

Model Selection Results

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```
library(tidyverse)
library(kableExtra)

source("aux_functions.R")
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Model Selection

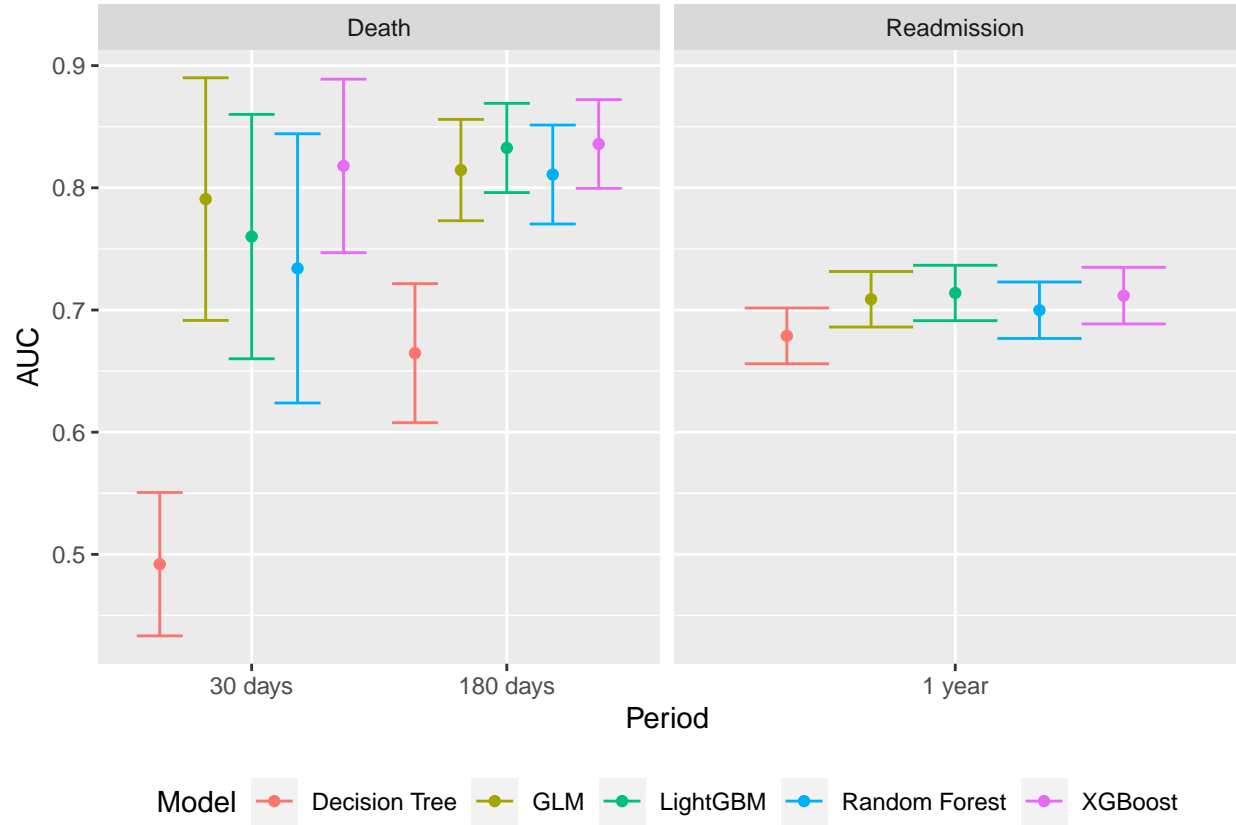


Table 1: Readmission models comparison

Period	Model	AUC	Lower Limit	Upper Limit
1 year	LightGBM	0.71	0.69	0.74
1 year	XGBoost	0.71	0.69	0.73
1 year	GLM	0.71	0.69	0.73
1 year	Random Forest	0.70	0.68	0.72
1 year	Decision Tree	0.68	0.66	0.70

Table 2: Death models comparison

Period	Model	AUC	Lower Limit	Upper Limit
30 days	XGBoost	0.82	0.75	0.89

Table 2: Death models comparison (*continued*)

Period	Model	AUC	Lower Limit	Upper Limit
30 days	GLM	0.79	0.69	0.89
30 days	LightGBM	0.76	0.66	0.86
30 days	Random Forest	0.73	0.62	0.84
30 days	Decision Tree	0.49	0.43	0.55
180 days	XGBoost	0.84	0.80	0.87
180 days	LightGBM	0.83	0.80	0.87
180 days	GLM	0.81	0.77	0.86
180 days	Random Forest	0.81	0.77	0.85
180 days	Decision Tree	0.66	0.61	0.72

Final Model

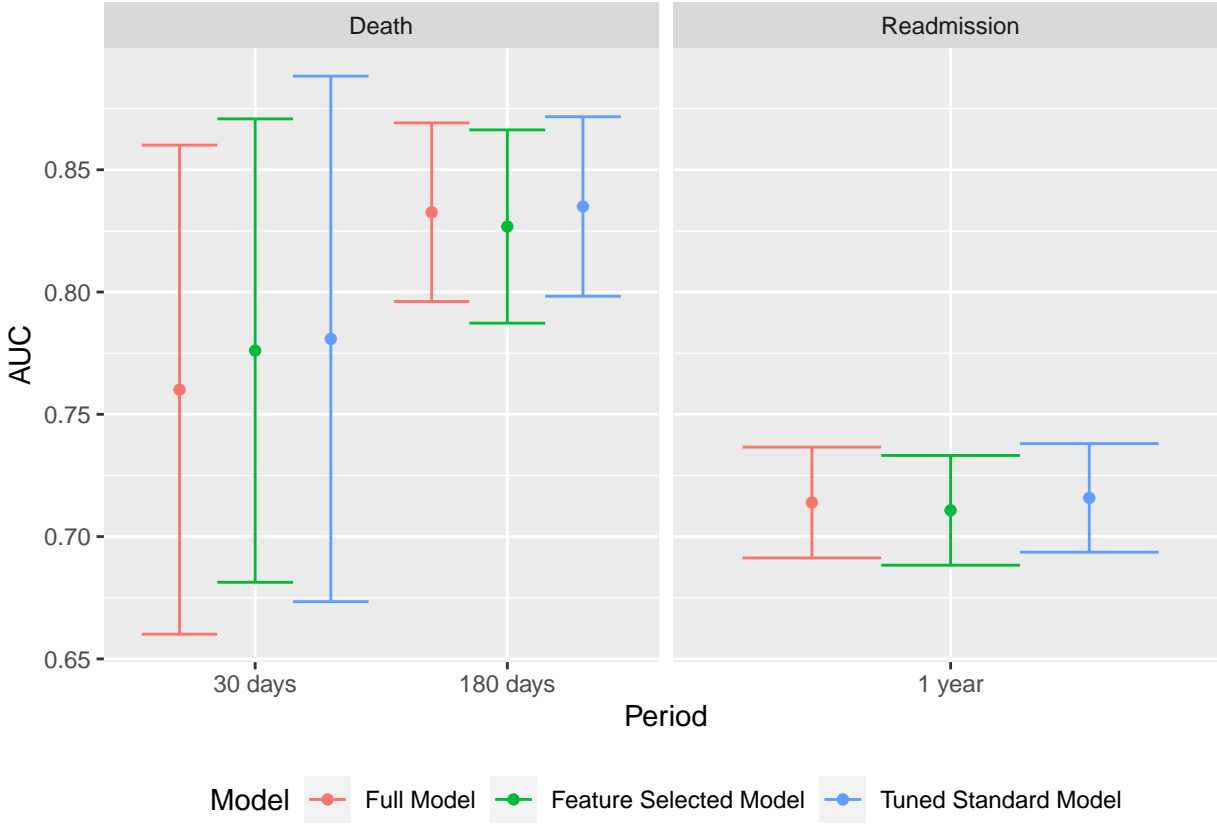


Table 3: Readmission models comparison

Period	Model	Features	AUC	Lower Limit	Upper Limit
1 year	Tuned Standard Model	10	0.72	0.69	0.74
1 year	Full Model	97	0.71	0.69	0.74
1 year	Feature Selected Model	10	0.71	0.69	0.73

Table 4: Death models comparison

Period	Model	Features	AUC	Lower Limit	Upper Limit
30 days	Tuned Standard Model	39	0.78	0.67	0.89
30 days	Feature Selected Model	39	0.78	0.68	0.87
30 days	Full Model	65	0.76	0.66	0.86

Table 4: Death models comparison (*continued*)

Period	Model	Features	AUC	Lower Limit	Upper Limit
180 days	Tuned Standard Model	9	0.83	0.80	0.87
180 days	Full Model	78	0.83	0.80	0.87
180 days	Feature Selected Model	9	0.83	0.79	0.87

Selected Features

death_180days

1. hospital_stay
2. age
3. year_adm_t0
4. espirolactona
5. education_level
6. laboratorio
7. comorbidities_count
8. admission_pre_t0_count
9. vasodilatador

death_1year

1. aco
2. admission_pre_t0_count
3. age
4. analises_clinicas_qtde
5. antiarritmico
6. antifungico
7. cateter_venoso_central
8. cateterismo
9. cied_final_group_1
10. citologia
11. classe_meds_qtde
12. comorbidities_count
13. diabetes
14. diuretico
15. dva
16. ecocardiograma
17. education_level
18. endoscopia
19. equipe_multiprof
20. espirolactona
21. estatina
22. exames_imagem_qtde
23. flebografia
24. hemodialysis
25. hospital_stay
26. icu_t0
27. ieca_bra
28. insuf_cardiaca
29. interconsulta
30. meds_antimicrobianos
31. meds_cardiovasc_qtde
32. metodos_graficos_qtde
33. nyha_basal
34. outros_proced_cirurgicos
35. proced_invasivos_qtde
36. procedure_type_new
37. psicofarmacos

38. sex
39. teste_esforco
40. ultrassom
41. valvopathy
42. vasodilatador
43. year_adm_t0

death__2year

1. aco
2. admission_pre_t0_180d
3. admission_pre_t0_count
4. admission_t0_emergency
5. af
6. age
7. analises_clinicas_qtde
8. angio_tc
9. antiarritmico
10. antifungico
11. antiplaquetario_ev
12. bic
13. cardiac_arrest
14. cateter_venoso_central
15. cateterismo
16. cied_final_1
17. cied_final_group_1
18. cintilografia
19. citologia
20. classe_meds_qtde
21. comorbidities_count
22. copd
23. cultura
24. diabetes
25. dialysis_t0
26. digoxina
27. diuretico
28. dva
29. ecocardiograma
30. education_level
31. endoscopia
32. equipe_multiprof
33. espirolactona
34. estatina
35. exames_imagem_qtde
36. flebografia
37. heart_disease
38. histopatologia_qtde
39. holter
40. hospital_stay
41. hypertension
42. icp
43. icu_t0
44. ieca_bra
45. insuf_cardiaca
46. insulina
47. interconsulta
48. laboratorio
49. meds_antimicrobianos
50. meds_cardiovasc_qtde
51. metodos_graficos_qtde
52. nyha_basal

- 53. outros_proced_cirurgicos
- 54. pet_ct
- 55. prior_mi
- 56. proced_invasivos_qtde
- 57. procedure_type_1
- 58. procedure_type_new
- 59. psicofarmacos
- 60. renal_failure
- 61. ressonancia
- 62. stroke
- 63. teste_esforco
- 64. tilt_teste
- 65. tomografia
- 66. ultrassom
- 67. underlying_heart_disease
- 68. valvopathy
- 69. vasodilatador
- 70. ventilacao_mecanica
- 71. year_adm_t0

death_30days

- 1. age
- 2. education_level
- 3. nyha_basal
- 4. hypertension
- 5. af
- 6. diabetes
- 7. renal_failure
- 8. comorbidities_count
- 9. procedure_type_1
- 10. cied_final_1
- 11. cied_final_group_1
- 12. admission_pre_t0_count
- 13. admission_pre_t0_180d
- 14. year_adm_t0
- 15. icu_t0
- 16. antiarritmico
- 17. antihipertensivo
- 18. betabloqueador
- 19. dva
- 20. diuretico
- 21. vasodilatador
- 22. insulina
- 23. psicofarmacos
- 24. classe_meds_qtde
- 25. meds_cardiovasc_qtde
- 26. meds_antimicrobianos
- 27. ventilacao_mecanica
- 28. proced_invasivos_qtde
- 29. interconsulta
- 30. equipe_multiprof
- 31. holter
- 32. metodos_graficos_qtde
- 33. laboratorio
- 34. cultura
- 35. analises_clinicas_qtde
- 36. citologia
- 37. tomografia
- 38. ressonancia
- 39. hospital_stay

death_3year

1. age
2. hospital_stay
3. year_adm_t0
4. admission_pre_t0_count
5. ieca_bra
6. classe_meds_qtde
7. comorbidities_count
8. insuf_cardiaca
9. education_level
10. vasodilatador
11. estatina
12. equipe_multiprof
13. analises_clinicas_qtde
14. antiarritmico
15. nyha_basal
16. dva
17. admission_t0_emergency
18. cied_final_group_1
19. renal_failure
20. valvopathy
21. hypertension
22. admission_pre_t0_180d
23. race
24. underlying_heart_disease
25. sex
26. ultrassom
27. diabetes
28. digoxina
29. ecocardiograma
30. aco
31. cied_final_1
32. tomografia
33. cultura
34. af
35. heart_failure
36. bic
37. prior_mi
38. anticonvulsivante
39. outros_proced_cirurgicos
40. insulina
41. antifungico
42. endoscopia
43. copd
44. holter
45. eletrofisiologia
46. cintilografia
47. cateter_venoso_central
48. teste_esforco
49. transfusao
50. transplante_cardiaco

readmission_180d

1. hospital_stay
2. admission_pre_t0_count
3. classe_meds_qtde
4. antiarritmico
5. procedure_type_1

readmission__1year

1. hospital_stay
2. admission_pre_t0_count
3. year_adm_t0
4. meds_antimicrobianos
5. vasodilatador
6. icu_t0
7. procedure_type_new
8. nyha_basal
9. admission_pre_t0_180d
10. cied_final_1

readmission__30d

1. hospital_stay
2. admission_pre_t0_count
3. antiarritmico
4. digoxina
5. bic
6. icu_t0
7. procedure_type_new

readmission__60d

1. hospital_stay
2. admission_pre_t0_count
3. classe_meds_qtde
4. vasodilatador

Union

1. hospital_stay
2. age
3. year_adm_t0
4. espirolactona
5. education_level
6. laboratorio
7. comorbidities_count
8. admission_pre_t0_count
9. vasodilatador
10. aco
11. analises_clinicas_qtde
12. antiarritmico
13. antifungico
14. cateter_venoso_central
15. cateterismo
16. cied_final_group_1
17. citologia
18. classe_meds_qtde
19. diabetes
20. diuretico
21. dva
22. ecocardiograma
23. endoscopia
24. equipe_multiprof
25. estatina
26. exames_imagem_qtde
27. flebografia
28. hemodialysis
29. icu_t0

30. ieca_bra
31. insuf_cardiaca
32. interconsulta
33. meds_antimicrobianos
34. meds_cardiovasc_qtde
35. metodos_graficos_qtde
36. nyha_basal
37. outros_proced_cirurgicos
38. proced_invasivos_qtde
39. procedure_type_new
40. psicofarmacos
41. sex
42. teste_esforco
43. ultrassom
44. valvopathy
45. admission_pre_t0_180d
46. admission_t0_emergency
47. af
48. angio_tc
49. antiplaquetario_ev
50. bic
51. cardiac_arrest
52. cied_final_1
53. cintilografia
54. copd
55. cultura
56. dialysis_t0
57. digoxina
58. heart_disease
59. histopatologia_qtde
60. holter
61. hypertension
62. icp
63. insulina
64. pet_ct
65. prior_mi
66. procedure_type_1
67. renal_failure
68. ressonancia
69. stroke
70. tilt_teste
71. tomografia
72. underlying_heart_disease
73. ventilacao_mecanica
74. antihipertensivo
75. betabloqueador
76. race
77. heart_failure
78. anticonvulsivante
79. eletrofisiologia
80. transfusao
81. transplante_cardiaco