MINISTRY OF NATIONAL GUARD HEALTH AFFAIRS
KINGDOM OF SAUDI ARABIA

Quality & Patient Safety Newsletter

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IN THIS ISSUE

ABOUT THE NEWSLETTER

"By providing important and relevant information to healthcare providers, this Newsletter aims to enhance communication of quality and patient safety information, raise awareness of reported adverse events and maintain an ongoing link to all the medical departments of the National Guard Health Affairs (NGHA) facilities. "

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Insulin Safety: Mixing of insulins and the use of syringes

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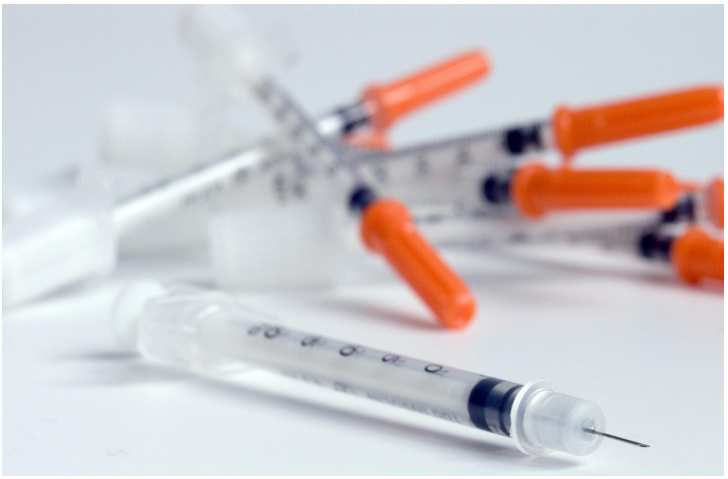
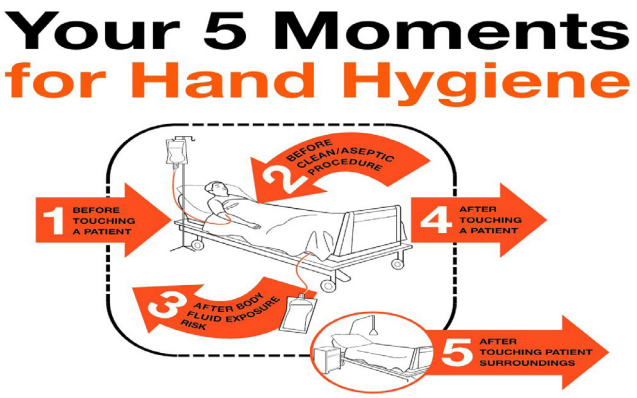


Administered by subcutaneous or intravenous injection, insulin products are frequently involved in medication errors in hospitals, and are classified as High Alert Medications; insulin medication errors have the potential to result in serious harm, including death.[1] Failure to provide an adequate amount of insulin may lead to hyperglycemia crisis and conversely the prescribing or administration of excessive insulin results in hypoglycemia that can lead to poor coordination and increase the risk of falls, seizures and coma. As detailed in the aforementioned QPS Newsletter volume 6 / issue 1 March 2014, in an effort to promote the safe use of insulin, a consensus document of practical recommendations for enhancing insulin-use safety in hospitals was published by the American Society of Health-System Pharmacists (ASHP).[2] This second article from the Center of Nursing Education Riyadh in the series for insulin safety, provides information on the availability of insulin within Saudi Arabia and focuses on the preparing and mixing of and administration of insulin using a syringe, considering the tenth recommendation for safe practice; education of health professionals who are responsible for the use of insulin. It also aims to align with inauguration of the National Guard Health Affairs Journey to Becoming a High Reliability Organization (HRO)[3] and is foremost a reminder for all healthcare professionals of the Joint Commission International Accreditation[4] (JCIA) six International Patient Safety Goals (ISPG), detailed in table 1 and the World Health Organization's 5 moments for Hand Hygiene[5,6] (figure 1)

Table 1

IPSG 1	Improve Accuracy of Patient Identification
ISPG 2	Improve Effective Communication
IPSG 3	Improve the Safety of High-Alert Medications
IPSG 4	Ensure Correct-Site, Correct-Procedure, Correct-Patient Surgery
IPSG 5	Reduce the Risk of Health Care–Associated Infections
ISPG 6	Reduce the Risk of Patient Harm Resulting from Falls

Figure 1



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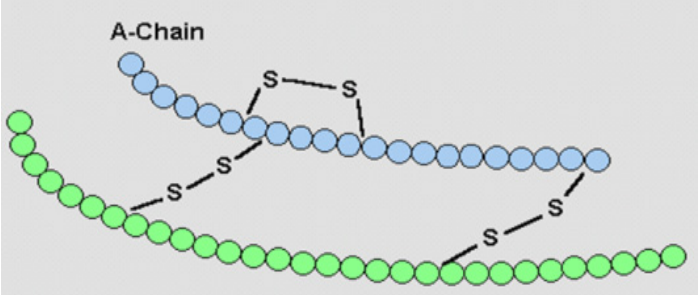
The insulin molecule
Figure 2



Insulin is a hormone produced exclusively by the pancreatic beta cells and is central to regulating carbohydrate and fat metabolism in the body. It consists of two polypeptide chains made of 51 amino acids arranged as a two chained molecule connected by two disulphide bridges (figure 2). The process by which insulin is released from beta cells is biphasic and occurs in response to changes in blood glucose concentration. Due to the protein properties of insulin it cannot be taken orally as the gastric juices within the stomach would destroy it, therefore, insulin is administered parenterally as replacement therapy in people with absolute (T1 diabetes mellitus) or relative insulin deficiencies (T2 diabetes mellitus), insulin is currently the main injectable option to treat diabetes.

Commercial availability of the first insulin in 1923 followed the successful administration to a 14 year old boy in the previous year[7] (figure 3). Over the last 80 years insulin has been refined and the molecular structure changed in an attempt to mimic the normal physiological insulin response to carbohydrate metabolism (figure 4 shows the molecular changes with insulin Aspart where there is substitution of proline with an aspartic acid residue). Within Saudi Arabia in 2007 the Saudi Food and Drug Authority (SFDA) was established. As with all FDAs, their objective is to ensure the safety, effectiveness, and availability of drugs for human usage and whilst newer therapies are available in a number of countries external to Saudi Arabia some have not yet reached the submission phase or gained authorization from the SFDA; it could be some time before our patients will gain access to more recently marketed medications such as ultra-long acting analogues.

Figure 3

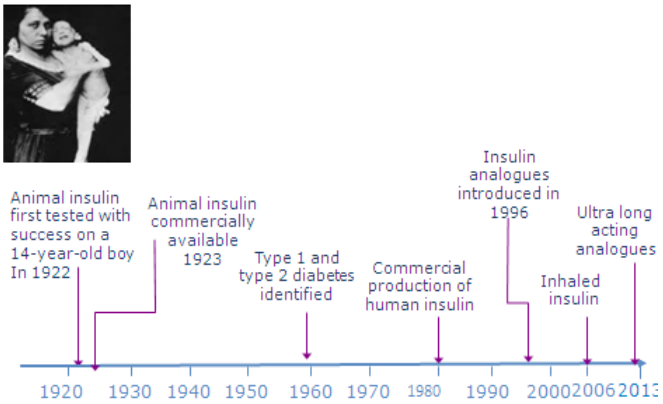
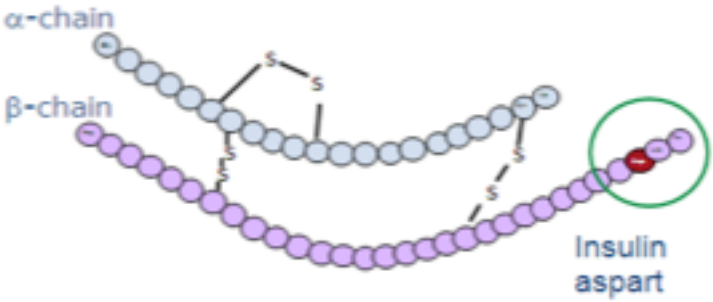


Figure 4



Types of insulin available (in Saudi Arabia NGHA)

- Human insulin
  - Short-acting e.g. Human Regular
  - Intermediate-acting e.g. Human Neutral Protamine Hagedorn (NPH)
  - Mixture of short and intermediate acting (biphasic) e.g. Human 70/30 mix

- Analogue insulin
  - Rapid-acting e.g. Insulin Aspart
  - Long-acting (basal insulin) e.g. Insulin Detemir or Lantus

A document with the full list of insulins with detailed information on licensing indications, time

action profiles was developed in 2013 for all clinical areas and can be found on the One Stop Resource at http://portal.ngha.med/ngha/smsc/Documents/Insulin_Therapy_used_in_NGHA.pdf[8]

The mixing of NPH and Human Regular is often practiced within the organization however, it is not recommended to dilute or mix Insulin Detemir or Lantus with any other insulin or solution as the pharmacokinetic and or pharmacodynamic properties may be altered in an unpredictable manner.[9,10]

Equally, manufacturers do not recommend removing insulin from any cartridge or pen device unless an emergency exists and the pen is malfunctioning. Large air pockets or bubbles left behind in the cartridge after aspiration of some of the insulin with a needle can result in dosing errors or in subcutaneous injection of air if the pen is used to deliver a subsequent dose[11]

Mixing of insulins

Equipment required

- Vials of insulin
- Alcohol swab
- Insulin syringe with needle

Insulin care begins with storage and should be refrigerated according to the manufacturers' recommendations between (2º - 8 ºC); it should not be exposed to extreme temperatures and a visual check should be made prior to administration:

- Rapid and short-acting insulin should look clear. There should be no cloudiness, particles floating in the liquid, nor a change in color.
- Intermediate-acting insulin should look cloudy/milky when re-suspended and there should be no clumps floating around in the liquid or particles stuck to the sides of the vial.

If any of these signs are seen in either vials of insulin, safely discard the vial.

Preparation

Wash your hands with soap and water and dry thoroughly.

Take the vial of insulin between your hands and roll it gently back and forth. This is especially important for cloudy insulins where thorough mixing of the contents is required. Do not shake an insulin vial, it is a fragile medication and could be damaged by rough handling.

Confirm from the physician's order for the number of units of insulin that will be administered. Any error-prone abbreviations or symbols identified in the prescription as per APP 1427-16 Error-Prone Abbreviations, Symbols and Dose Designations, such as the use of 'u' instead of units or SC instead of subcut or subcutaneously must be rectified prior to the medication being drawn and reported within the Safety Reporting System (SRS) of NGHA.

The safe administration includes verifying the following:

- medication with the prescription or order;
- time and frequency of administration with the prescription or order;
- dosage amount with the prescription or order;
- route of administration with the prescription or order;
- identity of the patient - Proper patient identifiers as per APP 1430-16 Patient Identification (e.g. compare arm band plus positive verbal verification by the patient asking to state full name)

Given the High Alert Medication designation which insulin carries, an independent double checking is required for insulin administered via the intravenous (IV) route

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(APP 1429-02 Look-Alike, Sound - Alike & High Alert Medications); the procedure in which two healthcare professionals separately check (alone and apart from each other, then compare results) each component of prescribing, dispensing, and verifying the high-alert medication before administering it to the patient.

Steps to mixing[12,13]

Open an alcohol wipe and swab the tops of the insulin vials. If the vial has not been opened yet, remove the protective cover using upward pressure and write the beyond-use date (BUD) on the label. As per APP 1434-08 Beyond-Use Date/Time Assignment, Appendix A, the BUD for an insulin vial is 28 days from the day it was opened, unless the manufacturer specifies otherwise, providing that there is no obvious contamination and that normal precautions have been taken. Check the expiry date before drawing up.

Pick up the syringe and pull the cap straight off without touching the needle.

Step 1

Pull the plunger of the syringe back and draw the required number of insulin units as air into the syringe. Insert the needle through the rubber stopper of the NPH (cloudy insulin) insulin vial and push the plunger to inject the air into the vial. This helps to draw the insulin out easier because the air displaces the volume of the insulin and equalizes the pressure in the vial. Do not draw back the insulin at this time. (figure 5)

Step 2

Using the same syringe, pull back the plunger to the number of units of insulin prescribed for the Human Regular (clear insulin). Place the vial of clear insulin on a flat surface, and push the needle through the rubber top. Press down on the plunger to push air into the vial. Leave the needle in the vial.

Step 3

Turn the clear insulin vial and syringe upside down, holding the syringe and needle in place. Make sure the tip of the needle is in the insulin solution. Pull back the plunger drawing insulin into the syringe until the prescribed number of units of clear insulin is reached. Check for air bubbles in the syringe and remove by gently tapping the syringe. Having air space instead of insulin may lead to an incorrect dose. Re-check the dose again.

Step 4

Without moving the plunger, insert the needle into the inverted second vial of insulin (cloudy insulin) and withdraw the dose. Again, check that the correct dose has been withdrawn. The syringe will now contain two types of insulin. It is important not to pull past the total number of units. Once the insulins are mixed in the syringe, you cannot push any of the insulin back into the cloudy insulin vial. If you draw too much insulin, throw away the syringe and start again.

Figure 5

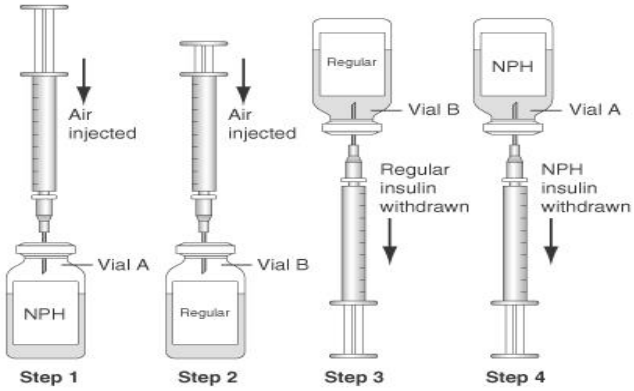

Figure 8: Drawing 2 types of insulin into syringe.

Administration

Remember the 5 moments of hand hygiene!

Tips for injecting using a syringe

- Wait until the alcohol from the swab has dried completely on the skin before injecting.
- Inject at a 45 - 90° angle using a short needle.
- Penetrate the skin quickly.
- Inject slowly and ensure the plunger has been fully depressed.
- Inject the insulin when it is at room temperature.
- Never use the needle more than once.
- Do not inject through clothing.

Conclusion

The essence of sharing knowledge and evidence-based practice across disciplines is paramount in forging

forward as a HRO; putting patients at the heart of the organization. This article has been prepared to promote the sharing of knowledge for the correct mixing of insulins in a syringe.

Mini Injectable Quiz

A. At what angle should the needle be inserted for subcutaneous injections with an insulin syringe?

B. How long must you wait post injection before you could remove the needle?

C. When mixing insulins into a syringe, which insulin is drawn into the syringe first, Clear or cloudy?

D. Can Insulin Detemir or Lantus be mixed with other insulins?

E. Is 'subcut' an appropriate abbreviation used for prescribing?

Answers:

A. 45 or 90 degrees
B. 10 seconds
C. Clear
D. No
E. Yes

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A SAFE NURSE always ensures SAFETY FIRST and advocates for MEDICATION SAFETY

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Introduction

The issue of medication errors (MEs) is not a new discovery, a study 50 years ago (Barker et al, 1962) demonstrated that MEs were a much bigger problem than anyone realized and that on a daily basis patients are harmed by healthcare providers (HCP) that were supposed to help them. As a high risk for patients in hospital, MEs remains a significant contributor to patient harm (Phillip et al, 2007; IOM, 2006; Kelly et al, 2006; Leape et al, 2005). The Institute of Medicine's (IOM) first quality Chasm report; ***To Err Is Human: Building a safer Health System,*** stated that MEs were a significant cause of morbidity and mortality and cited that nearly 100,000 deaths, one million injuries, and 17 billion dollars annually were attributable to MEs (IOM, 1999). In addition, that a hospital patient is subject to at least 1 medication error per day, and that the actual error rates were considerably higher as not all detected errors were reported (IOM, 2007). Further studies notified that up to 30% of patients will experience a harmful occurrence during a hospitalization (Fowler et al, 2008; Griffin and Classen, 2008) and the influential study by Wilson et al (1999) found that human error was a significant factor with 81% of harmful occurrences associated with one or more human factors, such as lack of knowledge, care or attention. Vincent et al (2001) also labelled 48% of these harmful occurrences as ***preventable***, which were supported by other studies (Regenbogen et al, 2007; Rex et al, 2000).

In the Harvard medical practice study, Leape and colleagues (1991) found that 1 in 4 of these harmful occurrences was found to be the result of ***negligence*** and 58% were deemed to be ***preventable***. Yet again, some of the most common types of harmful occurrences that resulted in patient mortality involved MEs; which included ***documented known allergy status.*** Supplementary reports stated that 1 in 10 patients experience medication related harm, similarly involving known allergy status and despite awareness of the dilemma, medication errors still occurred with astonishing frequency (Rothchild et al, 2005; Barker et al, 2002; Bond et al 2002). The Joint Commission International (JCI) publishes revised National Patient Safety Goals each year and these goals assist health care organizations to improve patient safety. A minimum of 3 patient safety goals focus on improving medication administration and patient identification (JCI, 2014). However, despite more than 12 years after the first IOM report, ***To Err is Human,*** MEs continue to occur and compromise patient safety in hospitals (Phillip 2007; IOM, 2006; Kelly et al, 2006; Leape 2005).

Medication errors

MEs are ***defined as any preventable event*** that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient or consumer. These potentially harmful events may be related to professional practice, health care products, procedures and systems. This includes, prescribing; order communication; product labelling; packaging; and nomenclature; compounding; dispensing; distribution; administration; education; monitoring and use (NCCME, 2014). Essentially, it is ***a failure*** in the treatment process that leads to or has the potential to lead to ***patient harm*** and can be classified according to whether they are mistakes, slips or lapses (Reason, 1990). Types of MEs may include wrong patient, wrong drug, wrong dose, wrong frequency, wrong route, ***wrong known allergy status*** (Burke, 2005; Reason, 1990). The phenomenon of MEs are among the most common types of health care related errors and one of the ***most preventable*** causes of iatrogenic patient harm (Phillip, 2007; IOM, 2006; Rothchild, 2005) and can be considered a ***sentinel event*** when associated with patient harm (Cohen, 2001). In the 1990s, research into MEs focused on systems and nurses as crucial to intercepting MEs before they reached the patient, and relevant strategies were implemented, however, as the number of medications prescribed to hospital patients increased, so did the number of MEs (AFHCR & Q 2001). The outcome has been that the IOM concluded that it is not acceptable for patients to be harmed by a health care system that is meant to heal and comfort, conversely declaring that it may be human nature to err (IOM, 1999, 2006). Nonetheless, in spite of a decade to improve patient safety following the IOM report, MEs remain common and occur with increasing frequency (IOM, 2006). An additional dilemma is that the literature pertaining to MEs is divided, as indicated by Etchells et al (2008) declaring that MEs are unavoidable, due to human factors, and Smith, 2004, insisting that MEs are always avoidable. Therefore, with the research data, purporting HCPs are cognizant of MEs, and that HCPs are undeniably informed and instructed on the ***'right' medication theory*** that affects the ***'right' medication practices (MNG-HA – BMS, 2006)***, an additional contributing factor such as HCP competence and compliance must be considered (Anderson et al, 2010; Johnstone, 2009). Mortell, (2013; 2012), offers an additional ME paradigm to consider, one that affects theory - practice and ethics, an ethics gap which is one of ***behavioural non-compliance*** with the recommended organizational policies and procedures that involve patient - medication praxis.

Patient safety

Patient safety is an essential aspect of health care, because when people are admitted to hospital, they expect to have their illness or disease treated, receive quality health care and ***not be harmed*** in the process. The primary goal of health care is to maximize wellbeing, and therefore optimize the quality of people's lives (Wilson, 2009). The culture of patient safety acknowledges 7 key basic fundamentals, leadership; teamwork; evidence-based health care; communication; learning; organization; just culture; and patient centeredness (Sammer, 2010). The organizational safety climate is linked directly to patient safety and care behaviour outcomes, the greater the safety climate, the lower the rate of MEs (Fogarty, 2006; Hoffman, 2006). However, O'Shea (1999), cautions that despite structured organizational safety policies, medication safety and MEs may not improve, due to a high incidence of ***safety violations*** leading to preventable and avoidable patient harm; which includes sentinel events, and therefore alleges that a ***duty of care predicament*** of non-compliance, a ***theory - practice - ethics dilemma*** (Mortell, 2009) exists in health care which compromises patient safety.

Ethics / duty of care

The word ethics has Greek origins; Ta Ethika: into good and evil; Ethos: personal character; a code of ethics defines basic principles to determine what constitutes 'right' behaviour, united with a moral duty and obligation. Ethics are moral values and behaviours that express ideals for other human beings (Certo, 2009), comprising of commitments to remove harm or promote benefit (Twomey, 2010; Levine, 1977). These basic principles of safety management, ***primum non nocere*** (first do no

harm) and in ***dubio abstine*** (in case of doubt, do not intervene) go back to ancient times. Historically, nursing in Saudi Arabia was established in the time of the Prophet Mohammed (PBUH), under the direction of Rufaida Al-Asalmiya, acknowledged as the first Muslim nurse, 570 – 632 AD (Kasule, 2003; Mansour & Fikry, 1987) with religious values shaping ethical codes of patient care. Within the Islamic medical ethics literature there are two dominant generes; first, ***Adab***, which relates to character ***ethics*** in both professional and personal realms and second, ***Sharia***, Islamic sacred law or ***ethics***. These writings expound ethical and moral values when using medical and/or health care technologies and interventions to facilitate greater clinical competence (Padela, 2006). Medical ethics as cultural norms are also referred to in the Bible of Christians (Markwell et al, 2001).

Hippocrates, a Greek physician born circa 460 BC is acknowledged as the father of medicine and principally he was concerned with assuaging human suffering whilst guaranteeing ethical values of integrity and moral conduct. He created the Hippocratic Oath to remind doctors of their patient care obligations, to practice medicine ethically, thereby ensuring safe, effective care and never doing harm. In part, the ionic Greek version of the Hippocratic Oath translated into English, reads … according to my ability and judgement will ***never do harm, will never give a deadly drug to anybody.*** In a comparable modus, nurses abide by an equivalent oath, referred to as the Nightingale pledge, written by Lystra E. Gretter in 1893, to honour Florence Nightingale (1820 - 1910); and acts to remind nurses of their responsibilities to the patient and in part, states that nurses will not ***administer any harmful drug*** (Reid, 2011; Marples, 2010). As noted by Florence Nightingale more than 150 years ago, and remaining valid today, the greatest threat to patient safety are the ***frailties of the human condition, complacent attitudes and unconscious behaviours*** (Reid, 2011).

Doctors, nurses, pharmacists, and other HCPs appear to have misplaced their focus on the moral and ethical fundamentals as the work of health care has become more complex and regardless of the dilemmas in clinical practice, HCPs cannot replace the comprehension of the moral core of their professions or themselves as moral agents. A physician's ethical work focuses on clinical, scientific and ethical competence aimed at curing and healing. A nurse's moral work focuses on the health experience of the person through treatment or other interventions caring for them physically, emotionally and spiritually. The urgent need for HCPs to commit to patient-centred care, patient safety and therefore a reduction in MEs provide HCPs with opportunities to work together to reclaim patient trust and safety.

Medication safety

Medication safety is a significant global issue in health care and considerable improvements are required to reduce MEs and increase this facet of patient safety. Based on the literature reviewed, there is a consensus that MEs ***do occur frequently*** (Anderson et al, 2010; Johnstone et al, 2009; Hughes et al, 2008) and despite a myriad of strategies, interventions, methodologies and technologies to reduce MEs since the IOM report (1999), there has been ***limited success*** achieved. There have been no paucity in the strategies established and utilized to reduce or eliminate MEs, including, education, independent double-checking, computerized prescriber order entry (CPOE), automated pharmacy dispensing systems, bar coding, 'smart' IV devices, and electronic medication administration records. (Early, 2011; Cohen, 2008).

However, despite sentient implementation of patient safety strategies, MEs ***continue to occur frequently*** and continue to affect patient safety (Phillip 2007; IOM, 2006; Kelly et al, 2006; Leape 2005). Education programs to improve medication knowledge, practices and decrease MEs, have demonstrated ***marginal*** improvement (Schneider, 2006). Yet, lack of medication knowledge and ongoing practice ***violations continue*** (Buckley, 2007; Kopp, 2006; Armitage et al, 2003; O'Shea, 1999). Double-checking medications is a routine clinical practice and is thought to reduce MEs even though not supported by the research literature which actually implies that it's a contributing factor to MEs if ***not performed correctly***. Utilization of automated dispensing cabinets

and unit dose dispensing have reduced MEs, however, has not discontinued the prohibited practice of borrowing another patients' medications. The timeless phrase, ***'Neither a borrower or a lender be',*** 'originating from Shakespeare's Hamlet (1603), is relevant today, especially pertaining to medication safety. Nonetheless, HCPs continue to borrow another patients' medication for convenience to supplement a 'missing dose'. Using another patients' medication to supplement unobtainable medications is a recipe for disaster and promotes the risk of MEs (Cohen, 2008). Franklin (2007) reported that use of Bar coding with medication administration demonstrated a decline in MEs from 8.6 to 4.4%. While, Early (2011), countered that HCPs did override ***safety systems*** which created significant MEs (Koppel, 2008). 'Smart' intravenous (IV) pump equipment is another technology that can reduce MEs, however Rothchild et al (2005) discovered, that despite organizational policies for recommended medication practices, drug libraries and IV pump alerts were ***frequently bypassed*** by HCPs and therefore did not reduce critical MEs. Electronic medication systems (EMS) such as CPOE have been advocated as an effective strategy to reduce MEs and increase patient safety (Franklin, 2007); conversely other research studies maintain that ***MEs continue*** to occur despite utilization of EMS (Englebright et al, 2005; Leape 1995). These practices could be explained by behavioural attitudes toward the recommended safe practice organizational policies, ***one of non-compliance and deliberate violations*** of organizational guidelines (Dean et al 2008; Williams, 2007). As organizations adopt more complex and costly technologies to prevent MEs, and improve patient safety, success relies on professional responsibility, accountability, and ethics. To achieve compliance requires HCPs to be vigilant, responsible and held ***accountable for their actions.***

Five (5) "medication safety" rights

Nursing schools have long been teaching ***the 5 rights to safe medication delivery*** as an important strategy to reduce MEs and incorporate the ***right patient, right drug, right dose, right route, and right time for administration.*** These rights simply focus on providing medications as they were ordered by the physician. A simple 5 rule mnemonic to assist HCP to ***'do the right thing'*** when administering medications to their patients (Benjamin, 2003). A procedure recommended by the National Coordinating Council for Medication Error Reporting and Prevention to prevent MEs (Morris 2002). However, Pepper (2006), argues that the 5 rights do not recognize the complexity of the nurses' role and lack evidence - based practice to support their use in teaching nurses to prevent MEs (Cox, 2000).

Regardless of whether the "5 Rights" of medication administration lack evidence - based endorsement, they are basic principles taught to HCPs and if complied with, offer a standard, simple methodology that has the potential to reduce MEs and improve patient safety. All HCPs have a crucial ***primary role*** in the prevention of MEs and that is to verify that other HCPs have not erred in the medication order chain. The ***second role*** is primarily for nurses, as they are the final verification and a potential barrier to prevent MEs from causing serious patient harm (Adams and Koch, 2010; Davey et al, 2008; Rothschild et al, 2006). Therefore, they have a responsibility as patient advocates ensuring that the '5 rights' of medication administration are adhered to.

Conclusion

The ***MNG-HA*** mission is to provide safe, evidence-based quality care to patients with core values that exemplify the mission statement, accountability, behaviour and work ethic, excellence and innovation, patient safety, quality (NGHA, 2013), just some of the key elements that are essential to achieving the ***vision of the MNG-HA - program***. In 2006, in coalition with the ***MNG-HA*** mission, core values and vision the ***Basic Medication Safety*** **(BMS) Course** was created, as a major quality and safety initiative under the auspices of the Chief Executive Officer and Chairman of the Quality and Patient Safety Council, ***HE. Dr. Bandar Knawy*** with a mandate that all HCPs involved in the processes of prescribing, dispensing and administering medications for/to patients are to attend, pass and maintain credentialing and re-

credentialing initially and every 2 years thereafter. The organizational rationale to maintain and retain ***safe*** basic medication knowledge and practice for all HCPs involved in the medication process. In doing so, all HCPs acknowledge that they have a responsibility to identify contributing factors to MEs and are accountable for their actions if they choose to be noncompliant with MNG-HA organizational medication policies.

Creating a culture of safety does not just mean eradicating the culture of blame, but involves changing the behaviour and manner how HCPs think and approach patient safety issues, such as the medication cycle. Medication errors are acknowledged to be one of the most preventable patient safety events that cause serious harm. As patient advocates, HCPs have an individual responsibility, which requires accountability to support patient's rights.

Acknowledgement

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Drug Allergy – Part 2

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As a continuation from QPS Newsletter Volume 6 / issue 4 / September 2014 on "Drug Allergy "
The Saudi Medication Safety Center (SMSC) Board has approved Penicillin Allergy Card and several one page algorithms to assist staff in navigating the confusion often associated with cross-reactivity of penicillin, opioids and sulfa drugs, as well as aspirin sensitivity.

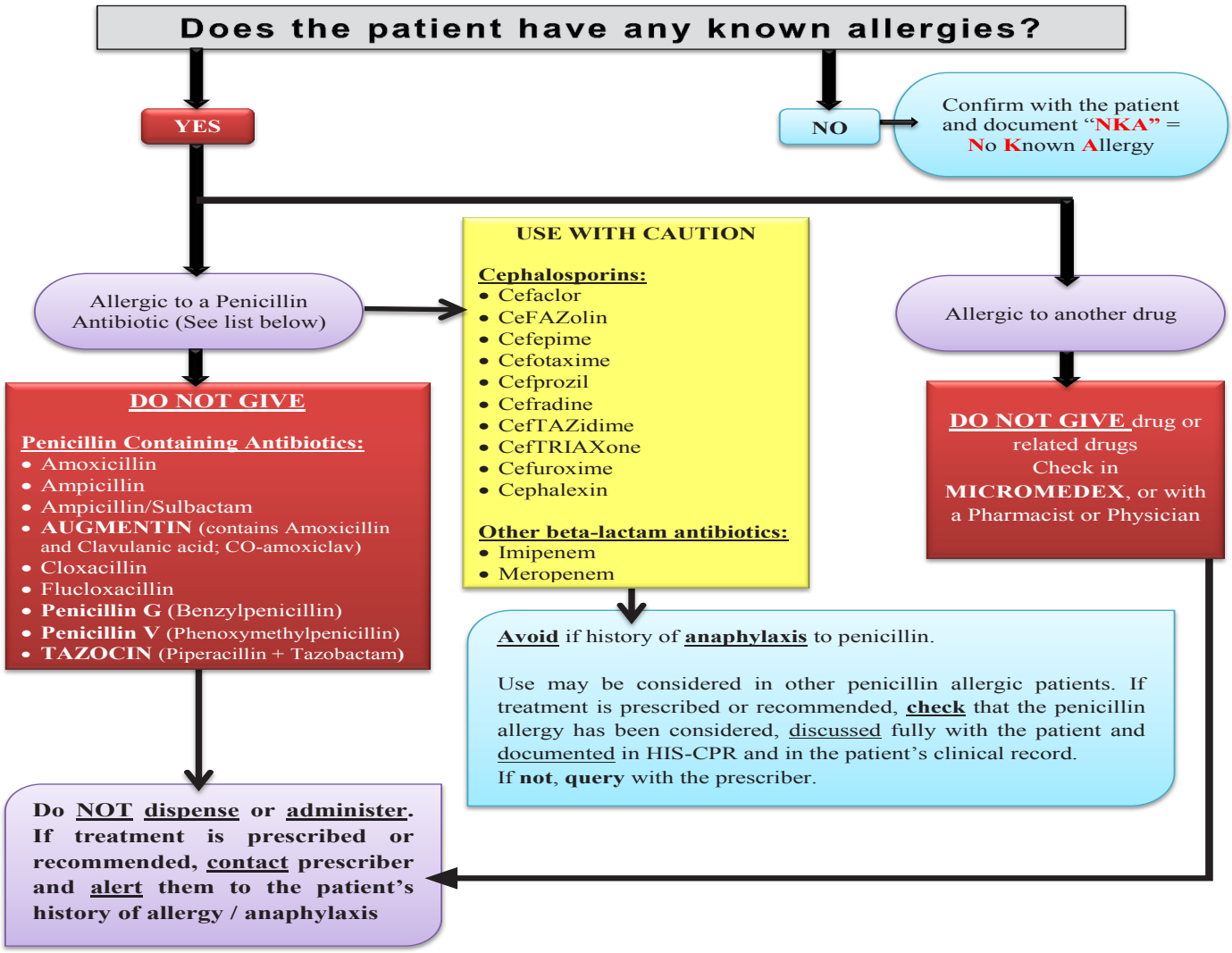
The following algorithms has been uploaded in the One Stop Resource ('NGHA Specific information' and also under the section of 'NGHA Specific Information'

1. Penicillin (beta-lactam) Allergy Cross-Reactivity
2. Sulfa Drug Allergy Cross-Reactivity
3. Opioid Intolerance Decision
4. Aspirin Sensitivity
5. Penicillin Allergy Card

PENICILLIN (BETA-LACTAM) ALLERGY CROSS-REACTIVITY ALGORITHM

مقياس التفاعلات الجانبية المتضادة المسببة لحساسية البنسلين (أنزيم بيتا لاكتام)

Always Check for drug allergy before prescribing, dispensing and administering drugs



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SULFA DRUGS ALLERGY CROSS-REACTIVITY ALGORITHM

مقياس التفاعلات الجانبية المتضادة المسببة لحساسية دواء السلفات

Always Check for drug allergy before prescribing, dispensing and administering drugs

Does the patient have any known allergies?

YES

NO → Confirm with the patient and document "**NKA**" = **N**o **K**nown **A**llergy

Allergic to Sulfa Drugs (See list below) → **USE WITH CAUTION**

- Tamsulosin
- Dapsone
- Procainamide

Allergic to another drug → **DO NOT GIVE** drug or related drugs Check in **MICROMEDEX**, or with a Pharmacist or Physician

DO NOT GIVE

Sulfa Antibiotics:
- Silver SulfADIAZINE
- Sulfacetamide
- Sulfamethoxazole
- Co-Trimoxazole

Diuretics
- Bumetanide
- Diazoxide
- **DYAZIDE** (Triamterene / Hydrochlorothiazide)
- Furosemide
- Hydrochlorothiazide
- Indapamide
- Metolazone
- **MODURETIC** (AMILoride / Hydrochlorothiazide)

Other
- AcetaZOLAMIDE
- Dorzolamide
- Celecoxib
- SulfaSALAZINE
- Zonisamide
- GlyBURIDE (Glibenclamide)

Avoid if history of **anaphylaxis** to Sulfa.

Use may be considered in other Sulfa allergic patients. If treatment is prescribed or recommended, **check** that the Sulfa allergy has been considered, discussed fully with the patient and documented in HIS-CPR and in the patient's clinical record. If **not**, **query** with the prescriber.

Do NOT dispense or administer. If treatment is prescribed or recommended, contact prescriber and alert them to the patient's history of allergy / anaphylaxis

Agents containing sulfur, sulfates, sulfites and saccharin are **NOT** sulfonamides and **DO NOT** cross-react. They are also chemically unrelated to sulfonamides and there is **NO** risk of cross-sensitivity.

NOTE: Sulfites may cause their own reactions such as dyspnea, wheeziness and chest tightness in patients with asthma.

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OPIOID INTOLERANCE DECISION ALGORITHM

مقياس عدم تحمل المورفين و مشتقاته

Always Check for drug allergy before prescribing, dispensing and administering drugs

Does the patient have any known allergies?

NO → Confirm with the patient and document "**NKA**" = **N**o **K**nown **A**llergy

YES

When patients say they're allergic to an opioid, are all opioid analgesics off limits? The key is getting a detailed description of the reaction. Answer the questions below and follow the instructions to find the best options for your patient.

Check the symptoms the patient describes, and follow the instructions in the far right column.

Flushing, itching, hives, sweating, and/or mild hypotension **only**	Go to **A**
Itching, flushing, or hives at injection or application site **only**	Go to **A**
Severe hypotension	Go to **B**
Skin reaction other than itching, flushing, or hives (e.g., rash)	Go to **B**
Breathing, speaking, or swallowing difficulties	Go to **B**
Swelling of face, lips, mouth, tongue, pharynx, or larynx	Go to **B**

A

These symptoms **may** be due to a ***pseudoallergy.*** It's a result of histamine release, a pharmacologic side effect of some opioids. Options for this patient include:

1. A nonopioid analgesic (e.g., Acetaminophen, an NSAID)
2. Avoidance of Codeine, Morphine, and Meperidine, the opioids most commonly associated with pseudoallergy
3. Use of a more potent opioid less likely to release histamine. Potency, from lower to higher: **Meperidine** *less than* **Codeine** *less than* **Morphine** *less than* **Oxycodone** *less than* **HYDROmorphone** *less than* **FentaNYL**
4. If needed, concurrent administration of an antihistamine…an H1 (e.g., DiphenhydrAMINE) and perhaps an H2 blocker (e.g., Ranitidine)
5. Dose reduction, if tolerated

B

This patient **may** have experienced a ***true allergy***. Options for this patient include:

1. A nonopioid analgesic (e.g., acetaminophen, an NSAID)
2. An opioid in a chemical class *different* from the one to which the patient reacted, with close monitoring:
   - **Phenylpiperidines**: Meperidine, FentaNYL, SUFentanil, Remifentanil.
   - **Diphenylheptanes**: Methadone
   - **Morphine group**: Codeine, Morphine, Oxycodone, HYDROmorphone, **PERCOCET** (Acetaminophen/ Oxycodeine), **TYLENOL #3** (Acetaminophen/ Codeine), **FEVADOL PLUS or SOLPADINE** (Acetaminophen/ Codeine/ Caffeine)
   - **Other:** TraMADol is contraindicated in patients with opioid allergy per U.S. and Canadian product labeling; however there is **NOT** good evidence for cross-sensitivity of TraMADol with opioids. Experts recommend using TraMADol ***ONLY*** for patients who have mild reactions to opioids.

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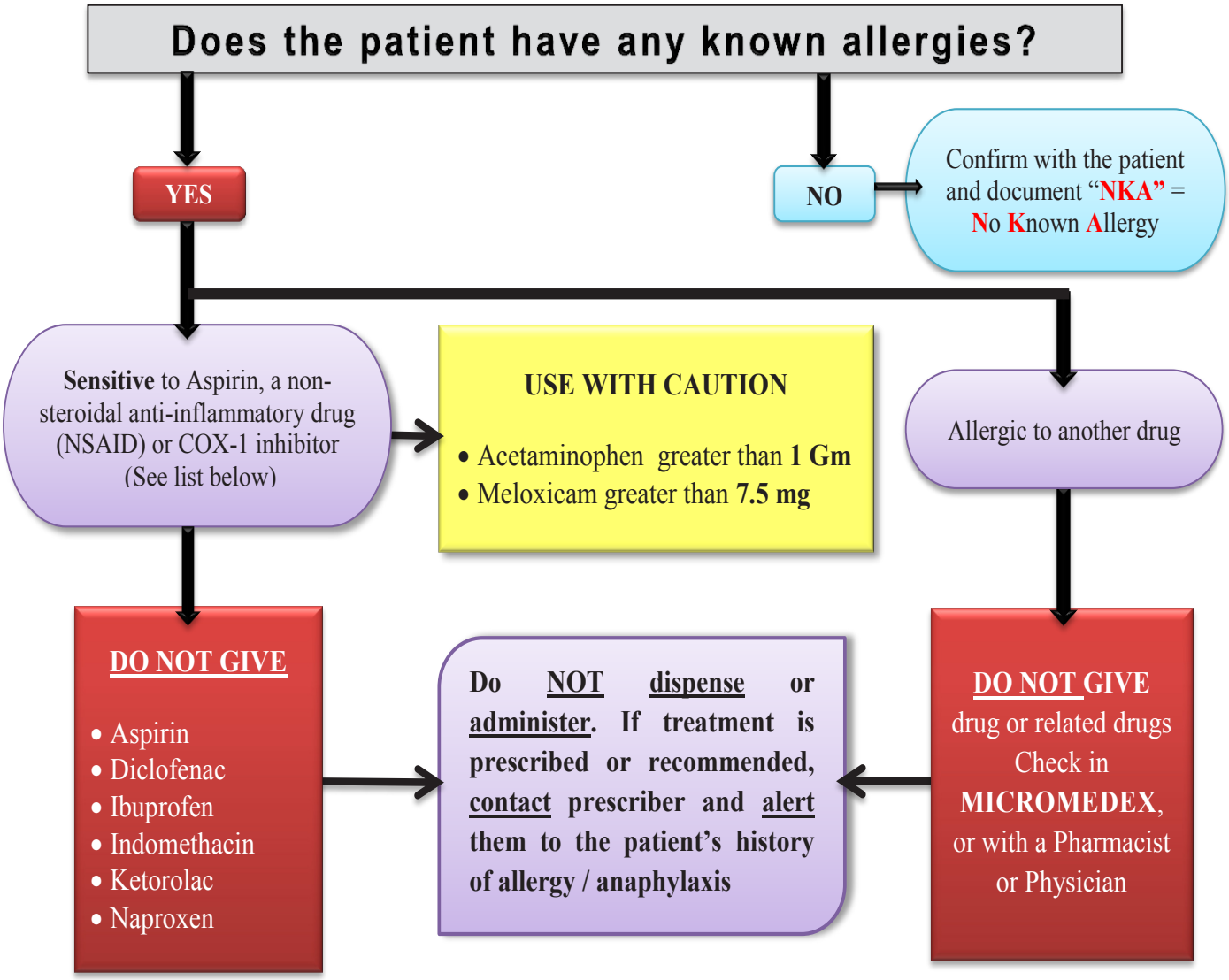
ASPIRIN SENSITIVITY ALGORITHM

مقياس الحساسية من الأسبرين

Always Check for drug allergy before prescribing, dispensing and administering drugs



Aspirin sensitivity is due to COX-1 inhibition, and **NOT** an actual immune response. Most NSAIDs also inhibit COX-1 and are therefore likely to also induce a sensitivity reaction.
Aspirin sensitivity involves symptoms that are respiratory in nature, such as rhinitis and worsening of asthma, or skin manifestations, such as urticaria and angioedema (swelling of the skin).

The chance for cross-reactivity between aspirin and NSAID in a patient with **a true allergic** reaction to either is less likely.

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Penicillin Allergy Card

Use of Antibiotics in Patients with a Penicillin Allergy
(List is not exhaustive – refer to MNGHA Formulary for details)

CONTRAINDICATED DO NOT USE	Allergic Cross-reactivity possible* May be used with CAUTION in non-severe allergy (i.e., non-Anaphylaxis)	CONSIDERED SAFE
ANTIBIOTICS CONTAINING	CEPHALOSPORINS:	Amikacin
Amoxicillin	CeFAZolin +	Azithromycin
Ampicillin	Cefepime	Ciprofloxacin
Ampicillin / Sulbactam	Cefotaxime	Clarithromycin
AUGMENTIN (Amoxicillin and Clavulanic acid; CO-amoxiclav)	Cefprozil	Clindamycin
	CefTAZidime	Colistin
Cloxacillin	CefTRIAXone	Co-trimoxazole
Flucloxacillin	Cefuroxime	Doxycycline
Penicillin G (Benzylpenicillin)	Cephalexin +	Erythromycin
Penicillin G Sodium-Potassium		Gentamicin
Penicillin V (Phenoxymethylpenicillin)	OTHER BETA-LACTAM	MetroNIDAZOLE
	Imipenem	Nitrofurantoin
TAZOCIN (Piperacillin and Tazobactam)	Meropenem	Trimethoprim
		Vancomycin
		Tigecycline

* Contraindicated in severe Penicillin allergy (Anaphylaxis)

+ First-generation Cephalosporins carry a higher risk of severe reaction than other listed Cephalosporins

FACT: Penicillin can kill

If given to patients with a Penicillin Allergy

STOP: Check the patient's allergy status

Flucloxacillin

Amoxicillin

CO-amoxiclav (= AUGMENTIN or KLAVOX)

TAZOCIN (Piperacillin + Tazobactam)

and other Penicillins

Contraindicated

in patients with Penicillin Allergy.

This is your Newsletter and we value your comments. Please recommend Quality Improvement Projects in your area. We strongly encourage you to share patient safety information.
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