TOTAL COST-OF-CARE MODELS

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Outline

- Value of total-cost-of-care
- Examples of total-cost-of-care models
- Incorporation of total-cost-of-care model in Pharmacoeconomic evaluation
- Key messages

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Total-cost-of-care

- Considers the Total-Cost-of-Care and not just individual costs such as medicine costs.
- Allows incorporation of clinical information related to the costs of care.
- Report on ‘Episode-of-Care’ costs for every patient in the population.
- Takes into account the pre-diagnosis costs, diagnosis, the costs for the variable duration of treatment for each patient, the follow-up costs and the costs due to adverse reactions.
- Costs over a continuum of care.
- Total-Cost-of-Care models are expected to greatly contribute to improve budgeting – value in the NHI.

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Projects

- Diabetes and its complications
- Breast cancer
- Deep vein thrombosis and pulmonary embolism
- Asthma
- Haemophilia A

Diabetes and its complications - GSH

2 methods:

- the combined method (using data from electronic database and patient folders)
- electronic method (using data from the electronic database only).

- The patient folders were used to complete any missing information from the electronic patient records.
- The combined method allowed better categorisation of costs.
- The electronic method estimated a total cost of 6,4% more than the combined method.
- Patients with diabetes and its complications cost 2,6 times more to treat than a patient with diabetes only.

Shaun Nomame, Development of a model to predict the cost of management of diabetes mellitus and its complications at Groote Schuur HospitalMasters thesis, 2012. Cum Laude.

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Costing of diabetes complications

Myocardial infarction	% Use	Quantity	Unit cost	Total cost
Acute management				
Re-hospitalization	36,1	1	R 3 986	R 143 895
Angioplasty	25,30%	1	R 1 921	R 486
Stent	25,30%	2	R 2 607	R 1 319
Myocardial revascularization	27,20%	1		
First and following years beyond acute				
Consultation	100%	6	R 900	R 5 400
Complete blood cell count	100%	4	R 0	R 0
Prothrombin time	100%	4	R 95	R 380
Partial thromboplastin time	100%	4	R 0	R 0
Coagulation blood tests	100%	4	R 1 130	R 4 518
Platelets		4	R 0	R 0
Chest x ray	80%	1	R 600	R 480
Exercise ECG	40%	1	R 528	R 211
Myocardial scintigraphy	20%	1	R 359	R 72
ECG	100%	4	R 188	R 754
Echocardiogram	100%	1	R 420	R 420
AMI acute management	10%	1	R 3 986	R 399
TOTAL FOR MYOCARDIAL INFARCTION				**R 158 333**

Retinopathy	% Use	Quantity	Unit cost	Total cost
Specialist consultation	100%	4	R 1 000	R 4 000
Eye examination	100%	4	*	*
Screw light examination	100%	4	*	*
Tonometry	100%	4	*	*
Visual acuity potential	100%	4	*	*
Fluorescein angiography	20%	1	R 595	R 119
Argon laser photocoagulation	20%	48	R 1 586	R 15 226
Focal photocoagulation	20%	48	R 1 586	R 15 226
Pan-photocoagulation laser	5%	0,1	R 1 586	R 8
Medical treatment	0%	0		
Vitrectomy (surgical correction of retinal detachment or vitreous haemorrhage)	5%	0,1	R 5 540	R 28
TOTAL COST OF RETINOPATHY				**R 34 606**

* Part of specialist consultation

Private sector prices - 2018

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Breast cancer - Groote Schuur Hospital

Cost components	Costs for 10 - 12 month period (n=200)				
	Cost (%)	Mean cost per patient	SD	Median	Range
Chemotherapy and dispensing fee	R801 311 (25.4)	R4 006	R1 635	R3 880	R544 – R10 653
Chemotherapy administration	R262 749 (8.3)	R1 313	R335	R1 404	R234 – R3 276
Support medicines	R235 425 (7.5)	R1 177	R738	R1 089	R116 – R 7 385
Consultations	R549 562 (17.4)	R2 747	R736	R2 691	R897 – R4 784
Laboratory tests (routine)	R445 247 (14.1)	R2 237	R1 166	R1 997	R447 – R6 840
Scans and imaging (routine)	R860 583 (27.3)	R4 302	R1 674	R4 233	R527 – R10 064
Total cost	R3 154 877 (100)	-	-	-	-

N Guzha, T Thebe, N Butler, P.N. Valodia. Development of a method to determine the cost of breast cancer treatment with chemotherapy at Groote Schuur Hospital. SAMJ. 2020; 110(4):296-301.

Tender prices - 2014

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Rivaroxaban versus Enoxaparin / warfarin - DVT

Cost category	Rivaroxaban	Enoxaparin/warfarin	Savings
Length of stay	200 days	500 days	
General ward costs	R 533 200	R 1 333 000	R 799 800
Medicines costs	R 317 312	R 111 659	-R 205 654
Dispensing fee	R 11 856	R 3 735	-R 8 121
INR		R 631	R 631
Total savings			R 586 656
Savings per patient			R 5 867

3 months treatment, n =100
SEP - 2017

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Pharmacoeconomic evaluation of emicizumab prophylaxis in haemophila A

Objectives

- To determine the total-cost-of-care of emicizumab prophylaxis relative to episodic FVIII in adults without inhibitors.
- To assess the pharmacoeconomic value of emicizumab prophylaxis relative to its comparators in haemophilia A with or without inhibitors in adults.

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Emicizumab prophylaxis versus episodic FVIII in adults who have haemophilia A without inhibitors

	Emicizumab prophylaxis	Episodic FVIII	Cost-saving
	n = 492		
Number of patients with bleeds	207	492	
Annualised Bleeding Rate (ABR)	1,4	38,2	
Number of bleeds per year	290	18 794	
Drug cost to treat bleeds per year	R 20 375 838	R 1 321 434 264	
Cost of administering infusion for breakthrough bleeds	R 54 267	R 3 519 383	
Cost of emicizumab prophylaxis per year (n = 492)	R 798 739 368		
Total costs	**R 819 169 473**	**R 1 324 953 647**	**R 505 784 174**
Average cost per patient	**R 1 664 979**	**R 2 692 995**	**R 1 028 017**

Tender prices - 2021

Emicizumab prophylaxis and treatment of breakthrough bleeding with FVIII (50 units/kg IV given twice a day for 3 days) versus episodic FVIII (50 units/kg IV given twice a day for 3 days). The ABRs for emicizumab prophylaxis and FVIII episodic treatment were derived from Haven 3 (2018).

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Emicizumab prophylaxis versus episodic FVIII in adults who have haemophilia A without inhibitors

	Emicizumab prophylaxis	Episodic FVIII	Cost-saving
	n = 492		
Number of patients with bleeds	207	492	
ABR	1,4	38,2	
Number of bleeds per year	290	18 794	
Drug cost to treat bleeds per year	R 6 792 043	R 440 484 353	
Cost of administering infusion for breakthrough bleeds	R 18 089	R 1 173 128	
Cost of emicizumab prophylaxis per year (n = 492)	R 798 739 368		
Total costs	**R 805 549 500**	**R 441 657 480**	**-R 363 892 019**
Average cost per patient	**R 1 637 296**	**R 897 678**	**-R 739 618**

Tender prices - 2021

Emicizumab prophylaxis and treatment of breakthrough bleeding with FVIII (50 units/kg IV given twice a day for 1 day) versus episodic FVIII (50 units/kg IV given twice a day for 1 day). The ABRs for emicizumab prophylaxis and FVIII episodic treatment

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Pharmacoeconomic evaluation

- ICER = $\frac{\text{Difference in costs}}{\text{Difference in effectiveness}}$

$= \frac{\text{R 739 618}}{\text{36,8}}$

= R 20 098,32 more per patient with EMI to prevent 1 bleed

However, to treat 1 bleed with FVIII at 50 IU/kg bd for 1 to 3 days could cost between R 23 437 to R 70 310.

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Key messages

- Medical scheme administrators, managed care organizations, hospitals, pharmaceutical companies, etc. should consider the Total-Cost-of-Care and Episode-of-Care costs approach.
- Assist with budgeting in the NHI.
- Provides detailed understanding of how money is being spent.
- Identification of cost-drivers.
- Allow integration of clinical data with cost data.
- Provide inputs for PE evaluations.
- Form an important component of value-based pricing
- Assist with the development of new funding models such as global fees / bundled fees.
- Episode-of-care-costs at an individual patient level.

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