Supplemental material:

Supplemental Figure 1: Search Strategy

Medline

1   exp Renal insufficiency/

2   exp renal insufficiency, chronic/

3   ((kidney or renal) adj (chronic or insufficien* or disease* or CKD)).ti,ab,kw.

4   or/1-3

5   exp Interdisciplinary Communication/

6   ((interdisciplinary or inter-disciplinary or multidisciplinary or pre-dialysis or multi-disciplinary or coordinat* or co-ordinat* or MDC or interprofessional or multiprofessional or augment*) adj2 (care or patient or program or communicat* or team)).ti,ab,kw.

7   5 or 6

8   Shared decision making.ti,ab,kw.

9   ((patient* or health*) adj (literacy or educat* or knowledge or teach* or inform*)).ti,ab,kw.

10 exp Patient Education as Topic/

11 or/8-10

12 exp "Pulmonary Disease, Chronic Obstructive"/

13 (chronic obstructive pulmonary disease or COAD or COPD or Chronic Obstructive Airway Disease or Chronic Obstructive Lung Disease or Chronic Airflow Obstruction).ti,ab,kw.

14 12 or 13

16 ((Cardiac or heart or myocardial) adj (failure or decompensation or congestive or right-sided or left-sided or CHF)).ti,ab,kw.

17 15 or 16

18 4 and 7

19 limit 18 to english language

20 18 and 11

21 limit 20 to (english language and yr="2015 -Current")

22 7 and 17

23 limit 22 to english language

24 7 and 14

25 limit 24 to english language

26 "Diabetes Mellitus"/ or "diabetes mellitus".ti,ab,kw.

27 7 and 26

28 limit 27 to english language

29 23 or 25 or 28

30 limit 29 to (english language and yr="2002 -Current")

31 19 or 21 or 30

32 ("Case Reports" or editorial or comment or letter or newspaper article).pt.

33 31 not 32

EMBASE

1. *kidney failure/
2. *chronic kidney failure/
3. ((kidney or renal) adj (chronic or insufficien* or disease* or CKD)).ti,ab,kw.
4. or/1-3
5. ((interdisciplinary or inter-disciplinary or multidisciplinary or pre-dialysis or multi-disciplinary or coordinat* or co-ordinat* or MDC or interprofessional or multiprofessional or augment*) adj2 (care or patient or program or communicat* or team)).ti,ab,kw.
6. *interdisciplinary communication/
7. 5 or 6
8. *patient education/
9. Shared decision making.ti,ab,kw.
10. ((patient* or health*) adj (literacy or educat* or knowledge or teach* or inform*)).ti,ab,kw.
11. or/8-10
12. *chronic obstructive lung disease/
13. (chronic obstructive pulmonary disease or COAD or COPD or Chronic Obstructive Airway Disease or Chronic Obstructive Lung Disease or Chronic Airflow Obstruction).ti,ab,kw.
14. 12 or 13
15. *heart failure/
16. ((Cardiac or heart or myocardial) adj (failure or decompensation or congestive or right-sided or left-sided or CHF)).ti,ab,kw.
17. 15 or 16
18. *diabetes mellitus/
19. "diabetes mellitus".ti,ab,kw.
20. 18 or 19
21. 4 and 7
22. limit 21 to english language
23. 22 and 11
24. limit 23 to english language
25. limit 24 to yr="2015 -Current"
26. 7 and 14
27. limit 26 to english language
28. 7 and 17
29. limit 28 to english language
30. 7 and 20
31. limit 30 to english language
32. 27 or 29 or 31
33. limit 32 to yr="2002 -Current"
34. ("abstracts of meeting presentations" or editorials or letters).mp. or conference abstract.pt. or ("case report$" or "case serie$").mp.
35. 22 or 25 or 33
36. 35 not 34

Cochrane

1   ((kidney or renal) adj (chronic or insufficien* or disease* or CKD)).ti,ab,kw.

2   ((interdisciplinary or inter-disciplinary or multidisciplinary or pre-dialysis or multi-disciplinary or coordinat* or co-ordinat* or MDC or interprofessional or multiprofessional or augment*) adj2 (care or patient or program or communicat* or team)).ti,ab,kw.

3   Shared decision making.ti,ab,kw.

4   ((patient* or health*) adj (literacy or educat* or knowledge or teach* or inform*)).ti,ab,kw.

5   3 or 4

6   (chronic obstructive pulmonary disease or COAD or COPD or Chronic Obstructive Airway Disease or Chronic Obstructive Lung Disease or Chronic Airflow Obstruction).ti,ab,kw.

7   ((Cardiac or heart or myocardial) adj (failure or decompensation or congestive or right-sided or left-sided or CHF)).ti,ab,kw.

8   "diabetes mellitus".ti,ab,kw.

9   1 and 2

10 9 and 5

11 2 and 6

12 2 and 7

13 2 and 8

14 or/11-13

15 9 or 10 or 14

CINAHL

(MH "Renal Insufficiency+")
OR
(MH "Renal Insufficiency, Chronic+")
OR
((TI kidney or TI renal) w1 (TI chronic or TI insufficien* or TI disease* or TI CKD))
OR
((AB kidney or AB renal) w1 (AB chronic or AB insufficien* or AB disease* or AB CKD))
OR
((TX kidney or TX renal) w1 (TX chronic or TX insufficien* or TX disease* or TX CKD))

(MH "Multidisciplinary Care Team+")
OR
((TI interdisciplinary or TI inter-disciplinary or TI multidisciplinary or TI pre-dialysis or TI multi-disciplinary or TI coordinat* or TI co-ordinat* or TI MDC or TI interprofessional or TI multiprofessional or TI augment*) W2 (TI care or TI patient or TI program or TI communicat* or TI team))
OR
((AB interdisciplinary or AB inter-disciplinary or AB multidisciplinary or AB pre-dialysis or AB multi-disciplinary or AB coordinat* or AB co-ordinat* or AB MDC or AB interprofessional or AB multiprofessional or AB augment*) W2 (AB care or AB patient or AB program or AB communicat* or AB team))
OR
((TX interdisciplinary or TX inter-disciplinary or TX multidisciplinary or TX pre-dialysis or TX multi-disciplinary or TX coordinat* or TX co-ordinat* or TX MDC or TX interprofessional or TX multiprofessional or TX augment*) W2 (TX care or TX patient or TX program or TX communicat* or TX team))

(MH "Patient Education+")
OR
TI "Shared decision making" OR AB "Shared decision making" OR AB "Shared decision making"
OR
((TI patient* or TI health*) W1 (TI literacy or TI educat* or TI knowledge or TI teach* or TI inform*))
OR
((AB patient* or AB health*) W1 (AB literacy or AB educat* or AB knowledge or AB teach* or AB inform*))
OR
((TX patient* or TX health*) W1 (TX literacy or TX educat* or TX knowledge or TX teach* or TX inform*))

(MH "Pulmonary Disease, Chronic Obstructive+")
OR
(TI chronic obstructive pulmonary disease or TI COAD or TI COPD or TI Chronic Obstructive Airway Disease or TI Chronic Obstructive Lung Disease or TI Chronic Airflow Obstruction)
OR
(AB chronic obstructive pulmonary disease or AB COAD or AB COPD or AB Chronic Obstructive Airway Disease or AB Chronic Obstructive Lung Disease or AB Chronic Airflow Obstruction)
OR
(TX chronic obstructive pulmonary disease or TX COAD or TX COPD or TX Chronic Obstructive Airway Disease or TX Chronic Obstructive Lung Disease or TX Chronic Airflow Obstruction)

(MH "Heart Failure+")
OR
((TI Cardiac or TI heart or TI myocardial) w1 (TI failure or TI decompensation or TI congestive or TI right-sided or TI left-sided or TI CHF))
OR
((AB Cardiac or AB heart or AB myocardial) w1 (AB failure or AB decompensation or AB congestive or AB right-sided or AB left-sided or AB CHF))
OR
((TX Cardiac or TX heart or TX myocardial) w1 (TX failure or TX decompensation or TX congestive or TX right-sided or TX left-sided or TX CHF))

(MH "Diabetes Mellitus+")
OR
TI "diabetes mellitus" OR AB "diabetes mellitus" OR TX "diabetes mellitus"

TX "abstracts of meeting presentations" or TX editorial or TX newsletters or TX conference abstract or TX "case report" or TX "case series"

S42	S40 NOT S41
S41	TX "abstracts of meeting presentations" or TX editorial or TX newsletters or TX letters or TX conference abstract or TX "case report" or TX "case series"
S40	S32 OR S34 OR S39
S39	S35 OR S36 OR S37
S38	S35 OR S36 OR S37
S37	S11 AND S30
S36	S11 AND S27
S35	S11 AND S22
S34	S17 AND S32
S33	S17 AND S32
S32	S6 AND S11
S31	S6 AND S11
S30	S28 OR S29
S29	TI "diabetes mellitus" OR AB "diabetes mellitus" OR TX "diabetes mellitus"
S28	(MH "Diabetes Mellitus+")
S27	S23 OR S24 OR S25 OR S26
S26	((TX Cardiac or TX heart or TX myocardial) w1 (TX failure or TX decompensation or TX congestive or TX right-sided or TX left-sided or TX CHF))
S25	((AB Cardiac or AB heart or AB myocardial) w1 (AB failure or AB decompensation or AB congestive or AB right-sided or AB left-sided or AB CHF))
S24	((TI Cardiac or TI heart or TI myocardial) w1 (TI failure or TI decompensation or TI congestive or TI right-sided or TI left-sided or TI CHF))
S23	(MH "Heart Failure+")
S22	S18 OR S19 OR S20 OR S21
S21	(TX chronic obstructive pulmonary disease or TX COAD or TX COPD or TX Chronic Obstructive Airway Disease or TX Chronic Obstructive Lung Disease or TX Chronic Airflow Obstruction)
S20	(AB chronic obstructive pulmonary disease or AB COAD or AB COPD or AB Chronic Obstructive Airway Disease or AB Chronic Obstructive Lung Disease or AB Chronic Airflow Obstruction)
S19	(TI chronic obstructive pulmonary disease or TI COAD or TI COPD or TI Chronic Obstructive Airway Disease or TI Chronic Obstructive Lung Disease or TI Chronic Airflow Obstruction)
S18	(MH "Pulmonary Disease, Chronic Obstructive+")
S17	S12 OR S13 OR S14 OR S15 OR S16

S16	((TX patient* or TX health*) W1 (TX literacy or TX educat* or TX knowledge or TX teach* or TX inform*))
S15	((AB patient* or AB health*) W1 (AB literacy or AB educat* or AB knowledge or AB teach* or AB inform*))
S14	((TI patient* or TI health*) W1 (TI literacy or TI educat* or TI knowledge or TI teach* or TI inform*))
S13	TI "Shared decision making" OR AB "Shared decision making" OR AB "Shared decision making"
S12	(MH "Patient Education+")
S11	S7 OR S8 OR S9 OR S10
S10	((TX interdisciplinary or TX inter-disciplinary or TX multidisciplinary or TX pre-dialysis or TX multi-disciplinary or TX coordinat* or TX co-ordinat* or TX MDC or TX interprofessional or TX multiprofessional or TX augment*) W2 (TX care or TX patient or TX program or TX communicat* or TX team))
S9	((AB interdisciplinary or AB inter-disciplinary or AB multidisciplinary or AB pre-dialysis or AB multi-disciplinary or AB coordinat* or AB co-ordinat* or AB MDC or AB interprofessional or AB multiprofessional or AB augment*) W2 (AB care or AB patient or AB program or AB communicat* or AB team))
S8	((TI interdisciplinary or TI inter-disciplinary or TI multidisciplinary or TI pre-dialysis or TI multi-disciplinary or TI coordinat* or TI co-ordinat* or TI MDC or TI interprofessional or TI multiprofessional or TI augment*) W2 (TI care or TI patient or TI program or TI communicat* or TI team))
S7	(MH "Multidisciplinary Care Team+")
S6	S1 OR S2 OR S3 OR S4 OR S5
S5	((TX kidney or TX renal) w1 (TX chronic or TX insufficien* or TX disease* or TX CKD))
S4	((AB kidney or AB renal) w1 (AB chronic or AB insufficien* or AB disease* or AB CKD))
S3	((TI kidney or TI renal) w1 (TI chronic or TI insufficien* or TI disease* or TI CKD))
S2	(MH "Renal Insufficiency, Chronic+")
S1	(MH "Renal Insufficiency+")

Supplemental Figure 2: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	3
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4, 6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Supplement Figure 1
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	5
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	5
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	-

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	5
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Figure 1
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Supplement Table 1 and 2
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	-
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Supplement Table 1 and 2
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	6-9
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	9-13
Limitations	20	Discuss the limitations of the scoping review process.	12
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	9
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	13

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

Supplemental Table 1: Summary of randomized controlled trials

Author (year)	Design Center Country Years Population Analysis Follow-up	Multidisciplinary chronic kidney disease clinic (n)	Comparator (n)	Entry criteria Cr or CrCl or GFR based Cr/CrCl/GFR mean (SD) median (IQR) proteinuria	Follow-up visits Laboratory testing frequency	Outcomes **bold = statistically significant**	Other
			RCT				
Harris[1] (1998)	RCT 4 centers U.S 1989 CKD ITT Cox PH model adjusted for age, sex, race, Cr, laboratory, vital signs, diagnoses 2 years, 5 years	Nephrology case management clinic = Nephrologist or nephrology fellow, nurse, dietician, social worker (206)	General medicine practice (231)	CrCl<50ml/min/1.73m2 and Cr>1.4mg/dL 2.1 (0.9) 34 (10)	q6 months if ≤3mg/dL q4 months if >3, ≤4mg/dL q3 months if >4mg/dL NR	1=SCr, eGFR, health care utilization (**outpatient**, ER, inpatient visits) 2=weight, SBP, DBP, ACE, **CCB**, cimetidine, NSAID, sulfa, mortality	SOP standardized letter
Barrett[2] (2011) Hopkins[3] (2011) costs, cost-effectiveness CanPREVENT	RCT 5 centers Canada 2005-2008 CKD GEE GLM for repeated measures median 742 days	Nurse-coordinated care focused on risk factor modification with medical protocols, working closely with nephrologist with referral to dietician, social workers, diabetes educators, other professionals (238)	Usual care by family doctor with specialists and allied health personnel if necessary (236)	Age 40-75 years, eGFR 25-60 ml/min/1.73m² 128 (114, 143) 42 (37, 46) 0.12g/day (0.08, 0.22)	q4 months NR	targets: BP<130/80, RAAS, proteinuria, LDL<2.5, APA if IHD or DM, HGBA1C<7%, HCO3>22, P<1.8, HGB>105, TSAT>20%, smoking cessation, KDQOL-SF, WHOQOL-BREF, **HUI MARK 3**, resource utilization, satisfaction **kidney function**, kidney and CV adverse events, QOL, ER visits, **hospitalizations, family physician, specialist,**	Protocols for BP, RAAS, dyslipidemia, anemia, MBD, APA, BB, smoking cessation, diabetes, metabolic acidosis, diet

Study	Design	Intervention	Control	Population	Assessment	Outcomes	Intervention details
van Zuilen[4] (2012) Peeters[5] (2014) MASTERPLAN	RCT 9 centers 2004-2010 Netherlands CKD Cox PH models GEE ITT 4.62 years 4.83 years (4.44-5.36) KMC, Cox proportional hazard model adjusted for SCr, linear mixed effects model for eGFR median 5.7 years	Nurse practioner supervised by a qualified nephrologist (395)	Specialist physician care alone -frequency of visits up to the treating physician but yearly visits (393)	CrCl 20-70ml/min 38.4 (15.2) 0.2 (0.1-0.8) 35.9 (14.2) 149mg/g	Study laboratory evaluation, office BP measurements, evaluation of medication use performed at least quarterly F/U by NP as often as considered necessary Annually extensive laboratory measurements	1= composite of MI, ischemic stroke and CVD mortality 2 = vascular interventions, mortality, KRT **SBP, DBP, LDL,** HDL, **C, TG, proteinuria, HGB, anemia,** P, PTH, HGBA1C, phosphate binders, **VDA, APA, statins,** glucose lowering drugs, **antihypertensive drugs,** ACE/ARB, smoking, BMI, Na excretion, physical activity, **outpatient visits, physician visits,** EQ-5D 1=composite of MI, stroke, CV mortality 2=**composite of death, ESRD, 50% increase in SCr** and individually, **eGFR**	guidelines and treatment goals applied to all patients lifestyle intervention (physical activity, nutritional counseling, weight reduction, smoking cessation) specified mandatory medication (statin, ACE/ARB, VDA, ASA) Implementation of current guidelines (Supplementary Table 1) self-management
Howden[6] (2013) Howden[7] (2015) LANDMARK 3	RCT 1 center Australia 2008-2010 CKD PPA Pearson and Spearman correlations	Nurse-led multidisciplinary team: nurse practitioner, dietician, exercise physiologist, diabetes educator, psychologist, social worker (41)	Standard nephrologic care, lifestyle modification but no specific information or education, referral to allied health	Age 18-75 years, eGFR 25-60 ml/min/1.73m^2, one or more uncontrolled CV risk factors (BP>target, BMI>25kg/m^2,	NR NR	1= **change in peak VO2** 2= **weight**, BMI, **waist**, SBP, DBP, cardiac function, arterial stiffness, ventricular-vascular coupling, Cr, eGFR, albumin, fasting glucose, HGBA1C,	exercise training = 150 minutes of moderate exercise with 8 weeks supervised by clinical exercise physiologist lifestyle intervention = 4 weeks of group behaviour and lifestyle modification by dietician, psychologist

	Linear mixed effects model repeated-measures analysis 12 months		member on ad hoc basis (42)	HGBA1C>7%, lipids>target) 38.4 (8.8)		lipids, TTE, dietary assessment **Peak METs**, peak SBP, **peak DBP**, peak HR, **6MWT, muscle strength (hand-grip dynamometer)**, muscular power (Timed Get-Up-And-Go test), self-reported activity, adherence, adverse events, biochemical (Cr, eGFR, ACR, PCR, HGB, cholesterol, A1C, FBG, CRP) **anthropometry** (weight, **BMI**), SBP, DBP, **number of antihypertensives**, interactions with nephrologist, **nurse, dietician, psychologist**	Standard protocol for risk factors NP: education about exercise safety Diabetes educator: hypoglycemia Exercise prescription: 8 weeks supervised exercise training, 10 months home-based training with aerobic, resistance training
Ishani[8] (2016)	RCT 2 centers U.S 2012 CKD ITT Cox proportional hazards models 1 year	LifeView; American TeleCare with video monitoring device, peripherals (BP cuff, scale, glucometer, pulse oximeter, stethoscope) broadband with nephrologist, nurse practitioner, nurse, clinical pharmacy specialist, psychologist, social worker, telehealth care technician, dietician (451)	CKD education class, follow-up with primary care providers with or without nephrologist (150)	Patients older than 18 with eGFR<60ml/min/1.73m^2 37(9) 321 (815) mg/g	Frequency of monitoring was intensified was intensified following hospitalizations until patients returned to their baseline states, review q30 days NR	1=composite of death, hospitalization, ER visits, admission to skilled nursing facility 2= individual components of primary endpoint, incidence of ESRD	Comprehensive care of CKD and comorbid conditions: blood pressure, volume status, proteinuria, DM, lipid levels, depression, health literacy, patient activation, lifestyle modification (physical activity, diet, weight reduction, smoking cessation), education program, self-monitoring strategy, video conferencing acutely and routinely, periodic clinic visits, review after each ER visit or hospitalization Telemonitoring nurses: vital signs, virtual visits to review the clinical situation

							nurses, clinical pharmacy specialist = medication management
Fishbane[9] (2017)	RCT 3 centers U.S. 2013-2014 CKD ITT negative binomial model 18 months	Healthy Transitions program = nurse care managers, informatics system with protocols with daily reports on process steps, medical issues with home visits (65)	Usual care by their nephrologist (65)	Older than 18 years with eGFR 0-30ml/min/1.73m^2 18.5 (6.4) NR	monthly telephone visits or more frequently as needed NR	1= **hospitalization rate** 2 = **home modality (PD or HHD), vascular access for HD,** preemptive kidney transplants, ambulatory starts, **composite outcomes**	initial home visit (education, self-management, dietary education including Na intake and food labels, medication reconciliation, home safety including falls, modality discussions), daily weights
Fogelfeld[10] (2017)	RCT 1 hospital system U.S. 2007-2013 Diabetic nephropathy t test, Mann-Whitney, Chi square, Cox proportional hazard ratio, Kaplan-Meier 2 years	Multifactorial-multidisciplinary intervention targeting tight control of blood pressure, glycemia, lipid control, and albuminuria. Combined visits with endocrinologist, nephrologist, nurse practitioner, certified diabetes educator/dietitian and research coordinator (60)	Usual care by their nephrologist and endocrinologist separately (60)	T2DM, age 18-70, CKD 3-4, proteinuria/albuminuria eGFR 37.95 (10.74) ACR (mg/g) 853.4 (121-2461)	Visits monthly for the first 6 months then bimonthly for the next 18 months for total 15 visits over 2 year intervention, Labs q 6 months	1= **Development of ESRD** 2= Achievement of risk factor target (blood pressure, **glycemia**, lipids, and **albuminuria**) Safety measures (hypoglycemia, **hyperkalemia**)	
Jiamjariyapon[11] (2017)	RCT 2 districts within Thai province Thailand 2011-2013 CKD ITT Cox-proportional hazards model 2 years	Integrated CKD care program District hospital based - Two general practitioners, two chronic care nurses, pharmacist, nutritionist, physical therapist and community care network made up of village health	Standard care (208)	Age 18-70, CKD 3-4, diabetes and/or hypertension eGFR 41.2 (10.3) uPCR (mg/g) 442.4	Hospital visits and home visits q 3 months Labs at enrolment, 1 month and every 3 months there after	1= **difference of mean eGFR** 2= laboratory parameters (**HbA1C, triglycerides, 24-h urine Na, 24-h urine protein, blood pressure, serum bicarbonate**, uPCR, LDL), mortality, CV events, ESRD, 50% increase in serum creatinine from baseline,	Intervention included live demonstration of optimal diets, medication and exercise. Community care network members received four day CKD training-course. Home visit by community care network included 24-h dietary recall, BP measurement, medication compliance monitoring, avoidance of nephrotoxins and exercise behavior

		volunteers and selected family members (234)				**composite (CV events, ESRD , 50% increase in Cr)**	

Note: Cr = creatinine, CrCl = creatinine clearance, GFR = glomerular filtration rate, SD = standard deviation, IQR = interquartile range, RCT = randomized controlled trial, U.S = United States. CKD = chronic kidney disease, ITT = intention to treat, PH = proportional hazards, NR = not reported, ER = emergency room, SBP = systolic blood pressure, DBP = diastolic blood pressure, ACE = angiotensin converting enzyme, CCB = calcium channel blocker, NSAID = non-steroidal anti-inflammatory drug, SOP = standardized operating procedure, GEE = generalized estimating equation, GLM = generalized linear model, eGFR = estimated glomerular filtration rate, RAAS = renin angiotensin aldosterone system, LDL = low density lipoprotein, APA = antiplatelet agent, IHD = ischemic heart disease, DM = diabetes, HGBA1C = hemoglobin A1C, HCO3 = bicarbonate, P = phosphate, HGB = hemoglobin, TSAT = transferrin saturation, BP = blood pressure, MBD = mineral bone disorder, BB = beta blocker, KMC = Kaplan Meier curve, NP = nurse practitioner, MI = myocardial infarction, CVD = cardiovascular disease, KRT = kidney replacement therapy, HDL = high density lipoprotein, C = cholesterol, TG = triglycerides, PTH = parathyroid hormone, VDA = vitamin D analogue, ARB = angiotensin II receptor blocker, BMI = body mass index, Na = sodium, ESRD= end stage renal disease, PPA = per protocol analysis, VO2 = oxygen consumption, TTE = transthoracic echocardiogram, METs = metabolic equivalents, 6MWT = 6 minute walk test, ACR = albumin to creatinine ratio, PCR = protein to creatinine ratio, FBG = fasting blood glucose, CRP = C reactive protein, PD = peritoneal dialysis, HHD = home hemodialysis, HD = hemodialysis

Supplemental Table 2: Summary of non-randomized interventional and observational studies

Author (year)	Design Center Country Years Population Analysis Follow-up	Multidisciplinary chronic kidney disease clinic (n)	Comparator (n)	Entry criteria Cr or CrCl or GFR based Cr/CrCl/GFR mean (SD) median (IQR) proteinuria	Follow-up Laboratory	Outcomes **bold = statistically significant**	Other
Levin[12] (1997)	Retrospective 2 centers Canada 1992-1995 1991-1993 Incident dialysis NR	Predialysis clinic dialysis physician, renal nurse coordinator, social worker, renal dietician = 1 visit and F/U with nephrologist (37+141)	Usual standard of individualized physician care = nephrologist or general practitioner Historic data: 3 months prior to initiating clinic (39+60)	Incident dialysis N/A N/A	Frequency of visits and laboratory tests is predetermined based on the level of renal function and in accordance with reasonable clinical practice q2,3,6 months	1=**urgent/elective dialysis starts, training as outpatients**, **hospital days, admissions in 1st month of dialysis** 2=BP, **MAP, HGB, Ca**, P, urea, PTH, modality 1= **vascular access**, dialysis starts 2= LOS at dialysis initiation	Multidisciplinary clinic-based education and follow-up program Standardized education program (renal function, BP, bone disease, diets) with initial visit 3 hours, subsequent 1.5 hours with equal time nurse educator, physician, social worker, nutritionist Multidisciplinary ESRD team, renal education (living with ESRD, nutrition, medications) with 1st visit physician, nurse, dietician (all 30 minutes each), social worker (1 hour)
Ravani[13] (2003)	Retrospective 2 centers Italy 1999-2002 Incident dialysis KMC, LRT, Cox PH regression analysis, >3 months 32.7 months	NR (93)	Renal outpatient clinic according to current clinical practice, usually with no standardized approach (52 traditional +84 late referrals)	Incident dialysis N/A N/A	Predefined stepwise progressively intense follow-up as renal function deteriorated	**survival,** albumin, **HGB, unplanned start,** PD **HR PEP vs late referral 0.30 (0.18-0.52)**	N/A

Goldstein[14] (2004)	Retrospective Single center Canada 1998-2000 Incident dialysis KMC, LRS, Cox regression model with propensity scores, censoring for transplant, death 2012	At least 3 months Progressive Renal Disease Clinic (PRDC) dietician, nephrologist, nurse educator, pharmacist, social worker, trained peer-support volunteers (61)	No PRDC (26)	Incident dialysis N/A N/A	NR NR	**vascular access**, SBP, DBP, PP, BP medications, **ACE, iron,** ESA, CaCO3, VDA, **NaHCO3, albumin, Ca,** P, HGB, HCT, ferritin, PTH, CO2, **hospital days, mortality**	Goals of clinic: reduce the rate of decline in kidney function, manage sequelae of CRI, education regarding modalities and transplantation, access, transition
Curtis[15] (2005)	Retrospective 2 centers Canada, Italy 1997-1998 1999-2002 Incident dialysis Multiple linear regression, KMC, LRS, Cox PH modeling median 14 months after dialysis start	Canada: nurse educator, physician, social worker, nutritionist, pharmacist Italy: nephrologist, nurse and nutritionist, psychologist and social worker when necessary (132)	Standard nephrologist office care (156)	Incident dialysis N/A N/A	The frequency of both visits and laboratory tests is predetermined based on the level of kidney function.	**HGB, albumin, Ca,** P, **survival**	Educational programmes as well as regular, protocolized clinic and laboratory follow-up Exposure to each individual is based on varied depending on the GFR Approximately 1.5 hours per visit with a 2 hour specialized educational session or 3 x 2 hours educational dialysis orientation meetings
Thanamayooran[16] (2005)	Retrospective Single center Canada 1998-1999 CKD ANOVA, paired t-tests, KMC, Chi squared analyses 4 years	Nurses, nurse-educators, social workers, dieticians, nephrologists (340) F/U in clinic	N/A	Cr>140 micromol/L for men, Cr>105 micromol/L for women approximately eGFR<60ml/min/1.73m2 274 (160) NR 4358mg (4822)	GFR 30-60 q annually GFR 15-30 q6 months GFR <15 q3 months NR	**SBP, DBP**, proteinuria, **ACE/ARB**, CrCl, Ca, P, Ca-P, PTH, HCO3, HGB, targets, medications, time to RRT	No protocols but consensus re: tight BP control <130/80, use of ACE/ARB, MBD, acidosis, anemia, access

Hemmelgarn[17] (2007)	Retrospective single health region Canada 2001-2002 CKD KMC, LRT, Cox model with 1:1 propensity matching, censoring NR	1st visit = education by nurse, dietician, social worker, seen by primary nephrologist in follow-up (187)	No MDC (6791) (374 matching)	66 years or older, at least 1 SCr during 6 month period 2001, eGFR<60ml/min/1.73^2 referral by primary nephrologist 13.4% eGFR 30-60ml/min/1.73m^2 86.6% eGFR<30ml/min/1.73m^2 NR	seen by primary nephrologist q3-6 months bloodwork q1-3 months	**1=mortality** 2=all cause hospitalization, CV hospitalization (MI, CHF, CVA, TIA)	Education includes a discussion of CKD and its progression and complications, fluid and dietary restrictions, BP, medications, exercise, diet Focus on medical management, lifestyle modification to delay progression of CKD and target CV risk factor reduction
Lee[18] (2007)	Retrospective Single center U.S. 2000-2005 Incident dialysis Wilcoxon rank sum tests for relative differences, logistic regression adjusted for covariates NR	renal nurse practitioner, nephrologist (77)	Renal-hypertension clinic = not protocol driven but consensus regarding BP, MBD, nutrition, anemia, vascular access (36)	Incident dialysis 16.3 (5.8) N/A	NR NR	SBP, **DBP, HGB, albumin,** Ca, P, GFR, ESA, phosphate binder, **vascular access, dietary counseling, dialysis education, hospitalizations**, death at 1 year	CKD clinic adheres strictly to KDOQI guidelines, renal nurse practitioner addresses psychosocial and learning needs of patients
Murtagh[19] (2007)	Retrospective 4 centers U.K. 2003-2004 Incident dialysis, conservative	Physician, nurse, counsellor, dietician (77)	NR (52)	Predicted to need dialysis within 18 months	NR NR	**1 year 84% vs 68% 2 year 76% vs 47% dialysis vs conservative LRT P<0.0001 Cox PH: modality, ischemic heart disease**	The main difference between dedicated multi-disciplinary pre-dialysis care and general nephrology care is the time and resources available for education and psycho-social support

	Descriptive statistics, MWU, Chi square, KMC, LRT for dialysis vs conservative, Cox PH model						
Wong[20] (2007)	Retrospective Single center U.K. 2003-2006 conservative therapy Cox regression multivariate analysis to study prognostic factors for survival median survival 1.95 years	Consultant nephrologist, renal dietician, anemia specialist nurse, ward link nurse, social worker, community nephrology nurse (home visits), complementary therapy practitioner (73)	N/A	Patients approaching ESRD who chose not to dialyze 371 (184-1205) 12 (4-31) NR	The interval between clinic visits ranged from one week to three months, depending on clinical need NR	N/A	N/A
Friedman[21] (2008)	Retrospective Single center Canada 2002-2005 Incident dialysis t-test, Wilcoxon rank sum test, Pearson's Chi square, Fisher's exact test	(67) Nephrologist, nurse educator, dietician, pharmacist, social worker, trained peer-support volunteers Goldstein et al.	(84) NR Goldstein et al.	Incident in-center hemodialysis NR NR	NR NR	CoCa, P, CaP, PTH CoCa, P, CaP, **PTH** targets at initiation of dialysis, over 1 year	goals = reducing rate of decline in kidney function, managing biochemical/clinical sequelae education regarding RRT, dialysis modality selection, dialysis access, transition
Soares[22] (2008) Also: Soares[23] (2003)	Retrospective Single center Brazil 1990-2005 CKD KMC, log rank test, paired t-test	Pediatric nephrologist, pediatrician, nurses, psychologists, nutritionists, social workers (107) F/U in clinic	N/A	GFR<75% of value expected for age, according to normal reference data 37 (24-48)	Scheduled periodically at approximately 3 month intervals Laboratory evaluation at	progression to stage 5 CKD, GFR, patient survival, HTN, weight for age z-score, height for age z-score, HGB, albumin	anemia, HTN, acidosis, renal osteodystrophy, malnutrition pediatrics, treatment compliance, protocols

Study	Design	Team (post)	Team (pre)	Population/Referral	Follow-up	Outcomes	Intervention components
Soares[24] (2009) Cerqueira[25] (2014) Silva[26] (2015)	>6 months of F/U with median F/U 94 months			NR	approximately 3 month intervals depending on the clinical condition of each patient		
Zhang[27] (2008)	Retrospective China 2006-??? CKD descriptive	Nephrologist, nurse, dietician (1000)	N/A	Stage 1=6% Stage 2=27% Stage 3=33% Stage 4=21% Stage 5=13% NR 31.9%≥1g/day of proteinuria	Stage 1-3 q6 months Stage 4 q3-6 months Stage 5 q1-3 months	Descriptive	nephrologists: diagnosis and treatment nurses: education (medication, lifestyle modifications), self-management dietician: nutrition assessment, diet counseling CKD management protocol = proteinuria, HTN, anemia, MBD, hyperlipidemia, DM, CV disease, modalities, vascular access education by nephrologist, nurse, dietician re: modality, access, diet
Zhang[28] (2009)	Retrospective 2 centers 2000-2007 Canada CKD paired t tests > 6 months of F/U with median F/U 1.57 years	Nephrologists, nurses, dieticians, pharmacists, social workers (940) F/U in clinic	N/A	Stage 4-5 CKD 19.3 (8.4) NR	NR NR	eGFR, **HGB, albumin**, potassium, **phosphorus**, ACE/ARB	Care plans, clinical pathways, multi-dimensional patient-education program
Collister[29] (2010)	Retrospective single center 2007-2009 Canada CKD t-test, chi-square test, multivariate Poisson model	Nurse, dietician, pharmacist, nephrologist (post-intervention) (369)	Nurse, dietician, pharmacist, nephrologist (pre-intervention) (478)	Referral by nephrologist, typically eGFR<30 or high risk of profession to stage 4/5 CKD in the next 6 months	NR NR	**planned HD or PD vs unplanned start or death**, cycle times (nurse, dietician, pharmacist, **nephrologist**), BP control, ACE/ARB, statin, HGB, PTH, **Ca, P,** vascular access referrals,	Figure 5 for SOP's Clinic encounter sheets Sequence Timing: 15 minutes per practitioner

						PD assessments, transplant referrals, **acute starts**	
Fenton[30] (2010)	Retrospective single center 2000-2006 U.K. CKD T test, Wilcoxon rank sum, Chi-square test, KMC, LRT NR >3 months	Nurse led MDC, pre-dialysis nurse, anemia nurse, vascular access nurse supported by vascular surgeon, dietician, social worker, occupational therapy, physician education by nurse average 20 minutes (171)	General nephrology clinic = pre-dialysis nurse, dietician, physician, education by nurse average 15 minutes (194)	Progressive stage 4,5 CKD eGFR<25 (non-diabetics) and eGFR<30 (diabetics) with declining renal function >5ml/1 year or >10ml/5 years NR NR	NR NR	**HGB,** albumin, Ca, P, SPB, DPB, **permanent access, hospital admissions, survival**	guidelines and protocols well-being, medication, fluid status, chemistry, hematology education = modality choice, access, transplantation work-up
Wei[31] (2010)	Retrospective 4 centers 2004-2005 Taiwan incident dialysis patients Mann-Whitney U test, Chi square, multivariate linear regression NR	Nephrologist, renal nurses, dieticians (71)	Nephrologist (69)	NR	F/U with clinical evaluation, laboratory, nursing, dietary education: Stage 3-4 q 3 months Stage 5 q1-2 months	**albumin, HCT,** BUN, Cr, K, eGFR, ESA, **vascular access, hospitalizations, LOS, outpatient visits, outpatient costs, inpatient costs, direct medical costs**	Different goals and education contents, according to stages of CKD and clinical protocols, with a teaching time of 30-45 minutes each clinic visit Goals = slowing down deterioration of renal function, early preparations for dialysis, reducing the risk of complications, smooth and safe transition to dialysis, BP control, diabetes, dyslipidemia, low protein diet, dialysis modality, vascular access, outpatient RRT initiation
Bayliss[32] (2011)	Retrospective 3 centers 2005-2009 U.S. CKD mixed effect modeling with	Nephrologist, pharmacist, diabetes nurse educator, renal dietician, social worker, nephrology nurse (233)	Usual care = shared care between PCP and nephrologist with referrals e.g. diabetes educators, subspecialists (1769)	Adults with stage 3 CKD and either DM or HTN 40.89 (6.54) NR	F/U q1-6 months NR	1=**eGFR** 2=LDL, HGBA1c, percent time at goal BP<130/80	Educational class, educational materials, medication therapy management, medication reconciliation, medical recommendations for HTN, DM, CVD, anemia, bone mineral metabolism,

	multivariable analyses censoring 1.95 years						depression screening PHQ-9, dietary assessment self-management behavioral, lifestyle MDT visits were individualized to meet patient needs because not all patients required all services offered within the team at each visit
Dixon[33] (2011)	Retrospective Single center 2002-2005 U.S incident dialysis Kruskal-Wallis, Mann-Whitney, t-tests >30 days	Registered nurse CCMs and a team of 6 nephrologists with dietician, social worker available as needed (89)	Traditional care with nephrologist with intervention by allied health member if requested (82)	Enrollment in the multidisciplinary CKD care model was at the discretion of the nephrologist NR NR	NR NR	**AVF, CVC**, PD, **hospitalization days, admission, charges 90 days after dialysis, inpatient vs outpatient initiation of dialysis**, 1 year mortality, **HGB, albumin, ESA**	Nursing assessment for psychosocial and educational needs by a CCM Clinical assessment by a nephrologist NKF/KDOQI clinical action plan Discussion between patient, CCM, nephrologist Documentation in template note in electronic record system: anemia, HTN, DM, BMD, proteinuria, nutrition, dyslipidemia, education, KRT plan
Ajarmeh[34] (2012)	Retrospective Single center 2003 vs 2009 Canada CKD Simple linear regression, simple logistic regression, censoring NR	MDC = nephrologist, renal nurse, dietician, pharmacist, social worker, clinic data manager (125)	Prior to MDC (73)	0-18 years stage 3-5 CKD or any child with stage 1-2 CKD who manifests at least 1 comorbidity of CKD 58.8 (25.5) NR	stage 1-2 = q6-12 months stage 3 q3-6 months stage 4-5 q1-3 months NR	**HGB, Ca, albumin**, PTH, phosphate, HCO3, BP, medications, growth (height, weight), **eGFR**, hospitalization	pediatrics

Lim[35] (2012)	Retrospective Single center 2009-2010 Singapore CKD NR 1 year	Nephrologist, clinical pharmacist, renal coordinator, dietician referral if necessary "low clearance clinic" (53)	Nephrologist (96)	renal function<30% of normal age>21, stage 4/5 CKD NR NR	NR NR	**SBP**, DBP, goal BP<130/80, **HGB**, **Ca**, P, PTH, KDOQI targets	goals of clinic = slow the progression of renal disease, optimally manage CKD and its complications, counselling regarding RRT, early referral for vascular access, clinical pharmacy services (medication review, education, counseling, drug related problems, nephrotoxins) SOP for nephrologist, pharmacist, renal coordinator
Luciano[36] (2012)	Retrospective Single center 2008-2011 Brazil CKD Paired Student's t test >3 months 546 (336) days	Nurse, physician, psychologist, nutritionist, social worker (2151) F/U in clinic	N/A	Referral by physicians Stage 1-5 CKD 58.5 (31) 1.04 (1.44)	Monthly NR	Beginning and end of follow-up **SBP, DBP, eGFR, proteinuria, fasting glycemia**, BMI	Nursing: anthropometric data, BP, general instructions regarding CKD BP control<130/80, ACE, ARB, glycemic control, statins, protein restriction, smoking cessation, aerobic physical exercise
Chen[37] (2013)	Prospective 5 centers 2008-2010 Taiwan CKD KMC, LRT, 1:1 matching by propensity score multivariate Cox regression model, censoring F/U March 15, 2011 = 33.1 months	Nephrologist, nurse educator, dietician, social worker, pharmacist, surgeon, case management nurse (528)	Usual care group = PCP, GIM, specialists (endocrinologists, cardiologists, rheumatologists, orthopedics, nephrologists) (528)	age 20-80 with eGFR<60ml/min/1.73m^2 32.7 (12.6) ACR 767.5 (1836.4) PCR 1481.4 (2135.3)	Stage 3,4 q3 months Stage 5 q1 month Uremia q1-2 weeks NR	1=ESRD warranting initiation of RRT**, mortality** 2=hospitalization rate, **rate of eGFR decline**, BP control, laboratory measurements (albumin, lipid profile, HCT, HGBA1C, CaxP, **iPTH**, proteinuria), **PD, temporary catheter,** permanent catheter/AVF	Management and education depending on the different stages of CKD, KDOQI guidelines Medical management and lifestyle intervention CV risk reduction, anemia, MBD, diet Stage 3 = renal function, clinical presentations of CKD and uremia symptoms, risk and deterioration factors and related complications Stage 4 = management of CKD and related complications, dialysis access, indications of RRT initiation Stage 5 = monitoring of renal function and uremic symptoms,

							timing initiation of RRT, care of dialysis access
Lei[38] (2013)	Retrospective Single center 2002-2008 Taiwan Incident dialysis t test, chi square test, linear equation, univariate, multivariate logistic regression	nephrologist, nephrology nurse educator, renal dietician (136)	Nephrologist (88<1 year) (83>1 year)	age 18-90 with eGFR<15ml/min/ 1.73m^2 by MDRD NR NR	clinical evaluation, laboratory examinations, nursing, dietary education q1-2 months	MDC vs non-MDC **temporary catheter, total medical costs (hospitalization, medicine, surgery,** EKG, angiography, **ward,** nursing, **HD)** <1 year vs > 1year MDC **HGB, albumin**, Ca, P **eGFR**	CKD education program A standardized curriculum and prespecified educational topics were delivered systematically with a teaching time of around 30–40 minutes at each visit. Monitoring for uremic complications, early referral for creation of dialysis access, pretransplant assessment, timely initiation of RRT
Lin[39] (2013)	Retrospective 27 centers 2007-2010 Taiwan CKD >12 weeks of MDC median F/U 12 months Chi square test, ANOVA, Cox PH model	Nephrologist, nurse, dietician (4061) F/U in clinic	N/A	Stage 3b,4,5 CKD 22.4 (11.0) 26% stage 3b 37.3 (4.4) 44% stage 4 22.5 (4.3) 31% stage 5 10.1 (2.9)	Follow-up Stage 3b = 12 weeks Stage 4 = 8 weeks Stage 5 = 4 weeks or when necessary Bloodwork q12 weeks or when necessary	0.2%, 17.5%, 64.7% progressed to ESRD 0.47, -1.27, -2.69ml/min/1.73m2 GFR decline per year Predictors of dialysis = eGFR, , age, male, SBP, HCT, albumin, DM	Control of BP, sugar, lipid by counseling and medication, low protein diet, selection of appropriate dialysis modality, early preparation of dialysis access, outpatient dialysis treatment
Rognant[40] (2013)	Prospective Multicenter 2004-2009 France Incident dialysis 12 months pre/post t-tests, z-tests, KMC, LRT, conditional	NR (40)	Standard care: periodic visits, biologic assays with frequency based on level of GFR (120)	14.2 (4.5) NR	Frequency of monitoring is based on level of severity of CKD	1=CV event (MI, CHF, stroke), lower limb ischemia/amputation, CV death 2 = death, **hospitalizations, eGFR slope, visits**, RAAS, BB, APA, lipid lowering drugs, ESA, iron, Ca, VDA, calcimimmetic,	Standardized protocols Contacted by telephone when nonattendance at consultations Educational sessions on a voluntary basis Nurse rather than physician gave information and preparation for dialysis

						SBP, DBP, BP<130/80, BP<140/90, **Cr, eGFR,** K, urea, HCO3, Ca, Ca target, **P, P target,** albumin, **albumin target**, HGB, HGB target, **frequency of tests,** information, education session, unplanned 1st dialysis, HD, PD, first dialysis access, hospital vs out-of-hospital vs self-dialysis, transplant waiting list	
logistic regression							
Chen[41] (2014)	Retrospective 5 centers 2005-2009 Taiwan incident dialysis multivariate, GLM, Tobit regression, KMC, LRT, multivariate Cox regression 33.6 months	Nephrologist, nurse educator, dietician, social worker, pharmacist, surgeon, case management nurse (391)	Usual care group (endocrinologists, cardiologists, nephrologists) (431)	Patients aged 18 years or older who were on maintenance RRT (HD or PD)\n\nNR\nNR	NR\n\nNR	**PD, temporary catheter,** initial dialysis admission, **hospitalization rate, decline in eGFR 1 year prior to RRT,** mortality, **costs**	management and education was dependent on the different stage of CKD, KDOQI guidelines
Brown[42] (2015)	Retrospective Single center Canada 2010-2013 CKD t-test, Chi square test, logistic regression 1.01 years	Physician, nurse, dietician at every visit, pharmacist, social worker as needed (649) F/U in clinic	N/A	Discretion of primary nephrologist but referral suggested with eGFR<25ml/min/1.73m2\n\n17.7 (5.9) 222 (321) mg/mmol	visits q2 weeks to minimum 2x per year, interval is left to the discretion of the physician\n\nNR	Predictors of unplanned dialysis = BMI, CHF, HTN	N/A
Chen[43] (2015)	Retrospective Single center	ESRD multidisciplinary care	Nephrology outpatient clinic	Ages 18-80 yes with CKD 3B-5	visits q1-3 months,	1= mortality, **initiation of RRT** (HD, PD,	The nursing staff conducted a detailed interview with the

23

	Taiwan 2007-2009 CKD December 31, 2012 median F/U 2.43 years t-tests, chi-square tests, MWU test, Poisson test, Fine and Gray proportional hazards model, censoring >3 months	program = nephrologists, nurses, dieticians, pharmacists (592)	ICD 9 coding 585, 582 matched by CKD stage, age, sex, diabetes (614)	= eGFR<45, requested by the physician to join the program 22.41 (11.64) 1.230 (0.499-2.748)	nursing education q 3 months laboratory q 3 months	transplant), **emergency, vascular access 2= eGFR, phosphate,** HGB, PCR, albumin, BP, **CV hospitalization, infection hospitalization, ER visits, costs**	patients, consisting of basic knowledge of CKD, lifestyle modification, clarifying risk factors, and condition of ESRD Stage 5 CKD = dialysis education regarding modality of RRT
Tsai[44] (2015)	Retrospective Single center 2009-2013 Taiwan CKD t test, Chi square test, multiple logistic regression >12 months June 2013 21.4 (3.3) months	Nephrologist, nephrology nurse educator, social worker, pharmacy specialist, surgeon (437) F/U in clinic	N/A	NR Cr 2.48 (1.24) PCR 0.94 (2.3)	Stage 3,4 q3 months Stage 5 at least q1 month Uremia q1-2 weeks However, q3 months due to poor compliance and reimbursement policy NR	N/A	medical management and lifestyle modification management and education according to CKD stages KDOQI guidelines
Sood[45] (2017)	Retrospective Single center 2010-2015 Canada CKD Descriptive statistics Median follow-up 548 days	Multidisciplinary CKD clinic Nephrologist, nurse, dietitian, pharmacist, social worker (1203) F/U in clinic	N/A	Age >18 eGFR <30 ml/min/m2 or rapid decline eGFR 16.8 ml/min/m2 (5.5) N/A	Visits averaged every 3 months	N/A	Multidisciplinary CKD clinic had standardized procedures for vaccinations and physician consensus regarding anemia management, preferred medications and BP targets.

							Primary outcome was association of blood pressure components with eGFR decline
Lin[46] (2018)	Retrospective Nationwide 2007-2009 Taiwan Incident HD Chi square test, t test, Wilcoxon sum-rank test, propensity score, multiple logistic regression, Cox regression hazard ratio 1 year prior to HD and 3 years post-HD	Pay for performance (P4P) pre-ESRD program. Program required nephrologist, nurse and dietitian (6781)	Usual care (19807)	Entry at time of long-term (>3 months) dialysis initiation, retrospective to 1 year prior to HD N/A N/A	Not standardized Averaged labs 8 times per year in P4P group	Pre-dialysis care (**Frequency of eGFR measurement, screening for CKD complications**, **vascular access preparation pre-HD**, **dialysis initiation without hospitalization**, **use of a temporary catheter**, **use of AV fistula**) Health care utilization (**outpatient visits, ER visits**, inpatient visits and **length of stay**) Health care expenditure (**annual expenses of outpatient visits, inpatient visits, all medical visits**) **Mortality**	Nationwide insurance program, pay for performance pre-ESRD care with voluntary entrance. P4P team receives bonus if patient meets quality indicators (CKD management, patient education, continuous care, remission of proteinuria, maintenance of renal function)
Rinfret[47] (2018)	Retrospective Single center Cross-sectional cohort on July 16, 2014 Canada CKD Descriptive statistics No follow-up	CKD clinic – nephrologist, nurse, social worker, nutritionist, psychologist (128) F/U in clinic	N/A	eGFR <20 ml/min/m2 14.0 (4.7) N/A	Visits every 1-6 months depending on severity Blood work done monthly	N/A	N/A

Note: Cr =creatinine, CrCl = creatinine clearance, GFR = glomerular filtration rate, SD = standard deviation, IQR = interquartile range, NR = not reported, F/U = follow-up, N/A = not applicable, MAP = mean arterial pressure, HGB = hemoglobin, Ca = calcium, P = phosphate, PTH = parathyroid hormone, LOS = length of stay, BP = blood pressure, ESRD = end stage renal disease, KMC = Kaplan Meier curve, LRT = log rank test, PH = proportional hazards, PD = peritoneal

dialysis, HR = hazard ratio, PEP = pre-dialysis education program, LRS = log rank statistic, SBP = systolic blood pressure, DBP = diastolic blood pressure, PP = pulse pressure, ACE = angiotensin converting enzyme, ESA = erythropoietin stimulating agent, $CaCO_3$ = calcium carbonate, VDA = vitamin D analogue, $NaHCO_3$ = sodium bicarbonate, HCT = hematocrit, CO_2 = carbon dioxide, CRI = chronic renal insufficiency, CKD = chronic kidney disease, ANOVA = analysis of variance, ARB = angiotensin II receptor blocker, CV = cardiovascular, MI = myocardial infarction, CHF = congestive heart failure, CVA = cerebrovascular accident, TIA = transient ischemic attack, U.S. = United States, U.K. = United Kingdom, MWU = Mann-Whitney U test, RRT = renal replacement therapy, HTN = hypertension, MBD = mineral bone disorder, DM = diabetes, HD = hemodialysis, PD = peritoneal dialysis, SOP's = standardized operating procedures, MDC = multidisciplinary clinic, BUN = blood urea nitrogen, K = potassium, LDL = low density lipoprotein, PCP = primary care provider, HGBA1C = hemoglobin A1C, CCM = clinical care manager, AVF = arteriovenous fistula, CVC = central venous catheter, NKF/KDOQI = National Kidney Foundation/Kidney Disease Quality Outcomes Initiative, KRT = kidney replacement therapy, BMI = body mass index, ACR = albumin to creatinine ratio, PCR = protein to creatinine ratio, EKG = electrokardiogram, GLM = generalized linear model, ICD = International Classification of Diseases, ER = emergency room

Supplemental References

1. Harris LE, Luft FC, Rudy DW, Kesterson JG, Tierney WM. Effects of multidisciplinary case management in patients with chronic renal insufficiency. *Am J Med.* 1998;105(6):464-471.
2. Barrett BJ, Garg AX, Goeree R, et al. A nurse-coordinated model of care versus usual care for stage 3/4 chronic kidney disease in the community: a randomized controlled trial. *Clinical Journal of The American Society of Nephrology: CJASN.* 2011;6:1241-1247.
3. Hopkins RB, Garg AX, Levin A, et al. Cost-effectiveness analysis of a randomized trial comparing care models for chronic kidney disease. *Clin J Am Soc Nephrol.* 2011;6(6):1248-1257.
4. van Zuilen AD, Bots ML, Dulger A, et al. Multifactorial intervention with nurse practitioners does not change cardiovascular outcomes in patients with chronic kidney disease. *Kidney Int.* 2012;82(6):710-717.
5. Peeters MJ, van Zuilen AD, van den Brand JA, et al. Nurse practitioner care improves renal outcome in patients with CKD. *J Am Soc Nephrol.* 2014;25(2):390-398.
6. Howden EJ, Leano R, Petchey W, Coombes JS, Isbel NM, Marwick TH. Effects of exercise and lifestyle intervention on cardiovascular function in CKD. *Clinical Journal of The American Society of Nephrology: CJASN.* 2013;8:1494-1501.
7. Howden EJ, Coombes JS, Strand H, Douglas B, Campbell KL, Isbel NM. Exercise training in CKD: efficacy, adherence, and safety. *American Journal of Kidney Diseases.* 2015;65:583-591.
8. Ishani A, Christopher J, Palmer D, et al. Telehealth by an Interprofessional Team in Patients With CKD: A Randomized Controlled Trial. *American Journal of Kidney Diseases.* 2016;68:41-49.
9. Fishbane S, Agoritsas S, Bellucci A, et al. Augmented Nurse Care Management in CKD Stages 4 to 5: A Randomized Trial. *Am J Kidney Dis.* 2017;70(4):498-505.
10. Fogelfeld L, Hart P, Miernik J, et al. Combined diabetes-renal multifactorial intervention in patients with advanced diabetic nephropathy: Proof-of-concept. *Journal of Diabetes and its Complications.* 2017;31(3):624-630.
11. Jiamjariyapon T, Ingsathit A, Pongpirul K, et al. Effectiveness of Integrated Care on Delaying Progression of stage 3-4 Chronic Kidney Disease in Rural Communities of Thailand (ESCORT study): a cluster randomized controlled trial. *BMC Nephrology.* 2017;18(1):83.
12. Levin A, Lewis M, Mortiboy P, et al. Multidisciplinary predialysis programs: quantification and limitations of their impact on patient outcomes in two Canadian settings. *American Journal of Kidney Diseases.* 1997;29:533-540.
13. Ravani P, Marinangeli G, Tancredi M, Malberti F. Multidisciplinary chronic kidney disease management improves survival on dialysis. *Journal of nephrology.* 2003;16:870-877.
14. Goldstein M, Yassa T, Dacouris N, McFarlane P. Multidisciplinary predialysis care and morbidity and mortality of patients on dialysis. *American Journal of Kidney Diseases.* 2004;44:706-714.
15. Curtis BM, Ravani P, Malberti F, et al. The short- and long-term impact of multi-disciplinary clinics in addition to standard nephrology care on patient outcomes. *Nephrol Dial Transplant.* 2005;20(1):147-154.

16.   Thanamayooran S, Rose C, Hirsch DJ. Effectiveness of a multidisciplinary kidney disease clinic in achieving treatment guideline targets. *Nephrol Dial Transplant.* 2005;20(11):2385-2393.
17.   Hemmelgarn BR, Manns BJ, Zhang J, et al. Association between multidisciplinary care and survival for elderly patients with chronic kidney disease. *Journal of the American Society of Nephrology.* 2007;18:993-999.
18.   Lee W, Campoy S, Smits G, Vu Tran Z, Chonchol M. Effectiveness of a chronic kidney disease clinic in achieving K/DOQI guideline targets at initiation of dialysis--a single-centre experience. *Nephrol Dial Transplant.* 2007;22(3):833-838.
19.   Murtagh FE, Marsh JE, Donohoe P, Ekbal NJ, Sheerin NS, Harris FE. Dialysis or not? A comparative survival study of patients over 75 years with chronic kidney disease stage 5. *Nephrology Dialysis Transplantation.* 2007;22:1955-1962.
20.   Wong CF, McCarthy M, Howse ML, Williams PS. Factors affecting survival in advanced chronic kidney disease patients who choose not to receive dialysis.Erratum appears in Ren Fail. 2008;30(3):343]. *Renal failure.* 2007;29:653-659.
21.   Friedman O, Wald R, Goldstein MB. The impact of prior multidisciplinary predialysis care on mineral metabolic control among chronic hemodialysis patients. *Nephron.* 2008;110:c229-234.
22.   Soares CM, Diniz JS, Lima EM, et al. Clinical outcome of children with chronic kidney disease in a pre-dialysis interdisciplinary program. *Pediatric Nephrology.* 2008;23:2039-2046.
23.   Soares CM, Oliveira EA, Diniz JS, Lima EM, Vasconcelos MM, Oliveira GR. Predictive factors of progression of chronic renal insufficiency: a multivariate analysis. *Pediatric Nephrology.* 2003;18:371-377.
24.   Soares CM, Diniz JS, Lima EM, et al. Predictive factors of progression to chronic kidney disease stage 5 in a predialysis interdisciplinary programme. *Nephrol Dial Transplant.* 2009;24(3):848-855.
25.   Cerqueira DC, Soares CM, Silva VR, et al. A predictive model of progression of CKD to ESRD in a predialysis pediatric interdisciplinary program. *Clinical Journal of The American Society of Nephrology: CJASN.* 2014;9:728-735.
26.   Silva VR, Soares CB, Magalhaes JO, et al. Anthropometric and biochemical profile of children and adolescents with chronic kidney disease in a predialysis pediatric interdisciplinary program. *Thescientificworldjournal.* 2015;2015:810758.
27.   Zhang AH, Zhong H, Tang W, et al. Establishing a renal management clinic in China: initiative, challenges, and opportunities. *International Urology & Nephrology.* 2008;40:1053-1058.
28.   Zhang AH, Tam P, LeBlanc D, et al. Natural history of CKD stage 4 and 5 patients following referral to renal management clinic. *International Urology & Nephrology.* 2009;41:977-982.
29.   Collister D, Rigatto C, Hildebrand A, et al. Creating a model for improved chronic kidney disease care: designing parameters in quality, efficiency and accountability. *Nephrology Dialysis Transplantation.* 2010;25:3623-3630.
30.   Fenton A, Sayar Z, Dodds A, Dasgupta I. Multidisciplinary care improves outcome of patients with stage 5 chronic kidney disease. *Nephron.* 2010;115:c283-288.
31.   Wei SY, Chang YY, Mau LW, et al. Chronic kidney disease care program improves quality of pre-end-stage renal disease care and reduces medical costs. *Nephrology.* 2010;15:108-115.

32.   Bayliss EA, Bhardwaja B, Ross C, Beck A, Lanese DM. Multidisciplinary team care may slow the rate of decline in renal function. *Clinical Journal of The American Society of Nephrology: CJASN.* 2011;6:704-710.
33.   Dixon J, Borden P, Kaneko TM, Schoolwerth AC. Multidisciplinary CKD care enhances outcomes at dialysis initiation. *Nephrology Nursing Journal: Journal of the American Nephrology Nurses' Association.* 2011;38:165-171.
34.   Ajarmeh S, Er L, Brin G, Djurdjev O, Dionne JM. The effect of a multidisciplinary care clinic on the outcomes in pediatric chronic kidney disease. *Pediatric Nephrology.* 2012;27:1921-1927.
35.   Lim S, Lee JJ, Subramanian S, How P. Multidisciplinary clinic for patients with newly diagnosed chronic kidney disease. *American Journal of Health-System Pharmacy.* 2012;69:2034-2038.
36.   Luciano Ede P, Luconi PS, Sesso RC, et al. Prospective study of 2151 patients with chronic kidney disease under conservative treatment with multidisciplinary care in the Vale do Paraiba, SP. *Jornal Brasileiro de Nefrologia.* 2012;34:226-234.
37.   Chen YR, Yang Y, Wang SC, et al. Effectiveness of multidisciplinary care for chronic kidney disease in Taiwan: a 3-year prospective cohort study. *Nephrology Dialysis Transplantation.* 2013;28:671-682.
38.   Lei CC, Lee PH, Hsu YC, et al. Educational intervention in CKD retards disease progression and reduces medical costs for patients with stage 5 CKD. *Renal failure.* 2013;35:9-16.
39.   Lin CM, Yang MC, Hwang SJ, Sung JM. Progression of stages 3b-5 chronic kidney disease--preliminary results of Taiwan national pre-ESRD disease management program in Southern Taiwan. *Journal of the Formosan Medical Association.* 2013;112:773-782.
40.   Rognant N, Alamartine E, Aldigier JC, et al. Impact of prior CKD management in a renal care network on early outcomes in incident dialysis patients: a prospective observational study. *BMC Nephrology.* 2013;14:41.
41.   Chen YR, Yang Y, Wang SC, et al. Multidisciplinary care improves clinical outcome and reduces medical costs for pre-end-stage renal disease in Taiwan. *Nephrology.* 2014;19:699-707.
42.   Brown PA, Akbari A, Molnar AO, et al. Factors Associated with Unplanned Dialysis Starts in Patients followed by Nephrologists: A Retropective Cohort Study. *PLoS ONE Electronic Resource].* 2015;10:e0130080.
43.   Chen PM, Lai TS, Chen PY, et al. Multidisciplinary care program for advanced chronic kidney disease: reduces renal replacement and medical costs. *American Journal of Medicine.* 2015;128:68-76.
44.   Tsai MH, Fang YW, Wang LH, You XG, Leu JG. Unexpected Return for Follow-up During the First Year of Multidisciplinary Care May Be Predictive of Rapid Deterioration of Renal Function. *Medicine.* 2015;94:e1731.
45.   Sood MM, Akbari A, Manuel D, et al. Time-Varying Association of Individual BP Components with eGFR in Late-Stage CKD. *Clin J Am Soc Nephrol.* 2017;12(6):904-911.
46.   Lin MY, Cheng LJ, Chiu YW, et al. Effect of national pre-ESRD care program on expenditures and mortality in incident dialysis patients: A population-based study. *PLoS ONE.* 2018;13 (6) (no pagination)(e0198387).

47.   Rinfret F, Lambert F, Youmbissi JT, et al. Cross-Sectional Assessment of Achievement of Therapeutic Goals in a Canadian Multidisciplinary Clinic for Patients With Advanced Chronic Kidney Disease. *Can J Kidney Health Dis.* 2018;5:2054358118775097.