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EVALUATION OF MICROBIOLOGICAL QUALITY OF READY-TO-EAT FOOD AND DRINKS FROM VENDING MACHINE IN SINGAPORE

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Background
With gaining popularity of vending machine, there is a need to evaluate the microbiological quality of ready-to-eat food and drinks in vending machines in Singapore.

Methods
A total of 168 samples (hot bakes, n=76), (hot meals, n=58), (orange juices, n=34) and 47 environmental swabs were collected from 65 vending machines and tested for microbiological parameters.

Results
Campylobacter coli/jejuni, *Listeria monocytogenes*, *Salmonella*, and *Staphylococcus aureus* were not detected. Mean aerobic plate count (APC) in hot bakes (log 4.1 CFU/g) was significantly higher than that of in hot meals (log 2.1 CFU/g) ($p<0.05$). Statistical analysis showed a positive correlation between the ambient temperatures in display compartments and APC (R_s +0.538), and a negative correlation between temperatures of reheated food and APC (R_s -0.661). This suggests the lower the ambient display temperature or the higher the temperature of reheated food, the lower the APC. Mean APC in orange juices prepared in vending machine (log 4.9 CFU/g) was significantly higher than that of in orange juices freshly made (log 2.4 CFU/g) ($p<0.05$). Environmental swabs from juice-contact surfaces in vending machines showed high APC (≥log 5.0 CFU/swab). Three of 14 (21%) hot bakes were detected with *Clostridium perfringens*; two belonged to Type A strain containing *cpe* gene which can potentially associate with foodborne illness.

Conclusion
The findings reinforce a need to renew food handlers' and business owners' knowledge on thorough cooking, proper temperature control during storage, proper reheating for ready-to-eat food as well as frequent and thorough cleaning of juice-contact surfaces in vending machines.