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NICU

Evidence Update

September 2017

(Quarterly)

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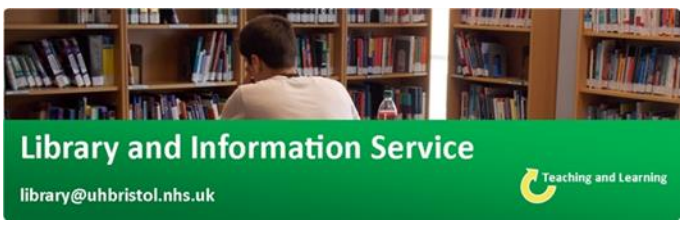

Training Calendar 2017

All sessions are one hour

September (13.00-14.00)

Fri 1st	Literature Searching
Mon 4th	Critical Appraisal
Tue 12th	Interpreting Statistics
Wed 20th	Literature Searching
Thu 28th	Critical Appraisal

October (12.00-13.00)

Fri 6th	Interpreting Statistics
Mon 9th	Literature Searching
Tue 17th	Critical Appraisal
Wed 25th	Interpreting Statistics

November (13.00-14.00)

Thu 2nd	Literature searching
Fri 10th	Critical Appraisal
Mon 13th	Statistics
Tue 21st	Literature searching

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Updates

NICE National Institute for Health and Care Excellence

In development

Developmental follow-up of children and young people born preterm (GID-CGWAVE0752)

August 2017 NICE guidelines

End of life care for infants, children and young people (GID-QS10031)

October 2017 Quality standards

Faltering growth - recognition and management of faltering growth in children (GID-CGWAVE0767)
October 2017 NICE guidelines

Neuroblastoma (high risk) - APN311 [ID910] (GID-TA10069)

March 2018 Technology appraisal guidance

Parenteral nutrition in neonates (GID-NG10037)

August 2019 NICE guidelines

Specialist neonatal respiratory care for babies born preterm (GID-NG10039)

April 2019 NICE guidelines

Cochrane Library

Sildenafil for pulmonary hypertension in neonates

Lauren E Kelly, Arne Ohlsson, Prakeshkumar S Shah

Online Publication Date: August 2017

Prebiotics for the prevention of hyperbilirubinaemia in neonates

Amir Mohammad Armanian, Shayesteh Jahanfar, Awat Feizi, Mitra Molaeinezhad, Nima Salehimehr, Erfan Sadeghi

Online Publication Date: July 2017

Saline irrigation for the management of skin extravasation injury in neonates

P N Gopalakrishnan, Nitin Goel, Sujoy Banerjee

Online Publication Date: July 2017

Sustained versus standard inflations during neonatal resuscitation to prevent mortality and improve respiratory outcomes

Matteo Bruschettini, Colm PF O'Donnell, Peter G Davis, Colin J Morley, Lorenzo Moja, Simona Zappettini, Maria Grazia Calevo

Online Publication Date: July 2017

Non-invasive high-frequency ventilation in newborn infants with respiratory distress

Jocelyn Chan, Lisa J Jones, David A Osborn, Mohamed E Abdel-Latif

Online Publication Date: July 2017

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NEONATOLOGY

Procalcitonin monitoring to reduce antibiotic exposure in neonatal sepsis (August 2017)

In a multicenter randomized controlled trial in neonates with suspected early-onset sepsis, a risk assessment protocol that included serial procalcitonin (PCT) measurements reduced the duration of antibiotic therapy [20]. Rates of reinfection were low in both groups, and there was only one death (in the control group). Important limitations of the study include its fairly liberal suggested antibiotic duration for infants with negative cultures and high rates of noncompliance with the treatment protocols by the treating clinicians. Despite these limitations, the results suggest that PCT may have some utility in guiding the duration of antibiotic therapy in neonates with suspected sepsis. If PCT levels are obtained, they should be used in conjunction with other clinical indicators of sepsis and should not be the sole basis of decision-making. (See "Clinical features, evaluation, and diagnosis of sepsis in term and late preterm infants", section on 'Other inflammatory markers'.)

Neonatal nCPAP and long-term adverse outcome (July 2017)

Nasal continuous positive airway pressure (nCPAP) is the preferred initial intervention to manage neonatal respiratory distress syndrome (RDS) versus a more invasive regimen (eg,

endotracheal intubation and surfactant administration). However, an observational study of extremely preterm survivors (gestational age <28 weeks) has shown that the use of nCPAP is associated with long-term morbidity [21]. Data comparing use of respiratory support over three historical time periods showed that patients managed in the most recent period (2005) had the longest median duration of nCPAP use, the highest degree of airflow obstruction at eight years of age, and the greatest risk of bronchopulmonary dysplasia. Interpretation of these results must account for factors other than duration of nCPAP that also changed over time (decreasing use of postnatal steroids, decreasing neonatal mortality, and increasing use of nCPAP for other conditions). While these findings emphasize that clinicians need to follow the criteria for initiation and discontinuation of CPAP to avoid overuse and minimize long-term sequelae, CPAP remains the preferred intervention for the management of neonatal RDS based on evidence from clinical trials. (See "Prevention and treatment of respiratory distress syndrome in preterm infants", section on 'Long-term outcome'.)

Recent Database Articles

If you would like any of the articles in full text, or if you would like a more focused search on your own topic, please contact us: **library@bristol.nhs.uk**

1. Neonatal ICU System Safety: A Pilot Test for Medication Error by Using Fuzzy Grey Relational Analysis.

Author(s): Zhang, Xin; Lee, Shih-Yu; Chen, Jingli; Liu, Huaping

Source: Journal of nursing care quality; ; vol. 32 (no. 3); p. 259-266

Publication Type(s): Journal Article

PubMedID: 27828930

Available in full text at Journal of Nursing Care Quality - from EBSCOhost

Abstract: This study analyzed risk factors for medication/near-miss errors in the neonatal intensive care unit by using Grey Relational Analysis based on self-incident reports from staff nurses. The ASSESS-ERR Medication System Worksheet was used. A total of 156 medication/near-miss errors were found across 5 stages of the medication use process. The order prescribing stage had the most errors. The highest systemic risk factors were critical drug information missing; environmental, staffing, and workflow problems; and lack of staff education.

Database: Medline

2. Trajectories of Externalizing and Internalizing Behaviors in Preterm Children Admitted to a Neonatal Intensive Care Unit.

Author(s): Gerstein, Emily D; Woodman, Ashley C; Burnson, Cynthia; Cheng, Erika R; Poehlmann-Tynan, Julie

Source: The Journal of pediatrics; Aug 2017; vol. 187 ; p. 111-118

Publication Date: Aug 2017

Publication Type(s): Journal Article

PubMedID: 28533035

Abstract:OBJECTIVETo examine the trajectories of internalizing and externalizing behavior problems of preterm children between 16 months and 6 years of age and predictors of trajectories, including gestational age, child dysregulation, maternal depression, socioeconomic status, and parenting.STUDY DESIGNThis longitudinal study followed 148 children and their mothers from neonatal intensive care unit discharge until 6 years of age. Gestational ages ranged from 23 to 36 weeks. The study included assessment of maternal-reported behavior problems, maternal depression, neonatal and socioeconomic characteristics, and observations of dysregulated behavior and parenting. Trajectories were identified with a semiparametric group-based analytic method, and multinomial logistic regression was used to identify significant risk factors.RESULTSThree distinct trajectories for preterm children were found for both internalizing and externalizing behavior problems. For the 2 groups with greater behavior problems (groups 1 and 2), trajectories reached their peak between 24 and 36 months of age, then leveled off or decreased. Group 3 showed a stable low level of externalizing behaviors, and a low, but slightly increasing level of internalizing behaviors. Maternal depression, child dysregulation, gestational age, and socioeconomic challenges were identified as risk factors that predicted less optimal behavior problem trajectories.CONCLUSIONSChildren born prematurely followed 1 of 3 distinct developmental trajectories for both internalizing and externalizing behavior problems. The most severe behavior problems started early in development and were associated with increased child dysregulation,

maternal depression, and lower socioeconomic status. These findings have implications for screening and monitoring preterm children.

Database: Medline

3. The Frequency and Severity of Magnetic Resonance Imaging Abnormalities in Infants with Mild Neonatal Encephalopathy.

Author(s): Walsh, Brian H; Neil, Jeffrey; Morey, JoAnn; Yang, Edward; Silvera, Michelle V; Inder, Terrie E; Ortinau, Cynthia

Source: The Journal of pediatrics; Aug 2017; vol. 187 ; p. 26

Publication Date: Aug 2017

Publication Type(s): Journal Article

PubMedID: 28479101

Abstract:OBJECTIVETo assess and contrast the incidence and severity of abnormalities on cerebral magnetic resonance imaging (MRI) between infants with mild, moderate, and severe neonatal encephalopathy who received therapeutic hypothermia.STUDY DESIGNThis retrospective cohort studied infants with mild, moderate, and severe neonatal encephalopathy who received therapeutic hypothermia at a single tertiary neonatal intensive care unit between 2013 and 2015. Two neuroradiologists masked to the clinical condition evaluated brain MRIs for cerebral injury after therapeutic hypothermia using the Barkovich classification system. Additional abnormalities not included in this classification system were also noted. The rate, pattern, and severity of abnormalities/injury were compared across the grades of neonatal encephalopathy.RESULTSEighty-nine infants received therapeutic hypothermia and met study criteria, 48 with mild neonatal encephalopathy, 35 with moderate neonatal encephalopathy, and 6 with severe neonatal encephalopathy. Forty-eight infants (54%) had an abnormality on MRI. There was no difference in the rate of overall MRI abnormalities by grade of neonatal encephalopathy (mild neonatal encephalopathy 54%, moderate neonatal encephalopathy 54%, and severe neonatal encephalopathy 50%; P= .89). Basal ganglia/thalamic injury was more common in those with severe neonatal encephalopathy (mild neonatal encephalopathy 4%, moderate neonatal encephalopathy 9%, severe neonatal encephalopathy 34%; P = .03). In contrast, watershed injury did not differ between neonatal encephalopathy grades (mild neonatal encephalopathy 36%, moderate neonatal encephalopathy 32%, severe neonatal encephalopathy 50%; P = .3).CONCLUSIONMild neonatal encephalopathy is commonly associated with MRI abnormalities after therapeutic hypothermia. The grade of neonatal encephalopathy during the first hours of life may not discriminate adequately between infants with and without cerebral injury noted on MRI after therapeutic hypothermia.

Database: Medline

4. Postoperative characteristics of infants who developed necrotizing enterocolitis with different postnatal ages.

Author(s): Li, Xiaowen; Li, Lei; Wang, Yan; Deng, Chun; Guo, Chunbao

Source: Medicine; Aug 2017; vol. 96 (no. 32); p. e7774

Publication Date: Aug 2017

Publication Type(s): Journal Article Observational Study

PubMedID: 28796074

Abstract: Our goal was to investigate the surgical procedures, postoperative complications, and survival with regard to different onset timing of necrotizing enterocolitis (NEC).We performed a

retrospective review of medical records with a diagnosis of NEC between 2005 and 2016. The cutoff was set at 10 days for early onset ≤10 days and late onset over 10 days. Propensity score matching was performed to adjust for any baseline differences. In 53 paired patients, clinical outcomes, including, mortality, postoperative complications, and length of neonatal intensive care unit (NICU) stay, were evaluated on the basis of early or late-onset NEC.Successful 1:1 matching propensity score matching was performed with 208 infants. Mortality for early-onset NEC infants was lower than that of early late NEC infants (P = .026). A lower overall postoperative complication rate, including infectious complications [19 (35.8) vs 29 (54.7); odds ratio, 0.462, confidence interval (CI) 0.212-1.008, P = .039], was noted in patients with early-onset NEC compared with infants with late-onset NEC. NICU stay and major complication were marginal different between the 2 groups. Comparison of feeding outcomes revealed that the time to achieve full enteral feeds was significantly longer for those with late-onset NEC (18.1 ± 11.5 vs 26.3 ± 15.6, P = .008).The infants who develop NEC after 10 days of life do influence postoperative outcome survival or other clinically important outcomes after laparotomy.

Database: Medline

5. Congenital nasal obstruction in infants: A retrospective study and literature review.

Author(s): Patel, Vijay A; Carr, Michele M

Source: International journal of pediatric otorhinolaryngology; Aug 2017; vol. 99 ; p. 78-84

Publication Date: Aug 2017

Publication Type(s): Journal Article Review

PubMedID: 28688570

Abstract:OBJECTIVESTo identify etiologies of congenital nasal obstruction and describe clinical practice patterns in the evaluation, diagnosis, and treatment of symptomatic infants.METHODSAn electronic chart review from 1/1/2006-10/1/2016 for all patients with a diagnosis of nasal obstruction within the first six months of life using ICD-9 and 10 codes 478.19 and J34.89.RESULTSA total of 34 patients were evaluated by the Division of Otolaryngology for this chief complaint. 38% of neonates were born premature and 32% were admitted to the NICU at birth, with a female-to-male ratio of 1:1.4. Presenting signs and symptoms included: stertor (44%), cyanosis (24%), stridor (24%), retractions (21%), rhinorrhea (21%), apnea (12%), and epistaxis (8%). 47% of patients received ancillary radiographic imaging (CT or MRI). Diagnoses observed include: midnasal stenosis (38%), pyriform aperture stenosis (21%), choanal stenosis (12%), dacryocystocele (6%), microrhinia (6%), septal deviation (6%), nasopharyngeal reflux (3%), nasopharyngeal teratoma (3%), neonatal rhinitis (3%), and pharyngeal wall collapse (3%). 71% of patients were noted to have bilateral nasal obstruction. 41% of infants were found to have an associated ear, nose, and throat anomaly. 15% of patients required surgical intervention. The mean time-to-resolution was 240 days.CONCLUSIONCongenital nasal obstruction has a broad differential diagnosis: the timing, onset, and laterality of symptoms can provide insights into the source of upper airway compromise. Most infants improve through conservative management (i.e. suctioning, humidification) and medical therapies (i.e. intranasal drops, nasal sprays).

Database: Medline

6. Antenatal Determinants of Bronchopulmonary Dysplasia and Late Respiratory Disease in Preterm Infants.

Author(s): Morrow, Lindsey A; Wagner, Brandie D; Ingram, David A; Poindexter, Brenda B; Schibler, Kurt; Cotten, C Michael; Dagle, John; Sontag, Marci K; Mourani, Peter M; Abman, Steven H

Source: American journal of respiratory and critical care medicine; Aug 2017; vol. 196 (no. 3); p. 364-374

Publication Date: Aug 2017

Publication Type(s): Multicenter Study Journal Article

PubMedID: 28249118

Available in full text at American Journal of Respiratory and Critical Care Medicine - from ProQuest

Available in full text at American journal of respiratory and critical care medicine [Am J Respir Crit Care Med] NLMUID: 9421642 - from EBSCOhost

Abstract:RATIONALEMechanisms contributing to chronic lung disease after preterm birth are incompletely understood.OBJECTIVESTo identify antenatal risk factors associated with increased risk for bronchopulmonary dysplasia (BPD) and respiratory disease during early childhood after preterm birth, we performed a prospective, longitudinal study of 587 preterm infants with gestational age less than 34 weeks and birth weights between 500 and 1,250 g.METHODSData collected included perinatal information and assessments during the neonatal intensive care unit admission and longitudinal follow-up by questionnaire until 2 years of age.MEASUREMENTS AND MAIN RESULTSAfter adjusting for covariates, we found that maternal smoking prior to preterm birth increased the odds of having an infant with BPD by twofold (P = 0.02). Maternal smoking was associated with prolonged mechanical ventilation and respiratory support during the neonatal intensive care unit admission. Preexisting hypertension was associated with a twofold (P = 0.04) increase in odds for BPD. Lower gestational age and birth weight z-scores were associated with BPD. Preterm infants who were exposed to maternal smoking had higher rates of late respiratory disease during childhood. Twenty-two percent of infants diagnosed with BPD and 34% of preterm infants without BPD had no clinical signs of late respiratory disease during early childhood.CONCLUSIONSWe conclude that maternal smoking and hypertension increase the odds for developing BPD after preterm birth, and that maternal smoking is strongly associated with increased odds for late respiratory morbidities during early childhood. These findings suggest that in addition to the BPD diagnosis at 36 weeks, other factors modulate late respiratory outcomes during childhood. We speculate that measures to reduce maternal smoking not only will lower the risk for preterm birth but also will improve late respiratory morbidities after preterm birth.

Database: Medline

7. Transition from an open-plan to a two-cot neonatal intensive care unit: a participatory action research approach.

Author(s): Broom, Margaret; Gardner, Anne; Kecskes, Zsuzsoka; Kildea, Sue

Source: Journal of clinical nursing; Jul 2017; vol. 26 (no. 13-14); p. 1939-1948

Publication Date: Jul 2017

Publication Type(s): Journal Article

PubMedID: 27533312

Abstract:AIMS AND OBJECTIVESTo facilitate staff transition from an open-plan to a two-cot neonatal intensive care unit design.BACKGROUNDIn 2012, an Australian regional neonatal intensive care unit transitioned from an open-plan to a two-cot neonatal intensive care unit design. Research has reported single- and small-room neonatal intensive care unit design may negatively impact on the distances nurses walk, reducing the time they spend providing direct neonatal care. Studies have also reported nurses feel isolated and need additional support and education in such neonatal intensive care units. Staff highlighted their concerns regarding the impact of the new design on workflow and clinical practice.DESIGNA participatory action research approach.METHODSA

participatory action group titled the Change and Networking Group collaborated with staff over a four-year period (2009-2013) to facilitate the transition. The Change and Networking Group used a collaborative, cyclical process of planning, gathering data, taking action and reviewing the results to plan the next action. Data sources included meeting and workshop minutes, newsletters, feedback boards, subgroup reports and a staff satisfaction survey.RESULTSThe study findings include a description of (1) how the participatory action research cycles were used by the Change and Networking Group: providing examples of projects and strategies undertaken; and (2) evaluations of participatory action research methodology and Group by neonatal intensive care unit staff and Change and Networking members.CONCLUSIONThis study has described the benefits of using participatory action research to facilitate staff transition from an open-plan to a two-cot neonatal intensive care unit design. Participatory action research methodology enabled the inclusion of staff to find solutions to design and clinical practice questions. Future research is required to assess the long-term effect of neonatal intensive care unit design on staff workload, maintaining and supporting a skilled workforce as well as the impact of a new neonatal intensive care unit design on the neonatal intensive care unit culture.RELEVANCE TO CLINICAL PRACTICEA supportive work environment for staff is critical in providing high-quality health care.

Database: Medline

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Acta Paediatrica

Low age, low birth weight and congenital heart disease are risk factors for intensive care in infants with bronchiolitis

Minna Mecklin, Paula Heikkilä and Matti Korppi

Archives of Disease in Childhood: Fetal and Neonatal

Neurodevelopmental outcomes of extremely low birthweight infants randomised to different PCO2 targets: the PHELBI follow-up study Free

Neonatology

Randomized Controlled Trial Comparing Different Single Doses of Intravenous Paracetamol for Placement of Peripherally Inserted Central Catheters in Preterm Infants

Neonatology 2017;112:150-158 (DOI:10.1159/000468975)

Journal of Pediatrics

Are Children Born with Birth Defects at Increased Risk of Injuries in Early Childhood?

DOI: http://dx.doi.org/10.1016/j.jpeds.2017.05.063

p148–155.e2

Published online: June 23, 2017

JAMA Pediatrics

Regulatory Science in NeonatesA Framework That Supports Evidence-Based Drug Therapy

Mark A. Turner, MBChB, PhD; Ronald J. Portman, MD; Jonathan M. Davis, MD

Abstract Full Text

JAMA Pediatr. 2017;171(8):721-722. doi:10.1001/jamapediatrics.2017.1360

This Viewpoint highlights the importance of collecting high-quality data, rationally using data, and having a framework for evaluating drugs in regulatory science.

Pediatrics

Benign Neonatal Shudders, Shivers, Jitteriness, or Tremors: Early Signs of Vitamin D Deficiency

Millicent Collins, Michal Young

Pediatrics Aug 2017, 140 (2) e20160719; DOI: 10.1542/peds.2016-0719

This case report highlights the significance of mild, incidental shivering or jitteriness in the normal newborn, elucidating the role of vitamin D.

Journal of Perinatology

Journal of Perinatology 37, 827-833 (July 2017) | doi:10.1038/jp.2017.37

Standardized feeding regimen for reducing necrotizing enterocolitis in preterm infants: an updated systematic review

B Jasani and S Patole

A systematic review (2005) of observational studies has reported 87% reduction in the incidence of necrotizing enterocolitis (NEC) after introducing standardized feeding regimen (SFR) in preterm infants. Considering the many new studies in this field since 2005 and the continued health burden of NEC, we aimed to systematically review the incidence of NEC in preterm infants 'before' vs 'after' implementing a SFR.

Study Design:

PubMed, EMBASE, CINAHL and E-abstracts from the Pediatric Academic Society meetings and other pediatric and neonatal conference proceedings were searched in May 2016. Observational studies reporting incidence of NEC before and after implementing a SFR were included. Relevant data were extracted independently by two reviewers. Meta-analysis was conducted using random effects model (REM) and results rechecked with fixed effects model.

Results:

Pooled results from 15 observational studies (N=18 160) using REM showed that SFR significantly reduced the incidence of NEC (risk ratio 0.22; 95% confidence interval 0.13 to 0.36; P<0.00001; I2=74%). The results remained significant after comparing studies in two epochs (1978 to 2003 vs 2004 to 2016).

Conclusion:

SFR continues to be an important tool in prevention of NEC in preterm infants.

Journal of Perinatology (2017) 37, 809–813; doi:10.1038/jp.2017.24; published online 23 March 2017

Consensus approach to nasal high-flow therapy in neonates

Objective: Nasal high-flow therapy (nHFT) is commonly used for noninvasive respiratory support in the neonatal intensive care unit. Our objective was to determine which aspects of neonatal nHFT have achieved adequate evidence base to support consensus among experienced clinical investigators, and to document areas lacking consensus to promote future investigations.

Study Design: Prospective, modified Delphi collation of tabular queries related to specific aspects of neonatal nHFT. Seven international nHFT clinical researchers were queried regarding approaches to initiation, escalation, weaning and discontinuing nHFT. Completed tables were reviewed

independently by each investigator, results clarified and discussed and areas of consensus determined.

Results: Consensus agreement was reached for many aspects of nHFT including: need for adequate heating and humidification, need to prevent nares occlusion, maximum flow rate of 8 l min−1, assessment of fraction of inspired oxygen (FiO2) and work of breathing for either flow escalation or weaning, equivalence of nHFT to nasal continuous positive airway pressure (nCPAP) for noninvasive support of infants of greater than or equal to28 weeks with resolving respiratory distress and use of nHFT for noninvasive support of stable infants on nCPAP. There was general agreement for initial gas flow rates in the range of 4 to 6 l min−1 and for nHFT as primary therapy for mild respiratory distress. There was no consensus on the approach to discontinuing nHFT.

Conclusions: Among an experienced group of nHFT clinical researchers, there was general consensus in the approach to neonatal nHFT. Additional randomized studies are indicated to provide better evidence related to several aspects of nHFT, as well as to identify other clinical conditions where nHFT may provide safe, effective noninvasive support.

Pediatric Anesthesia

Does ultrasound guidance add accuracy to continuous caudal-epidural catheter placements in neonates and infants?

Vrushali C. Ponde, Vinit V. Bedekar, Ankit P. Desai and Kiran A. Puranik

Version of Record online: 10 AUG 2017 | DOI: 10.1111/pan.13212

Exercise: Heterogeneity

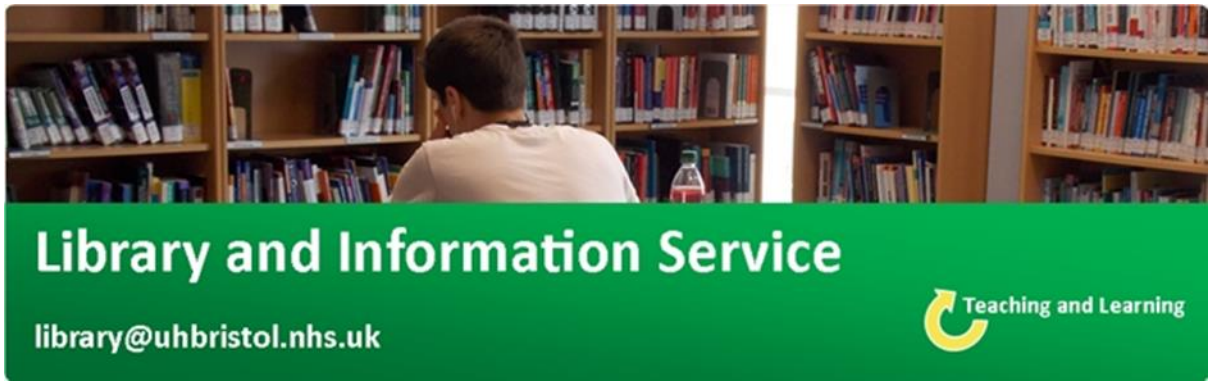
Heterogeneity is the extent to which studies brought together in a systematic review demonstrate variation across a range of key variables.

Match the different types of heterogeneity:

1. Statistical heterogeneity (conventionally just known as 'heterogeneity')
2. Methodological heterogeneity
3. Clinical heterogeneity

A. Variability in the participants, interventions and outcomes studied
B. Variability in study design and risk of bias
C. Variability in the intervention effects being evaluated in the different studies

Answers: 1C, 2B, 3A



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