

M LoPresti<sup>1</sup>, D Mazumder<sup>2</sup>, H Bhandari<sup>2</sup>, S Ranjan<sup>2</sup>, M Smulders<sup>3</sup>

<sup>1</sup>Junicon K.K., Tokyo, Japan, <sup>2</sup>SmartAnalyst India Pvt. Ltd., Gurgaon, India, <sup>3</sup>SmartAnalyst Inc., New York, NY, USA

## INTRODUCTION

- The cost of a new treatment, relative to an existing treatment for a given condition, is an important aspect of cost-effectiveness analysis (CEA). In fact, differences in the cost of existing treatments from one market to another can lead to differences in the results of CEA across markets.
- This could become an important consideration as the use of healthcare technology assessment (HTA) to determine the appropriate reimbursement level for a newer agent in Japan becomes more common.
- Based on current discussions in Japan, for some new treatments HTA is likely to be used to assess the appropriateness of premium awarded relative to existing conventional treatments and to adjust the premium level depending on the results of HTA studies.
- Differences in the results of HTA studies could emerge in Japan relative to other markets simply based on the differences in the reimbursement of existing comparator treatments.

## OBJECTIVES

To examine the sources of data for the cost of existing treatments and highlight how differences in the cost may affect the results of CEA for Japan.

## METHODS

- The incremental cost-effectiveness ratio (ICER) may be used to determine an adjustment coefficient that will be used to adjust the premium for new drugs and devices in Japan. This consideration is likely to be made at the time of reimbursement revisions. Currently, the revisions are made every two years but from April 2020, these are likely to be revised annually. This may also impact the technical fees for evaluation of surgical and other procedures, but no details are publicly available as yet.

The ICER is determined by the difference in cost between two possible interventions divided by the difference in their efficacy. The ICER equation is shown below:

$$ICER = (C_1 - C_0) / (E_1 - E_0)$$

$C_1$  = Cost of the new intervention

$C_0$  = Cost of an existing intervention

$E_1$  = Efficacy of the new intervention

$E_0$  = Efficacy of an existing intervention

- Since the net cost comprises of both the cost of the new intervention ( $C_1$ ) and the cost of an existing intervention ( $C_0$ ), a difference in the cost of an existing intervention from one market to another could also lead to differences in the outcome of HTA studies, across markets.
- The study also reviewed the sources of information on the cost of existing treatments for Japan, and the impact of the cost on the results of CEA

## RESULTS

### Sources of Cost (Reimbursement) Data for Japan

#### Reimbursement of Medical Interventions in Japan

- The reimbursement level for all healthcare interventions covered under the National Health Insurance System in Japan, including drugs, medical devices, and surgical procedures, is set by the Ministry of Health, Labor, and Welfare (MHLW).
- Reimbursement fees are reviewed and revised every two years in Japan. The last set of revisions was implemented on April 1, 2018. Revisions are likely to take place every year starting from April 2020.
- Foreign reference pricing is applied only once for new drugs at the time of initial reimbursement. However, for specified insured medical equipment, foreign reference pricing adjustments also take place at the time of reimbursement revisions. Foreign reference pricing is not currently applied for reimbursement fees related to surgical procedures.

#### Drug Reimbursement in Japan

- The MHLW publishes a list of drugs reimbursed under the National Health Insurance (NHI) program in Japan. The list is often referred to as the NHI drug list and includes the reimbursement code, generic name, brand name, manufacturer, formulation amount, and the national reimbursement amount for each drug covered under the NHI program.
- As on July 1, 2018, there were 10,499 oral medications, 3,923 injection agents, 2,375 external preparations, and 28 dental agents included in the NHI drug list.<sup>1</sup>
- An updated NHI drug list is released by the MHLW every 3 months or so.

#### Device Reimbursement in Japan

- A separate reimbursement fee is only allowed for medical devices and equipment that is disposable. They are not considered an integral part of the procedure itself and are referred to as "specified insured medical equipment".
- For specified insured medical equipment, a "functional category" is established with a specific definition based on the design, usage, and/or indication of the device. Devices and equipment under this definition receive a level of reimbursement corresponding to the functional category.
- As on May 31, 2018, there were 1,236 functional categories recognized in Japan covering about 20,000 different medical devices and equipment.<sup>2</sup>
- New functional categories are established for a new device when it does not fit in any of the existing functional categories.

#### Surgical Procedure Reimbursement in Japan

- The reimbursement level for medical procedures is also set by the MHLW.
- As on August 3, 2018, there were 7,570 reimbursement categories for medical procedures in Japan including 2,723 surgical procedures. The fee ranges from ¥1,300 (extraction of a baby tooth) to ¥2,860,100 (allogenic heart-lung transplant.)
- An updated list of reimbursement levels for surgical procedures is released once or twice a month but the bulk of revisions take place only once every two years based on requests from medical societies.

**Table 1: Sources and Entries for Treatment Reimbursement Levels in Japan**

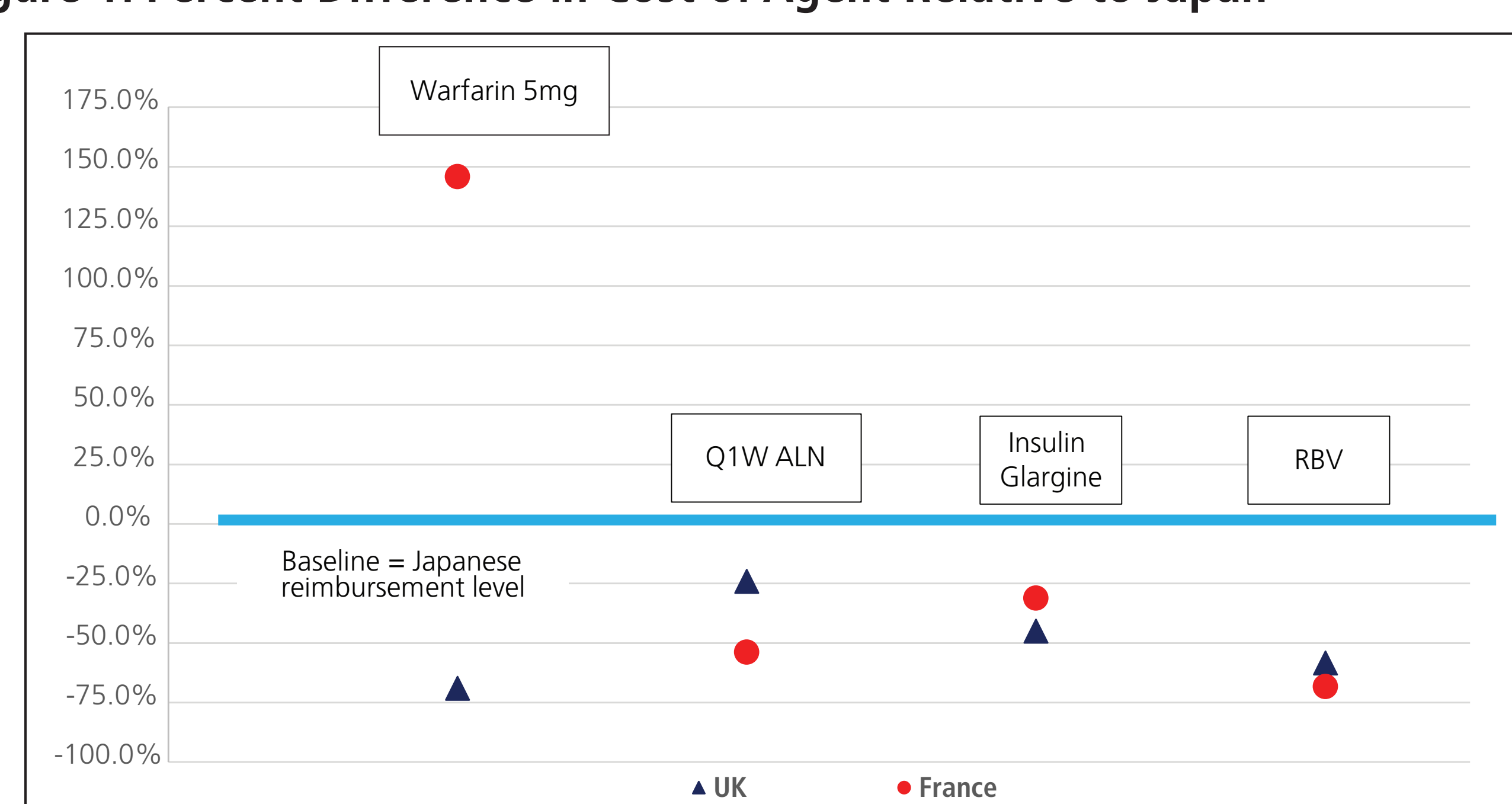
	Source	Entries
Medications	NHI drug list (an MHLW publication)	16,825+ products
Medical devices and equipment	Specified Insured Medical Equipment Definitions (a Health Insurance Bureau notification)	1,236 functional categories
Medical procedures	Reimbursement category listing (an MHLW publication)	7,570 reimbursement categories

### Impact of Differences in Costs (Reimbursement) of Existing Treatments

#### Impact of Differences in the Cost of Drugs

- Drugs for which a CEA study has been conducted in Japan were investigated and the current reimbursement level of an existing (control) intervention were examined relative to the cost of that intervention in two of the four reference markets for Japan – the UK and France – where comparable data was readily available. Drugs investigated included warfarin 5mg, once-weekly alendronate (ALN), insulin glargine, and ribavirin (RBV). The reimbursement price of branded agents was used in all cases.
- Figure 1** shows the cost differences in the existing drugs in Japan in comparison to the UK and France. The results show that the reimbursement level is 26% **lower** in the reference markets compared to Japan.

**Figure 1: Percent Difference in Cost of Agent Relative to Japan**

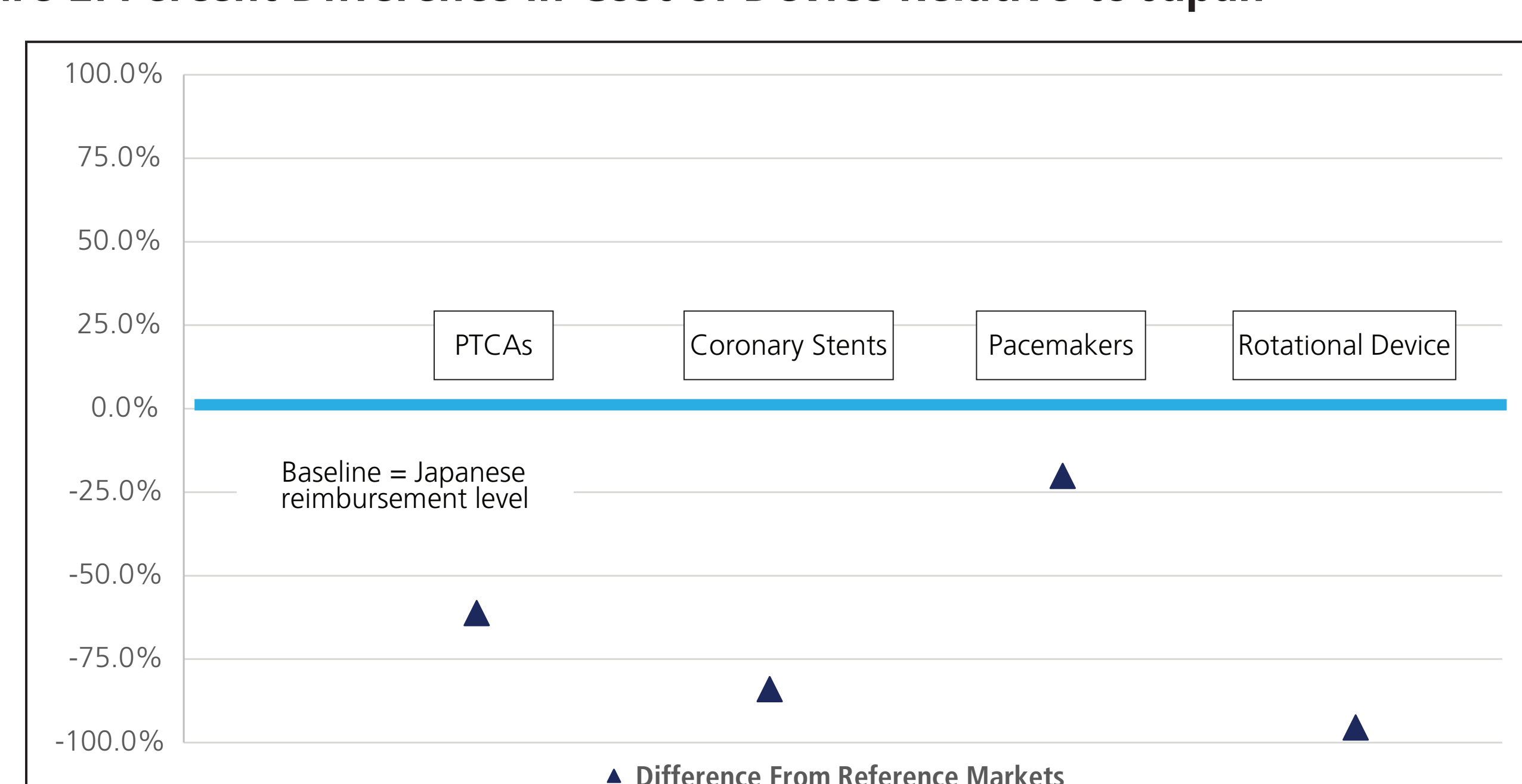


- These findings imply that if the net benefit and the cost of other aspects are assumed to be identical or similar, then the outcome of CEA for new drugs in Japan may tend to be better than other markets.

#### Impact of Differences in the Cost of Medical Device

- Very few CEA for devices were found for Japan where the existing treatment ( $C_0$ ) was also a device. Most of the studies are based on procedures and drugs as the existing treatment.
- A study conducted in 2013 by the MHLW examined the differences in device reimbursement levels in Japan relative to prices in four out of five of the reference markets for three key device categories: PTCA catheters (standard), coronary stents (standard), and pacemakers (single chamber)<sup>3</sup>. The study found that the price of those devices tends to be lower in the reference markets. Findings from a recent CEA conducted by Pletzsch et al. (2017) examined the cost-effectiveness of orbital atherectomy as compared to rotational atherectomy for Japan<sup>4</sup>. Similar results were found for that specific device area based on the cost of that device in the US.
- Figure 2** shows the cost differences in the existing devices in Japan in comparison to the reference market and the US for rotational devices. The results show that the reimbursement level of the devices is 65% **lower** in the reference markets compared to Japan.

**Figure 2: Percent Difference in Cost of Device Relative to Japan**

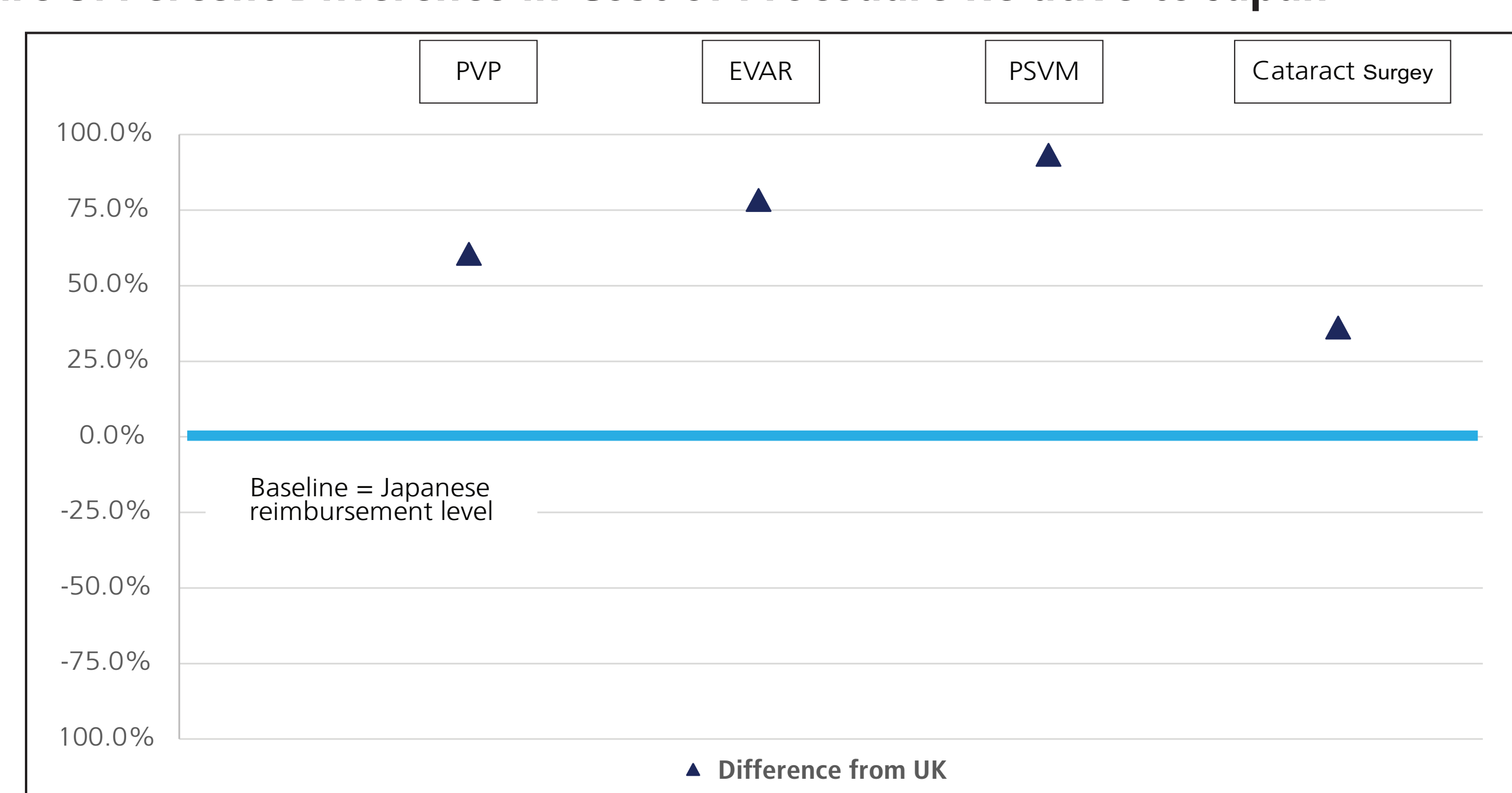


- These findings imply that if the net benefit and the cost of other aspects are assumed to be identical or similar, then the outcome of CEA for new devices in Japan may tend to be better than other markets.

#### Impact of Differences in the Cost of Procedures

- Similar to drugs, procedures for which a CEA has been conducted in Japan were investigated, and the current reimbursement levels of the existing (control) intervention were examined for the UK, where comparable data was readily available. Procedures investigated included percutaneous vertebroplasty (PVP), endovascular aneurysm repair (EVAR), percutaneous sclerotherapy for venous malformations (PSVM), and cataract surgery.
- Figure 3** shows the cost differences in the existing drugs in Japan in comparison to the UK. The results show that the reimbursement level is 65% **higher** in the reference markets compared to Japan.

**Figure 3: Percent Difference in Cost of Procedure Relative to Japan**



- These findings imply that if the net benefit and the cost of other aspects are assumed to be identical or similar, then the outcome of CEA for new procedures (or drugs and devices that are meant to replace existing procedures) in Japan may tend to be worse than other markets.

## CONCLUSION

The results suggest that differences in the cost of existing treatments in local markets can have an impact on the results of CEA across markets. The impact may be higher for certain pharmaceutical interventions in Japan compared to medical device and procedure interventions.

## LIMITATIONS

- Lack of readily available information on the cost of existing treatments for the reference markets was a limiting factor for this study.
- The use of prospective payment systems such as diagnostic related groups (DRG) to determine reimbursement also made the identification of comparable data difficult and may influence the results for certain therapy areas. For example, while Japan also has a prospective payment system for inpatient care, procedures costing more than ¥10,000 are typically reimbursed on a fee-for-service basis.
- Moreover, this analysis did not consider the differences in resource utilization in Japan relative to other markets. The cost of rotational devices, for example, may differ depending on the average number of burrs used per patient in each market.

## REFERENCES

- NHI Drug List. Ministry of Health, Labor, and Welfare. (accessed August 3, 2018)
- Specified Insured Medical Equipment Functional Category List. Ministry of Health, Labor, and Welfare. (accessed August 3, 2018)
- Comparison of Reimbursement Levels in Japan and Foreign Prices for Key Specified Insured Medical Equipment. September 4, 2013. Ministry of Health, Labor, and Welfare
- Pletzsch J.B. et al. 2017. Cost-effectiveness of orbital atherectomy compared to rotational atherectomy in treating patients with severely calcified coronary artery lesions in Japan. Cardiovascular Intervention and Therapeutics. September 5, 2017

