |
| Vaccination Exemption | Yes | 1 | 0.1% | 1 | 0.2% |
| Age of MMR Vaccination | 0 - 11 mo | 37 | 2.0% | 8 | 1.3% |
| | 12 - 17 mo | 1258 | 67.1% | 444 | 70.6% |
| | 18 - 23 mo | 271 | 14.4% | 92 | 14.6% |
| | 24 - 29 mo | 93 | 5.0% | 29 | 4.6% |
| | 30 - 35 mo | 38 | 2.0% | 16 | 2.5% |
| | 36+ mo | 179 | 9.5% | 40 | 6.4% |
| | Total | 1876 | 100.0% | 629 | 100.0% |

* All subjects reported in table had date of receipt of MMR vaccine

* All cases are confirmed cases

Table 2: Preliminary Descriptive Statistics for Birth Certificate Variables

| Variable | Category | Controls | | Cases | |
|---------------|-----------------|----------|---------|-------|---------|
| | | N | Percent | N | Percent |
| Age in 1996 | 3 - 5 yrs | 382 | 36% | 127 | 35% |
| | 6 - 8 yrs | 552 | 53% | 182 | 51% |
| | 9 - 10 yrs | 115 | 11% | 50 | 14% |
| | Total | 1049 | 100% | 359 | 100% |
| Sex | Male | 834 | 80% | 286 | 80% |
| | Female | 215 | 20% | 73 | 20% |
| | Total | 1049 | 100% | 359 | 100% |
| Race | White | 578 | 55% | 201 | 56% |
| | Black | 405 | 39% | 139 | 39% |
| | Other | 66 | 6% | 19 | 5% |
| | Total | 1049 | 100% | 359 | 100% |
| Mothers Age | < 20 yrs | 102 | 10% | 16 | 4% |
| | 20 - 34 yrs | 823 | 78% | 282 | 79% |
| | 35+ yrs | 124 | 12% | 61 | 17% |
| | Total | 1049 | 100% | 359 | 100% |
| Maternal Race | White | 618 | 59% | 209 | 58% |
| | Black | 399 | 38% | 138 | 38% |
| | Other | 30 | 3% | 12 | 3% |
| | Total | 1047 | 100% | 359 | 100% |
| Maternal Educ | <= 12 yrs | 485 | 46% | 138 | 38% |
| | 13 - 15 yrs | 259 | 25% | 100 | 28% |
| | 16+ yrs | 305 | 29% | 121 | 34% |
| | Total | 1049 | 100% | 359 | 100% |
| Birth Weight | 0 - 1499 gms | 11 | 1% | 12 | 3% |
| | 1500 - 2499 gms | 55 | 5% | 37 | 10% |
| | 2500 + gms | 983 | 94% | 310 | 86% |
| | Total | 1049 | 100% | 359 | 100% |
| Multiplicity | Singleton | 1017 | 97% | 333 | 93% |
| | Twin + | 32 | 3% | 26 | 7% |
| | Total | 1049 | 100% | 359 | 100% |
| Parity | 1st Born | 462 | 44% | 151 | 42% |
| | 2nd or Higher | 578 | 56% | 206 | 58% |
| | Total | 1040 | 100% | 357 | 100% |

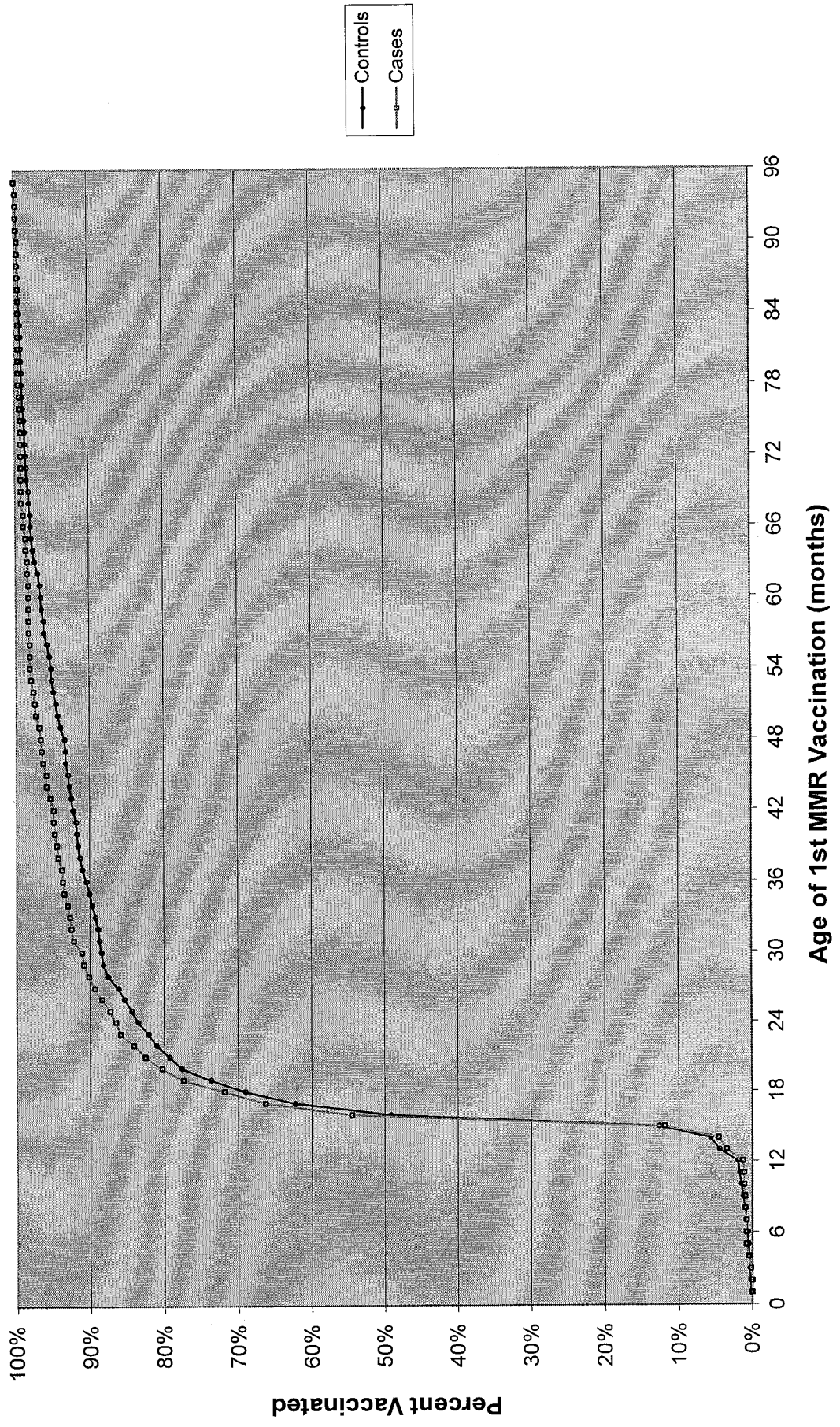
* All subjects reported in table had date of receipt of MMR vaccine

* All cases are confirmed cases

Table 3: Preliminary Statistical Analyses

| Sample | Exposure Variable | Subsample | Cases | Univariate | | Multivariate | | |
|-------------------|-------------------|------------------------------------|-------|------------|-------|--------------|-------|-------|
| | | | | OR | L95CI | OR | L95CI | U95CI |
| Total | MMR < 18 Mo | All Subjects | 629 | 1.13 | 0.92 | 1.39 | | |
| | | Isolated | 229 | 1.21 | 0.84 | 1.73 | | |
| | | Non-Isolated | 400 | 1.10 | 0.86 | 1.41 | | |
| | | Delay or Pre-existing Condition | 222 | 1.13 | 0.80 | 1.60 | | |
| | | No Delay or Pre-Existing Condition | 407 | 1.13 | 0.88 | 1.47 | | |
| Birth Certificate | MMR < 24 Mo | All Subjects | 629 | 1.23 | 0.95 | 1.60 | | |
| | | Isolated | 229 | 1.48 | 0.92 | 2.39 | | |
| | | Non-Isolated | 400 | 1.14 | 0.83 | 1.55 | | |
| | | Delay or Pre-existing Condition | 222 | 1.32 | 0.85 | 2.04 | | |
| | | No Delay or Pre-Existing Condition | 407 | 1.19 | 0.86 | 1.64 | | |
| Total | MMR < 18 Mo | All Subjects | 359 | 1.00 | 0.72 | 1.38 | 0.95 | 0.67 |
| | | Isolated | 139 | 0.77 | 0.45 | 1.30 | 0.72 | 0.41 |
| | | Non-Isolated | 220 | 1.16 | 0.77 | 1.76 | 1.10 | 0.71 |
| | | Delay or Pre-existing Condition | 133 | 0.77 | 0.45 | 1.32 | 0.61 | 0.34 |
| | | No Delay or Pre-Existing Condition | 226 | 1.15 | 0.76 | 1.74 | 1.11 | 0.72 |
| Total | MMR < 24 Mo | All Subjects | 359 | 1.14 | 0.74 | 1.75 | 1.04 | 0.66 |
| | | Isolated | 139 | 1.16 | 0.54 | 2.51 | 1.10 | 0.49 |
| | | Non-Isolated | 220 | 1.13 | 0.67 | 1.90 | 1.00 | 0.57 |
| | | Delay or Pre-existing Condition | 133 | 1.19 | 0.86 | 1.64 | 0.83 | 0.40 |
| | | No Delay or Pre-Existing Condition | 226 | 1.18 | 0.68 | 2.07 | 1.12 | 0.62 |

Age of 1st MMR Vaccination by Case Status



| Month | Control Freq | Control Cum Freq | Controls | Case Freq | Case Cum Freq | Cases |
|-------|--------------|------------------|----------|-----------|---------------|-------|
| 0 | 1 | 1 | 0.1% | 0 | 0 | 0.0% |
| 1 | 3 | 4 | 0.2% | 0 | 0 | 0.0% |
| 2 | 1 | 5 | 0.3% | 1 | 1 | 0.2% |
| 3 | 2 | 7 | 0.4% | 2 | 3 | 0.5% |
| 4 | 3 | 10 | 0.5% | 2 | 5 | 0.8% |
| 5 | 1 | 11 | 0.6% | 0 | 5 | 0.8% |
| 6 | 4 | 15 | 0.8% | 0 | 5 | 0.8% |
| 7 | 2 | 17 | 0.9% | 1 | 6 | 1.0% |
| 8 | 6 | 23 | 1.2% | 0 | 6 | 1.0% |
| 9 | 5 | 28 | 1.5% | 1 | 7 | 1.1% |
| 10 | 4 | 32 | 1.7% | 0 | 7 | 1.1% |
| 11 | 5 | 37 | 2.0% | 1 | 8 | 1.3% |
| 12 | 47 | 84 | 4.5% | 14 | 22 | 3.5% |
| 13 | 23 | 107 | 5.7% | 7 | 29 | 4.6% |
| 14 | 131 | 238 | 12.7% | 46 | 75 | 11.9% |
| 15 | 685 | 923 | 49.2% | 268 | 343 | 54.5% |
| 16 | 245 | 1168 | 62.3% | 74 | 417 | 66.3% |
| 17 | 127 | 1295 | 69.0% | 35 | 452 | 71.9% |
| 18 | 87 | 1382 | 73.7% | 35 | 487 | 77.4% |
| 19 | 74 | 1456 | 77.6% | 18 | 505 | 80.3% |
| 20 | 31 | 1487 | 79.3% | 14 | 519 | 82.5% |
| 21 | 33 | 1520 | 81.0% | 10 | 529 | 84.1% |
| 22 | 20 | 1540 | 82.1% | 11 | 540 | 85.9% |
| 23 | 26 | 1566 | 83.5% | 4 | 544 | 86.5% |
| 24 | 16 | 1582 | 84.3% | 5 | 549 | 87.3% |
| 25 | 19 | 1601 | 85.3% | 7 | 556 | 88.4% |
| 26 | 15 | 1616 | 86.1% | 6 | 562 | 89.3% |
| 27 | 26 | 1642 | 87.5% | 5 | 567 | 90.1% |
| 28 | 12 | 1654 | 88.2% | 4 | 571 | 90.8% |
| 29 | 5 | 1659 | 88.4% | 2 | 573 | 91.1% |
| 30 | 5 | 1664 | 88.7% | 7 | 580 | 92.2% |
| 31 | 3 | 1667 | 88.9% | 2 | 582 | 92.5% |
| 32 | 7 | 1674 | 89.2% | 1 | 583 | 92.7% |
| 33 | 8 | 1682 | 89.7% | 2 | 585 | 93.0% |
| 34 | 7 | 1689 | 90.0% | 3 | 588 | 93.5% |
| 35 | 8 | 1697 | 90.5% | 1 | 589 | 93.6% |
| 36 | 10 | 1707 | 91.0% | 1 | 590 | 93.8% |
| 37 | 6 | 1713 | 91.3% | 3 | 593 | 94.3% |
| 38 | 5 | 1718 | 91.6% | 1 | 594 | 94.4% |
| 39 | 3 | 1721 | 91.7% | 2 | 596 | 94.8% |
| 40 | 2 | 1723 | 91.8% | 1 | 597 | 94.9% |
| 41 | 8 | 1731 | 92.3% | 0 | 597 | 94.9% |
| 42 | 4 | 1735 | 92.5% | 3 | 600 | 95.4% |
| 43 | 5 | 1740 | 92.8% | 3 | 603 | 95.9% |
| 44 | 3 | 1743 | 92.9% | 0 | 603 | 95.9% |
| 45 | 6 | 1749 | 93.2% | 3 | 606 | 96.3% |
| 46 | 1 | 1750 | 93.3% | 1 | 607 | 96.5% |

| | | | | | | |
|--------------|-----------|------|--------|----------|-----|--------|
| 47 | 2 | 1752 | 93.4% | 1 | 608 | 96.7% |
| 48 | 10 | 1762 | 93.9% | 1 | 609 | 96.8% |
| 49 | 7 | 1769 | 94.3% | 3 | 612 | 97.3% |
| 50 | 5 | 1774 | 94.6% | 1 | 613 | 97.5% |
| 51 | 6 | 1780 | 94.9% | 1 | 614 | 97.6% |
| 52 | 5 | 1785 | 95.1% | 2 | 616 | 97.9% |
| 53 | 1 | 1786 | 95.2% | 1 | 617 | 98.1% |
| 54 | 4 | 1790 | 95.4% | 0 | 617 | 98.1% |
| 55 | 6 | 1796 | 95.7% | 0 | 617 | 98.1% |
| 56 | 8 | 1804 | 96.2% | 1 | 618 | 98.3% |
| 57 | 1 | 1805 | 96.2% | 0 | 618 | 98.3% |
| 58 | 5 | 1810 | 96.5% | 0 | 618 | 98.3% |
| 59 | 2 | 1812 | 96.6% | 0 | 618 | 98.3% |
| 60 | 2 | 1814 | 96.7% | 0 | 618 | 98.3% |
| 61 | 5 | 1819 | 97.0% | 1 | 619 | 98.4% |
| 62 | 8 | 1827 | 97.4% | 0 | 619 | 98.4% |
| 63 | 5 | 1832 | 97.7% | 1 | 620 | 98.6% |
| 64 | 3 | 1835 | 97.8% | 0 | 620 | 98.6% |
| 65 | 2 | 1837 | 97.9% | 2 | 622 | 98.9% |
| 66 | 1 | 1838 | 98.0% | 0 | 622 | 98.9% |
| 67 | 3 | 1841 | 98.1% | 2 | 624 | 99.2% |
| 68 | 1 | 1842 | 98.2% | 0 | 624 | 99.2% |
| 69 | 4 | 1846 | 98.4% | 0 | 624 | 99.2% |
| 71 | 1 | 1847 | 98.5% | 0 | 624 | 99.2% |
| 72 | 2 | 1849 | 98.6% | 0 | 624 | 99.2% |
| 74 | 1 | 1850 | 98.6% | 0 | 624 | 99.2% |
| 79 | 1 | 1851 | 98.7% | 0 | 624 | 99.2% |
| 80 | 1 | 1852 | 98.7% | 0 | 624 | 99.2% |
| 82 | 3 | 1855 | 98.9% | 1 | 625 | 99.4% |
| 83 | 2 | 1857 | 99.0% | 0 | 625 | 99.4% |
| 85 | 0 | 1857 | 99.0% | 1 | 626 | 99.5% |
| 88 | 1 | 1858 | 99.0% | 0 | 626 | 99.5% |
| 89 | 1 | 1859 | 99.1% | 0 | 626 | 99.5% |
| 90 | 1 | 1860 | 99.1% | 0 | 626 | 99.5% |
| 91 | 1 | 1861 | 99.2% | 0 | 626 | 99.5% |
| 92 | 1 | 1862 | 99.3% | 0 | 626 | 99.5% |
| 93 | 2 | 1864 | 99.4% | 0 | 626 | 99.5% |
| 97 | 1 | 1865 | 99.4% | 0 | 626 | 99.5% |
| 98 | 1 | 1866 | 99.5% | 0 | 626 | 99.5% |
| 100 | 1 | 1867 | 99.5% | 1 | 627 | 99.7% |
| 112 | 1 | 1868 | 99.6% | 0 | 627 | 99.7% |
| 113 | 1 | 1869 | 99.6% | 0 | 627 | 99.7% |
| 117 | 1 | 1870 | 99.7% | 0 | 627 | 99.7% |
| 118 | 1 | 1871 | 99.7% | 1 | 628 | 99.8% |
| 125 | 1 | 1872 | 99.8% | 0 | 628 | 99.8% |
| 126 | 1 | 1873 | 99.8% | 0 | 628 | 99.8% |
| 129 | 2 | 1875 | 99.9% | 0 | 628 | 99.8% |
| Not Total | 1 1876 | 1876 | 100.0% | 1 629 | 629 | 100.0% |

| | Controls | Cases |
|------------|----------|-------|
| 100% Max | 9999 | 9999 |
| 99% | 88 | 67 |
| 95% | 52 | 42 |
| 90% | 34 | 27 |
| 75% Q3 | 19 | 18 |
| 50% Median | 16 | 15 |
| 25% Q1 | 15 | 15 |
| 10% | 14 | 14 |
| 5% | 13 | 14 |
| 1% | 8 | 9 |
| 0% Min | 0 | 2 |

| | | | | | | | | |
|-------|---|---------|---------|--------|--------|------|------|------|
| MMRC1 | 1 | -0.0033 | 0.42895 | 0.0001 | 0.9939 | 1.00 | 0.43 | 2.31 |
| MMRC2 | 1 | 0.51588 | 0.18883 | 7.4636 | 0.0063 | 1.68 | 1.16 | 2.43 |
| MMRC3 | 1 | 0.32446 | 0.20107 | 2.6038 | 0.1066 | 1.38 | 0.93 | 2.05 |
| MMRC4 | 1 | 0.31229 | 0.23199 | 1.812 | 0.1783 | 1.37 | 0.87 | 2.15 |
| MMRC5 | 1 | 0.45219 | 0.24846 | 3.3124 | 0.0688 | 1.57 | 0.97 | 2.56 |

1.133 0.922 1.392
1.532 1.071 2.193

| | | | | | | | | |
|-------|---|---------|---------|--------|--------|-------|-------|-------|
| MMRC1 | 1 | 0.23687 | 0.8579 | 0.0762 | 0.7825 | 1.267 | 0.236 | 6.81 |
| MMRC2 | 1 | 1.01753 | 0.39426 | 6.6607 | 0.0099 | 2.766 | 1.277 | 5.991 |
| MMRC3 | 1 | 0.82215 | 0.41091 | 4.0031 | 0.0454 | 2.275 | 1.017 | 5.091 |
| MMRC4 | 1 | 0.60296 | 0.479 | 1.5845 | 0.2081 | 1.828 | 0.715 | 4.673 |
| MMRC5 | 1 | 0.95207 | 0.49387 | 3.7164 | 0.0539 | 2.591 | 0.984 | 6.821 |

1.206 0.84 1.73

2.527 1.179 5.413

| | | | | | | | | |
|-------|---|---------|---------|--------|--------|-------|-------|-------|
| MMRC1 | 1 | 0.25353 | 0.50422 | 0.2528 | 0.6151 | 1.289 | 0.48 | 3.462 |
| MMRC2 | 1 | 0.60148 | 0.22673 | 7.0379 | 0.008 | 1.825 | 1.17 | 2.846 |
| MMRC3 | 1 | 0.43439 | 0.23988 | 3.2791 | 0.0702 | 1.544 | 0.965 | 2.471 |
| MMRC4 | 1 | 0.34649 | 0.27683 | 1.5666 | 0.2107 | 1.414 | 0.822 | 2.433 |
| MMRC5 | 1 | 0.53671 | 0.29405 | 3.3314 | 0.068 | 1.71 | 0.961 | 3.044 |

| | | | | | | | | |
|-------|---|----------|---------|--------|--------|-------|-------|-------|
| MMRC1 | 1 | -0.36457 | 0.87655 | 0.173 | 0.6775 | 0.694 | 0.125 | 3.871 |
| MMRC2 | 1 | 0.30863 | 0.35119 | 0.7723 | 0.3795 | 1.362 | 0.684 | 2.71 |
| MMRC3 | 1 | 0.18735 | 0.3697 | 0.2568 | 0.6123 | 1.206 | 0.584 | 2.489 |
| MMRC4 | 1 | 0.15499 | 0.40435 | 0.1469 | 0.7015 | 1.168 | 0.529 | 2.579 |
| MMRC5 | 1 | 0.39542 | 0.44137 | 0.8026 | 0.3703 | 1.485 | 0.625 | 3.527 |

| | | | | | | | | |
|-------|---|----------|---------|--------|--------|-------|-------|-------|
| MMRC1 | 1 | -0.29528 | 0.86285 | 0.1171 | 0.7322 | 0.744 | 0.137 | 4.038 |
| MMRC2 | 1 | 0.41639 | 0.33788 | 1.5187 | 0.2178 | 1.516 | 0.782 | 2.941 |
| MMRC3 | 1 | 0.28976 | 0.35685 | 0.6593 | 0.4168 | 1.336 | 0.664 | 2.689 |
| MMRC4 | 1 | 0.301 | 0.38834 | 0.6008 | 0.4383 | 1.351 | 0.631 | 2.893 |
| MMRC5 | 1 | 0.43138 | 0.43118 | 1.0009 | 0.3171 | 1.539 | 0.661 | 3.584 |

| | | | |
|---|------|-----|------|
| 1 | 37 | 8 | 45 |
| 2 | 1258 | 444 | 1702 |
| 3 | 271 | 92 | 363 |
| 4 | 93 | 29 | 122 |
| 5 | 38 | 16 | 54 |
| 6 | 179 | 40 | 219 |
| | 1876 | 629 | 2505 |

| | | | |
|---|-----|-----|-----|
| 1 | 10 | 2 | 12 |
| 2 | 744 | 251 | 995 |
| 3 | 159 | 59 | 218 |
| 4 | 42 | 16 | 58 |
| 5 | 17 | 12 | 29 |

6

77

19

96