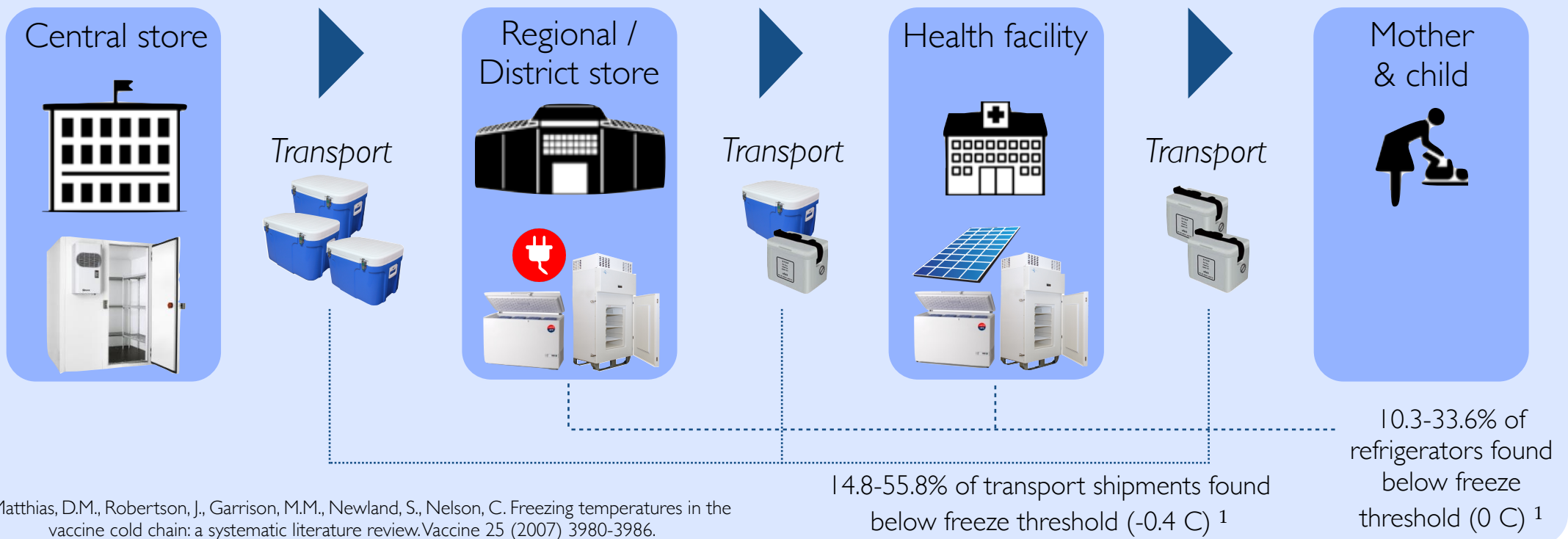


Freeze protection for vaccine cold chain equipment

WHO PQS (pqsinfo@who.int)

Vaccine cold chains suffer from significant instances of freezing temperatures. The figures below are a generalized representation of cold chains in developing world countries.



¹: Matthias, D.M., Robertson, J., Garrison, M.M., Newland, S., Nelson, C. Freezing temperatures in the vaccine cold chain: a systematic literature review. *Vaccine* 25 (2007) 3980-3986.

Thus far, freeze protection for vaccines has been reliant on user-dependent interventions. However, user-dependent interventions are likely to be unreliable for a variety of reasons.

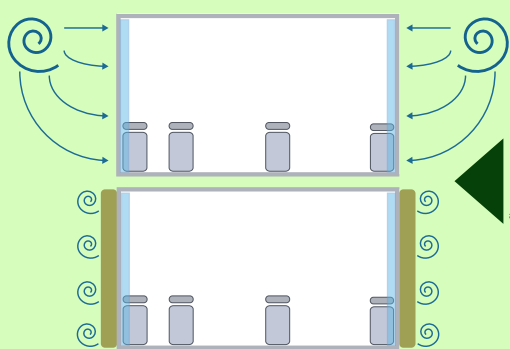


Insufficient cold chain capacity at the facility (left). The healthcare worker therefore removed some baskets from the refrigerator in order to make more space for vaccines.

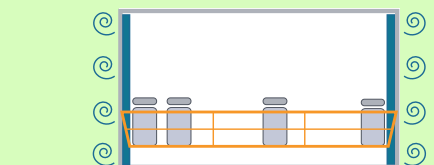


Insufficient time at the facility for preconditioning ice packs (right). The healthcare workers had to leave very early in the morning for their outreach activities.

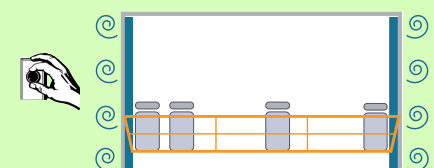
In response to this challenge, WHO PQS has issued a grading system to move the market towards user-independent freeze protection.



Grade A (user-independent) freeze protection:
Zero user interventions required



Grade B (user-dependent) freeze protection:
One user intervention (e.g., proper usage of baskets) required



Grade C (user-dependent) freeze protection:
More than one user intervention (e.g., proper usage of baskets, manual defrosting, manual adjustment of thermostat) required

WHO PQS plan and timeline

October 2014: Freeze protection grading system published in SDD TPP

January-July 2015: WHO-CHAI refrigerator testing project at the Pennsylvania State University

August-December 2015: Working with manufacturers to test all PQS-certified refrigerators and move the market to Grade A

September/October 2015: Publication of freeze protection grading system in TPP for mains-powered refrigerators

January 2016: Publication of freeze protection grades in WHO PQS catalogue