ORGANIZATIONAL IMPACT OF IMPLEMENTING SINGLE-USE RHINOLARYNGOSCOPES IN THE EMERGENCY DEPARTMENT

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Introduction

Fiberoptic rhinolaryngoscopy is essential for upper airway assessment. However, the conventional reusable rhinolaryngoscope (RR) has limitations, including lack of availability and resource demanding decontamination procedures. This study aimed to compare physicians and nurses perception of organizational impact (OI) of RR compared to single-use rhinolaryngoscope (SUR).

Materials and Methods

A survey was conducted among 13 ear-nose-throat (ENT) residents and 8 nurses from the Department of Otolaryngology, Head and Neck Surgery, Aarhus University Hospital, comparing the SUR (Ambu® aScope™ 4 RhinoLaryngo Slim) and the RR eyepiece (Olympus ENF-GP Fiber RhinoLaryngoscope). The survey is combined by 10 categories, further divided between one or more sub-categories, and is answered using a visual analog rating scale (VAS) (1-100). Results for categories and sub-categories is presented for nurses and doctors, separately, and analyzed using paired t-tests.

Results

The residents perceived that the SUR had a positive OI within the categories: patient/carer involvement, cooperation and communication, and vigilance and monitoring methods; and further within the sub-categories: wear and tear problems, recording and saving images and videos, and disadvantage/advantage of being unable/able to record video during rhinolaryngoscopy. Nurses found that SUR took less time to clean, transport, store and dispose. Eighty-five percent of physicians found SURs sufficient within the emergency department. Accordingly, 69% of physicians thought that SUR could replace RR and further 46%, 31% and 23% preferred RR, had no preference or preferred SUR, respectively.

Discussion

SUR diminishes parts of the organizational burden of emergency department rhinolaryngoscopy. However, utilizing VAS and not controlling for internal nor external validity potentially results in bias.

Organisational Impact

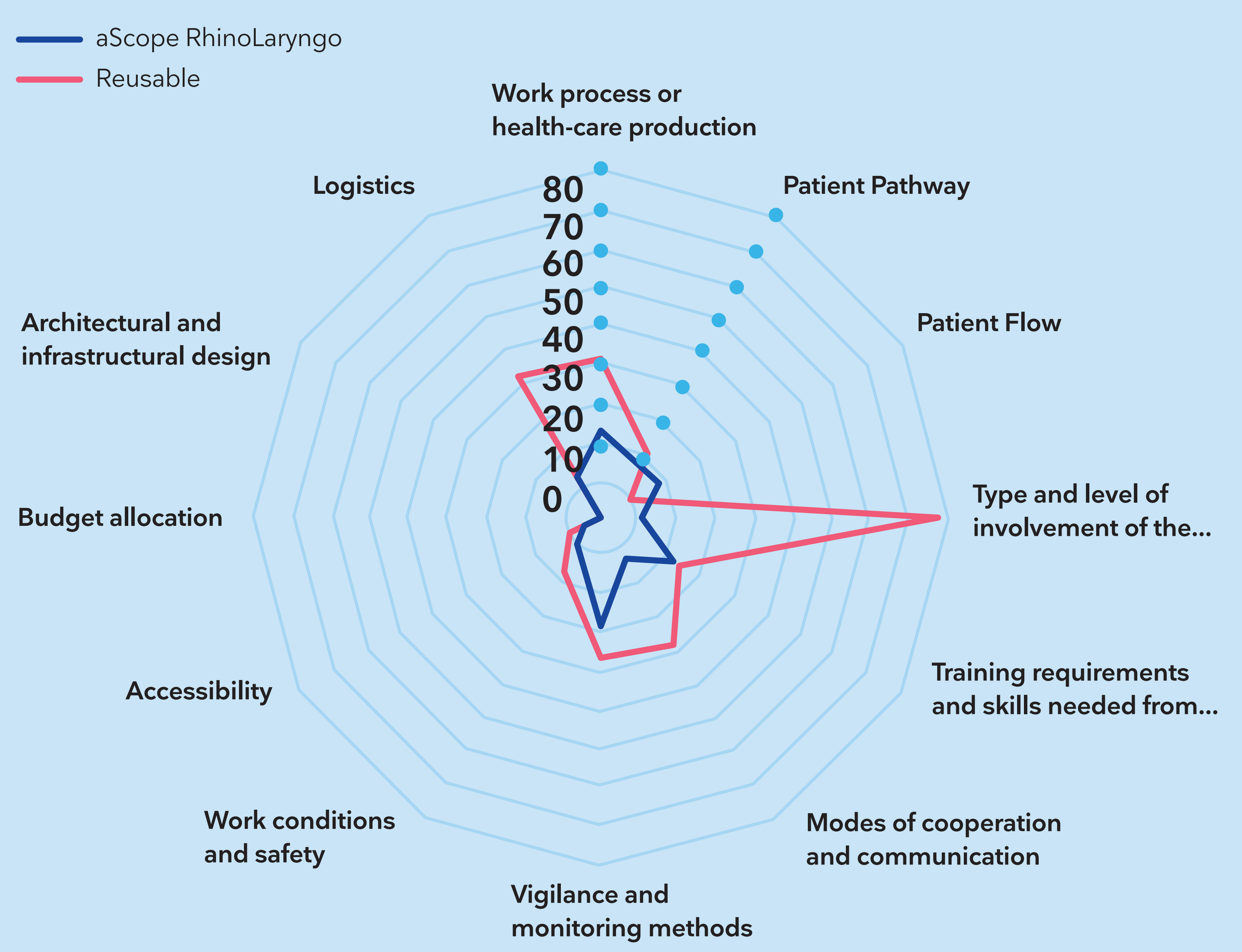

Figure 1. Radar plot illustrating the ENT residents perception of the organizational burden associated to rhinolaryngoscopes within the emergency department. 0: no burden – 100: biggest imaginable burden, N=12.

Is aScope RhinoLaryngo sufficient in the emergency department?

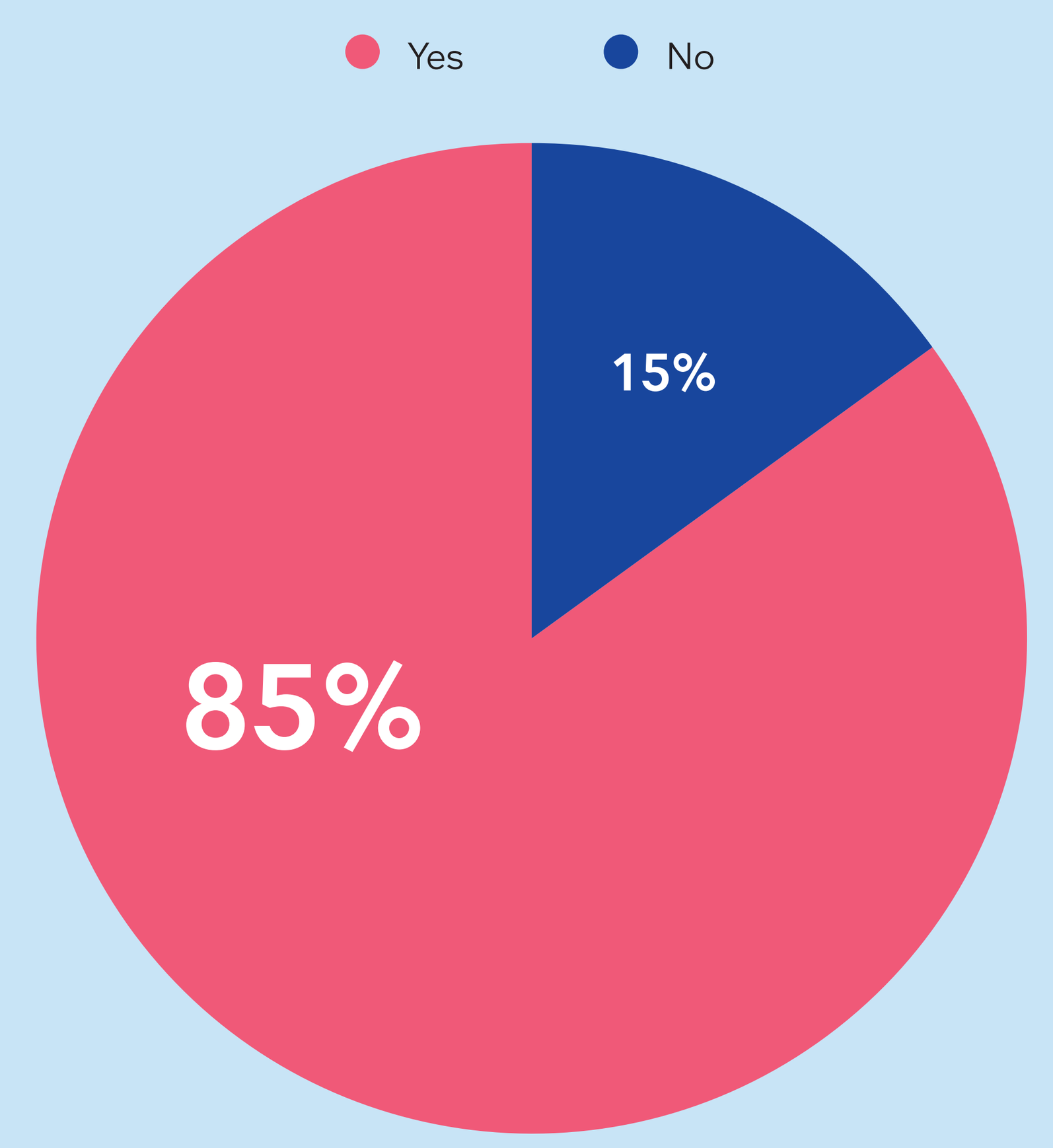

Figure 4. ENT resident's perception of whether the single-use rhinolaryngoscope is sufficient for the procedures conducted in the emergency department, N=12.

ENT Residents perception of the organizational burden of reusable rhinolaryngoscopes compared to single-use rhinolaryngoscopes in the emergency department

Category N=12	Sub-category	Reusable Burden ± SEM	Single-use rhinolaryngoscope Burden ± SEM	P-Value
Work process or health care production		33.97 ± 5.82	22.86 ± 5.48	P=0.16
	Wear and tear problems	**31.33 ± 10.26**	**4.58 ± 3.97**	**P=0.03**
	Training and education of students	9.67 ± 4.19	35.25 ± 11.82	P=0.06
	Recording and saving images and videos	**60.92 ± 8.49**	**28.75 ± 8.46**	**P=0.01**
Patient pathway		20.54 ± 6.41	17.83 ± 5.01	P=0.70
	Need to transport patient to get the procedure	12.75 ± 6.34	17.42 ± 6.55	P=0.54
	Need to transport rhinolaryngoscope to the patient	28.33 ± 10.48	18.25 ± 7.58	P=0.40
Patient flow	Delay from indication for rhinolaryngoscopy till procedure start	9.58 ± 4.31	17.33 ± 6.19	P=0.37
Patient/Carer involvement	**Rhinolaryngoscope enables patient/carer involvement**	**75.75 ± 9.07**	**12.67 ± 4.93**	**P<0.01**
Training Requirements	Training required to operate rhinolaryngoscope	22.42 ± 7.86	20.92 ± 6.89	P=0.68
Cooperation and communication		**37.46 ± 6.05**	**12.63 ± 3.98**	**P<0.01**
	Disadvantage/advantage of being unable/able to record video during rhinolaryngoscopy	**50.33 ± 8.30**	**17.67 ± 6.29**	**P=0.03**
	Level of communication needed to ensure a ready to use rhinolaryngoscope	24.58 ± 7.07	7.58 ± 4.43	P=0.08
Vigilance and monitoring methods		**36.11 ± 4.19**	**27.06 ± 4.36**	**P=0.05**
	Track and trace infectious diseases	16.83 ± 6.21	10.08 ± 5.41	P=0.40
	Reporting of malfunctioning devices to authority	44.25 ± 4.70	37.5 ± 6.25	P=0.13
	Monitor expiry date	47.25 ± 7.12	33.58 ± 8.15	P=0.21
Work conditions and safety		17.92 ± 5.94	7.75 ± 3.04	P=0.08
	Exposed to infectious agents	13 ± 7.32	8 ± 4.16	P=0.23
	Waiting on an available rhinolaryngoscope's effect on working conditions	22.83 ± 9.13	7.5 ± 4.43	P=0.18
Accessibility	Percentage of procedures where a rhinolaryngoscope is not available	9.25 ± 4.17	4.17 ± 2.19	P=0.38
Budget allocation		NA	NA	NA
Architectural and infra-structural design		NA	NA	NA

Nurses perception of Organisational burden

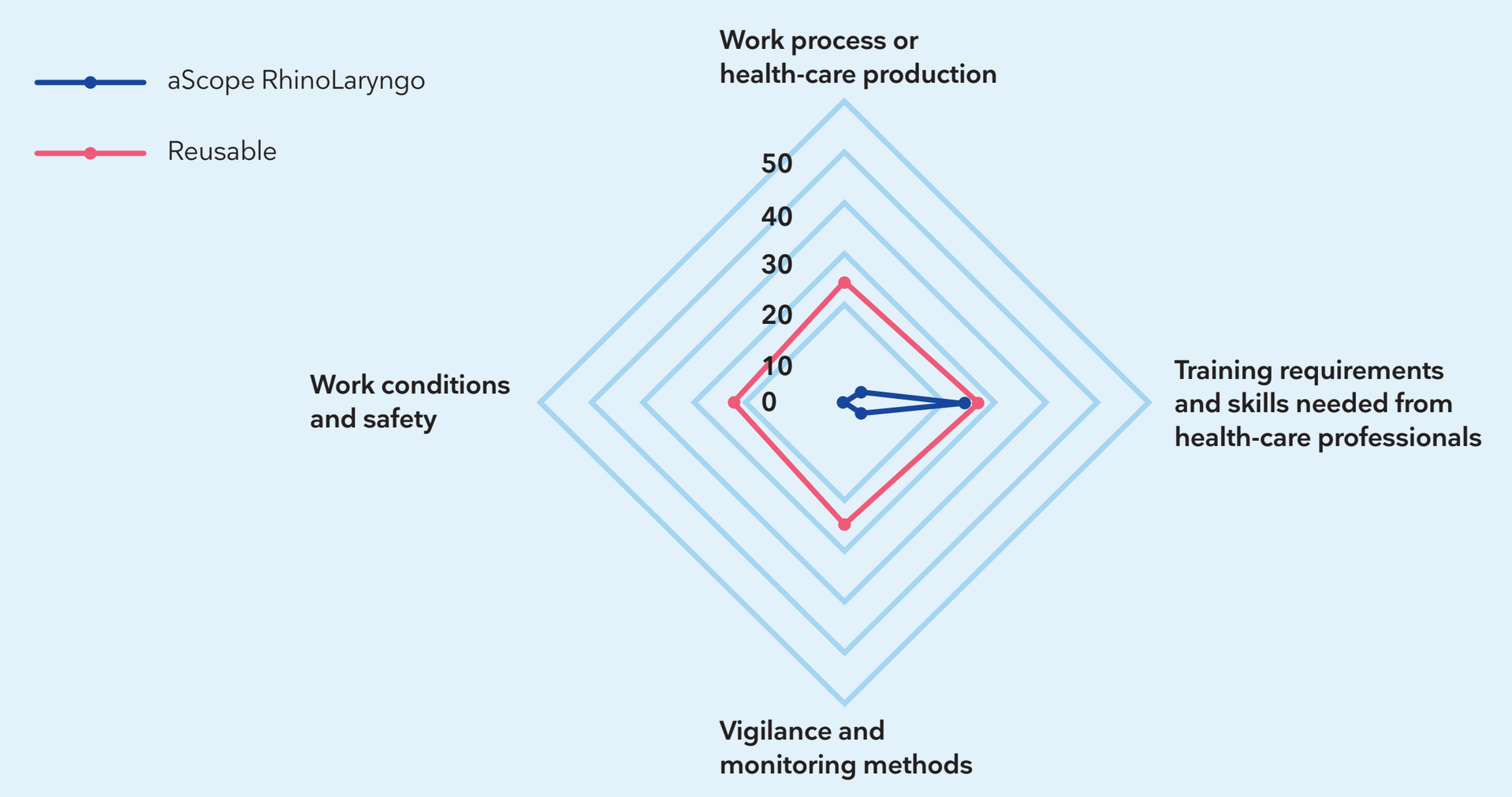

Figure 2. Radar plot illustrating the ENT residents perception of the organizational burden associated to rhinolaryngoscopes within the emergency department. 0: no burden – 100: biggest imaginable burden, N=12.

Device evaluation

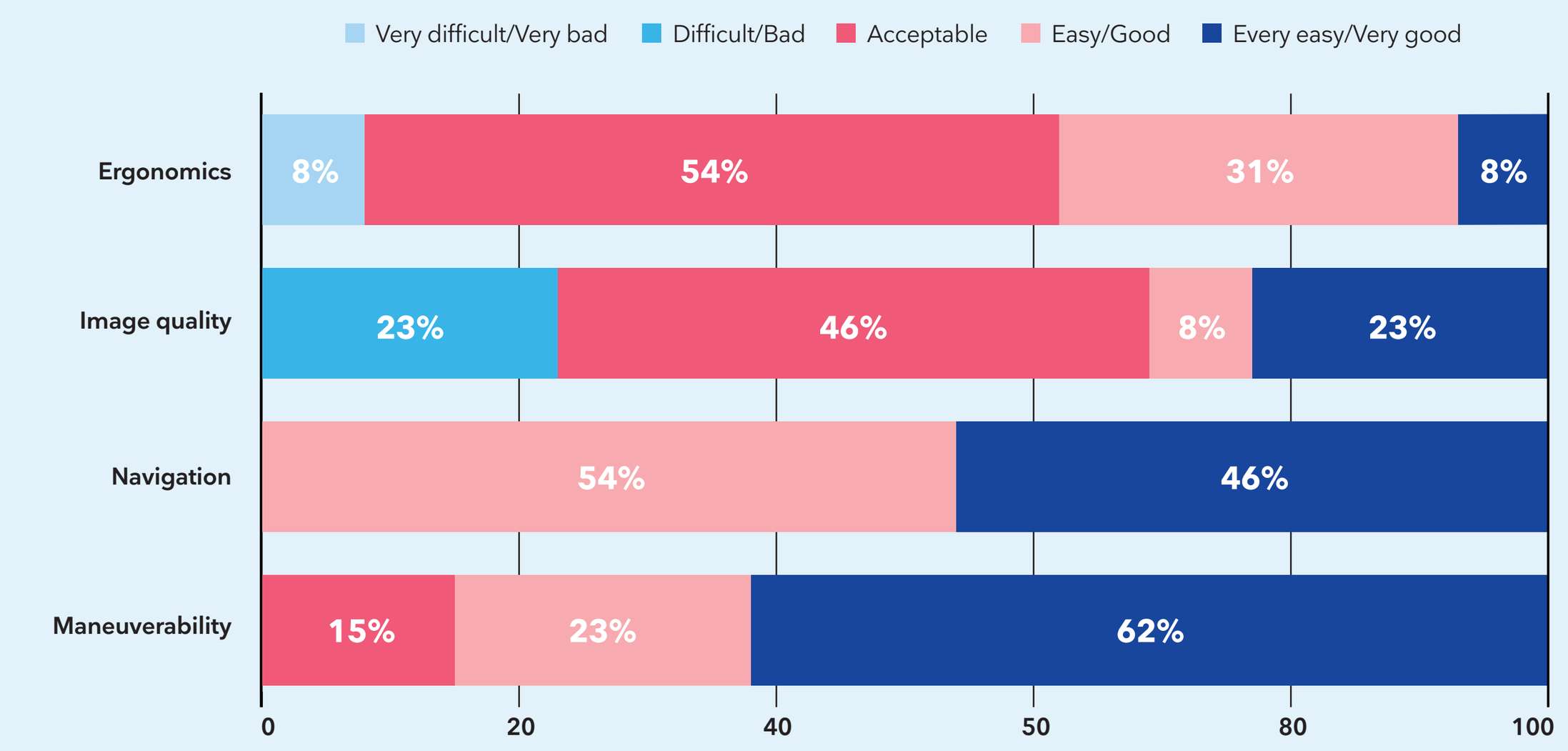

Figure 6. ENT residents evaluation of the single-use rhinolaryngoscope in terms of ergonomics, image quality, navigation and maneuverability, N=12.

Nurses perception of the organizational burden of reusable rhinolaryngoscopes compared to single-use rhinolaryngoscopes

Category N=12	Sub-category	Reusable Burden ± SEM	Single-use rhinolaryngoscope Burden ± SEM	P-Value
Work process or health care production	**Time (min) needed to clean, transport, store and dispose of rhinolaryngoscopes**	**14.63 ± 4.50**	**1.13 ± 0.45**	**P=0.02**
Patient pathway		NA	NA	NA
Patient flow		NA	NA	NA
Patient/Carer involvement		NA	NA	NA
Training Requirements		15.81 ± 5.04	12.69 ± 5.70	P=0.61
	Training level needed to clean the rhinolaryngosocpes	25.5 ± 8.21	10.63 ± 6.13	P=0.06
	Training needed to sample	6.13 ± 3.29	14.75 ± 9.48	P=0.33
	rhinolaryngoscopes to check if they are contaminated			
Cooperation and communication		NA	NA	NA
Vigilance and monitoring methods	Paper work	0.625 ± 0.47	0.25 ± 0.15	P=0.35
Work conditions and safety		13.88 ± 5.60	1.88 ± 0.78	P=0.05
	Exposed to infectious agents	6.75 ± 3.14	0.88 ± 0.69	P=0.07
	Exposure to detergents	21 ± 10.14	1.875 ± 1.11	P=0.11
Accessibility		NA	NA	NA
Budget allocation		NA	NA	NA
Architectural and infrastructural design		NA	NA	NA
Logistics		NA	NA	NA

Procedures Conducted with aScope RhinoLaryngo

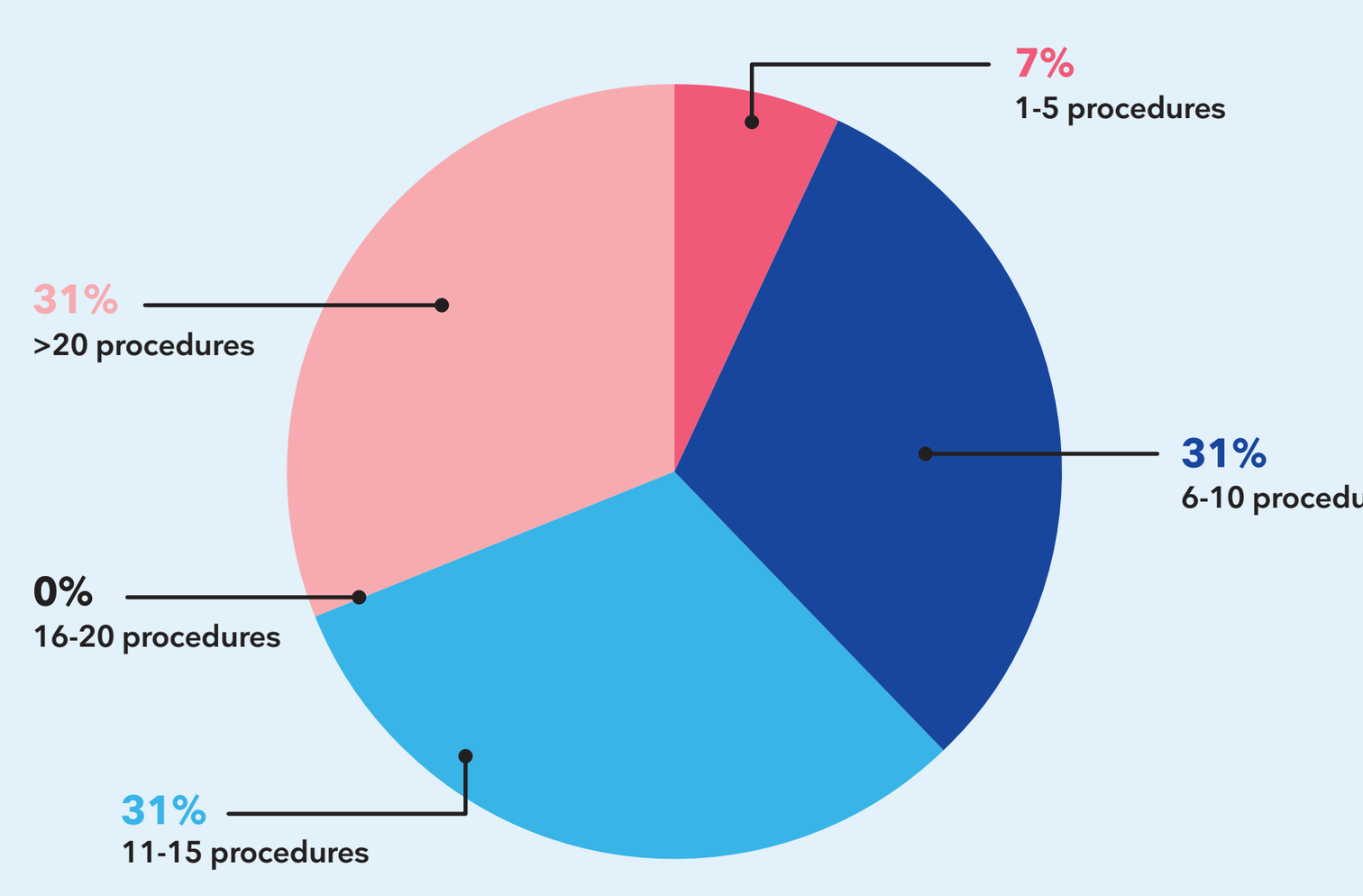

Figure 3. ENT residents experience with the single-use rhinolaryngoscope, N=12.

Can aScope RhinoLaryngo replace the reusable scope in the emergency department?

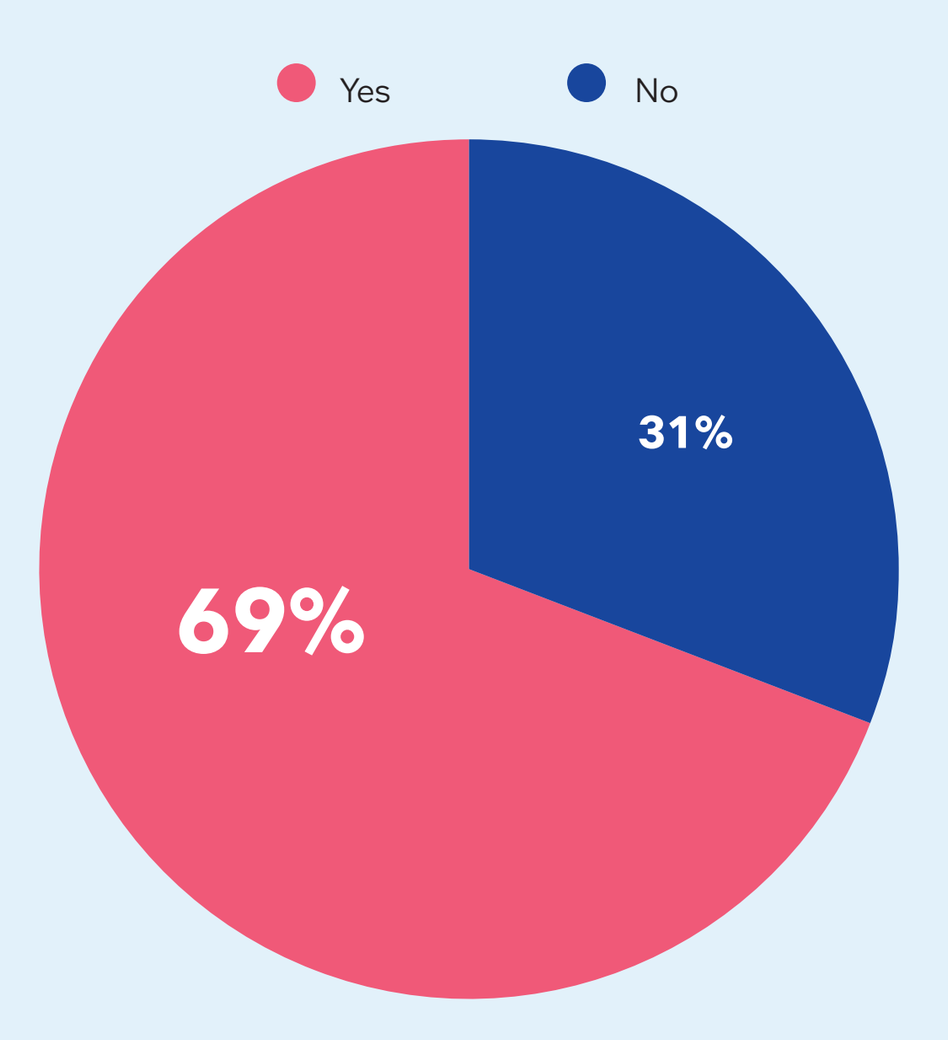

Figure 5. ENT resident's perception of whether the single-use rhinolaryngoscope can replace the reusable rhinolaryngoscopes in the emergence department, N=12.

Residents rhinolaryngoscope preference within the emergency department

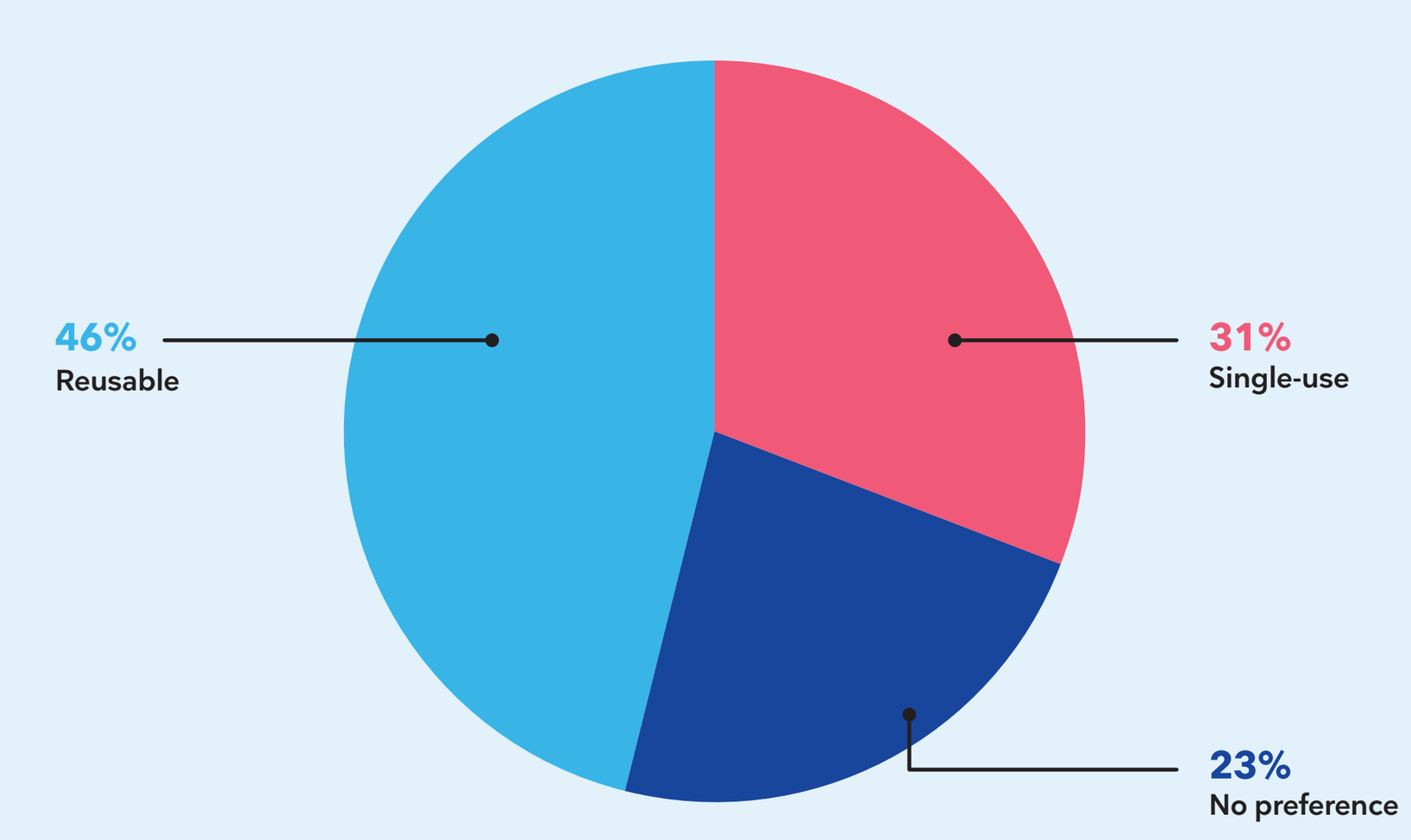

Figure 7. ENT residents preferred scope within the emergency department, N=12.

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