# Clinical and economic impact of early diagnosis of chronic kidney disease in general practice: the ENDORSE study

Supplementary material

<u>Millewin computerized medical record</u>

The data considered for the study were collected by extraction from the Millewin computerized medical record: a computerized and problem-oriented medical record (CMOP), equipped with a Clinical Decision Support System (DSS), and a software (Milleutilità) based on the Postgres-SQL language for the extraction of recorded data, used by the general practitioners included in the study (n = 53, residing in Italy, 18 females and 35 males) in their usual clinical practice. Millewin is a Class 1 (as per EU 2017/745 regulation) Medical Device (Medical devices are all instruments, appliances, equipment, software, implants, reagents, materials or other items that are used alone or in combination to intervene on a subject, i.e. human being, and called a patient for diagnosis, prevention, monitoring, prediction disease, prognosis, treatment) registered with the Italian Ministry of Health with ID 1847935. In order to guarantee homogeneity of data collection/management and results, only Italian GPs with Millewin digital platform installed were selected for this study. Patients' data were anonymized. All entries were used for statistical analyses.

Figure S1. Training and co-management plan on a regional basis
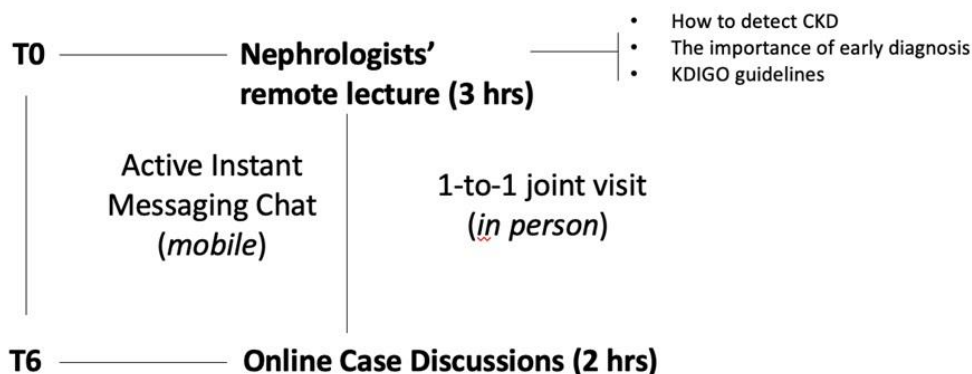
Legend: CKD: Chronic kidney disease

Table S1. Costs associated with CKD stages and with dialysis.

CKD stages	Annual cost
CKD 1	€ 1.169
CKD 2	€ 1.506
CKD 3a	€ 1.635
CKD 3b	€ 2.555
CKD 4	€ 4.147
CKD 5	€ 5.453
Dialysis	
Haemodialysis	€ 43.800
Peritoneal dialysis	€ 29.800
Indirect costs	€ 6.650

Legend: CKD: Chronic kidney disease
Direct costs associated with CKD stages and dialysis costs (both direct and indirect) were obtained from the studies by Jommi et al. and Cicchetti et al.[14,15]

Table S2. Detail of the number of tests according to comorbidities

Group	Variable	T0 (%)	T6 (%)	Delta (%)
T2DM	eGFR < 60 mL/min/1.73m2	5,4	9,7	+79
	eGFR	22,7	38,4	+69
	ACR	8,4	18,0	+114
HT	eGFR < 60 mL/min/1.73m2	4,7	7,4	+58
	eGFR	22,2	32,3	+45
	ACR	3,5	6,7	+90
HF	eGFR < 60 mL/min/1.73m2	8,9	17,6	+98
	eGFR	20,2	35,3	+74
	ACR	4,5	10,0	+121
Overall	eGFR < 60 mL/min/1.73m2	1,7	2,7	+62
	eGFR	13,0	18,4	+41
	ACR	1,3	2,5	+91

Legend:
T2DM, Type 2 diabetes; HT, Hypertension; HF, Heart Failure; eGFR,estimated Glomerular Filtration Rate; ACR, Albumin-Creatinine Ratio

Table S3. eGFR tests performed at t0 and t6

		ENDORSE Data	
		Number	Percentage
T0	**eGFR tests**	**14.241**	**13,0%**
	eGFR level G1	5.932	41,7%
	eGFR level G2	6.490	45,6%
	eGFR level G3a	1.198	8,4%
	eGFR level G3b	406	2,9%
	eGFR level G4	86	0,6%
	eGFR level G5	129	0,9%
T6	**eGFR tests**	**20.610**	**18,4%**
	eGFR level G1	8.013	38,9%
	eGFR level G2	9.581	46,5%
	eGFR level G3a	1.853	9,0%
	eGFR level G3b	697	3,4%
	eGFR level G4	171	0,8%
	eGFR level G5	295	1,4%

Legend: eGFR,estimated Glomerular Filtration Rate

Table S4. ACR tests performed at t0 and t6

		ENDORSE Data	
		Number	Percentage
T0	**ACR tests**	**1.269**	**1,2%**
	ACR level A1	1.172	92,4%
	ACR level A2	68	5,4%
	ACR level A3	29	2,3%
T6	**ACR tests**	**2.477**	**2,2%**
	ACR level A1	2.270	91,6%
	ACR level A2		6,0%

		148	
	ACR level A3	59	2,4%

Legend: ACR, Albumin-Creatinine Ratio

Table S5. Results of the clinical evolution simulation for the ENDORSE cohort

	eGFR level	Baseline N	Baseline %	Year 1 N	Year 1 %	Year 2 N	Year 2 %	Year 3 N	Year 3 %	Year 4 N	Year 4 %	Year 5 N	Year 5 %
Scenario 1	G1	682	29,2%	622	26,6%	544	23,3%	477	20,4%	414	17,7%	358	15,3%
	G2	1206	51,7%	1.173	50,2%	1174	50,3%	1145	49,0%	1142	48,9%	1119	47,9%
	G3a	304	13,0%	345	14,8%	373	16,0%	425	18,2%	427	18,3%	439	18,8%
	G3b	87	3,7%	132	5,7%	166	7,1%	198	8,5%	233	10,0%	270	11,6%
	G4	23	1,0%	26	1,1%	38	1,6%	48	2,1%	71	3,0%	92	3,9%
	G5 not dialyzed	7	0,3%	12	0,5%	15	0,6%	12	0,5%	17	0,7%	21	0,9%
	G5 dialyzed	25	1,1%	25	1,1%	25	1,1%	30	1,3%	31	1,3%	36	1,5%
Scenario 2	G1	682	29,2%	642	27,5%	594	25,4%	545	23,3%	502	21,5%	467	20,0%
	G2	1206	51,7%	1.199	51,3%	1194	51,1%	1192	51,0%	1198	51,3%	1175	50,3%
	G3a	304	13,0%	326	14,0%	338	14,5%	361	15,5%	375	16,1%	404	17,3%
	G3b	87	3,7%	108	4,6%	145	6,2%	166	7,1%	178	7,6%	197	8,4%
	G4	23	1,0%	24	1,0%	26	1,1%	32	1,4%	43	1,8%	52	2,2%
	G5 not dialyzed	7	0,3%	11	0,5%	13	0,6%	14	0,6%	14	0,6%	13	0,6%
	G5 dialyzed	25	1,1%	25	1,1%	25	1,1%	25	1,1%	25	1,1%	27	1,2%

Legend: eGFR, estimated Glomerular Filtration Rate

Table S6. Results of the clinical evolution simulation for the population of reference

	eGFR level	Baseline N	Baseline %	Year 1 N	Year 1 %	Year 2 N	Year 2 %	Year 3 N	Year 3 %	Year 4 N	Year 4 %	Year 5 N	Year 5 %
Scenario 1	G1	91.003	26,1%	82.967	23,8%	72.563	20,8%	63.747	18,3%	55.348	15,9%	47.952	13,8%
	G2	160.934	46,2%	156.464	44,9%	156.598	44,9%	153.019	43,9%	152.676	43,8%	149.884	43,0%
	G3a	40.615	11,7%	46.019	13,2%	49.754	14,3%	56.798	16,3%	57.086	16,4%	58.802	16,9%
	G3b	11.604	3,3%	17.607	5,1%	22.142	6,4%	26.461	7,6%	31.150	8,9%	36.165	10,4%
	G4	3.054	0,9%	3.468	1,0%	5.069	1,5%	6.415	1,8%	9.492	2,7%	12.323	3,5%
	G5 not dialyzed	916	0,3%	1.601	0,5%	2.001	0,6%	1.604	0,5%	2.273	0,7%	2.813	0,8%
	G5 dialyzed	40.377	11,6%	40376,55	11,6%	40.377	11,6%	40.460	11,6%	40.477	11,6%	40.564	11,6%
Scenario 2	G1	91.003	26,1%	85.635	24,6%	79.232	22,7%	72.696	20,9%	66.961	19,2%	62.340	17,9%
	G2	160.934	46,2%	159.932	45,9%	159.265	45,7%	158.999	45,6%	159.799	45,9%	156.851	45,0%
	G3a	40.615	11,7%	43.484	12,5%	45.085	12,9%	48.153	13,8%	50.021	14,4%	53.930	15,5%
	G3b	11.604	3,3%	14.406	4,1%	19.341	5,5%	22.142	6,4%	23.743	6,8%	26.298	7,5%
	G4	3.054	0,9%	3.201	0,9%	3.468	1,0%	4.268	1,2%	5.736	1,6%	6.941	2,0%
	G5 not dialyzed	916	0,3%	1.467	0,4%	1.734	0,5%	1.867	0,5%	1.867	0,5%	1.735	0,5%
	G5 dialyzed	40.377	11,6%	40376,55	11,6%	40.377	11,6%	40.377	11,6%	40.377	11,6%	40.408	11,6%

Legend: eGFR, estimated Glomerular Filtration Rate

Table S7. Economic impact for the population of reference

		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative
Scenario 1	Dialysis	€ 1.980.469.728	€ 1.980.469.728	€ 1.980.469.728	€ 1.984.556.729	€ 1.985.408.004	€ 1.989.660.104	€ 9.920.564.293
	Other costs	€ 682.637.061	€ 696.135.012	€ 710.687.245	€ 721.413.416	€ 740.036.474	€ 757.960.928	€ 3.626.233.075
	Total	€ 2.663.106.789	€ 2.676.604.740	€ 2.691.156.973	€ 2.705.970.145	€ 2.725.444.478	€ 2.747.621.032	€ 13.546.797.368
Scenario 2	Dialysis	€ 1.980.469.728	€ 1.980.469.728	€ 1.980.469.728	€ 1.980.469.728	€ 1.980.469.728	€ 1.982.012.228	€ 9.903.891.140
	Other costs	€ 682.637.061	€ 690.319.828	€ 699.618.707	€ 707.795.660	€ 715.523.628	€ 723.052.215	€ 3.536.310.038
	Total	€ 2.663.106.789	€ 2.670.789.556	€ 2.680.088.435	€ 2.688.265.388	€ 2.695.993.356	€ 2.705.064.443	€ 13.440.201.178
Difference (total)		€ 0	-€ 5.815.184	-€ 11.068.538	-€ 17.704.757	-€ 29.451.122	-€ 42.556.589	-€ 106.596.190
Difference %		0,00%	-0,22%	-0,41%	-0,65%	-1,08%	-1,55%	-0,79%

Legend: green is the saving