REDUCCTION
REDUcing the burden of dialysis
Catheter ComplicaTIOns: a National approach

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Overview

Background

Methods of the project

Current state of play

Current data

Aims

1. Define and standardise reporting of bacteraemia resulting from central venous dialysis catheters in Australia and New Zealand
2. Reduce the rate of dialysis catheter related bacteraemia

History of the project

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KHA-CARI evidence implementation projects

- Vascular access (Pamela Lopez-Vargas, Kevan Polkinghorne)
- PD (Denise Campbell, David Mudge)

Closing the loop…evidence into practice

Building upon prior work at CRGH

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History: implementation projects

High variation in:

- Use of protocols
- Nature of protocols
- Definitions of outcomes
- Actual outcomes

Variable settings:

- Different barriers/enablers
- Variable expertise/interest

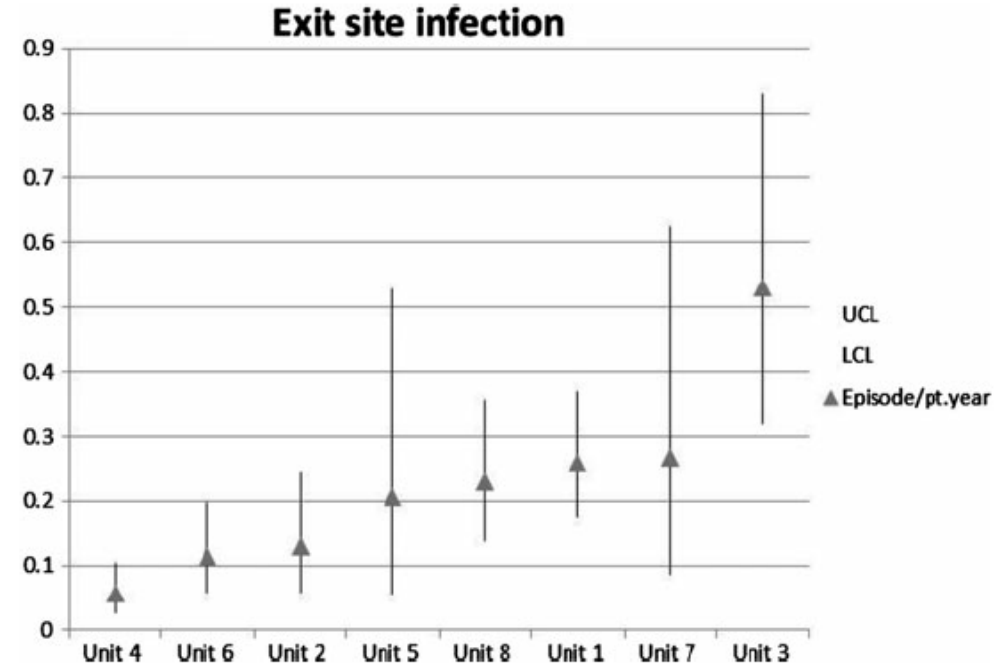

FIGURE 2: ESI rates by unit (January to December 2011).

Campbell et al, NDT 2015, doi: 10/1093/ndt/gfv115

eGFR at surgical referral (mL/min/ 1.73 m^2)[a]	7.0 (2.0-39.0)	6.0 (2.0-13.0)	7.0 (3.0-14.0)	8.0 (4.0-13.0)	7.0 (3.0-9.0)	9.0 (5.0-39.0)	7.0 (4.0-17.0)	10.0 (3.0-21.0)	8.0 (3.0-11.0)	9.0 (4.0-14.0)	0.02

Lopez-Vargas et al, AJKD 2011; 57(6): 873-882

Scientific background

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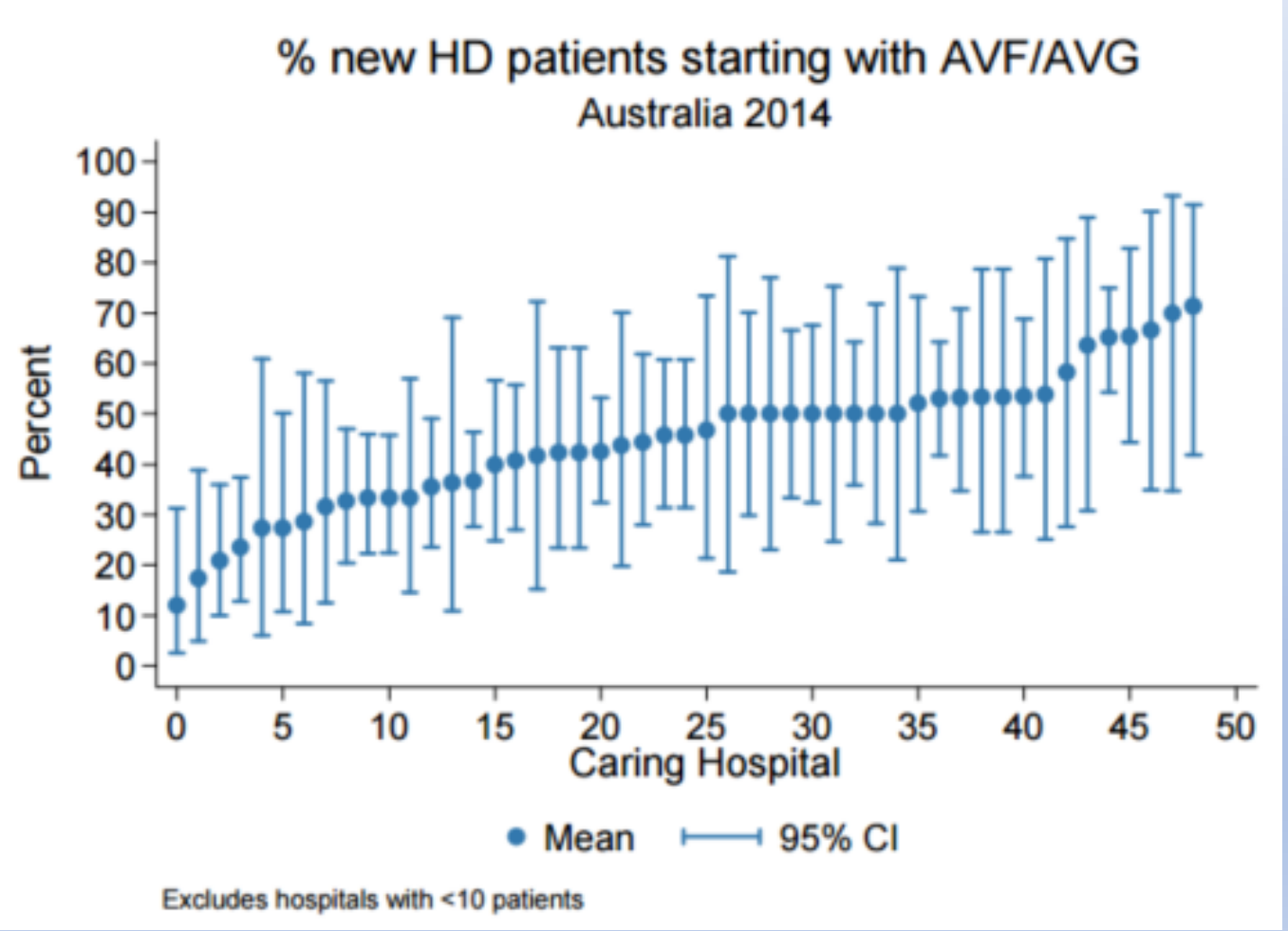
Healthcare associated infections (HAI)

- Global health issue
- Complicate ~10-15% of hospitalisations
- Australian hospital sector has 3.7m overnight stays (5.1m same-day)/annum

Catheter problem:

- Risk of mortality
- After adjusting for co-morbidity
- Marker of processes of care

Variation in Australia: ANZDATA



Limited data on prevalent patients
No data on AKI

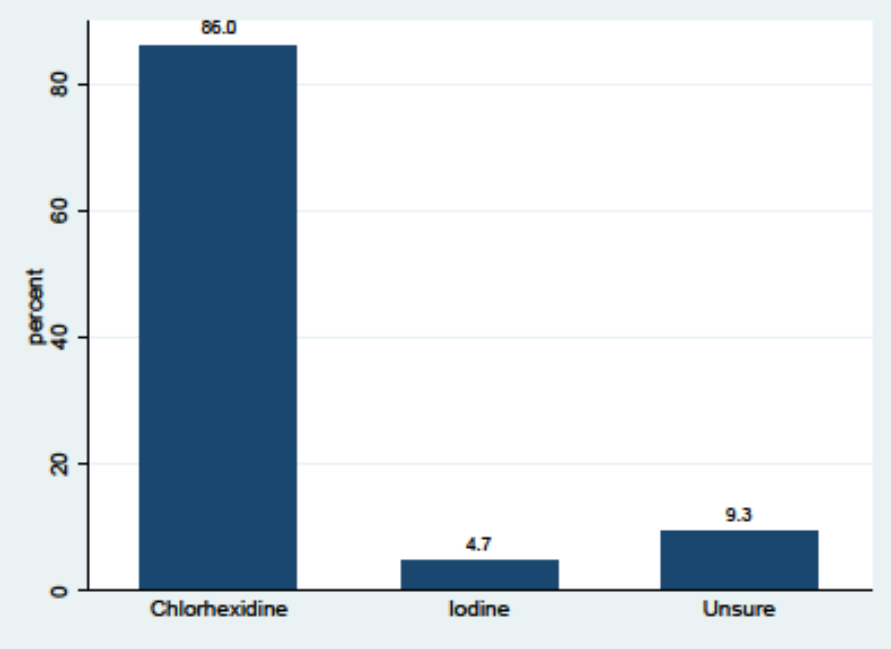
Recording of catheter associated bacteraemia

Are catheter complication rates (eg. bacteraemia) recorded?	Frequency	Percent
No	8	17.4
Yes	38	82.6
Total	46	100
How are they recorded	**Frequency**	**Percent**
Retrospective	19	50
Prospective	16	42.1
Automated	2	5.3
By hospital Infection Control unit	1	2.7
Total	38	100

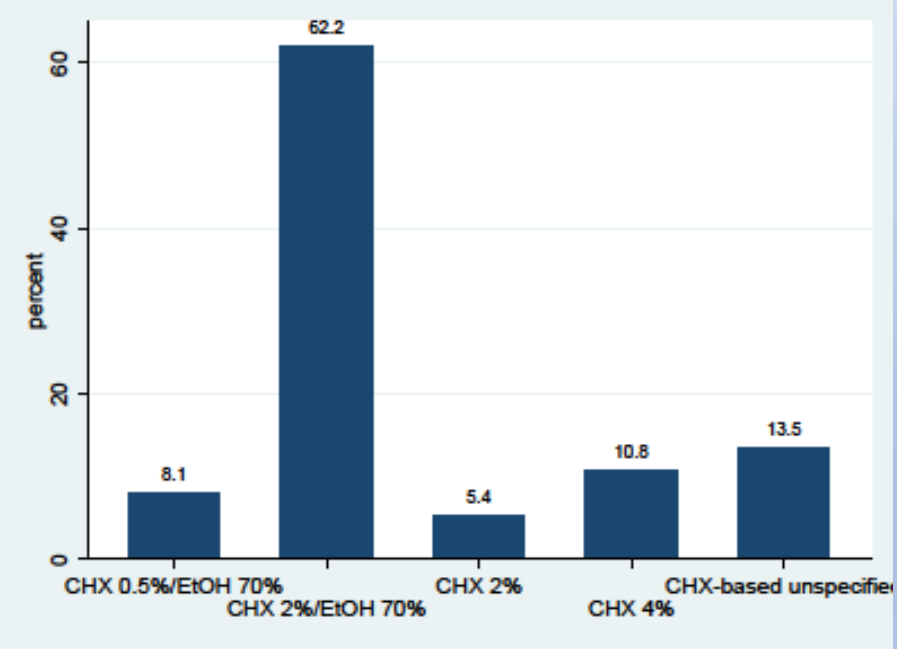
Unpublished data

Skin prep for non-tunnelled catheters – results for tunnelled catheters almost identical

1. Type of antiseptic



2. Types of chlorhexidine in use



Unpublished data

Other literature

Bacteraemia rates aren't clear

- Good rates <1/1000 catheter days
- Published studies in clinical trials 2.5-5.5/1000 catheter days

Mortality from bacteraemia:

- 12-25%
- Higher for staph aureus, 13.5% in-hospital mortality in one study

Cost from bacteraemia:

- Meta-analysis (US): $45,814 (95% CI $31,650)
- Canadian data: $23,500 per episode

Extent of use

Complications

Cost

Reasons

Variability in practice and outcomes

Ability to compare

Study plan

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International stepped-wedge, cluster study

37 renal units Australia and 6 in New Zealand

Prospective, electronic data collection, real time reporting

Study plan

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All patients receiving a new dialysis catheter

Opt-out approach or waiver of consent

Standardised definitions of patient population and outcomes

Local leadership and comparative data

Data linkage for health economic analyses

Timeline

Process Evaluation

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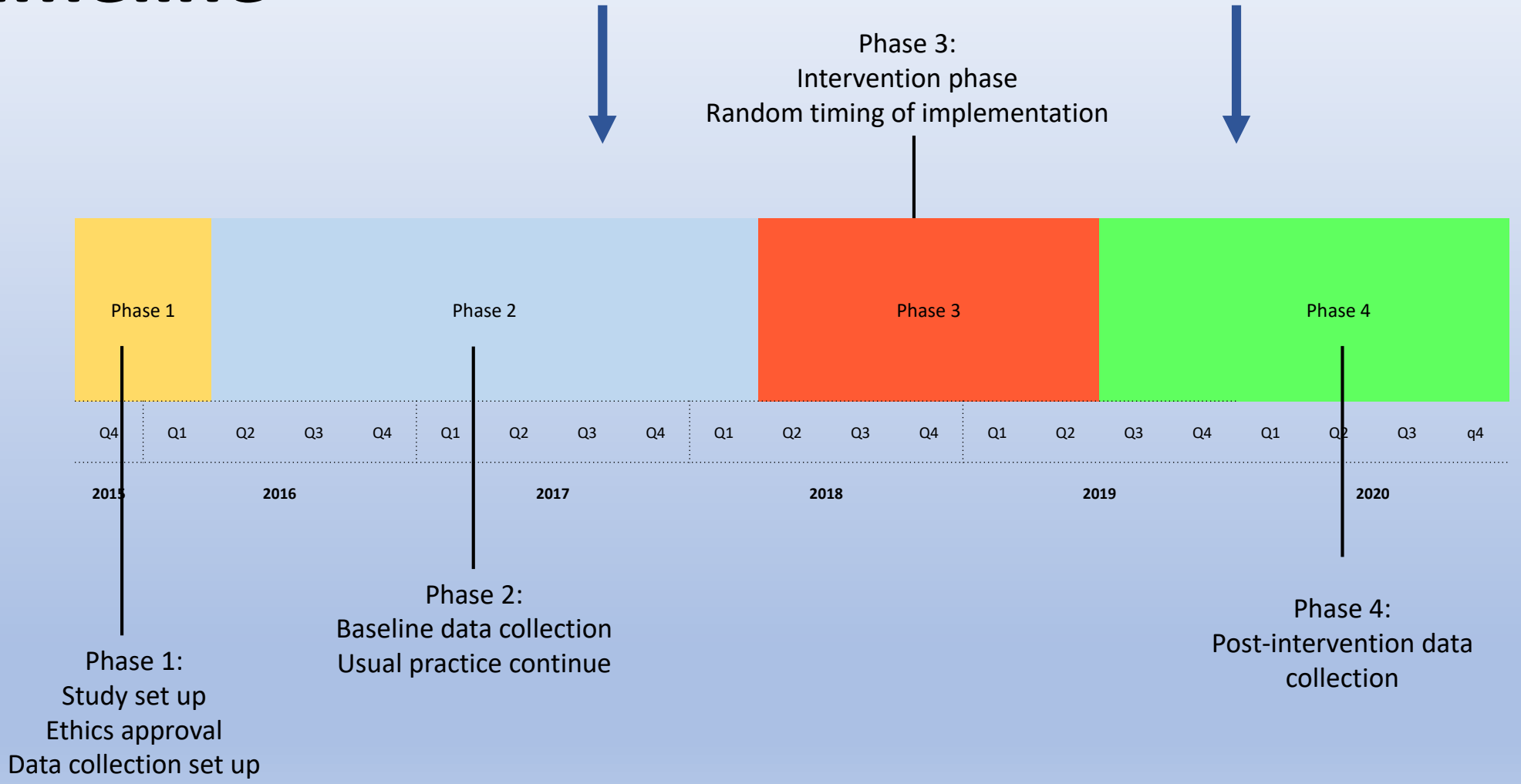

Baseline Survey

Partners

- ANZDATA registry
- KHA-CARI Renal Guidelines
- Kidney Health Australia
- Department of Health & Human Services, Victorian Government
- Queensland Government

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Northern Territory

- **Alice Springs Hospital**
- **Royal Darwin Hospital**

Queensland Sites

- **Cairns Hospital**
- **Princess Alexandra Hospital**
- Rockhampton Hospital
- **Royal Brisbane Hospital**
- **Sunshine Coast Hospital and Health Service**
- **Toowoomba Hospital**
- Mater Hospital
- Mackay Base Hospital
- Gold Coast Hospital

NSW &ACT Sites

- **ACT/NSWSHLD Renal Network**
- **Concord Repatriation and General Hospital**
- John Hunter Hospital
- **Liverpool Hospital**
- **Nepean Hospital**
- **Royal North Shore Hospital**
- **Royal Prince Alfred Hospital**
- Prince of Wales Hospital
- St George Hospital
- Tamworth Hospital
- Woollongong Hospital
- **WSLHD (Westmead, Auburn, Blacktown Hospitals)**

Western Australian Sites

- Sir Charles Gairdner Hospital
- Armadale Renal Service
- Fiona Stanley Hospital
- Royal Perth Hospital

South Australian Sites

- **CNARTS Royal Adelaide Hospital**
- Flinders Medical Centre

Victorian Sites

- **Austin Hospital**
- **Eastern Health**
- **Monash Hospital**
- **Royal Melbourne Hospital**
- The Alfred Hospital
- **Western Health**
- St Vincents Hospital

Tasmania

- **Royal Hobart Hospital**

New Zealand Sites

- Auckland Hospital
- Middlemore Hospital
- Northland Hospital
- Waikato Hospital
- Wellington Hospital
- Waitamata Health

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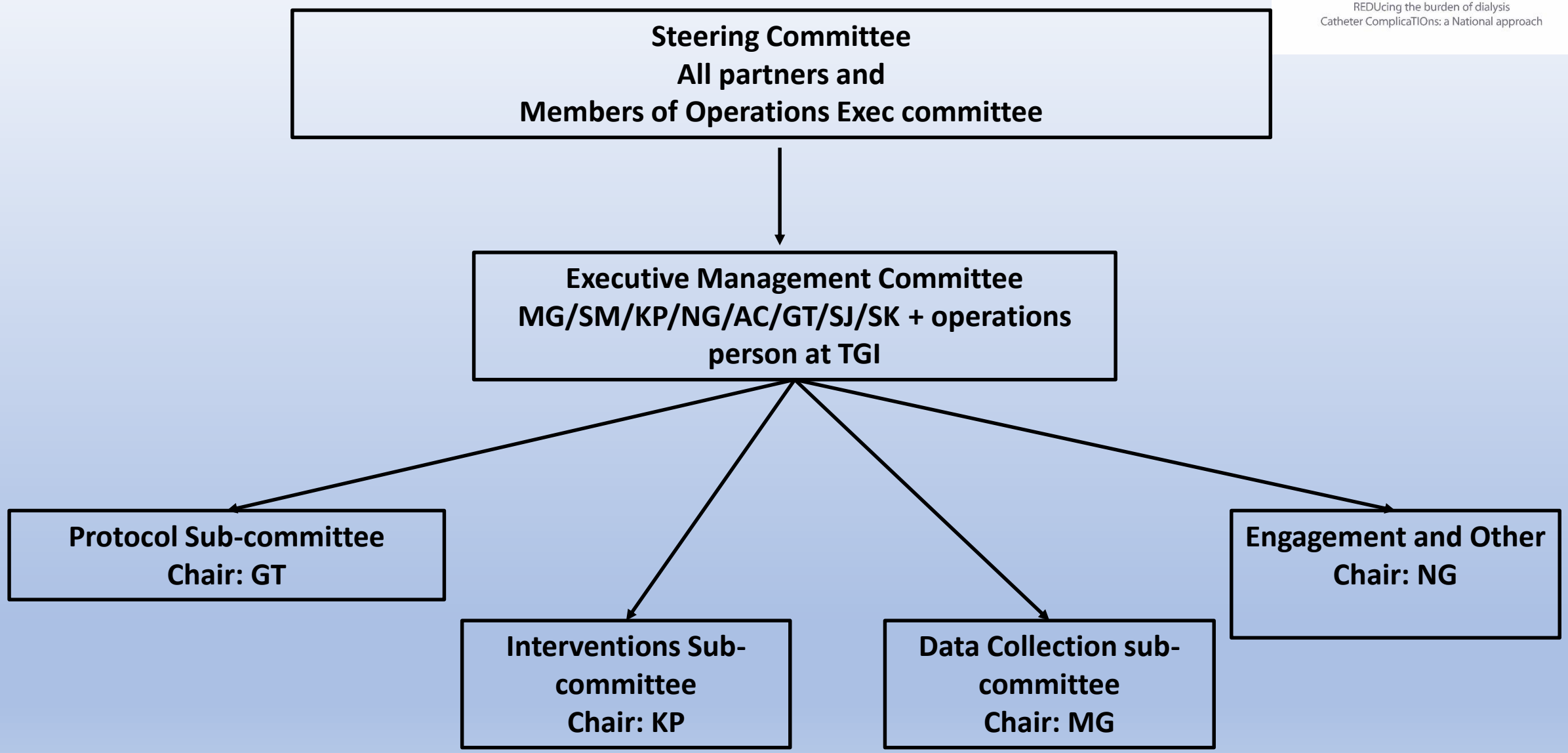

New Zealand

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6 sites

Data collection only

Data Linkage

Start-up this year

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Data Collection

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Data collected

Basic Demographic Data

Limited medical history

Data around catheter insertion

WHEN

WHY

WHERE IN BODY

WHERE IN HOSPITAL

WHO

PREVIOUS ACCESS

Interventions

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ACCESS INTERVENTIONS

ACCESS CREATION

Infections

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TYPE

ORGANISMS

CATHETER REMOVED?

YES NO

WHEN WHY

PERMANENT ACCESS ATTEMPT

Death

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CAUSE

DATE

Data Linkage

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ANZDATA

State based hospitalisation datasets

State based mortality datasets

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ANZDATA
Demographic details
Comorbidities
Dialysis details (modality, change, vintage)

REDUCCTION cohort
Catheter insertion/removal
Catheter associated Infections
Interventions on ANY access

Surveys
Site specific data around practice before and after
Number of patients on dialysis
Facilities at each site

State mortality datasets
Date of death
Cause of death (coded and uncoded)

State Hospitalisation Datasets
Reason for admission
All relevant comorbidities at each admission
All inpatient procedures (including daystay)
Discharge destination
Slight differences between states
Readmissions

Can look at (in addition to primary outcome)

- Reasons for admission/catheter insertion/removal
- Cost of admissions
- Number of admissions/bed days
- Procedures on catheters/AVF
- Access issues – timing between access creation and access use/type of access created and type of access used at RRT
- Relation of location to burden of catheter/infections etc

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Interventions

Box 1. CDC Dialysis BSI Prevention Collaborative Interventions

Core Interventions

Surveillance & feedback using NHSN: Conduct monthly surveillance for BSIs and other dialysis events and enter events into CDC's NHSN. Calculate facility rates and compare to rates in other facilities using NHSN. Actively share results with front-line clinical staff.

Chlorhexidine for skin antisepsis: Use a chlorhexidine (>0.5%) with alcohol solution as first-line agent for skin antisepsis, particularly for central catheter insertion & during dressing changes. Povidone-iodine, preferably with alcohol, or 70% alcohol are alternatives.

Hand hygiene surveillance: Perform monthly hand hygiene audits with feedback of results to clinical staff.

Catheter/vascular access care observations: Perform quarterly audits of vascular access care & catheter accessing to ensure adherence to recommended procedures. This includes aseptic technique while connecting & disconnecting catheters and during dressing changes. Share results with front-line clinical staff.

Patient education/engagement: Provide standardized education to all patients on infection prevention topics including vascular access care, hand hygiene, risks related to catheter use, recognizing signs of infection, and instructions for access management when away from dialysis unit.

Staff education & competency: Provide regular training of staff on infection control topics, including access care & aseptic technique. Perform competency evaluation for skills such as catheter care and accessing at least every 6-12 mo and upon hire.

Catheter reduction: Incorporate efforts (eg, through patient education, vascular access coordinator) to reduce catheters by identifying barriers to permanent vascular access placement & catheter removal.

Supplemental Intervention

Antimicrobial ointment or chlorhexidine-impregnated sponge dressing: Apply bacitracin/gramicidin/polymyxin B ointment or povidone-iodine ointment to catheter exit sites during dressing change *or* use a chlorhexidine-impregnated sponge dressing.

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Core Interventions:

- Surveillance & Feedback
- Hand Hygiene audit
- Chlorhexidine
- Catheter Care
- Patient Education
- Staff Education/Competency
- Catheter Reduction

Supplemental Interventions:

- Antimicrobial ointment or Chlorhexidine impregnated sponge dressing

Interventions design

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Interventions sub-committee

KHA-CARI

Evidence based

Latest evidence

Guiding rather than prescriptive

Kevan Polkinghorne
David Johnson
Emma Marsh
Madhivanan Sundaram
Peter Mount
Sradha Kotwal
Vincent Lee
KHA-CARI

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What might the Intervention look like?

Multifaceted, Three Broad Phases:

Interventions employed at the time of dialysis catheter insertion

Interventions employed during the dialysis catheter maintenance phase

Interventions associated with dialysis catheter removal

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Data Collection tool

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Patient Name or MRN...

Search Participants

Please Select A Hospital

All Reports

From: January 2016 To: August 2018

Filter

CSV

Clear Filter

3469	Total Participant Count
1281	Participants with Active Catheters
1	Average Lines Per Participant
513678	Total Catheter Days
	Project-wide Infection Rate *(Infections/1000 catheter days)*

Reason for dialysis requiring catheter insertion

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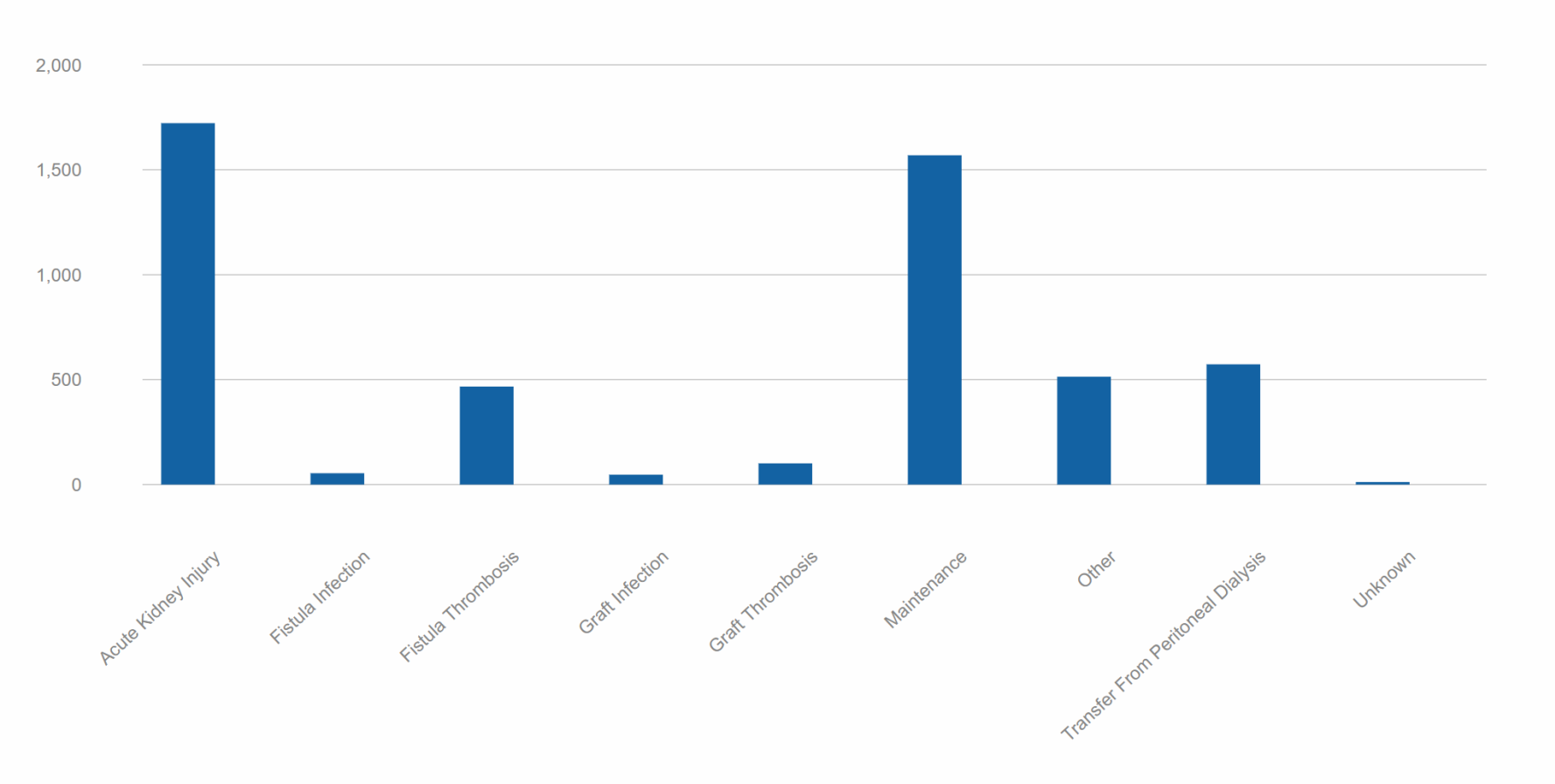

Reason for removal

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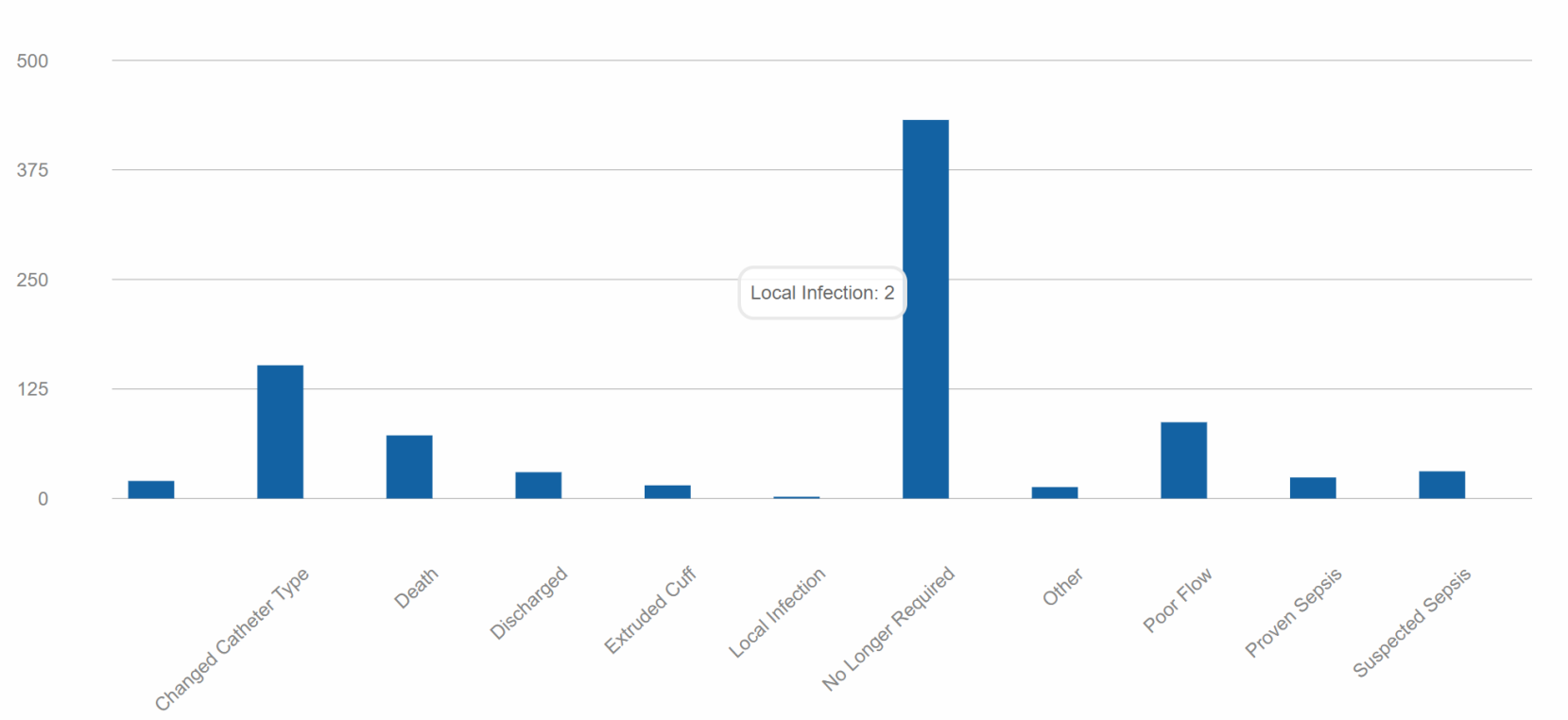

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APCN Presentation 2018

Current study methods

Proportion of catheters inserted for AKI

Reasons for removal of catheters in patients with AKI

Duration of catheter exposure

Reason for dialysis catheter requiring central venous access

I__I Acute Kidney Injury (proceed to Q16 /form complete)
I__I Commencement of maintenance dialysis without functioning access (proceed to Q13)
I__I Transfer from Peritoneal Dialysis (temporary or permanent) (proceed to Q15 /form complete)
I__I Fistula thrombosis (proceed to Q16 /form complete)
I__I Fistula infection (proceed to Q16 /form complete)
I__I Graft thrombosis (proceed to Q16 /form complete)
I__I Graft infection (proceed to Q16 /form complete)
I__I Other: specify .....

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Reason for removal

I__I No Longer Required
I__I Poor flow
I__I Extruded cuff
I__I Local infection
I__I Proven sepsis
I__I Suspected sepsis
I__I Changed catheter site/type to reduce complication risk
I__I Patient discharge from our service
I__I Patient death with catheter in-situ (Link to death page)
I__I Patient transferred to non-REDUCCTION renal unit
I__I Other: specify .....

Catheter replacement

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Was the catheter replaced?	I__I Yes (if yes, link to new catheter insertion form) I__I No
What was the primary reason that this catheter was not replaced?	I__I Recovery of Renal Function I__I Functional Haemodialysis access (AVF or AVG) I__I Functional Peritoneal dialysis access I__I Withdrew from treatment I__I Transplant I__I Death (proceed to death page) I__I Other: specify .....

Results

20/12/2016 – 23/3/2018 = 15 months

3572 catheters in 2491 patients

324,147 catheter days

1176 catheters were inserted for AKI (32.9%)

- 34% patients with DM (n=399)
- 15% patients on I/S meds (n=177)

Catheters inserted for AKI

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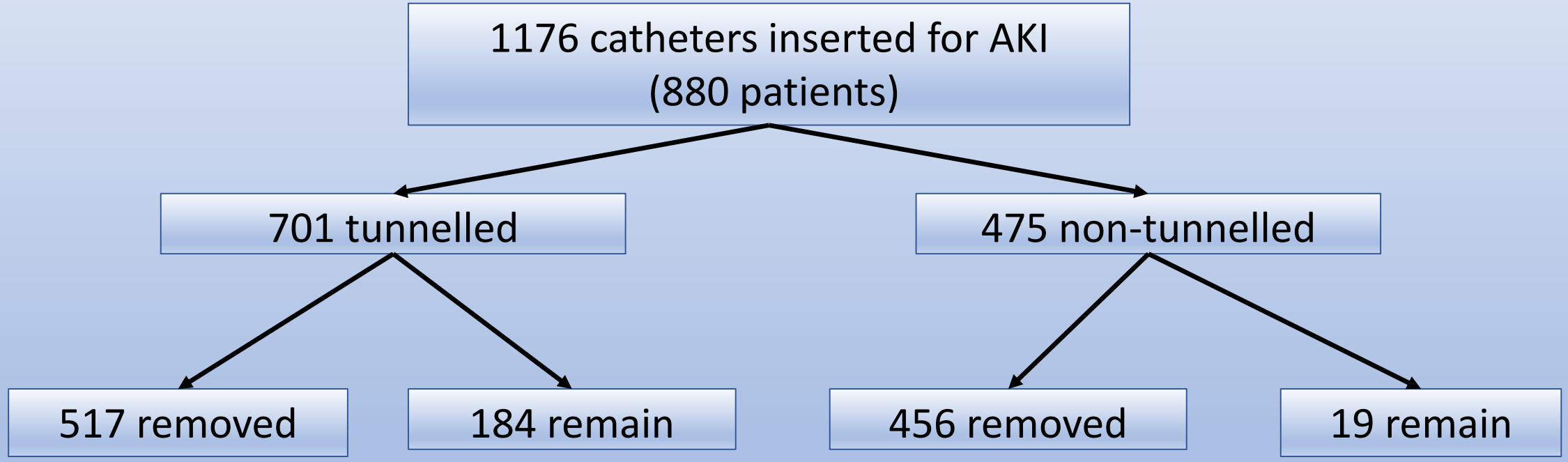

*data missing for 1 catheter

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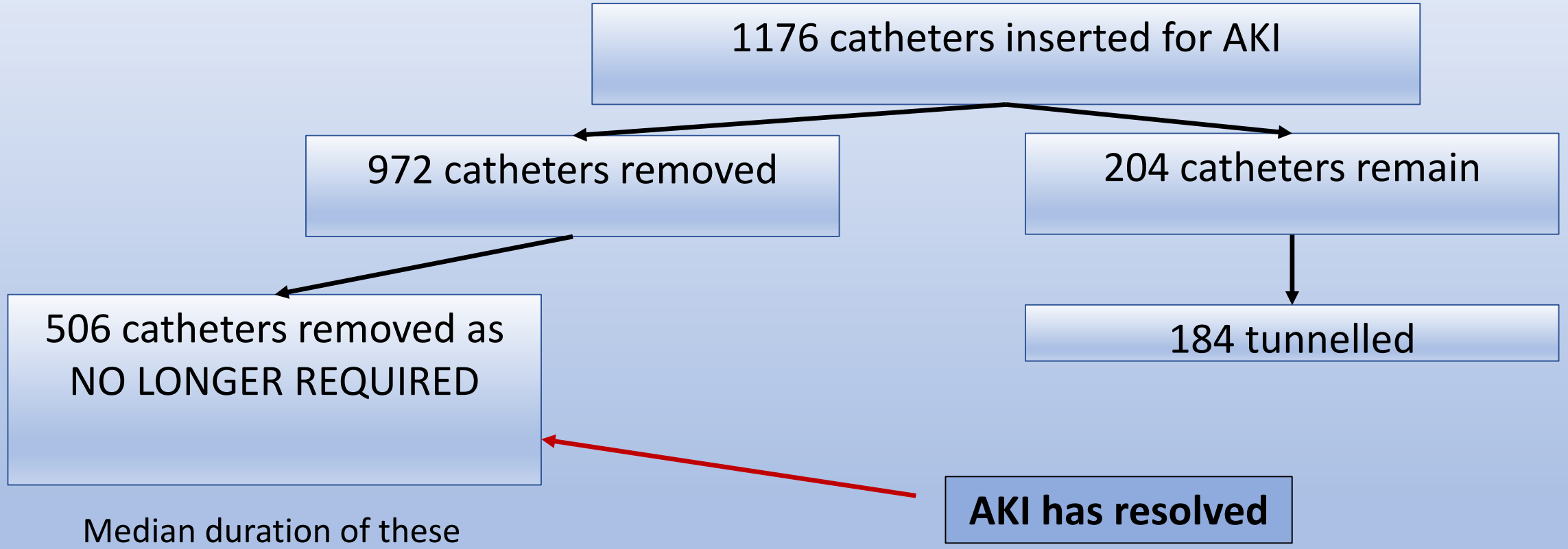
Overall catheters required for AKI



Median duration of these was 14 days (IQR 6-31 days)

Duration of catheters

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	AKI (IQR) days	Non-AKI (IQR) days	Overall (IQR) days
Tunnelled catheters	35 (14-106)	94 (37-186)	75 (26-170)
Non-Tunnelled catheter	6 (3-9)	5 (3-8)	6 (3-9)
All catheters	14 (6-52)	70 (15-167)	43 (9-136)

184 catheters that remained	**Duration – 126 (58-225)**

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Catheter removed and not replaced

Why catheters were not replaced?	n=532
Recovery of renal function	429
Functional haemodialysis access	54
Functional peritoneal dialysis access	17
Withdrew from treatment	79
Transplant	1
Death	2

Overall catheters required for AKI

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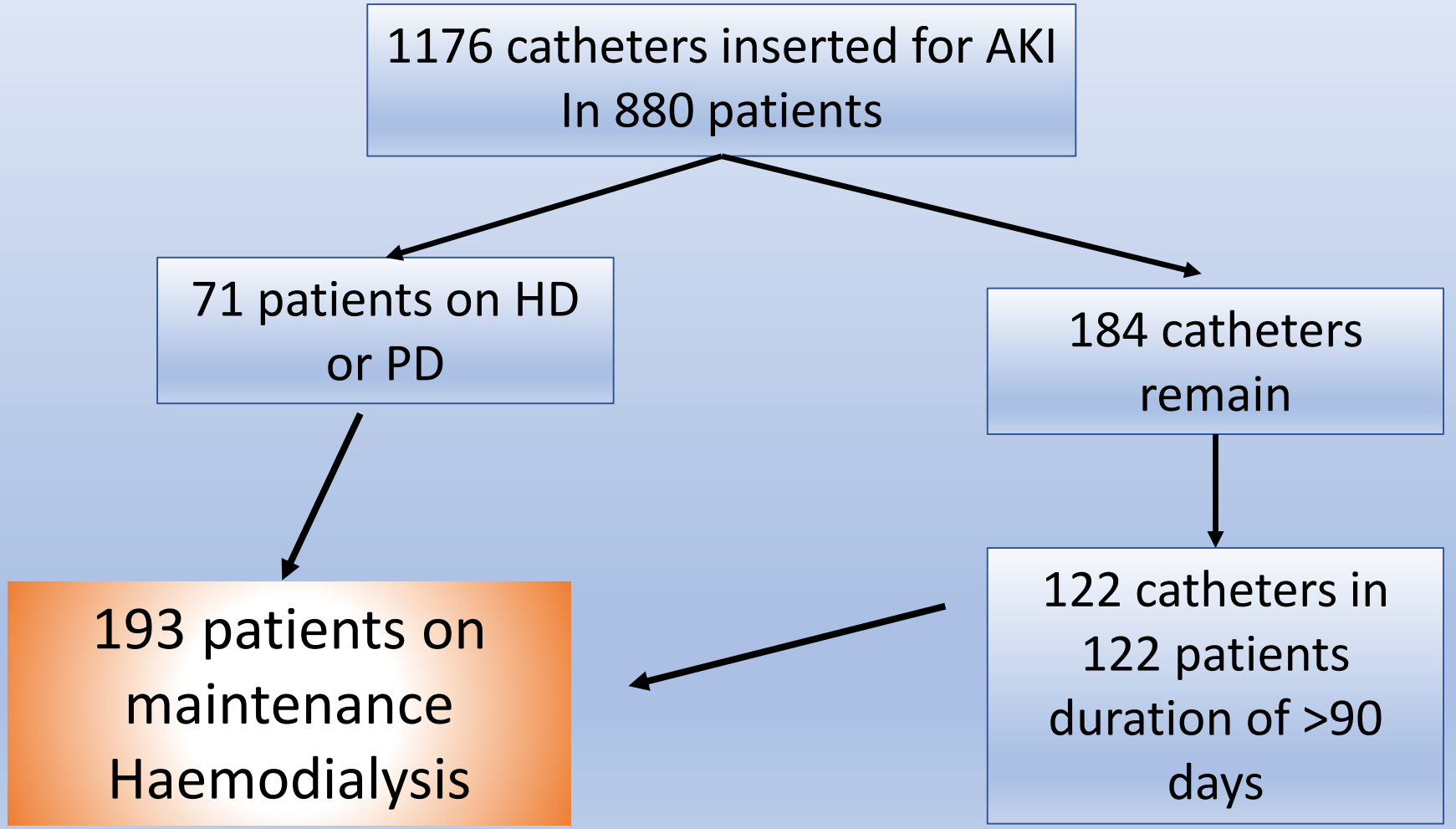

Conclusion

33% of all dialysis catheters inserted are for AKI

About 16% of these catheters are for people who end up on maintenance HD

Summary

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International cluster stepped wedge

75% of Australian renal population

Data on more than half a million catheter days

Another couple of years to go

Standardised definitions, data collection

Interventions implemented – standardisation of catheter management practices nationally

Acknowledgements

Nursing and Physician leaders
at all renal units

Ms Sarah Coggan
A/Prof Martin Gallagher
A/Prof Kevan Polkinghorne
A/Prof Nicholas Gray
A/Prof Girish Talaulikar

Partners

Prof Alan Cass
Prof Stephen McDonald
Prof Stephen Jan

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Questions?