A META-ANALYSIS OF BRONCHOSCOPE ASSOCIATED CROSS-INFECTION AND EARLY COST-EFFECTIVENESS ANALYSIS OF SINGLE-USE COMPARED TO REUSABLE FLEXIBLE BRONCHOSCOPES IN THE BRONCHOSCOPY SUITE OF AMERICAN ACADEMIC INSTITUTIONS.

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OBJECTIVE

As single-use flexible bronchoscope (SUFB) usage increases in the U.S, this study aims to investigate if the recently introduced SUFB, Ambu® aScope™ 5 Broncho, is cost-effective compared to current practice with reusable flexible bronchoscopy (RFB) in the American bronchoscopy suite.

METHODS

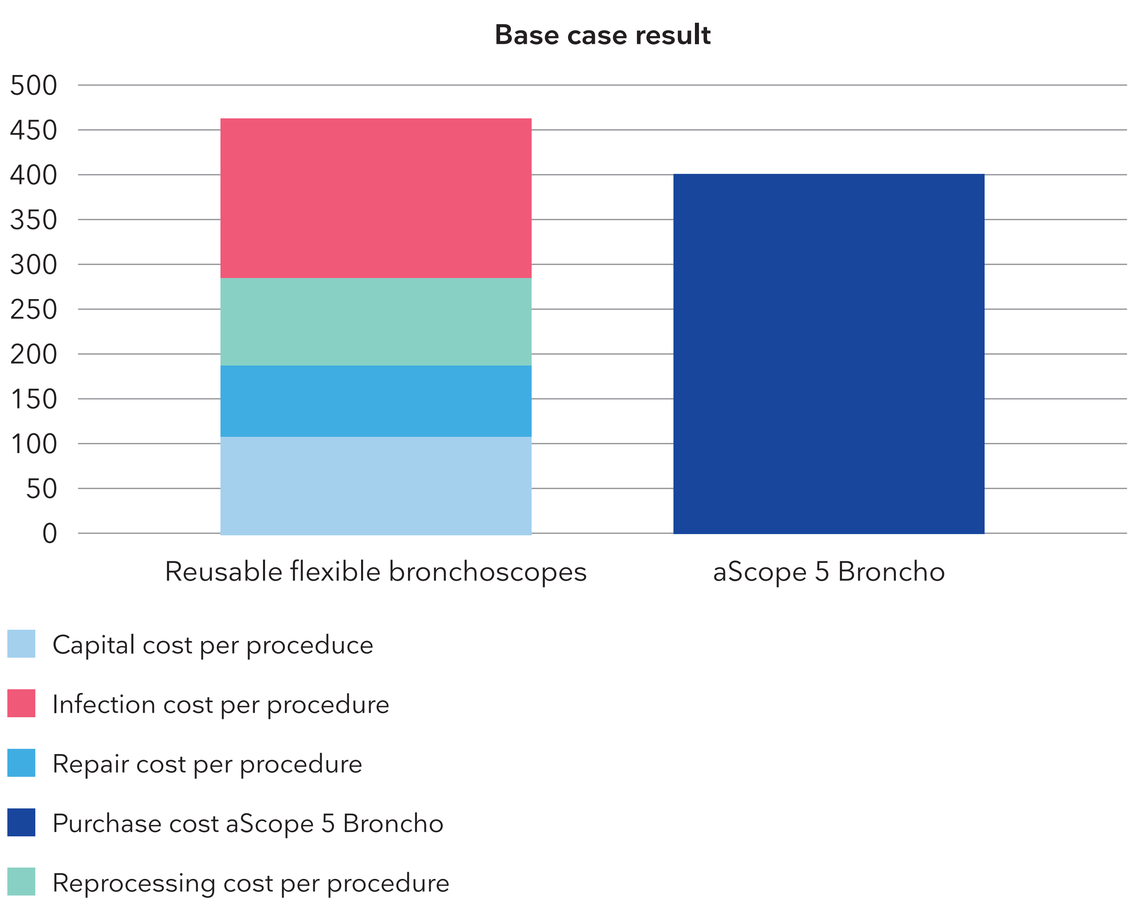
The primary outcome was the incremental cost-effectiveness ratio (ICER) between RFBs and SUFBs. Cost estimates, including capital-, repair-, and reprocessing costs, were derived from an observational micro-costing study within three large American Academic Institutions. Costs were valued in 2022 USD. A meta-analysis based on published literature from 2010-2020 provided an effect measure of cross-infection following bronchoscopy. Capital costs were discounted at 3% over 5-8 years. The robustness of the ICER estimate was assessed using both a deterministic and probabilistic sensitivity analysis (DSA, PSA).

RESULTS

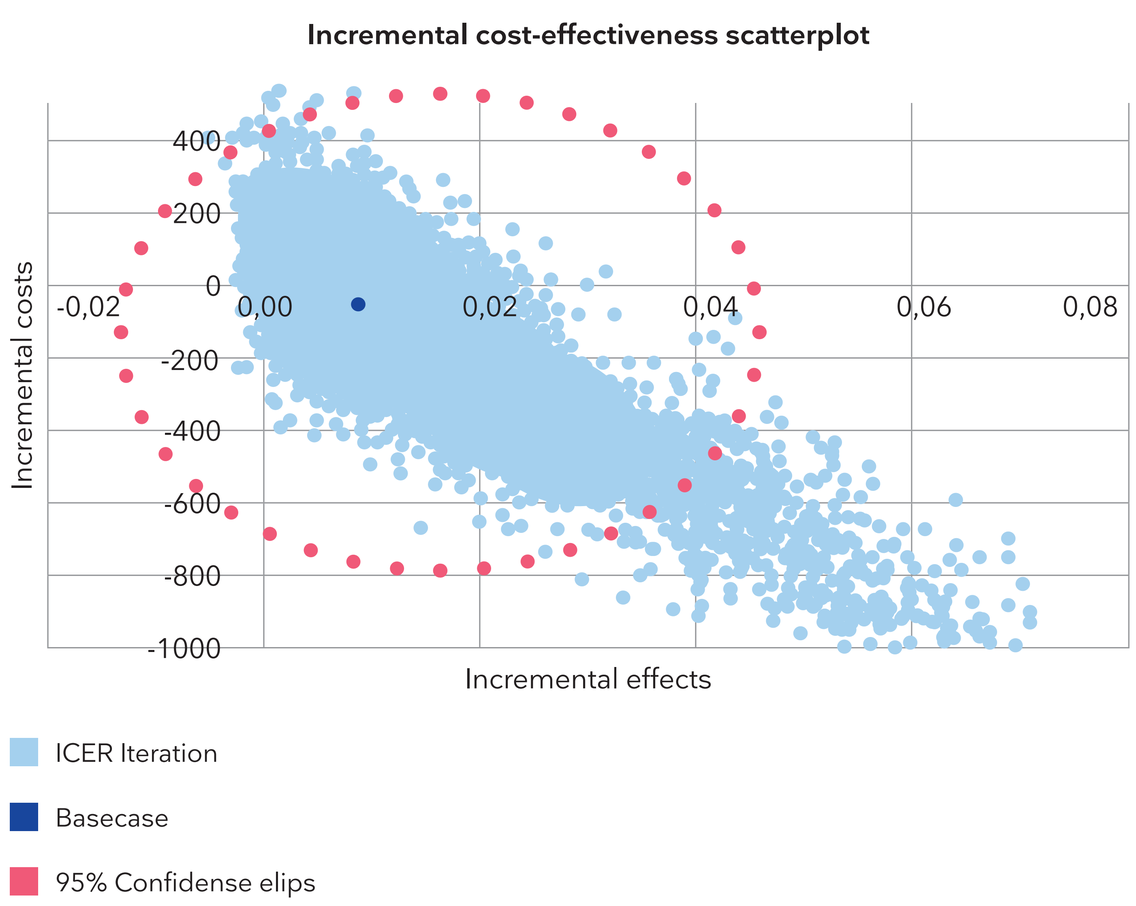
SUFBs demonstrated dominance over RFBs as each procedure was associated to an incremental saving of $63 and 1.21% reduction in cross-infection risk. The DSA illustrated that the parameters were robust; however, variations in procedure volume and SUFB cost had the biggest impact on the base-case. The PSA found that 73.5% of the 10,000 iterations were deemed to be cost-effective.

CONCLUSIONS

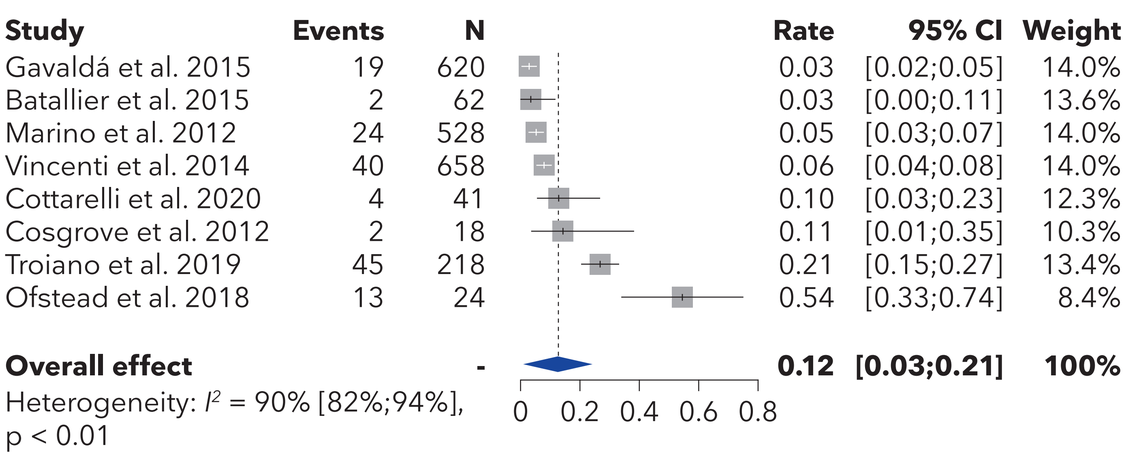
Based on the included parameters and when assuming equal clinical performance, SUFBs are expected to be cost-saving compared to RFBs in American bronchoscopy suite settings. However, as indicated in the DSA, a potential conversion from RFBs to SUFBs is expected to be dependent on individual hospitals' bronchoscopy setup, annual procedure volume and SUFB cost. The result must be interpreted considering the significant heterogeneity and publication bias in the included contamination- and infection studies in the meta-analysis. This calls for more studies within the field of bronchoscopy and associated infection control, focusing on uniform vigilance, reprocessing, sampling, and bioanalysis methods within the bronchoscopy suite.



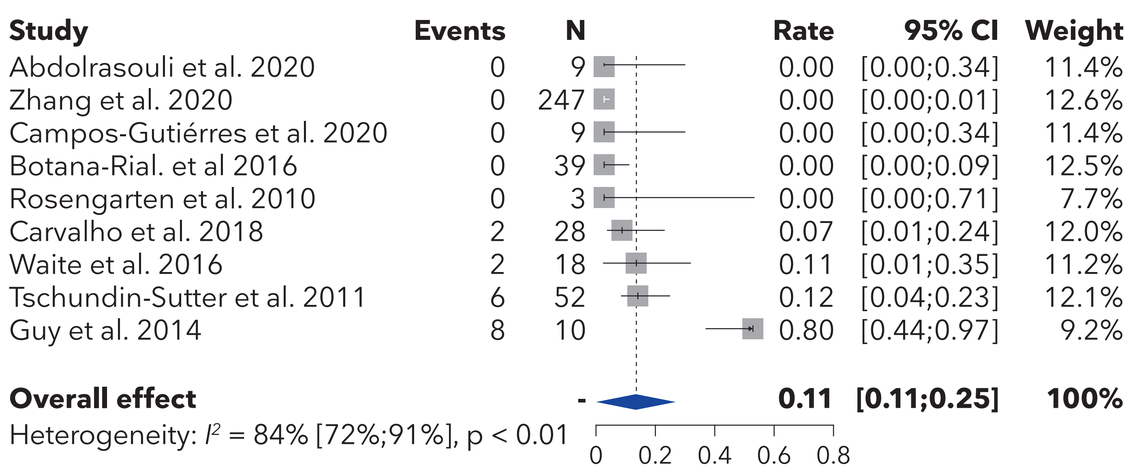
Graph 1: Base case result at 2,200 procedures per year



Graph 2: Incremental cost-effectiveness scatter plot



Graph 3: Meta-analysis for Cross-contamination



Graph 4: Meta-analysis for infection

Link to reference list