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Electronic Supplementary Material Methods and Results

This supplement includes additional information relating to the methods and results for the dialysis attendance and health care utilisation analysis including cohort definition and data management.

Setting

Most of the Northern Territory in Australia is classified as remote and very remote according to the Australian Statistical Geography Standard (1) which classifies areas according to degrees of remoteness. Only Darwin is identified as Outer Regional. For the purposes of this study and ease of differentiation between services, we classified treatment locations into three categories (urban, rural and remote) based on access to health services and the Australian Governments classification of hospitals (2):

- Urban: Darwin and Alice Springs serviced by Principal Referral or Acute Group A Hospitals.
- Rural: Katherine and Tennant Creek serviced by small Acute Group C Hospitals
- Remote: all other treatment centres without hospitals.

Methods

Australia’s health system is a mixture of publicly and privately funded services. Dialysis treatments in the Northern Territory are fully publicly funded under a case mix model based on coded discharge hospital data. All haemodialysis treatments, including those conducted in satellite facilities, are entered into the NT Department of Health’s (DoH) Admitted Patient Care (APC) (hospital) dataset. There is only one private hospital in the NT, which does not provide dialysis treatments. Therefore the capture of dialysis activity in the NT is considered to be comprehensive and robust.

The full database population for this study was derived from the DoH’s APC (hospital) dataset combined with the Australia and New Zealand Dialysis Transplant Registry (ANZDATA) dataset.

The APC hospital dataset contains individual episodes of patient care for the five (public) parent hospitals and several satellite services in the NT, from the beginning of consistent electronic record keeping (1991). It includes demographic details of the individual (age, ethnicity, residence) and the hospital (hospital code, ward/s), as well as admission/separation codes and diagnosis and procedure codes (primary and up to 49 secondary codes) based on the International Classification of Diseases version 10, Australian Modification (ICD 10AM). ANZDATA is the data repository for people receiving maintenance kidney replacement therapy (KRT) in Australia and New Zealand and contains patient level administrative and clinical data, based on an annual census from participating renal units. All renal units in the NT participate in the census.
The full database population included: 1) any individual from the APC dataset with an ICD 10AM diagnosis or procedure code for dialysis or transplantation (Table S1) between the years 2000 and 2015 (n= 2844); and 2) any individual from the ANZDATA dataset who registered as ever having dialysis in the NT between 2000 and 2015 (n=1390).

Table S1 includes the ICD 10AM diagnostic and procedure codes used to identify KRT admissions and create the ‘database population’ from the NT Department of Health Admitted Patient Care Hospital Dataset 1991-2015.

Table S1: ICD 10AM codes used to identify database population from hospital dataset

| ICD 10AM Procedure Code | Description                                           |
|-------------------------|-------------------------------------------------------|
| 13100-00                | Haemodialysis                                         |
| 13100-01                | Intermittent Haemofiltration                          |
| 13100-02                | Continuous Haemofiltration                           |
| 13100-03                | Intermittent Haemodialfiltration                      |
| 13100-04                | Continuous Haemodialfiltration                       |
| 13100-06                | Peritoneal Dialysis (PD) short term                   |
| 13100-07                | Intermittent PD long term                             |
| 13100-08                | Continuous PD long term                               |
| 13109-00                | Insertion and fixation of PD catheter                 |
| 13109-01                | Replacement of indwelling catheter                    |
| 13110-00                | Removal of indwelling catheter                        |
| 13112-00                | PD with temporary catheter                            |
| 36503-00                | Kidney transplant                                     |
| 36503-01                | Reimplantation of kidney                              |
| 90351-00                | Removal of temporary PD catheter                      |

| ICD 10AM Diagnosis Code | Description                                      |
|-------------------------|--------------------------------------------------|
| T85.71                  | Infection and inflammation reaction due to PD catheter |
| T86.1                   | Transplant rejection                              |
| Y84.1                   | Kidney dialysis (Other medical procedure as a cause) |
| Z49.0                   | Preparatory care for dialysis                     |
| Z49.1                   | Extracorporeal dialysis                           |
| Z49.2                   | Other dialysis                                    |
| Z94.0                   | Kidney transplant status                           |
| Z99.2                   | Dependence on renal dialysis                      |
The two datasets were linked by a third-party jurisdictional data linkage agency (SA/NT Datalink) following standard ethical systems and protocols. SA/NT Datalink is an independent agency based at the University of South Australia. Using probabilistic matching, de-identified individuals across data sets were linked and assigned a unique identifier. Due to the voluntary nature of the ANZDATA collection, a one to one (1:1) match with the hospital dataset was not expected and one hundred and thirty-two (132) individuals in the hospital dataset were not present in the ANZDATA set. Sixty-seven (67) individuals in ANZDATA dataset did not match any individuals in the hospital data set. These 67 individuals were excluded as hospital activity data was not available for analysis. The datasets included all hospital admission and registry data for eligible patients.

The full database population of 2844 individuals was then linked with activity data from two additional data sets: a) interstate patient travel information (n=171 patients); and b) dialysis data from individuals (n=189) receiving care in the community controlled DxMoC4 and self-care HD DxMoC5. This was necessary because inconsistencies in data entry for these models led to some gaps in attendance data, however, manual compilation of activity between 2008-2014 was possible and linkage with the hospital data set was undertaken by an independent linker not associated with the project.

Study cohort definition

The final study population (n=896) included individuals who had any KRT for more than three months continuously (to eliminate acute and short term dialysis support including patients visiting from elsewhere on holidays), between the years 2008 to 2014. This date range was chosen as some models of care only became fully established after 2008 and the additional activity data (for DxMoC4 and DxMoC5) was provided to the end of 2014. Restricting the analysis of patterns of health service utilisation to 2008 to 2014 ensured that sufficiently robust activity data across all models was available for the analysis.

Patients were excluded if they were 16 years and younger at 2008 or did not have at least one admission after 2008 – to exclude patients who left the NT and were therefore not eligible for inclusion. Non-Aboriginal patients (n=107) were also excluded as they comprised less than 10% of the population and did not experience all models of care. All available admission data pre 2008 was also retained for the purposes of identifying home residence and health status (comorbidities) prior to commencing dialysis.

Table S2 identifies the ICD 10AM codes (collapsed to group level) used to identify and map comorbid conditions for each admission. Once a comorbid condition was present it was carried forward to other admissions if not already present. Comorbidities were chosen for their relevance as kidney disease risk factors and concurrent chronic diseases considered to have a significant impact on health outcomes of kidney patients.
Table S2: ICD 10AM codes used to identify presence of selected comorbid conditions for each admission in Final Study Population 2008-2014

| Variable           | ICD 10 Group | High level description                                           |
|--------------------|--------------|-----------------------------------------------------------------|
| Diabetes           | E10-E14      | Diabetes mellitus                                               |
|                    | O24          | Diabetes mellitus in pregnancy                                  |
| Obesity            | E65-E68      | Overweight, obesity and other hyperalimentation                 |
| Hypertension       | I10-I15      | Hypertensive diseases                                           |
| Cardiac disease    | I20-I25      | Ischemic heart diseases                                         |
|                    | I26-I28      | Pulmonary heart disease and diseases of pulmonary circulation   |
|                    | I30-I52      | Other forms of heart disease                                    |
| Cerebrovascular disease | I60-I69      | Cerebrovascular diseases                                        |
| Vascular disease   | I70-I79      | Diseases of arteries, arterioles and capillaries                |
|                    | I80-I89      | Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified |
|                    | I95-I99      | Other and unspecified disorders of the circulatory system       |
Each admission was aligned with a KRT treatment option of haemodialysis (HD), peritoneal dialysis (PD) or transplant based on diagnosis or procedure codes (Table S3). Relevant diagnosis and procedure codes were present for all patients for at least one admission a year but not all admissions contained a KRT relevant code.

**Table S3:** ICD 10AM diagnostic and procedure codes used to establish dialysis model of care

| ICD 10AM Procedure Code | Description               |
|--------------------------|---------------------------|
| 13100-00                 | Haemodialysis             |
| 13100-07                 | Intermittent PD long term |
| 13100-08                 | Continuous PD long term   |
| 13109-01                 | Replacement of indwelling catheter |
| 13110-00                 | Removal of indwelling catheter |

| ICD 10AM diagnosis Code  | Description            |
|--------------------------|------------------------|
| Z49.1                    | Extracorporial dialysis|
| Z94.0                    | Kidney transplant status|

| AR-DRG Code | Description |
|-------------|-------------|
| L61Z        | HD          |
| L68Z        | PD          |

To determine whether an individual relocated for treatment and whether any treatment was received at or closer to home, we identified home address (to suburb level) for each admission episode that occurred in the 24 months prior to commencement of KRT, taking the earliest admission address as the residence pre-KRT start. Less than 1% of patients did not have an admission in the 24 months prior to KRT start and their home address was taken as the address when they started KRT.

Patients were categorized as ‘Relocated’ when they lived outside the urban areas of Darwin and Alice Springs prior to commencement of KRT. All patients start KRT in the urban areas of Darwin and Alice Springs regardless of original residence. Limited capacity in rural and remote areas mean patients from these areas are not guaranteed treatment in or near their community and thus are placed on urban government housing priority lists once in the urban area. Hostel accommodation is usually available in the interim if not staying with family, although many patients never leave hostel accommodation due to the very long housing wait list. We defined ‘Relocation’ as having to change residence from rural/remote to urban, indefinitely, in order to access KRT.

Remoteness of a patient’s home address was determined by mapping their residence (suburb or community) pre-KRT start to the Modified Monash Model (MMM), which classifies metropolitan, regional, rural and remote areas according to seven levels of geographical remoteness (3). That is: MMM1 = Metropolitan city; MMM2 = Outer regional centres; MMM3 = Large rural towns; MMM4 = Medium rural towns; MMM5 = Small rural towns; MMM6 = Remote community and MMM7 = Very remote community. Only three
MMM categories apply to the NT: MMM2 Outer regional (which we renamed ‘Urban’ for the purposes of this study); MMM6: Remote and MMM7: Very remote.

We used the MMM for home residence as the Australian Government recently approved a Medicare Benefits Schedule (MBS) item (4), for staffed dialysis in very remote locations (MMM7). We were interested in understanding how many patients might possibly benefit from this item.

Activity was separated by region, Top End (TE) and Central Australia (CA), to align with health service responsibility in the NT.

Variable definitions (descriptions and calculations) are shown in Table S4.
### Table S4: Description of available and created Outcome and Exposure variables in Final Study Population data set

| Variable               | Variable label                                      | Value                                                                 | Calculation                                                                 | Type            |
|------------------------|-----------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------|
| year                   | Year of admission                                   | Continuous (2008-2014)                                               | Year of admission date                                                     | Exposure        |
| indig                  | Ethnicity (Aboriginal)                              | Categorical (0= Not Aboriginal; 1=Aboriginal)                         | Hospital coding - collapsed to 'Aboriginal or Torres Strait Islander or 'Not' | Exposure        |
| gender                 | Gender (Male)                                       | Categorical (0= Female; 1=Male)                                      | Hospital coding                                                           | Exposure        |
| region                 | Region (TE)                                         | Categorical (0=Central Australia; 1=Top End)                         | Based on hospital coding                                                   | Exposure        |
| Orig_district          | Residence pre KRT stratified by NT Health Service district | Categorical (1=Darwin; 2= Darwin rural; 3=Tiwi Islands; 4=East Arnhem; 5=Daly West Arnhem; 6=Katherine; 7=Alice Urban; 8=Alice rural; 9=Barkly; 10=Central Desert; 11= Western Desert; 12=Interstate) | Based on hospital coding of Locality codes allocated to NT Health Service district | Exposure        |
| Reloc_flag             | Relocated                                           | Categorical (0=Not relocated; 1=Relocated)                           | Flaged if NT Health Service District not equivalent to Darwin or Alice Springs | Exposure        |
| Orig_MM7               | Remoteness of residence pre-RRT start               | Categorical (1=Outer regional; 2=Remote; 3=Very remote; 4=Interstate) | Modified Monash Model classification for areas of remoteness *Outer regional= Urban | Exposure        |
| admage                 | Age at date of admission                            | Continuous (18-84)                                                  | Calculated from date of birth and date of admission                        | Exposure        |
| admage_cat             | Age at date of admission category                   | Categorical (0=<30yrs; 1=30-39yrs; 2=40-49yrs; 3=50-59yrs; 4=60-69yrs; 5=>70yrs) | Age at admission stratified into 6 categories                              | Exposure        |
| RRT_start              | Date of KRT commencement                            | Ordinal dd/mm/yyyy - Interval                                        | Used as interval variable to calculate time on KRT and time in study       | Exposure        |
| dxtime_cat             | Time on dialysis at time of admission category      | Categorical (0<=1 yr; 1>=1-2yrs; 2=>2-3yrs; 3=>3-4yrs; 4=>4-5yrs)     | Calculated from KRT start date to date of admission and stratified by 12 month periods for first 5 years | Exposure        |
| DxMoC                  | Dominant dialysis model of care                     | Categorical (0=DxMoC0; 1=DxMoC1; 2=DxMoC2; 3=DxMoC3; 4=DxMoC4; 5=DxMoC5; 6=DxMoC6) | Determined by majority model attendance over 3 week rolling period          | Exposure        |
| MoCyrr_tar             | Proportion of year exposed to DxMoC                 | Continuous (0-1.0)                                                  | Proportion of year spent in DxMoC (base unit =weeks) minus intermittent LTFU and time interstate | Exposure        |
| MoCdxatt_cat           | Category of calculated dialysis attendance by DxMoC/year | Categorical (1=High:>144; 2=Medium:132-143; 3=Low:<132)               | Dialysis attendance stratified into high, medium and low attendance         | Exposure        |
| Variable   | Variable label                  | Value Description | Calculation                                                                                     | Type          |
|------------|---------------------------------|-------------------|-------------------------------------------------------------------------------------------------|---------------|
| DM         | Diabetes Mellitus               | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| CVD        | Cerebrovascular Disease         | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| CAD        | Cardiovascular Disease          | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| Hyptn      | Hypertension                    | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| Obesity    | Obesity                          | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| VascD      | Vascular Disease                | Categorical      | Presence of ICD-10AM code; if present always present                                            | Exposure      |
| iLTFU      | Intermittent lost to follow up  | Categorical      | Flagged for each week if attendance data (dialysis and hospital) is absent => 52 weeks for haemodialysis patients | Outcome      |
| Ifu_time   | Period of intermittent LTFU     | Continuous        | Calculated from intermittent LTFU, minimum of 52 weeks                                           | Used in calculation of time at risk |
| calcMoC_att| Calculated outpatient dialysis  | Continuous        | Number of dialysis treatments by DxMoC, divided by time (weeks) in DxMoC x 52 (weeks) to represent yearly rate | Outcome      |
| MoChosp_adm| Rate of hospital admissions by  | Continuous        | Sum of overnight admissions while exposed to a DxMoC                                             | Outcome      |
| yrlyhosp_adm| Annual rate of hospital         | Continuous        | Sum of overnight admissions by year per patient                                                   | Outcome      |
| MoCEDpres  | Rate of ED presentations by DxMoC/year | Continuous  | Sum of Emergency Department presentations while exposed to a DxMoC                               | Outcome      |
| yrlyED_pres| Annual rate of ED presentations | Continuous        | Sum of Emergency Department presentations by year per patient                                     | Outcome      |
| misdx_mocyr| Admissions associated with missed dialysis by DxMoC/year | Continuous  | Sum of ICD codes for fluid overload or hyperkalaemia while exposed to a model of care            | Outcome      |
| misdx_cat  | Risk for missed dialysis category | Categorical      | Based on 5 or more admissions with ICD codes E87.7 or E87.5 present per DxMoC exposure per year   | Outcome      |
| MoC_los    | Number of inpatient days by DxMoC/year | Continuous  | Total days as inpatient while exposed to a DxMoC                                                  | Outcome      |
| yrly_los   | Number of inpatient days /year  | Continuous        | Total days as inpatient by year per patient                                                       | Outcome      |
| LTFU       | Lost to follow-up               | Categorical      | Based on 'missing' data to end of observation period with no indication of death                  | Censoring    |
| stdy_status| Status at end of study          | Categorical      | Censored at end of study as Alive, Dead or LTFU                                                   | Outcome      |
Results

Table S5 identifies the proportion of Aboriginal patients with a select comorbid condition at admission by DxMoC between the years 2008-2014. Patients can have more than one comorbid condition.
Table S5: Proportion of admissions (95% CI) for NT Aboriginal patient with a specific comorbid condition by DxMoC, 2008-2014

| DxMoC % (95% CI) | Diabetes | Cardiac | Vascular | Obesity | Hypertension | Cerebrovascular |
|------------------|----------|---------|----------|---------|--------------|----------------|
| Incentre DxMoC0  | 80 (77-82) | 57 (54-60) | 45 (42-48) | 13 (11-16) | 95 (94-97) | 7 (5-8) |
| Urban DxMoC1     | 86 (85-87) | 61 (59-63) | 59 (57-60) | 18 (17-20) | 98 (97-98) | 8 (7-9) |
| Rural DxMoC2     | 89 (86-91) | 69 (65-72) | 58 (54-62) | 12 (10-15) | 97 (96-98) | 3 (2-4) |
| Remote DxMoC3    | 83 (76-89) | 61 (52-69) | 55 (47-64) | 10 (6-17)  | 100 (97-100) | 4 (2-9) |
| RemoteCC* DxMoC4 | 92 (88-95) | 55 (54-61) | 61 (55-66) | 19 (14-26) | 98 (96-99) | 8 (5-11) |
| SC HD* DxMoC5    | 87 (82-91) | 76 (70-81) | 61 (55-68) | 16 (12-21) | 94 (91-97) | 7 (4-10) |
| SC PD* DxMoC6    | 74 (69-79) | 60 (54-65) | 60 (54-65) | 11 (8-15)  | 97 (94-98) | 6 (4-10) |

*CC: Community-controlled; SC HD: self-care haemodialysis; SC PD: self-care peritoneal dialysis
Dialysis Attendance

Table S6 displays the contribution of individual exposure variables to the mean annual dialysis attendance for patients receiving haemodialysis, therefore DxMoC6 (selfcare peritoneal dialysis) is not included.

Table S6: Mean annual dialysis treatments by exposure variables for NT Aboriginal patients 2008-2014

**Univariate linear regression**

|                     | Mean (95% CI) | P value |
|---------------------|---------------|---------|
| **Gender**          |               |         |
| Female              | 132 (131-133) | Ref     |
| Male                | 130 (128-131) | 0.007   |
| **Region**          |               |         |
| Central Australia   | 127 (126-129) | Ref     |
| Top End             | 136 (135-138) | <0.001  |
| **Residence pre-KRT** |             |         |
| Urban               | 135 (129-141) | Ref     |
| Remote              | 130 (126-133) | 0.044   |
| Very Remote         | 131 (130-133) | 0.235   |
| Interstate          | 115 (100-130) | 0.008   |
| **Admission age**   |               |         |
| <30 years           | 124 (118-130) | Ref     |
| 30-39               | 125 (121-128) | 0.904   |
| 40-49               | 129 (127-131) | 0.162   |
| 50-59               | 131 (129-133) | 0.036   |
| 60-69               | 137 (135-139) | <0.001  |
| >70                 | 141 (136-146) | <0.001  |
| **Time on dialysis** |            |         |
| <12mths             | 124 (121-128) | Ref     |
| 1-2 yrs             | 125 (122-128) | 0.747   |
| 2-3yrs              | 129 (126-132) | 0.045   |
| 3-4yrs              | 130 (127-132) | 0.025   |
| 4-5yrs              | 134 (130-137) | <0.001  |
| >5yrs               | 136 (134-137) | <0.001  |
| **DxMoC**           |               |         |
| Incentre DxMoC0     | 97 (92-101)   | Ref     |
| Urban DxMoC1        | 131 (129-132) | <0.001  |
| Rural DxMoC2        | 143 (140-145) | <0.001  |
| Remote DxMoC3       | 142 (136-147) | <0.001  |
| RemoteCC* DxMoC4    | 147 (141-152) | <0.001  |
| SC HD* DxMoC5       | 129 (124-133) | <0.001  |

*CC:Community-controlled; SC HD: self-care haemodialysis*
Dialysis attendance, hospital admissions and ED presentations

Low dialysis attendance is associated with increased rates of hospitalisations and ED presentations as shown in Table S7.

Table S7: Hospital admission and ED presentation incidence rate ratios for NT Aboriginal haemodialysis patients including dialysis attendance as an exposure variable, 2008-2014

| Negative binomial regression adjusted for included variables | Multivariate Incidence Rate Ratio (IRR) |
|---------------------------------------------------------------|-----------------------------------------|
|                                                               | Hospital admissions | ED Presentations |
|                                                               | IRR (95% CI) | P Value | IRR (95% CI) | P Value |
| Gender Male (vs Females) | 0.99 (0.93-1.06) | 0.664 | 1.09 (0.97-1.22) | 0.133 |
| Region TE (vs CA)* | 0.80 (0.74-0.86) | <0.001 | 0.37 (0.32-0.43) | <0.001 |
| Residence pre KRT Urban | 1 | Reference | 1 | Reference |
| Remote | 1.38 (1.18-1.60) | <0.001 | 2.21 (1.57-3.11) | <0.001 |
| Very Remote | 1.30 (1.16-1.50) | <0.001 | 2.01 (1.47-2.71) | <0.001 |
| Interstate | 1.81 (1.34-2.83) | 0.002 | 3.35 (1.76-6.35) | <0.001 |
| Admission age <30yrs | 1 | Reference | 1 | Reference |
| 30-39yrs | 1.10 (0.90-1.33) | 0.282 | 1.36 (0.96-1.94) | 0.083 |
| 40-49yrs | 0.75 (0.62-0.90) | 0.002 | 0.71 (0.51-0.99) | 0.050 |
| 50-59yrs | 0.70 (0.58-0.85) | <0.001 | 0.58 (0.41-0.82) | 0.002 |
| 60-69yrs | 0.78 (0.64-0.95) | 0.010 | 0.70 (0.49-0.99) | 0.048 |
| >70yrs | 0.74 (0.57-0.91) | 0.013 | 0.49 (0.31-0.77) | 0.002 |
| Time on dialysis <12mths | 1 | Reference | 1 | Reference |
| 1-2 yrs | 0.70 (0.65-0.81) | <0.001 | 1.10 (0.90-1.36) | 0.355 |
| 2-3yrs | 0.65 (0.61-0.78) | <0.001 | 1.15 (0.92-1.44) | 0.209 |
| 3-4yrs | 0.68 (0.60-0.77) | <0.001 | 1.13 (0.89-1.43) | 0.301 |
| 4-5yrs | 0.59 (0.51-0.67) | <0.001 | 1.08 (0.84-1.39) | 0.547 |
| >5yrs | 0.65 (0.58-0.76) | <0.001 | 1.05 (0.86-1.30) | 0.587 |
| Dialysis attendance High >=144 | 1 | Reference | 1 | Reference |
| Medium 132-143 | 1.37 (1.25-1.51) | <0.001 | 1.88 (1.58-2.58) | <0.001 |
| Low <=131 | 2.10 (1.96-2.28) | <0.001 | 3.29 (2.86-3.80) | <0.001 |
| Comorbid conditions Diabetes | 1.27 (1.15-1.40) | <0.001 | 1.06 (0.88-1.27) | 0.521 |
| Cardiac | 1.34 (1.25-1.44) | <0.001 | 1.52 (1.34-1.73) | <0.001 |
| Vascular | 1.35 (1.26-1.45) | <0.001 | 1.06 (0.93-1.21) | 0.366 |
| Obesity | 1.09 (1.00-1.18) | 0.038 | 1.18 (1.02-1.36) | 0.027 |
| DxMoC Incentre DxMoC0 | 1.91 (1.74-2.12) | <0.001 | 1.19 (0.99-1.43) | 0.060 |
| Urban DxMoC1 | 1 | Reference | 1 | Reference |
| Rural DxMoC2 | 1.11 (1.00-1.21) | 0.040 | 0.45 (0.37-0.56) | <0.001 |
| Remote DxMoC3 | 0.69 (0.55-0.86) | 0.001 | 0.17 (0.07-0.39) | <0.001 |
| RemoteCC* DxMoC4 | 0.71 (0.60-0.85) | <0.001 | 0.69 (0.52-0.92) | 0.013 |
| SC HD* DxMoC5 | 0.56 (0.47-0.66) | <0.001 | 0.34 (0.24-0.50) | <0.001 |

*TE: Top End; CA: Central Australia; *CC: Community-controlled; SC HD: self-care haemodialysis
ED Presentations

When examining ED presentations, the unadjusted analysis showed increased rates associated with male gender (IRR=1.18, 95% CI:1.05-1.32) compared to female, remoteness of residence pre-KRT start, time on dialysis greater than 12 months, and the comorbidities of diabetes, vascular disease, cardiac disease and obesity (Table S8). However, on multivariate analysis, time on dialysis was not significant and the only comorbidity that remained significant was cardiac disease with an IRR=1.44; 95% CI: 1.26-1.64. Remoteness of residence pre-KRT start was associated with increased rates of ED presentations, while the rates were substantially lower for rural, remote and self-care models (DxMoC2-6) (Table S8).

This suggests that relocated people receiving care in the urban area had higher rates of ED presentations compared to people who were able to return to their communities and receive care at or closer to home in DxMoC2-6. However, we acknowledge that people in remote areas have little chance of presenting to a local emergency department, and if requiring care will be medically transferred to the urban hospital. Our data set did not include information about emergency medical transfers. However, if a medical transfer was warranted, it would result in an admission to hospital and as shown in Table 5 in the manuscript, the rates of hospital admissions for remote models was lower than urban models. We do not believe there has been a significant underestimation of ED use by patients attending rural and remote models.
Days in hospital

We also examined the total annual days in hospital (Table S9). Most exposure variables tested individually were statistically significant. The mean annual days were higher for those with a comorbidity of diabetes, cardiac disease, vascular disease and obesity compared to those without the respective comorbidity, while dialysing in remote and self-care HD models (DxMoC3 to 5) was associated with lower mean annual days in hospital compared to Incentre DxMoC0. When modelled together the associations persisted although the difference in days in hospital for those with and without obesity were fewer. Self-care PD DxMoC6 had relatively high adjusted mean annual days in hospital at 24.1 (95% CI:22.9-25.4) compared to Incentre DxMoC0 of 18.3 (95% CI:17.5-19.0) days in hospital (Table S9).
An analysis of diagnosis codes for this group noted a higher rate of admissions for more severe and complex conditions when compared to the other models of care (5).

**Table S9: Mean annual days in hospital for NT Aboriginal patients 2008-2014**

| Zero inflated poisson regression | Days in hospital |    |    |    |    |    |
|---------------------------------|------------------|----|----|----|----|----|
| adjusted for included variables | Mean (95% CI)    | P value | Mean (95% CI) | P Value |
| Gender                          |                  |    |    |    |    |    |
|                                 | Female           | 17.7 (17.2-18.1) | Reference | 17.6 (17.2-17.9) | Reference |
|                                 | Male             | 16.2 (15.7-16.6) | <0.001 | 16.3 (15.9-16.7) | <0.001 |
| Region                          |                  |    |    |    |    |    |
|                                 | Central Australia| 18.2 (17.8-18.6) | Reference | 18.2 (17.7-18.5) | Reference |
|                                 | Top End          | 15.9 (15.5-16.3) | <0.001 | 16.0 (15.6-16.4) | <0.001 |
| Residence pre-KRT               |                  |    |    |    |    |    |
|                                 | Urban            | 13.9 (13.0-14.7) | Reference | 15.5 (13.8-17.3) | Reference |
|                                 | Remote           | 17.1 (16.4-17.9) | <0.001 | 15.3 (14.4-16.3) | <0.001 |
|                                 | Very Remote      | 17.7 (17.3-18.0) | <0.001 | 17.7 (17.2-18.1) | <0.001 |
|                                 | Interstate       | 16.1 (12.2-20.0) | 0.567 | 18.6 (14.2-22.9) | 0.197 |
| Admission age                   |                  |    |    |    |    |    |
|                                 | <30 years        | 13.6 (12.2-14.9) | Reference | 17.5 (16.2-18.9) | Reference |
|                                 | 30-39            | 16.6 (15.8-17.5) | <0.001 | 18.1 (17.3-18.9) | 0.582 |
|                                 | 40-49            | 14.9 (14.4-15.4) | 0.005 | 15.6 (15.1-16.1) | 0.001 |
|                                 | 50-59            | 17.3 (16.7-17.8) | <0.001 | 16.6 (16.1-17.1) | 0.164 |
|                                 | 60-69            | 20.1 (19.3-21.0) | <0.001 | 18.5 (17.8-19.2) | <0.001 |
|                                 | >70              | 17.9 (16.4-19.4) | <0.001 | 18.2 (16.8-19.5) | 0.004 |
| Time on dialysis                |                  |    |    |    |    |    |
|                                 | <12mths          | 13.8 (13.3-14.3) | Reference | 16.2 (15.9-17.1) | Reference |
|                                 | 1-2 yrs          | 16.7 (16.0-17.5) | <0.001 | 18.3 (17.6-19.1) | <0.001 |
|                                 | 2-3yrs           | 15.8 (14.9-16.7) | <0.001 | 16.4 (15.6-17.2) | <0.001 |
|                                 | 3-4yrs           | 18.5 (17.4-19.7) | <0.001 | 18.8 (17.8-19.8) | <0.001 |
|                                 | 4-5yrs           | 15.4 (14.3-16.4) | <0.001 | 14.5 (13.6-15.5) | <0.001 |
|                                 | >5yrs            | 19.4 (18.8-20.0) | <0.001 | 16.9 (16.4-17.4) | <0.001 |
| Comorbid conditions             |                  |    |    |    |    |    |
|                                 | Diabetes (No)    | 11.2 (10.6-11.7) | Reference | 12.0 (11.4-12.6) | Reference |
|                                 | Yes              | 18.4 (18.0-18.6) | <0.001 | 18.1 (17.8-18.5) | <0.001 |
|                                 | Cardiac (No)     | 12.7 (12.3-13.1) | Reference | 14.3 (13.8-14.7) | Reference |
|                                 | Yes              | 19.8 (19.4-20.2) | <0.001 | 18.5 (18.1-18.9) | <0.001 |
|                                 | Vascular (No)    | 10.6 (10.3-11.0) | Reference | 11.2 (10.8-11.6) | Reference |
|                                 | Yes              | 22.1 (21.6-22.5) | <0.001 | 21.2 (20.8-21.7) | <0.001 |
|                                 | Obesity (No)     | 16.3 (16.0-16.6) | Reference | 16.8 (16.5-17.1) | Reference |
|                                 | Yes              | 21.0 (20.1-21.9) | <0.001 | 18.2 (17.4-19.0) | <0.001 |
| DxMoC                           |                  |    |    |    |    |    |
|                                 | Incentre DxMoC0  | 16 (15.3-16.6) | Reference | 18.3 (17.5-19.0) | Reference |
|                                 | Urban DxMoC1     | 18.3 (17.9-18.8) | <0.001 | 17.6 (17.2-18.1) | <0.007 |
|                                 | Rural DxMoC2     | 17.3 (16.4-18.3) | <0.001 | 16.0 (15.1-16.9) | <0.001 |
|                                 | Remote DxMoC3    | 13.6 (11.5-15.7) | <0.001 | 14.6 (12.8-16.5) | <0.001 |
|                                 | RemoteCC* DxMoC4 | 5.9 (5.0-6.8) | <0.001 | 5.2 (4.3-6.0) | <0.001 |
|                                 | SC HD* DxMoC5    | 11.1 (9.9-12.4) | <0.001 | 12.1 (10.9-13.3) | <0.001 |
|                                 | SC PD* DxMoC6    | 22.5 (21.1-23.8) | <0.001 | 24.1 (22.9-25.4) | <0.001 |

*CC: Community-controlled; SC HD: self-care haemodialysis; SC PD: self-care peritoneal dialysis*
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