WHO publishes list of bacteria for which new antibiotics are urgently needed thereby highlighting the requirement for further vigilance for platelet transfusions

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The presence of bacteria and bacterial toxins in platelet concentrates intended for transfusion has been a vexing and longstanding problem that continues to threaten patients and challenge physicians, scientists, and regulators to improve transfusion safety while preserving transfusion efficacy. To address these issues, on March 14, 2016, FDA issued a revised draft guidance addressing bacterial detection testing to enhance the safety and availability of platelets for transfusion.[1] FDA reports document septic deaths from bacterially contaminated platelet transfusions every year.   The passive hemovigilance in hospitals that generates these reports has been documented to miss the majority of these septic reactions.[2]

On February 27, 2017, the World Health Organization (WHO) published its first ever list of antibiotic-resistant "priority pathogens" consisting of 12 families of bacteria that pose the greatest threat to human health.[3] The list highlights in particular the threat of gram-negative bacteria that are resistant to multiple antibiotics.

According to Dr Marie-Paule Kieny, WHO's Assistant Director-General for Health Systems and Innovation, the list is intended to catalyze research and development efforts.   Dr. Kieny stated "Antibiotic resistance is growing, and we are fast running out of treatment options. If we leave it to market forces alone, the new antibiotics we most urgently need are not going to be developed in time."

The WHO list is divided into three categories according to the urgency of the need for new antibiotics: critical, high and medium priorities.

Priority 1: CRITICAL

1. *Acinetobacter baumannii*, carbapenem-resistant
2. *Pseudomonas aeruginosa*, carbapenem-resistant
3. *Enterobacteriaceae*, carbapenem-resistant, ESBL-producing

Priority 2: HIGH

1. *Enterococcus faecium*, vancomycin-resistant
2. *Staphylococcus aureus*, methicillin-resistant, vancomycin-intermediate and resistant
3. *Helicobacter pylori*, clarithromycin-resistant
4. *Campylobacter* spp., fluoroquinolone-resistant
5. *Salmonellae*, fluoroquinolone-resistant
6. *Neisseria gonorrhoeae*, cephalosporin-resistant, fluoroquinolone-resistant

Priority 3: MEDIUM

1. *Streptococcus pneumoniae*, penicillin-non-susceptible
2. *Haemophilus influenzae*, ampicillin-resistant
3. *Shigella* spp., fluoroquinolone-resistant

The priority 1 list includes multidrug resistant bacteria that pose a particular threat to patients in hospitals   These bacteria have become resistant to a large number of antibiotics, including carbapenems and third generation cephalosporins which are the best available antibiotics for treating multi-drug resistant bacteria.

The second and third tiers in the list contain other increasingly drug-resistant bacteria.

According to WHO, the criteria for selecting pathogens on the list were: how deadly the infections they cause are; whether their treatment requires extended hospitalization; how frequently they are resistant to existing antibiotics; how readily they spread between animals, from animals to humans, and from person to person; whether they are preventable (e.g. through good hygiene); how many treatment options currently exist; and whether new antibiotics to treat them are already being developed.

With respect to the list, *Staphylococcus aureus*, methicillin-resistant has been reported to cause a septic transfusion reaction from a platelet transfusion.[4]

The prospect exists that an increasing number of septic transfusion reactions following platelet transfusion could be caused by these and other antibiotic resistant bacteria. This would increase the already high mortality from these devastating, almost entirely preventable events. The Verax Platelet PGD test is FDA-cleared to detect bacteria in leukocyte reduced apheresis platelets (LRAP) suspended in plasma, LRAP suspended in Platelet Additive Solution C and plasma, and pre-storage pools of up to six leukocyte reduced whole blood derived platelets suspended in plasma, within 24 hours prior to platelet transfusion as a safety measure following testing with a growth-based quality control test cleared by the FDA for platelet components and also cleared for pools of up to six units of leukocyte reduced and non-leukocyte reduced whole blood derived (WBD) platelets suspended in plasma that are pooled within four hours of transfusion. In addition, seven-day expiration is available for apheresis platelets collected with the Amicus and Trima devices. The PGD test can effectively prevent septic reactions to platelet transfusion due to any bacteria with no effect on platelet quantity or quality.

1. **US Food and Drug Administration. Bacterial Detection Testing by Blood Collection Establishments and Transfusion Services to Enhance the Safety and Availability of Platelets for Transfusion.**
   http://www.fda.gov/downloads/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/ Guidances/Blood/UCM425952.pdf
2. **Hong H, Xiao W, Lazarus HM, et al. Detection of septic transfusion reactions to platelet transfusions by active and passive surveillance. Blood 2016;127:496-502.**
3. **http://www.who.int/mediacentre/news/releases/2017/bacteria-antibiotics-needed/en/**
4. **Sapatnekar S[1], Wood EM, Miller JP, Jacobs MR, Arduino MJ, McAllister SK, Kellum ME, Roth V, Yomtovian R. Methicillin-resistant Staphylococcus aureus sepsis associated with the transfusion of contaminated platelets: a case report. Transfusion. 2001;41:1426-30.**

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