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OBJECTIVES

Advanced airway management techniques encompass a set of procedures and tools employed by healthcare professionals to establish and secure a patient's airway in situations where conventional methods may be challenging or insufficient. Video laryngoscopy is a well-established technology that is widely applied in the clinical settings worldwide. According to the clinical guidelines video laryngoscopes are recommended for routine use. This study aimed to conduct a cost-benefit analysis of video laryngoscopy in Ukraine with reference to the world experience.

METHODS

Decision tree modeling of cost benefit analysis in MS Excel of the introduction of video laryngoscopy comparing with the current practice (direct laryngoscopes) based on the local cost data in Ukraine.

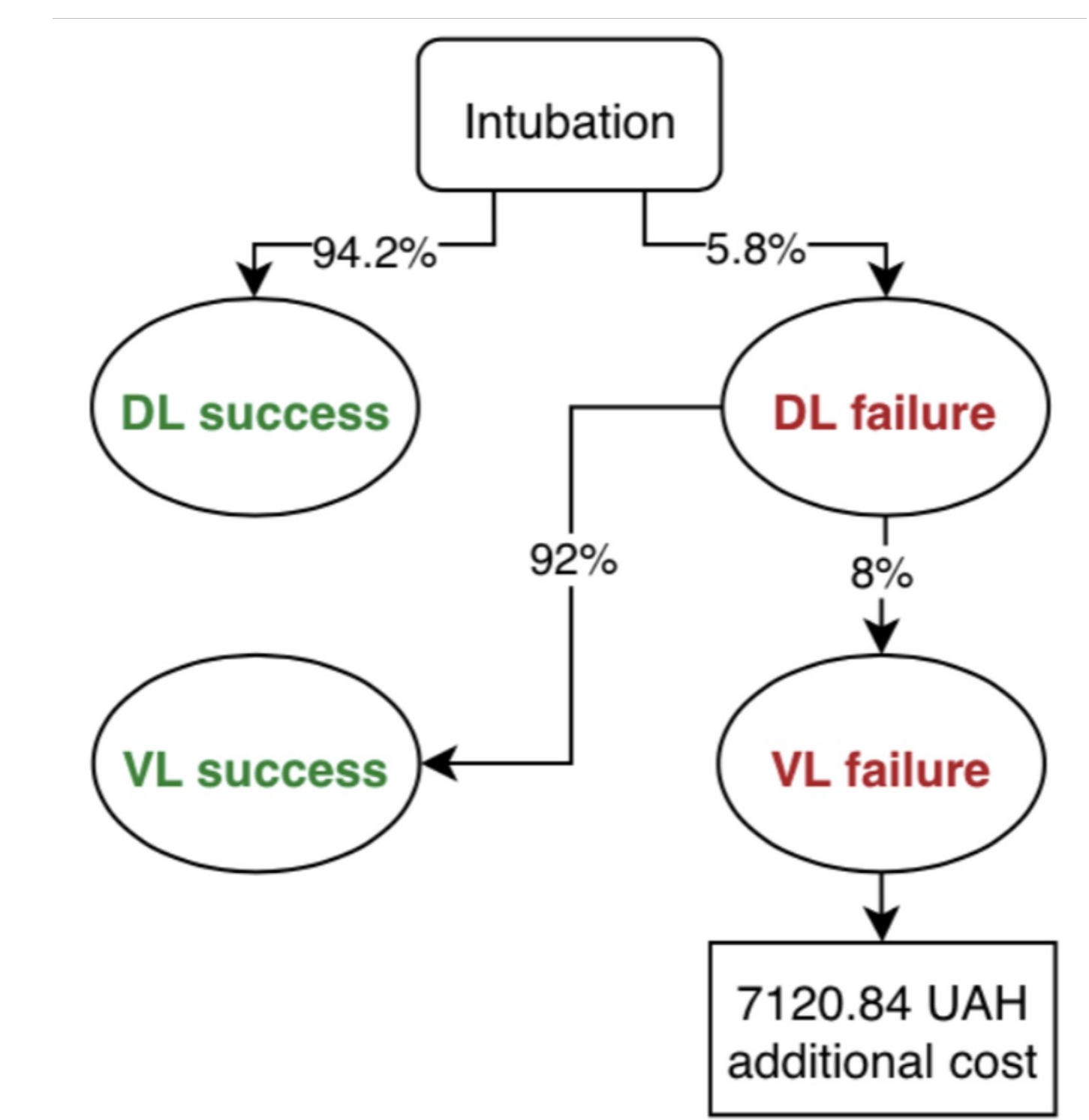
Video laryngoscopy is a well-established technology that is widely applied in the clinical settings worldwide. It is said that “video laryngoscopes should replace direct laryngoscopes as smart phones have replaced standard cell phones: they should be used for all intubations” [1]. This technique is easy to learn, and the skills involved are easy to master [2]. Having performed 20 intubations within a clinical setting may be considered for an anaesthetist to be enough to become an experienced intubator [3].

Video laryngoscopy is usually introduced into practice as a rescue modality first, and becomes a first technique of choice in regular intubations later. This is especially true due to COVID-related intubations, where the intubator is also subject to significant risk.

A study showed that there may be incidence of 10.7% to contract COVID-19 during a related intubation. [4]. A review of hospital admissions in the US compared admissions with and without a difficult intubation. It was found that difficult intubations increase median cost of admission by 2.56 times (calculated and round up) [5].

Cost data were obtained from local sources in Ukraine [6].

Figure 1: Model decision tree



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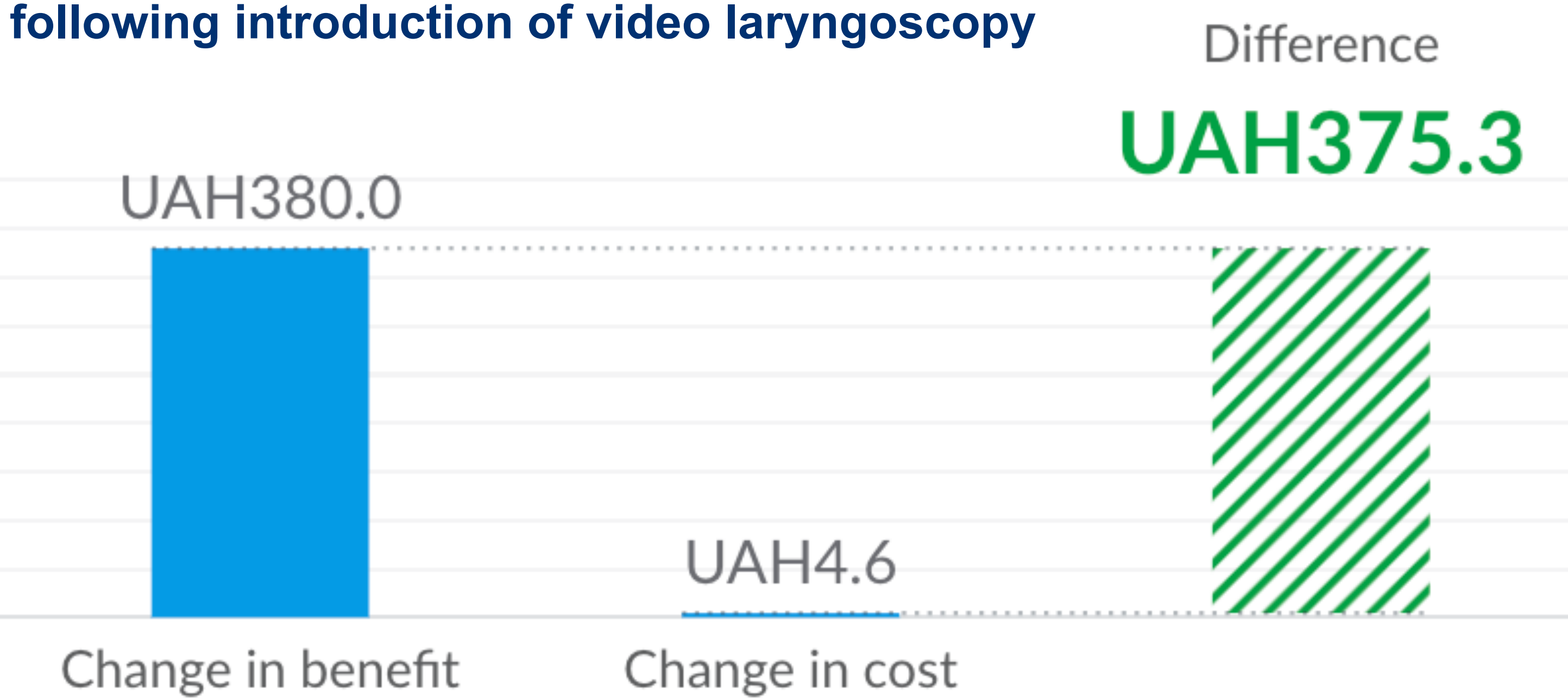
Table 1: Overview of model inputs

Comparators	
Standard of care	Direct Laryngoscopy
New intervention	Video laryngoscopy ▼
Device costs	
Direct laryngoscope set	UAH5,000
Video laryngoscope set	UAH60,000
Healthcare costs	
Gross average cost of a surgical admission	UAH4,565
Cost of disinfection	UAH20
Clinical inputs	
Difficult intubation-related admissions multiple	2.56
Probability of difficult intubation case	5.80%
Probability of video laryngoscopy failure in 1st attempt after 1st direct laryngoscopy attempt	8.00%
Probability of a difficult intubation case in video laryngoscopy	0.46%

RESULTS

Video laryngoscopy is a cost saving intervention from a payer perspective. Its introduction into clinical practice may decrease incidence of difficult intubations from 5.8% to 0.47%, resulting in average decrease of healthcare cost per procedure by 8,8 EUR (375 UAH).

Figure 2: Per patient incremental costs following introduction of video laryngoscopy



CONCLUSIONS

The introduction of advanced air management techniques will lead to anaesthesiologic care improvement in Ukraine from both clinical and economic perspectives. Video laryngoscopes, as electronic devices, may also provide a valuable resource for data collection that can be later used in development of AI tools for anatomic structures recognition and procedure success evaluation. Such tools may complement existing solutions through integration with a clinical decision support system and is a topic for further research. There are additional benefits associated with video laryngoscopy introduction. Ease of learning and intubation skill development may ensure fast technology deployment in a clinical setting.