Infection prevention and control measures for Ebola and Marburg Virus disease: A series of rapid reviews

KQ3 IPC Ring Approach- Initial Summary

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Competing interests: DM was involved in the 2015 rapid review by Hersi et al. [1] There are no other competing interests to acknowledge.

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Question

Question (3): Should the IPC ring approach* be used versus not used to prevent and control transmission of Ebola Virus Disease (EVD) or Marburg virus disease in health care facility and community settings? (How effective is IPC ring at preventing Ebola or Marburg transmission in health care and community settings?)

*The ICP ring approach rapidly mobilizes teams to assist affected health facilities and the community in implementing ICP measures to reduce Ebola transmission in a predetermined risk area whenever a case is identified.

Methods Summary

This is one of a series of rapid reviews answering 12 key questions related to three themes on infection prevention and control measures for filoviruses: (i) transmission/exposure (n=3 questions), (ii) personal protective equipment (PPE) (n=5), and (iii) decontamination and disinfection (n=4). Data sources include Medline, Embase, bio/medRxiv pre-print servers, Global Medicus Index, Epistemonikos, China National Knowledge Infrastructure (CNKI) and Wangfang database. We used an automation tool (CAL® tool) for titles/abstracts screening for relevant systematic reviews and primary comparative studies. Full-text screening, data extraction, risk of bias assessment, and GRADE (Grading of Recommendations Assessment, Development and Evaluation) for the certainty of evidence were completed independently by two reviewers with any disagreements resolved by consensus, with arbitration by a third reviewer, when needed.

Initial findings relating to work exclusion

We present study characteristics in Table 1 and a summary of findings in Table 2.

Initially, 141 studies were screened in the CAL tool software and 16 studies were included for full-text screening. Of these 16 studies, none met the eligibility criteria (Appendix 2). However, one non-comparative study was included to provide rates of EVD infection associated with the initiation of the approach. A list of excluded studies with reasons for exclusion can be found in Appendix 1.

Table 1. Characteristics of Included Study

Citation [Author, Year]	Funding Source	Country	Dates of Outbreak	Study Type	Virus Species	Setting	# Total Health Workers	# Health Care Facilities	Description of IPC Ring Approach	Study Objectives [as reported by study authors]
Nyenswah, 2015, [Cohort][1]	Not Reported	Liberia	2015 outbreak	Outbreak Investigation	Ebola	Health facility	166 exposed in St. Paul Bridge Cluster	59 HCFs across 4 IPC rings	Strategy: Identifying HCW exposure to an Ebola patient, neighboring HCFs around the HCF that treated a patient, or HCFs near the residence of a patient with confirmed Ebola. Components: Rapid IPC needs assessments focused on triage procedures and personal protective equipment use. Following assessment, PPE distribution, general IPC training and specialized triage training.	In mid-January to mid-February 2015, there were 22 confirmed patients with Ebola virus disease in Liberia. This report describes possible health care worker exposures to the cluster's eight patients who sought and received care from at least one of 10 non-Ebola health care facilities and the implementation of the IPC Ring approach.

Abbreviations: HCF, health care facility; HCW, health care worker

Table 2. Summary of Findings: Implementation of IPC Ring Approach

Study details	*Intervention and Comparator*	*Outcome details*	*Intervention with outcome (n/N, %)*	*Comparator with outcome (n/N, %)*	*Summary Effect Measure*	*Quality Assessment*[a]	*GRADE*	*Notes*
Incidence of EVD								
Nyenswah, 2015, [Cohort][1]	IPC Ring Approach [No Comparator]	Confirmed EVD	1/166	NA	NA	Moderate Risk of Bias	⊕◯◯◯ Very low	None

a. Quality assessment of studies was completed using the Newcastle Ottawa Scale (NOS) for observational studies. Scores from 7-9 were considered to be high quality (low risk of bias), scores of 4-6 of moderate quality (moderate risk of bias) and scores of 0-3 of low quality (high risk of bias).

Citations:

1. Nyenswah T, Massaquoi M, Gbanya MZ, et al. Initiation of a Ring Approach to Infection Prevention and Control at Non-Ebola Health Care Facilities — Liberia, January–February 2015. 2015;64(18):4.

Appendix 1. Excluded Studies List – By Reason for Exclusion:

Study does not evaluate the IPC ring approach for controlling the transmission of EVD/Marburg disease

Bangura I, Conteh C. The Impact of Quality Improvement Methodology to Improve Infection Control Practices. Antimicrobial Resistance & Infection Control. 2019;8(1):P405.

Bemah P, Baller A, Cooper C, et al. Strengthening healthcare workforce capacity during and post Ebola outbreaks in Liberia: an innovative and effective approach to epidemic preparedness and response. Pan Afr Med J. 2019;33. doi:10.11604/pamj.supp.2019.33.2.17619

Biedron C, Lyman M, Stuckey MJ, et al. Evaluation of Infection Prevention and Control Readiness at Frontline Health Care Facilities in High-Risk Districts Bordering Ebola Virus Disease–Affected Areas in the Democratic Republic of the Congo — Uganda, 2018. MMWR Morb Mortal Wkly Rep. 2019;68(39):851-854. doi:10.15585/mmwr.mm6839a4

Cooper C. Using Data to Enhance Implementation in a Low Resource Setting - Liberia Experience. Antimicrobial Resistance & Infection Control. 2017;6(Supp 3):175.

Forrester JD, Hunter JC, Pillai SK, et al. Cluster of Ebola Cases Among Liberian and U.S. Health Care Workers in an Ebola Treatment Unit and Adjacent Hospital — Liberia, 2014. 2014;63(41):5.

Keïta M, Camara AY, Traoré F, et al. Impact of infection prevention and control training on health facilities during the Ebola virus disease outbreak in Guinea. BMC Public Health. 2018;18(1):547. doi:10.1186/s12889-018-5444-3

Matanock A, Arwady MA, Ayscue P, et al. Ebola Virus Disease Cases Among Health Care Workers Not Working in Ebola Treatment Units — Liberia, June–August, 2014. 2014;63(46):5.

Mehtar S. The impact of education on reducing Ebola virus disease transmission in healthcare facilities. International Journal of Infectious Diseases. 2016;45:66-67. doi:10.1016/j.ijid.2016.02.193

Oji MO, Haile M, Baller A, et al. Implementing infection prevention and control capacity building strategies within the context of Ebola outbreak in a "Hard-to-Reach" area of Liberia. Pan Afr Med J. 2018;31. doi:10.11604/pamj.2018.31.107.15517

Tremblay N, Musa E, Cooper C. Infection prevention and control in health facilities in post-Ebola Liberia: don't forget the private sector! Public Health Action.:6.

Study is not about health workers

Fallah M, Dahn B, Nyenswah TG, et al. Interrupting Ebola Transmission in Liberia Through Community-Based Initiatives. Ann Intern Med. 2016;164(5):367. doi:10.7326/M15-1464

Nyenswah T, Fahnbulleh M, Massaquoi M, et al. Ebola Epidemic — Liberia, March–October 2014. 2014;63(46):5.

Nyenswah T, Fallah M, Sieh S, et al. Controlling the Last Known Cluster of Ebola Virus Disease — Liberia, January–February 2015. 2015;64(18):5.

Logan G, Vora NM, Nyensuah TG, et al. Establishment of a Community Care Center for Isolation and Management of Ebola Patients — Bomi County, Liberia, October 2014. 2014;63(44):3.

Appendix 2. Eligibility Criteria

Question (3): Should the IPC ring approach* be used versus not used to prevent and control transmission of Ebola Virus Disease (EVD) or Marburg virus disease in health care facility and community settings? (How effective is IPC ring at preventing Ebola or Marburg transmission in health care and community settings?)

Setting	Health care facility, community
Population	Staff, communities, organizations responsible for management of Ebola or Marburg cases
Background interventions (Standard of care)	New approach: Use the IPC ring approach when a new case of EVD is identified. The IPC ring approach rapidly mobilizes teams to assist affected health facilities and the community in implementing IPC measures to reduce Ebola transmission in a predetermined risk area whenever a case is identified.
Intervention	Implement the ring approach, which includes identification of nearby health centres, household and public places visited by the positive case for case finding, environmental cleaning/decontamination, IPC assessment, education, PPE supplies.
Comparator(s)	Single intervention, Single health facility prioritization
Outcome	Transmission of Ebola or Marburg, *score of IPC standard in the HCF*
Potential effect modifiers	**Effect modifier** – conflict zone

*The IPC ring approach rapidly mobilizes teams to assist affected health facilities and the community in implementing IPC measures to reduce Ebola transmission in a predetermined risk area whenever a case is identified.

Appendix 3. GRADE Assessment

Number of studies	*Study Design*	*Risk of Bias*[a]	*Inconsistency*	*Indirectness*	*Imprecision*	*Other Considerations*	*Quality*
Incidence of EVD							
IPC Ring Approach Intervention							
1[1]	[Cohort]	Very serious[b]	No serious[c]	No serious[d]	Serious[e]	None	⊕◯◯◯ Very low

a. Individual quality assessment of studies was completed using the Newcastle Ottawa scale (NOS) for observational studies. Scores from 7-9 were considered to be high quality (low risk of bias), scores of 4-6 of moderate quality (moderate risk of bias) and scores of 0-3 of low quality (high risk of bias).
b. 3/9 on NOS; downrated for lack of comparator group, no demonstration that the outcome of interest was not present at the start of study and a lack of reporting of outcome follow-up for study participants.
c. No inconsistency as only one study evaluated.
d. No serious indirectness as intervention evaluated was the IPC Ring Approach.
e. Downrated by 1 due to the small sample size and low event rate.