**Appendix A: Model details**

Table 5. Codes for the ten primary input characteristics.

TYP = Type of event:

1 = AFL, 2 = Rugby, 3 = Royal shows, 4 = Cricket, 5 = Air shows,

6 = Parades, marches, 7 = Car and motorbike races, 8 = Horse races,

9 = Walks, runs, marathons, 10 = Concerts, 11 = Soccer, 12 = Tennis,

13 = Miscellaneous.

MOB = Mobility of audience. 0 = mobile, 1 = seated.

BDD = Bounded event. 0 = not bounded, 1 = bounded.

FOC = Focussed or extended. 0 = extended, 1 = focussed.

DAY = Day or night event. 1 = day, 2 = night, 3 = both.

ATT = Attendance.

TEM = Temperature in C.

HUM = Humidity.

ALC = Alcohol: 1 = alcohol served, 0 = no alcohol served.

OUT = Indoor or outdoor event: 1 = indoor, 2 = outdoor, 3 = both.

Each model consists of a decision tree comprising 25 nodes, of which 12 are splitting nodes (branch points) and 13 are terminal nodes (leaves). The model may be represented as a tree graph to understand the general structure (Fig 2), but implementation requires knowing the rules for decisions at every splitting node (Appendices B – G).

In Appendices B – G, the decision criterion is stated for every splitting node. The split may result in two new splitting nodes (for example, node 1 in Fig. 2), in one leaf and one new splitting node (for example, node 2 in Fig. 2) or in two leaves (for example, node 10 in Fig 2). If a leaf is created, the value of the output variable predicted for that leaf is stated. The model prediction given by “else” is the value that should be assigned if an event does not satisfy either of the branching criteria. For example, at node 9 of model for TPP (Appendix B), event types 3, 8, 9, 10 and 12 do not appear in either branching criteria because no events of these types in the training data reached this node of the tree. When such an event is encountered in practice (or in the testing phase) the TPP value specified by “else” is assigned. The value assigned by “else” is based on the mean values of events reaching the node during the training phase.

**Appendix B**

The tree model for Total Patient Presentation (TPP)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If TYP = {1 2 4 5 6 7 8 9 11 13},  go to node 2. | If TYP = {3 10 12},  go to node 3. | TPP = 5.94. |
| 2 | If ATT < 450000,  go to node 4. | If ATT ≥ 450000, TPP = 21.05. | TPP = 4.38. |
| 3 | If DAY = {1 2},  TPP = 5.67. | If DAY = {3},  go to node 7. | TPP = 11.38. |
| 4 | If ATT < 48660,  go to node 8. | If ATT ≥ 48660,  go to node 9. | TPP = 4.28. |
| 7 | If HUM < 62.5,  go to node 10. | HUM ≥ 62.5,  go to node 11. | TPP = 12.52. |
| 8 | If ATT < 29934,  TPP = 2.72. | If ATT ≥ 29934,  go to node 13. | TPP = 3.48. |
| 9 | If TYP = {1 4 5 6 11 13},  TPP = 4.91. | If TYP = {2 7},  go to node 15. | TPP = 5.79. |
| 10 | If TMP < 23.5,  TPP = 11.30. | If TMP ≥ 23.5,  TPP = 9.41. | TPP = 10.50. |
| 11 | If TMP < 25.5,  go to node 18. | If TMP ≥ 25.5,  TPP = 26.14. | TPP = 14.34. |
| 13 | If TYP = {1 2 5 6 8 13},  TPP = 3.76. | If TYP = {7},  TPP = 9.64. | TPP = 3.94. |
| 15 | If DAY = {2},  TPP = 5.60. | If DAY = {1 3},  TPP = 10.43. | TPP = 9.55. |
| 18 | If TMP < 23.5,  TPP = 11.49. | If TMP ≥ 23.5,  TPP = 16.84. | TPP = 12.38. |

**Appendix C**

The tree model for total patient transported (TPT)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If MOB = {0},  go to node 2. | If MOB = {1},  go to node 3. | TPT = 0.82. |
| 2 | If TYP < {5 13},  go to node 4. | If TYP = {3 6 7 8 9 10}, go to node 5. | TPT = 1.17. |
| 3 | If DAY = {1},  go to node 6. | If DAY = {2 3},  go to node 7. | TPT = 0.56. |
| 4 | If ATT < 215000,  TPT = 0.24. | If ATT ≥ 215000,  TPT = 0.87. | TPT = 0.28. |
| 5 | If TMP < 24.5,  go to node 10. | TMP ≥ 24.5,  go to node 11. | TPT = 1.65. |
| 6 | If ATT < 47180,  go to node 12. | If ATT ≥ 47180,  TPT = 0.80. | TPT = 0.46. |
| 7 | If TMP < 23.5,  go to node 14. | If TMP ≥ 23.5,  go to node 15. | TPT = 0.67. |
| 10 | If HUM < 74.5,  TPT = 1.28. | If HUM ≥ 74.5,  TPT = 1.87. | TPT = 1.48. |
| 11 | If TYP = {3 7},  TPT = 1.53. | If TYP = {6 10},  TPT = 3.04. | TPT = 2.03. |
| 12 | If HUM < 59.5,  TPT = 0.54. | If HUM ≥ 59.5,  TPT = 0.00. | TPT = 0.31. |
| 14 | If HUM < 50.5,  TPT = 0.49. | If HUM ≥ 50.5,  TPT = 0.93. | TPT = 0.81. |
| 15 | If TMP < 35.5,  TPT = 0.32. | If TMP ≥ 35.5,  TPT = 2.00. | TPT = 0.41. |

**Appendix D**

The tree model for asthma related presentations (AST)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If ATT < 39612,  go to node 2. | If ATT ≥ 39612,  go to node 3. | AST = 0.86. |
| 2 | If TYP < {1 2 4 5 6 7 11 13},  go to node 4. | If TYP = {3 9 10 12}, go to node 5. | AST = 0.38. |
| 3 | If MOB = {0},  go to node 6. | If MOB = {1},  go to node 7. | AST = 1.18. |
| 4 | If ATT < 27389,  go to node 8. | If ATT ≥ 27389,  go to node 9. | AST = 0.31. |
| 5 | If HUM < 79.0,  AST = 0.53. | HUM ≥ 79.0,  AST = 2.28. | AST = 0.84. |
| 6 | If TYP = {3 5 6 7 8 13},  go to node 12. | If TYP = {10},  AST = 5.48. | AST = 1.49. |
| 7 | If ATT < 97114,  go to node 14. | If ATT ≥ 97114,  AST = 1.91. | AST = 0.85. |
| 8 | If TMP < 27.5,  AST = 0.09. | If TMP ≥ 27.5,  AST = 0.33. | AST = 0.12. |
| 9 | If ATT < 32610,  AST = 0.54. | If ATT ≥ 32610,  AST = 0.23. | AST = 0.40. |
| 12 | If BDD = {0},  AST = 0.53. | If BDD = {1},  go to node 21. | AST = 1.37. |
| 14 | If ATT < 43410,  AST = 0.35. | If ATT ≥ 43410,  AST = 0.85. | AST = 0.76. |
| 21 | If TYP = {5 8},  AST = 0.87. | If TYP = {3 6 7},  AST = 1.79. | AST = 1.68. |

**Appendix E**

The tree model patients presenting with lacerations (LAC)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If DAY = {1 2},  go to node 2. | If DAY = {3},  go to node 3. | LAC = 1.23. |
| 2 | If ATT < 116500,  go to node 4. | If ATT ≥ 116500,  LAC = 5.70. | LAC = 0.89. |
| 3 | If OUT = {2},  go to node 6. | If OUT = {3},  go to node 7. | LAC = 1.90. |
| 4 | If ATT < 67519,  go to node 8. | If ATT ≥ 67519,  go to node 9. | LAC = 0.82. |
| 6 | If TYP = {1 3 4 5 6 7 12 13},  go to node 10. | TYP = {10},  LAC = 4.23. | LAC = 1.08. |
| 7 | If HUM < 51.0,  go to node 12. | If HUM ≥ 51.0,  go to node 13. | LAC = 3.19. |
| 8 | If ATT < 29934,  LAC = 0.30. | If ATT ≥ 29934,  LAC = 0.83. | LAC = 0.67. |
| 9 | If TMP < 26.5,  LAC = 1.40. | If TMP ≥ 26.5,  LAC = 3.38. | LAC = 1.84 |
| 10 | If TYP = {5 6 13},  go to node 18. | If TYP = {1 3 4 7 12},  LAC = 1.36. | LAC = 0.93. |
| 12 | If ATT < 76041,  LAC = 2.23. | If ATT ≥ 76041,  LAC = 0.00. | LAC = 1.79. |
| 13 | If ATT < 97645,  LAC = 3.85. | If ATT ≥ 97645,  LAC = 6.00. | LAC = 3.97. |
| 18 | If ATT < 130000  LAC = 0.23 | If ATT ≥ 130000,  LAC = 1.22. | LAC = 0.57. |

**Appendix F**

The tree model for minor illness or injury (MIN)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If TYP = {1 2 4 5 6 7 8 9 11 13},  go to node 2. | If TYP = {3 10 12},  go to node 3. | MIN = 4.99. |
| 2 | If ATT < 48502,  go to node 4. | If ATT ≥ 48502,  go to node 5. | MIN = 3.53. |
| 3 | If DAY = {1 2},  MIN = 3.82. | If DAY = {3},  go to node 7. | MIN = 10.10. |
| 4 | If ATT < 25550,  go to node 8. | If ATT ≥ 25550,  go to node 9. | MIN = 2.68. |
| 5 | If TYP = {1 4 11 13},  go to node 10. | TYP = {2 5 6 7},  go to node 11. | MIN = 5.04. |
| 7 | If HUM < 59.0,  go to node 12. | If HUM ≥ 59.0,  go to node 13. | MIN = 11.35. |
| 8 | If ATT < 19000,  MIN = 0.00. | If ATT ≥ 19000,  MIN = 1.68. | MIN = 0.84. |
| 9 | If MOB = {0},  MIN = 3.88. | If MOB = {1},  MIN = 2.82. | MIN = 3.00. |
| 10 | If DAY = {1},  MIN = 4.55. | If DAY = {2 3},  MIN = 3.20. | MIN = 3.67. |
| 11 | If TMP < 22.5,  MIN = 5.38. | If TMP ≥ 22.5,  MIN = 9.38. | MIN = 7.78. |
| 12 | If HUM < 34.5,  MIN = 12.19. | If HUM ≥ 34.5,  MIN = 8.94. | MIN = 9.30. |
| 13 | If TMP < 23.5,  MIN = 10.33. | If TMP > 23.5,  MIN = 18.82. | MIN = 13.03. |

**Appendix G**

The tree model for other illness or injury (OTH)

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Branch 1 | Branch 2 | Else |
| 1 | If ATT < 36794,  go to node 2. | If ATT ≥ 36794,  go to node 3. | OTH = 1.31. |
| 2 | If TYP =  {1 2 3 4 5 7 9 10 11 13},  go to node 4. | If TYP = {12},  OTH = 2.44. | OTH = 0.73. |
| 3 | If TYP = {1 2 5 6 8 11 13},  go to node 6. | If TYP = {3 4 7 10},  go to node 7. | OTH = 1.65. |
| 4 | If ATT < 25050,  OTH = 0.00. | If ATT ≥ 25050,  go to node 9. | OTH = 0.64. |
| 6 | If TMP < 31.5,  go to node 10. | TMP ≥ 31.5,  OTH = 0.00. | OTH = 1.27. |
| 7 | If OUT = {2},  go to node 12. | If OUT = {3},  go to node 13. | OTH = 2.35. |
| 9 | If TYP = {2 5 7},  OTH = 0.20. | If TYP = {1 3 4 10 11 13},  OTH = 0.88. | OTH = 0.82. |
| 10 | If OUT = {1},  OTH = 0.50. | If OUT = {2},  go to node 17. | OTH = 1.30. |
| 12 | If TYP = {7},  OTH = 2.48. | If TYP = {3 4 10},  go to node 19. | OTH = 3.21. |
| 13 | If TMP < 19.5,  OTH = 2.72. | If TMP ≥ 19.5,  OTH = 1.44. | OTH = 1.68. |
| 17 | If ATT < 450000,  OTH = 1.27. | If ATT ≥ 450000,  OTH = 5.29. | OTH = 1.32. |
| 19 | If ATT < 42262,  OTH = 8.12. | If ATT ≥ 42262,  OTH = 3.29. | OTH = 3.66. |