

# ASSESSING VALUE-BASED HEALTH CARE DELIVERY FOR HEMODIALYSIS

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## INTRODUCTION

The Value of Health Care (VHC) is defined as the patient benefit (PB) achieved with a specific medical intervention per monetary unit invested.

$$VHC = PB / Cost$$

To our knowledge, no previous study has assessed VHC for hemodialysis.

## OBJECTIVE

The objective is to assess the VHC of hemodialysis centers and to establish their ranking.

## METHODS

$$VHC = Patient Benefit / cost = \sum (Results \times Specific Weight)_n / cost =$$

$$= [(Evidence Base Variables \times SW1) + (Mortality \times SW2) + (HRQoL \times SW3) + (Satisfaction \times SW4)] / Cost$$

SW: Specific Weight

**Multicriteria Decision Analysis methodology (MCDA):**  
 Based on values and preferences of stakeholders (patients, clinicians, and managers)

Evidence-based Variables (SW1)	43
Kt/v ≥ 1.4	7
Hb 11-13 gr/dl	7
Ca 8.4-10 mg/dl	3.5
P 2.5-4.5 mg/dl	3.5
Functioning AAVF	15
Hospitalization rate (1 year)	7
<b>Mortality (SW2)</b>	<b>27</b>
Cumulative survival (2 years)	27
<b>Health related quality of life (HRQoL) (SW3)</b>	<b>17</b>
MCS from SF-36 Mean	8.5
PCS from SF-36 Mean	8.5
<b>Patient satisfaction (SW4)</b>	<b>13</b>
KBD questionnaire Mean	13
<b>Patient Benefit (PB)</b>	<b>100</b>

Results of centers were adjusted for the case mix (demographics and comorbidity data). A multi-way sensitivity analysis was conducted.

## RESULTS

Table shows the adjusted results for demographics and comorbidity features in 5 centers (C). The score for each criterion was proportional to the center's adjusted comorbidity results. Thus, hypothetically, in a center where 100% of patients underwent autologous vascular access (criterion score = 15), the score assigned for the center to that criterion would be 15. The Patient Benefit was the sum of the individual scores for each criteria.

Outcomes	Weight (%)	Adjusted rates					p-value
		C1	C2	C3	C4	C5	
<b>Evidence-based clinical performance criteria</b>	<b>43</b>						
Kt/v ≥ 1.4 (% patient)	7	72.91	84.16	56.73*	85.61	86.70	0.003
Hb 11-13 g/dl (% patient)	7	56.80	56.80	56.80	56.80	56.80	1.000
Ca 8.4-10 mg/dl (% patient)	3.5	81.70	81.70	81.70	81.70	81.70	1.000
P 2.5-4.5 mg/dl (% patient)	3.5	46.96	46.83	45.47	51.12	45.86	0.762
Functioning AAVF (% patient)	15	57.07	73.16	71.18	75.73	73.62	0.184
Non-hospitalization rate (1 year) <sup>#</sup> (% patient)	7	56.82	54.56	59.63	65.90	65.93	0.438
<b>Mortality</b>	<b>27</b>						
Cumulative survival (2 years) (% patient)	27	78.40	70.60	74.20	86.80	83.70	0.596
<b>Health related quality of life (HRQoL)</b>	<b>17</b>						
MCS from SF-36 (Mean)	8.5	49.65	49.65	49.65	49.65	49.65	0.169
PCS from SF-36 (Mean)	8.5	33.85	33.85	33.85	33.85	33.85	1.000
<b>Patient satisfaction</b>	<b>13</b>						
DCQ (Mean)	13	91.24	94.54*	89.15	88.22	87.85	0.043
<b>Patient Benefit (PB)</b>		<b>66.25</b>	<b>67.61</b>	<b>65.97</b>	<b>72.59</b>	<b>71.28</b>	
<b>Cost (€ per patient per year)</b>		<b>42,574</b>	<b>39,289</b>	<b>32,872</b>	<b>35,461</b>	<b>35,294</b>	
Direct cost		34,247	31,044	22,174	26,497	26,350	
Allocated cost		8,327	8,246	10,698	8,964	8,945	
<b>Value (PB/cost) × 10,000</b>		<b>15.56</b>	<b>17.21</b>	<b>20.07</b>	<b>20.47</b>	<b>20.20</b>	

C4 delivered the highest patient benefit (72.59) and value (20.47). C1 delivered low patient benefit (66.25), the highest cost (42,574) and the lowest value (15.56).

Table shows Multi-way sensitivity analysis of estimated center values; the weights and costs (direct and allocated) were changed simultaneously to evaluate the frequency of center ranking.

10 [10; 30]: 10% variation in weights; 10% variation in direct cost; 30% variation in allocated cost

Center Ranking: highest value C4... lowest value C1

Change	Center Ranking (frequency %)		
%weight	4-5-3-2-1	4-3-5-2-1	3-4-5-2-1
<b>10 [10; 30]</b>	64.40	27.04	8.56
<b>20 [10; 30]</b>	64.63	25.90	9.47
<b>30 [10; 30]</b>	63.99	25.89	10.12
<b>40 [10; 30]</b>	63.75	24.15	12.10
<b>50 [10; 30]</b>	62.95	22.67	14.38
<b>60 [10; 30]</b>	62.21	21.55	16.24

With 10 [10; 30] variation, C4 was the first at the center ranking in 91.44% of simulations (64.40 + 27.04), and with 60 [10; 30] variation, C4 was the first in 83.76% of simulations. C1 delivered the lowest value at the center ranking in 100% of simulations.

## CONCLUSIONS

- Value assessments may integrate divergent stakeholder perceptions, create a context for improvement, and aid in policy-making decisions.
- Results are robust, straightforward, transparent, comprehensive, consistent, reproducible, acceptable, useful for benchmarking, and focused on center improvement.
- Results can be easily understood by patients, staff, managers, and policy makers.

## References

- Porter ME. What is value in health care? N Engl J Med 2010
- Gagnon MP, Desmartis M, Lepage-Savary D, et al. Introducing patients' and the public's perspectives to health technology assessment: A systematic review of international experiences. Int J Technol Assess Health Care 2011
- Dolan JG. Multi-criteria clinical decision support: A primer on the use of multiple criteria decision making methods to promote evidence-based, patient-centered healthcare. Patient 2010

