Budget Impact Analysis of Everolimus for the Treatment of Hormone Receptor Positive, Human Epidermal Growth Factor Receptor-2 Negative (HER2-) Advanced Breast Cancer in Kazakhstan

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Background and Objectives

Breast cancer is the most common cancer in women across the world. The World Health Organisation (WHO) estimates that in 2011, breast cancer resulted in around 508,000 deaths[1]. It is estimated that in 2012, over 1.6 million new cases of breast cancer were diagnosed and that the prevalence of breast cancer cases diagnosed in the previous five years is over 6 million[2]. The prevalence of breast cancer in Kazakhstan was estimated to be 27,137 in 2012[3]. The number of newly diagnosed breast cancer patients in Kazakhstan in 2012 was 3,951[3]. Metastatic breast cancer is the presence of disease at distant sites. It is estimated that the total number of patients with breast cancer will be more than 27,000 in Kazakhstan in 2014, of which around 8% will develop metastatic disease[4].

The effectiveness of everolimus (in combination with exemestane) has been demonstrated against exemestane alone in the BOLERO-2 trial. The BOLERO-2 trial[5] was a randomised, double-blind, phase III study of everolimus plus exemestane versus exemestane plus placebo, which has been conducted in 189 centres in 24 countries. The trial participants were women with HER2-negative, ER+ advanced or metastatic breast cancer whose disease had recurred or progressed following prior treatment with non-steroidal aromatase inhibitors.

The aim of this study was to determine the budget impact of everolimus (in combination with letrozole/anastrozole) as a second-line treatment for ER+ HER2-negative advanced and metastatic breast cancer in postmenopausal women.

Methods

A cumulative cohort model was developed to estimate the five-year costs associated with introducing everolimus to the Kazakhstan healthcare system. In order to do so, two alternative scenarios were compared: (i) An existing state of affairs, with current market share being used to estimate the numbers of patients receiving different treatments, and (ii) an 'intervention' scenario, where everolimus is introduced to the market and assumed to replace a proportion of existing treatments. These have been named as *without everolimus* and *with everolimus* respectively. The market share used within the model are shown in Table 1 below.

Progression-free survival (PFS) and overall survival (OS) data were taken from the trial and extrapolated. The background costs of the pre-progressed and postprogressed health states, drug costs and costs associated with adverse events were included in the model. The budget impact was estimated for 2014 to 2018.

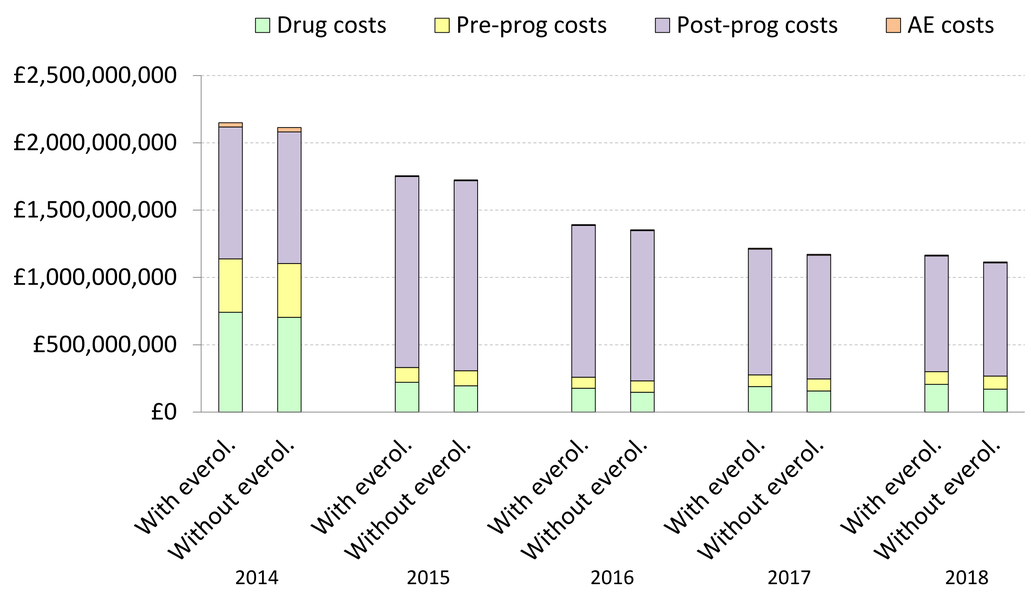
Table 1: Market share with and without everolimus

	Current market share (2015 to 2018)		
	1st line	2nd line	3rd line
Everolimus + letrozole	0%	0%	0%
Letrozole / anastrozole	15%	30%	30%
Chemotherapy	70%	70%	70%
Tamoxifen	15%	0%	0%
Total	**100%**	**100%**	**100%**
	Market share with everolimus (2014)		
	1st line	2nd line	3rd line
Everolimus + letrozole	1.0%	1.0%	0.0%
Letrozole / anastrozole	15.0%	30.0%	30.0%
Chemotherapy	69.1%	69.0%	70.0%
Tamoxifen	14.9%	0.0%	0.0%
Total	**100%**	**100%**	**100%**
	Market share with everolimus (2015)		
	1st line	2nd line	3rd line
Everolimus + letrozole	2.0%	2.0%	0.0%
Letrozole / anastrozole	15.0%	30.0%	30.0%
Chemotherapy	68.3%	68.0%	70.0%
Tamoxifen	14.7%	0.0%	0.0%
Total	**100%**	**100%**	**100%**
	Market share with everolimus (2015 to 2018)		
	1st line	2nd line	3rd line
Everolimus + letrozole	3.0%	3.0%	0.0%
Letrozole / anastrozole	15.0%	30.0%	30.0%
Chemotherapy	67.5%	67.0%	70.0%
Tamoxifen	14.6%	0.0%	0.0%
Total	**100%**	**100%**	**100%**

Results

The five-year results from the budget impact analysis are shown in Figure 1. These demonstrate that the introduction of everolimus leads to a 12% increase in drug costs, a 2% reduction in pre-progression health state costs, a 1% increase in post-progression health state costs and a 2% reduction in adverse event costs. The net result is only a modest increase in total costs; a 2.69% increase of T201 million, from T7.5 billion to T7.7 billion over a period of five years. The full results can be found in Figure 1 below.

Figure 1: Budget impact analysis results



Incremental impact of introducing everolimus						
	2014	2015	2016	2017	2018	Total costs
Drug costs	38,009,622	26,179,760	29,530,726	32,692,311	35,712,812	162,125,231
Pre-prog costs	-3,577,725	-1,533,340	-2,080,804	-2,315,813	-2,516,262	-12,023,944
Post-prog costs	2,041,115	6,671,013	11,308,548	14,670,588	17,570,202	52,261,466
AE costs	-318,799	-108,313	-176,403	-191,531	-207,957	-1,003,002
Total	**36,154,213**	**31,209,120**	**38,582,067**	**44,855,556**	**50,558,795**	**201,359,752**

Conclusions

The analysis estimated that, if everolimus were to be introduced to the Kazakhstan healthcare market for the treatment of ER+ HER2- advanced breast cancer, there would be minimal impact upon overall healthcare expenditure. An increase in drug acquisitions costs was almost exactly offset by a reduction in other healthcare costs due to improved management of the disease.

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