

Supplementary Table S1. Definitions of drugs analyzed

ARB type	ATC code
Candesartan	C09CA06, C09DB07, C09DA06
Fimasartan	C09CA10, C09DA10
Irbesartan	C09CA04, C09DA04
Losartan	C09CA01, C09DA01, C09DB06
Olmesartan	C09CA08, C09DB02, C09DA08, C09DX03, C10BX
Telmisartan	C09CA07, C09DA07, C09DB04
Valsartan	C09CA03, C09DB01, C09DA03, C09DB08, C09DX04

ARB, angiotensin receptor blocker; ATC, anatomical therapeutic chemical.

Supplementary Table S2. Definitions of clinical events

Clinical event	KCD code	Definition
MACE	I21, I22, I60 - I64, I50, I110, I130, I132, O1640, O1641, O1648, O1649, OA641, OA647, OA648, OA649, I46	At least one of these codes.
Cardiac death	I110, I21, I130, I132, I46, I50, I61 – I64	Death record with at least one of these codes.
Non-fatal MI	I21-I22	At least one of these codes.
Stroke	I60-I64	At least one of these codes.
Hospitalization for HF	I110, I130, I132, I50	At least one of these codes and record of admission.
Coronary revascularization	O1640, O1641, O1648, O1649, OA640, OA641, OA647, OA648, OA649	At least one of these codes.

MACE, major adverse cardiovascular event; MI, myocardial infarction; HF, heart failure.

Supplementary Table S3. Results of Cox-regression analyses showing the hazard ratios of each component of MACE according to different ARBs

Cardiac death (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.951	0.845	1.071	0.409	1.027	0.912	1.157	0.656
Fimasartan	0.628	0.499	0.789	<0.001	0.897	0.713	1.129	0.355
Irbesartan	1.094	0.955	1.253	0.197	1.119	0.976	1.282	0.107
Olmesartan	0.765	0.690	0.849	<0.001	0.949	0.855	1.053	0.327
Telmisartan	0.767	0.698	0.844	<0.001	0.977	0.888	1.076	0.638
Valsartan	0.900	0.826	0.982	0.018	1.066	0.977	1.163	0.150

Non-fatal MI (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.049	0.961	1.145	0.283	1.045	0.957	1.141	0.324
Fimasartan	0.863	0.741	1.003	0.055	0.999	0.858	1.162	0.988
Irbesartan	1.035	0.930	1.152	0.529	0.996	0.895	1.109	0.941
Olmesartan	0.937	0.871	1.009	0.085	1.001	0.930	1.078	0.971
Telmisartan	0.930	0.869	0.995	0.036	1.004	0.938	1.076	0.905
Valsartan	0.947	0.887	1.011	0.104	0.988	0.925	1.055	0.716

Stroke (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.009	0.964	1.056	0.690	1.042	0.996	1.091	0.077
Fimasartan	0.800	0.738	0.867	<0.001	0.997	0.920	1.081	0.946
Irbesartan	1.100	1.043	1.160	0.001	1.088	1.031	1.147	0.002
Olmesartan	0.881	0.847	0.915	<0.001	1.004	0.965	1.043	0.859
Telmisartan	0.860	0.830	0.891	<0.001	1.004	0.968	1.041	0.831
Valsartan	0.927	0.897	0.959	<0.001	1.029	0.995	1.065	0.095

HF (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.139	1.052	1.234	0.001	1.166	1.076	1.263	<0.001

Fimasartan	0.867	0.751	1.000	0.049	1.097	0.951	1.265	0.206
Irbesartan	1.169	1.062	1.286	0.001	1.136	1.032	1.251	0.009
Olmesartan	0.955	0.892	1.024	0.196	1.093	1.019	1.171	0.012
Telmisartan	0.820	0.767	0.877	<0.001	0.960	0.897	1.027	0.232
Valsartan	0.912	0.857	0.971	0.004	1.003	0.942	1.068	0.927
Coronary revascularization (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.770	0.409	1.450	0.418	0.687	0.363	1.298	0.248
Fimasartan	0.595	0.188	1.888	0.378	0.697	0.219	2.215	0.541
Irbesartan	0.663	0.289	1.524	0.333	0.561	0.244	1.293	0.175
Olmesartan	0.816	0.498	1.337	0.420	0.880	0.536	1.447	0.615
Telmisartan	0.521	0.303	0.894	0.018	0.566	0.329	0.976	0.041
Valsartan	0.595	0.363	0.975	0.039	0.598	0.363	0.984	0.043

*The following variables were adjusted: age, sex, diabetes mellitus, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-1. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in patients ≥ 70 years old (n=154,427)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*				Adjusted model (with age variable)			
	HR	95% CI		P-value	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High			Low	High	
Candesartan	0.956	0.894	1.022	0.598	0.975	0.911	1.043	0.755	0.990	0.925	1.059	0.930
Fimasartan	0.955	0.844	1.080	0.791	1.006	0.889	1.138	0.447	1.058	0.935	1.197	0.232
Irbesartan	0.888	0.818	0.965	0.111	0.892	0.821	0.969	0.028	0.940	0.865	1.021	0.133
Olmesartan	0.961	0.908	1.018	0.403	0.994	0.939	1.053	0.257	1.028	0.971	1.089	0.170
Telmisartan	0.906	0.858	0.956	0.119	0.942	0.892	0.995	0.316	0.962	0.910	1.016	0.201
Valsartan	0.926	0.881	0.974	0.485	0.957	0.909	1.006	0.676	0.975	0.927	1.025	0.429

MACE (Ref.=Losartan)	Crude model				Adjusted model*				Adjusted model (with age variable)			
	HR	95% CI		P-value	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High			Low	High	
Candesartan	1.089	1.030	1.152	0.050	1.058	1.000	1.119	0.279	1.064	1.006	1.125	0.351
Fimasartan	1.062	0.958	1.178	0.613	1.078	0.972	1.195	0.313	1.098	0.990	1.218	0.223
Irbesartan	1.105	1.035	1.181	0.031	1.062	0.994	1.135	0.285	1.081	1.012	1.156	0.175
Olmesartan	1.017	0.968	1.068	0.341	1.018	0.969	1.070	0.602	1.028	0.979	1.080	0.612
Telmisartan	0.973	0.929	1.020	0.002	0.980	0.935	1.027	0.017	0.987	0.942	1.035	0.013
Valsartan	1.028	0.985	1.072	0.584	1.017	0.974	1.062	0.511	1.024	0.981	1.069	0.421

*The following variables were adjusted: sex, diabetes mellitus, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-2. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in patients <70 years old (n=626,358)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*				Adjusted model (with age variable)			
	HR	95% CI		P-value	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High			Low	High	
Candesartan	0.956	0.882	1.037	0.216	0.968	0.893	1.050	0.360	1.002	0.924	1.086	0.438
Fimasartan	0.750	0.652	0.862	0.001	0.817	0.711	0.940	0.023	0.893	0.777	1.027	0.150
Irbesartan	1.001	0.908	1.103	0.035	0.958	0.869	1.056	0.603	0.976	0.885	1.076	0.976
Olmesartan	0.887	0.830	0.948	0.274	0.937	0.877	1.001	0.988	0.976	0.913	1.044	0.955
Telmisartan	0.889	0.837	0.945	0.270	0.932	0.876	0.990	0.817	0.970	0.913	1.032	0.866
Valsartan	0.953	0.900	1.010	0.111	0.961	0.907	1.018	0.331	1.010	0.953	1.070	0.162

MACE (Ref.=Losartan)	Crude model				Adjusted model*				Adjusted model (with age variable)			
	HR	95% CI		P-value	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High			Low	High	
Candesartan	1.068	1.017	1.121	<0.001	1.047	0.997	1.099	0.008	1.071	1.020	1.125	0.016
Fimasartan	0.827	0.761	0.899	<0.001	0.889	0.817	0.966	0.003	0.950	0.873	1.032	0.052
Irbesartan	1.129	1.066	1.197	<0.001	1.066	1.006	1.130	0.003	1.079	1.018	1.143	0.022
Olmesartan	0.946	0.909	0.986	0.066	0.982	0.943	1.023	0.655	1.012	0.971	1.054	0.704
Telmisartan	0.926	0.892	0.962	0.001	0.971	0.934	1.008	0.225	1.002	0.964	1.040	0.307
Valsartan	0.975	0.941	1.011	0.885	0.986	0.951	1.022	0.780	1.022	0.986	1.060	0.810

*The following variables were adjusted: sex, diabetes mellitus, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-3. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in male patients (n=442,694)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.882	0.827	0.941	0.004	0.984	0.922	1.050	0.531
Fimasartan	0.677	0.603	0.760	0.0003	0.951	0.847	1.067	0.751
Irbesartan	0.893	0.826	0.967	0.006	0.928	0.858	1.005	0.251
Olmesartan	0.754	0.715	0.796	0.002	0.980	0.928	1.034	0.558
Telmisartan	0.726	0.690	0.762	<0.001	0.935	0.889	0.983	0.140
Valsartan	0.802	0.766	0.840	0.527	0.988	0.942	1.035	0.292

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.049	0.997	1.103	<0.001	1.078	1.024	1.133	0.172
Fimasartan	0.827	0.757	0.902	0.0002	1.040	0.952	1.135	0.877
Irbesartan	1.135	1.069	1.204	<0.001	1.109	1.045	1.178	0.023
Olmesartan	0.886	0.849	0.924	<0.001	1.031	0.988	1.076	0.427
Telmisartan	0.882	0.849	0.917	<0.001	1.030	0.990	1.070	0.351
Valsartan	0.928	0.894	0.963	0.097	1.038	1.000	1.077	0.635

*The following variables were adjusted: age, diabetes mellitus, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-4. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in female patients (n=338,091)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.922	0.846	1.004	0.136	1.013	0.930	1.104	0.910
Fimasartan	0.728	0.624	0.849	0.007	1.019	0.873	1.189	0.885
Irbesartan	0.921	0.830	1.022	0.226	0.980	0.883	1.087	0.515
Olmesartan	0.888	0.826	0.955	0.561	1.044	0.971	1.123	0.293
Telmisartan	0.808	0.753	0.866	0.015	1.021	0.951	1.095	0.718
Valsartan	0.861	0.807	0.919	0.675	0.989	0.927	1.055	0.486

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.031	0.977	1.087	<0.001	1.054	0.999	1.112	0.030
Fimasartan	0.794	0.721	0.875	<0.001	0.958	0.869	1.055	0.284
Irbesartan	1.058	0.992	1.128	<0.001	1.045	0.980	1.114	0.135
Olmesartan	0.931	0.888	0.975	0.609	1.004	0.958	1.052	0.912
Telmisartan	0.851	0.814	0.890	<0.001	0.952	0.910	0.996	0.010
Valsartan	0.948	0.910	0.987	0.671	1.004	0.964	1.046	0.891

*The following variables were adjusted: age, diabetes mellitus, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-5. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in diabetes patients (n=190,528)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.874	0.803	0.950	0.764	0.959	0.882	1.043	0.334
Fimasartan	0.871	0.749	1.013	0.833	1.103	0.948	1.283	0.112
Irbesartan	0.902	0.820	0.993	0.609	0.964	0.875	1.061	0.464
Olmesartan	0.838	0.779	0.902	0.103	0.980	0.910	1.055	0.664
Telmisartan	0.825	0.771	0.883	0.023	0.953	0.891	1.021	0.163
Valsartan	0.883	0.829	0.940	0.986	1.005	0.943	1.071	0.687

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.009	0.947	1.075	0.051	1.055	0.990	1.124	0.293
Fimasartan	0.836	0.739	0.946	0.012	0.984	0.870	1.114	0.450
Irbesartan	1.011	0.940	1.088	0.078	1.026	0.954	1.104	0.966
Olmesartan	0.939	0.888	0.993	0.466	1.034	0.977	1.094	0.712
Telmisartan	0.926	0.879	0.975	0.152	1.021	0.969	1.075	0.859
Valsartan	0.985	0.938	1.034	0.163	1.056	1.005	1.108	0.168

*The following variables were adjusted: age, sex, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S4-6. Results of Cox-regression analyses showing the hazard ratios of mortality and MACE according to different ARBs in non-diabetes patients (n=590,257)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.885	0.829	0.945	0.003	1.020	0.955	1.089	0.151
Fimasartan	0.643	0.572	0.723	<0.001	0.916	0.815	1.029	0.194
Irbesartan	0.845	0.777	0.918	0.284	0.936	0.861	1.018	0.229
Olmesartan	0.803	0.761	0.847	0.647	1.019	0.966	1.075	0.088
Telmisartan	0.7440	0.707	0.782	<0.001	0.974	0.926	1.025	0.867
Valsartan	0.811	0.773	0.850	0.935	0.987	0.941	1.035	0.676

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.033	0.987	1.080	<0.001	1.073	1.026	1.123	0.027
Fimasartan	0.812	0.752	0.876	<0.001	1.007	0.933	1.087	0.547
Irbesartan	1.106	1.047	1.167	<0.001	1.115	1.056	1.178	0.001
Olmesartan	0.887	0.855	0.921	0.002	1.011	0.973	1.050	0.315
Telmisartan	0.838	0.809	0.869	<0.001	0.984	0.950	1.020	0.006
Valsartan	0.906	0.876	0.936	0.030	1.008	0.975	1.043	0.199

*The following variables were adjusted: age, sex, dyslipidemia, smoking, drinking, exercise, body mass index, systolic blood pressure, albuminuria, glomerular filtration rate, and concomitant medications including calcium antagonists, beta-blockers, angiotensin converting enzyme inhibitor, diuretics, antithrombotic agents, and statins.

CI, confidence interval; HR, hazard ratio.

Supplementary Table S5-1. Risks for all-cause mortality and MACE according to different ARBs compared to those associated with losartan (only ARB)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.778	0.634	0.956	0.717	0.918	0.747	1.128	0.461
Fimasartan	0.694	0.514	0.938	0.262	1.024	0.757	1.384	0.744
Irbesartan	0.701	0.534	0.920	0.247	0.769	0.586	1.009	0.040
Olmesartan	0.834	0.721	0.966	0.568	1.083	0.936	1.254	0.128
Telmisartan	0.830	0.728	0.947	0.591	1.092	0.957	1.246	0.069
Valsartan	0.828	0.725	0.946	0.619	1.023	0.896	1.169	0.481

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.164	0.960	1.412	0.065	1.256	1.035	1.524	0.109
Fimasartan	0.940	0.702	1.258	0.627	1.127	0.842	1.510	0.843
Irbesartan	1.217	0.961	1.541	0.052	1.238	0.978	1.569	0.241
Olmesartan	1.001	0.860	1.165	0.978	1.138	0.977	1.326	0.596
Telmisartan	0.798	0.689	0.926	<0.001	0.925	0.797	1.074	0.006
Valsartan	0.934	0.811	1.077	0.266	1.053	0.913	1.214	0.473

*The following variables were controlled in the adjusted model: age, sex, body mass index, systolic blood pressure, diabetes mellitus, dyslipidemia, cigarette smoking, alcohol drinking, physical activity, household income, glomerular filtration rate.

MACE, major adverse cardiovascular event; ARB, angiotensin receptor blocker; HR, hazard ratio; CI, confidence interval

Supplementary Table S5-2. Risks for all-cause mortality and MACE according to different ARBs compared to those associated with losartan (ARB with one class of anti-hypertensive drug)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.808	0.712	0.916	0.913	0.999	0.880	1.134	0.988
Fimasartan	0.732	0.598	0.895	0.230	1.061	0.867	1.298	0.488
Irbesartan	0.823	0.705	0.961	0.848	0.949	0.812	1.109	0.456
Olmesartan	0.800	0.725	0.882	0.721	1.029	0.933	1.136	0.486
Telmisartan	0.739	0.674	0.811	0.022	0.955	0.870	1.048	0.282
Valsartan	0.813	0.745	0.888	0.977	0.999	0.915	1.091	0.975

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.925	0.825	1.036	0.702	1.024	0.913	1.148	0.775
Fimasartan	0.901	0.757	1.073	0.930	1.095	0.919	1.304	0.285
Irbesartan	0.932	0.810	1.073	0.657	0.990	0.860	1.139	0.745
Olmesartan	0.907	0.829	0.991	0.986	1.024	0.936	1.120	0.712
Telmisartan	0.857	0.788	0.932	0.119	0.990	0.910	1.077	0.601
Valsartan	0.839	0.772	0.911	0.030	0.950	0.874	1.032	0.094

*The following variables were controlled in the adjusted model: age, sex, body mass index, systolic blood pressure, diabetes mellitus, dyslipidemia, cigarette smoking, alcohol drinking, physical activity, household income, glomerular filtration rate.

MACE, major adverse cardiovascular event; ARB, angiotensin receptor blocker; HR, hazard ratio; CI, confidence interval

Supplementary Table S5-3. Risks for all-cause mortality and MACE according to different ARBs compared to those associated with losartan (ARB with two more classes of anti-hypertensive drug)

All-cause mortality (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	0.914	0.862	0.969	0.055	0.998	0.941	1.059	0.582
Fimasartan	0.745	0.667	0.832	0.001	0.978	0.875	1.093	0.899
Irbesartan	0.910	0.847	0.977	0.145	0.957	0.891	1.027	0.366
Olmesartan	0.852	0.810	0.897	0.378	0.993	0.943	1.045	0.695
Telmisartan	0.823	0.785	0.864	0.011	0.966	0.920	1.013	0.382
Valsartan	0.864	0.826	0.903	0.740	0.998	0.954	1.043	0.488

MACE (Ref.=Losartan)	Crude model				Adjusted model*			
	HR	95% CI		P-value	HR	95% CI		P-value
		Low	High			Low	High	
Candesartan	1.017	0.977	1.058	0.012	1.079	1.037	1.122	0.145
Fimasartan	0.871	0.811	0.936	<0.001	1.027	0.956	1.104	0.448
Irbesartan	1.061	1.012	1.112	<0.001	1.096	1.046	1.149	0.045
Olmesartan	0.955	0.923	0.988	0.195	1.047	1.012	1.084	0.748
Telmisartan	0.950	0.920	0.981	0.081	1.052	1.019	1.086	0.979
Valsartan	0.972	0.944	1.002	0.927	1.067	1.035	1.099	0.297

*The following variables were controlled in the adjusted model: age, sex, body mass index, systolic blood pressure, diabetes mellitus, dyslipidemia, cigarette smoking, alcohol drinking, physical activity, household income, glomerular filtration rate.

MACE, major adverse cardiovascular event; ARB, angiotensin receptor blocker; HR, hazard ratio; CI, confidence interval