

Addendum

Supplementary Table 1. Costs to reprocess 20 colonoscopes at differing annual volumes including capital costs, repair costs, cleaning supplies, and personnel costs. Costs are categorized based on The Healthcare Infection Control Practices Advisory Committee (HICPAC) reprocessing steps.

Item	Description	Annual cost	Cost per procedure 1,000 annual procedures	Cost per procedure 2,000 annual procedures	Cost per procedure 3,000 annual procedures
Capital costs					
Colonoscopes (n = 20)	Purchase cost: \$35,000 per scope. Unit cost provided by JHH. Amortized over 5 years.	\$155,036.96	\$155.04	\$77.52	\$51.68
Scope processor and light source (n = 8)	Purchase cost: \$50,000 per scope processor and light source. Unit cost provided by JHH. Amortized over 5 years	\$88,592.55	\$88.59	\$44.30	\$29.53
Automated Endoscopic Reprocessing (AER) (n = 2) incl. tracking system	Used to disinfect the colonoscope after manual cleaning. Purchase cost: \$47,646.86. Cost provided by JHH. Amortized over 8 years.	\$13,863.01	\$13.86	\$6.93	\$4.62
Drying cabinets (n = 2)	Used to store and dry the colonoscopes after reprocessing. Purchase cost: \$12,068.74. Amortized over 8 years. Cost estimate based on the average purchase cost from Ofstead, et al. ¹	3,511.44	\$3.51	\$1.76	\$1.17
Compressed air dryer	Used to remove leftover water from reprocessed colonoscope. Purchase cost: \$300. Cost estimate provided by JHH. Amortized over 5 years.	\$66.44	\$0.07	\$0.03	\$0.02
Scope plastic tray rack (n=1)	Used to contain the colonoscope between precleaning and manual cleaning. Purchase cost: \$ 848.47. Amortized over 5 years. Source: www.surgicaltools.com	\$187.92	\$0.19	\$0.09	\$0.06
Channel separators	Used to block scope channels during manual cleaning. Purchase cost: \$394, amortized over 2 years. Source: www.surgicaltools.com	\$207.40	\$0.21	\$0.10	\$0.07
Laerdal suction unit	Used to suction blood, secretion and other sediments during manual cleaning. Purchase cost: \$900. Cost provided by JHH. Amortized over 5 years.	\$199.33	\$0.20	\$0.10	\$0.07
Scope buddy	Used to flush the scope during manual cleaning. Purchase cost: \$1,400. Cost provided by JHH. Amortized over 5 years.	\$310.07	\$0.31	\$0.16	\$0.10
Blocks	Used to connect the colonoscope to the AER. Purchase cost: \$900. Cost provided by JHH. Amortized over 2 years.	\$473.76	\$0.47	\$0.24	\$0.16
Total			\$262.45	\$131.22	\$87.48

¹ Available from: <https://www.bostonscientific.com/content/dam/bostonscientific/uro-wh/portfolio-group/LithoVue/pdfs/Sterilization-Resource-Handout.pdf>

Repair costs					
Colonoscopy repair (n = 20)	Average annual repair cost per colonoscopy: \$8,609.94. Cost based on manufacturer estimates ² .	\$172,198.78	\$172.20	\$86.10	\$57.40
AER repair (n = 2)	Average annual repair cost per AER: \$7,831.25 Cost based on manufacturer estimates ³	\$15,662.50	\$15.66	\$7.83	\$5.22
Scope processor and light source repair (n=8)	Average annual repair cost per processor and light source: \$2,307.69. Estimates from hospital in United Kingdom (unpublished data).	\$18,461.54	\$18.46	\$9.23	\$6.15
Total			\$206.32	\$103.16	\$68.77
PPE used during reprocessing					
Face mask	Face mask to protect personnel from water splashes and contamination. Unit cost provided by JHH.	-		\$1.74	
Gloves (2 pair)	Protection of skin and prevention of contamination. Unit cost provided by JHH.	-		\$1.52	
Hair covers	Hair cover to prevent contamination of scopes with hair and other particles. Unit cost provided by JHH.	-		\$0.05	
Scrubs (laundry cost)	Protection of clothes. Cost estimate based on Ofstead et al. ⁴	-		\$0.54	
Shoe covers	Prevention of contamination. Unit cost provided by JHH.	-		\$1.79	
Surgical mask	Protection of face and prevention of contamination. Unit cost provided by JHH.	-		\$0.88	
Wash gown	Protection of clothes. Unit cost provided by JHH.	-		\$0.06	
Total				\$6.58⁵	
Pre-cleaning					
Container	Used to collect used cleaning solutions. Unit cost provided by JHH.	-		\$0.15	
Disposable plastic tray I	Used to mix water and intercept for cleaning. Cost estimate based on Ofstead et al. ⁶	-		\$0.18	
Disposable plastic tray II	Used to collect used cleaning solutions. Cost estimate based on Ofstead et al. ⁷	-		\$0.18	
Gloves	Protection of skin and prevention of contamination. Unit cost provided by JHH.	-		\$1.41	

² Based on Johns Hopkins Service Contract Performance Reports, 2018

³ Based on Johns Hopkins Service Contract Performance Reports, 2018

⁴ Available from: <https://www.bostonscientific.com/content/dam/bostonscientific/uro-wh/portfolio-group/LithoVue/pdfs/Sterilization-Resource-Handout.pdf>

⁵ Unit costs are provided by the Endoscopy Unit at Johns Hopkins Hospital. Unit costs may vary from hospital to hospital due to discounts and order size.

⁶ Available from: <https://www.bostonscientific.com/content/dam/bostonscientific/uro-wh/portfolio-group/LithoVue/pdfs/Sterilization-Resource-Handout.pdf>

⁷ Available from: <https://www.bostonscientific.com/content/dam/bostonscientific/uro-wh/portfolio-group/LithoVue/pdfs/Sterilization-Resource-Handout.pdf>

Intercept detergent	Special detergent used during scope pre-cleaning. Unit cost provided by JHH.	-	\$0.42
Labels	Used for tracking the scope until storage. Estimate from hospital in United Kingdom (unpublished data).	-	\$0.53
Sponge	Used for cleaning. Unit cost provided by JHH.	-	\$0.80
Sterile water	Used to rinse scope channel for detergent. Unit cost provided by JHH.	-	\$0.19
Syringe (60 ml)	Used to rinse scope channel for detergent. Unit cost provided by JHH.	-	\$0.31
Transport bag	Used to transport the scope from precleaning to manual cleaning. Estimate from large United Kingdom hospital.	-	\$0.96
Water	Used during cleaning. Unit cost provided by JHH.	-	\$0.19
Personnel cost	Time spend on pre-cleaning: 4.23 minutes (SE: 0.18) based on 25 observations of colonoscopes reprocessed at JHH (3-day period April 2019). Hourly wage (nurse, 2017): \$35.36 [Source: https://www.bls.gov/oes/2017/may/oes291141.htm]	-	\$2.49
Total			\$7.81³
Leak-testing, Manual cleaning, and visual inspection			
Intercept detergent	Special detergent applied to scope during manual cleaning. Unit cost provided by JHH.	-	\$0.42
Sponge	Used for cleaning purpose. Unit cost provided by JHH.	-	\$0.80
Channel brush	Used to clean scope channels. Unit cost provided by JHH.	-	\$2.85
Leak tester	Machine used to leak test the scopes. Cost estimate based on Ofstead et al. ⁸	-	\$3.15
Container	Filled with clean water to rinse the scope buddy. Unit cost provided by JHH.	-	\$0.15
Sterile water	Used to flush the scope before ChannelCheck. Unit cost provided by JHH.	-	\$0.19
Non-sterile water	Used for cleaning purpose. Unit cost provided by JHH.	-	\$0.23
ChannelCheck	Used to detect protein, blood and carbohydrate residues within the biopsy channel of endoscopes. Cost estimate based on use in 10% of colonoscopes. Unit cost provided by JHH.	-	\$0.90
Personnel cost (per procedure)	Time spend: 13.34 minutes (SE: 0.38) based on 25 observations of colonoscopes reprocessed at JHH (3-day period April 2019). Hourly wage (Certified endoscope	-	\$3.96

⁸ Available from: <https://www.bostonscientific.com/content/dam/bostonscientific/uro-wh/portfolio-group/LithoVue/pdfs/Sterilization-Resource-Handout.pdf>

	reprocessor technician, 2017): \$17.82 [Source: https://www.bls.gov/oes/2017/may/oes319093.htm].			
Personnel cost (daily)	Time spent cleaning countertops and sink daily: 30 minutes (SE: 0.20) based on 25 observations of colonoscopes reprocessed at JHH (3-day period April 2019). Hourly wage (Certified endoscope reprocessor technician, 2017): \$17.82 [Source: https://www.bls.gov/oes/2017/may/oes319093.htm].	-		\$0.30
Total				\$12.95³
High-level disinfection using AER				
Rapicide High-Level Disinfectant and Sterilant – type A	Special detergent used in the AER. Unit cost provided by JHH.	-		\$1.37
Rapicide High-Level Disinfectant and Sterilant – type B	Special detergent used in the AER. Unit cost provided by JHH.	-		\$1.37
Water	Used during cleaning.	-		N/A
Power	Electricity used for AER.	-		N/A
Total				\$2.74³
Storage				
Gloves	Used to prevent contamination. Unit cost provided by JHH.	-		\$1.41
Isopropyl alcohol	Used to dry the reprocessed colonoscope. Unit cost provided by JHH.	-		\$0.16
Lint free towels	Used to dry the scopes. Unit cost provided by JHH.	-		\$0.06
Tags	Used for tracking the scope – each day has its own label color with a date marked on it. Unit cost provided by JHH.	-		\$0.27
Personnel cost	Time spent: 1.38 minutes (SE: 0.12). based on 25 observations of colonoscopes reprocessed at JHH (3-day period April 2019). Hourly wage (Certified endoscope reprocessor technician, 2017): \$17.82 [Source: https://www.bls.gov/oes/2017/may/oes319093.htm].	-		\$0.41
Total				\$2.31³
Documentation	Documentation of each step. Cost included in the personnel costs above.			N/A
Total			\$501.16	\$266.77
				\$188.65

AER: automated endoscope reprocessor; HICPAC: The Healthcare Infection Control Practices Advisory Committee; JHH: Johns Hopkins Hospital; PPE: personal protective equipment; SE: standard error.