

Competences:

an education and training competence framework for administering medicines intravenously to children and young people

CLINICAL PROFESSIONAL RESOURCE



Acknowledgements

The Royal College of Nursing would like to thank the following members for support in publishing the revised 2017 edition of this document:

Mary Brady, Senior Lecturer (child nursing), FHSCE, Kingston University

Lin McGraw, Matron Children's Services Epsom and St Helier

The Royal College of Nursing would like to thank the following members for support in publishing the revised 2013 edition of this document:

Jessica Higson, Sister and Advanced Nurse Practitioner for Children, Royal Berkshire Hospital, Reading

Tony Knox, Practice Educator (Paediatrics) Royal Berkshire Hospital, Reading

Jude Taylor, Advanced Children's Nurse Practitioner, Oxford Children's Hospital

Dawn Williams, Advanced Children's Nurse Practitioner, Alderhey Hospital, Liverpool

Jeanette Pearce Resuscitation officer – Paediatric Lead, Sister – Paediatrics and Emergency department, Gloucestershire Hospitals NHS Foundation Trust

Neil Fletcher, Senior Nurse Paediatrics, Imperial Hospital, London

We would also like to thank the NHS Modernisation Agency for sponsoring the development of the original framework, first published in 2005. We are grateful to the following people for their assistance in the production of the original framework document.

Expert group

Karen Bravery, Nurse Practitioner/Practice Development Lead Intravenous Therapy for Infection, Cancer and Immunity, Great Ormond Street Hospital for Children NHS Trust

Pauline Brown, Lead Nurse IV Therapy, Royal Liverpool Children's Hospital NHS Trust

Julie Flaherty, Children's Nurse Consultant, Unscheduled Care, Salford Royal Foundation NHS Trust

Liz Gormley-Fleming, Senior Lecturer, Children's Nursing, University of Hertfordshire

Alison Hegarty, Teacher Practitioner, IV Therapy, Central Manchester and Manchester Children's Hospital NHS Trust

Valerie McGurk, Practice Development Facilitator, Paediatrics, Northampton General Hospital Trust

Louise Mills, Nurse Practitioner for Intravenous Therapy, Great Ormond Street Hospital for Children NHS Trust

Jo Rothwell, Lead Nurse, IV Therapy, Central Manchester and Manchester Children's Hospital NHS Trust

Review group

Anne Casey, Adviser, Royal College of Nursing

Jennie Craske, Pain and Sedation Clinical Nurse Specialist, Royal Liverpool Children's Hospital NHS Trust

Annette K Dearmun, Lecturer Practitioner, Oxford Radcliffe Hospitals NHS Trust

Ansley McGibbon, Senior Nurse, Practice, Research, Development and Education Unit, Lothian University Hospitals, Edinburgh

Steve McKenna, Charge Nurse, Paediatric Ambulatory Care/Outpatients, Royal Free Hampstead NHS Trust

Fiona Smith, Adviser in Children and Young People's Nursing, Royal College of Nursing

We are also grateful to the Royal College of Paediatrics and Child Health for its support of the content of this publication.

This publication is due for review in September 2020. To provide feedback on its contents or on your experience of using the publication, please email publications.feedback@rcn.org.uk

Contents

Introduction	4
1. Guidance for programme development	5
Education pathways	5
Teaching and learning strategies	5
Assessment	5
2. Practical and theoretical competences	7
Domain 1: professional and legal issues	7
Domain 2: communication	7
Domain 3: medical devices and equipment	7
Domain 4: medicines management	8
Domain 5: risks and hazards	9
3. References and further reading	10
4. Online resources	14

Publication

This is a RCN competence knowledge and skills framework to support personal development and career progression.

Description

This framework describes the theoretical and practical competences and overall indicative content for education and training programmes for administering medicines intravenously to children and young people.

Publication date: November 2017

Review date: September 2020.

The Nine Quality Standards

This publication has met the nine quality standards of the quality framework for RCN professional publications. For more information, or to request further details on how the nine quality standards have been met in relation to this particular professional publication, please contact publications.feedback@rcn.org.uk

Evaluation

The authors would value any feedback you have about this publication. Please contact publications.feedback@rcn.org.uk clearly stating which publication you are commenting on.

RCN Legal Disclaimer

This publication contains information, advice and guidance to help members of the RCN. It is intended for use within the UK but readers are advised that practices may vary in each country and outside the UK. The information in this booklet has been compiled from professional sources, but its accuracy is not guaranteed. Whilst every effort has been made to ensure the RCN provides accurate and expert information and guidance, it is impossible to predict all the circumstances in which it may be used. Accordingly, the RCN shall not be liable to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by what is contained in or left out of this website information and guidance.

Published by the Royal College of Nursing, 20 Cavendish Square, London, W1G 0RN

© 2017 Royal College of Nursing. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise, without prior permission of the Publishers. This publication may not be lent, resold, hired out or otherwise disposed of by ways of trade in any form of binding or cover other than that in which it is published, without the prior consent of the Publishers.

Introduction

Competence can be defined as: “The state of having the knowledge, judgement, skills, energy, experience and motivation required to respond adequately to the demands of one’s professional responsibilities” (Roach, 1992).

This education and training competence framework for administering medicines intravenously to children and young people was first published in 2005. It has been revised in 2017 to reflect a number of current political and professional issues and initiatives.

The use of intravenous medicines for children and young people is now commonplace with the intravenous route being the only method for giving some medicines. Therefore, it is an important skill for nurses caring for children and young people to develop and maintain.

This framework describes the theoretical and practical competences and overall indicative content for education and training programmes for administering medicines intravenously to children and young people.

It aims to support consistent curriculum and practice development so that practitioners can develop and maintain the ability to carry out this task, regardless of where they work. It should also be used to develop new programmes, and to review and revise existing ones. By using this framework, other professionals and employers can be confident in the standard and proficiency of practitioners.

1. Guidance for programme development

When either planning new courses or reviewing existing courses, we recommend that hospitals, community services and universities use this as their competence framework.

Education pathways

This framework can be used to develop hospital-based training programmes for nurses working with children and young people. Alternatively, it can be used to review existing programmes to ensure that they meet the needs of children and young people. Training may be linked to other competences, such as those required for capillary blood sampling and venepuncture.

Indicative training content should encompass:

- the Nursing and Midwifery Council Code (NMC, 2015)
- legal, professional and local policies concerning record keeping
- local and national policies and procedures for giving intravenous medicines
- evidence base for good practice in administering medicines intravenously
- policies and good practice guidance in obtaining informed consent
- policies and good practice guidance for holding and restraining children, which emphasise using the least restrictive intervention possible
- the nurse as advocate for the child and family
- medicine calculations and formulae, weight and body surface area
- Health and Safety at Work Act 1974 and other regulations (HSE)
- control of substances hazardous to health (COSHH) regulations 2002
- National Health Services Litigation Authority (NHSLA) standards
- medication errors, prevention, management, reporting
- Right patient – right care (NPSA, 2004a)
- the role of the National Patient Safety Agency and Medicines and Healthcare Products Regulatory Agency.

Teaching and learning strategies

The administration of medicines intravenously is a practical skill which is underpinned by theoretical knowledge. Teaching and learning strategies should focus on developing the competence and confidence of the practitioner. Assessment of prior knowledge, particularly in caring for the child undergoing intravenous therapy, can be useful in developing programmes that reflect the individual needs of the practitioner.

A variety of ways of learning can be used, including:

- workbooks
- problem-based learning
- taught provision
- scenarios
- supervised practice
- e-learning
- simulation
- blended learning.

Assessment

Each programme needs to assess competence in practice. Practice assessments should reflect the competences and learning outcomes. There are various assessment methods that are appropriate:

- observation under supervision and demonstration
- reflective practice
- portfolio of evidence showing skills, experience and development, supported by supervisors
- formal examination (objective structured clinical assessment).

Each of these relies on the use of practice assessors. Programme developers should consider who this may be and the criteria needed to become and maintain this status.

We recommend that an assessor should be experienced in administering medicines intravenously to children and young people. Their ability to assess others should be determined by a formal assessment process.

We also advise that they receive clear guidance on their role and responsibilities. Regular updating and skills assessment can assist in ensuring ongoing competence.

We suggest that this takes place at least annually and when new equipment is introduced. Many organisations have also introduced an annual maths assessment for all IV drugs givers to reduce calculation errors.

2. Practical and theoretical competences

Domain 1: professional and legal issues

Practical competences

- Administers medicines intravenously in accordance with legal, professional and policy requirements.
- Uses appropriate evidence to underpin best practice in administering intravenous medicines.
- Demonstrates knowledge and understanding of the process for gaining valid consent from children, young people and their parents/ carers.
- Records and reports information in a manner that is clear, concise, timely and accurate.
- Reflects on own practice and takes action to develop and improve knowledge and skills.
- Describes situations where it is inappropriate to administer a medicine intravenously, and the alternative action to take.
- Demonstrates the safe application of the principles of “restrictive physical intervention and therapeutic holding in children and young people” (RCN 2010).

Theoretical competences

At the end of a course of study and period of supervised practice the nurse will be able to:

- discuss the legal and professional issues associated with administering medicines intravenously
- use current evidence to support best practice in the administration of intravenous medicines
- give an account of professional and local policies relevant to giving and receiving medicines intravenously
- describe the principles that underpin the process of gaining valid consent from children, young people and their parents/ carers
- identify the legal requirements for good record keeping in the administration of intravenous medicines

- reflect on own practice, identifying accountability and competence issues.

Domain 2: communication

Practical competences

- Uses appropriate strategies for gaining the child and family’s trust and for reducing anxiety, including the role of play and diversion therapy, in administering medicines intravenously.
- Demonstrates active listening skills when communicating.
- Explains and gives information to the child and family to assist their understanding and to gain informed consent.
- Acts as an advocate for the child and family.
- Liaises with the multidisciplinary team in providing safe, effective intravenous medicine therapy.

Theoretical competences

At the end of a course of study and period of supervised practice the nurse will be able to:

- communicate the proposed care plan to the child and family, and gain informed consent to proceed
- explain the procedure to the child and family in a manner that increases confidence and minimises anxiety
- record all communication with the multidisciplinary team, child and family in appropriate nursing documentation
- explain the importance, and demonstrate the use of play and diversion therapy in minimising pain and anxiety.

Domain 3: medical devices and equipment

Practical competences

- Administers intravenous medicines safely and competently, using appropriate equipment.
- Demonstrates knowledge and understanding of the medical devices and equipment used

to administer medicines intravenously via peripheral and central venous access. This includes volumetric infusion pumps and pumps with in built drug libraries.

- Demonstrates dexterity and numeracy skills when handling the medical devices and equipment used for giving medicines intravenously.
- Initiates and monitors a care plan for a child receiving medicines intravenously using a medical device.
- Takes appropriate action in relation to faulty medical devices and equipment.

Theoretical competences

At the end of a course of study and period of supervised practice the nurse will be able to:

- outline the care required by children and young people receiving medicines intravenously by different methods and routes of administration
- provide a rationale for the selection of a specific piece of equipment or medical device
- develop a care plan for the child receiving medicines intravenously using a medical device
- monitor medication given via infusion pumps to ensure that the correct infusion rate has been set
- identify problems with equipment or medical devices, the procedures associated with faulty equipment, and take appropriate action
- demonstrate manual dexterity and numeracy skills to enable safe and effective use of volumetric infusion pumps.

Domain 4: medicines management

Practical competences

- Demonstrates an understanding of the uses and side effects associated with the medicines for administration.
- Demonstrates an understanding of the pharmacological actions that occur when medicines are given intravenously.
- Outlines the action of the medicine and

its pharmacokinetics in babies and young children.

- Calculates the doses and/or volumes of medicine for administration.
- Identifies a suitable method/means of administration for giving medicines intravenously.
- Initiates appropriate actions for checking the prescription chart, patient identity, and allergy status.
- Uses the correct series of actions and demonstrates dexterity when reconstituting and giving medicines intravenously, including the identification of the correct solution for flushing.
- Adheres to British National Formulary (child) and the manufacturers administration guidance
- Ensures that an accurate weight and height measurement has been recorded, to enable drug dosage calculation
- Administers intravenous medicines promptly, at the prescribed rate and dose.
- Demonstrates knowledge of the safe ordering, storage and disposal of intravenous medicines and equipment.
- Makes and records appropriate observations of the child and venous access device site, before, during and after the procedures.
- Demonstrates the knowledge and skills necessary for safe practice before, during and after the administration of intravenous medicines.
- Outlines immediate action to be taken in the case of unwanted or unexpected adverse reactions.
- Identifies likely causes of discomfort and/or pain and take appropriate action.
- Describes how to assess and maintain the patency of a venous access device.
- Documents that intravenous medication has been administered

Theoretical competences

At the end of a course of study and period of supervised practice the nurse will be able to:

- discuss the implications of administering

medicines to children and young people in relation to employer's practice policy and NMC guidance

- identify the commonly prescribed intravenous medicines within his/her area of practice and describe their uses and side-effects
- describe the factors that determine whether an intravenous medicine is given by infusion or as a bolus
- calculate medicine doses and infusion rates safely, using recognised formulae
- discuss medicine compatibility, displacement values and factors that affect the stability of medicines prepared for intravenous administration
- describe the rationale, and demonstrate the technique for flushing a venous access device, or intravenous administration set/extension tubing, before and after the administration of medicine
- describe how to assess and maintain the patency of a venous access device
- describe the different types of access ie peripheral venous access versus central access
- identify the roles and responsibilities of other team members in prescribing, dispensing, checking and administering intravenous medicines
- identify the immediate action to be taken in the case of unwanted or unexpected adverse reactions including the anaphylaxis policy.

Domain 5: risks and hazards

Practical competences

- Describes the specific risks to children of giving medicines intravenously.
- Applies appropriate measures to prevent and control infection.
- Utilises checking procedures that enhance patient safety and minimise the risk of error.
- Describes the risks to patients from inaccurate or incomplete identity checks.
- Recognises the clinical signs of hazards associated with giving intravenous medicines

and takes appropriate action to prevent/ minimise them.

- Demonstrates the correct procedure for hand washing, use of gloves, apron and aseptic non touch technique (Macqueen, Bruce and Gibson, 2012)
- Demonstrates the correct procedure for checking a patient's identity.
- Initiates appropriate action in response to an error in giving medicines intravenously.
- Recognises complications associated with indwelling venous access devices, their cause and actions required to prevent, minimise and treat them.
- Disposes of equipment safely in accordance with hospital policies.
- Recognises specific risks and hazards associated with a child's age, developmental level or individual circumstances.

Theoretical competences

At the end of a course of study and period of supervised practice the nurse will be able to:

- follow recognised procedures to prevent and detect infection when preparing and giving intravenous medicines
- recall the signs and symptoms of venous access device related infection, infiltration and extravasation
- identify actual and potential problems associated with giving medicines intravenously and discuss their prevention and management
- identify the correct process and procedures for the disposal of equipment and hazardous substances
- explain the actions to take in the event of an error or adverse incident associated with administering medicines intravenously, regardless of whether this was due to numerical, manual or technological error.

3. References and further reading

- Beaney, Alison M; Black, Ann, (2012) Preparing injectable medicines safely, *Nursing Times* 108. 3 (January 17, 2012): 20-23.
- British Medical Association (2008) *BNF for children 2008: the essential resource for clinical use of medicines in children*, London: BMJ Publishing Group.
- Casey AL and Elliott SJ (2007) Infection risks associated with needleless intravenous access devices, *Nursing Standard*, 22(11), pp.38-44.
- Colligan, Lacey; Bass, Ellen J (2012) Interruption handling strategies during paediatric medication administration. *BMJ Quality and Safety* 21. 11 (November 2012): 912-917.
- Cummings, K. and McGowan, R. (2011) 'Equipment safety; medication errors prevention and control'. *Nursing*, 41(3): 58-59.
- Department for Education and Skills (2005) *Common core of skills and knowledge for the children's workforce*, London: DfES.
- Department of Health (1999) *Agenda for Change: modernising the NHS Pay System* HSC 1999/227, London: DH.
- Department of Health (2009) *Reference guide to consent for examination or treatment*. London: DH.
- Department of Health (2001b) *Seeking consent: working with children*, London: DH.
- Department of Health (2001c) *Building a safer NHS for patients: implementing an organisation with a memory*, London: DH.
- Department of Health (2003a) *Getting the right start: National Service Framework for Children. Standards for hospital services*, London: DH.
- Department of Health (2003b) *Winning ways: working together to reduce health care associated infection in England*, London: DH.
- Department of Health (2004a) *Building a safer NHS: improving medication safety*, London: DH.
- Department of Health (2004b) *National Service Framework for children, young people and maternity services: medicines for children and young people (Standard 10)*. London: DH.
- Department of Health (2004c) *National Service Framework for children and young people who are ill*, London: DH.
- Department of Health (2004d) *The NHS Knowledge and Skills Framework (KSF) and development review process*, London: DH.
- Department of Health (2008) *A high quality workforce: NHS next stage review*, London: DH.
- Department of Health (2009) *Healthy lives, brighter futures – the strategy for children and young people's health*, London: DH.
- Department of Health (2012) *Children and Young people's Health Outcomes Forum report – www.gov.uk/government/uploads/system/uploads/attachment_data/file/216852/CYP-report.pdf* (accessed 10 June 2013) (Web).
- Department of Health *Improving Children and Young People's Health Outcomes: a system wide response www.gov.uk/government/uploads/system/uploads/attachment_data/file/214928/9328-TSO-2900598-DH-SystemWideResponse.pdf* (accessed 10 June 2013) (Web).
- Department of Health *New national pledge to improve children's health and reduce child deaths. Better health outcomes for children and young people www.gov.uk/government/news/new-national-pledge-to-improve-children-s-health-and-reduce-child-deaths* (accessed 10 June 2013) (Web).
- Dyer L, Furze C, Maddox C, and Sales R (2006) 'Administration of medicines in practices', in Trigg E and Mohammed TA (editors) *Practices in children's nursing: guidelines for hospital and community (2nd edition)*, London: Churchill Livingstone Elsevier.
- Goulding, C. and Bedard, M. (2015) 'Safety implications of the dose change alert function in smart infusion pumps on the administration of high-alert medications'. *Canadian Journal of Critical Care Nursing*. 26(4): 23-27.
- Health and Safety Executive (2002) *Control of substances hazardous to health*, London: HSE.
- Helder, O. K.; Kornelisse, R.F.; Reiss, I.K.M. and Ista, E. (2016) 'Disinfection practices in intravenous drug administration'. *American Journal of Infection Control*. 44(6), pp.721-723

- Henderson N (1998) Anaphylaxis, *Nursing Standard*, 12(47), pp.49-55.
- Holliday L and Kierulff C (2008) 'Administration of medicines', in Kelsey J and McEwing G (editors) *Clinical skills in child health practice*, London: Churchill Livingstone Elsevier.
- Infection Control Nurses Association (2003) *Guidelines for preventing intravascular catheter-related infection*, London: ICNA.
- Ingram P and Lavery I (2005) Peripheral intravenous therapy, *Nursing Times*, 101(8), pp. 59-62.
- Ingram P and Lavery I (2005) Peripheral intravenous therapy: key risks and implications for practice, *Nursing Standard*, 19(46), pp.55-64.
- Joanna Briggs Institute (2008) Management of peripheral intravascular devices: *evidence based best practice information sheets for professionals*, Adelaide: JBI. Available from www.joannabriggs.edu.au
- Jackson A (1998) Infection control – a battle in vein: infusion phlebitis, *Nursing Times*, 94 (40), pp.68-71.
- Kanneh, A.(2011) Adverse drug reactions: 'six rights' to ensure best practice for children. *Nursing Children & Young People* 23. 5 (June 2011): 24-27.
- Kayley J, Bravery K and Dougherty L (2006) Strategies to reduce the risk of needle and sharps injuries, *Nursing Times*, 102(10), pp.30-32.
- Kayley, J. (2008) Effective practice in community IV therapy. *British Journal of Community Nursing* 13. 7 (July 2008): 323-328.
- Keeling, S; Burfield, R; Proudlove, C. (2010) The Injectable Medicines Guide website. *British Journal of Nursing* 19. 19 (October 28, 2010): S25-S28.
- Kilpatrick, Claire; Murdoch, Heather; Storr, Julie (2012) Importance of hand hygiene during invasive procedures. *Nursing Standard* 26. 41 (June 13, 2012): 42-46.
- Lapham R and Agar H (2009) *Drug calculations for nurses: a step by step approach*, London: Arnold.
- Lavery I and Ingram P (2006) Prevention of infection in intravenous devices, *Nursing Standard*, 20(49), pp.49-56.
- Lloyd M, Urquhart Law G, Heard A and Kroese B (2008) When a child says 'no': experiences of nurses working with children having invasive procedures, *Paediatric Nursing*, 20(4), pp.29-34.
- Looper, K. ; Winchester, K.; Robinson, D.; Price, A.; Langley, R.; Martin, G.; Jones, S.; Holloway, J.; Rosenberg, S. and; Flake, S. (2015) 'Best Practices for Chemotherapy Administration in Pediatric Oncology: Quality and Safety Process Improvements'. *Journal of Pediatric Oncology Nursing* 33(3), pp.165-172.
- MacQueen, S. Bruce, and Gibson, F. (eds.) (2012) *The Great Ormond Street Hospital manual of children's nursing practices*. Oxford: Wiley Blackwell.
- MacQueen S (2005) The special needs of children receiving intravenous therapy, *Nursing Standard*, 101(8), pp.59-64.
- McCartney, P. (2014) "Evidence for Practice With Smart Infusion Pumps." Evidence for practice with smart infusion pumps. *The American Journal of Maternal Child Nursing*, 39(4): 270-270.
- Millar A, Hughes D, Kerr, Duncan E and Logan M (2006) The safe preparation of injections in near patient areas, *Hospital Pharmacist*, 13(4), pp.128-130.
- Morris R (2006) Intravenous drug administration: a skill for student nurses, *Paediatric Nursing*, 18(3), pp.35-38.
- National Institute for Health and Care Excellence (2015) *Intravenous fluid therapy in children and young people in hospital*. London: NICE.
- National Patient Safety Agency (2004) *Seven steps to patient safety: full reference guide*, London: NPSA.
- National Patient Safety Agency (2004a) *Right patient – right care*, London: NPSA.
- National Patient Safety Agency (2004b) *Safer practice notice 01: improving infusion device safety*, London: NPSA. Available from www.npsa.nhs.uk

- National Patient Safety Agency (2007d) *Promoting safer use of injectable medicines: a template standard operating procedure for prescribing, preparing and administering injectable medicines in clinical areas*, London: NPSA.
- National Patient Safety Agency (2007) *Promoting safer use of injectable medicines – patient safety alert*, London: NPSA.
- National Patient Safety Agency (2007a) *Safer practice notice 24: standardising wristbands improves patient safety*, London: NPSA.
- National Patient Safety Agency (2007b) *Safety in doses: medication safety incidents in the NHS*, London: NPSA.
- National Patient Safety Agency (2007c) *Work competence statement: injectable medicines competence 2*, London: NPSA.
- National Patient Safety Agency (2007d) *Work competence statement: injectable medicines competence 3*, London: NPSA.
- National Patient Safety Agency (2008) *Rapid response report: risks with intravenous heparin flush solutions*, London: NPSA.
- NHS Education for Scotland (2004) *Transferring the skills: quality assurance framework for venepuncture, cannulation and intravenous therapy (draft)*, Edinburgh: NES.
- NHS Scotland (2002) *Good practice statement for the preparation of injections in near-patient areas including clinical and home environments*, Edinburgh: TSO.
- NHS Scotland (2006) *Good practice statement for the preparation of injections in near-patient areas, including clinical and home environments*, Edinburgh: TSO. Available from www.scotland.gov.uk
- NHS Litigation Authority (2008) *Risk management standards for acute trusts*, London: NHSLA.
- Niemann, D. ; Bertsche, A.; Meyrath, D.; Koepf, E. D; Traiser, C.; Seebald, K.; Schmitt, C. P.; Hoffmann, G. F. Haefeli, W. E. and Bertsche, T. (2015) 'A prospective three-step intervention study to prevent medication errors in drug handling in paediatric care'. *Journal of Clinical Nursing*. 24 (1-2), pp.101-114.
- Nursing and Midwifery Council (2007) *Guidelines for records and record-keeping*, London: NMC.
- Nursing and Midwifery Council (2008a) *Standards for medicines management*, London: NMC.
- Nursing and Midwifery Council (2015) *The Code: Professional standards of practice and behaviour for nurses and midwives*. London: NMC.
- Paul, S; Whibley, J; John, S (2011) Challenges in paediatric prescribing. *Nurse Prescribing* 9. 5 (May 2011): 220-226.
- Pengelly T (2008) 'The use of calculations in the administration of medicines', in Kelsey J and McEwing G (editors) *Clinical skills in child health practice*, London: Churchill Livingstone Elsevier.
- Porat, N; Bitan, Y; Shefi, D. (2009) Use of colour-coded labels for intravenous high-risk medications and lines to improve patient safety: *Quality & Safety in Health Care* 18. 6 (December 2009): 505-509.
- Pratt RJ, Pellowe C, Wilson JA, Loveday HP, Harper PJ, Jones SRLJ, McDougall C and Wilcox MH (2007) Epic 2: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England, *Journal of Hospital Infection*, 655 (supplement), pp. S1-S64.
- Quinn C (2000) Infusion devices: risks, functions and management, *Nursing Standard*, 4(26), pp.35-41.
- Quinn C. (2008) 'Intravenous flow control and infusion devices', in Dougherty L and Lamb J (editors) *Intravenous therapy in nursing practice* (2nd edition), Oxford: Blackwell Publishing.
- Roach MS (1992) *The human act of caring*, Ottawa: Canadian Hospital Association.
- Resuscitation Council UK (2005) *The emergency medical treatment of anaphylactic reactions for first medical responders and for community nurses*, London: Resuscitation Council.
- Royal College of Nursing (2017) *Principles of Consent: guidance for nursing staff*, London: RCN.

Royal College of Nursing (2017) *Three steps to positive practice*, London: RCN.

Royal College of Nursing (2013) *Guidance to support the implementation of the Health and Safety (Sharp instruments in Healthcare Regulation)*. London:RCN.

Royal College of Nursing (2013) *Competences: an education and training competence framework for capillary blood sampling and venepuncture in children and young people*, London: RCN.

Royal College of Nursing (2012) *Essential practice for infection prevention and control: guidance for nursing staff*, London: RCN.

Royal College of Nursing (2010) *Competences: an education and training competence framework for administering medicines intravenously to children and young people*, London: RCN.

Royal College of Nursing (2010) *Competences: an integrated competence framework for training programmes in the safe administration of chemotherapy to children and young people*, London: RCN.

Royal College of Nursing (2010) *RCN standards for infusion therapy*, London: RCN.

Royal College of Nursing (2010) *Restrictive physical intervention and therapeutic holding in children and young people: guidance for nursing staff*, London: RCN.

Royal College of Nursing (2009) *Needlestick injuries – the point of prevention*, London: RCN.

Royal College of Nursing (2009) *The recognition and assessment of acute pain in children: implementation guide* London: RCN.

Schreiber, S. ; Zanchi, C.; Ronfani, L.; Delise, A.; Corbelli, A.; Bortoluzzi, R.; Taddio, A. and Barbi, E. (2015) 'Normal saline flushes performed once daily maintain peripheral intravenous catheter patency: a randomised controlled trial'. *Archives of Disease in Childhood*. 100 (7), pp700-703.

Shawyer V, Copp A and Dobryevic J (2007) Nursing students and the administration of IV drugs, *Nursing Times*, 103(4), pp.32-33.

Skills for Health (2004) *Children's national workforce competence framework guide*, London: SfH.

The Royal Marsden Hospital (2011) 'Drug administration: delivery (infusion devices)', in Dougherty L and Lister S (editors) *The Royal Marsden Hospital Manual of Clinical Procedures* (7th edition), Chichester: Wiley Blackwell.

Tim JC, Adams J and Elliott TSJ (2003) Healthcare workers' knowledge of inoculation injuries and glove use, *British Journal of Nursing*, 12(4), pp.215-222.

Wilson J (2001) *Infection control in clinical practice (2nd edition)*, London: Baillière Tindall.

4. Online resources

- Action for Sick Children
www.actionforsickchildren.org
- ANTT guidelines
www.antt.org.uk
- British National Formulary for Children
www.bnf.org/bnf/index.htm
- BMJ Learning
E-learning module 'Safe use of injectable medicines'
www.learning.bmj.com
- Department for Education
www.dfe.gov.uk
- Department of Health (England)
www.gov.uk/dh
- Department of Health, Social Services and Public Safety, Northern Ireland
www.health-ni.gov.uk
- Evidence-based Practice in Infection Control [EPIC 2]
www.ncbi.nlm.nih.gov/pubmed/11161888
- Hand hygiene (Scotland)
www.washyourhandsofthem.com
- Health and Safety Executive
www.hse.gov.uk
- Health Care Standards Unit
www.hcsu.org.uk
- Infection Prevention Society
www.ips.uk.net
- Joanna Briggs Institute
www.joannabriggs.org
- National Association of Hospital Play Staff
www.nahps.org.uk
- National Patient Safety Agency
www.npsa.nhs.uk
- NHS Education for Scotland
www.nes.scot.nhs.uk
- NHS Evidence
www.evidence.nhs.uk
- NHS Litigation Authority
www.nhsla.com
- Northern Ireland Patient Safety Forum
www.publichealth.hscni.net/directorate-nursing-and-allied-health-professions/hsc-safety-forum
- Northern Ireland Practice and Education Council for Nurses and Midwives
www.nipec.n-i.nhs.uk
- NHS Scotland
www.scot.nhs.uk
- NHS Wales
www.wales.nhs.uk
- Nursing and Midwifery Council
www.nmc-uk.org
- Royal College of Nursing
www.rcn.org.uk
- Royal College of Paediatrics and Child Health
www.rcpch.ac.uk
- Skills for Health
www.skillsforhealth.org.uk
- UK Health and Safety legislation
www.coshh-essentials.org.uk
- Vascular access and infusion related policies and guidelines (Health Service Executive Republic of Ireland)
www.ivpolicy.com
- Venepuncture and Cannulation: ebook by Sarah Phillips, Mary Collins and Lisa Dougherty
<https://itunes.apple.com/gb/book/venepuncture-cannulation/id426639682?mt=11>

Notes

The RCN represents nurses and nursing, promotes
excellence in practice and shapes health policies

RCN Online
www.rcn.org.uk

RCN Direct
www.rcn.org.uk/direct
0345 772 6100

Published by the Royal College of Nursing
20 Cavendish Square
London
W1G 0RN

020 7409 3333

November 2017
Publication code 006 302

