

Implementation of Measuring and Monitoring of Patient Safety Framework to Improve Peritoneal Dialysis Catheter Failure Rate – Lessons Learned from the Clinical Improvement Team

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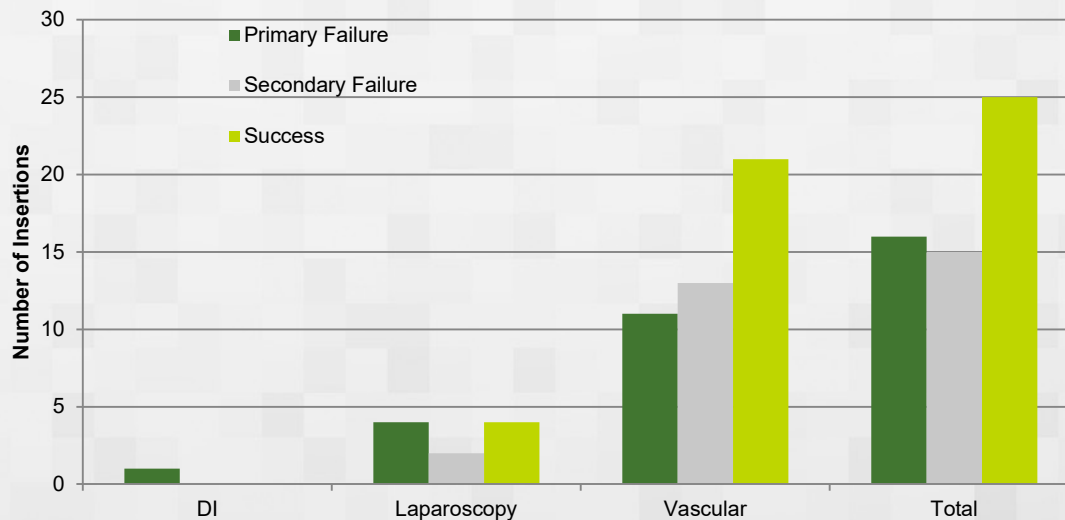
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PURPOSE

- Peritoneal Dialysis (PD) offers patients a home based dialysis option, resulting in improved quality of life for renal failure patients as well as decreased cost to the health system when compared to in hospital hemodialysis (HD).
- PD catheter failure rates are associated with significant hardship to the patient, and an overall increase in cost to the health system.
- Current methods of PD catheter insertion have resulted in high failure rates.
- As part of the Saskatchewan Health Authority's (SHA) sustainability plan, Kidney Health and Interventional Radiology (IR) collaborated to achieve best practice for peritoneal dialysis (PD) catheter insertions by providing a minimally invasive, timely, and cost effective alternative.

2015 PD Catheter Insertion Outcomes by Insertion Technique



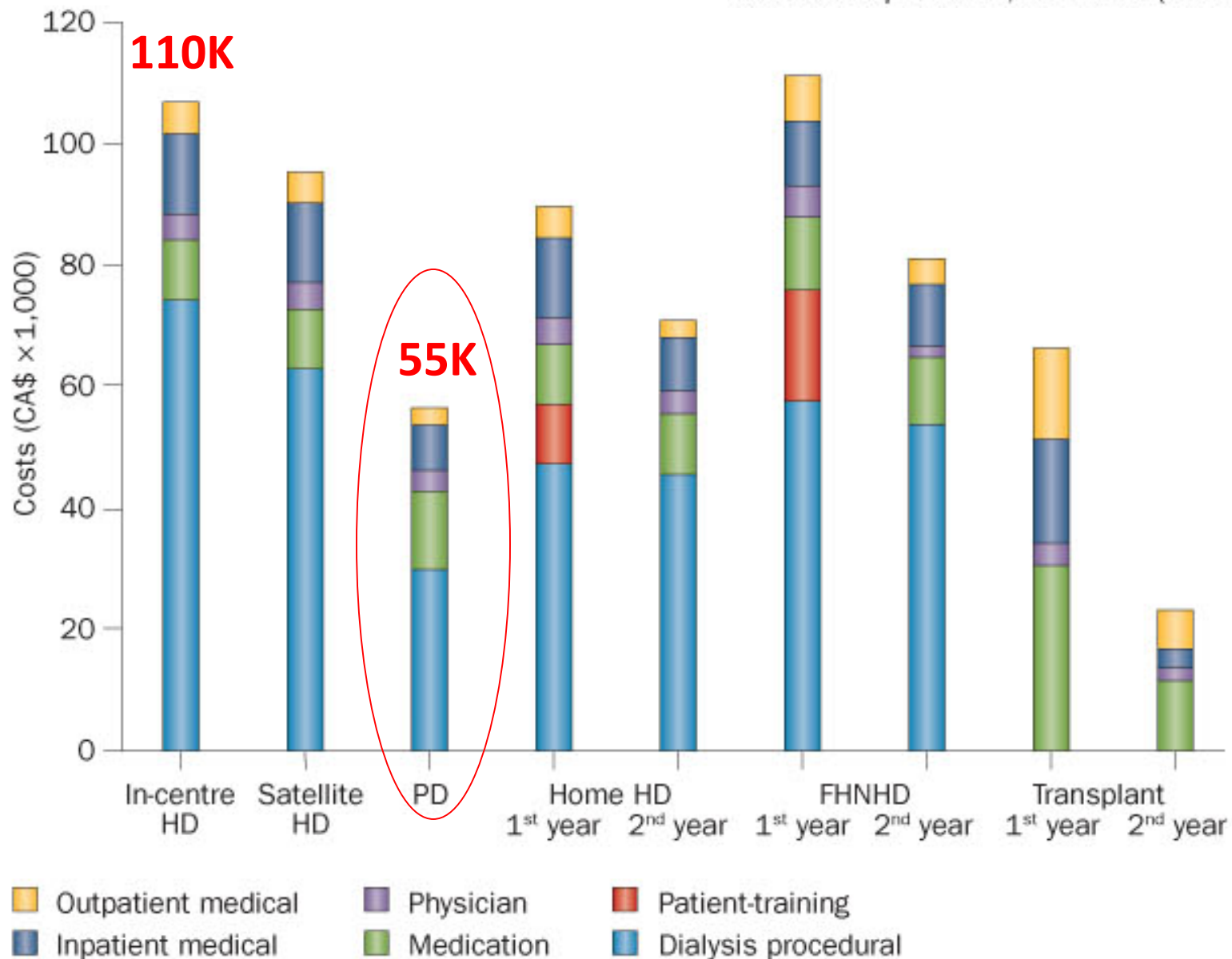


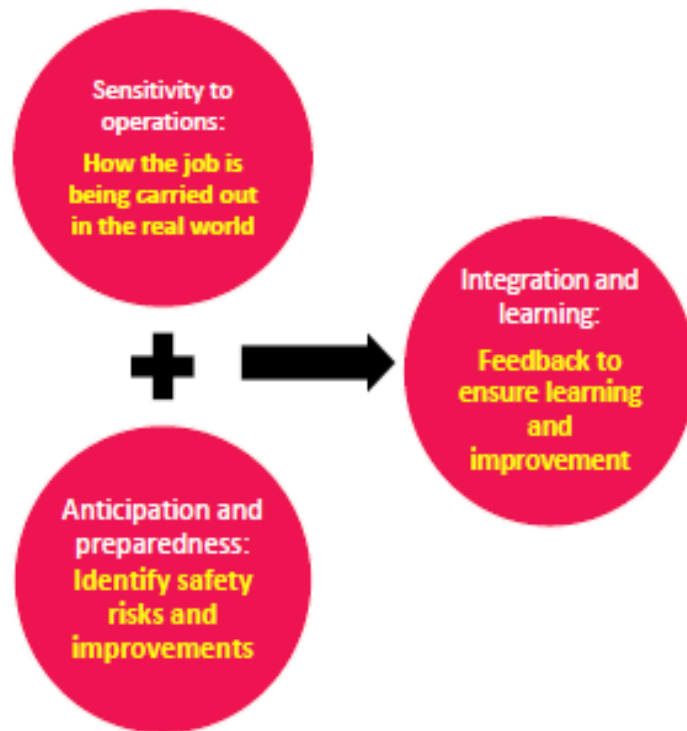
Figure 1 | Annual health-care costs of dialysis stratified by modality in Canada.

METHODS

- The interdisciplinary clinical improvement team (CIT) participated in the Canadian Patient Safety Institute Measuring and Monitoring for Patient Safety Framework (MMSF) national collaborative.
- The team was challenged to improve the quality and safety of patient care with clinical pathways, overcome traditional ‘department’ boundaries, and better capture and understand the patient and family care experience.
- The CIT oversees the development, monitoring, and continuous improvement of clinical pathways drawing upon evidence based best practice.
- This team employed a holistic approach and involves staff, clinicians, and patients and families at all levels.
- The MMSF served to translate real time data so it is useful to take action, gap analysis for process improvement, identifying strengths and weaknesses, and promoting a culture of safety and continuous improvement: PD patient flow (from selection criteria, referral, procedure, training, home); PD catheter failure rate; mapping of PD patient safety indicators by dimension to determine core data set; and cultural appropriateness (staff level).

In partnership with the Canadian Patient Safety Institute, the Kidney Health team participated in national collaborative for measuring and monitoring patient safety, and implemented the Vincent Framework for measuring and monitoring safety

THE LINKS and CONNECTIONS



Past Harm

- Prospective record of 1° and 2° PD failure
- Historical data of kidney failure
- Extra tests due to complications
- Death rate - transfer to hemodialysis
- Peritonitis rate
- Exit Infection rate

Reliability

- Standard patient education
- Standard order sets (pre intra post procedure)
- PD assessment / modality choice
- Referral process standardized
- Exit site marking
- Standard clinic visit with follow-up

Sensitivity to Operations

- Daily huddle in PD
- Exit site teach
- Follow-up appointments / Care plan

Anticipation and Preparedness

- Daily team huddles
- Discharge plan / teaching
- Quarterly meetings
- Access referral
- Clinical feedback loop

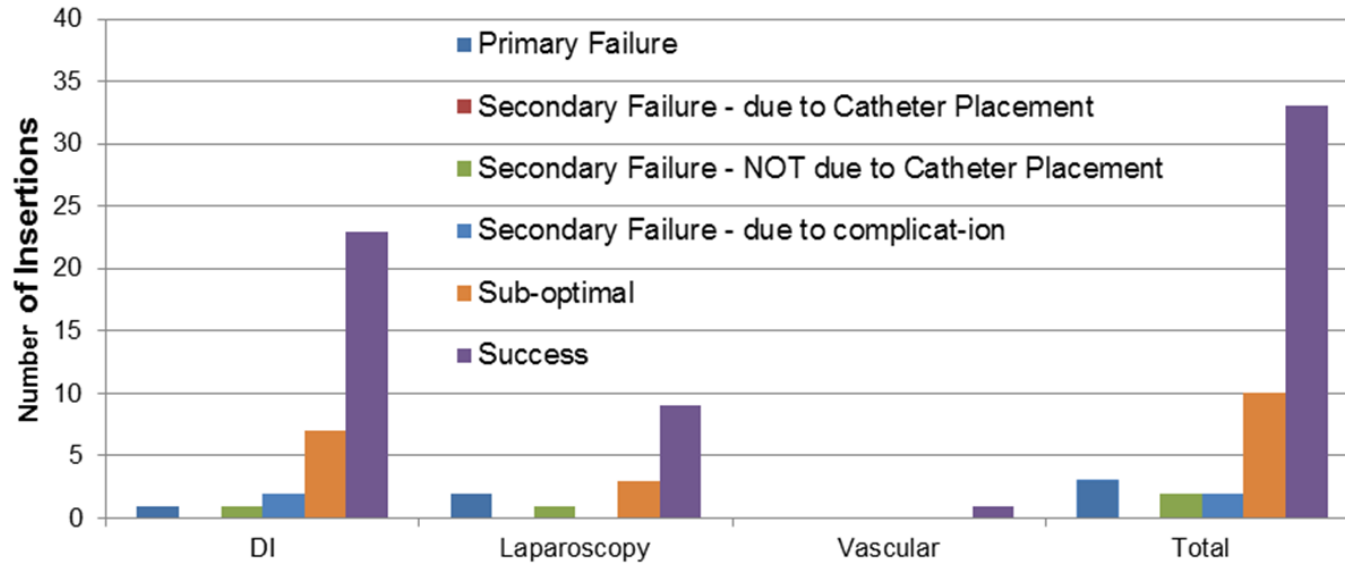
Integration and Learning

- Quarterly meetings - Full team
- Monthly clinical team meetings
- Process mapping and improvement

RESULTS

- Through focused efforts, the CIT has reduced PD catheter failure rate from 31/62 (50.0%) in 2016, to 11/50 (22.0%) in 2018.
- Process improvements implemented were standard workflow and PD assessment, exit site marking for interventional radiology only, standard room set up, patient safety questionnaire, quarterly review of metrics and reporting, ongoing case reviews, and lead time reduction (time to referral, assessment, PD insertion, and PD train).
- Single centre experience, with a single Interventional Radiologist has allowed for standardization of technique, but also poses challenges in terms of peer-to-peer support and enhancing insertion technique learning.
- The CIT was awarded a leading practice from the Health Standards Organization and Accreditation Canada, for excellence in patient and family engagement.

2018 PD Catheter Insertion Outcomes by Insertion Technique



From 2016 to 2019 ytd, 34.5% reduction in PD catheter failure rate to 15.5.0%

In 2018, 21 patients avoided need for hemodialysis lines, and were able to remain at home with PD

Reliability: probability of a catheter functioning correctly over a period of time, under a given set of conditions , goal is failure rate <10%

Success: patient able to train and at home performing PD

Primary Failure: inserted catheter cannot be used/flushed and patient is not trained

Secondary Failure: patient is trained but ultimately has to stop PD due to major issue

Due to Catheter: catheter drainage issue is reason patient cannot continue PD

Not due to Catheter: catheter is in good position by imaging but drainage is poor (typically felt due to “fecal loading”)

Due to Complication: hernia, leak

Current methods of PD catheter insertion have resulted in high failure rates (surgical and interventional radiology (IR) combined, insertions within 3 months) in patients in Saskatoon:

- 2016 1^o and 2^o failure rate 31/62 (50.0%)
- 2017 1^o and 2^o failure rate 23/71 (32.4%)
- 2018 1^o and 2^o failure rate 11/50 (22.0%)



Home Dialysis Rates by Location

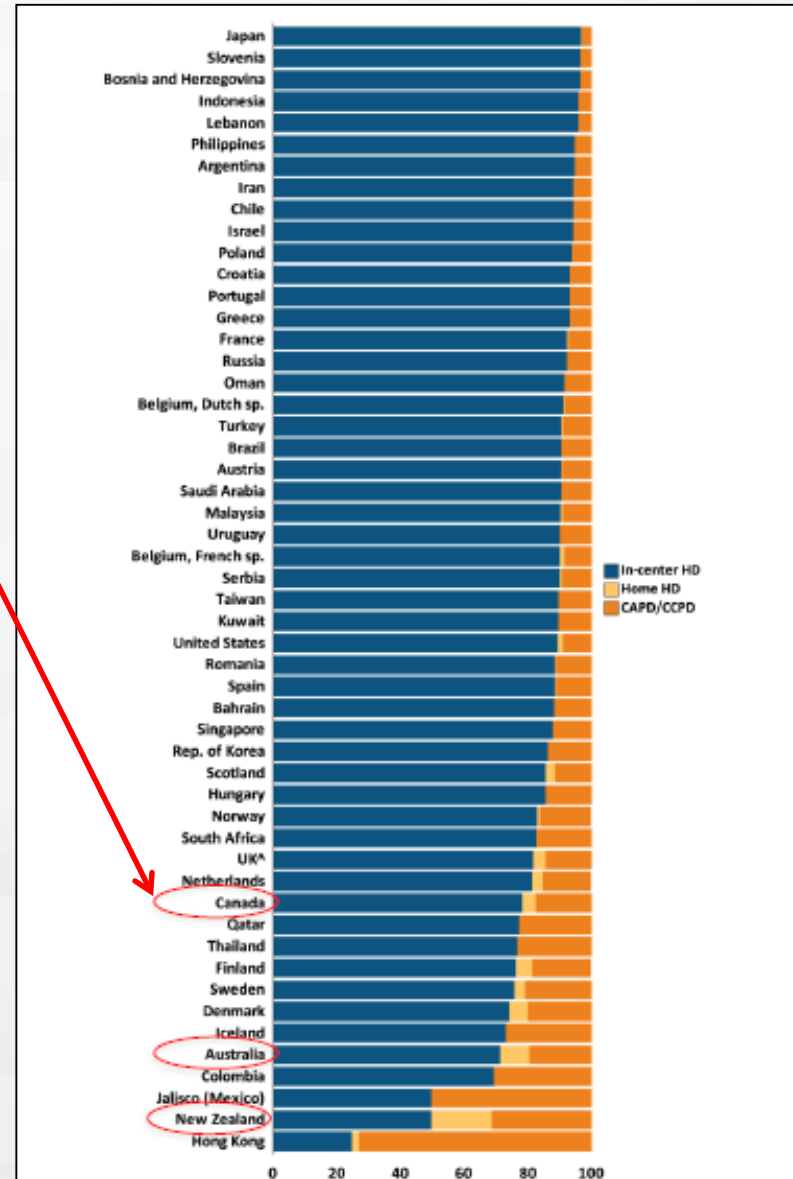
Home Dialysis Rates				
Location	PD	HHD	Total	Target
Australia	20%	9%	29%	40%
New Zealand	31%	19%	50%	60%
Canada	18%	4%	22%	30%*
Saskatchewan	23%	3%	26%	40%**
Saskatoon	28%	4%	32%	40%
Regina	17%	2%	19%	40%

* ISPD 30%
**Sask Provincial Dialysis Working Group 2019-20

Definition of targets vary significantly, by percentage set, operational definition, and financial penalty

- Within 6 months of initiating dialysis
- Peritoneal dialysis unless contra-indicated
- Type of *Home First* Model of Care

Reaching a target of 40% will require new strategies, investment, and a better understanding of patient and family preferences



United States Renal Data System

United States Renal Data System. 2018 USRDS annual data report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2018

Home Dialysis Rates by Location

Table 1. Current Patient Volumes for SHA Home Based Therapies

Program	% Home Based Therapies (HBT) Target: 30%	% HBT Target: 40%	Strategies to Achieve Growth - Enablers
Saskatoon	PD 152 pts HHD 21 pts # HBT Pts/# Dialysis Pts 173/546	+ 45 pts	<i>Home First & Patient Choice</i> Assisted PD Alternate housing Financial subsidies New Technology, cloud based monitoring New funding model New transition unit Self-needling Program Peritonitis and exit site infection protocols Pre-dialysis education redesign Community support/social network Best Practice and clinical pathways Key performance indicator set
Regina	PD 72 pts HHD 8 pts # HBT Pts/# Dialysis Pts 80/425	+ 90 pts	

Program	New PD Patients/YR	New HHD Patients/YR	Total
Regina	30	6	36
Saskatoon	80	8	88
Total	110	14	124

Need to consider attrition rate:
transfer to ICHD,
conservative care,
death

CONCLUSION

- Peritoneal dialysis is an important model of home based therapies to avert or delay the need for hemodialysis.
- Strategies to increase uptake of home based therapies to date are not well documented. It is important to identify best practice, implement solutions to ameliorate cause-specific technique failure, and optimize clinical practice.
- Extending technique survival on PD and home hemodialysis remains a major challenge to optimizing outcomes for patients while increasing utilization.