

Supplementary Online Content

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eTable 1. Transplantations and Immunosuppressive Drugs Algorithms

eTable 2. Chronic Disease Identification Algorithms

eTable 3. Baseline Characteristics of SOTRs According to the Transplanted Organ

eTable 4. Baseline Characteristics of KTRs According to Immunosuppressive Drugs Groups

eTable 5. Association Between KTRs Characteristics and Risk of Hospitalization for Covid-19 in Univariate Analysis

eTable 6. Baseline Characteristics of LTRs According to Immunosuppressive Drugs Groups

eTable 7. Association Between LTRs Characteristics and Risk of Hospitalization for Covid-19 in Univariate Analysis

eTable 8. Association Between Immunosuppressive Treatment Regimens and Risk of Hospitalization for Covid-19 in a Multivariate Analysis Among LTRs (Change in Reference Class)

eTable 9. Baseline Characteristics of HTRs According to Immunosuppressive Drugs Groups

eTable 10. Association Between HTRs Characteristics and Risk of Hospitalization for Covid-19 in Univariate Analysis

eTable 11. Baseline Characteristics of Lung Transplant Recipients According to Immunosuppressive Drugs Groups

eTable 12. Association Between Lung Transplant Recipients Characteristics and Risk of Hospitalization for Covid-19 in Univariate Analysis

eTable 13. Factors Associated With Hospitalization for Covid-19 in the Multivariable Model (Sensitivity Analysis: Exclusion of Patients With More Than One Transplant)

eTable 14. Factors Associated With Hospitalization for Covid-19 in the Multivariable Model (Sensitivity Analysis of the Largest Epidemic Wave November 2021-February 2022, Before the Largest Epidemic Wave, and After the Largest Epidemic Wave)

eTable 15. Comparison of Risk Factors Associated With Hospitalization for Covid-19 During the Period Before the Start of Vaccination (15/02/2020-31/12/2020) and the Period After the Start of Vaccination (01/04/2021*-31/07/2022) in the Multivariable Model (Sensitivity Analysis)

eTable 16. Comparison of Risk Factors Associated With Hospitalization for Covid-19 According to the Time After Transplant in the Multivariable Model (Sensitivity Analysis)

eTable 17. Association Between Immunosuppressive Treatment Regimens and Risk of Hospitalization for Covid-19 in Multivariate Analysis Among SOTRs (Exploratory Analysis)

eFigure 1. Kinetics of Hospitalizations for Covid-19 Among SOTRs

eFigure 2. Immunosuppressive Drugs Use According to the Time Since Transplant in KTRs

eFigure 3. Immunosuppressive Drugs Use According to the Time Since Transplant in LTRs

eFigure 4. Immunosuppressive Drugs Use According to the Time Since Transplant in HTRs

eFigure 5. Immunosuppressive Drugs Use According to the Time Since Transplant in Lung Transplant Recipients

eFigure 6. Description of Treatment Regimens in SOTRs (Whole Population N=60456)

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Transplantations and immunosuppressive drugs algorithms

	Identification algorithms
Kidney transplantation	Hospitalization for kidney transplantation (ICD-10 code Z940) or kidney and pancreas transplantation by laparotomy in 2019 (CCAM code JAEA003 and HNEA002) or Diagnosis related groups code 27C06Z, 27C061, 27C062, 27C063, 27C064, 24M39Z, 11M171, 11M172, 11M173, 11M174
Heart transplantation	Hospitalization for heart transplantation (ICD-10 code Z941) or Heart transplantation CCAM code (DZEA001 to DZEA004) or Diagnosis related groups code : 27C051, 27C052, 27C053, 27C054, 05M191, 05M192, 05M193, 05M194, 05K15J, 05K151, 05K152, 05K153, 05K154
Liver transplantation	Hospitalization for liver transplantation (ICD-10 code Z944) or Liver transplantation CCAM code (HLEA001, HLEA002) or Diagnosis related groups code 27C021, 27C022, 27C023, 27C024, 07M121, 07M122, 07M123, 07M124
Lung transplantation	Hospitalization for lung transplantation (ICD-10 code Z942) or Lung transplantation CCAM code (GFEA001 to GFEA007) or Diagnosis related groups code 27C041, 27C042, 27C043, 27C044, 04M211, 04M212, 04M213, 04M214
Tacrolimus (ATC code L04AD02)	CIP Code 3400949501007, 3400930223864, 3400930001264, 3400930001226, 3400930001196, 3400922102566, 3400930223840, 3400922101965, 3400922098852, 3400930223826, 3400930223802, 3400930009291, 3400930223789, 3400949500918, 3400935895882, 3400935895714, 3400935875723, 3400949500765, 3400938069914, 3400938069624, 3400938069273, 3400939534626, 3400939594996, 3400939594828, 3400949501014, 3400937485616, 3400937485326, 3400937415477
Ciclosporin (ATC code L04AD01)	CIP code 3400949002672, 3400949001095, 3400949001071, 3400949002719, 3400949002689, 3400949002443, 3400949002436, 3400934633157, 3400934630026, 3400934630774, 3400934630606, 3400934630545, 3400934630484, 3400934630316, 3400934630255, 3400934630194
Azathioprine (ATC code L04AX01)	CIP code 3400949003815, 3400936414907, 3400936414327, 3400937409384, 3400935451316, 3400937920070, 3400949001620, 3400938549904, 3400949002474, 3400949002283, 3400930525005
Mycophenolic acid (ATC code L04AA06)	CIP code 3400935952936, 3400949510924, 3400949212866, 3400949004218, 3400936308718, 3400937400398, 3400936309197, 3400938500417, 3400949793921, 3400935952585, 3400935952707, 3400939416250, 3400921791679, 3400949141456, 3400949179596, 3400949003020, 3400939533155, 3400949918034, 3400939574257, 3400949244515, 3400939212616, 3400939989501, 3400938500646, 3400939574028, 3400949504480, 3400949917891, 3400930009468, 3400949212118, 3400949297153, 3400939611259, 3400949466368, 3400949456192, 3400949456482, 3400949511006, 3400949465996, 3400949504541, 3400930009512
Sirolimus (ATC code L04AA10)	CIP code 3400949304578, 3400935953018, 3400935688477, 3400936156821
Everolimus (ATC code L04AA18)	CIP code 3400936411135, 3400936411593, 3400936411883, 3400936410305, 3400936410824, 3400930136676
Steroids (prednisone, prednisolone, methyprednisolone) : AT code H02AB04, H02AB06, H02AB07	CIP code 3400930655955, 3400933189846, 3400937232425, 3400930515068, 3400932014668, 3400930975206, 3400934936708, 3400932820399, 3400934936876, 3400935740557, 3400936087651, 3400936087712, 3400936117389, 3400936087422, 3400936136830, 3400936137141, 3400935740496, 3400936137080, 3400936087590, 3400936087880, 3400936481732, 3400936136779, 3400936806795, 3400936747913, 3400935740328, 3400939108209, 3400936196513, 3400936196452, 3400939109619, 3400939109329, 3400939108667, 3400939106885, 3400939107486, 3400939103464, 3400939102405, 3400939106595, 3400939108957, 3400939107196, 3400928099990, 3400928099976, 3400928099983, 3400928099969, 3400930050354, 3400938558609, 3400938559897, 3400938558838, 3400938560039, 3400938559958, 3400938559729, 3400938559439, 3400938559200, 3400938559378, 3400936665385, 3400936665095, 3400936521407, 3400936523128, 3400936522817, 3400936521865, 3400936519794, 3400936519565, 3400936518735, 3400936518506, 3 400936523708, 3400936523418, 3400936519916, 3400936521117, 3400936518384, 3400936520806, 3400936487307, 3400936522527, 3400936519275, 3400936665675, 3400936665217, 3400936757738, 3400934641251, 3400934641190, 3400934641022, 3400933283858, 3400930259054, 3400930258972

CIP Code : Presentation Identifier Code

eTable 2. Chronic disease identification algorithms

	Identification algorithms
Smoking	Hospitalization or ALD with ICD-10: Z716, F17, T652, Z720 since 2006 or reimbursement for ATC codes N06AX12 or N07BA since 2014 or hospitalization with ICD-10: I731, J41, J42, J43, J44, T652 and reimbursement for ATC codes R03AC18, R03AC19, R03BB04, R03BB05, R03BB06, R03BB07, R03AL04, R03AL05, R03AK04 since 2014 or Reimbursement of nicotine replacement therapy or smoking cessation consultation since 2006
Alcohol use disorders	Hospitalization or ALD with ICD-10: E244, E512, F10, G312, G621, G721, I426, K292, K70, K860, R780, T51, X45, X65, Y15, Y90, Y91, Y573, Z502, Z714, Z721 since 2006 or Reimbursement for ATC codes N07BB01, N07BB03, N07BB04, N07BB05 since 2014
Obesity	Hospitalization with ICD-10: E66 (excluding codes E6603, E6613, E6683, E6693) since 2006 or Bariatric surgery in the previous 5 years: CCAM codes HFCA001, HFCC003, HFFA001, HFFA011, HFFC004, HFFC018, HFGC900, HFKA001, HFKA002, HFKC001, HFMA009, HFMA010, HFMA011, HFMC006, HFMC007 HFMC008, HGCA009, HGCC027
Diabetes	Hospitalization or ALD with ICD-10: E10 to E14 during the previous 2 years or 3 reimbursements of a specific treatment, ATC codes A10 (excluding A10BX06) over 12 months for at least one of the previous 2 years or Hospitalization with ICD-10: G59.0, G63.2, G73.0, G99.0, H28.0, H36.0, I79.2, L97, M14.2, M14.6, N08.3 in diabetic patients
Hypertension	At least 3 reimbursements for antihypertensive drugs in 2019
Cardiovascular	
Coronary heart disease	ALD with ICD-10: I20, I21 to I24 in 2019 or hospitalization with ICD-10: I20, I200-0, I21 to I24 in the previous 5 years
Peripheral artery disease	Hospitalization with ICD-10: I70.2, I73.9, I74.0, I74.3, I74.4, I74.5 in the previous 5 years or ALD with ICD-10: I70, I73, I74 in 2019
Cardiac arrhythmias and conduction disorders	Hospitalization with ICD-10: I44, I45, I47 to I49 in the previous 5 years or ALD with ICD-10: I44, I45, I47 to I49 in 2019
Heart failure	Hospitalization with ICD-10: I50, I11.0, I13.0, I13.2, I13.9, IK76.1, J81 in the previous 5 years or ALD with ICD-10: I50, I11, I13 in 2019
Valvular heart disease	Hospitalization with ICD-10: I05 to I08, I34 to I39 in the previous 5 years or ALD with ICD-10: I05 to I08, I34 to I39 in 2019
Stroke	Hospitalization with ICD-10: I60 to I64, I67 to I69 in the previous 5 years or ALD with ICD-10: I60 to I64, I67 to I69 in 2019
Statin use	At least 3 reimbursements for ATC codes C10AA05, C10AA04, C10AA03, C10AA07, C10AA01 in 2019
Mucoviscidose	Hospitalization with ICD-10: E84 in the previous 5 years or ALD with ICD-10 E84 in 2019
Respiratory	
Chronic respiratory diseases (excluding cystic fibrosis)	Hospitalization with ICD-10: J40 to J47, J96 (excluding J96.0 or J96.9), J98 in the previous 5 years or ALD with ICD-10: J40 to J47, J96, J98 in 2019 or at least 3 reimbursements of an ATC code R03 in 2019
Pulmonary embolism	Hospitalization with ICD-10: I26 in the previous 5 years
Cancer	
Female breast cancer (active)	Hospitalization with ICD-10: C50, D01 in the previous 2 years or ALD with ICD-10: C50, D01 starting in 2019 or 2018.
Colorectal cancer (active)	Hospitalization with ICD-10: C18 to C20, D01.0, D01.1, D01.2 in the previous 2 years or ALD with ICD-10: C18 to C20 starting in 2019 or 2018.
Lung cancer (active)	Hospitalization with ICD-10: C33, C34, D02.1, D02.2 in the previous 2 years or ALD with ICD-10: C33, C34 starting in 2019 or 2018.
Prostate cancer (active)	Hospitalization with ICD-10: C61, D07.5 in the previous 2 years or ALD with ICD-10: C61 starting in 2019 or 2018 or 3 reimbursement of hormone therapy in 2019 or 2018 (ATC codes G03HA01, L01CD04, L01XX11, L02AA01, L02AA04, L02AE01, L02AE02, L02AE03, L02AE04, L02AE05, L02BB01, L02BB02, L02BB03, L02BB04, L02BX02, L02BX03, V10BX01, V10XX).
Other cancers (active)	Hospitalization with codes ICD-10 beginning with "C" (excluding female C50, C18, C19, C20, C61, C33, C34) or D00 to D09 (excluding female D05, D01.0, D01.1, D01.2, D07.5, D02.1, D02.2) in the previous 2 years or ALD with ICD-10 codes beginning with "C" (excluding female C50, C18, C19, C20, C61, C33, C34) or D00 to D09 (excluding female D05) beginning in 2019 or 2018.
Psychiatric diseases	
Neurotic and mood disorders	Hospitalization with ICD-10: F30 to F34, F38 to F45, F48 in the previous two years or ALD with ICD-10: F30 to F34, F38 to F45, F48 in 2019
Psychotic disorders	Hospitalization with ICD-10: F20 to F25, F28, F29 in the previous two years or ALD with ICD-10: F20 to F25, F28, F29 in 2019
Childhood mental illness	Hospitalization with ICD-10: F80 to F84, F88 to F95, F98 in the previous two years or ALD with ICD-10: F80 to F84, F88 to F95, F98 in 2019.
Mental retardation	Hospitalization with ICD-10: F70 to F73, F78, F79 in the previous 2 years or ALD with ICD-10: F70 to F73, F78, F79 in 2019.
Antidepressant use	3 reimbursements of an antidepressant ATC code N06A (excluding CIP13 3400933338022), Lithium ATC code N05AN01, Dépakote® CIP13 3400934876233, 3400934876691, 340093544427 or Dépamide® ATC code N03AG02 in 2019
Anxiolytic use	3 reimbursements of an anxiolytic ATC code N05BA01, N05BA04, N05BA05, N05BA06, N05BA08, N05BA09, N05BA11, N05BA12, N05BA16, N05BA18, N05BA21, N05BA23, N05BB01, N05BB02, N05BC01, N05BE01, N05BX03 in 2019.
Chronic dialysis	45 days of haemodialysis or at least 1 day of peritoneal dialysis in 2019 or at least 1 day of haemodialysis (and less than 45 days) in 2019 and at least 45 days of haemodialysis or at least 1 day of peritoneal dialysis in 2018 without kidney transplantation or followed by kidney transplantation in 2019.

eTable 3. Baseline characteristics of SOTRs according to the transplanted organ.

	Whole study population	Kidney transplant ¹	Liver transplant	Heart transplant	Lung transplant
Effective	60456	41463	14464	5327	2823
Age mean (SD)	56 (15.5)	56.2 (15.0)	56.6 (16.9)	55.2 (16.0)	50.3 (14.9)
Age median (IQR)	59 (47-67)	58 (47-67)	61 (50-68)	58 (46-67)	53 (38-63)
Age groups					
01-45	13725 (22.7)	9546 (23.0)	2849 (19.7)	1299 (24.4)	1025 (36.3)
46-65	28171 (46.6)	19362 (46.7)	6603 (45.7)	2465 (46.3)	1342 (47.5)
66 and up	18560 (30.7)	12555 (30.3)	5012 (34.7)	1563 (29.3)	456 (16.2)
Age categories					
01-17	1290 (2.1)	525 (1.3)	687 (4.7)	135 (2.5)	36 (1.3)
18-29	2664 (4.4)	1632 (3.9)	659 (4.6)	293 (5.5)	269 (9.5)
30-49	13796 (22.8)	10432 (25.2)	2169 (15.0)	1217 (22.8)	911 (32.3)
50-59	13987 (23.1)	9873 (23.8)	3059 (21.1)	1209 (22.7)	663 (23.5)
60-69	17090 (28.3)	10772 (26.0)	4959 (34.3)	1537 (28.9)	755 (26.7)
70-79	9931 (16.4)	6920 (16.7)	2625 (18.1)	787 (14.8)	178 (6.3)
80 and up	1698 (2.8)	1309 (3.2)	306 (2.1)	149 (2.8)	11 (0.4)
Sex (Female)	21967 (36.3)	15893 (38.3)	4723 (32.7)	1411 (26.5)	1337 (47.4)
region					
Île-de-France	11594 (19.2)	7944 (19.2)	2925 (20.2)	938 (17.6)	496 (17.6)
Centre-Val de Loire	2746 (4.5)	1858 (4.5)	653 (4.5)	276 (5.2)	91 (3.2)
Bourgogne-Franche-Comté	2512 (4.2)	1662 (4.0)	596 (4.1)	263 (4.9)	144 (5.1)
Normandie	3057 (5.1)	2082 (5.0)	697 (4.8)	304 (5.7)	139 (4.9)
Hauts-de-France	4601 (7.6)	3089 (7.5)	1124 (7.8)	419 (7.9)	234 (8.3)
Grand Est	5018 (8.3)	3313 (8.0)	1148 (7.9)	488 (9.2)	366 (13.0)
Pays de la Loire	3453 (5.7)	2372 (5.7)	746 (5.2)	357 (6.7)	160 (5.7)
Bretagne	3117 (5.2)	2034 (4.9)	769 (5.3)	326 (6.1)	169 (6.0)
Nouvelle-Aquitaine	5298 (8.8)	3729 (9.0)	1157 (8.0)	434 (8.1)	220 (7.8)
Occitanie	5252 (8.7)	3740 (9.0)	1351 (9.3)	378 (7.1)	206 (7.3)
Auvergne-Rhône-Alpes	7673 (12.7)	5214 (12.6)	1978 (13.7)	737 (13.8)	311 (11.0)
Provence-Alpes-Côte d'Azur	4437 (7.3)	3075 (7.4)	1027 (7.1)	295 (5.5)	252 (8.9)
Corse	199 (0.3)	145 (0.3)	45 (0.3)	10 (0.2)	10 (0.4)
DOM-TOM	1499 (2.5)	1206 (2.9)	248 (1.7)	102 (1.9)	25 (0.9)
Social deprivation index					
1 (least deprived)	10909 (18.0)	7375 (17.8)	2703 (18.7)	990 (18.6)	551 (19.5)

	Whole study population	Kidney transplant ¹	Liver transplant	Heart transplant	Lung transplant
2	11554 (19.1)	7913 (19.1)	2878 (19.9)	983 (18.5)	567 (20.1)
3	11752 (19.4)	8174 (19.7)	2700 (18.7)	997 (18.7)	544 (19.3)
4	11975 (19.8)	8136 (19.6)	2876 (19.9)	1097 (20.6)	560 (19.8)
5 (most deprived)	12193 (20.2)	8314 (20.1)	2896 (20.0)	1091 (20.5)	549 (19.4)
Unknown	2073 (3.4)	1551 (3.7)	411 (2.8)	169 (3.2)	52 (1.8)
Comorbidities					
Alcohol	10074 (16.7)	2392 (5.8)	7714 (53.3)	554 (10.4)	276 (9.8)
Smoking	13845 (22.9)	7822 (18.9)	4181 (28.9)	1656 (31.1)	1214 (43.0)
Obesity	12211 (20.2)	7833 (18.9)	3530 (24.4)	1154 (21.7)	397 (14.1)
Hypertension	46146 (76.3)	33840 (81.6)	9057 (62.6)	4192 (78.7)	1691 (59.9)
Cardiovascular ²	19322 (32.0)	11731 (28.3)	3538 (24.5)	4589 (86.1)	1011 (35.8)
Statin use	23444 (38.8)	17130 (41.3)	3214 (22.2)	3703 (69.5)	785 (27.8)
Diabetes	17483 (28.9)	11531 (27.8)	5020 (34.7)	1301 (24.4)	1054 (37.3)
Dialysis	240 (0.4)	0 (0.0)	104 (0.7)	113 (2.1)	34 (1.2)
Respiratory ³	6630 (11.0)	3421 (8.3)	1603 (11.1)	694 (13.0)	-
Cancer	5511 (9.1)	3182 (7.7)	2007 (13.9)	461 (8.7)	270 (9.6)
Psychiatric	3232 (5.3)	1710 (4.1)	1075 (7.4)	422 (7.9)	281 (10.0)
Antidepressants use	3687 (6.1)	2394 (5.8)	868 (6.0)	411 (7.7)	305 (10.8)
Anxiolytics use	5649 (9.3)	3513 (8.5)	1490 (10.3)	667 (12.5)	368 (13.0)
Age of Transplantation					
Under 2 years	9171 (15.2)	6014 (14.5)	2200 (15.2)	627 (11.8)	557 (19.7)
2-5 years	13673 (22.6)	9094 (21.9)	3283 (22.7)	1097 (20.6)	811 (28.7)
5-10 years	16958 (28.1)	11390 (27.5)	4252 (29.4)	1480 (27.8)	877 (31.1)
10 years and up	20654 (34.2)	14965 (36.1)	4729 (32.7)	2123 (39.9)	578 (20.5)
Immunosuppressive drugs					
Steroids	36926 (61.1)	28565 (68.9)	4165 (28.8)	4222 (79.3)	2437 (86.3)
Cumulative DDD for prednisolone					
0	23530 (38.9)	12898 (31.1)	10299 (71.2)	1105 (20.7)	386 (13.7)
1-75	9589 (15.9)	7161 (17.3)	1690 (11.7)	872 (16.4)	555 (19.7)
76-99	8904 (14.7)	7391 (17.8)	871 (6.0)	750 (14.1)	476 (16.9)
100-150	9661 (16.0)	7520 (18.1)	855 (5.9)	1367 (25.7)	595 (21.1)
151 and up	8772 (14.5)	6493 (15.7)	749 (5.2)	1233 (23.1)	811 (28.7)
Tacrolimus	42354 (70.1)	28932 (69.8)	11094 (76.7)	2614 (49.1)	2438 (86.4)
Ciclosporin	12678 (21.0)	8915 (21.5)	1537 (10.6)	2494 (46.8)	352 (12.5)
Mycophenolic Acid	43971 (72.7)	31303 (75.5)	8990 (62.2)	4109 (77.1)	2035 (72.1)

	Whole study population	Kidney transplant ¹	Liver transplant	Heart transplant	Lung transplant
Cumulative DDD for mycophenolic acid³					
0	16485 (27.3)	10160 (24.5)	5474 (37.8)	1218 (22.9)	788 (27.9)
1-65	12398 (20.5)	9457 (22.8)	2376 (16.4)	903 (17.0)	482 (17.1)
66-100	13045 (21.6)	9686 (23.4)	2790 (19.3)	862 (16.2)	445 (15.8)
101-140	8304 (13.7)	6127 (14.8)	1493 (10.3)	732 (13.7)	375 (13.3)
141 and up	10224 (16.9)	6033 (14.6)	2331 (16.1)	1612 (30.3)	733 (26.0)
Azathioprine	4161 (6.9)	3574 (8.6)	348 (2.4)	202 (3.8)	259 (9.2)
Sirolimus	1363 (2.3)	1144 (2.8)	232 (1.6)	35 (0.7)	24 (0.9)
Everolimus	7002 (11.6)	3280 (7.9)	2242 (15.5)	1535 (28.8)	526 (18.6)

¹149 kidney transplant patients had mucoviscidose.

²Except for heart transplantation

³Except for mucoviscidose and lung transplantation

DDD: Define Daily Dose

1- Kidney transplant recipients (KTRs): N = 41463

eTable 4. Baseline characteristics of KTRs according to immunosuppressive drugs groups.

	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Effective	12531	28932	32548	8915	10160	31303	37889	3574	40319	1144	38183	3280
Age mean (SD)	60.2 (13.7)	54.4 (15.1)	55.1 (15.1)	60.1 (13.9)	57.8 (15.8)	55.7 (14.6)	56.6 (14.7)	52 (16.8)	56 (15)	61.4 (12.9)	56 (15.0)	58.5 (14.4)
Age median (IQR)	62 (52-70)	56 (45-66)	57 (45-67)	62 (52-70)	60 (47-70)	57 (46-67)	58 (47-68)	53 (39-66)	58 (46-67)	63 (54-71)	58 (46-67)	61 (50-69)
Age groups												
01-45	1825 (14.6)	7721 (26.7)	8225 (25.3)	1321 (14.8)	2237 (22.0)	7309 (23.3)	8226 (21.7)	1320 (36.9)	9413 (23.3)	133 (11.6)	8951 (23.4)	595 (18.1)
46-65	5683 (45.4)	13679 (47.3)	15318 (47.1)	4044 (45.4)	4152 (40.9)	15210 (48.6)	18026 (47.6)	1336 (37.4)	18851 (46.8)	511 (44.7)	17857 (46.8)	1505 (45.9)
66 and up	5023 (40.1)	7532 (26.0)	9005 (27.7)	3550 (39.8)	3771 (37.1)	8784 (28.1)	11637 (30.7)	918 (25.7)	12055 (29.9)	500 (43.7)	11375 (29.8)	1180 (36.0)
Age categories												
01-17	63 (0.5)	462 (1.6)	469 (1.4)	56 (0.6)	168 (1.7)	357 (1.1)	436 (1.2)	89 (2.5)	520 (1.3)	5 (0.4)	495 (1.3)	30 (0.9)
18-29	275 (2.2)	1357 (4.7)	1435 (4.4)	197 (2.2)	345 (3.4)	1287 (4.1)	1401 (3.7)	231 (6.5)	1617 (4.0)	15 (1.3)	1543 (4.0)	89 (2.7)
30-49	2267 (18.1)	8165 (28.2)	8791 (27.0)	1641 (18.4)	2360 (23.2)	8072 (25.8)	9184 (24.2)	1248 (34.9)	10253 (25.4)	179 (15.6)	9745 (25.5)	687 (20.9)
50-59	2821 (22.5)	7052 (24.4)	7856 (24.1)	2017 (22.6)	1985 (19.5)	7888 (25.2)	9224 (24.3)	649 (18.2)	9625 (23.9)	248 (21.7)	9146 (24.0)	727 (22.2)
60-69	3628 (29.0)	7144 (24.7)	8223 (25.3)	2549 (28.6)	2673 (26.3)	8099 (25.9)	10030 (26.5)	742 (20.8)	10431 (25.9)	341 (29.8)	9802 (25.7)	970 (29.6)
70-79	2831 (22.6)	4089 (14.1)	4952 (15.2)	1968 (22.1)	2099 (20.7)	4821 (15.4)	6410 (16.9)	510 (14.3)	6615 (16.4)	305 (26.7)	6253 (16.4)	667 (20.3)
80 and up	646 (5.2)	663 (2.3)	822 (2.5)	487 (5.5)	530 (5.2)	779 (2.5)	1204 (3.2)	105 (2.9)	1258 (3.1)	51 (4.5)	1199 (3.1)	110 (3.4)
Sex (Female)	4454 (35.5)	11439 (39.5)	12697 (39.0)	3196 (35.8)	4502 (44.3)	11391 (36.4)	13901 (36.7)	1992 (55.7)	15522 (38.5)	371 (32.4)	14748 (38.6)	1145 (34.9)
Region of residence												
Île-de-France	2364 (18.9)	5580 (19.3)	6515 (20.0)	1429 (16.0)	1851 (18.2)	6093 (19.5)	7105 (18.8)	839 (23.5)	7781 (19.3)	163 (14.2)	7276 (19.1)	668 (20.4)
Northwest	2720 (21.7)	6190 (21.4)	7014 (21.5)	1896 (21.3)	1986 (19.5)	6924 (22.1)	8290 (21.9)	620 (17.3)	8612 (21.4)	298 (26)	8374 (21.9)	536 (16.3)
Northeast	2984 (23.8)	5080 (17.6)	5809 (17.8)	2255 (25.3)	2171 (21.4)	5893 (18.8)	7265 (19.2)	799 (22.4)	7771 (19.3)	293 (25.6)	7308 (19.1)	756 (23.0)
Southeast	2486 (19.8)	7763 (26.8)	8472 (26.0)	1777 (19.9)	2727 (26.8)	7522 (24.0)	9293 (24.5)	956 (26.7)	10025 (24.9)	224 (19.6)	9607 (25.2)	642 (19.6)
Southwest	1977 (15.8)	4319 (14.9)	4738 (14.6)	1558 (17.5)	1425 (14.0)	4871 (15.6)	5936 (15.7)	360 (10.1)	6130 (15.2)	166 (14.5)	5618 (14.7)	678 (20.7)
Social deprivation index												
1 (least deprived)	2244 (17.9)	5131 (17.7)	5898 (18.1)	1477 (16.6)	1876 (18.5)	5499 (17.6)	6660 (17.6)	715 (20.0)	7173 (17.8)	202 (17.7)	6717 (17.6)	658 (20.1)
2	2315 (18.5)	5598 (19.3)	6324 (19.4)	1589 (17.8)	2026 (19.9)	5887 (18.8)	7237 (19.1)	676 (18.9)	7685 (19.1)	228 (19.9)	7211 (18.9)	702 (21.4)
3	2402 (19.2)	5772 (20.0)	6449 (19.8)	1725 (19.3)	2013 (19.8)	6161 (19.7)	7523 (19.9)	651 (18.2)	7919 (19.6)	255 (22.3)	7584 (19.9)	590 (18.0)
4	2464 (19.7)	5672 (19.6)	6353 (19.5)	1783 (20.0)	1998 (19.7)	6138 (19.6)	7477 (19.7)	659 (18.4)	7929 (19.7)	207 (18.1)	7488 (19.6)	648 (19.8)
5 (most deprived)	2612 (20.8)	5702 (19.7)	6378 (19.6)	1936 (21.7)	1974 (19.4)	6340 (20.3)	7573 (20.0)	741 (20.7)	8081 (20.0)	233 (20.4)	7707 (20.2)	607 (18.5)

	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Effective	12531	28932	32548	8915	10160	31303	37889	3574	40319	1144	38183	3280
Unknown	494 (3.9)	1057 (3.7)	1146 (3.5)	405 (4.5)	273 (2.7)	1278 (4.1)	1419 (3.7)	132 (3.7)	1532 (3.8)	19 (1.7)	1476 (3.9)	75 (2.3)
Comorbidities												
Alcohol	652 (5.2)	1740 (6.0)	1962 (6.0)	430 (4.8)	604 (5.9)	1788 (5.7)	2276 (6.0)	116 (3.2)	2345 (5.8)	47 (4.1)	2142 (5.6)	250 (7.6)
Smoking	2015 (16.1)	5807 (20.1)	6448 (19.8)	1374 (15.4)	1707 (16.8)	6115 (19.5)	7281 (19.2)	541 (15.1)	7663 (19.0)	159 (13.9)	7129 (18.7)	693 (21.1)
Obesity	2393 (19.1)	5440 (18.8)	6078 (18.7)	1755 (19.7)	1669 (16.4)	6164 (19.7)	7286 (19.2)	547 (15.3)	7690 (19.1)	143 (12.5)	7245 (19.0)	588 (17.9)
Hypertension	10814 (86.3)	23026 (79.6)	26072 (80.1)	7768 (87.1)	8165 (80.4)	25675 (82.0)	31221 (82.4)	2619 (73.3)	32836 (81.4)	1004 (87.8)	31055 (81.3)	2785 (84.9)
Cardiovascular ¹	3840 (30.6)	7891 (27.3)	9066 (27.9)	2665 (29.9)	3119 (30.7)	8612 (27.5)	10957 (28.9)	774 (21.7)	11354 (28.2)	377 (33.0)	10639 (27.9)	1092 (33.3)
Statin use	6253 (49.9)	10877 (37.6)	12773 (39.2)	4357 (48.9)	4093 (40.3)	13037 (41.6)	15924 (42.0)	1206 (33.7)	16442 (40.8)	688 (60.1)	15590 (40.8)	1540 (47.0)
Diabetes	3006 (24.0)	8525 (29.5)	9467 (29.1)	2064 (23.2)	2730 (26.9)	8801 (28.1)	10727 (28.3)	804 (22.5)	11227 (27.8)	304 (26.6)	10505 (27.5)	1026 (31.3)
Respiratory ²	1083 (8.6)	2338 (8.1)	2677 (8.2)	744 (8.3)	864 (8.5)	2557 (8.2)	3178 (8.4)	243 (6.8)	3320 (8.2)	101 (8.8)	3133 (8.2)	288 (8.8)
Cancer	1291 (10.3)	1891 (6.5)	2434 (7.5)	748 (8.4)	1369 (13.5)	1813 (5.8)	2965 (7.8)	217 (6.1)	2988 (7.4)	194 (17.0)	2559 (6.7)	623 (19)
Psychiatric	517 (4.1)	1193 (4.1)	1326 (4.1)	384 (4.3)	446 (4.4)	1264 (4.0)	1548 (4.1)	162 (4.5)	1685 (4.2)	25 (2.2)	1587 (4.2)	123 (3.8)
Antidepressants use	782 (6.2)	1612 (5.6)	1852 (5.7)	542 (6.1)	661 (6.5)	1733 (5.5)	2160 (5.7)	234 (6.5)	2317 (5.7)	77 (6.7)	2214 (5.8)	180 (5.5)
Anxiolytics use	1129 (9.0)	2384 (8.2)	2750 (8.4)	763 (8.6)	954 (9.4)	2559 (8.2)	3205 (8.5)	308 (8.6)	3407 (8.5)	106 (9.3)	3231 (8.5)	282 (8.6)
Number of consultations (6 months prior to index date)												
0	987 (7.9)	2205 (7.6)	2582 (7.9)	610 (6.8)	726 (7.1)	2466 (7.9)	2879 (7.6)	313 (8.8)	3110 (7.7)	82 (7.2)	3000 (7.9)	192 (5.9)
1-3	4696 (37.5)	10802 (37.3)	12221 (37.5)	3277 (36.8)	3480 (34.3)	12018 (38.4)	14200 (37.5)	1298 (36.3)	15105 (37.5)	393 (34.4)	14442 (37.8)	1056 (32.2)
4-6	3637 (29.0)	7905 (27.3)	8925 (27.4)	2617 (29.4)	2913 (28.7)	8629 (27.6)	10523 (27.8)	1019 (28.5)	11181 (27.7)	361 (31.6)	10637 (27.9)	905 (27.6)
7 and up	3211 (25.6)	8020 (27.7)	8820 (27.1)	2411 (27.0)	3041 (29.9)	8190 (26.2)	10287 (27.2)	944 (26.4)	10923 (27.1)	308 (26.9)	10104 (26.5)	1127 (34.4)
Number of hospitalizations (6 months prior to index date)												
0	9823 (78.4)	21855 (75.5)	24735 (76.0)	6943 (77.9)	7546 (74.3)	24132 (77.1)	28850 (76.1)	2828 (79.1)	30789 (76.4)	889 (77.7)	29361 (76.9)	2317 (70.6)
1-3	2441 (19.5)	6195 (21.4)	6874 (21.1)	1762 (19.8)	2208 (21.7)	6428 (20.5)	7974 (21.0)	662 (18.5)	8406 (20.8)	230 (20.1)	7768 (20.3)	868 (26.5)
4-6	190 (1.5)	685 (2.4)	725 (2.2)	150 (1.7)	263 (2.6)	612 (2.0)	810 (2.1)	65 (1.8)	852 (2.1)	23 (2.0)	797 (2.1)	78 (2.4)
7 and up	77 (0.6)	197 (0.7)	214 (0.7)	60 (0.7)	143 (1.4)	131 (0.4)	255 (0.7)	19 (0.5)	272 (0.7)	2 (0.2)	257 (0.7)	17 (0.5)
Age of Transplantation												
Under 2 years	918 (7.3)	5096 (17.6)	5246 (16.1)	768 (8.6)	914 (9.0)	5100 (16.3)	5708 (15.1)	306 (8.6)	5988 (14.9)	26 (2.3)	5331 (14.0)	683 (20.8)
2-5 years	1888 (15.1)	7206 (24.9)	7789 (23.9)	1305 (14.6)	2060 (20.3)	7034 (22.5)	8362 (22.1)	732 (20.5)	9031 (22.4)	63 (5.5)	8161 (21.4)	933 (28.4)
5-10 years	3059 (24.4)	8331 (28.8)	9265 (28.5)	2125 (23.8)	2640 (26.0)	8750 (28.0)	10403 (27.5)	987 (27.6)	11135 (27.6)	255 (22.3)	10562 (27.7)	828 (25.2)
10 years and up	6666 (53.2)	8299 (28.7)	10248 (31.5)	4717 (52.9)	4546 (44.7)	10419 (33.3)	13416 (35.4)	1549 (43.3)	14165 (35.1)	800 (69.9)	14129 (37.0)	836 (25.5)

¹Except for heart transplantation

²Except for mucoviscidosis and lung transplantation

eTable 5. Association between KTRs characteristics and risk of hospitalization for Covid-19 in univariate analysis.

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	36184	5279	
Age groups			
01-45	8621 (23.8)	925 (17.5)	1
46-65	16805 (46.4)	2557 (48.4)	1.42 [1.31-1.54]
66 and up	10758 (29.7)	1797 (34)	1.56 [1.43-1.69]
Sex (Female)	13811 (38.2)	2082 (39.4)	1.05 [0.99-1.12]
Social deprivation index			
1 (least deprived)	6380 (17.6)	995 (18.8)	1
2	6997 (19.3)	916 (17.4)	0.84 [0.76-0.92]
3	7259 (20.1)	915 (17.3)	0.81 [0.73-0.89]
4	7170 (19.8)	966 (18.3)	0.86 [0.79-0.95]
5 (most deprived)	7098 (19.6)	1216 (23)	1.10 [1.00-1.20]
Comorbidities			
Alcohol	2079 (5.7)	313 (5.9)	1.03 [0.91-1.17]
Smoking	6847 (18.9)	975 (18.5)	0.97 [0.90-1.05]
Obesity	6481 (17.9)	1352 (25.6)	1.58 [1.48-1.69]
Hypertension	29304 (81.0)	4536 (85.9)	1.43 [1.32-1.56]
Cardiovascular ¹	9823 (27.1)	1908 (36.1)	1.52 [1.43-1.61]
Statin use	14773 (40.8)	2357 (44.6)	1.17 [1.10-1.24]
Diabetes	9440 (26.1)	2091 (39.6)	1.86 [1.75-1.97]
Respiratory ²	2824 (7.8)	597 (11.3)	1.51 [1.37-1.65]
Cancer	2808 (7.8)	374 (7.1)	0.91 [0.81-1.01]
Psychiatric	1456 (4.0)	254 (4.8)	1.21 [1.05-1.38]
Antidepressants use	2053 (5.7)	341 (6.5)	1.15 [1.02-1.29]
Anxiolytics use	3022 (8.4)	491 (9.3)	1.13 [1.02-1.24]
Number of consultations (6 months prior to index date)			
0	2795 (7.7)	397 (7.5)	1
1-3	13699 (37.9)	1799 (34.1)	0.92 [0.82-1.04]
4-6	10140 (28.0)	1402 (26.6)	0.97 [0.86-1.10]
7 and up	9550 (26.4)	1681 (31.8)	1.24 [1.10-1.39]
Number of hospitalizations (6 months prior to index date)			
0	28018 (77.4)	3660 (69.3)	1
1-3	7224 (20.0)	1412 (26.7)	1.50 [1.40-1.60]
4-6	707 (2.0)	168 (3.2)	1.82 [1.53-2.16]
7 and up	235 (0.6)	39 (0.7)	1.27 [0.90-1.79]
Age of Transplantation			
Under 2 years	5085 (14.1)	929 (17.6)	1
2-5 years	7810 (21.6)	1284 (24.3)	0.90 [0.82-0.98]
6-10 years	9927 (27.4)	1463 (27.7)	0.80 [0.73-0.88]
10 years and up	13362 (36.9)	1603 (30.4)	0.65 [0.60-0.71]
Immunosuppressive drugs			
Steroids	24378 (67.4)	4187 (79.3)	1.86 [1.73-1.99]
Tacrolimus	25218 (69.7)	3714 (70.4)	1.03 [0.97-1.10]
Ciclosporin	7804 (21.6)	1111 (21.0)	0.97 [0.90-1.04]

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	36184	5279	
Mycophenolic Acid	27049 (74.8)	4254 (80.6)	1.40 [1.30-1.51]
Azathioprine	3231 (8.9)	343 (6.5)	0.71 [0.63-0.80]
Sirolimus	1035 (2.9)	109 (2.1)	0.72 [0.59-0.87]
Everolimus	2887 (8.0)	393 (7.4)	0.93 [0.83-1.04]
Treatment regimen			
Tacrolimus-Mycophenolic Acid-Steroids	12324 (34.1)	2326 (44.1)	1
Tacrolimus-Mycophenolic Acid	6277 (17.3)	595 (11.3)	0.50 [0.46-0.55]
Ciclosporin-Mycophenolic Acid-Steroids	2973 (8.2)	566 (10.7)	1.01 [0.91-1.12]
Ciclosporin-Mycophenolic Acid	2127 (5.9)	245 (4.6)	0.61 [0.53-0.70]
Tacrolimus only	693 (1.9)	46 (0.9)	0.35 [0.26-0.48]
Tacrolimus-Steroids	1927 (5.3)	271 (5.1)	0.75 [0.65-0.85]
Tacrolimus-Sirolimus/Everolimus-Steroids	1012 (2.8)	144 (2.7)	0.75 [0.63-0.90]
Tacrolimus-Azathioprine-Steroids	1184 (3.3)	135 (2.6)	0.60 [0.50-0.73]
Ciclosporin-Steroids	1020 (2.8)	109 (2.1)	0.57 [0.46-0.69]
Mycophenolic Acid-Steroids	952 (2.6)	201 (3.8)	1.12 [0.95-1.31]
Sirolimus/Everolimus-Mycophenolic Acid	440 (1.2)	30 (0.6)	0.36 [0.25-0.52]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	750 (2.1)	115 (2.2)	0.81 [0.66-0.99]
Others	4505 (12.5)	496 (9.4)	0.58 [0.53-0.65]
Treatment regimen classes			
CNI + Antimetabolites + Steroids	17305 (47.8)	3150 (59.7)	1
CNI + mTORi + Steroids	1174 (3.2)	168 (3.2)	0.78 [0.66-0.92]
Antimetabolite + mTORi + Steroids	796 (2.2)	118 (2.2)	0.81 [0.66-0.99]
CNI + Antimetabolite + mTORi	110 (0.3)	7 (0.1)	0.35 [0.16-0.75]
CNI + Antimetabolites	9286 (25.7)	900 (17.0)	0.53 [0.49-0.57]
CNI + mTORi	427 (1.2)	41 (0.8)	0.52 [0.38-0.72]
CNI + Steroids	2952 (8.2)	380 (7.2)	0.70 [0.63-0.79]
Antimetabolite + Steroids	1273 (3.5)	241 (4.6)	1.04 [0.90-1.20]
Antimetabolite + mTORi	463 (1.3)	34 (0.6)	0.40 [0.28-0.57]
mTORi + Steroids	414 (1.1)	58 (1.1)	0.77 [0.58-1.01]
CNI	1116 (3.1)	68 (1.3)	0.33 [0.26-0.42]
Antimetabolite	333 (0.9)	39 (0.7)	0.64 [0.46-0.89]
mTORi	71 (0.2)	3 (0.1)	0.23 [0.07-0.73]
Others	464 (1.3)	72 (1.4)	0.85 [0.66-1.09]
Immunosuppression intensity (including steroids)			
Triple regimen	19849 (54.9)	3515 (66.6)	1
Double regimen	14815 (40.9)	1654 (31.3)	0.63 [0.59-0.67]
Single regimen	1520 (4.2)	110 (2.1)	0.40 [0.33-0.49]

CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors.

¹Except for heart transplantation

²Except for mucoviscidosis and lung transplantation

2- Liver transplant recipients (LTRs): N = 14464

eTable 6. Baseline characteristics of LTRs according to immunosuppressive drugs groups.

Effective	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No 3370	Yes 11094	No 12927	Yes 1537	No 5474	Yes 8990	No 14116	Yes 348	No 14232	Yes 232	No 12222	Yes 2242
Age mean (SD)	60.1 (16.8)	55.5 (16.7)	56.7 (16.4)	55.7 (20.7)	54.2 (20.2)	58 (14.3)	56.9 (16.7)	42.9 (19.0)	56.6 (16.8)	59.1 (18.2)	55.8 (17.5)	61.1 (11.6)
Age median (IQR)	64 (55-71)	60 (49-67)	61 (50-68)	62 (48-70)	61 (44-69)	61 (52-68)	61 (51-68)	42 (30-58)	61 (50-68)	65 (54-71)	60 (48-68)	63 (56-69)
Age groups												
01-45	476 (14.1)	2373 (21.4)	2489 (19.3)	360 (23.4)	1457 (26.6)	1392 (15.5)	2657 (18.8)	192 (55.2)	2813 (19.8)	36 (15.5)	2646 (21.6)	203 (9.1)
46-65	1356 (40.2)	5247 (47.3)	6037 (46.7)	566 (36.8)	2032 (37.1)	4571 (50.8)	6501 (46.1)	102 (29.3)	6515 (45.8)	88 (37.9)	5472 (44.8)	1131 (50.4)
66 and up	1538 (45.6)	3474 (31.3)	4401 (34.0)	611 (39.8)	1985 (36.3)	3027 (33.7)	4958 (35.1)	54 (15.5)	4904 (34.5)	108 (46.6)	4104 (33.6)	908 (40.5)
Age categories												
01-17	161 (4.8)	526 (4.7)	535 (4.1)	152 (9.9)	489 (8.9)	198 (2.2)	647 (4.6)	40 (11.5)	673 (4.7)	14 (6.0)	675 (5.5)	12 (0.5)
18-29	121 (3.6)	538 (4.8)	566 (4.4)	93 (6.1)	351 (6.4)	308 (3.4)	614 (4.3)	45 (12.9)	650 (4.6)	9 (3.9)	612 (5.0)	47 (2.1)
30-49	304 (9.0)	1865 (16.8)	2005 (15.5)	164 (10.7)	831 (15.2)	1338 (14.9)	2037 (14.4)	132 (37.9)	2146 (15.1)	23 (9.9)	1938 (15.9)	231 (10.3)
50-59	572 (17.0)	2487 (22.4)	2799 (21.7)	260 (16.9)	907 (16.6)	2152 (23.9)	3010 (21.3)	49 (14.1)	3021 (21.2)	38 (16.4)	2572 (21.0)	487 (21.7)
60-69	1193 (35.4)	3766 (33.9)	4522 (35.0)	437 (28.4)	1631 (29.8)	3328 (37.0)	4903 (34.7)	56 (16.1)	4890 (34.4)	69 (29.7)	3969 (32.5)	990 (44.2)
70-79	880 (26.1)	1745 (15.7)	2273 (17.6)	352 (22.9)	1098 (20.1)	1527 (17.0)	2602 (18.4)	23 (6.6)	2552 (17.9)	73 (31.5)	2176 (17.8)	449 (20.0)
80 and up	139 (4.1)	167 (1.5)	227 (1.8)	79 (5.1)	167 (3.1)	139 (1.5)	303 (2.1)	3 (0.9)	300 (2.1)	6 (2.6)	280 (2.3)	26 (1.2)
Sex (Female)	998 (29.6)	3725 (33.6)	4202 (32.5)	521 (33.9)	2134 (39.0)	2589 (28.8)	4529 (32.1)	194 (55.7)	4642 (32.6)	81 (34.9)	4164 (34.1)	559 (24.9)
Region of residence												
Île-de-France	550 (16.3)	2375 (21.4)	2628 (20.3)	297 (19.3)	1077 (19.7)	1848 (20.6)	2844 (20.1)	81 (23.3)	2881 (20.2)	44 (19.0)	2638 (21.6)	287 (12.8)
Northwest	702 (20.8)	2273 (20.5)	2577 (19.9)	398 (25.9)	1067 (19.5)	1908 (21.2)	2928 (20.7)	47 (13.5)	2954 (20.8)	21 (9.1)	2514 (20.6)	461 (20.6)
Northeast	975 (28.9)	1893 (17.1)	2578 (19.9)	290 (18.9)	1062 (19.4)	1806 (20.1)	2790 (19.8)	78 (22.4)	2760 (19.4)	108 (46.6)	2231 (18.3)	637 (28.4)
Southeast	793 (23.5)	3055 (27.5)	3507 (27.1)	341 (22.2)	1591 (29.1)	2257 (25.1)	3748 (26.6)	100 (28.7)	3809 (26.8)	39 (16.8)	3313 (27.1)	535 (23.9)
Southwest	350 (10.4)	1498 (13.5)	1637 (12.7)	211 (13.7)	677 (12.4)	1171 (13.0)	1806 (12.8)	42 (12.1)	1828 (12.8)	20 (8.6)	1526 (12.5)	322 (14.4)
Social deprivation index												
1 (least deprived)	558 (16.6)	2145 (19.3)	2423 (18.7)	280 (18.2)	1046 (19.1)	1657 (18.4)	2630 (18.6)	73 (21.0)	2671 (18.8)	32 (13.8)	2346 (19.2)	357 (15.9)
2	691 (20.5)	2187 (19.7)	2572 (19.9)	306 (19.9)	1041 (19.0)	1837 (20.4)	2797 (19.8)	81 (23.3)	2833 (19.9)	45 (19.4)	2389 (19.5)	489 (21.8)
3	609 (18.1)	2091 (18.8)	2443 (18.9)	257 (16.7)	1053 (19.2)	1647 (18.3)	2646 (18.7)	54 (15.5)	2654 (18.6)	46 (19.8)	2284 (18.7)	416 (18.6)
4	702 (20.8)	2174 (19.6)	2535 (19.6)	341 (22.2)	1069 (19.5)	1807 (20.1)	2817 (20.0)	59 (17.0)	2830 (19.9)	46 (19.8)	2388 (19.5)	488 (21.8)
5 (most deprived)	716 (21.2)	2180 (19.7)	2587 (20.0)	309 (20.1)	1131 (20.7)	1765 (19.6)	2831 (20.1)	65 (18.7)	2841 (20.0)	55 (23.7)	2451 (20.1)	445 (19.8)
Unknown	94 (2.8)	317 (2.9)	367 (2.8)	44 (2.9)	134 (2.4)	277 (3.1)	395 (2.8)	16 (4.6)	403 (2.8)	8 (3.4)	364 (3.0)	47 (2.1)
Comorbidities												

	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Effective	3370	11094	12927	1537	5474	8990	14116	348	14232	232	12222	2242
Alcohol	1786 (53)	5928 (53.4)	7089 (54.8)	625 (40.7)	2360 (43.1)	5354 (59.6)	7649 (54.2)	65 (18.7)	7637 (53.7)	77 (33.2)	6209 (50.8)	1505 (67.1)
Smoking	914 (27.1)	3267 (29.4)	3819 (29.5)	362 (23.6)	1307 (23.9)	2874 (32)	4126 (29.2)	55 (15.8)	4135 (29.1)	46 (19.8)	3339 (27.3)	842 (37.6)
Obesity	814 (24.2)	2716 (24.5)	3202 (24.8)	328 (21.3)	1130 (20.6)	2400 (26.7)	3485 (24.7)	45 (12.9)	3493 (24.5)	37 (15.9)	2934 (24.0)	596 (26.6)
Hypertension	2447 (72.6)	6610 (59.6)	8023 (62.1)	1034 (67.3)	3168 (57.9)	5889 (65.5)	8891 (63.0)	166 (47.7)	8878 (62.4)	179 (77.2)	7434 (60.8)	1623 (72.4)
Cardiovascular ¹	969 (28.8)	2569 (23.2)	3138 (24.3)	400 (26.0)	1268 (23.2)	2270 (25.3)	3484 (24.7)	54 (15.5)	3467 (24.4)	71 (30.6)	2875 (23.5)	663 (29.6)
Statin use	1076 (31.9)	2138 (19.3)	2854 (22.1)	360 (23.4)	1144 (20.9)	2070 (23.0)	3163 (22.4)	51 (14.7)	3113 (21.9)	101 (43.5)	2454 (20.1)	760 (33.9)
Diabetes	1200 (35.6)	3820 (34.4)	4554 (35.2)	466 (30.3)	1675 (30.6)	3345 (37.2)	4930 (34.9)	90 (25.9)	4927 (34.6)	93 (40.1)	4134 (33.8)	886 (39.5)
Dialysis	31 (0.9)	73 (0.7)	92 (0.7)	12 (0.8)	63 (1.2)	41 (0.5)	102 (0.7)	2 (0.6)	101 (0.7)	3 (1.3)	87 (0.7)	17 (0.8)
Respiratory ²	351 (10.4)	1252 (11.3)	1445 (11.2)	158 (10.3)	564 (10.3)	1039 (11.6)	1577 (11.2)	26 (7.5)	1584 (11.1)	19 (8.2)	1332 (10.9)	271 (12.1)
Cancer	461 (13.7)	1546 (13.9)	1862 (14.4)	145 (9.4)	714 (13.0)	1293 (14.4)	2000 (14.2)	7 (2.0)	1980 (13.9)	27 (11.6)	1347 (11)	660 (29.4)
Psychiatric	216 (6.4)	859 (7.7)	976 (7.6)	99 (6.4)	386 (7.1)	689 (7.7)	1046 (7.4)	29 (8.3)	1065 (7.5)	10 (4.3)	902 (7.4)	173 (7.7)
Antidepressants use	232 (6.9)	636 (5.7)	755 (5.8)	113 (7.4)	348 (6.4)	520 (5.8)	850 (6.0)	18 (5.2)	856 (6.0)	12 (5.2)	729 (6.0)	139 (6.2)
Anxiolytics use	393 (11.7)	1097 (9.9)	1314 (10.2)	176 (11.5)	570 (10.4)	920 (10.2)	1464 (10.4)	26 (7.5)	1472 (10.3)	18 (7.8)	1222 (10.0)	268 (12.0)
Number of consultations (6 months prior to index date)												
0	253 (7.5)	982 (8.9)	1084 (8.4)	151 (9.8)	482 (8.8)	753 (8.4)	1201 (8.5)	34 (9.8)	1219 (8.6)	16 (6.9)	1142 (9.3)	93 (4.1)
1-3	1223 (36.3)	4282 (38.6)	4911 (38.0)	594 (38.6)	2062 (37.7)	3443 (38.3)	5387 (38.2)	118 (33.9)	5424 (38.1)	81 (34.9)	4786 (39.2)	719 (32.1)
4-6	912 (27.1)	3003 (27.1)	3522 (27.2)	393 (25.6)	1507 (27.5)	2408 (26.8)	3819 (27.1)	96 (27.6)	3838 (27.0)	77 (33.2)	3282 (26.9)	633 (28.2)
7 and up	982 (29.1)	2827 (25.5)	3410 (26.4)	399 (26.0)	1423 (26.0)	2386 (26.5)	3709 (26.3)	100 (28.7)	3751 (26.4)	58 (25.0)	3012 (24.6)	797 (35.5)
Number of hospitalizations (6 months prior to index date)												
0	2666 (79.1)	8336 (75.1)	9778 (75.6)	1224 (79.6)	4281 (78.2)	6721 (74.8)	10726 (76.0)	276 (79.3)	10827 (76.1)	175 (75.4)	9418 (77.1)	1584 (70.7)
1-3	633 (18.8)	2448 (22.1)	2796 (21.6)	285 (18.5)	1043 (19.1)	2038 (22.7)	3017 (21.4)	64 (18.4)	3030 (21.3)	51 (22.0)	2495 (20.4)	586 (26.1)
4-6	50 (1.5)	252 (2.3)	285 (2.2)	17 (1.1)	103 (1.9)	199 (2.2)	295 (2.1)	7 (2.0)	299 (2.1)	3 (1.3)	238 (1.9)	64 (2.9)
7 and up	21 (0.6)	58 (0.5)	68 (0.5)	11 (0.7)	47 (0.9)	32 (0.4)	78 (0.6)	1 (0.3)	76 (0.5)	3 (1.3)	71 (0.6)	8 (0.4)
Age of Transplantation												
Under 2 years	233 (6.9)	1967 (17.7)	2069 (16.0)	131 (8.5)	491 (9.0)	1709 (19.0)	2150 (15.2)	50 (14.4)	2190 (15.4)	10 (4.3)	1761 (14.4)	439 (19.6)
2-5 years	515 (15.3)	2768 (25.0)	3101 (24.0)	182 (11.8)	1015 (18.5)	2268 (25.2)	3196 (22.6)	87 (25.0)	3266 (22.9)	17 (7.3)	2669 (21.8)	614 (27.4)
6-10 years	1084 (32.2)	3168 (28.6)	3790 (29.3)	462 (30.1)	1635 (29.9)	2617 (29.1)	4156 (29.4)	96 (27.6)	4170 (29.2)	82 (35.3)	3573 (29.2)	679 (30.3)
10 years and up	1538 (45.6)	3191 (28.8)	3967 (30.7)	762 (49.6)	2333 (42.6)	2396 (26.7)	4614 (32.7)	115 (33.0)	4606 (32.4)	123 (53.0)	4219 (34.5)	510 (22.7)

¹Except for heart transplantation

²Except for mucoviscidosis and lung transplantation

eTable 7. Association between LTRs characteristics and risk of hospitalization for Covid-19 in univariate analysis.

	Not hospitalized	Hospitalized for	Crude Odds Ratios
Effective	13539	Covid-19 925	OR [IC95%]
Age groups			
01-45	2719 (20.1)	130 (14.1)	1
46-65	6198 (45.8)	405 (43.8)	1.37 [1.12-1.67]
66 and up	4622 (34.1)	390 (42.2)	1.76 [1.44-2.16]
Sex (Female)	4436 (32.8)	287 (31.0)	0.92 [0.80-1.07]
Social deprivation index			
1 (least deprived)	2521 (18.6)	182 (19.7)	1
2	2696 (19.9)	182 (19.7)	0.94 [0.76-1.16]
3	2529 (18.7)	171 (18.5)	0.94 [0.75-1.16]
4	2704 (20.0)	172 (18.6)	0.88 [0.71-1.09]
5 (most deprived)	2715 (20.1)	181 (19.6)	0.92 [0.75-1.14]
Comorbidities			
Alcohol	7258 (53.6)	456 (49.3)	0.84 [0.74-0.96]
Smoking	3936 (29.1)	245 (26.5)	0.88 [0.76-1.02]
Obesity	3272 (24.2)	258 (27.9)	1.21 [1.05-1.41]
Hypertension	8383 (61.9)	674 (72.9)	1.65 [1.42-1.92]
Cardiovascular ¹	3201 (23.6)	337 (36.4)	1.85 [1.61-2.13]
Statin use	2928 (21.6)	286 (30.9)	1.62 [1.40-1.88]
Diabetes	4547 (33.6)	473 (51.1)	2.07 [1.81-2.37]
Dialysis	83 (0.6)	21 (2.3)	3.77 [2.32-6.11]
Respiratory ²	1475 (10.9)	128 (13.8)	1.31 [1.08-1.60]
Cancer	1896 (14.0)	111 (12.0)	0.84 [0.68-1.03]
Psychiatric	1003 (7.4)	72 (7.8)	1.05 [0.82-1.35]
Antidepressants use	795 (5.9)	73 (7.9)	1.37 [1.07-1.76]
Anxiolytics use	1391 (10.3)	99 (10.7)	1.05 [0.84-1.30]
Number of consultations (6 months prior to index date)			
0	1170 (8.6)	65 (7.0)	1
1-3	5191 (38.3)	314 (33.9)	1.09 [0.83-1.43]
4-6	3683 (27.2)	232 (25.1)	1.13 [0.85-1.50]
7 and up	3495 (25.8)	314 (33.9)	1.62 [1.23-2.13]
Number of hospitalizations (6 months prior to index date)			
0	10379 (76.7)	623 (67.4)	1
1-3	2825 (20.9)	256 (27.7)	1.51 [1.30-1.76]
4-6	269 (2.0)	33 (3.6)	2.04 [1.41-2.96]
7 and up	66 (0.5)	13 (1.4)	3.28 [1.80-5.98]
Age of Transplantation			
Under 2 year	2050 (15.1)	150 (16.2)	1
2-5 years	3074 (22.7)	209 (22.6)	0.92 [0.74-1.15]
5-10 years	3989 (29.5)	263 (28.4)	0.90 [0.73-1.10]
10 years and up	4426 (32.7)	303 (32.8)	0.93 [0.76-1.14]
Immunosuppressive drugs			
Steroids	3793 (28.0)	372 (40.2)	1.73 [1.51-1.98]

	Not hospitalized	Hospitalized for	Crude Odds Ratios
	13539	Covid-19 925	OR [IC95%]
Effective			
Tacrolimus	10418 (76.9)	676 (73.1)	0.81 [0.70-0.95]
Ciclosporin	1438 (10.6)	99 (10.7)	1.01 [0.81-1.25]
Mycophenolic Acid	8321 (61.5)	669 (72.3)	1.64 [1.41-1.90]
Azathioprine	328 (2.4)	20 (2.2)	0.89 [0.56-1.40]
Sirolimus	209 (1.5)	23 (2.5)	1.63 [1.05-2.51]
Everolimus	2113 (15.6)	129 (13.9)	0.88 [0.72-1.06]
Treatment regimen			
Tacrolimus-Mycophenolic Acid	4172 (30.8)	268 (29.0)	1
Tacrolimus-Mycophenolic Acid-Steroids	1816 (13.4)	193 (20.9)	1.65 [1.36-2.01]
Ciclosporin-Mycophenolic Acid-Steroids	190 (1.4)	38 (4.1)	3.11 [2.15-4.50]
Ciclosporin-Mycophenolic Acid	506 (3.7)	24 (2.6)	0.73 [0.48-1.13]
Tacrolimus only	2441 (18.0)	86 (9.3)	0.54 [0.42-0.70]
Tacrolimus-Steroids	735 (5.4)	54 (5.8)	1.14 [0.84-1.54]
Tacrolimus-Sirolimus/Everolimus-Steroids	217 (1.6)	16 (1.7)	1.14 [0.68-1.93]
Tacrolimus-Azathioprine-Steroids	121 (0.9)	7 (0.8)	1.15 [0.41-1.94]
Ciclosporin-Steroids	139 (1.0)	6 (0.6)	0.67 [0.29-1.53]
Mycophenolic Acid-Steroids	89 (0.7)	14 (1.5)	2.44 [1.37-4.36]
Sirolimus/Everolimus-Mycophenolic Acid	636 (4.7)	46 (5.0)	1.12 [0.81-1.55]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	115 (0.8)	16 (1.7)	2.16 [1.26-3.70]
Others	2362 (17.4)	157 (17)	1.03 [0.84-1.26]
Treatment regimen classes			
CNI + Antimetabolites	4803 (35.5)	300 (32.4)	1
CNI + Antimetabolites + Steroids	2173 (16.0)	239 (25.8)	1.76 [1.47-2.10]
CNI + mTORi + Steroids	229 (1.7)	19 (2.1)	1.32 [0.82-2.15]
Antimetabolite + mTORi + Steroids	126 (0.9)	16 (1.7)	2.03 [1.19-3.46]
CNI + Antimetabolite + mTORi	238 (1.8)	12 (1.3)	0.80 [0.44-1.45]
CNI + mTORi	430 (3.2)	22 (2.4)	0.81 [0.52-1.27]
CNI + Steroids	877 (6.5)	60 (6.5)	1.09 [0.82-1.45]
Antimetabolite + Steroids	102 (0.8)	16 (1.7)	2.51 [1.46-4.31]
Antimetabolite + mTORi	641 (4.7)	46 (5.0)	1.14 [0.83-1.58]
mTORi + Steroids	110 (0.8)	10 (1.1)	1.45 [0.75-2.81]
CNI	2903 (21.4)	110 (11.9)	0.60 [0.48-0.75]
Antimetabolite	361 (2.7)	48 (5.2)	2.12 [1.54-2.94]
mTORi	370 (2.7)	15 (1.6)	0.64 [0.38-1.10]
Others	176 (1.3)	12 (1.3)	1.09 [0.60-1.98]
Immunosuppression intensity (including steroids)			
Double regimen	6963 (51.4)	454 (49.1)	1
Triple regimen	2942 (21.7)	298 (32.2)	1.55 [1.33-1.80]
Single regimen	3634 (26.8)	173 (18.7)	0.73 [0.61-0.87]

CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors.

¹Except for heart transplantation

²Except for mucoviscidosis and lung transplantation

eTable 8. Association between immunosuppressive treatment regimens and risk of hospitalization for Covid-19 in a multivariate analysis among LTRs (change in reference class)

Adjusted Odds Ratios aOR [IC95%]	
Treatment regimen¹	
Tacrolimus-Mycophenolic Acid	1
Tacrolimus-Mycophenolic Acid-Steroids	1.51 [1.23-1.86]
Ciclosporin-Mycophenolic Acid-Steroids	2.62 [1.77-3.86]
Ciclosporin-Mycophenolic Acid	0.73 [0.47-1.13]
Tacrolimus only	0.52 [0.40-0.68]
Tacrolimus-Steroids	1.03 [0.75-1.41]
Tacrolimus-Sirolimus/Everolimus-Steroids	1.12 [0.65-1.93]
Tacrolimus-Azathioprine-Steroids	0.83 [0.37-1.83]
Ciclosporin-Steroids	0.54 [0.23-1.27]
Mycophenolic Acid-Steroids	1.71 [0.94-3.11]
Sirolimus/Everolimus-Mycophenolic Acid	1.03 [0.73-1.44]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	1.71 [0.98-2.98]
Others	0.90 [0.73-1.11]
Treatment regimen classes²	
CNI + Antimetabolites	1
CNI + Antimetabolites + Steroids	1.60 [1.32-1.93]
CNI + mTORi + Steroids	1.29 [0.78-2.13]
Antimetabolite + m+ Steroids	1.61 [0.93-2.78]
CNI + Antimetabolite + mTORi	0.84 [0.45-1.53]
CNI + mTORi	0.75 [0.48-1.19]
CNI + Steroids	0.97 [0.72-1.31]
Antimetabolite + Steroids	1.85 [1.06-3.23]
Antimetabolite + mTORi	1.04 [0.74-1.45]
mTORi + Steroids	1.07 [0.54-2.10]
CNI	0.58 [0.46-0.73]
Antimetabolite	1.60 [1.13-2.25]
mTORi	0.52 [0.30-0.91]
Others	1.02 [0.55-1.89]
Immunosuppression intensity (including steroids)³	
Double regimen	1
Single regimen	0.68 [0.57-0.82]
Triple regimen	1.49 [1.27-1.76]

CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors

¹Model 1: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

²Model 2: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

³Model 3: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

3- Heart transplant recipients (HTRs): N = 5327

eTable 9. Baseline characteristics of HTRs according to immunosuppressive drugs groups.

Effective	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No 2713	Yes 2614	No 2833	Yes 2494	No 1218	Yes 4109	No 5125	Yes 202	No 5292	Yes 35	No 3792	Yes 1535
Age mean (SD)	58.9 (14.9)	51.3 (16.2)	52.5 (16.2)	58.3 (15.2)	57.7 (16.6)	54.5 (15.8)	55.3 (15.9)	53.4 (18.9)	55.2 (16.0)	59.6 (15.3)	55 (16.4)	55.6 (15.0)
Age median (IQR)	62 (51-69)	54 (41-64)	55 (42-65)	61 (50-69)	61 (48-70)	58 (45-66)	58 (46-67)	56 (37-69)	58 (46-67)	61 (53-70)	58 (46-67)	58 (47-67)
Age groups												
01-45	466 (17.2)	833 (31.9)	841 (29.7)	458 (18.4)	266 (21.8)	1033 (25.1)	1222 (23.8)	77 (38.1)	1294 (24.5)	5 (14.3)	941 (24.8)	358 (23.3)
46-65	1211 (44.6)	1254 (48.0)	1343 (47.4)	1122 (45.0)	480 (39.4)	1985 (48.3)	2406 (46.9)	59 (29.2)	2449 (46.3)	16 (45.7)	1745 (46.0)	720 (46.9)
66 and up	1036 (38.2)	527 (20.2)	649 (22.9)	914 (36.6)	472 (38.8)	1091 (26.6)	1497 (29.2)	66 (32.7)	1549 (29.3)	14 (40.0)	1106 (29.2)	457 (29.8)
Age categories												
01-17	34 (1.3)	101 (3.9)	98 (3.5)	37 (1.5)	25 (2.1)	110 (2.7)	130 (2.5)	5 (2.5)	135 (2.6)	0 (0.0)	113 (3.0)	22 (1.4)
18-29	102 (3.8)	191 (7.3)	196 (6.9)	97 (3.9)	64 (5.3)	229 (5.6)	273 (5.3)	20 (9.9)	291 (5.5)	2 (5.7)	206 (5.4)	87 (5.7)
30-49	482 (17.8)	735 (28.1)	748 (26.4)	469 (18.8)	248 (20.4)	969 (23.6)	1157 (22.6)	60 (29.7)	1211 (22.9)	6 (17.1)	864 (22.8)	353 (23.0)
50-59	570 (21.0)	639 (24.4)	669 (23.6)	540 (21.7)	230 (18.9)	979 (23.8)	1184 (23.1)	25 (12.4)	1203 (22.7)	6 (17.1)	858 (22.6)	351 (22.9)
60-69	861 (31.7)	676 (25.9)	768 (27.1)	769 (30.8)	334 (27.4)	1203 (29.3)	1494 (29.2)	43 (21.3)	1527 (28.9)	10 (28.6)	1063 (28.0)	474 (30.9)
70-79	534 (19.7)	253 (9.7)	316 (11.2)	471 (18.9)	249 (20.4)	538 (13.1)	754 (14.7)	33 (16.3)	778 (14.7)	9 (25.7)	565 (14.9)	222 (14.5)
80 and up	130 (4.8)	19 (0.7)	38 (1.3)	111 (4.5)	68 (5.6)	81 (2.0)	133 (2.6)	16 (7.9)	147 (2.8)	2 (5.7)	123 (3.2)	26 (1.7)
Sex (Female)	505 (18.6)	906 (34.7)	940 (33.2)	471 (18.9)	383 (31.4)	1028 (25.0)	1321 (25.8)	90 (44.6)	1405 (26.5)	6 (17.1)	1078 (28.4)	333 (21.7)
Region of residence												
Île-de-France	574 (21.2)	364 (13.9)	410 (14.5)	528 (21.2)	188 (15.4)	750 (18.3)	893 (17.4)	45 (22.3)	936 (17.7)	2 (5.7)	673 (17.7)	265 (17.3)
Northwest	639 (23.6)	654 (25.0)	678 (23.9)	615 (24.7)	240 (19.7)	1053 (25.6)	1264 (24.7)	29 (14.4)	1289 (24.4)	4 (11.4)	960 (25.3)	333 (21.7)
Northeast	644 (23.7)	526 (20.1)	654 (23.1)	516 (20.7)	315 (25.9)	855 (20.8)	1116 (21.8)	54 (26.7)	1154 (21.8)	16 (45.7)	725 (19.1)	445 (29.0)
Southeast	549 (20.2)	707 (27.0)	715 (25.2)	541 (21.7)	340 (27.9)	916 (22.3)	1197 (23.4)	59 (29.2)	1249 (23.6)	7 (20.0)	941 (24.8)	315 (20.5)
Southwest	307 (11.3)	363 (13.9)	376 (13.3)	294 (11.8)	135 (11.1)	535 (13.0)	655 (12.8)	15 (7.4)	664 (12.5)	6 (17.1)	493 (13.0)	177 (11.5)
Social deprivation index												
1 (least deprived)	522 (19.2)	468 (17.9)	510 (18.0)	480 (19.2)	225 (18.5)	765 (18.6)	951 (18.6)	39 (19.3)	987 (18.7)	3 (8.6)	709 (18.7)	281 (18.3)
2	496 (18.3)	487 (18.6)	531 (18.7)	452 (18.1)	237 (19.5)	746 (18.2)	946 (18.5)	37 (18.3)	977 (18.5)	6 (17.1)	687 (18.1)	296 (19.3)
3	515 (19.0)	482 (18.4)	523 (18.5)	474 (19.0)	224 (18.4)	773 (18.8)	960 (18.7)	37 (18.3)	992 (18.7)	5 (14.3)	685 (18.1)	312 (20.3)
4	547 (20.2)	550 (21.0)	599 (21.1)	498 (20.0)	238 (19.5)	859 (20.9)	1059 (20.7)	38 (18.8)	1084 (20.5)	13 (37.1)	782 (20.6)	315 (20.5)
5 (most deprived)	535 (19.7)	556 (21.3)	596 (21.0)	495 (19.8)	262 (21.5)	829 (20.2)	1043 (20.4)	48 (23.8)	1085 (20.5)	6 (17.1)	798 (21.0)	293 (19.1)
Unknown	98 (3.6)	71 (2.7)	74 (2.6)	95 (3.8)	32 (2.6)	137 (3.3)	166 (3.2)	3 (1.5)	167 (3.2)	2 (5.7)	131 (3.5)	38 (2.5)
Comorbidities												

Effective	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
	2713	2614	2833	2494	1218	4109	5125	202	5292	35	3792	1535
Alcohol	267 (9.8)	287 (11.0)	307 (10.8)	247 (9.9)	107 (8.8)	447 (10.9)	541 (10.6)	13 (6.4)	550 (10.4)	4 (11.4)	398 (10.5)	156 (10.2)
Smoking	782 (28.8)	874 (33.4)	940 (33.2)	716 (28.7)	325 (26.7)	1331 (32.4)	1612 (31.5)	44 (21.8)	1646 (31.1)	10 (28.6)	1122 (29.6)	534 (34.8)
Obesity	605 (22.3)	549 (21.0)	614 (21.7)	540 (21.7)	253 (20.8)	901 (21.9)	1120 (21.9)	34 (16.8)	1145 (21.6)	9 (25.7)	811 (21.4)	343 (22.3)
Hypertension	2297 (84.7)	1895 (72.5)	2093 (73.9)	2099 (84.2)	975 (80.0)	3217 (78.3)	4048 (79.0)	144 (71.3)	4158 (78.6)	34 (97.1)	2911 (76.8)	1281 (83.5)
Cardiovascular ¹	2387 (88.0)	2202 (84.2)	2392 (84.4)	2197 (88.1)	1016 (83.4)	3573 (87.0)	4437 (86.6)	152 (75.2)	4567 (86.3)	22 (62.9)	3211 (84.7)	1378 (89.8)
Statin use	1949 (71.8)	1754 (67.1)	1887 (66.6)	1816 (72.8)	787 (64.6)	2916 (71.0)	3579 (69.8)	124 (61.4)	3683 (69.6)	20 (57.1)	2598 (68.5)	1105 (72.0)
Diabetes	592 (21.8)	709 (27.1)	779 (27.5)	522 (20.9)	314 (25.8)	987 (24.0)	1242 (24.2)	59 (29.2)	1290 (24.4)	11 (31.4)	921 (24.3)	380 (24.8)
Dialysis	59 (2.2)	54 (2.1)	54 (1.9)	59 (2.4)	44 (3.6)	69 (1.7)	108 (2.1)	5 (2.5)	113 (2.1)	0 (0.0)	83 (2.2)	30 (2.0)
Respiratory ²	323 (11.9)	371 (14.2)	400 (14.1)	294 (11.8)	153 (12.6)	541 (13.2)	666 (13.0)	28 (13.9)	690 (13.0)	4 (11.4)	513 (13.5)	181 (11.8)
Cancer	269 (9.9)	192 (7.3)	228 (8.0)	233 (9.3)	175 (14.4)	286 (7.0)	444 (8.7)	17 (8.4)	455 (8.6)	6 (17.1)	297 (7.8)	164 (10.7)
Psychiatric	179 (6.6)	243 (9.3)	246 (8.7)	176 (7.1)	92 (7.6)	330 (8.0)	404 (7.9)	18 (8.9)	420 (7.9)	2 (5.7)	312 (8.2)	110 (7.2)
Antidepressants use	219 (8.1)	192 (7.3)	203 (7.2)	208 (8.3)	100 (8.2)	311 (7.6)	399 (7.8)	12 (5.9)	407 (7.7)	4 (11.4)	302 (8.0)	109 (7.1)
Anxiolytics use	368 (13.6)	299 (11.4)	335 (11.8)	332 (13.3)	156 (12.8)	511 (12.4)	642 (12.5)	25 (12.4)	661 (12.5)	6 (17.1)	492 (13.0)	175 (11.4)
Number of consultations (6 months prior to index date)												
0	314 (11.6)	231 (8.8)	252 (8.9)	293 (11.7)	109 (8.9)	436 (10.6)	527 (10.3)	18 (8.9)	544 (10.3)	1 (2.9)	391 (10.3)	154 (10.0)
1-3	1119 (41.2)	1118 (42.8)	1220 (43.1)	1017 (40.8)	470 (38.6)	1767 (43.0)	2151 (42.0)	86 (42.6)	2222 (42.0)	15 (42.9)	1613 (42.5)	624 (40.7)
4-6	687 (25.3)	729 (27.9)	773 (27.3)	643 (25.8)	337 (27.7)	1079 (26.3)	1369 (26.7)	47 (23.3)	1407 (26.6)	9 (25.7)	998 (26.3)	418 (27.2)
7 and up	593 (21.9)	536 (20.5)	588 (20.8)	541 (21.7)	302 (24.8)	827 (20.1)	1078 (21.0)	51 (25.2)	1119 (21.1)	10 (28.6)	790 (20.8)	339 (22.1)
Number of hospitalizations (6 months prior to index date)												
0	1942 (71.6)	1807 (69.1)	1980 (69.9)	1769 (70.9)	833 (68.4)	2916 (71.0)	3610 (70.4)	139 (68.8)	3723 (70.4)	26 (74.3)	2683 (70.8)	1066 (69.4)
1-3	702 (25.9)	726 (27.8)	767 (27.1)	661 (26.5)	332 (27.3)	1096 (26.7)	1373 (26.8)	55 (27.2)	1420 (26.8)	8 (22.9)	997 (26.3)	431 (28.1)
4-6	46 (1.7)	60 (2.3)	63 (2.2)	43 (1.7)	33 (2.7)	73 (1.8)	101 (2.0)	5 (2.5)	106 (2.0)	0 (0.0)	80 (2.1)	26 (1.7)
7 and up	23 (0.8)	21 (0.8)	23 (0.8)	21 (0.8)	20 (1.6)	24 (0.6)	41 (0.8)	3 (1.5)	43 (0.8)	1 (2.9)	32 (0.8)	12 (0.8)
Age of Transplantation												
Under 2 year	243 (9.0)	384 (14.7)	366 (12.9)	261 (10.5)	67 (5.5)	560 (13.6)	615 (12.0)	12 (5.9)	625 (11.8)	2 (5.7)	473 (12.5)	154 (10.0)
2-5 years	466 (17.2)	631 (24.1)	660 (23.3)	437 (17.5)	191 (15.7)	906 (22.0)	1070 (20.9)	27 (13.4)	1092 (20.6)	5 (14.3)	759 (20.0)	338 (22.0)
5-10 years	673 (24.8)	807 (30.7)	860 (30.4)	620 (24.9)	317 (26.0)	1163 (28.3)	1429 (27.9)	51 (25.2)	1473 (27.8)	7 (20.0)	1027 (27.1)	453 (29.5)
10 years and up	1331 (49.1)	792 (30.3)	947 (33.4)	1176 (47.2)	643 (52.8)	1480 (36.0)	2011 (39.2)	112 (55.4)	2102 (39.7)	21 (60.0)	1533 (40.4)	590 (38.4)

¹Except for heart transplantation

²Except for mucoviscidose and lung transplantation

eTable 10. Association between HTRs characteristics and risk of hospitalization for Covid-19 in univariate analysis.

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	4640	687	
Age groups			
01-45	1147 (24.7)	152 (22.1)	1
46-65	2148 (46.3)	317 (46.1)	1.11 [0.91-1.37]
66 and up	1345 (29.0)	218 (31.7)	1.22 [0.98-1.53]
Sex (Female)	1229 (26.5)	182 (26.5)	1.00 [0.83-1.20]
Social deprivation index			
1 (least deprived)	859 (18.5)	131 (19.1)	1
2	848 (18.3)	135 (19.7)	1.04 [0.81-1.35]
3	880 (19.0)	117 (17.0)	0.87 [0.67-1.14]
4	976 (21.0)	121 (17.6)	0.81 [0.62-1.06]
5 (most deprived)	942 (20.3)	149 (21.7)	1.04 [0.81-1.33]
Comorbidities			
Alcohol	480 (10.3)	74 (10.8)	1.05 [0.81-1.36]
Smoking	1431 (30.8)	225 (32.8)	1.09 [0.92-1.30]
Obesity	963 (20.8)	191 (27.8)	1.47 [1.23-1.76]
Hypertension	3631 (78.3)	561 (81.7)	1.24 [1.01-1.52]
Cardiovascular ¹	3974 (85.6)	615 (89.5)	1.43 [1.11-1.85]
Statin use	3189 (68.7)	514 (74.8)	1.35 [1.13-1.62]
Diabetes	1084 (23.4)	217 (31.6)	1.51 [1.27-1.80]
Dialysis	83 (1.8)	30 (4.4)	2.51 [1.64-3.84]
Respiratory ²	586 (12.6)	108 (15.7)	1.29 [1.03-1.61]
Cancer	399 (8.6)	62 (9.0)	1.05 [0.80-1.40]
Psychiatric	368 (7.9)	54 (7.9)	0.99 [0.74-1.33]
Antidepressants use	357 (7.7)	54 (7.9)	1.02 [0.76-1.38]
Anxiolytics use	566 (12.2)	101 (14.7)	1.24 [0.99-1.56]
Number of consultations (6 months prior to index date)			
0	471 (10.2)	74 (10.8)	1
1-3	1964 (42.3)	273 (39.7)	0.88 [0.67-1.17]
4-6	1243 (26.8)	173 (25.2)	0.89 [0.66-1.19]
7 and up	962 (20.7)	167 (24.3)	1.10 [0.82-1.48]
Number of hospitalizations (6 months prior to index date)			
0	3318 (71.5)	431 (62.7)	1
1-3	1202 (25.9)	226 (32.9)	1.45 [1.22-1.72]
4-6	87 (1.9)	19 (2.8)	1.68 [1.01-2.79]
7 and up	33 (0.7)	11 (1.6)	2.57 [1.29-5.11]
Age of Transplantation			
Under 2 year	532 (11.5)	95 (13.8)	1
2-5 years	929 (20.0)	168 (24.5)	1.01 [0.77-1.33]
5-10 years	1307 (28.2)	173 (25.2)	0.74 [0.56-0.97]
10 years and up	1872 (40.3)	251 (36.5)	0.75 [0.58-0.96]
Immunosuppressive drugs			

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	4640	687	
Steroids	3634 (78.3)	588 (85.6)	1.64 [1.31-2.06]
Tacrolimus	2266 (48.8)	348 (50.7)	1.08 [0.92-1.26]
Ciclosporin	2204 (47.5)	290 (42.2)	0.81 [0.69-0.95]
Mycophenolic Acid	3566 (76.9)	543 (79.0)	1.14 [0.93-1.38]
Azathioprine	174 (3.8)	28 (4.1)	1.09 [0.73-1.64]
Sirolimus	25 (0.5)	10 (1.5)	2.73 [1.30-5.70]
Everolimus	1313 (28.3)	222 (32.3)	1.21 [1.02-1.44]
Treatment regimen			
Tacrolimus-Mycophenolic Acid-Steroids	1111 (23.9)	189 (27.5)	1
Tacrolimus-Mycophenolic Acid	305 (6.6)	25 (3.6)	0.48 [0.31-0.75]
Ciclosporin-Mycophenolic Acid-Steroids	1032 (22.2)	138 (20.1)	0.79 [0.62-0.99]
Ciclosporin-Mycophenolic Acid	276 (5.9)	28 (4.1)	0.60 [0.39-0.91]
Tacrolimus only	36 (0.8)	3 (0.4)	0.49 [0.15-1.61]
Tacrolimus-Steroids	147 (3.2)	17 (2.5)	0.68 [0.40-1.15]
Tacrolimus-Sirolimus/Everolimus-Steroids	198 (4.3)	43 (6.3)	1.28 [0.89-1.84]
Tacrolimus-Azathioprine-Steroids	59 (1.3)	11 (1.6)	1.10 [0.57-2.12]
Ciclosporin-Steroids	161 (3.5)	20 (2.9)	0.73 [0.45-1.19]
Mycophenolic Acid-Steroids	12 (0.3)	9 (1.3)	4.41 [1.83-10.61]
Sirolimus/Everolimus-Mycophenolic Acid	59 (1.3)	9 (1.3)	0.90 [0.44-1.84]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	113 (2.4)	32 (4.7)	1.66 [1.09-2.54]
Others	1131 (24.4)	163 (23.7)	0.85 [0.68-1.06]
Treatment regimen classes			
CNI + Antimetabolites + Steroids	2289 (49.3)	347 (50.5)	1
CNI + mTORi + Steroids	386 (8.3)	62 (9.0)	1.06 [0.79-1.41]
Antimetabolite + mTORi + Steroids	117 (2.5)	34 (4.9)	1.91 [1.28-2.85]
CNI + Antimetabolite + mTORi	131 (2.8)	17 (2.5)	0.85 [0.51-1.43]
CNI + Antimetabolites	622 (13.4)	58 (8.4)	0.61 [0.45-0.82]
CNI + mTORi	118 (2.5)	10 (1.5)	0.55 [0.29-1.07]
CNI + Steroids	311 (6.7)	37 (5.4)	0.78 [0.54-1.12]
Antimetabolite + Steroids	15 (0.3)	9 (1.3)	3.95 [1.71-9.11]
Antimetabolite + mTORi	59 (1.3)	9 (1.3)	1.01 [0.49-2.04]
mTORi + Steroids	17 (0.4)	2 (0.3)	0.77 [0.17-3.37]
CNI	63 (1.4)	4 (0.6)	0.41 [0.15-1.15]
Antimetabolite	2 (0.0)	0 (0.0)	-
mTORi	11 (0.2)	1 (0.1)	0.60 [0.07-4.65]
Others	499 (10.8)	97 (14.1)	1.28 [1.00-1.63]
Immunosuppression intensity (including steroids)			
Triple regimen	3422 (73.8)	557 (81.1)	1
Double regimen	1142 (24.6)	125 (18.2)	0.67 [0.54-0.82]
Single regimen	76 (1.6)	5 (0.7)	0.40 [0.16-1.00]

CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors.

¹Except for heart transplantation

²Except for mucoviscidosis and lung transplantation

4- Lung transplant recipients: N = 2881

eTable 11. Baseline characteristics of lung transplant recipients according to immunosuppressive drugs groups.

Effective	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No 385	Yes 2438	No 2471	Yes 352	No 788	Yes 2035	No 2564	Yes 259	No 2799	Yes 24	No 2297	Yes 526
Age mean (SD)	55 (13.5)	49.6 (15.0)	49.8 (15.0)	54.1 (13.6)	50.5 (14.8)	50.3 (15.0)	50.5 (14.9)	48.5 (15.4)	50.3 (15.0)	54.2 (11.8)	50.1 (15.1)	51.4 (14.3)
Age median (IQR)	57 (45-66)	53 (37-62)	53 (37-62)	56 (45-64)	53 (39-63)	53 (38-63)	54 (39-63)	49 (35-63)	53 (38-63)	53 (48-64)	53 (38-63)	55 (41-63)
Age groups												
01-45	99 (25.7)	926 (38)	929 (37.6)	96 (27.3)	285 (36.2)	740 (36.4)	910 (35.5)	115 (44.4)	1020 (36.4)	5 (20.8)	854 (37.2)	171 (32.5)
46-65	189 (49.1)	1153 (47.3)	1164 (47.1)	178 (50.6)	378 (48.0)	964 (47.4)	1236 (48.2)	106 (40.9)	1327 (47.4)	15 (62.5)	1069 (46.5)	273 (51.9)
66 and up	97 (25.2)	359 (14.7)	378 (15.3)	78 (22.2)	125 (15.9)	331 (16.3)	418 (16.3)	38 (14.7)	452 (16.1)	4 (16.7)	374 (16.3)	82 (15.6)
Age categories												
01-17	4 (1.0)	32 (1.3)	32 (1.3)	4 (1.1)	12 (1.5)	24 (1.2)	33 (1.3)	3 (1.2)	36 (1.3)	0 (0.0)	27 (1.2)	9 (1.7)
18-29	10 (2.6)	259 (10.6)	258 (10.4)	11 (3.1)	59 (7.5)	210 (10.3)	246 (9.6)	23 (8.9)	269 (9.6)	0 (0.0)	235 (10.2)	34 (6.5)
30-49	111 (28.8)	800 (32.8)	804 (32.5)	107 (30.4)	270 (34.3)	641 (31.5)	807 (31.5)	104 (40.2)	904 (32.3)	7 (29.2)	747 (32.5)	164 (31.2)
50-59	96 (24.9)	567 (23.3)	572 (23.1)	91 (25.9)	185 (23.5)	478 (23.5)	617 (24.1)	46 (17.8)	655 (23.4)	8 (33.3)	524 (22.8)	139 (26.4)
60-69	115 (29.9)	640 (26.3)	656 (26.5)	99 (28.1)	199 (25.3)	556 (27.3)	692 (27.0)	63 (24.3)	748 (26.7)	7 (29.2)	611 (26.6)	144 (27.4)
70-79	45 (11.7)	133 (5.5)	141 (5.7)	37 (10.5)	59 (7.5)	119 (5.8)	160 (6.2)	18 (6.9)	176 (6.3)	2 (8.3)	143 (6.2)	35 (6.7)
80 and up	4 (1.0)	7 (0.3)	8 (0.3)	3 (0.9)	4 (0.5)	7 (0.3)	9 (0.4)	2 (0.8)	11 (0.4)	0 (0.0)	10 (0.4)	1 (0.2)
Sex (Female)	182 (47.3)	1155 (47.4)	1169 (47.3)	168 (47.7)	442 (56.1)	895 (44.0)	1165 (45.4)	172 (66.4)	1323 (47.3)	14 (58.3)	1085 (47.2)	252 (47.9)
Region of residence												
Île-de-France	59 (15.3)	437 (17.9)	447 (18.1)	49 (13.9)	134 (17.0)	362 (17.8)	445 (17.4)	51 (19.7)	490 (17.5)	6 (25.0)	410 (17.8)	86 (16.3)
Northwest	110 (28.6)	464 (19.0)	472 (19.1)	102 (29.0)	226 (28.7)	348 (17.1)	532 (20.7)	42 (16.2)	569 (20.3)	5 (20.8)	459 (20.0)	115 (21.9)
Northeast	79 (20.5)	665 (27.3)	681 (27.6)	63 (17.9)	167 (21.2)	577 (28.4)	665 (25.9)	79 (30.5)	740 (26.4)	4 (16.7)	632 (27.5)	112 (21.3)
Southeast	50 (13.0)	615 (25.2)	617 (25.0)	48 (13.6)	186 (23.6)	479 (23.5)	590 (23.0)	75 (29.0)	656 (23.4)	9 (37.5)	537 (23.4)	128 (24.3)
Southwest	87 (22.6)	257 (10.5)	254 (10.3)	90 (25.6)	75 (9.5)	269 (13.2)	332 (12.9)	12 (4.6)	344 (12.3)	0 (0.0)	259 (11.3)	85 (16.2)
Social deprivation index												
1 (least deprived)	61 (15.8)	490 (20.1)	489 (19.8)	62 (17.6)	165 (20.9)	386 (19.0)	492 (19.2)	59 (22.8)	545 (19.5)	6 (25.0)	450 (19.6)	101 (19.2)
2	80 (20.8)	487 (20.0)	494 (20.0)	73 (20.7)	151 (19.2)	416 (20.4)	515 (20.1)	52 (20.1)	563 (20.1)	4 (16.7)	468 (20.4)	99 (18.8)
3	88 (22.9)	456 (18.7)	466 (18.9)	78 (22.2)	155 (19.7)	389 (19.1)	496 (19.3)	48 (18.5)	539 (19.3)	5 (20.8)	441 (19.2)	103 (19.6)
4	84 (21.8)	476 (19.5)	482 (19.5)	78 (22.2)	162 (20.6)	398 (19.6)	513 (20.0)	47 (18.1)	553 (19.8)	7 (29.2)	444 (19.3)	116 (22.1)
5 (most deprived)	64 (16.6)	485 (19.9)	495 (20.0)	54 (15.3)	149 (18.9)	400 (19.7)	498 (19.4)	51 (19.7)	548 (19.6)	1 (4.2)	450 (19.6)	99 (18.8)
Unknown	8 (2.1)	44 (1.8)	45 (1.8)	7 (2.0)	6 (0.8)	46 (2.3)	50 (2.0)	2 (0.8)	51 (1.8)	1 (4.2)	44 (1.9)	8 (1.5)
Comorbidities												

	Tacrolimus		Ciclosporin		Mycophenolic Acid		Azathioprine		Sirolimus		Everolimus	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Effective	385	2438	2471	352	788	2035	2564	259	2799	24	2297	526
Alcohol	46 (11.9)	230 (9.4)	235 (9.5)	41 (11.6)	75 (9.5)	201 (9.9)	256 (10.0)	20 (7.7)	272 (9.7)	4 (16.7)	230 (10.0)	46 (8.7)
Smoking	154 (40.0)	1060 (43.5)	1067 (43.2)	147 (41.8)	308 (39.1)	906 (44.5)	1115 (43.5)	99 (38.2)	1209 (43.2)	5 (20.8)	976 (42.5)	238 (45.2)
Obesity	63 (16.4)	334 (13.7)	339 (13.7)	58 (16.5)	109 (13.8)	288 (14.2)	366 (14.3)	31 (12.0)	393 (14.0)	4 (16.7)	311 (13.5)	86 (16.3)
Hypertension	287 (74.5)	1404 (57.6)	1431 (57.9)	260 (73.9)	534 (67.8)	1157 (56.9)	1534 (59.8)	157 (60.6)	1674 (59.8)	17 (70.8)	1311 (57.1)	380 (72.2)
Cardiovascular ¹	197 (51.2)	814 (33.4)	823 (33.3)	188 (53.4)	267 (33.9)	744 (36.6)	934 (36.4)	77 (29.7)	1008 (36.0)	3 (12.5)	797 (34.7)	214 (40.7)
Statin use	149 (38.7)	636 (26.1)	654 (26.5)	131 (37.2)	218 (27.7)	567 (27.9)	733 (28.6)	52 (20.1)	775 (27.7)	10 (41.7)	591 (25.7)	194 (36.9)
Diabetes	90 (23.4)	964 (39.5)	979 (39.6)	75 (21.3)	292 (37.1)	762 (37.4)	960 (37.4)	94 (36.3)	1049 (37.5)	5 (20.8)	859 (37.4)	195 (37.1)
Dialysis	11 (2.9)	23 (0.9)	24 (1.0)	10 (2.8)	18 (2.3)	16 (0.8)	28 (1.1)	6 (2.3)	33 (1.2)	1 (4.2)	25 (1.1)	9 (1.7)
Cancer	47 (12.2)	223 (9.1)	234 (9.5)	36 (10.2)	141 (17.9)	129 (6.3)	250 (9.8)	20 (7.7)	262 (9.4)	8 (33.3)	169 (7.4)	101 (19.2)
Psychiatric	34 (8.8)	247 (10.1)	244 (9.9)	37 (10.5)	94 (11.9)	187 (9.2)	251 (9.8)	30 (11.6)	276 (9.9)	5 (20.8)	232 (10.1)	49 (9.3)
Antidepressants use	39 (10.1)	266 (10.9)	269 (10.9)	36 (10.2)	92 (11.7)	213 (10.5)	276 (10.8)	29 (11.2)	301 (10.8)	4 (16.7)	235 (10.2)	70 (13.3)
Anxiolytics use	55 (14.3)	313 (12.8)	316 (12.8)	52 (14.8)	109 (13.8)	259 (12.7)	336 (13.1)	32 (12.4)	368 (13.1)	0 (0.0)	284 (12.4)	84 (16.0)
Number of consultations (6 months prior to index date)												
0	41 (10.6)	255 (10.5)	263 (10.6)	33 (9.4)	67 (8.5)	229 (11.3)	278 (10.8)	18 (6.9)	292 (10.4)	4 (16.7)	250 (10.9)	46 (8.7)
1-3	144 (37.4)	1070 (43.9)	1083 (43.8)	131 (37.2)	331 (42.0)	883 (43.4)	1106 (43.1)	108 (41.7)	1204 (43.0)	10 (41.7)	995 (43.3)	219 (41.6)
4-6	112 (29.1)	668 (27.4)	676 (27.4)	104 (29.5)	222 (28.2)	558 (27.4)	692 (27.0)	88 (34.0)	775 (27.7)	5 (20.8)	620 (27.0)	160 (30.4)
7 and up	88 (22.9)	445 (18.3)	449 (18.2)	84 (23.9)	168 (21.3)	365 (17.9)	488 (19.0)	45 (17.4)	528 (18.9)	5 (20.8)	432 (18.8)	101 (19.2)
Number of hospitalizations (6 months prior to index date)												
0	245 (63.6)	1401 (57.5)	1428 (57.8)	218 (61.9)	466 (59.1)	1180 (58.0)	1486 (58.0)	160 (61.8)	1633 (58.3)	13 (54.2)	1360 (59.2)	286 (54.4)
1-3	124 (32.2)	860 (35.3)	868 (35.1)	116 (33.0)	262 (33.2)	722 (35.5)	904 (35.3)	80 (30.9)	977 (34.9)	7 (29.2)	791 (34.4)	193 (36.7)
4-6	11 (2.9)	144 (5.9)	143 (5.8)	12 (3.4)	45 (5.7)	110 (5.4)	141 (5.5)	14 (5.4)	153 (5.5)	2 (8.3)	116 (5.1)	39 (7.4)
7 and up	5 (1.3)	33 (1.4)	32 (1.3)	6 (1.7)	15 (1.9)	23 (1.1)	33 (1.3)	5 (1.9)	36 (1.3)	2 (8.3)	30 (1.3)	8 (1.5)
Age of Transplantation												
Under 2 year	56 (14.5)	501 (20.2)	494 (20.0)	63 (17.9)	78 (9.9)	479 (23.5)	532 (20.7)	25 (9.7)	555 (19.8)	2 (8.3)	502 (21.9)	55 (10.5)
2-5 years	89 (23.1)	722 (29.6)	736 (29.8)	75 (21.3)	230 (29.2)	581 (28.6)	744 (29.0)	67 (25.9)	806 (28.8)	5 (20.8)	649 (28.3)	162 (30.8)
5-10 years	120 (31.2)	757 (31.1)	769 (31.1)	108 (30.7)	275 (34.9)	602 (29.6)	777 (30.3)	100 (38.6)	873 (31.2)	4 (16.7)	693 (30.2)	186 (35.0)
10 years and up	120 (31.2)	458 (18.8)	472 (19.1)	106 (30.1)	205 (26.0)	373 (18.3)	511 (19.9)	67 (25.9)	565 (20.2)	13 (54.2)	453 (19.7)	125 (23.8)

¹Except for heart transplantation

eTable 12. Association between lung transplant recipients characteristics and risk of hospitalization for Covid-19 in univariate analysis.

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	2312	511	
Age groups			
01-45	851 (36.8)	174 (34.1)	1
46-65	1082 (46.8)	260 (50.9)	1.18 [0.95-1.45]
66 and up	379 (16.4)	77 (15.1)	0.99 [0.74-1.33]
Sex (Female)	1099 (47.5)	238 (46.6)	0.96 [0.79-1.17]
Social deprivation index			
1 (least deprived)	444 (19.2)	107 (20.9)	1
2	473 (20.5)	94 (18.4)	0.82 [0.61-1.12]
3	460 (19.9)	84 (16.4)	0.76 [0.55-1.04]
4	472 (20.4)	88 (17.2)	0.77 [0.57-1.06]
5 (most deprived)	424 (18.3)	125 (24.5)	1.22 [0.91-1.64]
Comorbidities			
Alcohol	224 (9.7)	52 (10.2)	1.06 [0.77-1.45]
Smoking	964 (41.7)	250 (48.9)	1.34 [1.11-1.62]
Obesity	305 (13.2)	92 (18.0)	1.44 [1.12-1.87]
Hypertension	1390 (60.1)	301 (58.9)	0.95 [0.78-1.16]
Cardiovascular ¹	811 (35.1)	200 (39.1)	1.19 [0.98-1.45]
Statin use	631 (27.3)	154 (30.1)	1.15 [0.93-1.42]
Diabetes	840 (36.3)	214 (41.9)	1.26 [1.04-1.53]
Dialysis	25 (1.1)	9 (1.8)	1.64 [0.76-3.54]
Cancer	228 (9.9)	42 (8.2)	0.82 [0.58-1.15]
Psychiatric	230 (9.9)	51 (10.0)	1.00 [0.73-1.38]
Antidepressants use	242 (10.5)	63 (12.3)	1.20 [0.90-1.62]
Anxiolytics use	283 (12.2)	85 (16.6)	1.43 [1.10-1.86]
Number of consultations (6 months prior to index date)			
0	255 (11.0)	41 (8.0)	1
1-3	1010 (43.7)	204 (39.9)	1.26 [0.87-1.81]
4-6	636 (27.5)	144 (28.2)	1.41 [0.97-2.05]
7 and up	411 (17.8)	122 (23.9)	1.85 [1.25-2.72]
Number of hospitalizations (6 months prior to index date)			
0	1371 (59.3)	275 (53.8)	1
1-3	792 (34.3)	192 (37.6)	1.21 [0.99-1.48]
4-6	121 (5.2)	34 (6.7)	1.40 [0.94-2.09]
7 and up	28 (1.2)	10 (2.0)	1.78 [0.85-3.71]
Age of Transplantation			
Under 2 year	434 (18.8)	123 (24.1)	1
2-5 years	647 (28.0)	164 (32.1)	0.89 [0.68-1.16]
5-10 years	741 (32.1)	136 (26.6)	0.64 [0.49-0.84]
10 years and up	490 (21.2)	88 (17.2)	0.63 [0.46-0.85]
Immunosuppressive drugs			
Steroids	1966 (85.0)	471 (92.2)	2.07 [1.47-2.92]
Tacrolimus	1980 (85.6)	458 (89.6)	1.45 [1.07-1.97]
Ciclosporin	307 (13.3)	45 (8.8)	0.63 [0.45-0.88]

	Not hospitalized	Hospitalized for Covid-19	Crude Odds Ratios OR [IC95%]
Effective	2312	511	
Mycophenolic Acid	1640 (70.9)	395 (77.3)	1.40 [1.11-1.75]
Azathioprine	225 (9.7)	34 (6.7)	0.66 [0.45-0.96]
Sirolimus	18 (0.8)	6 (1.2)	1.51 [0.60-3.83]
Everolimus	429 (18.6)	97 (19.0)	1.03 [0.81-1.31]
Treatment regimen			
Tacrolimus-Mycophenolic Acid-Steroids	1071 (46.3)	303 (59.3)	1
Tacrolimus-Mycophenolic Acid	187 (8.1)	20 (3.9)	0.38 [0.23-0.61]
Ciclosporin-Mycophenolic Acid-Steroids	156 (6.7)	27 (5.3)	0.61 [0.40-0.94]
Ciclosporin-Mycophenolic Acid	28 (1.2)	4 (0.8)	0.50 [0.18-1.45]
Tacrolimus only	33 (1.4)	2 (0.4)	0.21 [0.05-0.90]
Tacrolimus-Steroids	124 (5.4)	15 (2.9)	0.43 [0.25-0.74]
Tacrolimus-Sirolimus/Everolimus-Steroids	211 (9.1)	53 (10.4)	0.89 [0.64-1.23]
Tacrolimus-Azathioprine-Steroids	138 (6.0)	23 (4.5)	0.59 [0.37-0.93]
Ciclosporin-Steroids	31 (1.3)	4 (0.8)	0.46 [0.16-1.30]
Mycophenolic Acid-Steroids	7 (0.3)	1 (0.2)	0.50 [0.06-4.12]
Sirolimus/Everolimus-Mycophenolic Acid	3 (0.1)	1 (0.2)	1.18 [0.12-11.37]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	15 (0.6)	3 (0.6)	0.71 [0.20-2.46]
Others	308 (13.3)	55 (10.8)	0.63 [0.46-0.86]
Treatment regimen classes			
CNI + Antimetabolites + Steroids	1413 (61.1)	358 (70.1)	1
CNI + mTORi + Steroids	234 (10.1)	57 (11.2)	0.96 [0.70-1.31]
Antimetabolite + mTORi + Steroids	17 (0.7)	3 (0.6)	0.69 [0.20-2.39]
CNI + Antimetabolite + mTORi	32 (1.4)	4 (0.8)	0.49 [0.17-1.40]
CNI + Antimetabolites	245 (10.6)	26 (5.1)	0.41 [0.27-0.63]
CNI + mTORi	20 (0.9)	5 (1.0)	0.98 [0.36-2.64]
CNI + Steroids	155 (6.7)	19 (3.7)	0.48 [0.29-0.79]
Antimetabolite + Steroids	9 (0.4)	2 (0.4)	0.87 [0.18-4.07]
Antimetabolite + mTORi	3 (0.1)	1 (0.2)	1.31 [0.13-12.68]
mTORi + Steroids	16 (0.7)	1 (0.2)	0.24 [0.03-1.86]
CNI	42 (1.8)	2 (0.4)	0.18 [0.04-0.78]
Antimetabolite	2 (0.1)	1 (0.2)	1.97 [0.17-21.82]
mTORi	2 (0.1)	1 (0.2)	1.97 [0.17-21.82]
Others	122 (5.3)	31 (6.1)	1.00 [0.66-1.51]
Immunosuppression intensity			
Triple regimen	1818 (78.6)	453 (88.6)	1
Double regimen	448 (19.4)	54 (10.6)	0.48 [0.35-0.65]
Single regimen	46 (2.0)	4 (0.8)	0.34 [0.12-0.97]
CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors.			
¹ Except for heart transplantation			

**eTable 13. Factors associated with hospitalization for Covid-19 in the multivariable model
(sensitivity analysis: exclusion of patients with more than one transplant)**

	Adjusted Odds Ratios aOR [IC95%] ¹			
	Kidney	Liver	Heart	Lung
Number of hospitalizations cases/Effective	4880/38422	646/12152	533/4299	401/2127
Age groups				
01-45	1	1	1	1
46-65	1.36 [1.24-1.49]	1.34 [0.99-1.81]	0.94 [0.73-1.22]	0.95 [0.69-1.32]
66 and up	1.47 [1.32-1.62]	1.71 [1.25-2.34]	1.17 [0.87-1.57]	0.86 [0.56-1.33]
Sex				
Male	1	1	1	1
Female	1.04 [0.98-1.11]	0.85 [0.70-1.02]	1.09 [0.86-1.37]	0.97 [0.77-1.23]
Social deprivation index				
1 (least deprived)	1	1	1	1
2	1.05 [0.94-1.17]	0.91 [0.69-1.19]	1.26 [0.93-1.71]	0.90 [0.62-1.32]
3	1.11 [0.99-1.23]	1.13 [0.86-1.49]	1.11 [0.80-1.55]	0.85 [0.57-1.27]
4	1.20 [1.08-1.34]	1.00 [0.76-1.32]	0.95 [0.68-1.32]	0.86 [0.57-1.27]
5 (most deprived)	1.34 [1.21-1.49]	1.02 [0.77-1.35]	1.03 [0.75-1.43]	1.26 [0.86-1.85]
Comorbidities				
Alcohol	0.97 [0.83-1.13]	0.86 [0.71-1.05]	0.93 [0.67-1.30]	0.91 [0.62-1.35]
Smoking	0.83 [0.76-0.91]	0.70 [0.57-0.86]	0.95 [0.77-1.18]	1.09 [0.82-1.44]
Obesity	1.21 [1.12-1.31]	0.96 [0.79-1.16]	1.34 [1.07-1.68]	1.29 [0.94-1.77]
Hypertension	1.13 [1.03-1.24]	1.14 [0.94-1.39]	1.17 [0.90-1.51]	0.98 [0.76-1.25]
Cardiovascular ²	1.21 [1.12-1.30]	1.25 [1.03-1.51]	1.34 [0.91-1.97]	1.09 [0.85-1.41]
Statin use	0.97 [0.91-1.04]	1.13 [0.93-1.39]	1.27 [1.01-1.59]	1.10 [0.83-1.46]
Diabetes	1.43 [1.34-1.54]	1.61 [1.34-1.92]	1.22 [0.97-1.52]	1.13 [0.89-1.44]
Dialysis	-	2.90 [1.63-5.17]	2.15 [1.29-3.57]	1.62 [0.61-4.33]
Respiratory ³	1.29 [1.16-1.43]	1.10 [0.86-1.41]	1.10 [0.82-1.47]	1.23 [0.89-1.69]
Cancer	0.91 [0.80-1.03]	0.77 [0.60-0.99]	1.11 [0.78-1.57]	0.82 [0.52-1.28]
Psychiatric	1.21 [1.04-1.40]	1.02 [0.74-1.40]	0.96 [0.67-1.37]	1.06 [0.72-1.56]
Antidepressants use	1.09 [0.96-1.25]	1.31 [0.96-1.79]	0.88 [0.61-1.27]	1.25 [0.87-1.78]
Anxiolytics use	1.06 [0.95-1.19]	0.95 [0.72-1.25]	1.33 [1.01-1.76]	1.29 [0.93-1.79]
Age of Transplantation				
Under 2 year	1	1	1	1
2-5 years	1.06 [0.96-1.18]	1.17 [0.87-1.56]	1.07 [0.78-1.47]	1.12 [0.82-1.54]
5-10 years	1.00 [0.91-1.11]	1.11 [0.83-1.48]	0.86 [0.62-1.19]	0.93 [0.65-1.32]
10 years and up	0.86 [0.78-0.96]	1.17 [0.87-1.57]	0.88 [0.63-1.23]	0.83 [0.53-1.30]
Immunosuppressive drugs				
Steroids	1.63 [1.51-1.77]	1.48 [1.22-1.79]	1.30 [0.99-1.72]	1.64 [1.05-2.56]
Tacrolimus	1.00 [0.89-1.13]	0.87 [0.66-1.15]	0.74 [0.49-1.12]	0.81 [0.38-1.70]
Ciclosporin	1.03 [0.91-1.17]	0.73 [0.50-1.07]	0.60 [0.40-0.89]	0.63 [0.28-1.38]
Mycophenolic Acid	1.38 [1.25-1.52]	1.55 [1.28-1.87]	1.29 [0.98-1.70]	1.41 [0.96-2.07]
Azathioprine	0.91 [0.78-1.05]	1.36 [0.73-2.51]	0.98 [0.53-1.82]	0.63 [0.36-1.08]
Sirolimus	0.78 [0.62-0.99]	1.31 [0.73-2.34]	1.91 [0.62-5.88]	1.74 [0.54-5.60]
Everolimus	0.94 [0.82-1.07]	0.82 [0.62-1.09]	1.33 [1.07-1.66]	1.13 [0.78-1.63]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

**eTable 14.1 Factors associated with hospitalization for Covid-19 in the multivariable model
(sensitivity analysis of the largest epidemic wave November 2021-February 2022)**

	Adjusted Odds Ratios aOR [IC95%] ¹			
	Kidney	Liver	Heart	Lung
Number of hospitalizations cases/Effective	1565/38777	263/13722	216/5021	171/2447
Age groups				
01-45	1	1	1	1
46-65	1.19 [1.03-1.38]	0.91 [0.61-1.36]	1.22 [0.84-1.76]	1.20 [0.76-1.89]
66 and up	1.24 [1.05-1.47]	1.25 [0.82-1.93]	0.93 [0.59-1.45]	1.18 [0.66-2.09]
Sex				
Male	1	1	1	1
Female	1.14 [1.02-1.27]	1.02 [0.77-1.35]	0.97 [0.70-1.35]	1.02 [0.73-1.42]
Social deprivation index				
1 (least deprived)	1	1	1	1
2	1.07 [0.9-1.27]	1.53 [1.01-2.32]	1.87 [1.19-2.95]	1.43 [0.81-2.52]
3	1.05 [0.87-1.25]	1.41 [0.91-2.20]	1.23 [0.74-2.05]	1.50 [0.82-2.74]
4	1.12 [0.94-1.34]	1.14 [0.72-1.80]	1.07 [0.64-1.78]	1.11 [0.60-2.05]
5([most deprived)	1.15 [0.97-1.37]	1.03 [0.64-1.66]	1.34 [0.82-2.18]	1.88 [1.06-3.34]
Comorbidities				
Alcohol	0.83 [0.66-1.05]	0.73 [0.55-0.97]	0.98 [0.61-1.57]	0.68 [0.37-1.24]
Smoking	0.93 [0.81-1.06]	0.88 [0.65-1.19]	0.83 [0.60-1.15]	1.22 [0.82-1.82]
Obesity	1.21 [1.07-1.38]	0.89 [0.66-1.20]	1.00 [0.71-1.42]	1.14 [0.74-1.77]
Hypertension	1.23 [1.06-1.44]	1.79 [1.29-2.48]	0.92 [0.64-1.30]	0.89 [0.63-1.26]
Cardiovascular ²	1.22 [1.08-1.37]	1.46 [1.10-1.95]	1.65 [0.98-2.79]	1.09 [0.76-1.56]
Statin use	1.00 [0.90-1.12]	1.10 [0.82-1.49]	1.24 [0.89-1.72]	0.97 [0.67-1.42]
Diabetes	1.46 [1.30-1.63]	1.48 [1.13-1.94]	1.50 [1.09-2.05]	1.24 [0.89-1.74]
Dialysis	-	2.52 [0.95-6.68]	1.54 [0.69-3.41]	1.08 [0.28-4.11]
Respiratory ³	1.43 [1.21-1.68]	1.22 [0.85-1.76]	1.03 [0.68-1.55]	1.33 [0.86-2.04]
Cancer	0.89 [0.72-1.10]	0.73 [0.49-1.10]	0.73 [0.42-1.28]	0.70 [0.37-1.32]
Psychiatric	0.94 [0.72-1.23]	0.84 [0.50-1.40]	0.91 [0.54-1.53]	0.81 [0.46-1.42]
Antidepressants use	1.16 [0.94-1.43]	0.59 [0.31-1.09]	0.66 [0.37-1.17]	1.00 [0.60-1.67]
Anxiolytics use	1.02 [0.85-1.22]	1.34 [0.91-1.96]	1.31 [0.87-1.98]	0.97 [0.60-1.59]
Age of Transplantation				
Under 2 year	1	1	1	1
2-5 years	0.96 [0.82-1.13]	1.26 [0.82-1.93]	1.52 [0.94-2.46]	0.97 [0.61-1.53]
5-10 years	0.91 [0.78-1.07]	1.25 [0.82-1.91]	1.16 [0.71-1.91]	0.76 [0.46-1.27]
10 years and up	0.75 [0.63-0.88]	0.98 [0.63-1.52]	1.07 [0.65-1.76]	0.96 [0.54-1.72]
Immunosuppressive drugs				
Steroids	1.63 [1.43-1.86]	1.57 [1.20-2.06]	1.63 [1.05-2.53]	3.56 [1.53-8.30]
Tacrolimus	1.16 [0.94-1.42]	0.97 [0.62-1.53]	1.16 [0.61-2.21]	1.39 [0.50-3.86]
Ciclosporin	1.06 [0.85-1.33]	0.74 [0.41-1.34]	0.78 [0.42-1.47]	1.17 [0.41-3.33]
Mycophenolic Acid	1.61 [1.36-1.90]	1.87 [1.37-2.54]	1.09 [0.73-1.61]	1.34 [0.79-2.27]
Azathioprine	0.98 [0.76-1.26]	0.71 [0.26-1.99]	1.42 [0.67-2.99]	0.90 [0.43-1.88]
Sirolimus	0.90 [0.61-1.35]	0.41 [0.10-1.72]	0.99 [0.12-8.05]	1.33 [0.26-6.88]
Everolimus	0.92 [0.74-1.16]	0.74 [0.47-1.17]	1.35 [0.97-1.88]	1.14 [0.69-1.88]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

**eTable 14.2 Factors associated with hospitalization for Covid-19 in the multivariable model
(sensitivity analysis of the period **before** the largest epidemic wave)**

	Adjusted Odds Ratios aOR [IC95%] ¹			
	Kidney	Liver	Heart	Lung
Number of hospitalizations cases/Effective	2686/41463	479/14464	306/5327	205/2823
Age groups				
01-45	1	1	1	1
46-65	1.39 [1.23-1.56]	1.42 [1.03-1.95]	0.91 [0.65-1.26]	0.74 [0.50-1.09]
66 and up	1.41 [1.23-1.61]	1.57 [1.11-2.21]	1.31 [0.91-1.88]	0.60 [0.35-1.01]
Sex				
Male	1	1	1	1
Female	0.92 [0.84-1.00]	0.88 [0.71-1.09]	1.02 [0.76-1.36]	0.97 [0.71-1.31]
Social deprivation index				
1 (least deprived)	1	1	1	1
2	1.13 [0.99-1.30]	0.89 [0.65-1.21]	0.95 [0.65-1.41]	0.83 [0.51-1.35]
3	1.16 [1.01-1.34]	1.00 [0.72-1.38]	0.99 [0.65-1.51]	0.89 [0.53-1.50]
4	1.37 [1.19-1.57]	1.15 [0.84-1.57]	1.00 [0.67-1.50]	1.18 [0.72-1.93]
5 (most deprived)	1.70 [1.49-1.94]	1.24 [0.91-1.68]	1.07 [0.72-1.58]	1.29 [0.80-2.09]
Comorbidities				
Alcohol	0.88 [0.74-1.05]	0.76 [0.61-0.94]	0.98 [0.66-1.46]	0.89 [0.53-1.50]
Smoking	0.79 [0.71-0.88]	0.76 [0.60-0.95]	0.99 [0.75-1.30]	1.13 [0.78-1.63]
Obesity	1.23 [1.11-1.35]	0.98 [0.79-1.23]	1.56 [1.18-2.06]	1.12 [0.74-1.69]
Hypertension	1.10 [0.98-1.24]	0.99 [0.79-1.24]	1.15 [0.83-1.59]	1.22 [0.89-1.69]
Cardiovascular ²	1.21 [1.10-1.33]	1.44 [1.16-1.79]	0.92 [0.64-1.33]	1.08 [0.78-1.50]
Statin use	0.92 [0.85-1.01]	1.07 [0.85-1.33]	1.17 [0.89-1.55]	1.12 [0.79-1.60]
Diabetes	1.52 [1.39-1.66]	2.03 [1.65-2.49]	1.16 [0.89-1.53]	0.99 [0.73-1.35]
Dialysis	-	3.32 [1.76-6.28]	1.85 [0.96-3.55]	1.24 [0.34-4.54]
Respiratory ³	1.23 [1.08-1.40]	1.17 [0.89-1.55]	0.93 [0.66-1.32]	1.30 [0.88-1.92]
Cancer	0.83 [0.70-0.97]	0.64 [0.47-0.88]	1.08 [0.71-1.64]	1.00 [0.59-1.69]
Psychiatric	1.23 [1.02-1.49]	1.05 [0.74-1.51]	0.99 [0.63-1.57]	0.79 [0.46-1.36]
Antidepressants use	1.04 [0.87-1.24]	1.27 [0.89-1.81]	0.88 [0.56-1.39]	0.72 [0.42-1.21]
Anxiolytics use	1.00 [0.86-1.16]	0.87 [0.63-1.20]	1.47 [1.05-2.06]	1.22 [0.79-1.88]
Age of Transplantation				
Under 2 year	1	1	1	1
2-5 years	1.15 [1.01-1.31]	1.20 [0.87-1.66]	0.83 [0.54-1.26]	1.12 [0.74-1.72]
5-10 years	1.08 [0.95-1.23]	0.93 [0.67-1.29]	0.87 [0.57-1.31]	0.96 [0.60-1.52]
10 years and up	0.93 [0.81-1.06]	1.16 [0.84-1.61]	0.81 [0.54-1.22]	0.68 [0.39-1.20]
Immunosuppressive drugs				
Steroids	1.57 [1.42-1.74]	1.66 [1.35-2.03]	1.38 [0.97-1.97]	0.69 [0.29-1.64]
Tacrolimus	0.86 [0.75-1.00]	0.70 [0.51-0.96]	0.52 [0.33-0.84]	0.37 [0.14-0.99]
Ciclosporin	0.97 [0.82-1.14]	0.86 [0.58-1.29]	0.51 [0.32-0.80]	1.38 [0.87-2.19]
Mycophenolic Acid	1.20 [1.06-1.35]	1.48 [1.18-1.85]	1.19 [0.85-1.68]	0.78 [0.40-1.53]
Azathioprine	0.76 [0.62-0.91]	0.92 [0.47-1.80]	1.00 [0.50-2.00]	1.20 [0.24-6.03]
Sirolimus	0.93 [0.70-1.24]	1.26 [0.68-2.32]	2.74 [1.01-7.42]	1.18 [0.76-1.84]
Everolimus	0.98 [0.83-1.16]	0.88 [0.64-1.23]	1.04 [0.77-1.40]	1.14 [0.69-1.88]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

**eTable 14.3 Factors associated with hospitalization for Covid-19 in the multivariable model
(sensitivity analysis of the period **after** the largest epidemic wave)**

	Adjusted Odds Ratios aOR [IC95%] ¹			
	Kidney	Liver	Heart	Lung
Number of hospitalizations cases/Effective	1028/37212	183/13722	165/4805	135/2447
Age groups				
01-45	1	1	1	1
46-65	1.26 [1.04-1.51]	1.18 [0.73-1.92]	0.81 [0.53-1.24]	0.77 [0.47-1.26]
66 and up	1.58 [1.29-1.94]	1.33 [0.79-2.23]	1.19 [0.74-1.93]	0.63 [0.32-1.24]
Sex				
Male	1	1	1	1
Female	1.22 [1.06-1.39]	1.04 [0.74-1.44]	1.25 [0.86-1.83]	0.89 [0.61-1.31]
Social deprivation index				
1 (least deprived)	1	1	1	1
2	0.85 [0.68-1.05]	0.76 [0.47-1.24]	0.83 [0.47-1.46]	0.73 [0.40-1.32]
3	0.96 [0.77-1.19]	0.88 [0.54-1.44]	1.06 [0.62-1.83]	0.61 [0.32-1.15]
4	0.91 [0.73-1.13]	0.67 [0.41-1.12]	0.82 [0.47-1.43]	0.52 [0.28-0.99]
5 (most deprived)	0.88 [0.71-1.09]	0.71 [0.43-1.18]	0.70 [0.40-1.24]	0.78 [0.43-1.43]
Comorbidities				
Alcohol	1.12 [0.86-1.45]	0.66 [0.47-0.93]	0.91 [0.52-1.57]	1.35 [0.77-2.37]
Smoking	0.90 [0.76-1.07]	0.80 [0.56-1.16]	1.03 [0.72-1.49]	1.11 [0.71-1.76]
Obesity	1.03 [0.88-1.21]	1.13 [0.80-1.60]	1.10 [0.75-1.62]	1.38 [0.86-2.24]
Hypertension	1.07 [0.89-1.28]	1.16 [0.81-1.66]	1.50 [0.95-2.37]	0.82 [0.56-1.22]
Cardiovascular ²	1.17 [1.01-1.35]	1.09 [0.77-1.55]	1.32 [0.76-2.28]	0.98 [0.65-1.47]
Statin use	1.06 [0.93-1.22]	1.57 [1.11-2.23]	1.29 [0.89-1.87]	1.15 [0.76-1.73]
Diabetes	1.21 [1.05-1.40]	1.26 [0.91-1.75]	1.17 [0.81-1.71]	1.22 [0.83-1.78]
Dialysis	-	1.52 [0.34-6.81]	3.05 [1.37-6.77]	2.46 [0.65-9.34]
Respiratory ³	1.12 [0.91-1.39]	0.94 [0.58-1.51]	1.52 [1.00-2.31]	1.22 [0.75-1.99]
Cancer	1.13 [0.90-1.42]	0.98 [0.63-1.53]	1.28 [0.75-2.19]	0.80 [0.41-1.56]
Psychiatric	1.45 [1.10-1.90]	1.53 [0.92-2.56]	0.78 [0.42-1.47]	1.19 [0.64-2.22]
Antidepressants use	1.04 [0.80-1.35]	2.27 [1.42-3.63]	1.12 [0.64-1.97]	1.59 [0.95-2.65]
Anxiolytics use	1.24 [1.00-1.53]	0.81 [0.48-1.35]	0.86 [0.52-1.42]	1.74 [1.08-2.80]
Age of Transplantation				
Under 2 year	1	1	1	1
2-5 years	1.05 [0.85-1.29]	0.64 [0.39-1.07]	1.05 [0.62-1.79]	0.82 [0.49-1.39]
5-10 years	0.96 [0.78-1.18]	0.91 [0.57-1.45]	0.60 [0.34-1.06]	0.67 [0.38-1.18]
10 years and up	0.93 [0.76-1.14]	0.63 [0.39-1.03]	0.86 [0.50-1.48]	0.99 [0.53-1.86]
Immunosuppressive drugs				
Steroids	1.49 [1.28-1.74]	1.43 [1.04-1.98]	1.22 [0.77-1.92]	1.99 [0.96-4.10]
Tacrolimus	1.01 [0.79-1.30]	0.79 [0.47-1.32]	1.47 [0.74-2.91]	0.83 [0.28-2.44]
Ciclosporin	1.07 [0.82-1.39]	0.92 [0.48-1.75]	1.01 [0.52-1.97]	0.74 [0.24-2.30]
Mycophenolic Acid	1.46 [1.20-1.77]	1.58 [1.11-2.25]	1.79 [1.10-2.91]	1.17 [0.66-2.08]
Azathioprine	1.22 [0.93-1.61]	1.57 [0.66-3.74]	1.90 [0.78-4.62]	0.75 [0.33-1.71]
Sirolimus	0.50 [0.28-0.88]	1.88 [0.78-4.51]	3.8 [0.99-14.61]	2.87 [0.56-14.69]
Everolimus	0.86 [0.66-1.13]	0.83 [0.50-1.38]	1.41 [0.97-2.05]	1.06 [0.60-1.88]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

eTable 15. Comparison of risk factors associated with hospitalization for Covid-19 during the period before the start of vaccination (15/02/2020-31/12/2020) and the period after the start of vaccination (01/04/2021*-31/07/2022) in the multivariable model (sensitivity analysis)

*corresponds to the period when more than 50% of patients had received at least one dose of covid-19 vaccine (in order to limit the number of patients hospitalized before being vaccinated)

	Adjusted Odds Ratios aOR [IC95%] ¹							
	Kidney		Liver		Heart		Lung	
	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination
Number of hospitalizations cases/Effective	1301/41463	3458/39642	250/14464	583/14122	152/5327	481/5121	95/2823	376/2688
Age groups								
01-45	1	1	1	1	1	1	1	1
46-65	1.75 [1.46-2.08]	1.17 [1.06-1.30]	1.30 [0.82-2.07]	1.04 [0.79-1.36]	1.10 [0.68-1.78]	0.93 [0.72-1.21]	1.09 [0.60-1.97]	0.87 [0.64-1.18]
66 and up	1.88 [1.54-2.28]	1.26 [1.12-1.41]	1.61 [0.99-2.63]	1.24 [0.93-1.67]	1.72 [1.02-2.90]	1.01 [0.75-1.36]	0.93 [0.43-1.99]	0.76 [0.50-1.15]
Sex								
Male	1	1	1	1	1	1	1	1
Female	0.80 [0.71-0.91]	1.17 [1.08-1.26]	0.62 [0.45-0.85]	1.11 [0.91-1.34]	1.13 [0.76-1.68]	1.05 [0.83-1.32]	0.95 [0.61-1.49]	0.96 [0.76-1.22]
Social deprivation index								
1 (least deprived)	1	1	1	1	1	1	1	1
2	1.13 [0.94-1.37]	1.01 [0.89-1.14]	0.87 [0.56-1.34]	1.12 [0.85-1.47]	0.74 [0.43-1.28]	1.29 [0.93-1.77]	0.79 [0.38-1.65]	0.98 [0.67-1.43]
3	1.20 [0.99-1.47]	1.06 [0.93-1.20]	1.04 [0.67-1.64]	1.05 [0.79-1.41]	0.77 [0.42-1.41]	1.17 [0.83-1.64]	1.35 [0.67-2.71]	0.89 [0.59-1.34]
4	1.40 [1.15-1.70]	1.11 [0.98-1.26]	1.31 [0.86-1.99]	0.93 [0.69-1.25]	1.11 [0.66-1.89]	0.94 [0.67-1.32]	1.35 [0.66-2.77]	0.79 [0.52-1.18]
5 (most deprived)	1.68 [1.41-2.01]	1.18 [1.04-1.33]	1.29 [0.85-1.95]	0.98 [0.73-1.32]	1.11 [0.66-1.84]	0.98 [0.70-1.37]	1.10 [0.53-2.28]	1.28 [0.87-1.88]
Comorbidities								
Alcohol	0.88 [0.69-1.12]	0.94 [0.81-1.10]	0.79 [0.59-1.05]	0.74 [0.61-0.90]	0.66 [0.35-1.25]	0.99 [0.71-1.37]	0.94 [0.46-1.93]	0.91 [0.62-1.35]
Smoking	0.83 [0.71-0.97]	0.88 [0.80-0.97]	0.74 [0.54-1.01]	0.81 [0.66-1.00]	1.03 [0.71-1.51]	0.95 [0.76-1.18]	0.84 [0.49-1.42]	1.16 [0.87-1.55]
Obesity	1.23 [1.07-1.40]	1.12 [1.03-1.22]	1.07 [0.80-1.44]	0.92 [0.75-1.13]	1.41 [0.96-2.07]	1.14 [0.90-1.45]	0.95 [0.53-1.72]	1.33 [0.98-1.82]
Hypertension	1.09 [0.91-1.29]	1.11 [1.00-1.23]	1.15 [0.83-1.58]	1.32 [1.07-1.62]	1.06 [0.68-1.67]	1.11 [0.86-1.43]	1.12 [0.70-1.78]	0.93 [0.72-1.18]
Cardiovascular ²	1.20 [1.06-1.37]	1.19 [1.10-1.30]	1.36 [1.02-1.83]	1.38 [1.13-1.68]	1.13 [0.65-1.97]	1.17 [0.85-1.60]	1.11 [0.70-1.77]	1.04 [0.81-1.34]
Statin use	0.87 [0.77-0.98]	1.03 [0.95-1.11]	1.17 [0.87-1.57]	1.19 [0.97-1.46]	1.20 [0.81-1.78]	1.23 [0.98-1.54]	1.77 [1.09-2.88]	0.96 [0.74-1.26]
Diabetes	1.55 [1.37-1.76]	1.41 [1.30-1.53]	2.01 [1.51-2.66]	1.54 [1.28-1.85]	1.38 [0.95-1.99]	1.28 [1.02-1.60]	1.32 [0.85-2.06]	1.17 [0.92-1.48]
Dialysis	-	-	2.99 [1.35-6.61]	2.70 [1.36-5.35]	1.78 [0.74-4.26]	2.37 [1.4-4.00]	1.77 [0.43-7.29]	1.48 [0.55-3.95]
Respiratory ³	1.06 [0.88-1.29]	1.33 [1.18-1.49]	1.20 [0.82-1.74]	1.08 [0.83-1.40]	0.90 [0.55-1.48]	1.16 [0.88-1.52]	1.39 [0.79-2.46]	1.24 [0.92-1.68]
Cancer	0.97 [0.78-1.20]	0.91 [0.79-1.06]	0.73 [0.48-1.10]	0.79 [0.60-1.04]	1.19 [0.68-2.08]	0.95 [0.66-1.36]	0.84 [0.40-1.77]	0.84 [0.55-1.29]
Psychiatric	1.24 [0.95-1.61]	1.11 [0.93-1.32]	1.27 [0.79-2.03]	1.04 [0.75-1.44]	1.06 [0.56-2.00]	0.86 [0.60-1.25]	1.14 [0.57-2.29]	0.90 [0.60-1.35]
Antidepressants use	1.01 [0.79-1.28]	1.13 [0.97-1.30]	1.36 [0.86-2.15]	1.27 [0.92-1.76]	0.83 [0.43-1.60]	0.91 [0.63-1.30]	0.69 [0.32-1.49]	1.16 [0.82-1.66]

	Adjusted Odds Ratios aOR [IC95%] ¹							
	Kidney		Liver		Heart		Lung	
	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination	Before the start of vaccination	After the start of vaccination
Number of hospitalizations cases/Effective	1301/41463	3458/39642	250/14464	583/14122	152/5327	481/5121	95/2823	376/2688
Anxiolytics use	1.07 [0.87-1.31]	1.05 [0.93-1.19]	1.21 [0.81-1.80]	0.96 [0.72-1.28]	1.46 [0.91-2.35]	1.14 [0.85-1.52]	1.12 [0.59-2.14]	1.40 [1.02-1.93]
Age of Transplantation								
Under 2 year	1	1	1	1	1	1	1	1
2-5 years	1.18 [0.98-1.42]	1.04 [0.93-1.17]	1.39 [0.88-2.20]	1.13 [0.84-1.51]	1.07 [0.58-1.96]	1.13 [0.82-1.56]	1.57 [0.84-2.93]	0.83 [0.60-1.14]
5-10 years	1.08 [0.90-1.30]	0.96 [0.86-1.08]	1.06 [0.66-1.68]	1.20 [0.90-1.60]	1.08 [0.60-1.95]	0.81 [0.58-1.13]	1.21 [0.61-2.38]	0.63 [0.44-0.90]
10 years and up	0.92 [0.76-1.11]	0.84 [0.74-0.94]	1.28 [0.81-2.04]	0.97 [0.72-1.31]	0.91 [0.50-1.66]	0.83 [0.59-1.15]	0.66 [0.28-1.56]	0.85 [0.57-1.27]
Immunosuppressive drugs								
Steroids	1.55 [1.34-1.79]	1.60 [1.46-1.75]	1.58 [1.19-2.09]	1.60 [1.33-1.92]	1.18 [0.73-1.92]	1.50 [1.12-2.00]	1.01 [0.51-1.99]	1.94 [1.24-3.03]
Tacrolimus	0.80 [0.66-0.97]	1.03 [0.89-1.18]	0.77 [0.50-1.18]	0.85 [0.63-1.16]	0.64 [0.34-1.23]	1.00 [0.66-1.53]	0.68 [0.20-2.29]	1.03 [0.51-2.07]
Ciclosporin	1.02 [0.82-1.27]	0.98 [0.85-1.15]	1.17 [0.70-1.97]	0.79 [0.53-1.17]	0.51 [0.27-0.97]	0.73 [0.48-1.11]	0.17 [0.03-0.87]	0.85 [0.41-1.76]
Mycophenolic Acid	1.07 [0.91-1.26]	1.54 [1.38-1.73]	1.18 [0.88-1.58]	1.85 [1.50-2.27]	1.18 [0.74-1.89]	1.28 [0.96-1.69]	1.25 [0.66-2.36]	1.38 [0.96-2.00]
Azathioprine	0.68 [0.51-0.89]	1.02 [0.87-1.21]	1.09 [0.46-2.58]	1.03 [0.57-1.85]	1.46 [0.62-3.39]	1.43 [0.83-2.44]	1.47 [0.64-3.37]	0.81 [0.48-1.36]
Sirolimus	1.09 [0.76-1.58]	0.69 [0.52-0.93]	1.30 [0.58-2.90]	1.09 [0.57-2.07]	2.83 [0.72-11.11]	2.31 [0.86-6.16]	0.70 [0.07-7.31]	2.21 [0.73-6.72]
Everolimus	1.10 [0.88-1.36]	0.83 [0.71-0.97]	1.02 [0.66-1.56]	0.76 [0.55-1.03]	1.09 [0.73-1.64]	1.27 [1.01-1.60]	1.34 [0.73-2.46]	1.12 [0.78-1.60]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

eTable 16. Comparison of risk factors associated with hospitalization for Covid-19 according to the time after transplant in the multivariable model (sensitivity analysis)

	Adjusted Odds Ratios aOR [IC95%] ¹							
	Kidney		Liver		Heart		Lung	
	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation
Number of hospitalizations cases/Effective	929/6014	4350/35449	150/2200	775/12264	95/627	592/4700	123/557	388/2266
Age groups								
01-45	1	1	1	1	1	1	1	1
46-65	1.38 [1.14-1.68]	1.27 [1.15-1.4]	1.33 [0.8-2.23]	1.18 [0.91-1.52]	0.96 [0.54-1.68]	0.96 [0.75-1.24]	0.68 [0.36-1.31]	0.92 [0.68-1.25]
66 and up	1.42 [1.14-1.78]	1.37 [1.23-1.53]	1.32 [0.71-2.48]	1.40 [1.07-1.83]	1.06 [0.44-2.58]	1.14 [0.87-1.50]	0.36 [0.12-1.03]	0.85 [0.57-1.25]
Sex								
Male	1	1	1	1	1	1	1	1
Female	0.98 [0.84-1.15]	1.06 [0.99-1.14]	0.94 [0.63-1.4]	0.95 [0.80-1.12]	0.86 [0.48-1.52]	1.12 [0.90-1.39]	0.73 [0.45-1.17]	1.02 [0.80-1.30]
Social deprivation index								
1 (least deprived)	1	1	1	1	1	1	1	1
2	1.03 [0.80-1.33]	1.07 [0.96-1.20]	1.79 [1.02-3.12]	0.88 [0.69-1.13]	2.08 [0.91-4.75]	1.06 [0.79-1.42]	1.30 [0.63-2.68]	0.87 [0.59-1.29]
3	1.21 [0.94-1.57]	1.08 [0.97-1.22]	1.23 [0.64-2.33]	1.06 [0.82-1.37]	3.64 [1.49-8.85]	0.95 [0.70-1.30]	0.81 [0.36-1.81]	0.98 [0.66-1.47]
4	1.32 [1.02-1.71]	1.18 [1.05-1.32]	1.12 [0.59-2.13]	1.00 [0.77-1.28]	1.42 [0.56-3.64]	0.92 [0.68-1.25]	0.88 [0.40-1.96]	0.95 [0.63-1.42]
5 (most deprived)	1.52 [1.19-1.94]	1.32 [1.18-1.47]	1.09 [0.56-2.11]	1.04 [0.81-1.34]	1.29 [0.52-3.16]	1.00 [0.74-1.35]	1.14 [0.52-2.48]	1.30 [0.89-1.90]
Comorbidities								
Alcohol	0.84 [0.62-1.13]	0.94 [0.81-1.08]	0.64 [0.42-0.99]	0.76 [0.64-0.90]	0.96 [0.45-2.07]	0.99 [0.73-1.35]	1.18 [0.58-2.40]	0.85 [0.56-1.28]
Smoking	0.75 [0.62-0.91]	0.89 [0.81-0.97]	0.88 [0.59-1.31]	0.77 [0.64-0.93]	1.03 [0.60-1.78]	0.95 [0.77-1.17]	0.86 [0.49-1.48]	1.26 [0.95-1.67]
Obesity	1.25 [1.05-1.48]	1.19 [1.10-1.29]	1.06 [0.70-1.61]	0.97 [0.81-1.16]	1.81 [0.96-3.39]	1.22 [0.98-1.51]	2.15 [1.16-3.97]	1.04 [0.76-1.44]
Hypertension	0.98 [0.80-1.19]	1.18 [1.07-1.30]	0.97 [0.64-1.45]	1.28 [1.07-1.55]	1.17 [0.62-2.21]	1.11 [0.87-1.41]	1.02 [0.63-1.64]	0.94 [0.74-1.21]
Cardiovascular ²	1.25 [1.07-1.47]	1.21 [1.12-1.31]	1.29 [0.87-1.90]	1.36 [1.14-1.63]	2.22 [0.56-8.83]	1.18 [0.89-1.56]	1.54 [0.93-2.53]	0.98 [0.76-1.26]
Statin use	0.99 [0.84-1.16]	0.96 [0.90-1.03]	1.08 [0.65-1.79]	1.17 [0.98-1.39]	1.49 [0.79-2.82]	1.20 [0.98-1.47]	0.87 [0.47-1.60]	1.09 [0.84-1.40]
Diabetes	1.50 [1.28-1.76]	1.46 [1.36-1.57]	2.40 [1.64-3.52]	1.62 [1.37-1.90]	0.85 [0.46-1.59]	1.36 [1.11-1.67]	1.02 [0.63-1.64]	1.18 [0.92-1.50]
Dialysis	-	-	3.32 [0.74-14.98]	2.77 [1.56-4.93]	3.22 [0.83-12.42]	2.01 [1.21-3.33]	1.31 [0.06-26.57]	1.31 [0.52-3.28]
Respiratory ³	1.38 [1.10-1.73]	1.26 [1.13-1.41]	0.77 [0.47-1.25]	1.27 [1.01-1.59]	0.67 [0.36-1.25]	1.21 [0.93-1.57]	2.12 [1.09-4.12]	1.21 [0.90-1.62]
Cancer	0.74 [0.51-1.08]	0.92 [0.81-1.04]	0.67 [0.43-1.02]	0.77 [0.59-1.00]	0.22 [0.03-1.89]	1.06 [0.78-1.44]	1.13 [0.46-2.75]	0.74 [0.49-1.12]
Psychiatric	1.44 [1.03-2.02]	1.15 [0.98-1.35]	0.98 [0.55-1.75]	1.10 [0.82-1.48]	1.38 [0.72-2.64]	0.81 [0.55-1.19]	0.52 [0.26-1.05]	1.26 [0.83-1.91]
Antidepressants use	1.01 [0.73-1.40]	1.09 [0.95-1.25]	1.41 [0.68-2.93]	1.21 [0.91-1.61]	0.52 [0.19-1.39]	0.91 [0.65-1.28]	1.19 [0.54-2.60]	1.04 [0.72-1.49]
Anxiolytics use	1.07 [0.83-1.38]	1.06 [0.94-1.19]	0.88 [0.48-1.6]	0.99 [0.77-1.27]	1.39 [0.66-2.93]	1.21 [0.93-1.58]	1.77 [0.96-3.28]	1.18 [0.84-1.65]
Immunosuppressive drugs								

	Adjusted Odds Ratios aOR [IC95%] ¹							
	Kidney		Liver		Heart		Lung	
	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation	< 2 years since transplantation	≥ 2 years since transplantation
Number of hospitalizations cases/Effective	929/6014	4350/35449	150/2200	775/12264	95/627	592/4700	123/557	388/2266
Steroids	1.61 [1.29-2.02]	1.64 [1.52-1.77]	1.68 [1.15-2.47]	1.63 [1.38-1.92]	5.51 [0.67-45.17]	1.41 [1.11-1.80]	0.46 [0.10-2.00]	1.79 [1.21-2.64]
Tacrolimus	0.87 [0.65-1.16]	1.01 [0.90-1.15]	0.37 [0.18-0.73]	0.88 [0.68-1.14]	1.21 [0.44-3.33]	0.81 [0.56-1.18]	0.18 [0.04-0.78]	1.21 [0.56-2.61]
Ciclosporin	1.06 [0.78-1.45]	1.00 [0.87-1.14]	0.70 [0.29-1.67]	0.87 [0.62-1.20]	0.43 [0.16-1.16]	0.67 [0.47-0.97]	1.96 [0.81-4.72]	1.01 [0.45-2.30]
Mycophenolic Acid	1.04 [0.80-1.34]	1.47 [1.33-1.63]	1.05 [0.66-1.66]	1.77 [1.48-2.10]	2.40 [0.78-7.38]	1.27 [0.99-1.63]	0.89 [0.22-3.61]	1.38 [0.97-1.95]
Azathioprine	0.90 [0.62-1.30]	0.91 [0.78-1.06]	0.80 [0.25-2.55]	0.99 [0.58-1.69]	0.91 [0.09-9.21]	1.31 [0.81-2.12]	1.61 [0.03-80.52]	0.81 [0.49-1.34]
Sirolimus	0.76 [0.22-2.62]	0.79 [0.63-1.00]	1.15 [0.12-11.58]	1.23 [0.74-2.03]	8.78 [0.38-205.31]	2.36 [1.01-5.53]	0.60 [0.22-1.59]	1.56 [0.50-4.83]
Everolimus	0.99 [0.76-1.29]	0.91 [0.79-1.06]	0.86 [0.51-1.44]	0.83 [0.63-1.09]	1.23 [0.66-2.30]	1.26 [1.02-1.57]	1.05 [0.30-3.66]	1.35 [0.96-1.90]

¹Adjusted on region of residence, number of consultations and number of hospitalizations

²Except for heart transplantation

³Except for mucoviscidosis and lung transplantation

eTable 17. Association between immunosuppressive treatment regimens and risk of hospitalization for Covid-19 in multivariate analysis among SOTRs (Exploratory analysis)

	Adjusted Odds Ratios aOR [IC95%]				
	Whole Cohort	Kidney transplant	Liver transplant	Heart transplant	Lung transplant
Treatment regimen¹					
Tacrolimus-Mycophenolic Acid-Steroids	1	1	1	1	1
Tacrolimus-Mycophenolic Acid	0.54 [0.50-0.59]	0.61 [0.55-0.67]	0.65 [0.53-0.80]	0.58 [0.37-0.91]	0.48 [0.29-0.79]
Ciclosporin-Mycophenolic Acid-Steroids	0.94 [0.86-1.03]	1.05 [0.95-1.17]	1.72 [1.16-2.56]	0.70 [0.54-0.90]	0.70 [0.44-1.11]
Ciclosporin-Mycophenolic Acid	0.66 [0.57-0.75]	0.73 [0.63-0.84]	0.48 [0.30-0.75]	0.74 [0.48-1.15]	0.60 [0.20-1.79]
Tacrolimus only	0.29 [0.24-0.35]	0.40 [0.29-0.54]	0.34 [0.26-0.45]	0.61 [0.18-2.05]	0.27 [0.06-1.18]
Tacrolimus-Steroids	0.70 [0.62-0.79]	0.75 [0.65-0.87]	0.67 [0.49-0.93]	0.61 [0.35-1.05]	0.54 [0.30-0.96]
Tacrolimus-Sirolimus/Everolimus-Steroids	0.83 [0.71-0.96]	0.74 [0.61-0.89]	0.74 [0.43-1.27]	1.22 [0.83-1.78]	0.91 [0.64-1.30]
Tacrolimus-Azathioprine-Steroids	0.67 [0.57-0.80]	0.66 [0.55-0.80]	0.54 [0.24-1.20]	1.08 [0.55-2.13]	0.61 [0.38-0.99]
Ciclosporin-Steroids	0.56 [0.46-0.68]	0.60 [0.49-0.74]	0.36 [0.15-0.84]	0.67 [0.40-1.12]	0.56 [0.19-1.67]
Mycophenolic Acid-Steroids	1.10 [0.94-1.29]	1.10 [0.94-1.30]	1.13 [0.61-2.06]	3.10 [1.20-7.96]	0.58 [0.06-5.03]
Sirolimus/Everolimus-Mycophenolic Acid	0.45 [0.35-0.58]	0.42 [0.28-0.61]	0.67 [0.47-0.96]	0.79 [0.37-1.67]	2.13 [0.20-21.83]
Sirolimus/Everolimus-Mycophenolic Acid-Steroids	0.94 [0.78-1.12]	0.87 [0.70-1.07]	1.13 [0.64-1.97]	1.62 [1.03-2.55]	0.76 [0.21-2.79]
Others	0.59 [0.54-0.65]	0.62 [0.56-0.69]	0.59 [0.47-0.75]	0.80 [0.63-1.01]	0.68 [0.49-0.95]
Treatment regimen classes²					
CNI + Antimetabolites + Steroids	1	1	1	1	1
CNI + mTORi + Steroids	0.83 [0.72-0.95]	0.75 [0.64-0.90]	0.80 [0.49-1.33]	1.07 [0.79-1.45]	1.00 [0.72-1.41]
Antimetabolite + mTORi + Steroids	0.93 [0.78-1.11]	0.84 [0.69-1.03]	1.00 [0.57-1.74]	1.98 [1.29-3.04]	0.70 [0.19-2.51]
CNI + Antimetabolite + mTORi	0.47 [0.33-0.67]	0.38 [0.17-0.82]	0.52 [0.28-0.96]	0.93 [0.54-1.58]	0.56 [0.19-1.65]
CNI + Antimetabolites	0.58 [0.54-0.62]	0.63 [0.58-0.68]	0.62 [0.51-0.75]	0.77 [0.56-1.05]	0.52 [0.33-0.81]
CNI + mTORi	0.47 [0.37-0.61]	0.55 [0.40-0.77]	0.47 [0.29-0.74]	0.62 [0.31-1.21]	1.04 [0.37-2.95]
CNI + Steroids	0.68 [0.61-0.76]	0.72 [0.63-0.81]	0.60 [0.44-0.82]	0.74 [0.51-1.09]	0.60 [0.36-1.02]
Antimetabolite + Steroids	1.04 [0.90-1.20]	1.02 [0.88-1.18]	1.15 [0.65-2.02]	2.72 [1.12-6.61]	0.85 [0.17-4.15]
Antimetabolite + mTORi	0.47 [0.37-0.60]	0.46 [0.32-0.65]	0.64 [0.45-0.91]	0.93 [0.44-1.96]	2.26 [0.22-23.20]
mTORi + Steroids	0.70 [0.54-0.92]	0.77 [0.57-1.02]	0.66 [0.33-1.32]	0.78 [0.17-3.49]	0.27 [0.03-2.10]
CNI	0.31 [0.26-0.36]	0.38 [0.30-0.50]	0.36 [0.28-0.46]	0.50 [0.17-1.40]	0.24 [0.05-1.01]
Antimetabolite	0.72 [0.56-0.92]	0.69 [0.49-0.97]	1.00 [0.70-1.42]	-	1.89 [0.16-21.92]
mTORi	0.26 [0.16-0.43]	0.25 [0.07-0.80]	0.33 [0.19-0.57]	0.47 [0.06-3.76]	2.56 [0.20-32.46]
Others	0.94 [0.80-1.10]	0.78 [0.60-1.01]	0.63 [0.34-1.17]	1.23 [0.95-1.58]	1.07 [0.69-1.66]
Immunosuppression intensity (including steroids)³					
Triple regimen	1	1	1	1	1
Double regimen	0.65 [0.61-0.68]	0.71 [0.66-0.76]	0.66 [0.56-0.78]		
Single regimen	0.38 [0.33-0.43]	0.47 [0.38-0.57]	0.45 [0.37-0.56]	0.72 [0.58-0.90]	0.58 [0.42-0.79]

CNI: Calcineurin Inhibitors / mTORi: mammalian target of rapamycin inhibitors

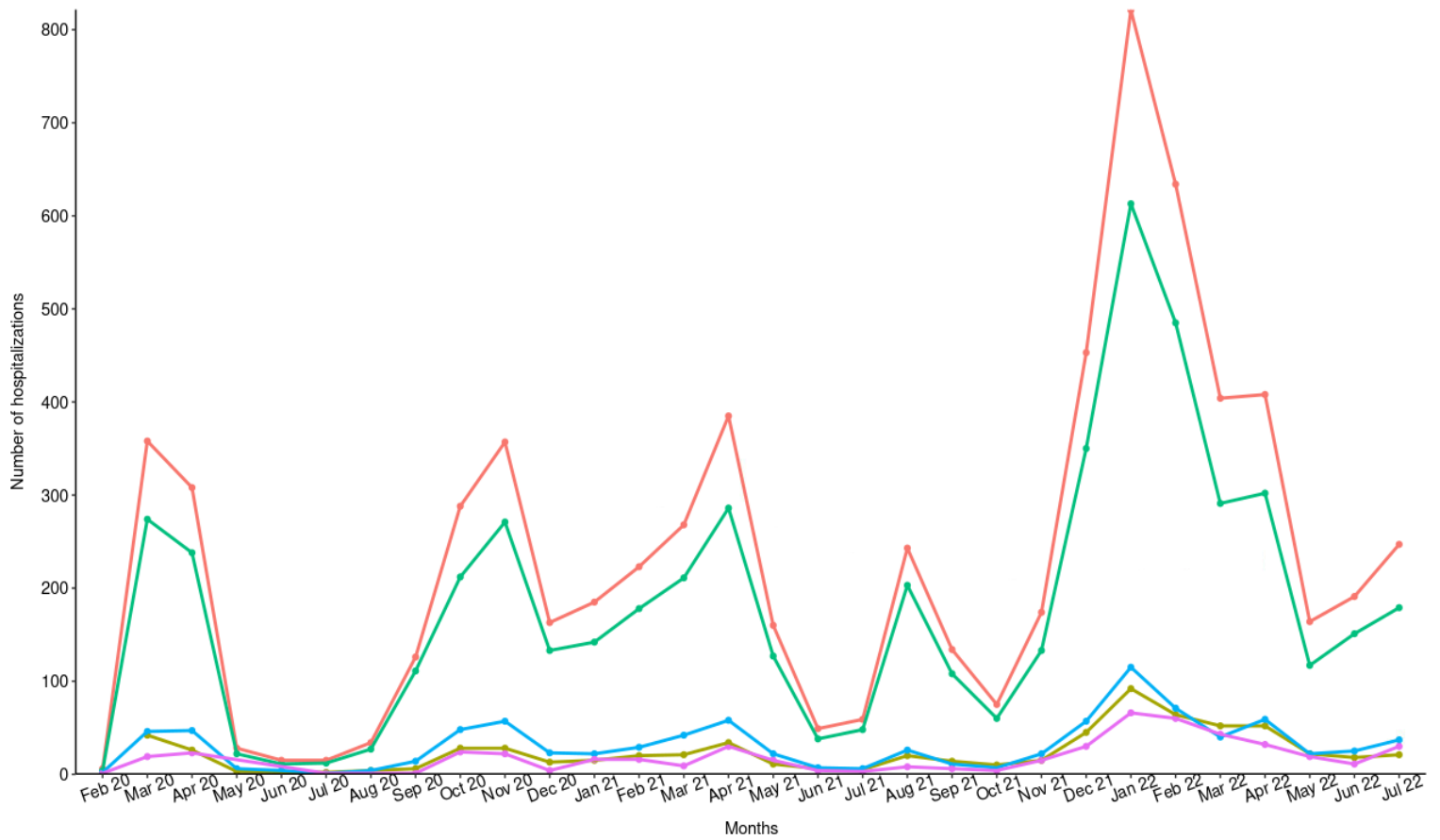
¹Model 1: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

²Model 2: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

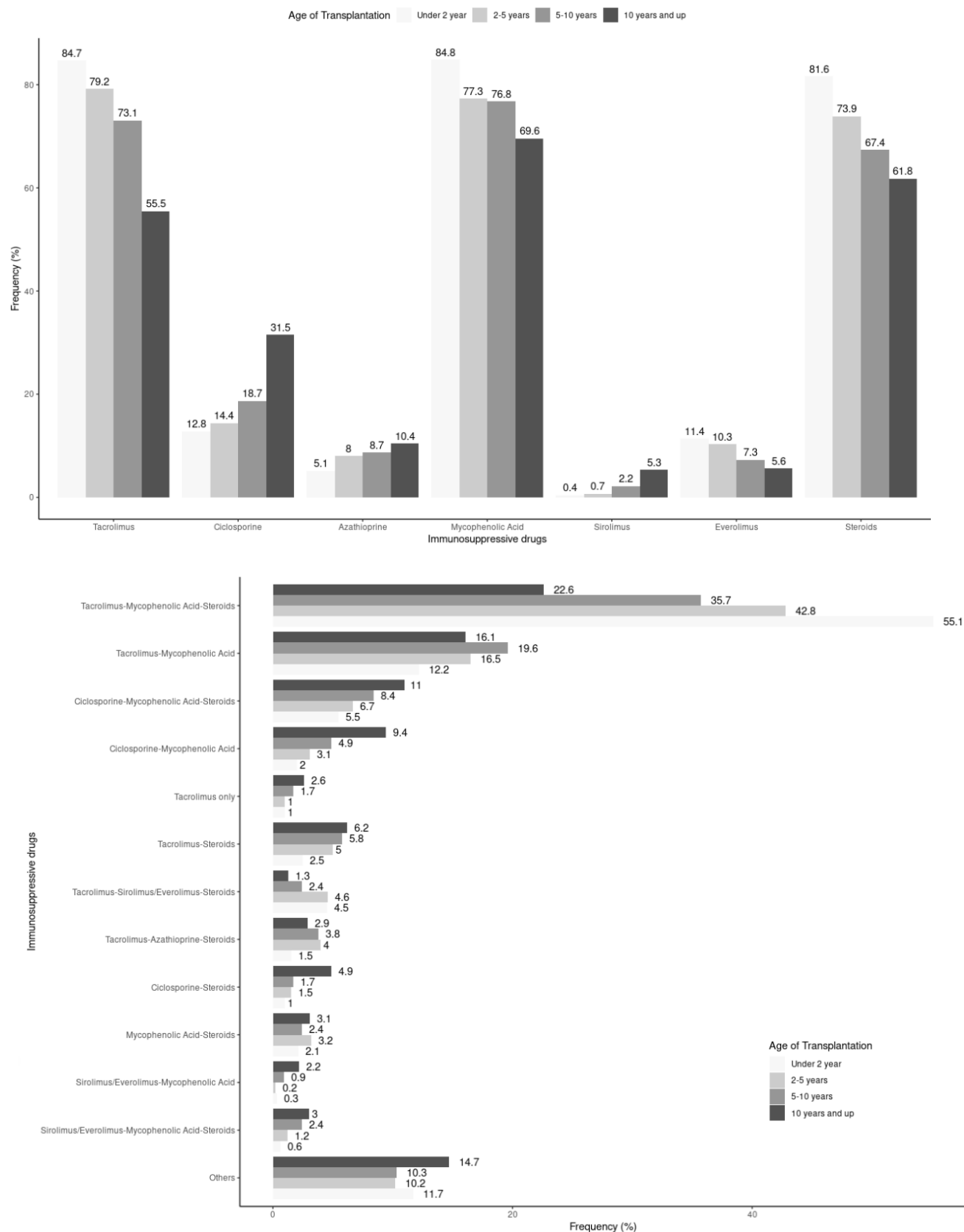
³Model 3: Adjusted for age, sex, social deprivation index, each of the comorbidities, number of consultations, number of hospitalizations, age of transplantation, and region of residence.

-Estimation was not possible

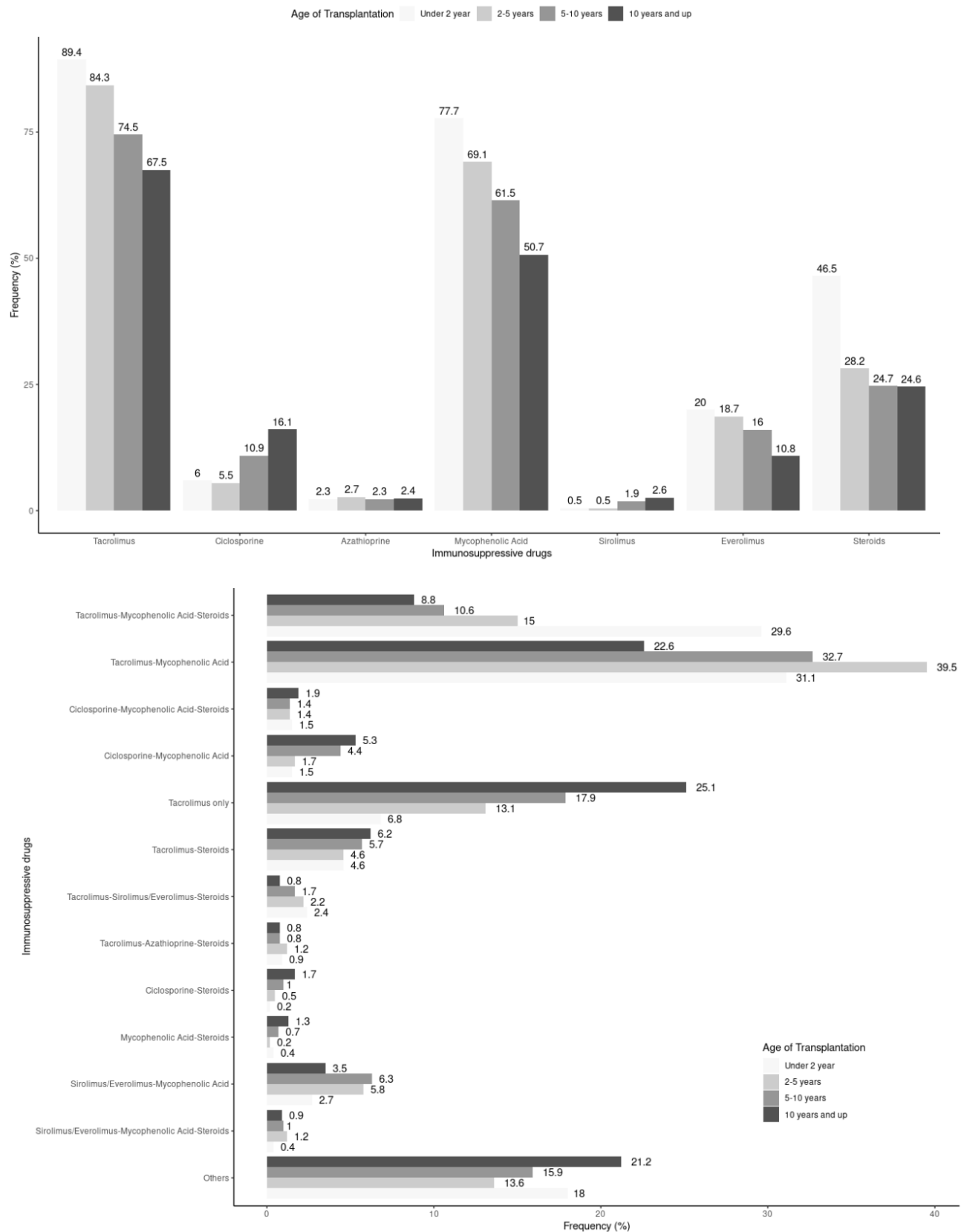
eFigure 1. Kinetics of hospitalizations for Covid-19 among SOTRs
 (Red: whole transplant population; Green: Kidney; Blue: Liver; Dark yellow: Heart; Pink: Lung)



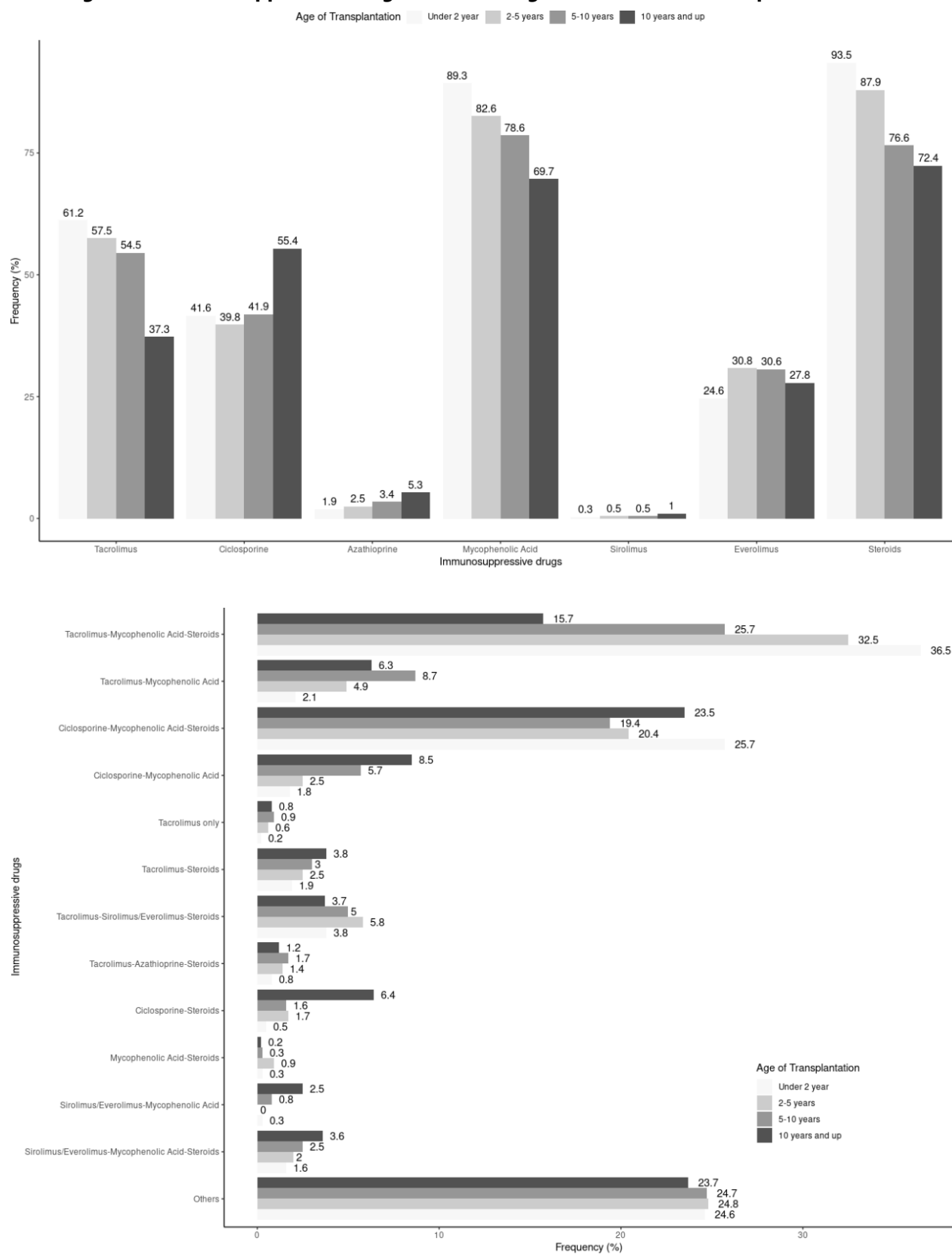
eFigure 2. Immunosuppressive drugs use according to the time since transplant in KTRs.



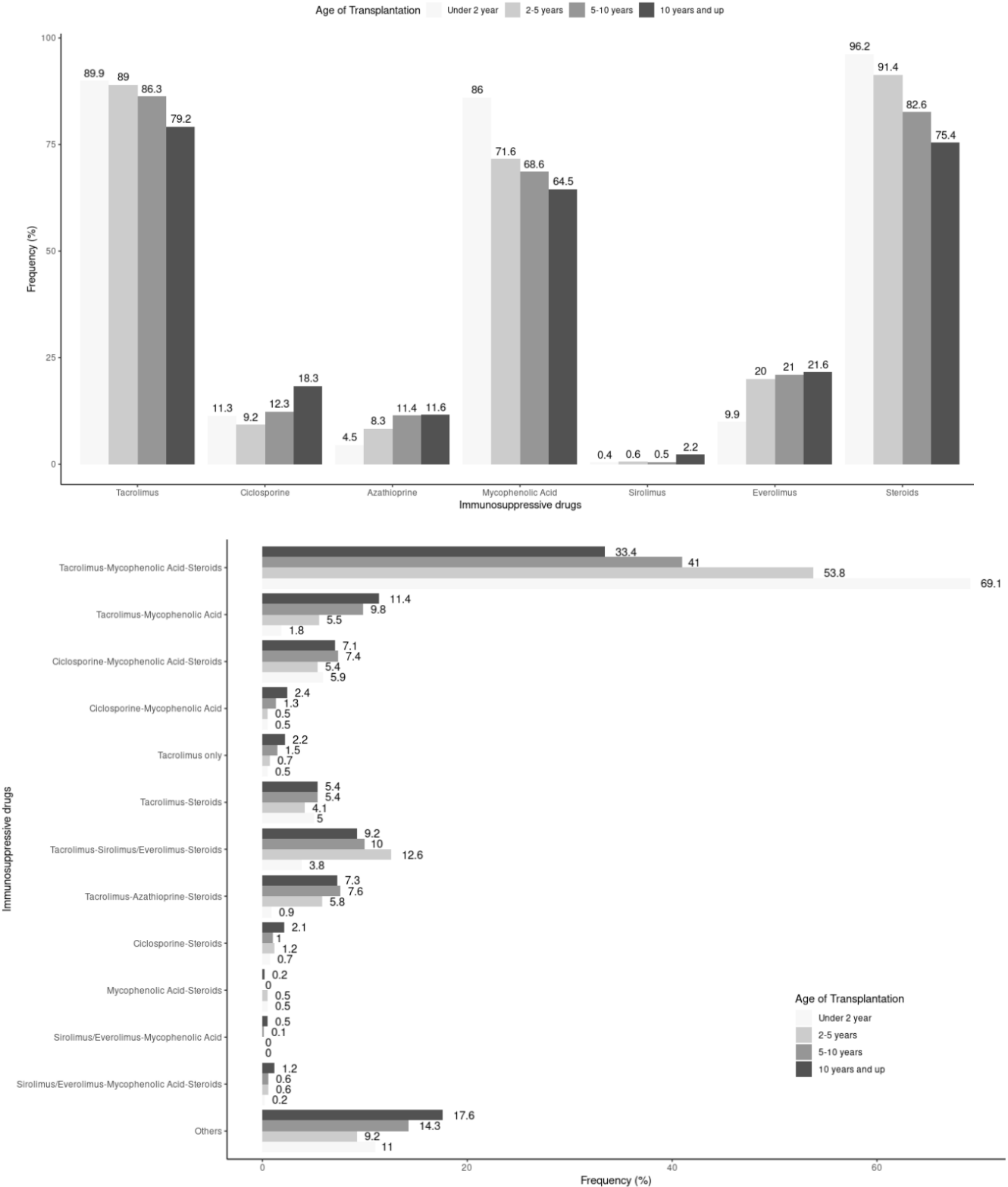
eFigure 3. Immunosuppressive drugs use according to the time since transplant in LTRs.



eFigure 4. Immunosuppressive drugs use according to the time since transplant in HTRs.



eFigure 5. Immunosuppressive drugs use according to the time since transplant in lung transplant recipients.



eFigure 6. Description of treatment regimens in SOTRs (Whole population N=60456)

