Budget Impact Analysis of the Introduction of Endo Arteriovenous Fistula System (WAVELINQ) for Hemodialysis Access Creation in Patients with End-Stage Kidney Disease

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Background and Objectives:

- Patients with end-stage kidney disease (ESKD) require hemodialysis (HD) for renal replacement therapy, which involves vascular access (VA). However, VA historically has low patency rates, leading to frequent reinterventions and significant costs.[1]
- Clinical guidelines recommend using arteriovenous access (arteriovenous fistula; AVF or arteriovenous graft; AVG) over a central venous catheter (CVC) for VA in HD patients.[2]
- Technological advancements, like endovascular AVF (endoAVF) using the WavelinQ System, offer a more cost-effective and clinically efficient way to create VA compared to traditional surgical AVF (sAVF).[3,4] Evidence supports endoAVF for improved patency and reduced reinterventions.[5]
- This budget impact analysis aims to estimate the potential budget impact of utilizing the endoAVF system (WavelinQ) compared with sAVF and CVC for treating end-stage kidney disease patients on HD in Australia.

Methods:

Modelling framework

Table 1 presents model aspects and **Figure 1** presents the model structure**.**

VA Comparators: Based on Kidney Disease Outcomes Quality Initiative (KDOQI) clinical practice guideline recommendations for VA (AVF, AVG, CVC).[6]

Epidemiology : ESKD patients receiving HD covered by the Australian healthcare system were included in the analysis. Epidemiology data was gathered from ANZData 2019[7]. **Table 2** presents epidemiological model parameters.

Market Share Determination: Conducted interviews with key opinion leaders.

Assumed Market Penetration: WavelinQ uptake was 50% of incident HD patients substituting from sAVF arm and 10% of prevalent HD patients from sAVF arm.

Table 1: Aspects of modelling framework

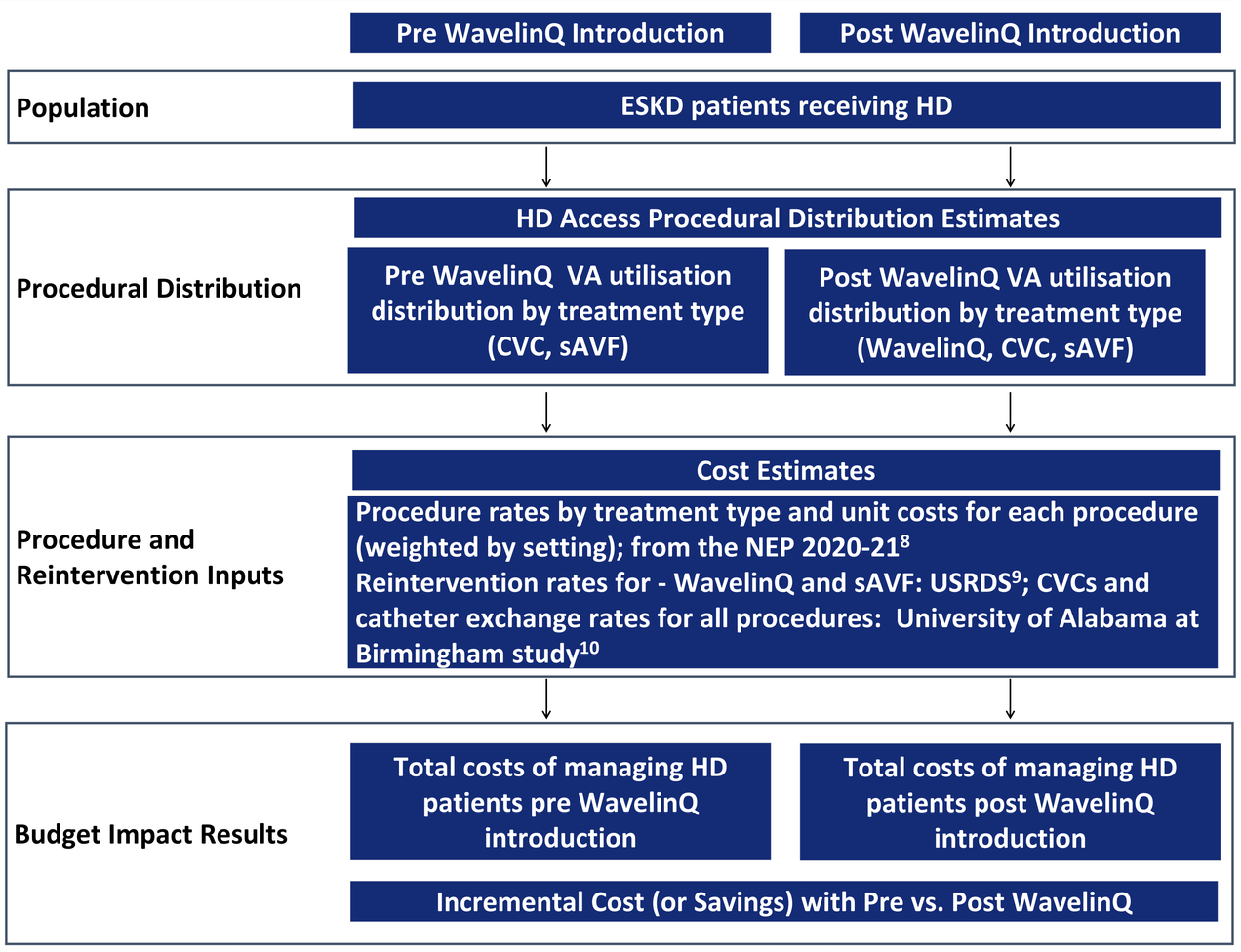
Aspect	Details
Model Perspective	Healthcare system
Settings Considered	Inpatient and outpatient hospital
Scenario Analysis	Eligible HD population at Flinders Medical Centre
Time Horizon	One-year
Discount Rate	Not applied
Costing Year	2021

Table 2: Model parameters

Variables	Base case parameters	Source
Country	Australia	[7]
Overall population	25704340	[7]
The general population with ESKD	Incident cases: 0.013% Prevalent cases: 0.104%	[7]
HD use in ESKD patients	Incident cases: 97% Prevalent cases: 43%	[7]
The proportion of patients remaining on HD at one year	81%	[7]
The proportion of HD patients covered nationally	100%	Assumption
Number of HD patients covered nationally	Incident cases: 2556 Prevalent cases: 9402	Calculated

Key: ESKD, end-stage kidney disease; HD, hemodialysis.

Figure 1: Model Structure



Key: AVF, arteriovenous fistula; CVC, central venous catheter; ESKD, end-stage kidney disease; HD, hemodialysis; sAVF, surgical arteriovenous fistula; VA, vascular access. the National Efficient Price; USRDS, United States Renal Data System.

Assumptions

- The catheter exchange rate for endoAVF (WavelinQ) and sAVF was assumed to be the same as the rate reported for AVFs in the study.
- The number of CVC placements was assumed to be one for incident CVC patients and zero for prevalent CVC patients.

Results:

- Costs per cohort and per patient for incident and prevalent HD patients in Australia were analyzed.
- Introduction of WavelinQ led to reduced reinterventions, resulting in cost savings.

Cost outcomes

Base case results

- **Table 3** presents a comprehensive overview of base case results for incident and prevalent patients per cohort.
- Post endoAVF (WavelinQ) introduction, total healthcare costs reduced by AU$86 million per cohort.
- Total cost decreased from AU$55,399 to AU$48,124, resulting in AU$7,275 savings per patient in the post-endoAVF phase.

Scenario analysis (FMC)

- Total costs reduced from AU$16.3 million to AU$14.4 million, saving AU$1.9 million per cohort.
- Per-patient analysis demonstrated AU$6,260 savings with endoAVF (WavelinQ) system introduction (**Figure 2**).

Reintervention outcomes

Both Base Case (Australia) and FMC Scenario Analysis:

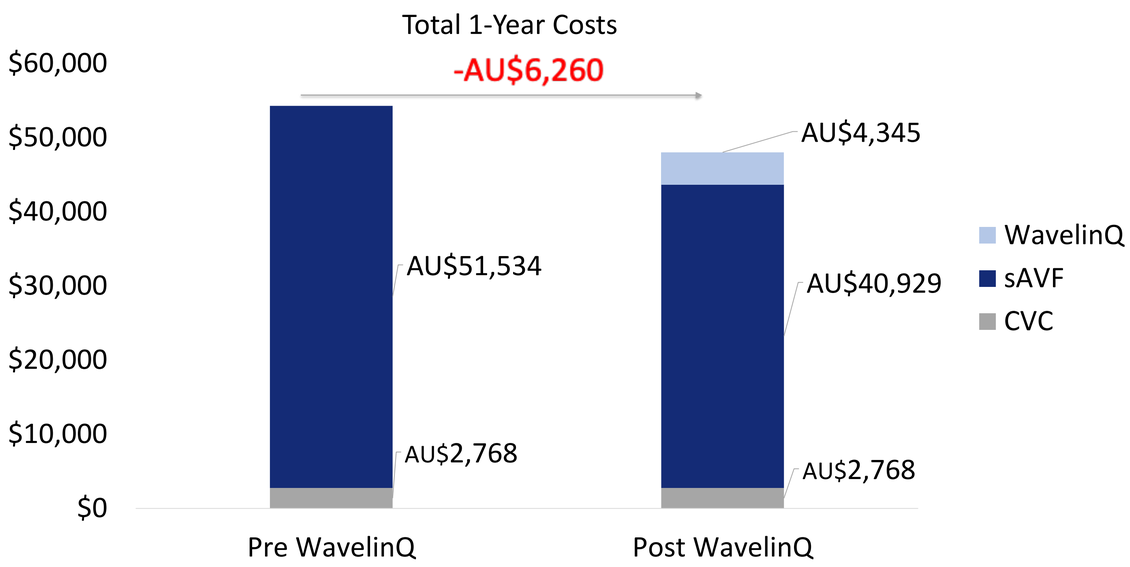
- EndoAVF (WavelinQ) system demonstrated overall reduction in reinterventions, enhancing outcomes.
- At base-case, Reinterventions reduced by 14,358 per cohort and 1.20 per patient.
- At FMC, overall reinterventions reduced by 324 per cohort and 1.08, further improving patient outcomes.

Table 3: Base-case results

Costs for Incident and Prevalent Patients in Australia (per cohort)				
Interventions	**Pre WavelinQ**	**Post WavelinQ**	**Incremental**	**Cost Savings**
WavelinQ	AU$0	AU$ 5,83,12,029	AU$ 5,83,12,029	-AU$ 8,69,85,646
sAVF	AU$ 62,91,32,895	AU$ 48,38,35,220	-AU$ 14,52,97,674	
CVC	AU$ 3,33,16,755	AU$ 3,33,16,755	AU$ 0	
Total	AU$ 66,24,49,649	AU$ 57,54,64,004	-AU$ 8,69,85,646	

Key: CVC, central venous catheter; SAVF, surgical arteriovenous fistula.

Figure 2: Costs for Incident and Prevalent Patients in Australia (per patient)



Key: CVC, central venous catheter; SAVF, surgical arteriovenous fistula.

Conclusion:

- Our analysis provides evidence supporting the clinical benefits and cost savings associated with the endovascular catheter-based approach for creating AVF (WavelinQ) system in HD patients.
- The utilization of WavelinQ is anticipated to result in cost savings primarily attributed to the reduction in reintervention procedures. Therefore, hospitals and healthcare providers should not solely focus on the initial increase in upfront costs but also consider the potential long-term savings derived from decreased reinterventions.
- These findings have important implications for decision-makers and healthcare providers, as they suggest that this technology may represent a promising avenue for improving the efficiency of HD care. There is a need for continued research on the budget impact of different HD modalities across multiple settings.

References:

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Presented at: EU ISPOR 2023, Annual Meeting, 12-15 November 2023, Copenhagen, Denmark