

# ECONOMIC IMPACT OF RIVAROXABAN USE FOR THROMBOEMBOLIC EVENTS PREVENTION AFTER HIP OR KNEE REPLACEMENT IN SPAIN



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## BACKGROUND AND AIM

- Patients undergoing elective total hip or knee replacement (THR or TKR) surgery present risk of venous thromboembolism (VTE). VTE is considered as one of the most common preventable hospital-related cause of death.<sup>1</sup> Anti-thrombotic prophylaxis is routinely used for decreasing the risk of VTE by 50-75%.<sup>2,3</sup> In Spain, this is performed with low-molecular-weight heparins (LMWHs) in approximately 90% of the patients, enoxaparin being the most widely used.<sup>2,3</sup>
- Enoxaparin has relevant drawbacks like risk of heparin-induced thrombocytopenia, need of patient training for post-discharge self-administration or home administration by a health professional, the treatment should begin 12 hours before surgery, and needs dose adjustment in case of extreme weight values.<sup>2</sup> Conversely, new oral anticoagulants, like rivaroxaban, offer several advantages over enoxaparin.<sup>4</sup>
- Rivaroxaban (factor Xa inhibitor) 10 mg once-daily dose, a direct oral anticoagulant, has demonstrated superior efficacy and similar safety profile to enoxaparin in preventing VTE in patients undergoing elective THR or TKR surgery in randomized clinical trials (RECORD program<sup>5</sup>), as well as, in the international observational XAMOS (Xarelto<sup>®</sup> for VTE Prophylaxis After Hip or Knee Arthroplasty)<sup>6</sup> study in the clinical routine practice.
- The aim of this study was to estimate the potential cost-savings from an increased use of rivaroxaban with respect to enoxaparin in the prophylaxis of VTE in patients undergoing elective THR or TKR surgery for the Spanish National Health System (NHS) perspective.

## METHODS

- A budget impact model (BIM) was performed based on the efficacy data of the Spanish cohort of the XAMOS study.<sup>6</sup>
- The BIM estimates the difference in the annual treatment cost between 2 scenarios:
  - ✓ Current scenario: the use of rivaroxaban vs. enoxaparin is estimated in a 30-to-70 ratio.<sup>3</sup>
  - ✓ Alternative scenario: rivaroxaban use increases progressively with respect to enoxaparin by 10%, 20% and 30% in the years 2017, 2018 and 2019.
- The population included in the BIM was the Spanish patients undergoing THR or TKR surgery estimated based on the annual incidence of the 2 surgeries in Spain<sup>7</sup> applied to the total Spanish population<sup>8</sup> (Table 1).

Table 1. Target population of the study

	Surgery prevalence	Number of patients undergoing THR or TKR surgery		
		2017	2018	2019
THR	0,043%	19,654	19,542	19,427
TKR	0,073%	33,366	33,175	32,981

- Treatment effectiveness (thromboembolism and major bleeding rates) and healthcare resource use (anaesthesia and nurse care) for patients undergoing elective THR or TKR surgery in the routine practice were derived from data from the Spanish cohort of the XAMOS study<sup>6</sup> (Table 2).

Table 2. Event rates and healthcare resource use associated with rivaroxaban and Standard of Care (i.e. enoxaparin) in the Spanish Cohort of the XAMOS study

Type of event or healthcare resource	Treatment	
	Rivaroxaban	SoC enoxaparin
Thromboembolic event	0.20%	0.80%
Anesthesia	General	18%
	Local	82%
Major bleeding (EMA Guideline)	0.70%	1.30%
Post-discharge treatment administration by a nurse	Home	3.70%
	Healthcare facility	0.2%
		2.60%

- Relevant direct costs (pharmacologic prophylaxis, thromboembolic events, anaesthesia, major bleeding events and post-discharge treatment administration by a nurse) were estimated from the Spanish NHS perspective (€ 2014). Unit costs were derived from the corresponding Spanish official source<sup>9,10,11</sup>, except for the cost of major bleeding which is derived from a similar Spanish publication.<sup>3</sup> Unit health care resource use and event costs are detailed in Table 3.
- The pharmacological cost was estimated based on the daily consumer price with VAT, the 8/2010 Royal Decree<sup>12</sup> discount was considered as well as co-payment (NHS assuming the 90% of the treatment cost), and applying the mean duration of the treatment after THR and TKR surgery (30 days with both treatment options) from hospital discharge, resulting in a mean cost per patient of €75.65 and €103.46 for rivaroxaban and enoxaparin, respectively.
- The mean cost per patient was estimated as average cost weighted on the incidence or percentage use of the event or resource. The cost per patient was equal for the 2 surgeries (THR or TKR).
- The annual cost was estimated based on the mean cost per patient and the annual use of rivaroxaban and enoxaparin in both scenarios (current and alternative) over the 3 years.

Table 3. Healthcare resource use and event unit costs

Type of cost	Definition	Unit cost	Reference	
Pharmacy cost	Rivaroxaban	Daily cost of Xarelto <sup>®</sup> 10mg (consumer price)	€2.52	9
	Enoxaparin	Daily cost of Clexane <sup>®</sup> 40 mg (4000 UI) (consumer price)	€3.45	9
Thromboembolic event	Cost per event calculated as a weighted average (6:4) of the cost of the Pulmonary Embolism (Diagnosis-Related Group; DRG78) and Deep Vein Thromboembolism (DRG128)	€3,373.04	10	
Anesthesia	General	Unit cost of general anaesthesia	€207.21	11
	Local	Unit cost of local anaesthesia	€51.80	11
Major bleeding	Unit cost Diagnosis-Related Group	€3,718.68	3	
Post-discharge treatment administration by a nurse	Home	Nurse for administration of post-discharge antithrombotic therapy	€16.30	11
	Healthcare facility		€7.12	11

## RESULTS

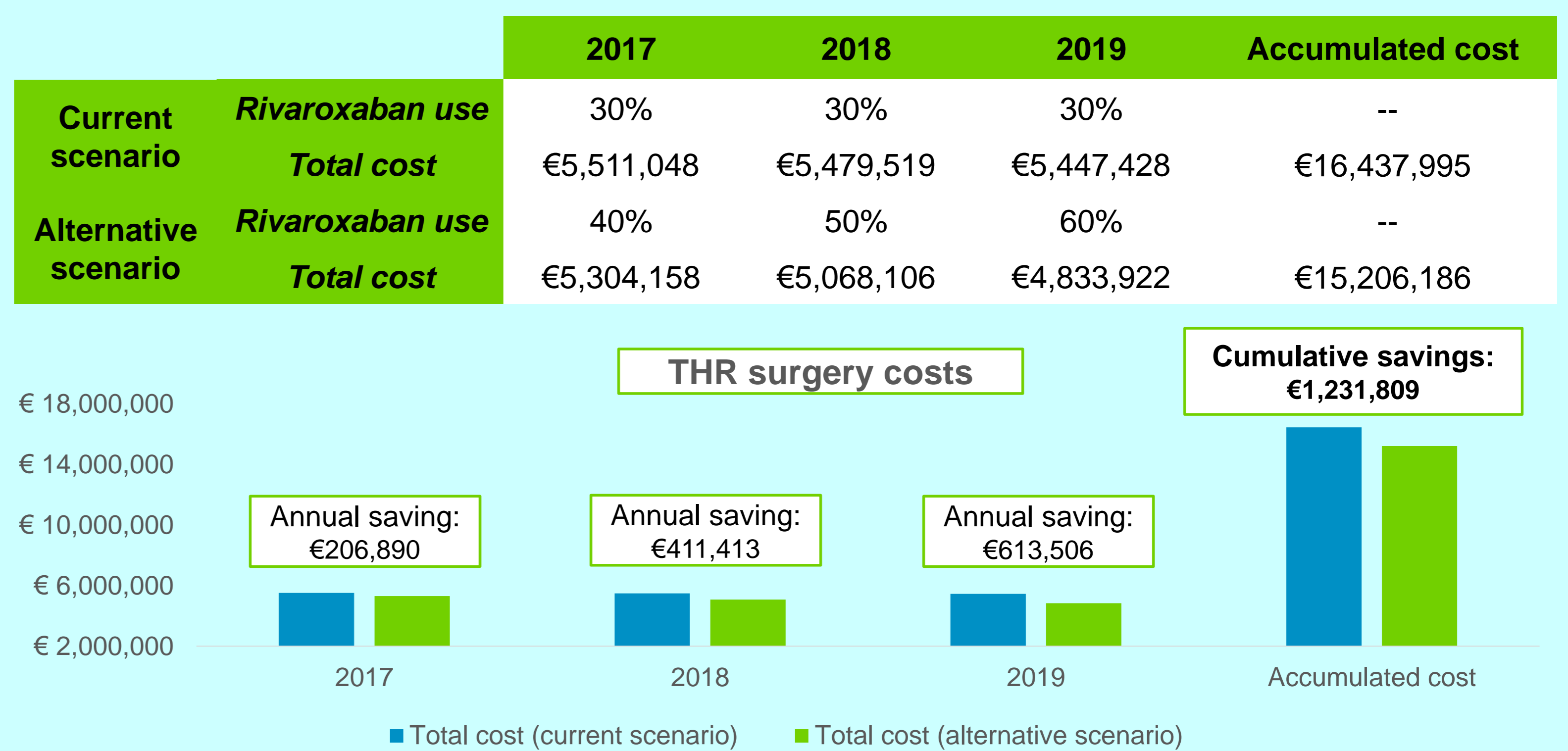
- The difference in per-patient cost undergoing THR or TKR surgery with rivaroxaban versus enoxaparin was -€105 (Table 4).

Table 4. Mean cost per patient

	Pharmacy costs	Event costs	Anesthesia costs	Major bleeding costs	Nursing costs	Total costs	Mean savings per patient
Rivaroxaban	€75.65	€6.75	€79.77	€26.03	€18.52	€206.72	-€105.26
Enoxaparin	€103.46	€26.98	€87.54	€48.34	€45.65	€311.98	

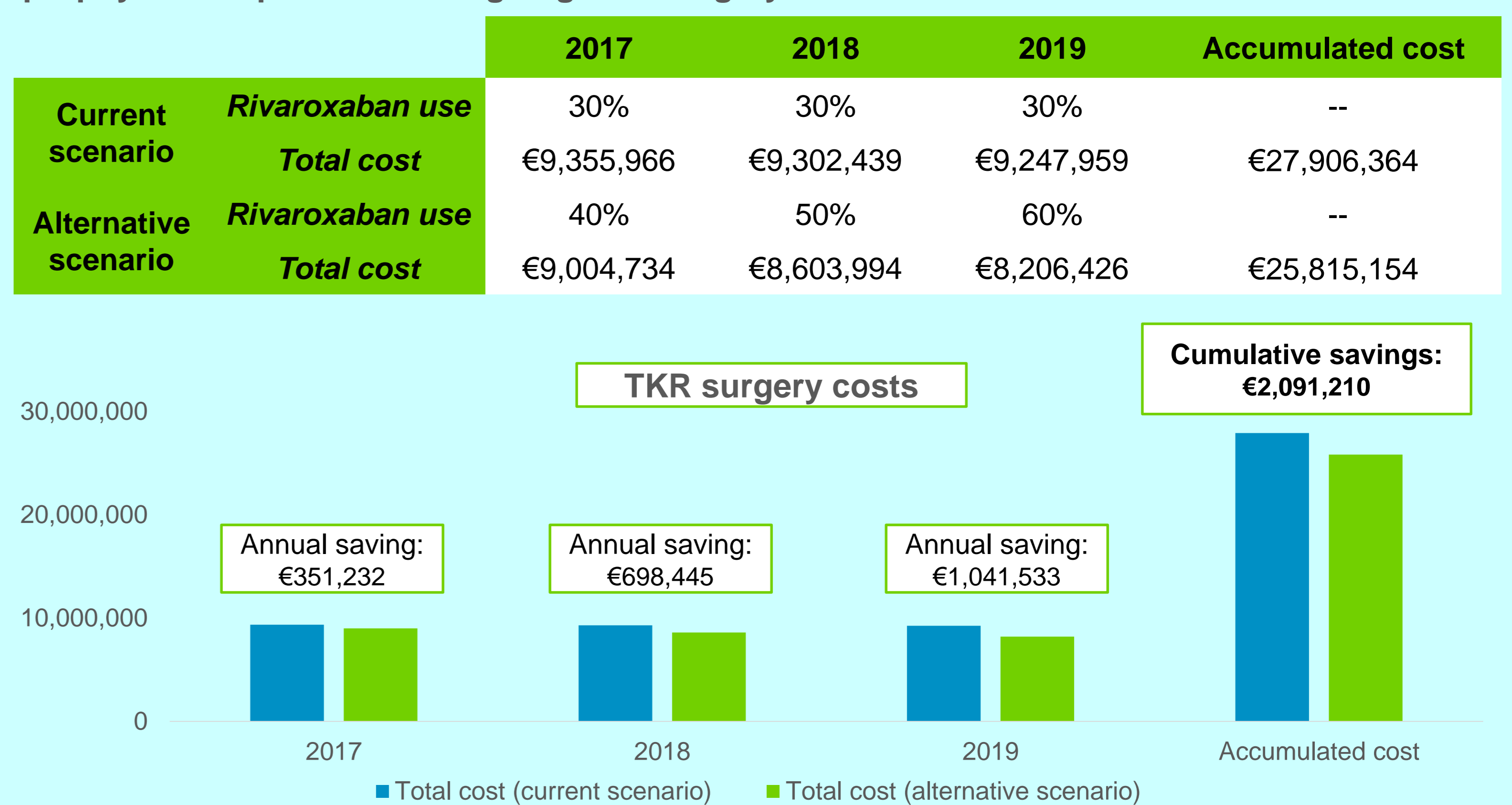
- The impact of progressively increasing the use of rivaroxaban in the THR surgery cohort, was -€206,890, -€411,413, and -€613,506 for 2017, 2018, and 2019, respectively (Figure 1).

Figure 1. Annual savings associated with an increased use of rivaroxaban in the VTE prophylaxis in undergoing THR surgery



- In the TKR cohort, the impact of progressively increasing the use of rivaroxaban was -€351,232, -€698,446, and -€1,041,533, in 2017, 2018, 2019, respectively (Figure 2).

Figure 2. Annual savings associated with an increased use of rivaroxaban in the VTE prophylaxis in patients undergoing TKR surgery



## CONCLUSIONS

- The analysis showed that, according to effectiveness data from the XAMOS study, an international, non-interventional, observational, open-label study in unselected patients undergoing elective hip or knee surgery in routine practice, rivaroxaban was more effective and less costly than the current SoC, enoxaparin, in the prevention of VTE in Spain.
- The study demonstrated that rivaroxaban increased use would lead in significant cost-savings for the Spanish NHS in the VTE prophylaxis in patients undergoing elective THR and TKR surgery.

REFERENCES: 1) Maynard G. Rockville, MD: AHRQ. 2016; Publication No. 16-001-EF. 2) Granero X. et al. JHEOR 2016;4(1):35-46. 3) Gómez Arrayas I. et al. Rev. Esp. Salud Pública. 2012;86(6):601-12. 4) Haas S. et al. Vasc Health Risk Manag. 2016;12:209-18. 5) Levitan B. et al. Vasc Health Risk Manag. 2014;10:157-67. 6) Turpie AG. et al. Thromb Haemost. 2014;111(1):94-102. 7) Allepuz et al. Rev Ortop Traumatol. 2009; 53: 2909. 8) INE Cifras de población a 1 de enero de 2016. Resultados definitivos. Disponible en: <http://www.ine.es/jaxi/tabla.do?path=/t20/p321/serie/def/10/&file=01001.px&type=pcaxis&L=0>. 9) Bot Plus Web. Available at: <https://botplusweb.portalfarma.com/botplus.aspx> Accessed: November, 2014. 10) CMBD. Available at: <http://www.msssi.gob.es/estadEstudios/estadisticas/cmbd.htm> Accessed: November 2014. 11) eSalud - Información económica del sector sanitario. Available at: <http://www.oblikue.com/bddcostes>. Accessed: November, 2014. 12) RD 8/2010 Available at: [https://www.boe.es/diario\\_boe/txt.php?id=BOE-A-2010-8228](https://www.boe.es/diario_boe/txt.php?id=BOE-A-2010-8228).