

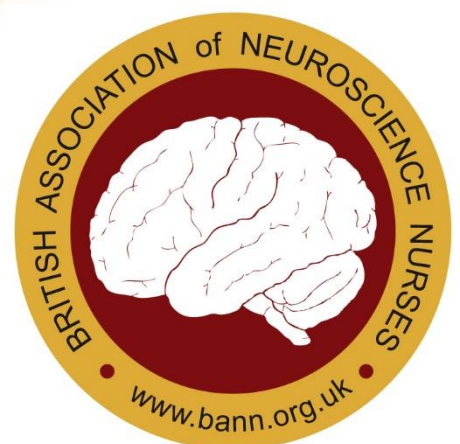
Benchmark No. 6

Cerebrospinal Fluid Management

(4th Edition)



**British Association of
Neuroscience Nurses**



Benchmark No. 6

Cerebrospinal Fluid Management

(4th Edition)

Copyright © 2025 British Association of Neuroscience Nurses. All rights reserved.

First PDF edition printed 2014, second edition printed 2017 and third edition printed 2021 in the United Kingdom. This PDF edition (4th) printed in 2025 in the United Kingdom (available online). A catalogue record for this book is available from the British Library.

ISBN 978-1-911059-37-0

No part of this book shall be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information retrieval system without written permission of the publisher.

Published by the British Association of Neuroscience Nurses

For more copies of this book, please email: info@bann.org.uk

Designed and Set by the British Association of Neuroscience Nurses
www.bann.org.uk

Printed in the United Kingdom

Although every precaution has been taken in the preparation of this publication, the publisher and authors assume no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of this information contained



History

The Neuroscience Nursing Benchmarking Group (NNBG) was established in the 1990's as a result of increasing concerns over inconsistencies in practices as part of a subsidiary of BANN. The group aims to improve on the quality of care by comparing and sharing practice with each other, and set explicit standards for comparison of current practice against the ideal standard. The group is committed to searching for the best evidence related to specific areas of neuroscience practice. Membership of the group consists of representatives from neuroscience units within the UK and Ireland, together with educational colleagues from both the NHS/HSC and Higher Educational Institutes. The group is further subdivided into regions and this benchmark was developed by the North East group of the NNBG in 2007.

In 2016, the NNBG consolidated back into BANN and further information about NNBG can be found on the BANN website www.BANN.org.uk.

BANN would like to acknowledge the leadership and significant contribution made by the NNBG, and all its contributors, to neuroscience nursing over the years.

Benchmark No.6

CSF MANAGEMENT – 4th Edition

Key Points

- Always establish correct zero reference to ensure consistency and accuracy in all readings of EVD. Measurement is to be achieved with the use of a spirit level or laser device.
- Ensure all connections and tubing are secured and clearly labelled as EVD to avoid accidental removal, leakage, and/or usage.
- The wound/entry site must be continually monitored for signs of infection (leaking CSF, erythema, purulence).
- Medical staff must prescribe the height or pressure level that the drain is to be set at. If a specific amount of drainage is expected, this must be documented in the patient's notes.
- The nursing staff must monitor and promptly report any deviations (e.g., over or under drainage) to the medical staff.
- Neurological observations and vital signs must be recorded in order to ensure early detection of signs of infection within the CSF or raised ICP (i.e., headache, nausea, neck stiffness, pyrexia).
- The amount of drainage and appearance of the CSF (i.e., colour and clarity) must be recorded hourly.
- There should be an escalation procedure in the event of an inadvertent disconnection.
- Asepsis must always be maintained when handling the drainage system.
- Patients and their relatives/carers should be aware of the rationale for the EVD insertion and the possible risks and side effects.
- All connections to the EVD/Lumbar drain must comply with NRFittm NHS Improvement regulations, 2017, preventing the inadvertent use of universal leuc lock connectors.

FACTOR 1 – Documentation

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
1.0	<p>There is evidence-based guidelines available for the care of a patient with an external CSF drainage system in situ, including: -</p> <ul style="list-style-type: none"> a) CSF sampling b) Equipment-NRFit™ compliant c) Medication insertion d) Changing the bags and the system e) Removal of the CSF drainage catheter f) Transferring a patient with a CSF drainage system in place g) Managing a blocked drainage system/accidental break in the system as per local protocol 	<p>NHSI, 2017</p> <p>Surveillance Report, Wales. 2018</p> <p>Humphreys <i>et al</i>, 2015</p>			
1.1	<p>Accurate documentation includes: -</p> <p>The recognised zero reference point (documented in nursing/medical records):</p> <ul style="list-style-type: none"> i. External lumbar drainage systems- level at the exit site (or as indicated by medical instructions) ii External cranial drainage system- tragus (level of Foramen of Monro) <p>The following is documented:</p> <ul style="list-style-type: none"> i. CSF drainage – hourly volume ii. CSF description -colour and clarity iii. Prescribed chamber level iv. Presence of oscillation <p>Physiological observations: -</p> <ul style="list-style-type: none"> a) Early Warning Score is recorded at least four hrly for early detection of infection and bacterial meningitis. b) Neurological observations are recorded at least four hrly to detect neurological deterioration or evidence of infection (i.e. neck stiffness, headache, nausea). 	<p>NEWS2, 2017</p> <p>Freathy, <i>et al</i>, 2019</p> <p>Muralidharan, 2015</p>			

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
1.2	The benchmark and local policy has been reviewed within the last two years), unless there are significant changes in practice	Epic3, 2014			
1.3	<p>Following assessment an individualised care plan has been implemented and evaluated specifically to all aspects of care relating to the patient's CSF management.</p> <ul style="list-style-type: none"> a) Documentation supports regular reviews or is updated when their healthcare needs change. b) There is documentation to support daily multi-disciplinary clinical reviews of the management plan, and the care delivered 	Fried <i>et al.</i> 2016			

FACTOR 2 – Protocol

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
2.0	The drain is clearly labelled to distinguish it from other invasive lines	NPSA 2015			
2.1	<p>On-going management of the drain must include: -</p> <ul style="list-style-type: none"> a) The system is 'primed' by a trained and competent practitioner in accordance with local policy b) To enable visualisation, a transparent adhesive dressing is applied to the entry site. c) The dressing remains undisturbed for the first 48hours and only changed if required. d) Observe for signs of infection (i.e. leaking CSF, erythema, induration and purulence). e) The CSF drainage system is securely attached to a stand. f) A laser system or appropriate levelling device is available at the bedside. g) Medical staff have prescribed the height and pressure level that the drain is to be set to (this must only be adjusted following instruction from the medical team). h) The medical team clearly prescribe and document whether the drain is to be managed via volume-led pressure-led drainage protocol. i) CSF drainage is monitored and any deviations (e.g. over or under drainage) promptly reported to medical staff). 	<p>Humphrey, 2018</p> <p>Kubilay <i>et al</i>, 2013</p> <p>Jamjoo <i>et al</i>, 2018</p> <p>Chatzi <i>et al</i> 2014</p>			
2.2	<p>Clamping the drain</p> <ul style="list-style-type: none"> a) Clamping of the drain either to challenge normal flow or following administration of intrathecal antibiotics must be monitored closely and any deviations escalated to the medical staff. b) Pressure led drainage: <ul style="list-style-type: none"> i) Observe for over-drainage of CSF when repositioning the patient or significant movement activities are anticipated 	Humphrey, 2018			

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
	<p>ii) Clamping of the drain must only be undertaken when a patient is being transferred (e.g., bed to chair) or if the drain needs to be laid on the bed (e.g., transfer to CT scan or theatre).</p> <p>c) Volume led drainage:</p> <p>i) Clamping of the drain, as part of volume-led drainage, is undertaken with caution and by a competent practitioner.</p> <p>ii) Medical staff have prescribed the amount of drainage per hour.</p>				
2.3	<p>CSF sampling</p> <p>a) CSF sampling is performed using strict aseptic technique</p> <p>b) Sampling is undertaken by trained and competent practitioners.</p> <p>c) Intra-thecal medication is given by trained and competent practitioners and documented accordingly.</p>	<p>Humphreys <i>et al</i>, 2015</p> <p>Champey <i>et al</i>. 2018</p>			
2.4	<p>Changing bags</p> <p>a) Bags are changed under strict aseptic technique observing infection control measures and in accordance with manufacturers' guidelines and local policy.</p> <p>The bag is changed when $\frac{3}{4}$ full to reduce the risk of introducing infection into a closed circuit (overfilling of the drainage bag impairs drainage).</p>	Lynn 2016			
2.5	<p>Removal</p> <p>a) The EVD is removed by a trained and competent practitioner (a suture is recommended to reduce the risk of infection).</p>				

FACTOR 3 – Education

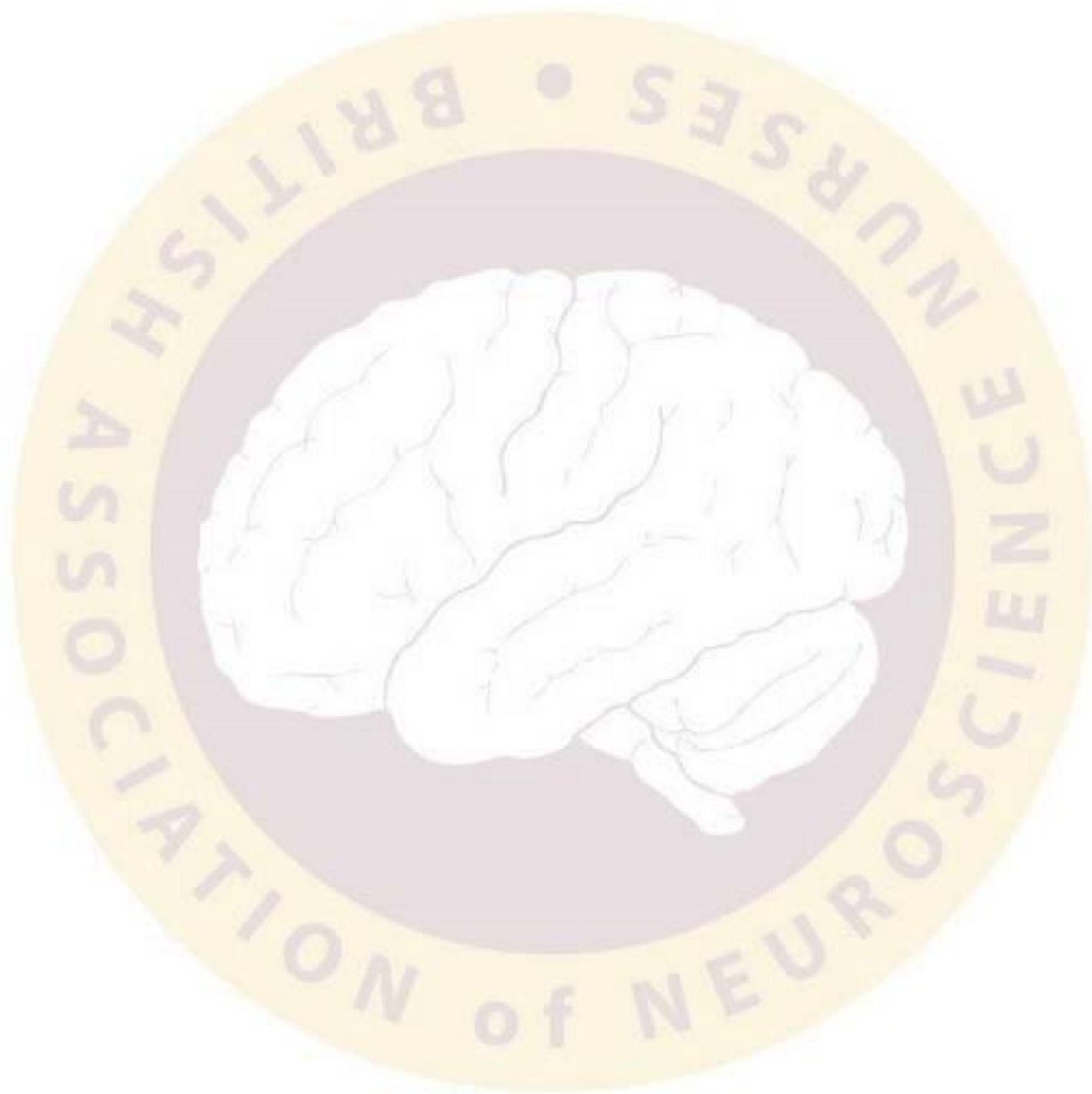
	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
3.0	All registered nurses involved in the management of external drainage systems are provided with a structured competency-based training and education programme.				
3.1	<p>Formal assessment of competency is undertaken and documented includes:</p> <ul style="list-style-type: none"> a) Awareness of the rationale for the external CSF drainage system b) The nurse's responsibilities in the management CSF drainage systems c) Identification of safeguard measures when caring for a patient with a CSF drainage system d) Knowledge of potential risk factors for infection (including duration of catheter placement) e) Knowledge of the clinical and laboratory parameters that indicate a CSF infection. e) Knowledge of the escalation procedure following accidental disconnection 	<p>Epic3, 2014</p> <p>Fried H. <i>et al</i> 2016</p> <p>Humphrey, 2018</p> <p>Muralidharan 2015</p>			
3.2	Protocols and guidance and all relevant documentation are easily accessible and visible in the appropriate clinical area				

FACTOR 4 – Patient Information

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
4.0	Current and evidence based written information is available for patients & carers and alternative methods of communication are available.				
4.1	<p>The patient and family are given the following information:</p> <ul style="list-style-type: none"> • Details of the CSF drainage system and how the drainage system works. • Details of any associated equipment that they are likely to encounter. • Likely duration of the treatment. • The importance of checking with healthcare professionals prior to any change in the patient's position. • The importance of reporting any changes in the patient's neurology to a healthcare professional 	<p>AANN 2007 Fried <i>et al.</i> 2016</p>			
4.2	Any information verbal /written that is given to the patient/carers is documented in the person's notes.				

References

- American Association Neuroscience Nurses (AANN) (2007) *Care of the Patient with a Lumbar Drain*. 2nd Ed. AANN: Glenview Illinois
- Champey, J., Mourey, C., Francony, G., Pavese, P., Gay, E., Gergele, L., Manet, R., Velly, L., Bruder, N., and Payen, J. (2019). Strategies to reduce external ventricular drain-related infections: a multicenter retrospective study. *Journal of Neurosurgery JNS*, 130(6), 2034-2039. <https://doi.org/10.3171/2018.1.JNS172486>
- Chatzi M, Karvouniaris M, Makris D, Tsimitrea, E, Gatos, C, Tasiou, A, Mantzaris, K, Fountas, K.N, Zakynthinos, E. (2014) Bundle of measures for external cerebral ventricular drainage-associated ventriculitis. *Critical Care Medicine*; 42(1):66-73.
- Fried H., Nathan B. R., Rowe A.S., Zabramski JM., Andaluz,N, Adarsh Bhimraj, McKenna Guanci, M Seder, DB, Singh, JM. (2016) The Insertion and Management of External Ventricular Drains: An Evidence-Based Consensus Statement. Review Article. *Neurocritical Care*. 24 (1):61-81
- Freathy, S, Smith, GB, Schoonhoven, L Westwood, G. (2019) The response to patient deterioration in the UK National Health Service-A survey of acute hospital policies. *Resuscitation*. 139:152-158.
- Humphreys H. and Jenks PJ. (2015) Surveillance and management of ventriculitis following neurosurgery. *Journal of Hospital Infection*. 89(4):281-286.
- Humphrey E. (2018) Caring for neurosurgical patients with external ventricular drains. *Nursing Times*. 114 (4):52-56.
- Jamjoo, A, Joannides, A, Tin-Chung Poon M, Chari, A, Zaben, M, Abdulla M, Roach, J, Glancz L, Solth, A, Duddy J, Brennan P. Bayston R. Butler, D. Mallucci, C. Jenkinson M, Gray, W. Kandasamy, J. Hutchinson P. Koliaas A. (2018). Prospective, multicentre study on EVD-related infections in the UK and Ireland. *Journal of Neurology, Neurosurgery and Psychiatry* 89(2):120-126
- Kubilay Z, Amini S, Fauerback LL, Archibald L, Friedman WA, Layon AJ. (2013). Decreasing ventricular infections through the use of a ventriculostomy placement bundle: experience at a single institution. *Journal of Neurosurgery* 2013; 118(3):514-520
- Loveday HP, Wilson JA, Pratt RJ, Golsorkhi M, Tingle A. (2014). EPIC3 - National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England. *Journal of Hospital Infection*. 86 (S1): S1-70.
- Lynn, S.J. (2016) Caring for patients with lumbar drains. <https://www.myamericannurse.com/caring-patients-lumbar-drains/>
- Muralidharan, R. (2015). External Ventricular drains: management and complications. *International Journal of Neurosurgery and Neurosciences*.6 (S6):S271-274.
- NHS Improvement - Patient Safety Alert (2017). Resources to support safe transition from the Luer connector to NRFit™ (ISO80369-6) for intrathecal and epidural procedures and delivery of regional blocks. Available from: <https://www.england.nhs.uk/2017/08/resources-support-safe-transition-luer-connector-nrfit-intrathecal-and-epidural-procedures-and-delivery-regional-blocks/> Date last accessed: 22/5/2024
- Royal College of Physicians (2017) *National Early Warning Score (NEWS)2*. Available from: <https://www.rcp.ac.uk/improving-care/resources/national-early-warning-score-news-2/> Date last accessed: 22/05/2024

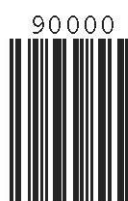


Benchmark No. 6
Cerebrospinal Fluid Management (4th Ed)

ISBN 9781911059370



9 781911 059370



90000 >