WHO CRES Report for the WFPI

The WHO Chest Radiography in Epidemiological Studies (CRES) project aims to provide clarifications to the definitions used in the standardized interpretation of pediatric chest radiographs in epidemiological studies, and develop guidelines and tools for investigators and site staff that assist in the collection of high quality radiographic data. The project is a sub-study to the PCV Technical Co-ordination project and is based at the Murdoch Children's Research Institute in Melbourne, Australia, in collaboration with the Johns Hopkins Bloomberg School of Public Health in Baltimore, USA and the Immunizations, Vaccines and Biologics Department of the World Health Organization (WHO) in Geneva, Switzerland. The WHO CRES Technical Working Group meeting took place on 23-24 June 2016 at the London School of Hygiene and Tropical Medicine. This meeting was co-chaired by Professor Kim Mulholland and Professor Kate O'Brien, WHO CRES principal investigators. Dr Thomas Cherian represented the WHO Immunizations, Vaccines and Biologics Department. Professor Henrique Lederman and Dr Nasreen Mahomed represented the World Federation of Pediatric Imaging (WFPI).

Background: In 1997 the WHO developed a Radiology Working Group to provide a consensus method for the standardized interpretation of pediatric chest X-rays in epidemiological studies. The agreed definition of chest X-ray "primary end-point" pneumonia was intended for use as an endpoint measure in bacterial vaccine trials and has since also been used in many other pneumonia epidemiological studies; the definition was not intended for clinical management (1). The application of this methodology has since been reviewed at high-level meetings, including the Hib Initiative Radiology Workshop in Hanoi, Vietnam in 2011 (2) and a session at the WHO PCV Impact Evaluation meeting in Geneva, Switzerland in 2013 (3). However, funds have not previously been available to action the recommendations of these meetings.

During the recent meeting in London the WHO CRES Technical Working Group agreed to maintain the original framework of the standardized definitions in order to ensure consistency with the previous vaccine trials and to understand accurately epidemiological trends over time. The aim of these clarifications is to improve specificity of the "primary endpoint" definition, and to enhance reproducible chest X-ray readings for future studies.

An updated set of reference chest X-rays is being developed under the WHO CRES project. Prior to the meeting the Technical Working Group applied the proposed clarifications to the WHO definitions by interpreting a set of 400 new chest X-rays and 50 chest X-rays from the original WHO reference images. The results of this exercise were reviewed and a process for identifying appropriate images for training in the methodology identified. In particular, discussions were held on inclusion criteria for the new set of training chest X-rays, emphasizing the need for inclusion of chest X-rays with a high WHO CRES committee reader agreement. In addition, annotations and explanations will be provided for each reference chest X-ray. Guidelines for the training and assessment of chest X-ray readers and support for studies in the form of a centralized arbitration process for discordant chest X-ray interpretations were also discussed.

The WHO CRES meeting emphasized the need to optimize chest X-ray quality, whilst optimizing the radiation safety of both patients and staff. A proposed chest X-ray quality criteria framework was discussed and is currently being developed into a set of guidelines for investigators and potential sites with the main objectives being to ensure that images are acquired and archived to a specific standard, and that consideration of radiation safety is paramount during the image acquisition process.

In summary the WHO CRES project aims to support investigators using the WHO standardized methodology for the interpretation of pediatric chest radiographs, including providing updated reference chest X-rays, resources for the training and assessment of readers, guidance with radiological quality and safety, updated reference publications, and a centralized arbitration process for the resolution of images with discordant interpretations.

References

(1) Cherian T, Mulholland EK, Carlin JB, et al. Standardized interpretation of paediatric chest radiographs for the diagnosis of pneumonia in epidemiological studies. Bull World Health Organ. 2005 May;83(5):353-9.

(2) Hib Initiative Radiology Workshop; 2011 11-12 October 2011; Hanoi, Vietnam

(3) WHO Short and Long-term PCV Impact Evaluation; 2013 10-12 September 2013; Geneva, Switzerland.