INTRODUCTION
Patients with external ventricular drain (EVD), a commonly performed neurosurgical procedure, are at risk of infection. Ventriculostomy-related infection (VRI) is usually associated with serious morbidity and mortality. Studies have demonstrated that implementing protocols can reduce VRIs. However, a protocol approach is not translatable to the National Neuroscience Institute (NNI) model due to its complex sub-speciality multi-site organization and different stake holders involved.

OBJECTIVE
We developed a pragmatic risk stratification EVD pathway to harmonize surgical and nursing practices across all hospitals served by NNI neurosurgery department with the aim of delivering an ethos of 'fair access to best EVD practices from the point of entry' for any patient presenting to a NNI neurosurgeon regardless of their inpatient location. We examined if a pragmatic risk stratification pathway, allowing for surgical decision-making, could be as effective as an EVD protocol in reducing the rate of VRIs.

METHODS
Ethics approval was obtained from the SingHealth CIRB. We performed two studies concurrently. The first study was a formal retrospective one-year audit from January to December 2014 of VRI rates and outcomes in our units across SGH, TTSH and CGH. We also performed a prospective one-year audit from January to December 2015 during the implementation of the pathway across the three sites. The pathway was constructed using current evidences in EVD literature.

RESULTS

Conclusion
We designed a pathway for EVD management to reduce VRIs which was multi-disciplinary and comprehensive but allows for different EVD strategies within a structured framework without increasing infection rates. The pathway is implementable across multiple sites and different hospital stakeholders. We were able to provide all NNI neurosurgery patients 'fair access to best practices in EVD management' regardless of their location and point of entry of consulting the neurosurgical service.

Acknowledgements
The authors thank the medical officers, registrars, residents and consultants, past and present, of the Department of Neurosurgery, NNI for their help in developing and administering the EVD pathway. We thank nurse clinician Lee Kah Keow for her contribution in coordinating and collating feedback from different levels of nursing staff. We thank nursing leaders, educators and staff, particularly Fu Liqing and Mariam Piperdy, and their ward teams (TTSH); Kamsiah bte Jaafar and Noel Loke, and their ward teams (SGH); Eric Koh and Gu Chonguang, and their NICU teams (TTSH); and OT nursing leaders and their teams, particularly, Teng Sai Lian (TTSH); Eileen Seah Xueli (SGH); and Ramona Tay Yu Ching (CGH). We thank Gao Qimeng for his assistance in data organization.