Skin disinfection and its efficacy before administering injections


Summary
The need to disinfect a patient’s skin before subcutaneous or intramuscular injection is a much debated practice. Guidance on this issue varies between NHS organisations that provide primary and secondary care. However, with patients being increasingly concerned with healthcare-associated infections, a general consensus needs to be reached whereby this practice is either rejected or made mandatory.

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Hospital protocols
Administering SC or IM injection is part of the daily routine of most nurses. It is estimated that 12 billion IM injections are administered worldwide annually (Nicoll and Hesby 2002). Giving drugs via SC or IM routes is favourable in many circumstances because they are usually absorbed quickly. By administering drugs intramuscularly, the medication is delivered deep into the muscle, which can absorb relatively large doses. This enables rapid systemic action of the medication. When administering drugs such as insulin, which requires a steady release, the SC route is used for slow, sustained absorption (Workman 1999).

Many healthcare professionals consider routine skin disinfection to be unnecessary and ineffective but, amid increasing concerns about healthcare-associated infections, it is important to decide whether guidelines on the cleansing of an injection site should be established. The current position of the Department of Health (DH) is that if the skin appears to be clean, then disinfection is not necessary before parenteral injection. Further, visibly soiled or dirty skin need only be cleaned with soap and water (DH 2006). This is supported by the World Health Organization (WHO), which no longer recommends the practice of disinfection (Hutin et al. 2003).

Despite these recommendations, guidance contained in The Royal Marsden Hospital Manual of Clinical Nursing Procedures (Hopwood 2008), while recognising that there are inconsistencies about skin disinfection before injection, continues to recommend that the skin should always be cleansed before giving any injection, with the rationale that it reduces the risk of contamination in the immunocompromised patient.

It is now mostly accepted in the NHS that, if the patient’s skin appears to be physically clean and the nurse maintains good hand hygiene, skin disinfection is unnecessary before SC or IM injection. With so much conflicting literature, there is confusion among nursing staff and healthcare professionals about whether disinfecting an injection site is beneficial.

DISINFECTING THE SKIN before subcutaneous (SC) or intramuscular (IM) injection is most popularly achieved by wiping the area with a 70% isopropyl alcohol-saturated wipe (Pratt et al. 2005). The aim of disinfection is to remove any potentially harmful microbes from the surface of the skin before inserting a needle. The needle should not be inserted until the skin is completely dry. If the injection is given before the skin dries, not only does it increase the level of pain for the patient when the needle enters the skin, but bacteria are not rendered inactive and might be inoculated into the injection site (Springhouse Corporation 1993). The Royal College of Paediatrics and Child Health (RCPCH 2002) also recommends that if skin is disinfected before giving a vaccination, the disinfection agent should be allowed to evaporate before the injection is given. This is because the disinfection agent could inactivate live vaccine preparations.
The evidence

Dann (1969) conducted possibly the most comprehensive research study on practice issues about the disinfection of skin before injection. Injections were given to 5,000 people—comprising students, staff and their families—aged between four months and 66 years, over a six-year period, during which they were monitored for any signs of infection. Dann (1969) rejected skin disinfection as being important to nursing practice, unless the skin was visibly soiled. In instances where the skin was not disinfected before injection, no single case of local or systemic infection was observed. Based on these results, Dann (1969) dispensed with routine skin disinfection and recommended that this practice be adopted universally. In response to this research, a letter was published in The Lancet supporting Dann’s (1969) viewpoint. Turner (1969) stated that in 30 years he had not disinfected patients’ skin before injection and had seen little evidence of infection. His experience had been in the UK and the Himalayas. He described the Himalayan population he injected as ‘having never washed since birth’ (Turner 1969).

Koivisto and Felig (1978) have also shown that there is no increased risk of infection if the injection site is not disinfected. They measured the effect of routine skin preparation on skin bacterial flora in 13 patients with insulin-dependent diabetes, now called type 1 diabetes. The skin was cleansed using 70% isopropyl alcohol for five seconds on several sites including the arm, leg and abdomen. This was found to reduce the bacteria count by 82-91%. On alternate weeks, over a three to five-month period, the patients omitted skin preparation before injecting insulin. More than 1,700 insulin injections were given and no signs of local or systemic infection were observed. Koivisto and Felig (1978) concluded that, although cleansing the skin with alcohol reduces the bacterial count, it is not always necessary to prevent infection from developing at the site.

As previously mentioned, the WHO advises that swabbing clean skin is unnecessary, although it states that visibly soiled or dirty skin should always be washed before injection. It considers that, although piercing the skin by injection can introduce bacteria from skin flora, most of these bacteria are non-pathogenic and the small number that might be introduced would be lower than the minimum infectious dose necessary for infection to occur (Hutin et al 2003).

A smaller study involved 93 patients being swabbed with alcohol before injection and 103 patients not being swabbed (Sutton et al 1999). Observations were carried out at one, three and five days following injection, during which time only two patients developed an infection in the form of an abscess. Both patients had been swabbed with alcohol but were on steroid therapy, which is known to suppress the immune system. The trial concluded that there was no significant difference between the two groups.

Vulnerable groups

In 1993 the Public Health Laboratory Service, now part of the Health Protection Agency, suggested that skin preparation before injection should be administered when giving injections to particular patients (Ayliffe et al 1993). These include older patients, those who are ill, or those who are immunocompromised, as it has been shown that certain groups in society are at greater risk of developing infection (Pratt et al 2005). Bacteria on the skin have a low potential to cause infection if the immunity of the patient is not impaired or compromised (Hoffman 2001). A problem facing nurses and healthcare professionals is that it is not always possible to identify such individuals in practice.

Hoffman (2001) observed that many hospitals in the UK had already abolished skin disinfection practices before injection without any adverse effects. However, the validity of this could be questioned as a large proportion of patients leave hospital within a few days and a number of bacteria have lengthy incubation periods. Post-discharge infection surveillance is rarely undertaken (National Audit Office 2004).

The RCPCH (2002) published a position statement on injection technique. It stated that there were 49 reports to the Committee on Safety of Medicines between July 1963 and January 1990, as a result of abscesses appearing at injection sites. This was believed to be an underestimate of the true number. However, it was recognised that, although an increasingly large number of people are no longer practising skin disinfection before immunisation, there has been no sudden increase in the number of incidences of abscess formation. It was recommended that skin disinfection before deep SC or IM injection is not necessary when administering immunisations (RCPCH 2002).

Issues arising

One issue that can arise in practice is when there are two patients to be given injections, one who is visibly clean and the other who is visibly soiled. In this situation, the authors propose that the healthcare professional use his or her judgement to determine whether the SC or IM injection site needs disinfection. In accordance with The Code (Nursing and Midwifery Council 2008), nurses and midwives should act considerately and in a non-discriminatory manner towards patients at all times. To provide a high standard of care, the nurse...
should act discreetly when obtaining consent to disinfect the skin of the patient that is visibly soiled. This is not so much of a problem in outpatient clinics where most patients are seen on a one-to-one basis, but it could be problematic for nurses working on wards. In these circumstances the authors suggest the curtains should be closed around the patient’s bed when giving any injection to ensure privacy. It should then be explained to the patient why cleansing the skin is preferable before consent is gained and the injection given.

By explaining this, the nurse ensures that good practice is undertaken. As previously discussed, the WHO and DH advise that soiled or dirty skin need only be cleansed with soap and water, and does not need to be disinfected. The authors advocate that a universal policy be adopted by NHS organisations when deciding on a preferred method of cleansing because this varies between organisations. We would also suggest that the nurse uses discretion when deciding the preferred method of cleansing the skin, depending on the cause of the soiling.

Another issue that might arise in practice is the legal implication of non-disinfection of the skin. It has been suggested that if skin disinfection before SC or IM injection is omitted and local sepsis results, it would be difficult to defend legally (Lawrence et al 1994). This is because the organisms Staphylococcus aureus and haemolytic Streptococcus pyogenes, which are responsible for causing abscesses at IM injection sites in particular, are known to be pathogenic (Dudgeon and Cutting 1991).

It has also been suggested that skin disinfection before injection is such a routine practice that it would be difficult to change (Cocoman and Murray 2007). One UK hospital had abolished routine skin disinfection before SC and IM injection. In spite of this, eight years later, a survey showed that 78% of medical staff still routinely followed the practice of skin disinfection. ‘Sterilisation’ was the main reason given by 52% of the staff when asked why they continued this practice (Liauw and Archer 1995).

### Conclusion

Local guidelines on skin disinfection before injection should always be followed. In cases where the injection site is visibly soiled, skin disinfection should always be recommended. There is a lack of evidence suggesting that people who are immunocompromised are at greater risk of infection if their skin is not disinfected. More research needs to be conducted on this topic to determine conclusively whether or not this practice is necessary. Given the lack of evidence suggesting any increased risk in infection rates, some consideration should be given to the cost effectiveness of this practice. If skin disinfection is not undertaken, NHS organisations should review their policies in relation to this because it would encourage all healthcare professionals to follow the same procedure.

### References


