LEARNING MATTERS

ISSUE 17
JUNE 2021

## IN THIS EDITION



Link below to previous Learning Matters:
Learning Matters Newsletters | HSC Public Health Agency (hscni.net)

**Welcome to issue 17 of the Learning Matters Newsletter. Health and Social Care in Northern Ireland endeavours to provide the highest quality service to those in its care. We recognise that we need to use a variety of ways to share learning therefore the purpose of this newsletter is to complement the existing methods by providing staff with short examples of incidents where learning has been identified.**

HSC Health and Social Care

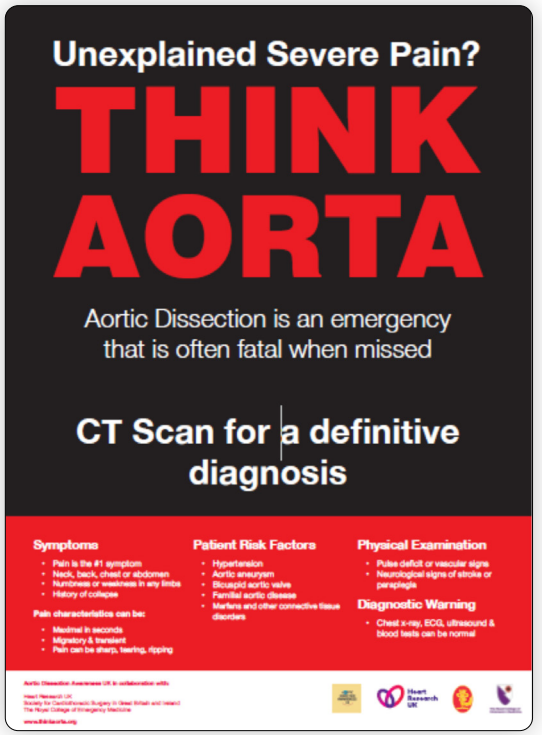
QUALITY 2020

# THINK AORTA: Aortic Dissection is an emergency that is often fatal when missed

## Summary of Event

### Case 1

A patient attended the Emergency Department (ED) with a 24-hour history of vomiting and **epigastric pain radiating to the back**. They were found to be tender in the epigastrium on examination. An electrocardiogram (ECG) showed no acute changes compared to a previous ECG and blood tests indicated a raised white cell count and C-reactive Protein (CRP), with two normal troponin results. A chest X-ray was interpreted as normal. The patient was discharged home with a diagnosis of viral gastroenteritis but later suffered a cardiac arrest in the ED waiting room, while waiting for transport home. Cardiopulmonary Resuscitation (CPR) was commenced immediately and they were transferred to the resuscitation room. All reversible causes were considered however resuscitation was unsuccessful. The case was referred to the coroner and the cause of death was identified as **haemothorax due to dissection of the thoracic aorta.**




### Case 2

A patient with a history of abdominal aortic aneurysm was brought by ambulance to ED complaining of **sudden onset lower back pain**. Observations were normal and they were triaged as Category 3 – to be seen within 1 hour. The ED was overcrowded at the time of the patient's presentation. Three hours after arrival, a doctor was asked to prescribe analgesia for the patient and noted the documented past medical history. They examined the patient and arranged an urgent Computerised Tomography (CT) angiogram to exclude a leak or dissection. This confirmed **a ruptured thoracic aneurysm**. The case was subsequently discussed with vascular and cardiothoracic surgeons and transferred to the appropriate hospital theatre by blue light ambulance for thoracic endovascular aortic repair.

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## KEY LEARNING

Aortic Dissection is a **time-critical, life threatening disease** that affects around 6 in 100,000 people. Untreated, it is usually **fatal**. Research has shown that a diagnosis of Aortic Dissection is considered in less than **half** of patients who arrive at the ED with the condition and that **one-third** of patients with Aortic Dissection are actively treated for a different, incorrect diagnosis.

Aortic dissection *typically* occurs in men over 50 years old with pain being the #1 symptom in the neck, back, chest or abdomen. There may also be numbness or weakness in any limbs and/or a history of collapse.

Pain characteristics can be maximal in seconds; migratory and transient and is described as being sharp, tearing or ripping but importantly may present in a variety of atypical ways including, renal failure, limb ischaemia and epigastric pain.

- Although uncommon, aortic dissection should be part of the differential diagnosis with any chest pain presentation. See NICE Guidance CG95: Recent-onset chest pain of suspected cardiac origin: assessment and diagnosis).
- Use of a clinical decision tool such as the aortic dissection detection risk score (ADD-RS) is validated and has a high sensitivity. Addition of d-dimer is currently not validated.
- **CT Scan for a definitive diagnosis**: Early consideration should be given to CT angiogram if dissection is suspected – Chest x-ray, ECG, ultrasound & blood tests **can be normal** and are therefore **not adequate** to rule out the diagnosis and **should not delay CT imaging.**
- Counselling high risk patients, such as those under aortic surveillance or with genetic conditions like Marfan's Syndrome, could aid in earlier presentation and diagnosis. Medical history including previous imaging should be sought from records if not available from the patient.

### Resources/Useful websites:

The **THINK AORTA** campaign aims to raise awareness and improve diagnosis of Aortic Dissection worldwide. Access to information on the campaign to improve Aortic Dissection awareness and education including free **THINK AORTA** Posters, Leaflets, Screensavers, Podcasts, Videos, and Teaching and Learning Events can be found below:

THINK AORTA website | THINK AORTA Poster | THINK AORTA Patient Leaflet | THINK AORTA Screensaver

**Aortic Dissection Awareness UK & Ireland** is the Patient Association for people affected by Aortic Dissection and their families.

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# Testicular Torsion

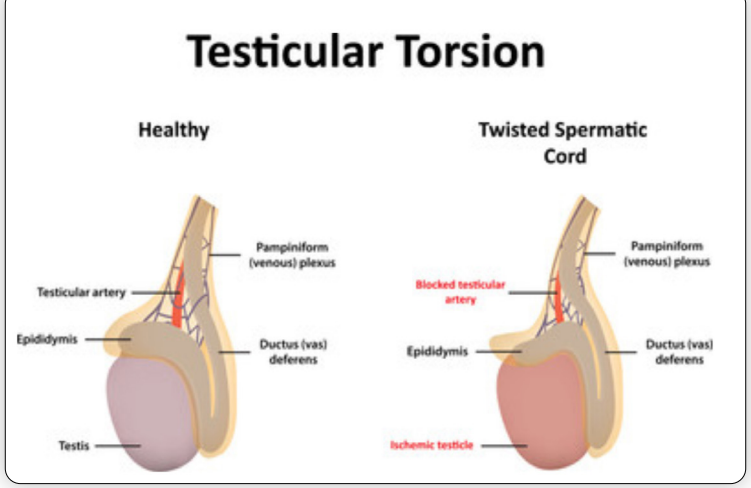
A patient presented to the Emergency Department (ED) with a one day history of left testicular swelling and pain. The examining doctor found a red, swollen, tender testicle with a palpable epididymis and a normal cremasteric reflex. He was diagnosed with epididymo-orchitis and given a 2 week supply of antibiotics. There was no differential diagnosis in the notes and **no safety netting advice** provided to the patient on discharge.

Two weeks later the patient re-presented to the ED with the same pain and swelling. The emergency physician identified the need for urology input but the urologist on call was reviewing another patient in a different hospital. On telephone discussion, as the symptoms were considered to be in keeping with ongoing epididymo-orchitis, the patient was given a further 2 weeks of antibiotics and advised to attend their GP for consideration of an ultrasound scan if symptoms continued.

**Four weeks** after the initial presentation, the patient returned to the ED with a GP letter suggesting a possible torsion. The reviewing doctor again discussed the patient with the urologist. They felt it was likely a slow healing epididymo-orchitis but advised a red flag referral to the urology clinic to rule out other pathology.

Six weeks after the onset of symptoms, the patient was reviewed at the urology testicular clinic and ultrasound was performed which showed **no Doppler flow to the left testis**. The patient was taken to theatre that evening where a left orchidectomy was performed, due to **missed testicular torsion**.

Although unlikely, the patient's testis may have been salvageable at initial presentation; though symptoms had been present for over 24 hours at that point however earlier recognition could have avoided the subsequent on-going pain and distress.




## KEY LEARNING

- There is a NICE guideline for history, examination and management of scrotal pain and swelling (revised in March 2021) available at Scrotal pain and swelling | Topics A to Z | CKS | NICE
- There should be a **low threshold** for suspecting testicular torsion in a boy or man presenting with acute, painful scrotal swelling, particularly if he is younger than 30 years of age.
- History should include time of onset, previous episodes of self-limiting pain which could be episodes of self-resolving torsion, any trauma and associated symptoms.
- Examination of the testicles should be performed in all males presenting with abdominal pain.
- There is no definitive feature that can rule out torsion.
- If testicular torsion is suspected, **urgent urology review** should be requested; if not available, discuss with senior medical staff.
- The testicular survival rate decreases rapidly after **6 hours** of onset of torsion.

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# Interruption of high flow nasal oxygen (AIRVO 2™) during transfer

## Summary of Event

A Serious Adverse Incident occurred when a patient presented to the Emergency Department (ED) in respiratory failure and was subsequently commenced on high flow nasal oxygen (HFNO) via AIRVO 2™.

The patient did not wish to be intubated should this be required and Do Not Attempt Resuscitation (DNAR) form was completed

Following a prolonged stay in the ED the patient was transferred to the ward for ongoing care, however they were transferred **whilst on AIRVO 2™** which is against the manufacturer's advice, as there is **no supplemental oxygen** supplied when the machine is disconnected from the mains power supply. Shortly after arriving on the ward the patient collapsed and passed away.

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## KEY LEARNING

- In April 2020 a **National Patient Safety Alert (NPSA)** was issued on the risk of patient harm caused by the **interruption** of high flow nasal oxygen (HFNO) during transfer. Full details of the NPSA alert and subsequent Department of Health (DoH) circular are available below:

  National Patient Safety Alert: Interruption of high flow nasal oxygen during transfer

  DoH Circular HSC (SQSD) 10/20 Interruption of high flow nasal oxygen during transfer

- The alert highlights that some HFNO delivery devices have a transport mode, but **most require** mains power and **will not deliver oxygen during transfer**, unless attached to a compatible uninterruptible power supply (UPS) device. NHS England and NHS Improvement identified **four deaths** in a recent two-year period from interrupted HFNO during patient transfer; further reports described hypoxia, cyanosis, collapse and respiratory arrest.

- The alert asks providers to add clear labels to HFNO delivery devices to make staff aware that even brief interruptions to mains power supply could lead to respiratory and cardiac arrest; and that HFNO in any emergency department or short stay unit must **not** be started without a plan for how to transfer the patient onwards. Where a UPS is used, action must be taken on the storage and maintenance of UPS devices to ensure they are ready for use and staff are aware of where to locate them.

**In summary:**

- Patients must **not be transferred** between wards/departments whilst receiving AIRVO 2™.
- Battery operated AIRVO 2™ units **must not be used** as they have insufficient duration of charge.
- A patient who requires HFNO via AIRVO 2™ for respiratory failure must be regarded as being **critically ill.** Safe transfer of these patients must be undertaken in line with a Standard Operating Procedure, a checklist and designated personnel. This must be the case irrespective of the patient's resuscitation status.

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# Safe Arterial Line Management

Image: Adobe Stock

## Summary of Event

A patient was brought in by ambulance to the Emergency Department (ED) following an out of hospital cardiac arrest. Return of spontaneous circulation (ROSC) was achieved by the Northern Ireland Ambulance Service (NIAS). Following various investigations and post resuscitation care in the ED, the patient was prepared for transfer to the ICU. Whilst in ED an arterial line was inserted by the Anaesthetic Doctor.

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The patient was transferred to ICU and two hours later it was noted that the patients' blood sugars were reading high, which was not in keeping with the clinical presentation of hypoxic brain injury. A review of the patient was immediately undertaken and at this point it was noted that the arterial transducer set had been set up **incorrectly** with **10% glucose**. This was immediately corrected with a new flush line being erected using 0.9% sodium chloride as per Trust policy. There was potential for this error to lead to **erroneous** blood glucose treatments, which if treated with insulin, could have led to hypoglycaemic brain injury. This error went unnoticed for 5 hours in total, whilst the patient was in the care of ED and ICU.

## What is already known about the problem?

Arterial lines are routinely used in critical care areas for sampling arterial blood to measure blood gases, glucose and electrolytes and for accurate continuous invasive blood pressure monitoring. Patients may be **harmed** if the wrong fluid is erected as the flush fluid in the arterial line and if the incorrect technique is used when sampling an arterial blood gas from the line. The flush fluid is used to maintain patency of the arterial line. The flush fluid in adult arterial lines should **always be 0.9% sodium chloride.** If the wrong flush fluid is attached to an arterial line, it can contaminate blood sampling and lead to erroneous results.

In 2008 the UK National Patient Safety Agency (NPSA) issued a Rapid Response Report (RRR) on '**problems with infusions and sampling from arterial lines**' which highlighted examples of patient harm resulting from glucose-containing flush infusions contaminating blood samples drawn from arterial lines, available here: Rapid Response Report: Problems with infusions and sampling from arterial lines

In 2012 The Medicines and Healthcare products Regulatory Authority (MHRA) issued a Drug Safety Update on 'Glucose solutions: false blood glucose readings when used to flush arterial lines'

Subsequently, in 2014 The Association of Anaesthetists of Great Britain and Ireland (AAGBI) published safety guidelines on Arterial line blood sampling: preventing hypoglycaemic brain injury.

These guidelines were produced as previous experience had shown that compliance with the NPSA RRR was not sufficient to prevent injury or death from a contamination error. The guideline makes detailed recommendations on the prescription, checking and administration of arterial line infusions in adult practice and other key recommendations about the storage, arterial pressure monitoring and sampling systems and techniques. They conclude by making recommendations about glucose monitoring and insulin administration.

In 2018 the PHA/HSCB issued a Safety and Quality Reminder of Best Practice Guidance Letter on Arterial Line Blood Sampling: preventing hypoglycaemic brain injury' following further serious adverse incidents related to this patient safety issue.

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## KEY LEARNING

**The following key points are taken from the guidance and recommendations to avoid iatrogenic hypoglycaemic brain injury:**

- Hospital Trusts must have a policy that defines local procedures for arterial line use, including prescribing, administering and monitoring flush solutions and blood sampling technique.
- All staff involved in the insertion of, management of, or sampling from arterial lines must be appropriately trained and competent to deliver the standards set out in the policy, and performance against these standards should be regularly audited.
- **Sodium chloride 0.9%,** with or without heparin, should be the only solution used for adult arterial line infusion and flushing. The solution must be prescribed and documented as per local Trust policy.
- Arterial infusion lines must be clearly identifiable. Labels and colour differentiation are appropriate measures to achieve this.
- In clinical areas that use arterial lines, bags of sodium chloride 0.9% for use as an arterial line flush should be stored **away from fluids** for intravenous use so that the wrong solution cannot be inadvertently accessed.
- The arterial flush solution must be **independently** double-checked by a second practitioner before setting up and attaching to an arterial line and must be **counter signed by both practitioners**.
- All pressurising devices must be designed to permit **unimpaired inspection** of the contained flush infusion bag while in use. A fully transparent front panel is strongly recommended.
- The flush infusion bag must be independently double-checked **at least once** during each nursing shift and whenever nursing care of the patient is handed over. This double-check must include removal of the flush bag from its pressurising device.
- When an arterial line is used to take blood samples for measurement of blood glucose concentrations, a value that is unexpectedly high must trigger a medical review and a check of the blood sampling system for possible sample contamination error. The source of the blood sample should be checked to ensure no possibility of sample contamination. If this is not possible, a confirmatory sample must be drawn from the most appropriate alternative site.

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# Peripheral Extravasation Injury

## Summary of Event

A patient attended the Emergency Department for treatment of epileptic seizures which required a period of admission to the High Dependency Unit (HDU). The patient was discharged with a wound on the left forearm where a previous intravenous cannula had been sited. The wound had been dressed in hospital and required further dressing renewal on discharge. The District Nursing Service (DNS) did **not** receive a referral from the hospital for wound management.

A relative contacted the DNS who attended to the patient and provided ongoing wound care management, which involved the General Practitioner and Tissue Viability service. Five days following discharge from hospital the District Nurse assessed the wound as being **necrotic**. The patient was referred to a Plastic Surgeon for ongoing treatment and care.

### Cause of Necrotic Wound

Whilst in the ED the patient required an intravenous (IV) Phenytoin infusion. It transpired that the infusion had leaked into the surrounding tissues causing **extravasation**. The patient **had not been alert** at this point so was unable to communicate the discomfort that the extravasation would have caused. The patient was transferred to the HDU, however staff were not informed that a peripheral IV cannula, containing a Phenytoin infusion, had dislodged and leaked into the surrounding tissues. In the ED a further IV cannula had been secured in the right foot.

HDU staff documented the finding of a blood blister on the left forearm, 10cm x 5cm at the site of the dislodged cannula and an appropriate dressing was applied. Neither medical nor nursing staff were aware that the peripheral extravasation was due to the **phenytoin infusion** administered in ED. A review of the case found that the wound care plan was noncompliant. A wound care chart was not commenced on identification of the blood blister. In addition, an incident had not been submitted by ED staff; had this been done, it may have **alerted** the HDU staff, which in turn would have allowed identification of the peripheral extravasation due to Phenytoin.

Image: Adobe Stock

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## KEY LEARNING

### Extravasation

- Local guidelines for the management of extravasation should be followed where they exist or specialist advice sought.
- **Extravasation injury** follows leakage of drugs or intravenous fluids from the veins or inadvertent administration into the subcutaneous or subdermal tissue. It must be dealt with **promptly** to prevent tissue **necrosis**. Acidic or alkaline preparations and those with an osmolarity greater than that of plasma can cause extravasation injury; excipients including alcohol and polyethylene glycol have also been implicated. Cytotoxic drugs commonly cause extravasation injury.
- In addition, **older** and **very young** patients are at increased risk. Those receiving anticoagulants are more likely to lose blood into surrounding tissues if extravasation occurs, while those receiving **sedatives** or **analgesics** may not notice the early signs or symptoms of extravasation.

  *Ref: BNF Extravasation monograph Last Update: 07-Jul-2020; accessed online via Medicines Complete 11/06/2021*

### Phenytoin

- Phenytoin injection has a high pH and may cause **venous irritation** and **tissue damage** in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein, **monitoring** insertion site closely, using a recognised phlebitis scoring tool. The cannula **must** be resited at first signs of inflammation. Flush with sodium chloride 0.9% **before** and **after** administration. Monitor injection site **during and for 72 hours** following administration.

  *Ref: NHS Injectable Medicines Guide (Medusa) - phenytoin IV monograph - accessed online 11/06/2021*

### Management of extravasation

- Suspected extravasation requires immediate medical referral for specialist advice. Treatment depends on the nature of the offending substance. Hospital based clinical pharmacists or Medicines Information Pharmacists may be able to help with confirmation of the nature of the substance. The Regional Medicines and Poisons Information Service can be contacted Monday - Friday 9am-5pm

  **Regional Medicines and Poisons Information Enquiry Service Line : 028 9504 0558**
- All information related to an extravasation event should be documented in the patient's medical and nursing records and on the clinical incident reporting system.[1]
- Prior to discharge appropriate referrals to other services, such as District Nursing must be completed to ensure safe, high quality continuity of care.

1 The Royal College of Nursing. (2010). *Standards for infusion therapy | Infection prevention and control | Royal College of Nursing.* [online] Available at: https://www.rcn.org.uk/clinical-topics/infection-prevention-and-control/standards-for-infusion-therapy.

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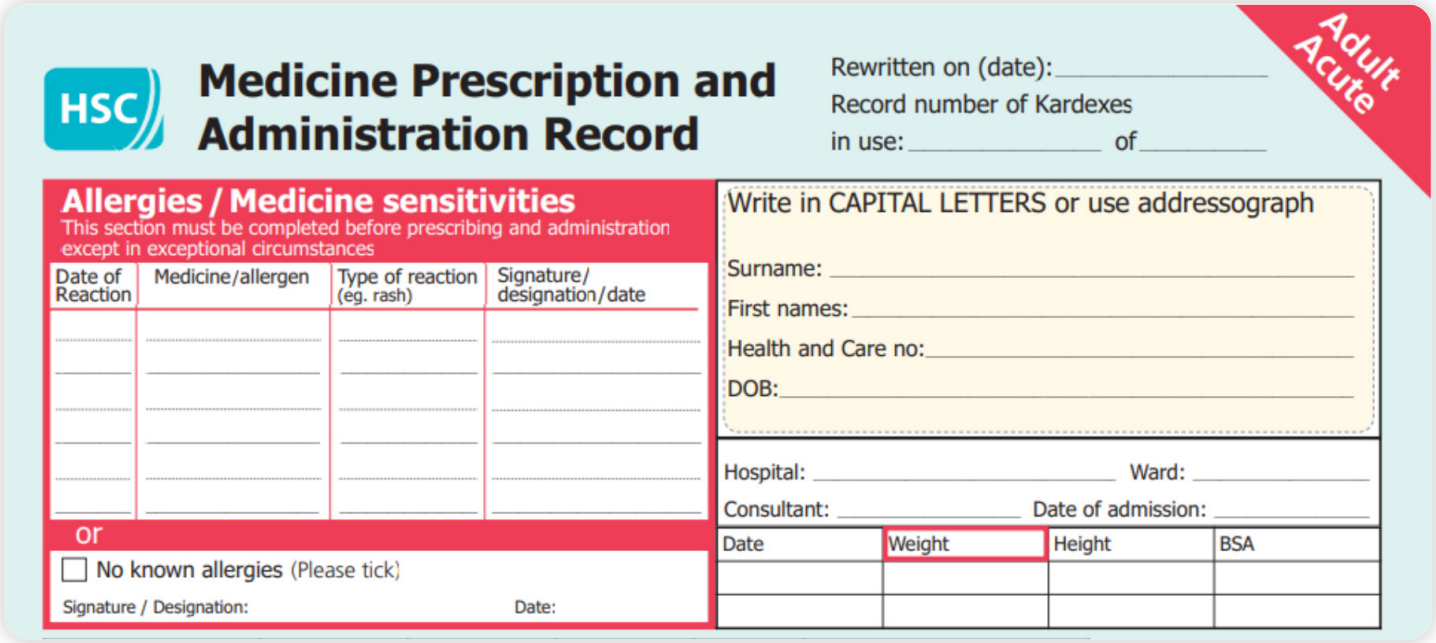
# Recording of Allergies and Medicine Sensitivities on the Medicine Prescription and Administration Record

## Summary of Event

A patient undergoing a cardiac procedure in hospital received morphine 2.5mg intravenously, despite having a previously well-known sensitivity to this medication. On this occasion the sensitivity had **not** been recorded on the 'Allergies/Medicine sensitivities' section of the Medicine Prescription and Administration Record. During the procedure the patient attempted to inform staff of their allergy status however this was impossible due to their inability to communicate clearly, as the patient's dentures had been removed prior to the procedure.



HSC

**Medicine Prescription and Administration Record**

Rewritten on (date): _____
Record number of Kardexes in use: _____ of _____

Adult Acute

**Allergies / Medicine sensitivities**
This section must be completed before prescribing and administration except in exceptional circumstances

| Date of Reaction | Medicine/allergen | Type of reaction (eg. rash) | Signature/ designation/date |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

or

☐ No known allergies (Please tick)

Signature / Designation: Date:

Write in CAPITAL LETTERS or use addressograph

Surname: _____
First names: _____
Health and Care no: _____
DOB: _____

Hospital: _____ Ward: _____
Consultant: _____ Date of admission: _____

| Date | Weight | Height | BSA |
|---|---|---|---|
| | | | |
| | | | |

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## KEY LEARNING

- All patients must have their allergy status checked on **admission** to hospital. The Northern Ireland Emergency Care Record (NIECR) can be used as a source of information to confirm a patient's allergy status. However, as it may also include contraindicated medicines, as well as allergy medicines, the information listed/not listed must be verified with a second source which may include the patient, the patient's carer or previous discharge letter.
- The Allergies/Medicine sensitivities section of the Medicine Prescription and Administration Record **MUST** be completed and checked **before** prescribing and administration except in exceptional circumstances.
- A blank allergies box does **not** mean that the patient has no reported allergies. All staff have a responsibility to ensure that the allergy box is completed.
- Patients' should be permitted to keep dentures or other communication aids in place, except in defined circumstances. If communication aids must be removed, healthcare staff must be fully aware of this and be vigilant if a patient is attempting to communicate. Healthcare staff must also have ability to use other communication techniques as and when required in this scenario.

**If you have any comments or questions on the articles in the newsletter please get in contact by email at learningmatters@hscni.net**

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