supportive supervision, and troubleshooting. The TWG had regular meetings to inform and advise on implementation.
**Results:** BLIS was successfully installed and validated at four pilot sites within 6 months. After the pilot, BLIS was rapidly scaled up to eight additional sites in 3 months and 120 laboratory staffs were trained on BLIS. One laboratory technologist was designated at each laboratory to serve as an administrator for managing BLIS use and minor troubleshooting. BLIS was successfully integrated into SLMTA at nine sites. Postimplementation assessments and monitoring visits showed greater efficiency, reduced turnaround time by 50%, decreased patient wait time by 30%, and increased ability to assess workload at all sites.
**Conclusion:** Strong leadership, careful planning, local partnership, a robust information system, and a standard approach were key factors that enhanced the implementation of BLIS in Ghana. BLIS has streamlined laboratory processes, enabled appropriate storage of data, and reduced turnaround time.

## Application of a Convolutional Neural Network to Distinguish Burkitt Lymphoma From Diffuse Large B-Cell Lymphoma

*Jeffrey Mohlman,[1] Samuel Leventhal,[1] Aniketh Venkat,[1] Attila Gyulassy, PhD,[1] Valerio Pascucci, PhD,[1] and Mohamed Salama, MD[2]; [1]University of Utah and [2]Mayo Clinic*

**Introduction:** Burkitt lymphoma (BL) and diffuse large B-cell lymphoma (DLBCL) are entities that can present a diagnostic challenge due to overlapping morphological features and often require exhaustive phenotypic and often expensive ancillary testing to yield a final diagnosis. On occasion, even with extensive testing and depending on the cytogenetic or molecular findings, the final diagnosis can be challenging. Convolutional neural networks (CNNs) are a popular machine-learning method for object recognition. The objective of this study was to evaluate if a CNN could reliably differentiate between images of BL and DLBCL.
**Methods:** Two hundred images (×20) from a single BL case and 200 images (×20) from a single DLBCL case were captured using Aperio ImageScope (Leica Biosystems, Buffalo Grove, IL). Based on previously published work, a deep and densely connected CNN (DenseNet) was developed and trained over the images and tested on two hold-out subsets, one of DLBCL images (n = 10) and another of 10 randomly selected (n = 5 DLBCL and n = 5 BL) unknown images from the original lymphoma cases. The 121-layered network was built by optimizing cross-entropy loss during mini-batch training. An element-wise sigmoid nonlinearity function was applied to the outputs of the final, fully connected layer. The resulting output was the predicted probability of each lymphoma class for the image.
**Results:** The CNN predicted with 100% accuracy both the subset of DLBCL images (10/10) as well as the lymphoma unknown images (DLBCL = 5/5; BL = 5/5) all with >99.9% probability.
**Conclusions:** CNNs hold promise for visual recognition of lymphoma subtypes; however, more research is needed to prove this concept, and an efficient process for generating extremely large amounts of high-quality magnified images of annotated slides will be necessary to fully test this concept and apply CNNs in more nuanced lymphoma cases and in a broader scope.

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