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Ng, C.Z.[a] , Lean, Y.L.[a] , Yeoh, S.F.[b] , Lean, Q.Y.[c] , Lee, K.S.[d] , Suleiman, A.K.[e] , Liew, K.B.[d] , Kassab, Y.W.[d] , Al-Worafi, Y.M.[f] , Ming, L.C.[g]

Cold chain time-and temperature-controlled transport of vaccines: A simulated experimental study
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[a] Faculty of Pharmacy, Quest International University Perak, Ipoh, Malaysia
[b] Department of Pharmacy, National University Health System, Singapore, Singapore
[c] Faculty of Pharmacy, Universiti Teknologi MARA, Kepala Batas, Malaysia
[d] Faculty of Pharmacy, University of Cyberjaya, Cyberjaya, Malaysia
[e] College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia
[f] College of Pharmacy, University of Science and Technology of Fujairah, Fujairah, United Arab Emirates
[g] PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, Gadong, Brunei Darussalam

Abstract
Purpose: The objective of this research was to examine the cold chain temperature maintenance for the supply of vaccines and other biological products by pharmaceutical wholesaler. Materials and Methods: In this study, six configurations using cold vaccine boxes or bags made with different materials, with and without insulation, of different sizes, and number of coolant-packs were used to simulate the configuration used by the pharmaceutical wholesal-ers for transportation of vaccine. Model vaccines (vial, n=10) were packed using these six configurations which then stored in an incubator at 38ºC and monitored for 24 hours. Each configuration was tested repeatedly for 5 times. Results: In term of compliance to 2°C–8°C, four out of six tested configurations are effective in cold chain transportation. The effectiveness is highly dependent on the type of passive con-tainers used, size of cold boxes, insulation, and number of coolant-packs. The configuration with a larger polystyrene foam box with five coolant-packs maintained the required temperature up to 23 hours. In contrast, configurations using a polystyrene foam box with four coolant-packs and a large vaccine cold box with two coolant-packs failed to reach below 8ºC through-out the 24 hours. Conclusion: Packaging method, the material and size of the container could have a direct impact on the effectiveness of cold chain temperature maintenance. Polystyrene foam box, cold box with polyethylene interior lining and polypropylene insulation, a cooler bag with proper number of ice packs could be effectively used for transportation of vaccines within their res-pective transportation duration allowance. © Korean Vaccine Society.

Author Keywords
Cold chain management; Pharmaceutical wholesaler; Temperature; Transportation

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polyethylene, polypropylene, polystyrene, tetanus toxoid; Article, cold, comparative study, controlled study, drug packaging, drug storage, temperature, temperature measurement

Correspondence Address
Ming L.C.; PAPRSB Institute of Health Sciences, Brunei Darussalam; email: ming.long@bath.edu

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