

Digital Pathology Systems Facilitate Remote Microscopic Diagnosis and Capacity Building for the Child Health and Mortality Prevention Surveillance Network

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Background

There is a need to increase in-country diagnostic pathology capacity for determining infectious causes of death in children in low-income countries. The Infectious Diseases Pathology Branch (IDPB) at CDC identifies pathogens associated with deaths of children under the age of five in seven countries in sub-Saharan Africa and South Asia in partnership with the Child Health and Mortality Prevention Surveillance (CHAMPS) Network sites. We describe the use of telepathology meetings (TM) for collaborative review of histopathologic findings of infectious diseases in minimally invasive tissue samples from child deaths in this setting and implications for site pathology capacity building.

Material & Methods

Pathology phase 2 of the CHAMPS program emphasizes building and transferring pathology capacity to the sites. This entails review of site-processed, evaluated, and scanned digital slides (Figure 1) by IDPB pathologists and conducting TM for real-time discussion between IDPB and site pathologists. TM are held with each site on a regular, rotating basis to discuss the pathology of select cases, and provide focused training on any other topics of interest or concern. IDPB pathologists also perform quality assessment of the site scanned slides and provide feedback on quality of site histology and scanning processes, with suggestions for improvement and standardization.

Results

Over the past 7 months in pathology Phase 2, IDPB has reviewed site digital slides for 723 CHAMPS cases and conducted 27 TM among the 7 sites. Discussions revolved around discrepant histopathologic findings, interpretation of immunohistochemical stains, collaborative determination of diagnoses, and improvement of histologic preparation, pre-analytic slide artifacts to be resolved before scanning, and post-scan quality control to improve image quality. Varying improvements have been achieved in site pathology capacity.

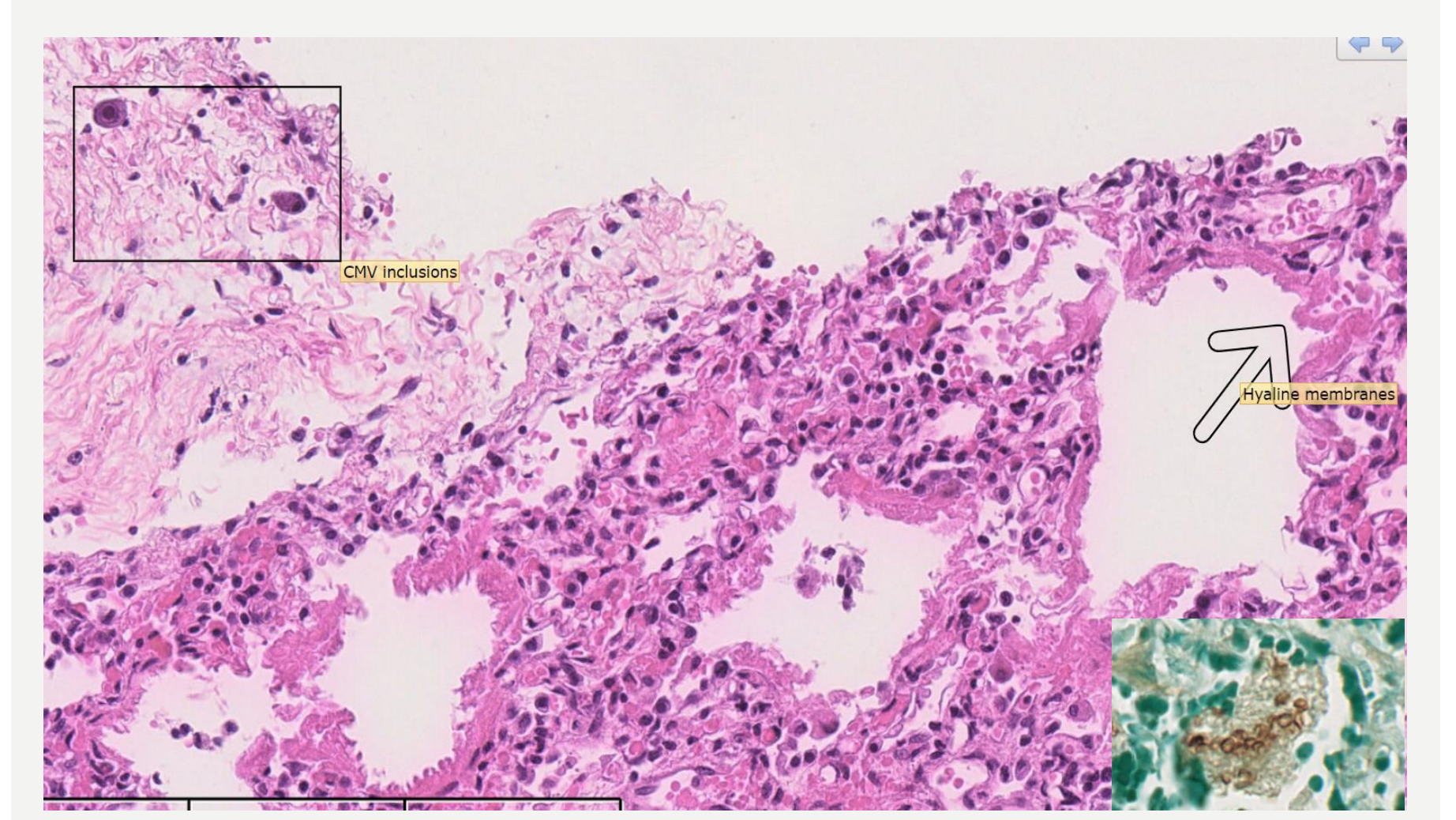
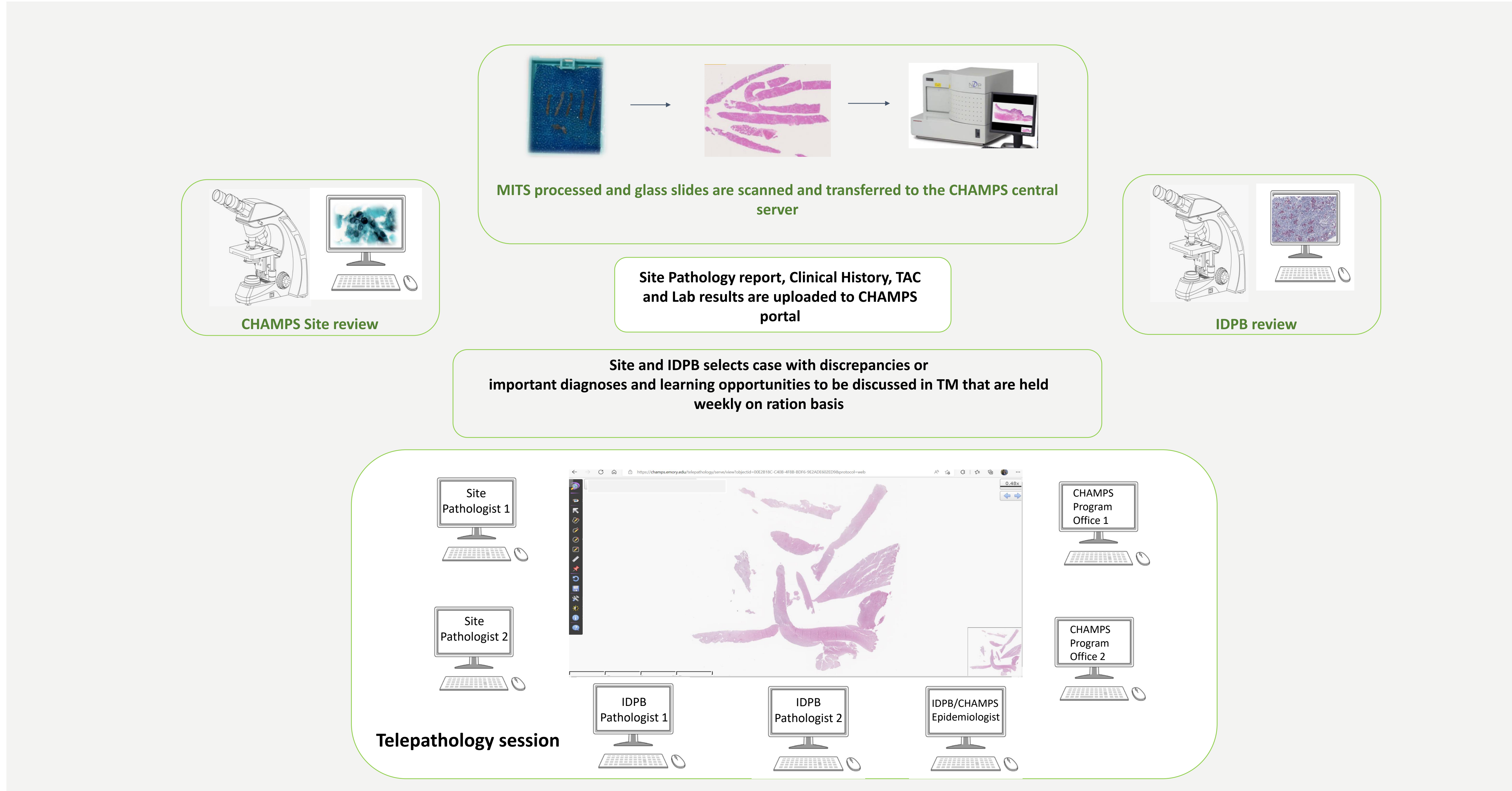


Figure 1: CHAMPS digital images uploaded to the CHAMPS central server. Annotated site-digital image showing lung with hyaline membranes (arrow) and Cytomegalovirus inclusion (square). Site-digital image of a Grocott's methenamine silver (GMS) positive round structures consistent with *Pneumocystis jirovecii* (inset).

Conclusion

Efforts of IDPB and CHAMPS site pathologists in pathology phase 2 of the project have demonstrated the value of digital pathology and TM for diagnostic review, pathology capacity building, digital management of pathology slides, and image quality control. Digital slide scanning and regular TM facilitates knowledge sharing around technical preparation of specimens and interpretation of pathologic findings

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.