

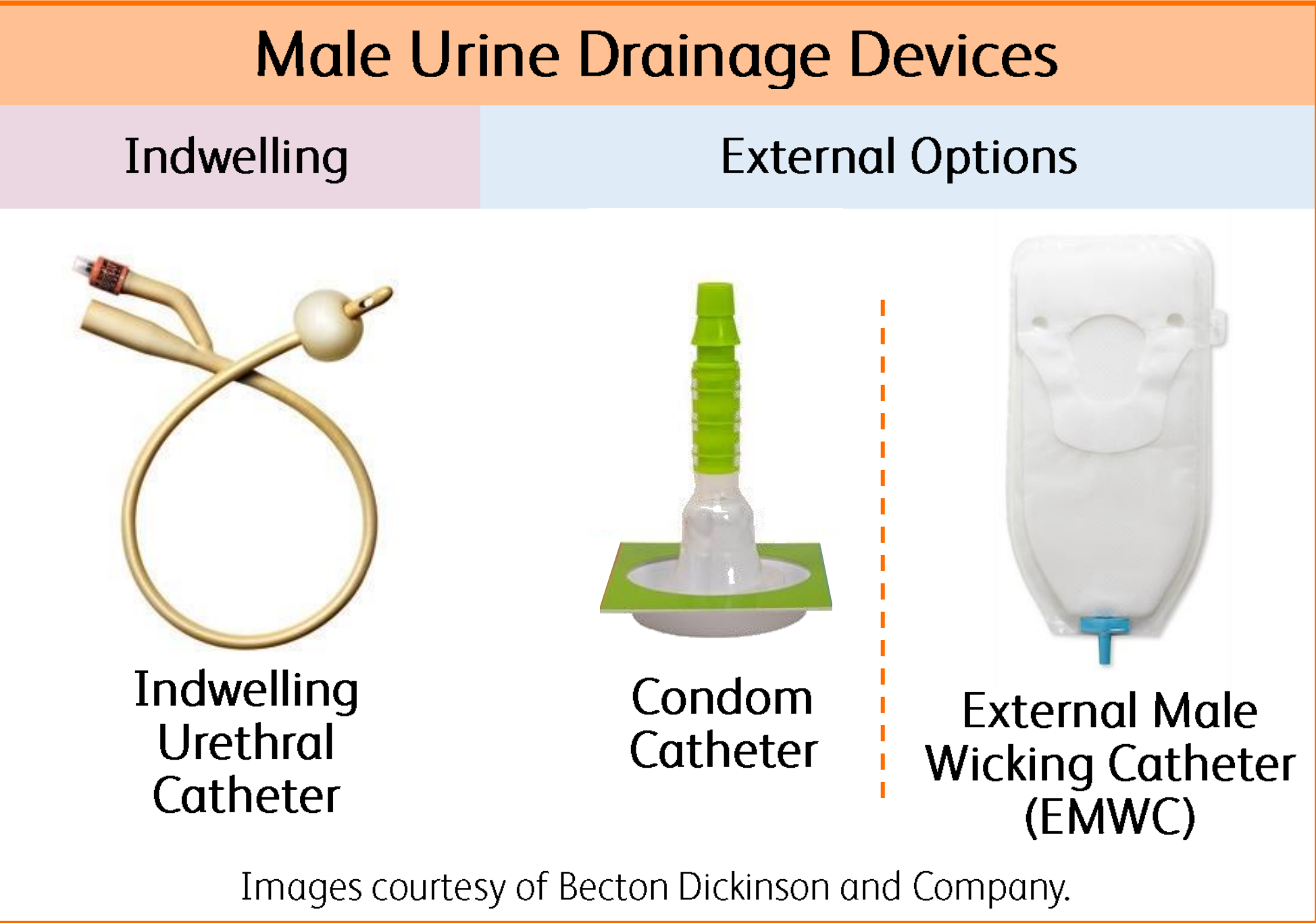
Examining Hospital-Onset Urinary Tract Infection (HO-UTI) in Male Patients – Modeling the Economic Impact of Utilizing External Male Wicking Catheters (EMWCs)

Timothy Kelly, MS, MBA; Becton Dickinson and Company Urology and Critical Care, Atlanta, GA , USA

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Background

To help avoid indwelling catheter-associated urinary tract infections (CAUTIs) in male patients, recommendations are to consider using alternatives to indwelling urethral catheterization in selected patients where appropriate.¹ Condom catheters are the most commonly used external catheters.¹ However, condom catheters have been observed to be associated with infection risk and risk of noninfectious complications.² Recently, suction-assisted external wicking catheters – similar to those employed with female patients³ – have been introduced for male patients.



Objective

The objective of this model is to estimate the potential per-day infection cost avoidance impact of EMWCs if they are employed as alternative urine drainage devices in two scenarios: 1) instead of condom catheters, and 2) instead of indwelling urethral catheters.

Methods

A model was constructed evaluating estimated infection reduction, costs of both CAUTI and non-CAUTI hospital-onset urinary tract infection (non-CAUTI HOUTI), and the infection incidence rates reported in two prospective studies comparing condom catheters to indwelling urethral catheters.

The projected infection risk reduction selected for the model was the CAUTI rate reduction observed in a large study of an external female wicking catheter.⁴ In addition, a two-way sensitivity analysis was performed to analyze the effect of varying both the cost of an infection, and the needed reduction in infection rate, in order to achieve a cost avoidance of \$15 (€14.25) per day.

Results

The prevalence of condom catheter and indwelling urethral catheter infections in one study were 11.1% and 6.8%, respectively,² which were extrapolated to per-day risks of 2.8% and 3.4%, respectively.[†] In the second study, the incidence of hospital-onset bacteriuria per 1,000 patient-days were 61 and 111 for condom catheter and indwelling urethral catheters, respectively,⁵ translating to per-day risks of 6.1% and 11.1%.

Two infection costs were evaluated: \$6,101⁶ (€5,796) – the cost of a non-CAUTI HOUTI for the condom catheter analysis, and \$13,793⁷ (€13,103) – the cost of a CAUTI for the indwelling urethral catheter analysis. The estimated infection reduction was 54.8% – the reduction observed in a large study of external female wicking catheters.⁴

The potential per-day CAUTI cost avoidance ranged from \$257 (€244) to \$839 (€797) for indwelling urethral catheters. The potential per-day non-CAUTI HOUTI cost avoidance ranged from \$94 (€89) to \$204 (€194) for condom catheters. A two-way sensitivity analysis – designed to yield a \$15 (€14.25) per day cost avoidance – found that if the cost of an infection were \$3,000 (€2,850), the necessary reduction in the four incidence rates modeled would range from 18% to 5%.

Model

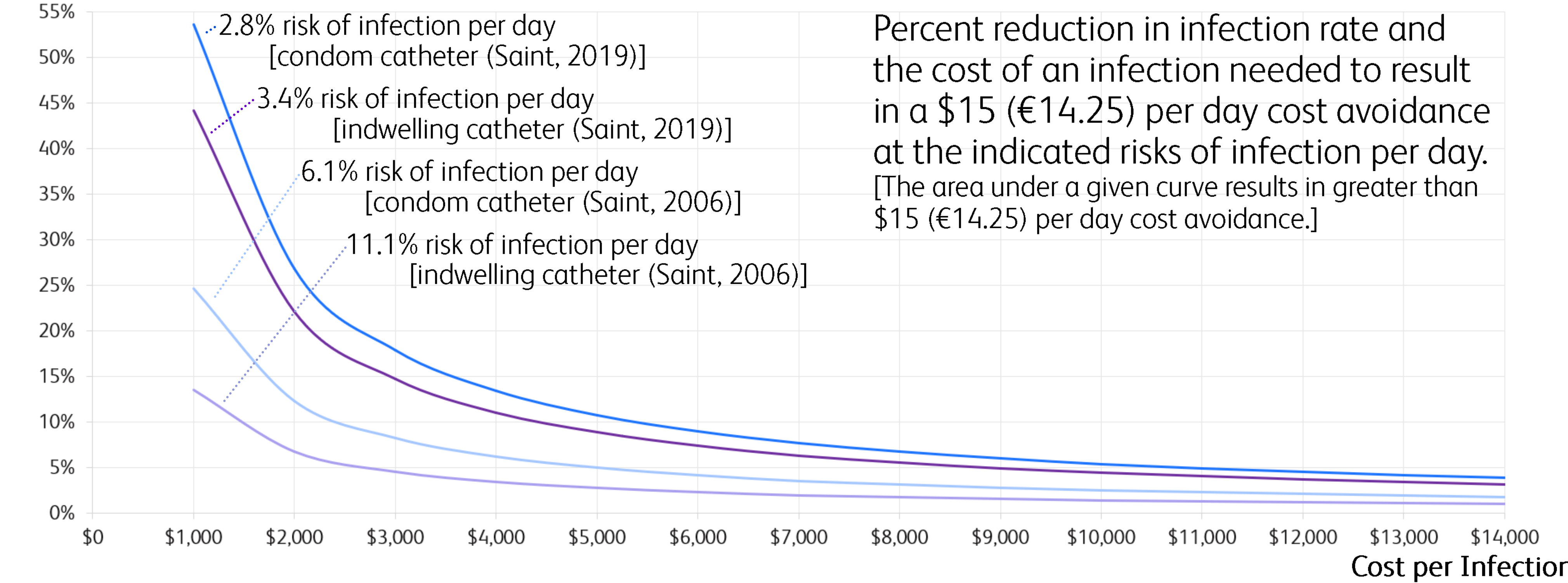
Risk of infection per day	
Cost per infection	
Cost of infection per day	

Projected reduction in risk with EMWCs	
Projected infection cost avoidance per day with EMWCs	

Condom Catheter Analysis	
2.8% ²	6.1% ⁵
\$6,101 ⁶	\$6,101 ⁶
\$171	\$372
54.8% ⁴	54.8% ⁴
\$94	\$204

Indwelling Catheter Analysis	
3.4% ²	11.1% ⁵
\$13,793 ⁷	\$13,793 ⁷
\$469	\$1,531
54.8% ⁴	54.8% ⁴
\$257	\$839

Reduction in Risk of Infection



KEY FINDINGS

- Utilization of External Male Wicking Catheters (EMWCs) – as alternatives to indwelling urethral catheters and/or condom catheters – may result in per-day infection cost avoidance if they reduce infection risk similar to the reduction observed with external female wicking catheters.
- This model is subject to certain assumptions and several limitations – prospective studies should be undertaken to validate these results.

Limitations

The limitations of this model include but are not limited to:

- Searches of both PubMed and Embase uncovered no studies of EMWCs and thus the finding for infection reduction with female external wicking catheters was assumed for this model. That estimated infection reduction may or may not be extensible to EMWCs.
- The same estimated infection reduction percentage for EMWCs was assumed to occur relative to both indwelling urethral catheters and condom catheters. The actual impact of EMWCs on the infection rates associated with condom catheters, if any, is unknown.
- While the model considered different costs for the infections associated with indwelling urethral catheters and with condom catheters, the applicability of the non-CAUTI HOUTI cost to the infections associated with condom catheters, including the study that reported bacteriuria incidence, is not known.
- This model considered only the cost of infections and not the cost of devices or non-infectious complications. It is not known what impact, if any, EMWCs may have upon non-infectious complications.

Conclusions

This model suggests that utilization of EMWCs may generate per-day cost avoidance if they reduce the risk of infection in patients with condom catheters and in patients with indwelling urethral catheters. The per-day cost avoidance is likely to be greater when EMWCs are utilized as alternatives to indwelling urethral catheters. Prospective studies with EMWCs, emulating the designs of the two analyzed studies, should be considered to validate this model.

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- [†]In order to estimate per-day infection incidence for the prevalence values reported in Saint, 2019,² the median length of stay values of 4 days for condom catheters and 2 days for indwelling catheters from Saint, 2006⁵ were employed.

All dollars were converted to euros at a rate of \$1=€0.95.

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