

Assisted Peritoneal Dialysis

BC Kidney Days
Vancouver, BC

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Declaration

- Co-inventor of the Dialysis Measurement Analysis and Reporting (DMAR) system
- Some of the data presented is derived from DMAR

Objectives for the talk

- To describe the key components of home care assisted PD
- To provide a framework for understanding PD utilization
- To apply this framework to explain how assisted PD may increase PD utilization

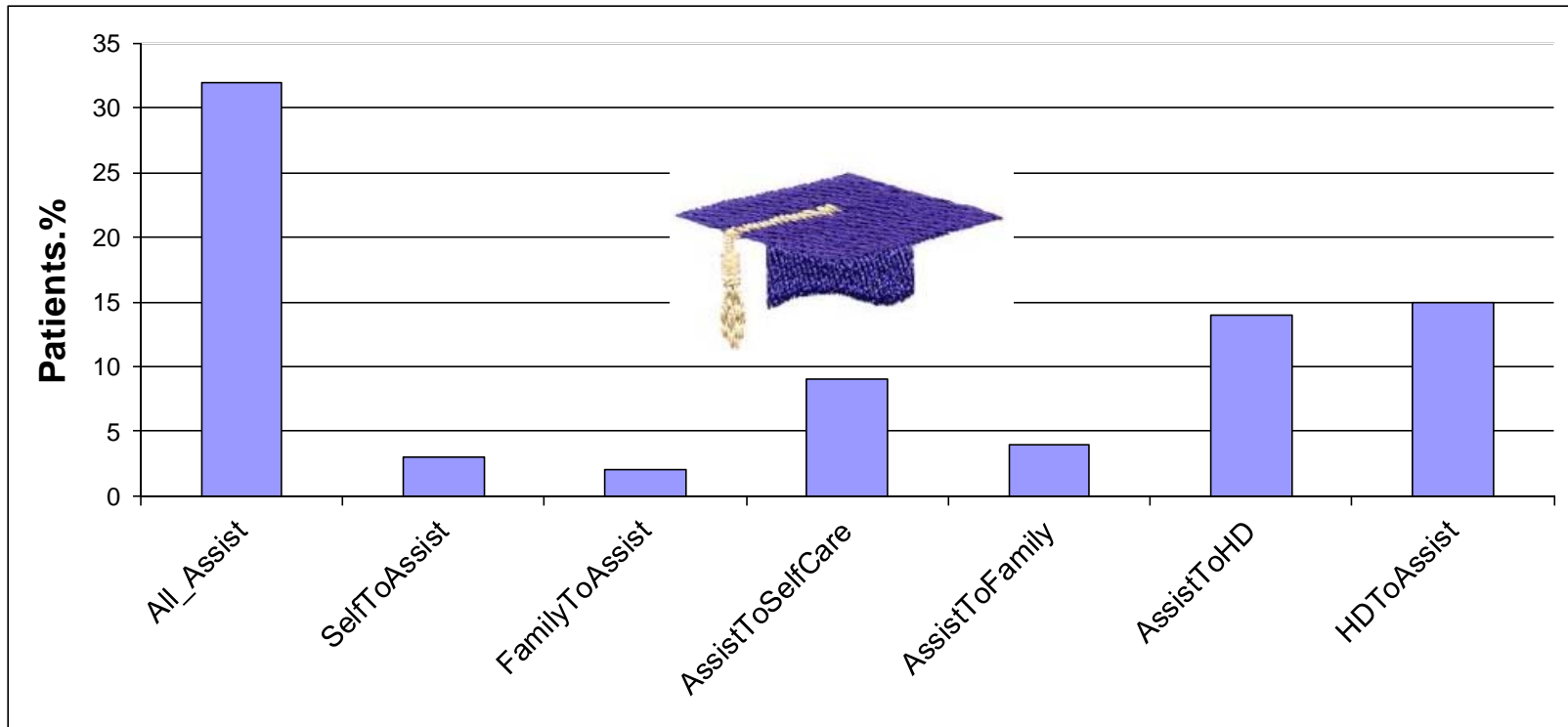
Key components of assisted PD

- Target pop: Patients with barriers to self-care (elderly)
- Assistants: Nurses or nursing assistants
- Tasks: Assessments, machine set-up, connection, disconnection
- Funding: Home agencies, PD programs +/- Vendors

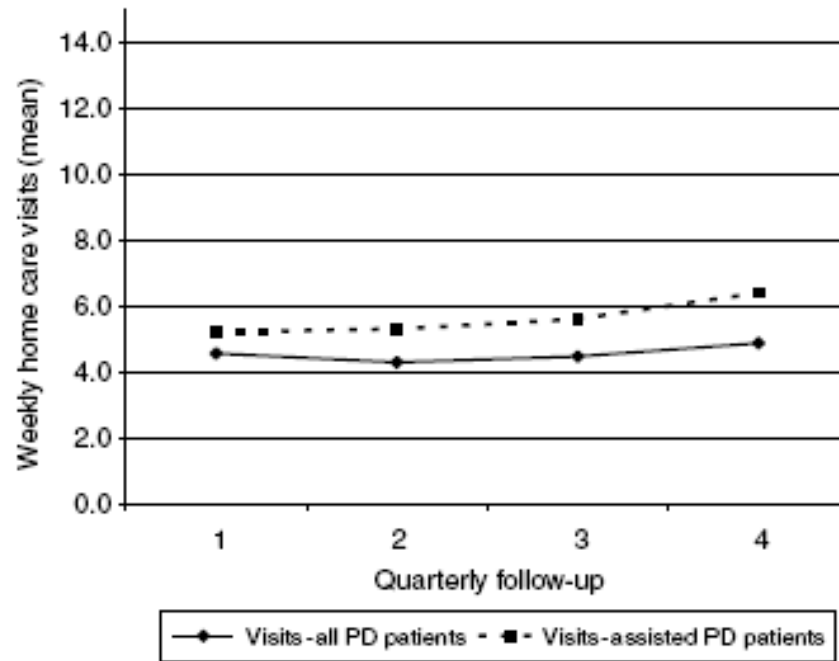
Cost considerations

- Periods of assistance and rate during the periods
- Number of assistants distributed over the patients
- Training and monitoring costs
- Maintaining critical mass
- Catchment area

Cost – variable periods of support



Cost – mean rate of visits per time on PD



Annual cost of PD = \$34,919

Annual cost of HD = \$66,353

Additional operating cost of
\$12,000 per patient-year at
\$50.00 per visit (all RNs)

Figure 1 | Weekly rate of home care nursing visits. The rate of home care visits is indicated in the total PD population living in the region of home care assistance (solid line) and the subgroup of patients who received assistance at some point (dashed line). The home rate was stable over time and below the maximum rate available, which were 14 visits per week.

Lee H et al. *Am.J.Kidney Dis.* 40 (3):611-622, 2002.

Oliver MJ et al. *Kidney Int.* 71 (7):673-678, 2007.

PD use among prevalent patients

18%

Canada \$51,689 USD per capital

7%

United States...\$49,601 USD per capita

66%

Mexico.....\$10,514 USD per capita

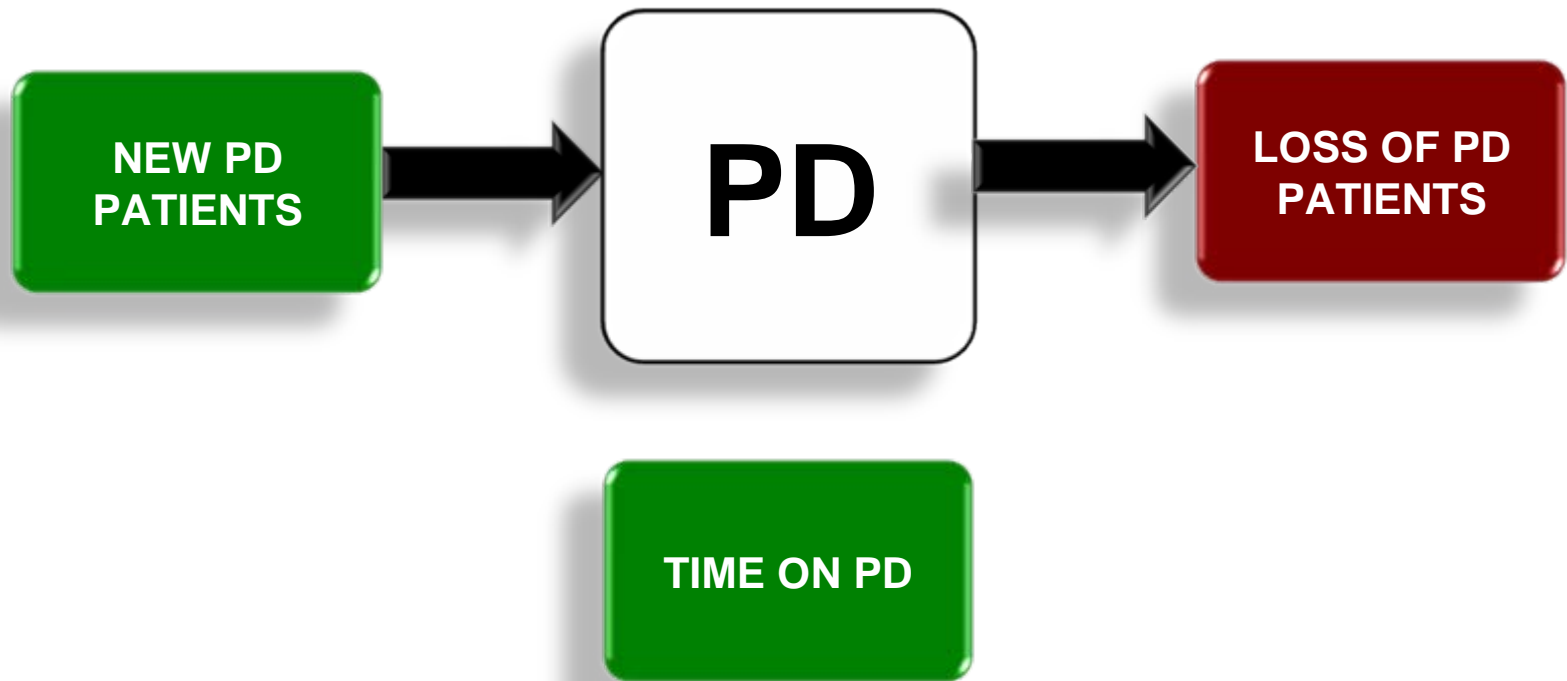
66%

Hong Kong\$36,218 USD per capita

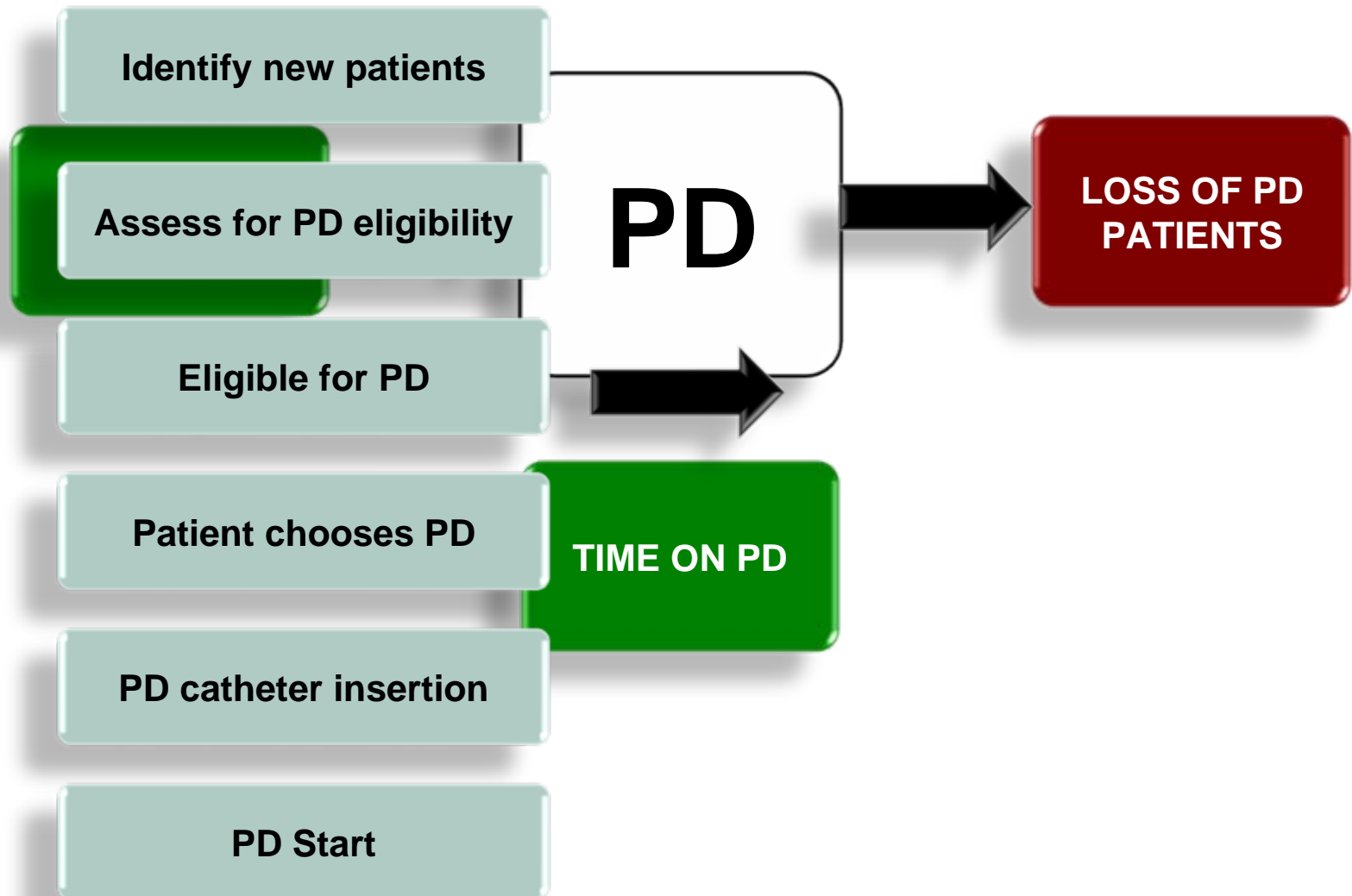
Jain AK, Blake P, Cordy P, Garg AX: Global trends in rates of peritoneal dialysis. *J Am Soc Nephrol* 23:533-544, 2012

<http://www.imf.org/external/pubs/ft/weo/2011/02/pdf/text.pdf>

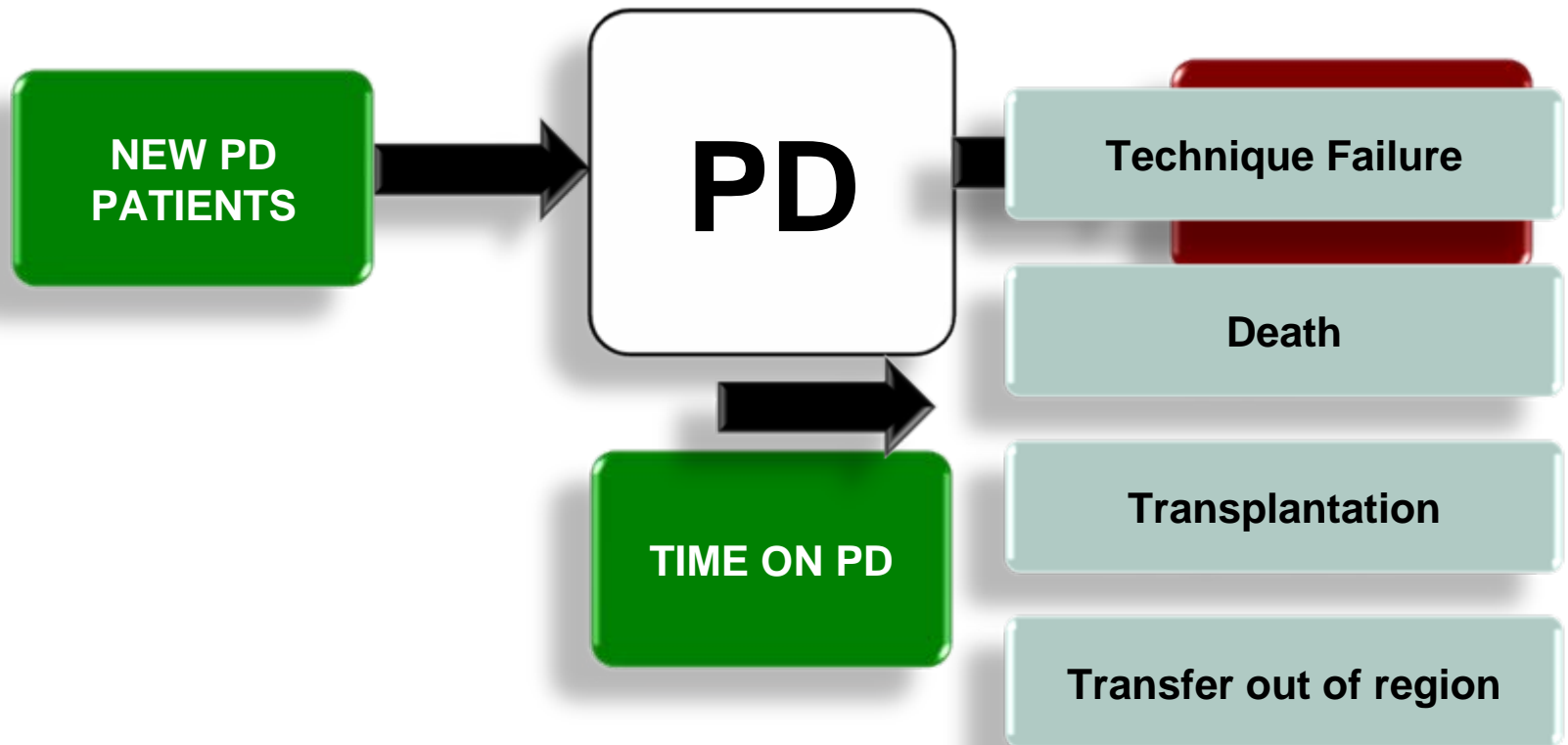
PD use among prevalent patients



Patient start on PD through six steps



Patients leave PD through four mechanisms



Resulting in 10 primary drivers of PD utilization

Identify new patients

Assess for PD eligibility

Eligible for PD

Patient chooses PD

PD catheter insertion

PD Start

Technique Failure

Death

Transplantation

Transfer out of region

Assisted PD likely affects 3 of these drivers

Identify new patients

Assess for PD eligibility

Eligible for PD

Patient chooses PD

PD catheter insertion

PD Start

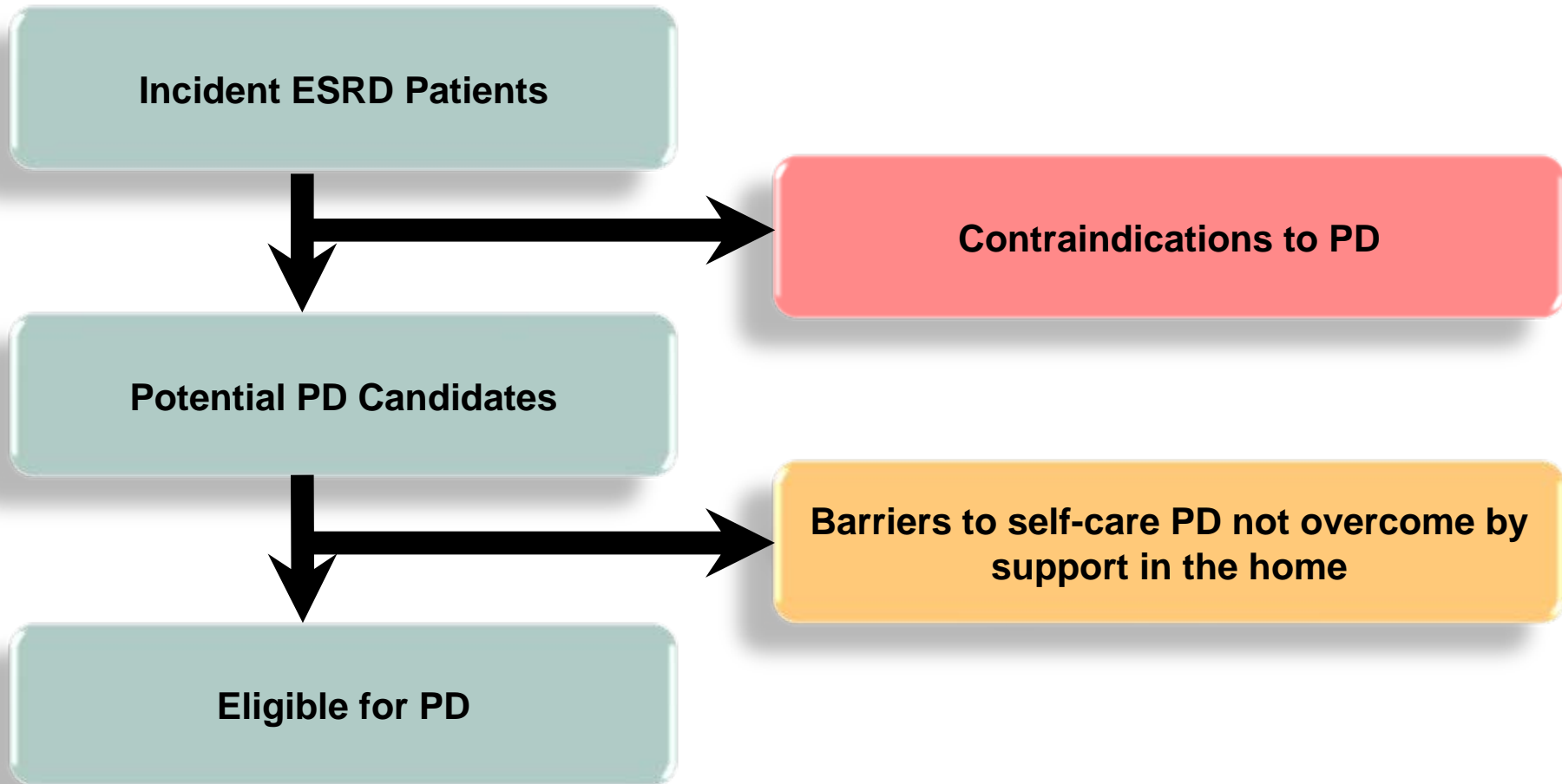
Technique Failure

Death

Transplantation

Transfer out of region

PD eligibility – Three secondary drivers



PD eligibility – Barriers to self care PD

N = 940 consecutive patients across 3 programs who were assessed for PD and did not have a medical or social contraindication identified (unpublished data)

Category	Types	Prevalence
Physical	Strength, Dexterity, Vision, Hearing, immobility, frailty	41%
Cognitive	Dementia, psychiatric illnesses, anxiety, non-compliance, language barriers, learning disabilities	37%
Social	Caregiver burden	NA

PD eligibility – increased by assistance

Table 2 | Eligibility, choice, and use of PD according to availability of home care

	Region with home care	Region with no home care
Patients	83	51
Age, median	75 ^a	66
Male, N (%)	42 (51) ^b	35 (68)
Predialysis care, N (%)	60 (74)	21 (78)
Hospital start, N (%)	29 (57)	35 (42)
Conditions acting as	3	2
<u>Eligible for PD, N (%)</u>	66 (80) ^c ←	33 (65)
<u>Choose PD if they were eligible, %</u>	39 (59) ←	19 (58)
Received PD as chronic modality	39 (47)	19 (37)

provision of self-care PD.

Choose PD was defined as an attempt or insertion of a PD catheter.

^aP=0.02.

^bP=0.04.

^cP=0.06 compared to region with no home care (unadjusted); P=0.01 adjusted for differences in age, sex, predialysis care, and number of conditions acting as barriers to PD between the regions.

Assisted PD – Technique survival

Identify new patients

Assess for PD eligibility

Eligible for PD

Patient chooses PD

PD catheter insertion

PD Start

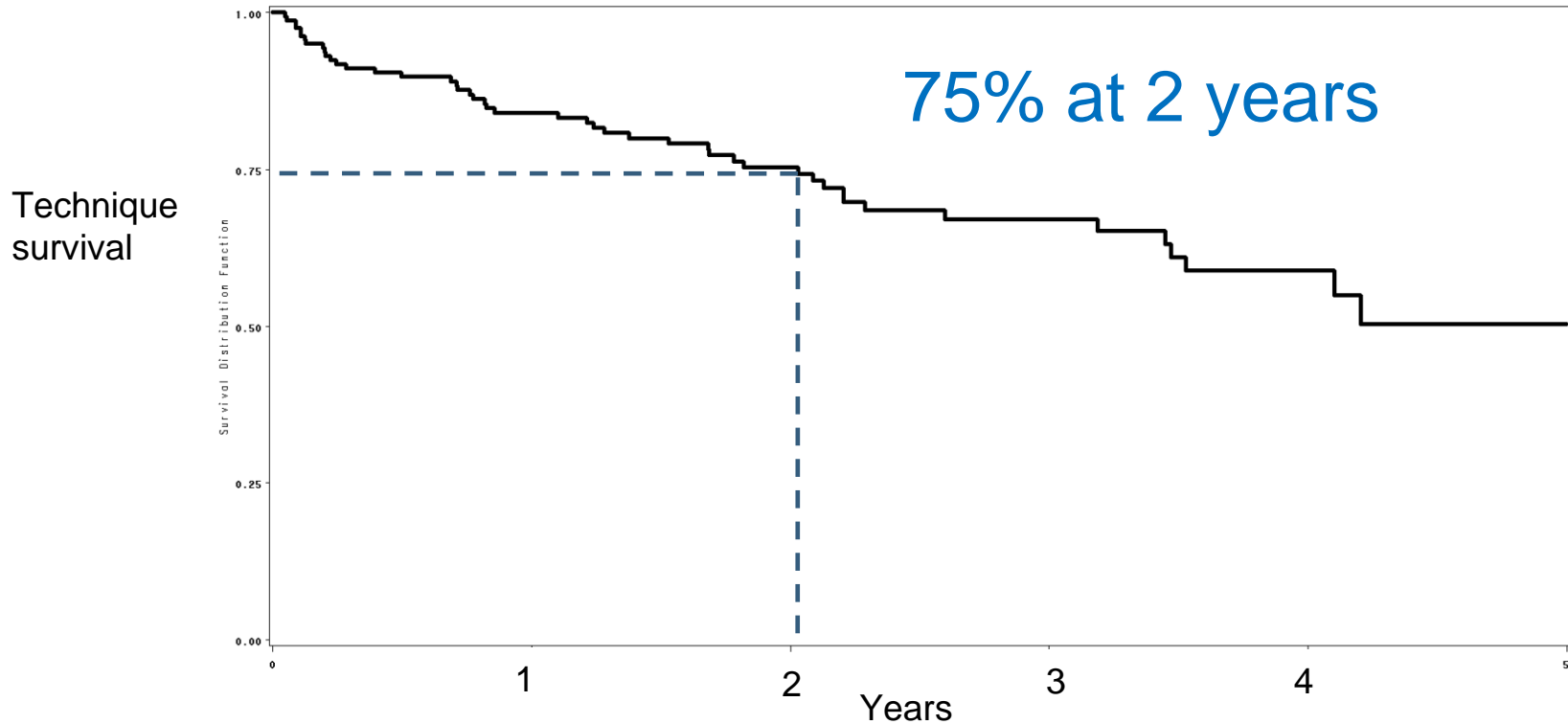
Technique Failure

Death

Transplantation

Transfer out of region

Traditional PD technique survival



Death, transplant, and transfer out are CENSORED

Technique survival – French PD registry

Table 2. Cumulative incidence of the events at specific times points with the cumulative incidence function estimate

Event per Type of Assistance	6 Months	12 Months	18 Months	24 Months
Self-PD				
death	1.8	3.8	5.4	7.2
renal recovery	0.6	1.0	1.1	1.3
transfer to HD	6.6	12.4	17.2	21.5
renal transplantation	4.4	12.2	19.1	24.7
Assisted PD				
death	13.8	24.3	32.5	39.8
renal recovery	0.7	1.1	1.3	1.4
transfer to HD	6.1	9.5	12.7	15.0
renal transplantation	0.3	0.7	0.9	1.2

Data are expressed as percentages. PD, peritoneal dialysis; HD, hemodialysis.

Lobbedez T, Verger C, Ryckelynck JP, Fabre E, Evans D: Is assisted peritoneal dialysis associated with technique survival when competing events are considered? *Clin J Am Soc Nephrol* 7:612-618, 2012

Technique survival – increased by assistance

Table 6. Cause-specific relative hazard and subdistribution relative hazard associated with assisted PD (event of interest: transfer to hemodialysis)

Assistance	Cause-Specific RH (95% CI)				Subdistribution RH for HD (95% CI)
	Death	Recovery	Transplantation	HD	
Family-assisted PD (reference group: nurse and self-care PD)	2.23 (1.97–2.53)	0.72 (0.40–1.31)	0.33 (0.24–0.46)	0.87 (0.75–1.01)	0.81 (0.70–0.94)
Nurse-assisted PD (reference group: family and self-care)	2.18 (1.96–2.42)	0.74 (0.48–1.13)	0.16 (0.12–0.22)	0.85 (0.76–0.95)	0.72 (0.63–0.81)
Assisted PD (reference group: self-care PD)	2.19 (1.98–2.43)	0.73 (0.49–1.10)	0.21 (0.17–0.26)	0.85 (0.77–0.95)	0.73 (0.65–0.81)

Adjusted for age, sex, modified Charlson comorbidity index, underlying nephropathy, failed transplantation, transfer to hemodialysis, early peritonitis, and center size. RH, relative hazard; CI, confidence interval; HD, hemodialysis; PD, peritoneal dialysis.

Lobbedez T, Verger C, Ryckelynck JP, Fabre E, Evans D: Is assisted peritoneal dialysis associated with technique survival when competing events are considered? *Clin J Am Soc Nephrol* 7:612-618, 2012

Technique survival - peritonitis

- Verger et al (France) – 1 per 36 months (similar to self-care, worse than family assisted PD)
- Xu et al (China) – 1 per 55 months (no difference between assisted and self-care PD)
- Hsieh (Taiwan) – 1 per 24 months (higher than family assisted or self-care PD)

Assisted PD as rescue or palliation

- Assisted PD has been described as salvage therapy in patients who have exhausted vascular access or those who are too hemodynamically unstable for hemodialysis (e.g. severe CHF)
- Some patients may choose assisted PD over palliation if incenter HD is the only other option

The 10 primary drivers of PD utilization

Identify new patients

Assess for PD eligibility

Eligibility - 65% to 80%

Patient chooses PD

PD catheter insertion

PD Start

Technique Failure +15%

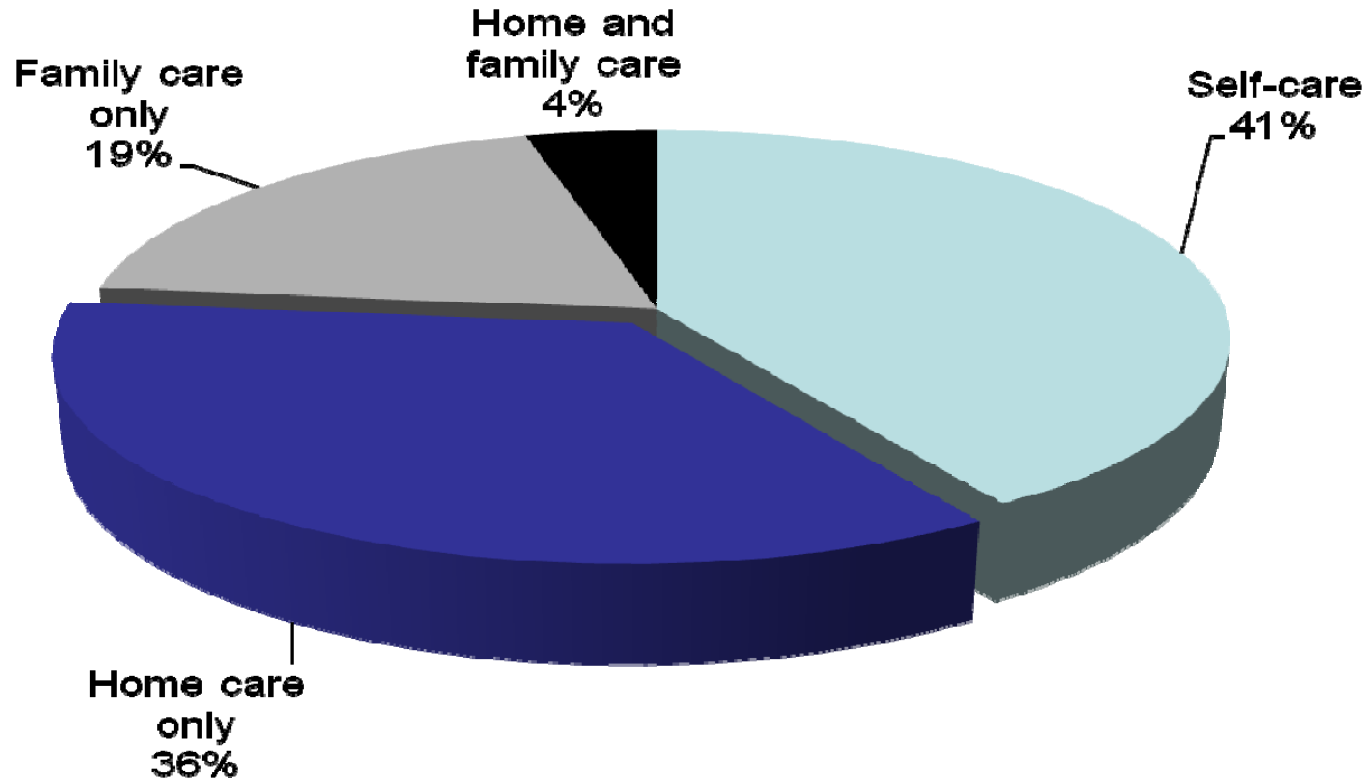
Death – ? effect

Transplantation

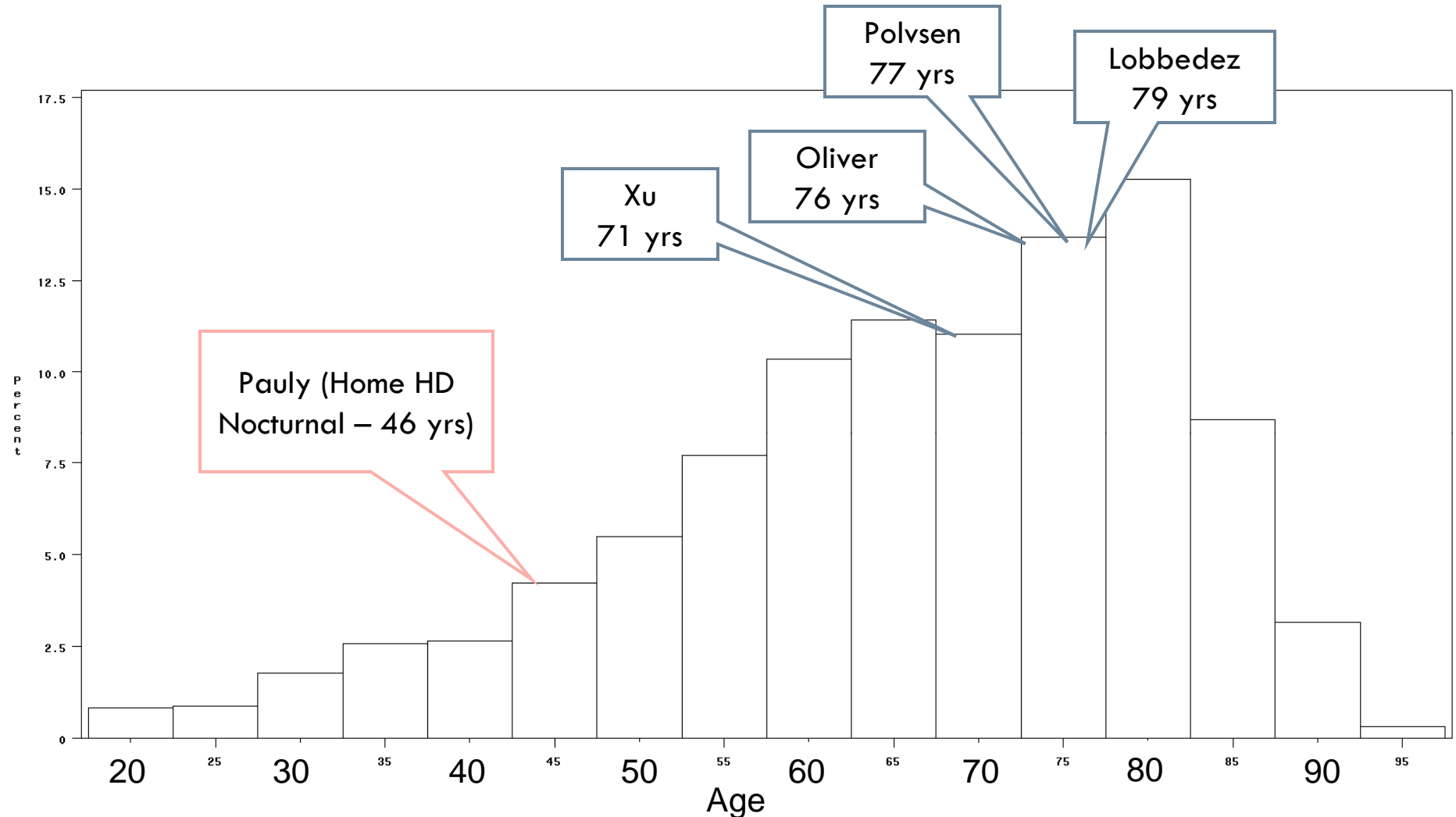
Transfer out of region

Indirect arguments for assisted PD

- The utilization of assisted PD is high if it is available



Indirect arguments for assisted PD: Only home dialysis modality that targets an elderly population



Lobbedez et al. Perit Dial Int 26:671-676, 2006; Oliver et al Kidney Int 71:673-678, 2007; Povlsen et al Perit.Dial.Int. 28 (5):461-467, 2008; Xu et al Perit.Dial.Int. 32 (1):94-101, 2012; Paul et al Nephrol Dial Transplant 2009 Sep;24(9):2915-9

Assisted PD patients are much older than self-care patients

	Self-care (N=44)	Assisted (N=61)
Age, mean	63	74
Diabetes, %	50	53
Coronary artery disease, %	25	51
Congestive heart failure, %	23	38
Other cardiac, %	25	44
Peripheral vascular disease, %	16	8
Cerebrovascular disease, %	5	21
History/active cancer, %	14	20
12 months of predialysis care, %	68	75
eGFR at start, ml/min, mean	8.1	12.9

What is not known about assisted PD

- The effect of implementing assistance on PD utilization at a program, regional, or national level.
- Whether the added cost of implementing and maintaining an assisted program is “paid back” from increasing PD utilization
- The effect of assisted PD compared to self-care PD on other important outcomes such as hospitalization and mortality adjusted for the significant differences in the populations

PD program survival

Identify new patients

Assess for PD eligibility

Eligible for PD

Patient chooses PD

PD catheter insertion

PD Start

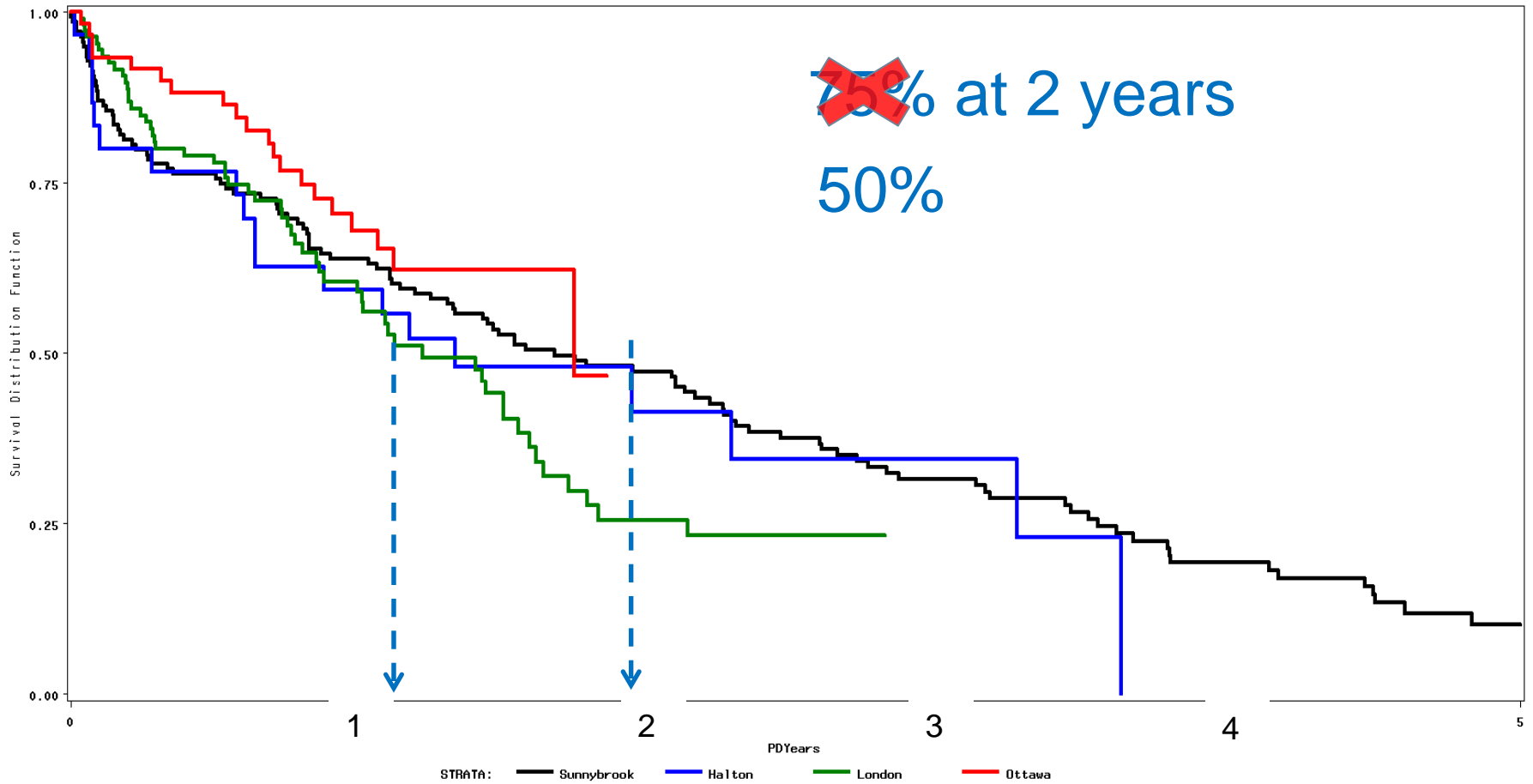
Technique Failure

Death

Transplantation

Transfer out of region

PD program survival – a sobering look



Summary

- Home care assisted PD allows elderly patients with barriers to self-care the option to receive dialysis in their home. This benefits shifts home dialysis up the age demographic.
- The availability of assistance likely increases PD eligibility, reduces technique failure and may extend life by offering patients a dialysis option when in-center HD is not possible.
- Assistance is widely used if offered.
- Continued research is required to better define the cost utility of assisted PD and outcomes on assisted PD.

Partners

