

## SUPPLEMENTAL MATERIAL

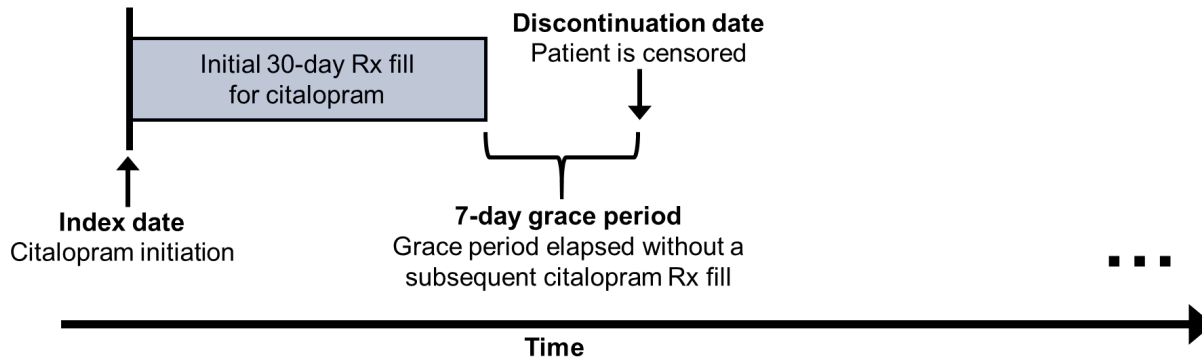
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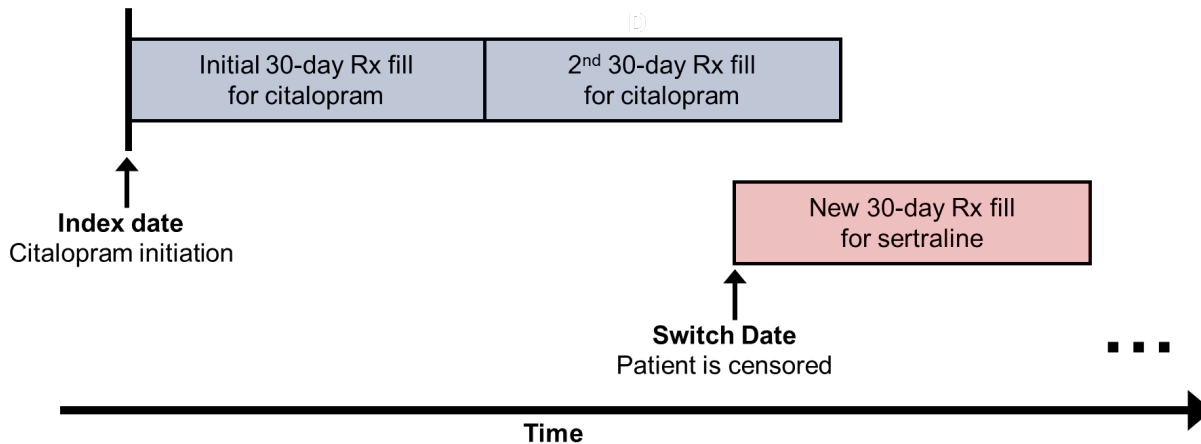
## SUPPLEMENTAL FIGURES

### Supplemental Figure 1. Illustration of SSRI discontinuation and switching events

#### Panel A. SSRI discontinuation



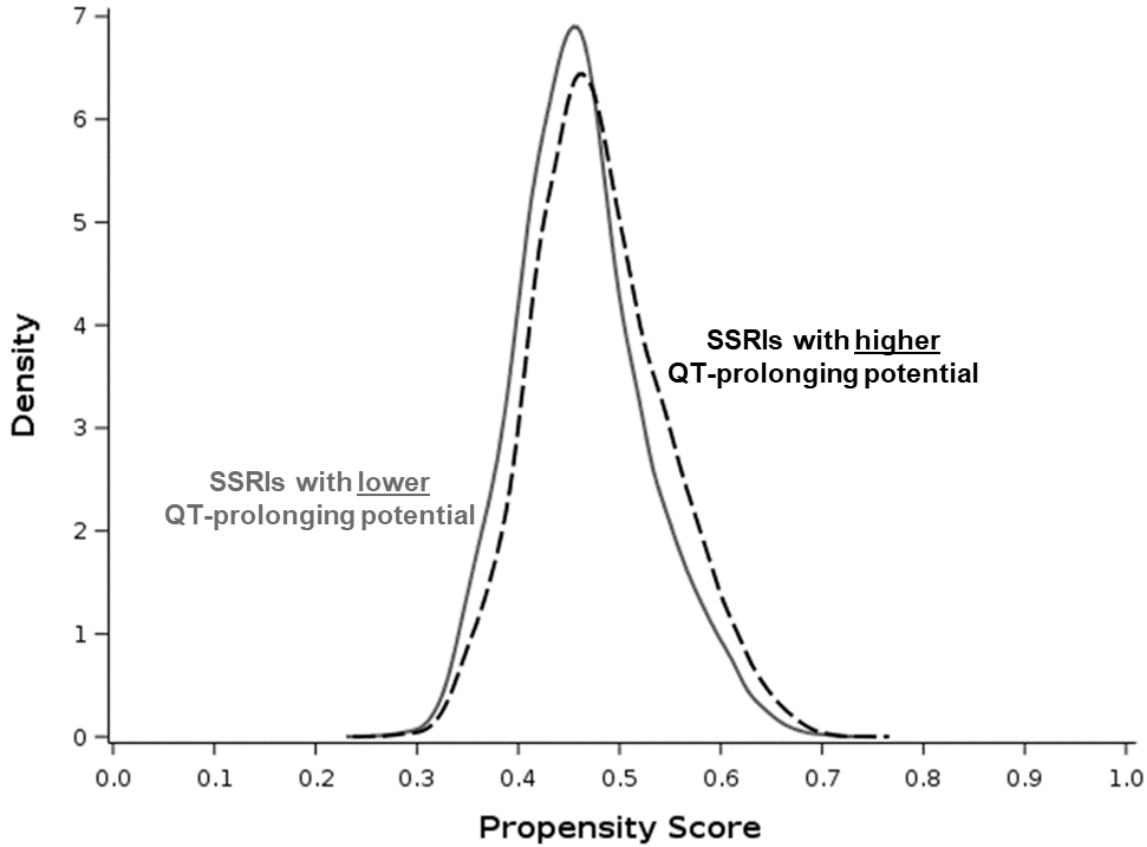
#### Panel B. SSRI switching



Patients were censored during study follow-up if they discontinued index SSRI therapy or if they switched from their index SSRI to a different generic product (i.e. from citalopram to sertraline). We defined the SSRI discontinuation date as the date when the index SSRI was exhausted for greater than 7-days (i.e. grace period) without a subsequent dispensing of the same SSRI (Panel A). We defined the SSRI switch date as the date of the first prescription fill for a non-index SSRI during follow-up (Panel B). Patients were only “at risk” for a switching event during times of continuous index medication use (i.e. prior to the end of the 7 day grace period).

Abbreviations: Rx, prescription; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Figure 2. Propensity score distribution of patients treated with higher and lower QT-prolonging-potential SSRIs**



The black dashed line is the propensity score distribution for initiators of SSRIs with higher QT-prolonging potential SSRIs. The gray solid line represents the propensity score distribution for initiators of lower QT-prolonging-potential SSRIs. Higher QT-prolonging-potential SSRIs include citalopram and escitalopram. Lower QT-prolonging-potential SSRIs include fluoxetine, fluvoxamine, paroxetine, and sertraline.

Abbreviations: SSRI, selective serotonin reuptake inhibitor.

## SUPPLEMENTAL TABLES

Supplemental Table 1. Outcome definitions

Primary study outcome	
Outcome	Specification
Sudden cardiac death <sup>27</sup>	Death with a cardiac arrhythmia or cardiac arrest cause of death code (28, 29) listed as the <u>primary</u> cause on the ESRD Death Notification Form.
Alternative study outcomes considered in sensitivity analyses	
Outcome	Specification
Composite outcome of sudden cardiac death <u>or</u> hospitalized ventricular arrhythmia	Death with a cardiac arrhythmia or cardiac arrest cause of death code (28, 29) listed as the <u>primary</u> cause on the ESRD Death Notification Form.  <u>or</u> An inpatient hospitalization <sup>a</sup> for ventricular arrhythmia (ICD-9 codes 427.1 or 427.4 in the primary position).
Cardiovascular mortality <sup>27</sup>	Death with any cardiovascular cause death code <sup>b</sup> (23, 25, 26, 27, 28, 29, 30, 31, 32, 35 or 36) listed as the <u>primary</u> cause on the ESRD Death Notification Form.
Alternative study outcomes considered in sensitivity analyses	
Outcome	Specification
Non-sudden cardiac death	Death with a non-sudden cardiac death code (all codes except 28 and 29) listed as the <u>primary</u> cause on the ESRD Death Notification Form.

<sup>a</sup> Inpatient hospitalizations were identified using Medicare Part A claims (i.e. institutional claims). Specified four-digit ICD-9 diagnosis codes included all existing 5<sup>th</sup> digit diagnosis codes.

<sup>b</sup> The cardiovascular cause of death codes include the following clinical conditions: acute myocardial infarction, pericarditis (including cardiac tamponade), atherosclerotic heart disease, cardiomyopathy, cardiac arrhythmia, cardiac arrest (cause unknown), valvular heart disease, pulmonary edema due to exogenous fluid, congestive heart failure, pulmonary embolus, and cerebrovascular accident (including intracranial hemorrhage).

Abbreviations: ESRD, end-stage renal disease; ICD-9, International Classification of Diseases, Ninth Revision.

**Supplemental Table 2. ICD-9 diagnosis, ICD-9 procedure and CPT procedure codes used to identify relevant baseline covariates**

<b>Baseline comorbidities</b>	
<b>Comorbid condition</b>	<b>ICD-9 diagnosis code(s)<sup>a</sup></b>
Depression	296.2, 296.3, 296.5, 300.4, 309.0, 309.1, 309.28, 311
Anxiety	300.0
Bipolar disorder	296.0, 296.4–296.8
Schizophrenia	295
Delusional disorders	297
Personality disorders	301
Dementia	331.0–331.2, 331.7, 290.0–290.4, 294.0–294.2, 294.8, 797
Arrhythmia	427
Conduction disorder	426
Dyslipidemia	272.0–272.2, 272.4
Heart failure	398.91, 402.x1, 404.x1, 404.x3, 428
Hypertension	401–405
Ischemic heart disease	410–414
Peripheral arterial disease	249.9, 250.7, 440.2, 440.3, 440.4, 440.8, 440.9, 443.1, 443.22, 443.81, 443.89, 443.9, 444.22, 444.81, 445.02
Stroke	430–438
Valvular disease	394–397
Cancer	140–209
COPD or asthma	491–494, 496
Chronic liver disease	571
Diabetes	250
Diabetic neuropathy	250.6
GI bleed	531.0, 531.2, 531.4, 531.6, 532.0, 532.2, 532.4, 532.6, 533.0, 533.2, 533.4, 533.6, 534.0, 534.2, 534.4, 534.6, 562.02, 562.03, 562.12, 562.13, 569.3, 569.85, 578.0, 578.1, 578.9
Hypothyroidism	243, 244
History of alcohol abuse	303, 305.0
History of cocaine abuse	304.2, 305.6
Tobacco use	305.1
History of non-compliance	V15.81, V45.12
Cardiac pacemaker	V45.01
<b>Baseline procedures</b>	
<b>Procedure</b>	<b>ICD-9 procedure code(s)<sup>b</sup> or CPT procedure code(s)</b>
Cardiac surgery	<i>ICD-9 procedure codes:</i> 35, 36, 37
Electrocardiogram	<i>CPT procedure codes:</i> 93000, 93005, 93010, 93040, 93041, 93042
Psychotherapy	<i>CPT procedure codes:</i> 90785, 90804–90819, 90821–90824, 90826–90829, 90832–90834, 90836–90844, 90846–90847, 90849, 90853, 90855, 90857, 90863

<sup>a</sup> Specified three-digit ICD-9 diagnosis code categories included all existing 4<sup>th</sup> and 5<sup>th</sup> digit diagnosis codes and specified four-digit ICD-9 diagnosis code categories included all existing 5<sup>th</sup> digit diagnosis codes.

<sup>b</sup> Specified two-digit ICD-9 procedure code categories included all existing 3<sup>rd</sup> and 4<sup>th</sup> digit procedure codes.

**Abbreviations:** COPD, chronic obstructive pulmonary disease; CPT, Current Procedural Terminology; GI, gastrointestinal; ICD-9, International Classification of Diseases, Ninth Revision.

### Supplemental Table 3. List of non-SSRI QT prolonging medications

#### Known risk of torsades de pointes<sup>a</sup>

Amiodarone, anagrelide, arsenic trioxide, astemizole, azithromycin, bepridil, chloroquine chlorpromazine, cilostazol, ciprofloxacin, clarithromycin, cocaine, disopyramide, dofetilide, donepezil, dronedarone, droperidol, erythromycin, flecainide, fluconazole, gatifloxacin, grepafloxacin, haloperidol, ibutilide, levofloxacin, levomethadyl, mesoridazine, methadone, moxifloxacin, ondansetron, oxaliplatin, papaverine, pentamidine, pimozide, probucol, procainamide, propofol, quinidine, sevoflurane, sotalol, sparfloxacin, terfenadine, thioridazine and vandetanib

#### Conditional risk of torsades de pointes<sup>b</sup>

Amantadine, amitriptyline, amphotericin B, atazanavir, chloral hydrate, cimetidine, diphenhydramine, doxepin, esomeprazole, famotidine, furosemide, galantamine, hydrochlorothiazide, hydroxychloroquine, hydroxyzine, indapamide, itraconazole, ivabradine, ketoconazole, lansoprazole, loperamide, metoclopramide, metolazone, metronidazole, nelfinavir, olanzapine, omeprazole, pantoprazole, piperacillin/tazobactam, posaconazole, propafenone, quetiapine, quinine sulfate, ranolazine, solifenacin, telaprevir, torsemide, trazodone, voriconazole and ziprasidone

#### Possible risk of torsades de pointes<sup>c</sup>

Alfuzosin, apomorphine, aripiprazole, asenapine, atomoxetine, bedaquiline, bendamustine, betrixaban, bortezomib, bosutinib, buprenorphine, cabozantinib, capecitabine, ceritinib, clomipramine, clozapine, crizotinib, dabrafenib, dasatinib, degarelix, delamanid, desipramine, deutetrabenazine, dexmedetomidine, dolasetron, efavirenz, eliglustat, epirubicin, eribulin, ezogabine, retigabine, felbamate, fingolimod, fluorouracil, gemifloxacin, granisetron, hydrocodone (extended release formulations), iloperidone, imipramine, melipramine, inotuzumab, isradipine, lapatinib, lenvatinib, leuprolide, lithium, lopinavir/ritonavir, maprotiline, memantine, midostaurin, mifepristone, mirabegron, mirtazapine, moexipril/hctz, necitumumab, nifedipine, nilotinib, norfloxacin, nortriptyline, nusinersen, ofloxacin, osimertinib, oxytocin, paliperidone, palonosetron, panobinostat, pasireotide, pazopanib, perflutren, perphenazine, pimavanserin, primaquine, promethazine, ribociclib, rilpivirine, risperidone, romidepsin, saquinavir, sorafenib, sunitinib, tacrolimus, tamoxifen, telavancin, telithromycin, tetrabenazine, tipiracil/trifluridine, tizanidine, tolterodine, toremifene, tramadol, trimipramine, valbenazine, vardenafil, vemurafenib, venlafaxine, vorinostat

Medication lists were obtained from the CredibleMeds® website ([www.Crediblemeds.org](http://www.Crediblemeds.org)) on September 27, 2018.

<sup>a</sup> According to the CredibleMeds® website, medications with a known risk of torsades de pointes are defined as drugs that prolong the QT interval and are clearly associated with a known risk of torsades de pointes, even when taken as recommended.<sup>26</sup>

<sup>b</sup> According to the CredibleMeds® website, medications with a conditional risk of torsades de pointes are defined as drugs are associated with torsades de pointes only under certain conditions (e.g. excessive dose, in patients with conditions such as hypokalemia, or when taken with interacting drugs) or medications that create conditions that facilitate or induce torsades de pointes (e.g. cause an electrolyte disturbance that induces torsades de pointes).<sup>26</sup>

<sup>c</sup> According to the CredibleMeds® website, medications with a possible risk of torsades de pointes are defined as drugs that can cause QT prolongation but currently lack evidence for a risk of torsades de pointes when taken as recommended.<sup>26</sup>

**Supplemental Table 4. HCPCS codes used to identify QT prolonging medications not billable to Medicare Part D**

<b>Known risk of Torsades de pointes<sup>a</sup></b>	
<b>Medication</b>	<b>HCPCS code(s)</b>
Arsenic trioxide	J9017
Droperidol	J1790, J1810
Ibutilide	J1742
Oxaliplatin	J9263
Papaverine	J2440
Pentamidine	J2545, J7676
Procainamide	J2690
Propofol	J2704
<b>Conditional risk of Torsades de pointes<sup>b</sup></b>	
<b>Medication</b>	<b>HCPCS code(s)</b>
Amphotericin B	J0285, J0287, J0288, J0289
Piperacillin/tazobactam	J2543
<b>Possible risk of Torsades de pointes<sup>c</sup></b>	
<b>Medication</b>	<b>HCPCS code(s)</b>
Bendamustine	J9033, J9034
Bortezomib	J9041
Degarelix	J9155
Epirubicin	J9178
Eribulin	J9179
Fluorouracil	J9190
Inotuzumab	FDA approved after the study period
Leuprolide	J1950, J9217, J9218, J9219
Necitumumab	J9295
Nusinersen	J2326
Oxytocin	J2590
Palonosetron	J2469, J8655
Pasireotide	J2502
Perflutren	Q9957
Romidepsin	J9315
Telavancin	J3095

HCPCS codes used to identify QT prolonging medications not billable to Medicare Part D were identified in Medicare Part A and B claims (i.e. institutional and physician/supplier claims).

<sup>a</sup> According to the CredibleMeds® website, medications with a known risk of torsades de pointes are defined as drugs that prolong the QT interval and are clearly associated with a known risk of torsades de pointes, even when taken as recommended.<sup>26</sup>

<sup>b</sup> According to the CredibleMeds® website, medications with a conditional risk of torsades de pointes are defined as drugs are associated with torsades de pointes only under certain conditions (e.g. excessive dose, in patients with conditions such as hypokalemia, or when taken with interacting drugs) or medications that create conditions that facilitate or induce torsades de pointes (e.g. cause an electrolyte disturbance that induces torsades de pointes).<sup>26</sup>

<sup>c</sup> According to the CredibleMeds® website, medications with a possible risk of torsades de pointes are defined as drugs that can cause QT prolongation but currently lack evidence for a risk of torsades de pointes when taken as recommended.<sup>26</sup>

**Abbreviations:** FDA, Food and Drug Administration; HCPCS, Healthcare Common Procedure Coding System.

## Supplemental Table 5. List of cytochrome P450 inhibitors

### Inhibitors of cytochrome P450 1A2

Amiodarone, cimetidine, ciprofloxacin, efavirenz, interferon alpha, methoxsalen, ticlopidine

### Inhibitors of cytochrome P450 3A4

Amiodarone, aprepitant, buprenorphine, chloramphenicol, cimetidine, ciprofloxacin, clarithromycin, delavirdine, diethyldithiocarbamate, diltiazem, erythromycin, fluconazole, gestodene, imatinib, indinavir, itraconazole, ketoconazole, mifepristone, nefazodone, nelfinavir, norfloxacin, ritonavir, saquinavir, telaprevir, telithromycin, verapamil, voriconazole

### Inhibitors of cytochrome P450 2C9

Amiodarone, efavirenz, fenofibrate, fluconazole, fluvastatin, isoniazid, lovastatin, metronidazole, phenylbutazone, probenecid, sulfamethoxazole, sulfaphenazole, teniposide, voriconazole, zafirlukast

### Inhibitors of cytochrome P450 2C19

Chloramphenicol, cimetidine, esomeprazole, felbamate, indomethacin, isoniazid, ketoconazole, lansoprazole, modafinil, omeprazole, oral contraceptives, oxcarbazepine, pantoprazole, probenecid, ticlopidine, topiramate, voriconazole

### Inhibitors of cytochrome P450 2D6

Amiodarone, bupropion, celecoxib, chlorpheniramine, chlorpromazine, cimetidine, cinacalcet, clemastine, clomipramine, diphenhydramine, doxepin, doxorubicin, duloxetine, haloperidol, hydroxyzine, methadone, metoclopramide, midodrine, moclobemide, perphenazine, promethazine, quinidine, ranitidine, ritonavir, terbinafine, ticlopidine, tripeleppamine

List of medications that can inhibit the metabolism of SSRIs via cytochrome P450 isoenzyme interactions were obtained from the Flockhart Table™ website (<https://drug-interactions.medicine.iu.edu/Main-Table.aspx>) on September 27, 2018.<sup>29</sup> Citalopram and escitalopram are major substrates of cytochrome P450 3A4 and 2C19. Fluoxetine is a major substrate of cytochrome P450 2C9 and 2D6. Fluvoxamine is a major substrate of cytochrome P450 1A2 and 2D6. Paroxetine is a major substrate of cytochrome P450 2D6.

Abbreviations: SSRI, selective serotonin reuptake inhibitor.



**Supplemental Table 6. Full list of baseline characteristics among study patients initiating a higher and lower QT-prolonging-potential SSRI**

Characteristic	Unweighted			Weighted		
	SSRI with <i>higher</i> QT-prolonging potential n = 30,932	SSRI with <i>lower</i> QT-prolonging potential n = 34,722	Std diff <sup>a</sup> (%)	SSRI with <i>higher</i> QT-prolonging potential n = 30,927	SSRI with <i>lower</i> QT-prolonging potential n = 34,730	Std diff <sup>a</sup> (%)
<b>Age (years)</b>	67.6 ± 17.2	66.5 ± 17.2	6.2	67.0 ± 17.2	67.0 ± 17.21	0.0
<b>Female</b>	16,512 (53.4%)	18,121 (52.2%)	2.3	16,316 (52.8%)	18,324 (52.8%)	0.0
<b>Race</b>						
Black	11,339 (36.7%)	11,959 (34.4%)	6.3	10,967 (35.5%)	12,320 (35.5%)	0.0
White	18,434 (59.6%)	21,005 (60.5%)	1.5	18,589 (60.1%)	20,870 (60.1%)	0.0
Other	1,159 (3.7%)	1,758 (5.1%)	33.5	1,371 (4.4%)	1,540 (4.4%)	0.0
<b>Hispanic</b>	5,233 (16.9%)	7,346 (21.2%)	22.7	5,933 (19.2%)	6,654 (19.2%)	0.1
<b>Year index SSRI was filled</b>						
2007	3,961 (12.8%)	4,751 (13.7%)	6.9	4,086 (13.2%)	4,594 (13.2%)	0.1
2008	4,095 (13.2%)	4,388 (12.6%)	4.8	3,977 (12.9%)	4,468 (12.9%)	0.0
2009	4,061 (13.1%)	4,343 (12.5%)	5.0	3,948 (12.8%)	4,435 (12.8%)	0.1
2010	4,139 (13.4%)	4,161 (12.0%)	11.5	3,907 (12.6%)	4,386 (12.6%)	0.0
2011	4,034 (13.0%)	4,061 (11.7%)	11.3	3,814 (12.3%)	4,287 (12.3%)	0.1
2012	3,611 (11.7%)	4,152 (12.0%)	2.5	3,670 (11.9%)	4,118 (11.9%)	0.1
2013	3,507 (11.3%)	4,398 (12.7%)	11.5	3,738 (12.1%)	4,194 (12.1%)	0.1
2014	3,524 (11.4%)	4,468 (12.9%)	12.7	3,787 (12.2%)	4,246 (12.2%)	0.2
<b>Low-dose index SSRI<sup>b</sup></b>	27,935 (90.3%)	31,560 (90.9%)	0.6	28,011 (90.6%)	31,456 (90.6%)	0.0
<b>Cause of ESRD</b>						
Diabetes	15,563 (50.3%)	17,416 (50.2%)	0.3	15,542 (50.3%)	17,458 (50.3%)	0.0
Hypertension	7,941 (25.7%)	8,760 (25.2%)	1.8	7,848 (25.4%)	8,813 (25.4%)	0.0
Glomerular disease	3,359 (10.9%)	3,934 (11.3%)	4.4	3,442 (11.1%)	3,864 (11.1%)	0.1
Other	4,069 (13.2%)	4,612 (13.3%)	1.0	4,095 (13.2%)	4,596 (13.2%)	0.1
<b>Dialysis vintage</b>						
0.7 – 0.9 years	5,467 (17.7%)	5,903 (17.0%)	4.0	5,364 (17.3%)	6,023 (17.3%)	0.0
1.0 – 1.9 years	5,965 (19.3%)	6,622 (19.1%)	1.1	5,933 (19.2%)	6,661 (19.2%)	0.0
2.0 – 2.9 years	4,631 (15.0%)	5,136 (14.8%)	1.3	4,594 (14.9%)	5,162 (14.9%)	0.1
≥ 3 years	14,869 (48.1%)	17,061 (49.1%)	2.2	15,035 (48.6%)	16,883 (48.6%)	0.0
<b>History of a failed kidney transplant</b>	2,029 (6.6%)	2,377 (6.8%)	4.6	2,083 (6.7%)	2,336 (6.7%)	0.1

<b>Medicare Part D low income subsidy</b>	24,601 (79.5%)	27,694 (79.8%)	0.3	24,620 (79.6%)	27,653 (79.6%)	0.0
<b>Depression</b>	10,960 (35.4%)	10,851 (31.3%)	12.7	10,298 (33.3%)	11,567 (33.3%)	0.0
<b>Anxiety</b>	5,590 (18.1%)	6,046 (17.4%)	3.8	5,492 (17.8%)	6,169 (17.8%)	0.0
<b>Bipolar disorder</b>	810 (2.6%)	741 (2.1%)	26.6	734 (2.4%)	825 (2.4%)	0.2
<b>Other mental health disorders<sup>c</sup></b>	872 (2.8%)	794 (2.3%)	26.5	786 (2.5%)	884 (2.5%)	0.2
<b>Dementia</b>	3,978 (12.9%)	3,174 (9.1%)	34.9	3,380 (10.9%)	3,800 (10.9%)	0.1
<b>Arrhythmia</b>	9,616 (31.1%)	10,135 (29.2%)	6.4	9,327 (30.2%)	10,471 (30.1%)	0.0
<b>Conduction disorder</b>	2,434 (7.9%)	2,659 (7.7%)	2.9	2,403 (7.8%)	2,699 (7.8%)	0.0
<b>Dyslipidemia</b>	15,756 (50.9%)	17,566 (50.6%)	0.7	15,723 (50.8%)	17,652 (50.8%)	0.0
<b>Heart failure</b>	14,937 (48.3%)	15,884 (45.7%)	5.5	14,536 (47.0%)	16,321 (47.0%)	0.0
<b>Hypertension</b>	28,289 (91.5%)	31,297 (90.1%)	1.5	28,073 (90.8%)	31,522 (90.8%)	0.0
<b>Ischemic heart disease</b>	15,171 (49.0%)	16,216 (46.7%)	4.9	14,810 (47.9%)	16,624 (47.9%)	0.0
<b>Peripheral arterial disease</b>	11,332 (36.6%)	11,737 (33.8%)	8.2	10,878 (35.2%)	12,216 (35.2%)	0.0
<b>Stroke</b>	8,225 (26.6%)	8,033 (23.1%)	14.2	7,668 (24.8%)	8,615 (24.8%)	0.0
<b>Valvular disease</b>	2,112 (6.8%)	2,165 (6.2%)	9.8	2,023 (6.5%)	2,273 (6.5%)	0.1
<b>Cancer</b>	2,671 (8.6%)	2,763 (8.0%)	8.7	2,564 (8.3%)	2,881 (8.3%)	0.1
<b>COPD or asthma</b>	9,384 (30.3%)	9,980 (28.7%)	5.5	9,134 (29.5%)	10,255 (29.5%)	0.0
<b>Chronic liver disease</b>	1,385 (4.5%)	1,577 (4.5%)	1.6	1,400 (4.5%)	1,570 (4.5%)	0.1
<b>Diabetes</b>	21,520 (69.6%)	23,690 (68.2%)	2.0	21,305 (68.9%)	23,927 (68.9%)	0.0
<b>Diabetic neuropathy</b>	7,718 (25.0%)	8,352 (24.1%)	3.7	7,584 (24.5%)	8,523 (24.5%)	0.1
<b>GI bleed</b>	3,586 (11.6%)	3,582 (10.3%)	12.2	3,378 (10.9%)	3,793 (10.9%)	0.0
<b>Hypothyroidism</b>	5,567 (18.0%)	5,960 (17.2%)	4.9	5,440 (17.6%)	6,110 (17.6%)	0.0
<b>History of alcohol abuse</b>	785 (2.5%)	795 (2.3%)	13.4	745 (2.4%)	835 (2.4%)	0.2
<b>History of cocaine abuse</b>	529 (1.7%)	554 (1.6%)	11.0	510 (1.6%)	572 (1.6%)	0.0
<b>Tobacco use</b>	4,327 (14.0%)	4,829 (13.9%)	0.6	4,321 (14.0%)	4,857 (14.0%)	0.1
<b>History of non-compliance</b>	3,501 (11.3%)	4,072 (11.7%)	3.7	3,575 (11.6%)	4,013 (11.6%)	0.0
<b>Had a cardiac pacemaker</b>	1,431 (4.6%)	1,463 (4.2%)	10.6	1,361 (4.4%)	1,529 (4.4%)	0.0
<b>Had cardiac surgery during the last 30 days of baseline</b>	588 (1.9%)	614 (1.8%)	10.7	565 (1.8%)	635 (1.8%)	0.1
<b>Had an ECG during the last 30 days of baseline</b>	9,908 (32.0%)	10,796 (31.1%)	3.0	9,777 (31.6%)	10,974 (31.6%)	0.1
<b>Alpha-blocker</b>	240 (0.8%)	285 (0.8%)	11.2	249 (0.8%)	280 (0.8%)	0.0

<b>ACE inhibitor</b>	5,749 (18.6%)	6,542 (18.8%)	1.4	5,801 (18.8%)	6,509 (18.7%)	0.1
<b>ARB</b>	3,018 (9.8%)	3,530 (10.2%)	4.3	3,082 (10.0%)	3,462 (10.0%)	0.0
<b>Beta blocker</b>	11,442 (37.0%)	13,114 (37.8%)	2.1	11,562 (37.4%)	12,981 (37.4%)	0.0
<b>Calcium channel blocker</b>	8,768 (28.3%)	10,385 (29.9%)	5.5	9,031 (29.2%)	10,141 (29.2%)	0.0
<b>Central alpha agonist</b>	3,906 (12.6%)	4,413 (12.7%)	0.7	3,913 (12.7%)	4,394 (12.7%)	0.0
<b>Diuretic</b>	2,903 (9.4%)	3,565 (10.3%)	9.5	3,048 (9.9%)	3,420 (9.8%)	0.1
<b>Vasodilator</b>	3,292 (10.6%)	3,837 (11.1%)	3.9	3,364 (10.9%)	3,779 (10.9%)	0.0
<b>Anticoagulant</b>	2,279 (7.4%)	2,450 (7.1%)	4.7	2,233 (7.2%)	2,506 (7.2%)	0.1
<b>Antiplatelet agent</b>	3,520 (11.4%)	3,980 (11.5%)	0.8	3,530 (11.4%)	3,964 (11.4%)	0.0
<b>Digoxin</b>	515 (1.7%)	596 (1.7%)	4.8	529 (1.7%)	592 (1.7%)	0.5
<b>Nitrate</b>	1,987 (6.4%)	2,299 (6.6%)	3.3	2,016 (6.5%)	2,264 (6.5%)	0.0
<b>Statin</b>	7,492 (24.2%)	8,885 (25.6%)	5.6	7,721 (25.0%)	8,671 (25.0%)	0.0
<b>Other cholesterol medication<sup>d</sup></b>	1,244 (4.0%)	1,429 (4.1%)	2.7	1,260 (4.1%)	1,414 (4.1%)	0.0
<b>Midodrine</b>	732 (2.4%)	874 (2.5%)	8.0	754 (2.4%)	848 (2.4%)	0.2
<b>Use of ≥ 1 medication with a known risk of TdP<sup>e</sup></b>	2,919 (9.4%)	3,210 (9.2%)	2.2	2,891 (9.3%)	3,244 (9.3%)	0.1
<b>Use of ≥ 1 medication with a conditional risk of TdP<sup>e</sup></b>	12,634 (40.8%)	14,238 (41.0%)	0.4	12,675 (41.0%)	14,231 (41.0%)	0.0
<b>Use of ≥ 1 medication with a possible risk of TdP<sup>e</sup></b>	3,228 (10.4%)	3,123 (9.0%)	15.6	3,001 (9.7%)	3,375 (9.7%)	0.1
<b>Use of ≥ 1 CYP 1A2 inhibitor<sup>f</sup></b>	1,154 (3.7%)	1,290 (3.7%)	0.5	1,155 (3.7%)	1,296 (3.7%)	0.1
<b>Use of ≥ 1 CYP 3A4 inhibitor<sup>f</sup></b>	2,419 (7.8%)	2,770 (8.0%)	2.1	2,450 (7.9%)	2,746 (7.9%)	0.2
<b>Use of ≥ 1 CYP 2C9 inhibitor<sup>f</sup></b>	2,074 (6.7%)	2,385 (6.9%)	2.6	2,104 (6.8%)	2,360 (6.8%)	0.1
<b>Use of ≥ 1 CYP 2C19 inhibitor<sup>f</sup></b>	8,119 (26.2%)	9,022 (26.0%)	1.0	8,095 (26.2%)	9,087 (26.2%)	0.0
<b>Use of ≥ 1 CYP 2D6 inhibitor<sup>f</sup></b>	8,777 (28.4%)	9,999 (28.8%)	1.5	8,845 (28.6%)	9,931 (28.6%)	0.0
<b>Hospitalized during the last 30 days of the baseline period</b>	8,701 (28.1%)	8,749 (25.2%)	11.2	8,248 (26.7%)	9,264 (26.7%)	0.0
<b>Number of hospital admissions during the baseline period</b>						
0	11,219 (36.3%)	14,063 (40.5%)	11.2	11,890 (38.4%)	13,354 (38.5%)	0.0
1 – 2	13,223 (42.7%)	14,199 (40.9%)	4.5	12,916 (41.8%)	14,499 (41.7%)	0.0
3 – 4	4,704 (15.2%)	4,651 (13.4%)	13.1	4,421 (14.3%)	4,965 (14.3%)	0.0
≥ 5	1,786 (5.8%)	1,809 (5.2%)	11.3	1,700 (5.5%)	1,911 (5.5%)	0.1

<b>Number of ED visits during the baseline period</b>						
0	7,621 (24.6%)	9,625 (27.7%)	12.0	8,113 (26.2%)	9,114 (26.2%)	0.0
1 – 2	11,966 (38.7%)	13,336 (38.4%)	0.7	11,918 (38.5%)	13,379 (38.5%)	0.0
3 – 4	6,135 (19.8%)	6,436 (18.5%)	6.9	5,924 (19.2%)	6,651 (19.2%)	0.0
≥ 5	5,210 (16.8%)	5,325 (15.3%)	9.7	4,973 (16.1%)	5,585 (16.1%)	0.0
<b>Had ≥ 1 psychotherapy visit during the baseline period</b>	3,314 (10.7%)	2,738 (7.9%)	31.8	2,859 (9.2%)	3,211 (9.2%)	0.0
<b>Had ≥ 1 skilled nursing facility admission during the baseline period</b>	7,947 (25.7%)	6,566 (18.9%)	30.7	6,853 (22.2%)	7,701 (22.2%)	0.1

Values are given as number (percent) for categorical variables and as mean ± standard deviation for continuous variables. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. All-covariates were measured during the 180-day baseline period prior to SSRI initiation. The weighted cohort is the pseudo-population generated by inverse probability of treatment weighting.

<sup>a</sup> A std diff > 10.0% represents meaningful imbalance between groups.<sup>33</sup>

<sup>b</sup> The definition of low-dose was based on the dosing recommendations found in each SSRI's package insert.<sup>62-67</sup> Low doses: citalopram ≤ 20 mg/day; escitalopram ≤ 10 mg/day; fluoxetine ≤ 20 mg per day; immediate release fluvoxamine ≤ 50 mg/day; controlled release fluvoxamine ≤ 100 mg/day; immediate release paroxetine ≤ 20 mg/day; controlled release paroxetine ≤ 25 mg/day; and sertraline 50 mg/day.

<sup>c</sup> Other mental health disorders included schizophrenia, delusional disorders, and personality disorders.

<sup>d</sup> Other cholesterol medications (i.e. non-statin cholesterol medications) included bile acid sequestrants, cholesterol absorption inhibitors, fibrates, and niacin.

<sup>e</sup> Lists medications with known, conditional, and possible risks of TdP are presented in Supplemental Table 3.

<sup>f</sup> Lists of medications that are relevant CYP 1A2, 3A4, 2C9, 2C19, and 2D6 inhibitors provided in Supplemental Table 4.

**Abbreviations:** ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; COPD, chronic obstructive pulmonary disease; CYP, cytochrome P450; ED, emergency department; ECG, electrocardiogram; ESRD, end-stage renal disease; GI, gastrointestinal; SSRI, selective serotonin reuptake inhibitor; std diff, standardized differences; TdP, torsades de pointes.

**Supplemental Table 7. Association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of fatal cardiac outcomes**

<b>Sudden cardiac death – primary outcome</b>					
<b>SSRI</b>	<b>n</b>	<b>No. of events</b>	<b>Rate per 1,000 p-y</b>	<b>Unadjusted HR (95% CI)</b>	<b>Adjusted HR (95% CI)</b>
Lower QT-prolonging-potential	34,722	601	68.5	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	702	89.3	1.30 (1.16, 1.45)	1.18 (1.05, 1.31)
<b>Composite of sudden cardiac death or hospitalized ventricular arrhythmia – alternative outcome</b>					
<b>SSRI</b>	<b>n</b>	<b>No. of events</b>	<b>Rate per 1,000 p-y</b>	<b>Unadjusted HR (95% CI)</b>	<b>Adjusted HR (95% CI)</b>
Lower QT-prolonging-potential	34,722	635	72.4	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	742	94.5	1.30 (1.17, 1.44)	1.18 (1.06, 1.31)
<b>Cardiovascular mortality – alternative outcome</b>					
<b>SSRI</b>	<b>n</b>	<b>No. of events</b>	<b>Rate per 1,000 p-y</b>	<b>Unadjusted HR (95% CI)</b>	<b>Adjusted HR (95% CI)</b>
Lower QT-prolonging-potential	34,722	912	103.9	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	1,002	127.5	1.22 (1.12, 1.34)	1.11 (1.02, 1.22)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of higher versus lower QT-prolonging-potential SSRIs and the 1-year risk of fatal cardiac outcomes. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging potential-SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Table 8. Association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of sudden cardiac death within clinically relevant subgroups**

Age subgroups										
SSRI	Age ≥ 65 years					Age < 65 years				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	19,631	446	85.0	1.00 (ref.)	1.00 (ref.)	15,091	161	43.9	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	18,259	541	110.1	1.29 (1.13, 1.46)	1.19 (1.05, 1.35)	12,673	155	54.7	1.24 (1.00, 1.56)	1.13 (0.90, 1.41)
Sex subgroups										
SSRI	Female					Male				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	18,121	280	61.6	1.00 (ref.)	1.00 (ref.)	16,601	321	75.9	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	16,512	356	85.7	1.38 (1.18, 1.62)	1.23 (1.06, 1.44)	14,420	346	93.4	1.23 (1.05, 1.43)	1.12 (0.96, 1.31)
Conduction disorder subgroups										
SSRI	(+ ) Conduction disorder					(- ) Conduction disorder				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	2,659	54	84.4	1.00 (ref.)	1.00 (ref.)	32,063	547	67.2	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	2,434	83	138.5	1.64 (1.16, 2.30)	1.47 (1.05, 2.06)	28,498	619	85.3	1.26 (1.12, 1.42)	1.14 (1.02, 1.28)

Heart failure subgroups										
SSRI	(+ Heart failure)					(- Heart failure)				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	15,884	413	105.6	1.00 (ref.)	1.00 (ref.)	18,838	188	38.7	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	14,937	484	131.8	1.24 (1.09, 1.42)	1.16 (1.02, 1.32)	15,995	218	52.1	1.34 (1.20, 1.63)	1.21 (1.00, 1.48)

Liver disease subgroups										
SSRI	(+ Liver disease)					(- Liver disease)				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	1,577	31	87.8	1.00 (ref.)	1.00 (ref.)	33,145	570	67.7	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	1,385	35	115.5	1.32 (0.82, 2.13)	1.20 (0.74, 1.95)	29,547	667	88.3	1.30 (1.16, 1.45)	1.17 (1.05, 1.31)

Non-SSRI QT-prolonging medication subgroups										
SSRI	Use of ≥ 1 non-SSRI QT-prolonging medication					Use of zero non-SSRI QT-prolonging medications				
	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	16,478	286	62.7	1.00 (ref.)	1.00 (ref.)	18,244	315	74.8	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	14,774	356	86.9	1.38 (1.18, 1.61)	1.29 (1.10, 1.50)	16,158	346	92.0	1.22 (1.05, 1.43)	1.08 (0.93, 1.26)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of sudden cardiac death within clinically relevant subgroups. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Table 9. Association between the initiation of individual higher QT-prolonging-potential SSRIs versus lower QT-prolonging-potential SSRIs and the 1-year risk of sudden cardiac death**

<b>Citalopram versus SSRIs with lower QT prolonging potential</b>					
<b>SSRI</b>	<b>n</b>	<b>No. of events</b>	<b>Rate per 1,000 p-y</b>	<b>Unadjusted HR (95% CI)</b>	<b>Adjusted HR (95% CI)</b>
Lower QT-prolonging-potential	34,722	601	68.5	1.00 (ref.)	1.00 (ref.)
Citalopram	16,288	366	85.6	1.25 (1.10, 1.42)	1.16 (1.02, 1.32)
<b>Escitalopram versus SSRIs with lower QT prolonging potential</b>					
<b>SSRI</b>	<b>n</b>	<b>No. of events</b>	<b>Rate per 1,000 p-y</b>	<b>Unadjusted HR (95% CI)</b>	<b>Adjusted HR (95% CI)</b>
Lower QT-prolonging-potential	34,722	601	68.5	1.00 (ref.)	1.00 (ref.)
Escitalopram	14,644	336	93.8	1.36 (1.19, 1.55)	1.21 (1.05, 1.38)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate: 1) the association between the initiation of citalopram versus lower QT-prolonging-potential SSRIs and the 1-year risk of sudden cardiac death, and 2) the association between the initiation of escitalopram versus lower QT-prolonging-potential SSRIs and the 1-year risk of sudden cardiac death. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

Abbreviations: CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.



**Supplemental Table 10. Association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of the sudden cardiac death when longer grace periods were used to define SSRI discontinuation**

14-day grace period used to define discontinuation					
SSRI	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	34,722	746	71.8	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	845	90.6	1.26 (1.14, 1.39)	1.14 (1.03, 1.26)
30-day grace period used to define discontinuation					
SSRI	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	34,722	966	73.9	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	1,083	92.6	1.25 (1.14, 1.36)	1.14 (1.04, 1.24)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of sudden cardiac death. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Table 11. Association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the risk of sudden cardiac death considering all possible follow-up time**

Sudden cardiac death – primary outcome					
SSRI	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	34,722	688	65.4	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	791	84.3	1.28 (1.15, 1.42)	1.17 (1.05, 1.29)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of higher versus lower QT-prolonging-potential SSRIs and the 1-year risk of sudden cardiac death. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower-QT-prolonging potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Table 12. Association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of the sudden cardiac death using an intent-to-treat analytic approach**

Intention-to-treat analysis					
SSRI	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	34,722	2,015	74.4	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	2,184	92.0	1.22 (1.15, 1.30)	1.13 (1.07, 1.20)

An intention-to-treat analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of a higher versus lower QT prolonging potential SSRI and the 1-year risk of sudden cardiac death. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.

**Supplemental Table 13. Association between the initiation of an SSRI with higher versus lower QT-prolonging potential and the 1-year risk of the negative control outcome**

Non-sudden cardiac death – negative control outcome					
SSRI	n	No. of events	Rate per 1,000 p-y	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Lower QT-prolonging-potential	34,722	1,519	173.1	1.00 (ref.)	1.00 (ref.)
Higher QT-prolonging-potential	30,932	1,552	197.5	1.14 (1.06, 1.22)	1.01 (0.95, 1.09)

An on-treatment analytic approach was used in all analyses. Fine and Gray proportional subdistribution hazards models were used to estimate the association between the initiation of a higher versus lower QT-prolonging-potential SSRI and the 1-year risk of the negative control outcome, non-sudden cardiac death. Higher QT-prolonging-potential SSRIs included citalopram and escitalopram. Lower QT-prolonging-potential SSRIs included fluoxetine, fluvoxamine, paroxetine, and sertraline. Adjusted analyses controlled for baseline covariates listed in Supplemental Table 6 using inverse probability of treatment weighting.

**Abbreviations:** CI, confidence interval; HR, hazard ratio; ref., referent; No., number; p-y, person-years; SSRI, selective serotonin reuptake inhibitor.