

Model Selection Results

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```
library(tidyverse)
library(kableExtra)

source("aux_functions.R")
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Model Selection

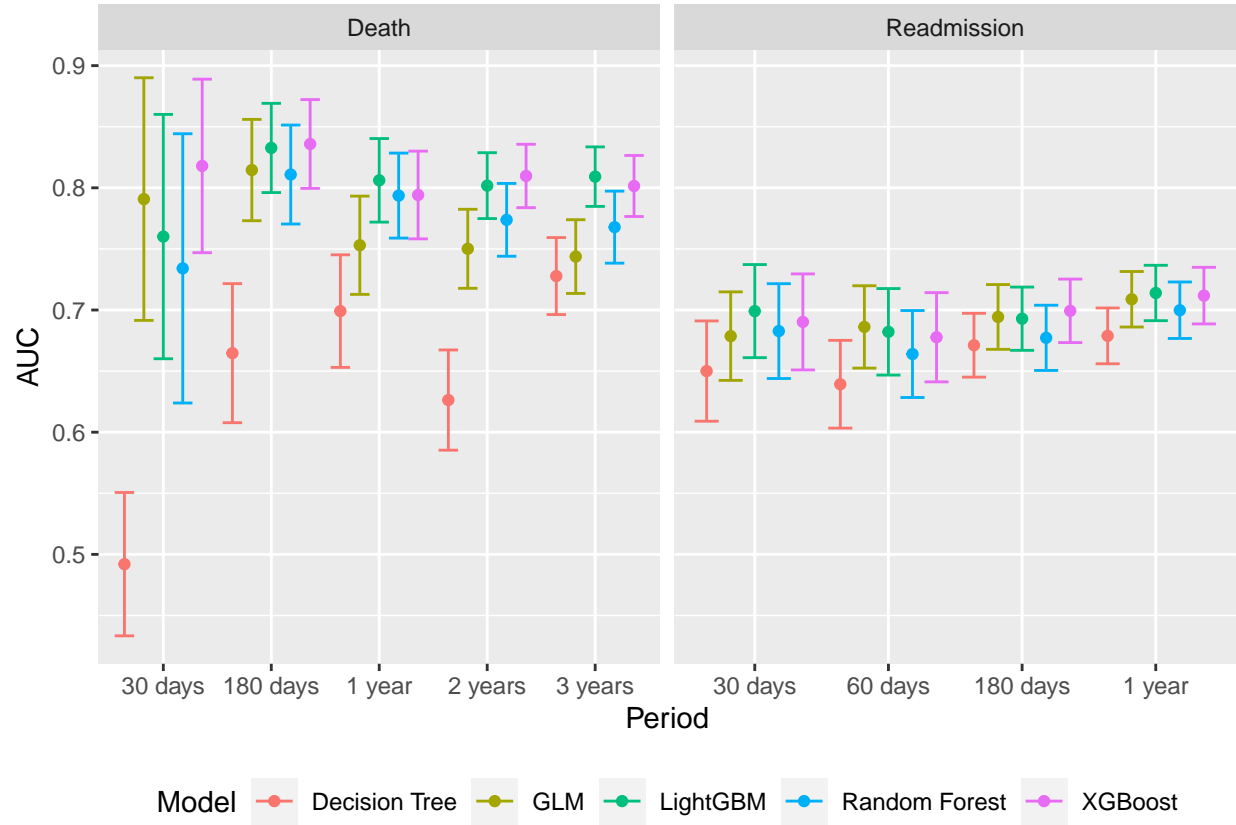


Table 1: Readmission models comparison

Period	Model	AUC	Lower Limit	Upper Limit
30 days	LightGBM	0.70	0.66	0.74
30 days	XGBoost	0.69	0.65	0.73
30 days	Random Forest	0.68	0.64	0.72
30 days	GLM	0.68	0.64	0.71
30 days	Decision Tree	0.65	0.61	0.69
60 days	GLM	0.69	0.65	0.72
60 days	LightGBM	0.68	0.65	0.72
60 days	XGBoost	0.68	0.64	0.71
60 days	Random Forest	0.66	0.63	0.70
60 days	Decision Tree	0.64	0.60	0.68
180 days	XGBoost	0.70	0.67	0.73

Table 1: Readmission models comparison (*continued*)

Period	Model	AUC	Lower Limit	Upper Limit
180 days	GLM	0.69	0.67	0.72
180 days	LightGBM	0.69	0.67	0.72
180 days	Random Forest	0.68	0.65	0.70
180 days	Decision Tree	0.67	0.65	0.70
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
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
1 year	LightGBM	0.81	0.77	0.84
1 year	XGBoost	0.79	0.76	0.83
1 year	Random Forest	0.79	0.76	0.83
1 year	GLM	0.75	0.71	0.79
1 year	Decision Tree	0.70	0.65	0.75
2 years	XGBoost	0.81	0.78	0.84
2 years	LightGBM	0.80	0.77	0.83
2 years	Random Forest	0.77	0.74	0.80
2 years	GLM	0.75	0.72	0.78
2 years	Decision Tree	0.63	0.59	0.67
3 years	LightGBM	0.81	0.78	0.83
3 years	XGBoost	0.80	0.78	0.83
3 years	Random Forest	0.77	0.74	0.80
3 years	GLM	0.74	0.71	0.77
3 years	Decision Tree	0.73	0.70	0.76

Final Model

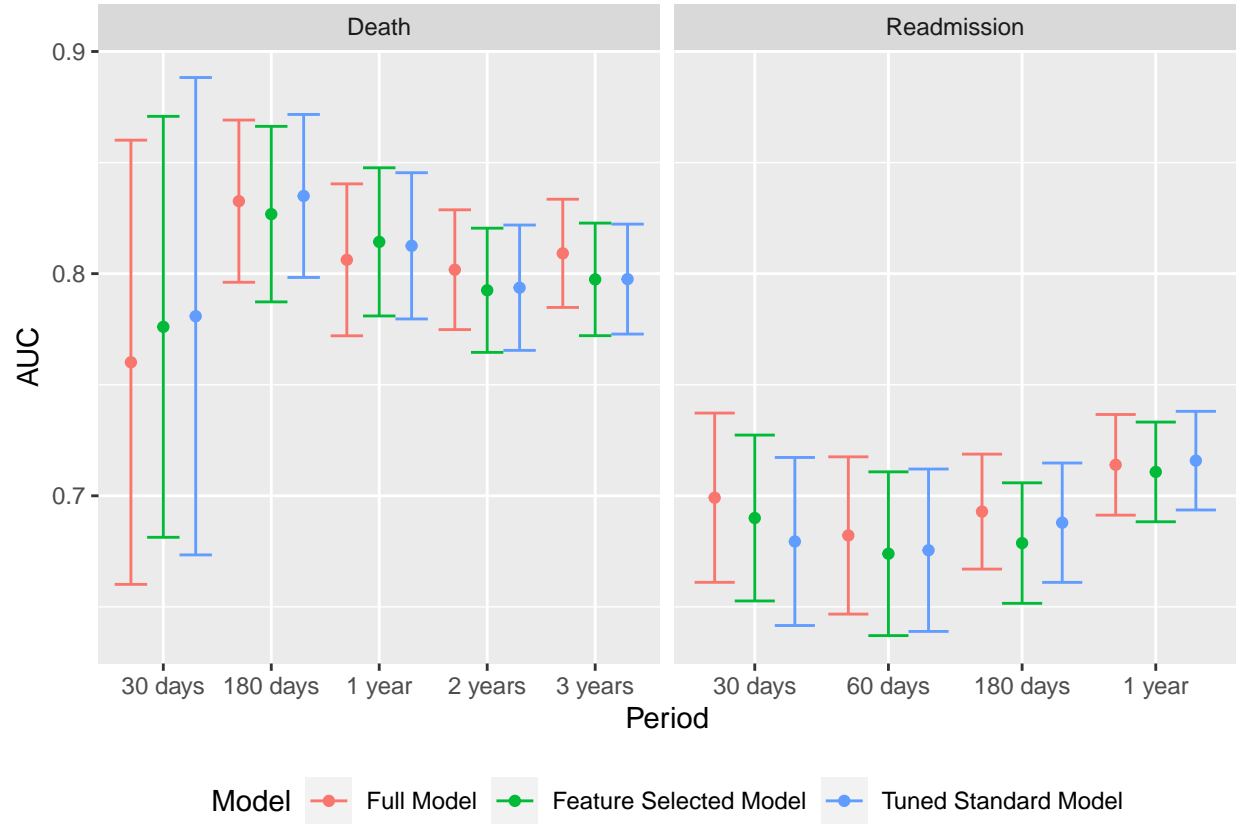


Table 3: Readmission models comparison

Period	Model	Features	AUC	Lower Limit	Upper Limit
30 days	Full Model	76	0.70	0.66	0.74
30 days	Feature Selected Model	11	0.69	0.65	0.73
30 days	Tuned Standard Model	11	0.68	0.64	0.72
60 days	Full Model	84	0.68	0.65	0.72
60 days	Tuned Standard Model	4	0.68	0.64	0.71
60 days	Feature Selected Model	4	0.67	0.64	0.71
180 days	Full Model	95	0.69	0.67	0.72
180 days	Tuned Standard Model	7	0.69	0.66	0.71
180 days	Feature Selected Model	7	0.68	0.65	0.71
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
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
1 year	Feature Selected Model	16	0.81	0.78	0.85
1 year	Tuned Standard Model	16	0.81	0.78	0.85
1 year	Full Model	83	0.81	0.77	0.84

Table 4: Death models comparison (*continued*)

Period	Model	Features	AUC	Lower Limit	Upper Limit
2 years	Full Model	80	0.80	0.77	0.83
2 years	Tuned Standard Model	11	0.79	0.77	0.82
2 years	Feature Selected Model	11	0.79	0.76	0.82
3 years	Full Model	81	0.81	0.78	0.83
3 years	Tuned Standard Model	13	0.80	0.77	0.82
3 years	Feature Selected Model	13	0.80	0.77	0.82

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. hospital_stay
2. age
3. year_adm_t0
4. comorbidities_count
5. admission_pre_t0_count
6. espirolactona
7. education_level
8. antiarritmico
9. ieca_bra
10. cied_final_group_1
11. proced_invasivos_qtde
12. hypertension
13. ultrassom
14. admission_pre_t0_180d
15. antiplaquetario_ev
16. valvopathy

death_2year

1. hospital_stay
2. age
3. year_adm_t0
4. admission_pre_t0_count
5. espirolactona
6. education_level
7. comorbidities_count
8. diuretico
9. metodos_graficos_qtde
10. cied_final_group_1
11. antiarritmico

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. hospital_stay
2. age
3. year_adm_t0
4. admission_pre_t0_count
5. espirolactona
6. education_level
7. comorbidities_count
8. ieca_bra
9. meds_cardiovasc_qtde
10. nyha_basal
11. antiarritmico
12. cied_final_group_1
13. ventilacao_mecanica

readmission_180d

1. hospital_stay
2. admission_pre_t0_count
3. vasodilatador
4. classe_meds_qtde
5. cied_final_1

6. equipe_multiprof
7. 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. digoxina
4. meds_antimicrobianos
5. bic
6. icu_t0
7. antiarritmico
8. anticonvulsivante
9. comorbidities_count
10. procedure_type_new
11. prior_mi

readmission__60d

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

Union

1. hospital_stay
2. age
3. year_adm_t0
4. espironolactona
5. education_level
6. laboratorio
7. comorbidities_count
8. admission_pre_t0_count
9. vasodilatador
10. antiarritmico
11. ieca_bra
12. cied_final_group_1
13. proced_invasivos_qtde
14. hypertension
15. ultrassom
16. admission_pre_t0_180d
17. antiplaquetario_ev
18. valvopathy
19. diuretico
20. metodos_graficos_qtde
21. nyha_basal
22. af

- 23. diabetes
- 24. renal_failure
- 25. procedure_type_1
- 26. cied_final_1
- 27. icu_t0
- 28. antihipertensivo
- 29. betabloqueador
- 30. dva
- 31. insulina
- 32. psicofarmacos
- 33. classe_meds_qtde
- 34. meds_cardiovasc_qtde
- 35. meds_antimicrobianos
- 36. ventilacao_mecanica
- 37. interconsulta
- 38. equipe_multiprof
- 39. holter
- 40. cultura
- 41. analises_clinicas_qtde
- 42. citologia
- 43. tomografia
- 44. ressonancia
- 45. procedure_type_new
- 46. digoxina
- 47. bic
- 48. anticonvulsivante
- 49. prior_mi