Table A: Estimation of the Risk of Central Line-Associated Bloodstream Infections (CLABSIs)

Hazard Identification											Toxicity Assessment					
Annual CLABSIs in ACH	Ref.	Annual CLABSIs in CAH	Ref.	Annual CLABSIs in IRF	Ref.	Microorganisms Most Commonly Associated	Ref.	Probability of CLABSIs Caused by Specific Microorganisms		Ref.	Probability of Colonization Progressing to Infection		Ref.	Mortlity Ratio		Ref.
0.0007389	1	0.0002543	1	0.000411429	1	*Acinetobacter*	2	0.022		2	0.54	0.69	4,5	0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	CoNS	2	0.095	0.341	9,2	0.12	0.25	3	0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*E.coli*	2	0.027	0.095	2,9				0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*Enterobacter*	2	0.039		2				0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*Enterococcus*	2	0.16		2	0.18		16	0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*Klebsiella*	2	0.058		2	0.05		6	0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*Pseudomonas*	2	0.031		2				0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*S. aureas*	2	0.099		2	0.318	0.38	14	0.12	0.33	12,13
0.0007389	1	0.0002543	1	0.000411429	1	*Others*	2	0.105		2				0.12	0.33	12,13

References:

[1] Sourced from 2018 National and State HAI Progress Report SIR Data for Acute Care Hospitals (2018-SIR-ACH.xlsx) , Critical Care Access Hospitals (2018-SIR-CAH.xlsx), and Inpatient Rehabilitation Facilities (2018-SIR-IRF.xlsx) at https://www.cdc.gov/hai/excel/hai-progress-report/.

[2] Haddadin, Y. and Regunath, H., 2019. Central Line Associated Blood Stream Infections (CLABSI). December 22. NCBI Bookshelf. A service of the National Library of Medicine, National Institutes of Health. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Accessed January 2020. https://www.ncbi.nlm.nih.gov/books/NBK430891/?report=printable.

[3] Tufariello, J.M. and Lowy, F.D., 2017. Infection due to coagulase-negative staphylococci: Epidemiology, microbiology, and pathogenesis. https://www.uptodate.com/contents/infection-due-to-coagulase-negative-staphylococci-epidemiology-microbiology-and-pathogenesis.

[4] Jung, J.Y., Park, M.S., Kim, S.E., Park, B.H., Son, J.Y., et al., 2010. Risk factors for multi-drug resistant Acinetobacter baumannii bacteremia in patients with colonization in the intensive care unit. BMC Infectious Diseases, 10:228. https://link.springer.com/article/10.1186/1471-2334-10-228.

[5] Latibeaudiere, R., Rosa, R., Laowansiri, P., Arheart, K., Namias, N., and Munoz-Price, L.S., 2014. Surveillance Cultures Growing Carbapenem-Resistant Acinetobacter baumannii Predict the Development of Clinical Infections: A Retrospective Cohort Study. Clin Infectious Diseases, 60(3):415–422. https://academic.oup.com/cid/article/60/3/415/312715.

[6] Martin, R.M. and Bachman, M.A., 2018. Colonization, Infection, and the Accessory Genome of Klebsiella pneumoniae. Front Cell Infect Microbiol, 8:4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5786545/pdf/fcimb-08-00004.pdf.

[7] Bhalla, A., Pultz, N.J., Gries, D.M., Ray, A.J., et al., 2004. Acquisition of Nosocomial Pathogens on Hands After Contact with Environmental Surfaces Near Hospitalized Patients. Infection Control Hosp Epidemiol, 25(2): 164-167.

[8] Kleinpell, R.M., Munro, C.L., and Giuliano, K.K., 2008. Targeting Health Care–Associated Infections: Evidence-Based Strategies. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): Agency for Healthcare Research and Quality (US); Apr. Chapter 42.

[9] Pittet, D., Dharan, S., Touveneau, S., Sauvan, V., et al., 1999. Bacterial contamination of the hands of hospital staff during routine patient care. Arch Int Med, 159: 821 – 826.

[10] Crick, B., Chua, S., Canty, J., and Mccullough, K., 2008. Potential for Contamination of Orthopaedic Implants Using Individually Wrapped Screws. ANZ J Surg, 78: 266–268.

[11] Silow-Carroll, S. and Edwards, J.N., 201. Eliminating Central Line Infections and Spreading Success at High-Performing Hospitals: Synthesis Report. December. Commonwealth Fund pub. 1559, Vol. 21.

[12] O'Grady, N. P., Alexander, M., Burns, L. A., Dellinger, E. P., Garland, J., et al., 2011). Guidelines for the prevention of intravascular catheter-related infections. Clinical Infectious Diseases, 52(9), e162-e193.

[13] Iordanou, S., Middleton, N., Papathanassoglou, E. and Raftopoulos, V., 2017. Surveillance of device associated infections and mortality in a major intensive care unit in the Republic of Cyprus. BMC Infectious Diseases, 17:607. https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-017-2704-2.

[14] David, M.C. and Daum, R.S., 2010. Community-Associated Methicillin-Resistant Staphylococcus aureus: Epidemiology and Clinical Consequences of an Emerging Epidemic. Clin Microbiol Rev, 23(3): 616–687.

[15] McGee, D.C. and Gould, M.K, 2003. Preventing Complications of Central Venous Catheterization. N Engl J Med, 348:1123-33.

[16] Roghmann, M.C., McCarter, R.J., Brewrink, J., Cross, A.S. and Morris, J.G., 1997. Clostridium difficile Infection Is a Risk Factor for Bacteremia Due to Vancomycin-Resistant Enterococci (VRE) in VRE-Colonized Patients with Acute Leukemia. Clin Infect Diseas, 25:1056–1059.

Definitions:

ACH - Acute Care Hospital
CAH - Care Access Hospital
IRF - Inpatient Rehabilitation Facility
CAUTI - Catheter-Associated Urinary Tract Infections
CLABSI - Central Line-Associated Bloodstream Infections
CoNS - Coagulase Negative Staphylococcus
E. Coli - Escherichia coli
S. aureas - Staphylococcus aureas
SIR - Standard Infection Ratio

Exposure Assessment							
Probability of Healthcare Worker's Gloves are Contaminated	Ref.	Probability that Healthcare Workers Do Not Change Contaminated Gloves before Handling Medical Supplies/Devices	Ref.	Probability of Contaminating Medical Supplies/Devices with each Package Opened	Ref.	No. of Consumables in Central Line Kit	Ref.
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11
0.5	7,8	0.85	9	0.01	10	10	11

Risk Characterization

Risk of CLABSI - ACH	Risk of CLABSI - CAH	Risk of CLABSI - IRF	TOTAL Risk of CLABSI	Risk of CLABSI Death - ACH	Risk of CLABSI Death - CAH	Risk of CLABSI Death - IRF	TOTAL Risk of CLABSI Death	TOTAL Number of Central Line Insertions (Annually)	Ref.	TOTAL Number of Central Line - Associated Deaths
3.73E-07	1.28E-07	2.08E-07	7.09E-07	4.48E-08	1.54E-08	2.49E-08	8.51E-08	5000000	12,15	0.4
3.58E-07	1.23E-07	1.99E-07	6.81E-07	4.30E-08	1.48E-08	2.39E-08	8.17E-08	5000000	12,15	0.4
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5000000	12,15	0.0
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5000000	12,15	0.0
9.04E-07	3.11E-07	5.04E-07	1.72E-06	1.09E-07	3.74E-08	6.04E-08	2.06E-07	5000000	12,15	1.0
9.11E-08	3.13E-08	5.07E-08	1.73E-07	1.09E-08	3.76E-09	6.09E-09	2.08E-08	5000000	12,15	0.1
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5000000	12,15	0.0
9.89E-07	3.40E-07	5.50E-07	1.88E-06	1.19E-07	4.08E-08	6.61E-08	2.26E-07	5000000	12,15	1.1
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5000000	12,15	0.0
2.72E-06	**9.35E-07**	**1.51E-06**	5.16E-06	**3.26E-07**	**1.12E-07**	**1.81E-07**	6.19E-07			3