



Patient Safety Alert

Risk of severe harm and death due to withdrawing insulin from pen devices

16 November 2016

Alert reference number: NHS/PSAW/2016/011

Warning Alert

Pen-shaped devices are commonly used by patients for subcutaneously injecting insulin. Compared to insulin syringes, the use of these devices has increased as they make it easier for patients to self-inject.

Although the strength of insulin was previously standardised at 100 units/mL, this can vary in pen devices, currently by multiples of 100 units/mL. Pen devices can be adjusted to take account of this variation and ensure the correct dosage is delivered. The dose is set on the pen's dial and the device automatically determines the volume it delivers.

If patients are unable to use their pen device as normal, they may require a healthcare professional's help. Where this has happened, NHS Improvement is aware of patient safety incidents involving staff using insulin syringes and needles to extract insulin directly from pen devices or refill cartridges. Insulin syringes have graduations only suitable for calculating doses of standard 100 units/mL. If insulin extracted from a pen or cartridge is of a higher strength, and that is not considered in determining the volume required, it can lead to a significant and potentially fatal overdose.

While only a small number of low and no-harm reports of this type have been identified in the National Reporting and Learning System, our networks confirmed that the practice appears to occur more widely. Extracting insulin from pen devices also risks damaging the device's mechanism and will not be covered by the manufacturer's warranty.

Staff may use an insulin syringe and needle to withdraw insulin from pen devices or cartridges because they do not have access to equipment for safely disposing of needles attached to pen devices.¹ As pen devices are typically only used by patients, they are not routinely supplied with safety-engineered needles. If staff feel it will protect them from needlestick-injury, they may resort to using an insulin syringe and needle. Staff may also lack skill or confidence in using pen devices, as they are normally only used by patients.

To support the safe use of insulin pen devices, organisation should warn staff that extracting insulin from pen devices or cartridges is dangerous and should not happen. Organisations should ensure staff are trained and competent in using insulin pens and that training is available.² Staff, and where appropriate, patients who use pen devices, should be routinely provided with safety needles and access to equipment capable of safely removing and disposing of used insulin pen needles. This will ensure insulin can be given safely where a patient is not able to self-administer. It is essential that staff are also trained in correctly using safety needles.

If insulin overdose occurs rapid action is needed to prevent fatal hypoglycaemia. Local guidance should help staff take appropriate action if it is believed a patient has received an incorrect dose of insulin.

Actions

Who: All organisations providing NHS-funded care where insulin is prescribed, dispensed or administered

When: To begin as soon as possible and to be completed by 11 January 2017

- 1** Identify whether incidents involving inappropriate use of insulin pen devices could occur in your organisation.
- 2** Consider if immediate action needs to be taken locally and ensure that an action plan is underway, if required, to reduce the risk of incidents, including ensuring access to appropriate equipment and training wherever insulin is administered.
- 3** Share this alert, or its key messages in alternative formats (such as posters or revised local safety advice), to all clinical staff who prescribe, dispense or administer insulin.
- 4** Share any learning from local investigations or locally developed good practice by emailing: patientsafety.enquiries@nhs.net

See page 2 for technical notes, supporting information and references

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Technical notes

Patient safety incident reporting

The NRLS was searched on 4 October 2016 for medication incidents occurring between 1 January 2013 and 30 June 2016 using the following key words:

'Insulin OR Hypurin OR Actrapid OR Velosulin OR Humulin OR Insuman OR Aspart OR Novo OR Apidra OR Humalog OR Lispro OR Glulisine OR Levemir OR Detemir OR Glargin OR Lantu OR Isophane OR Insulatard OR Mixtard OR Optipen OR OptiSet OR Humapen OR Autopen OR Innovo OR MHI 500 OR Sliding scale OR Tresiba OR Xultophy OR toujeo OR degludec OR solostar AND safety needle OR stick injury OR drawing up.'

A total of 56 incidents were associated with withdrawing insulin from insulin pens or refill cartridges:

- 12 described drawing up insulin directly from pens or cartridges
- 9 described a failure of safety needle
- 9 described incorrect technique with safety needles (healthcare professional)
- 6 described incorrect technique with safety needles (patients)
- 10 described other themes.

These incidents showed evidence of issues with the availability of appropriate safety needles and a lack of adequate training for staff in using insulin pens and safety needles, in both community and hospital settings; and also a lack of training for patients.

Information was also received through professional networks, with 12 of an opportunistic sample (n=22) of medication safety officers confirming that the practice of extracting insulin from pen devices has occurred in their local area.

References

1. HSE. *Health and Safety (Sharp Instruments in Healthcare) Regulations 2013. Guidance for employers and employees*. March 2013. www.hse.gov.uk/pubns/hsis7.pdf (accessed 3 November 2016)
2. The six steps to insulin safety module www.diabetesonthenet.com (accessed 3 November 2016)

Stakeholder engagement

- National Patient Safety Response Advisory Panel (for a list of members and organisations represented on the panel, see improvement.nhs.uk/resources/patient-safety-alerts/)
- Specialist Pharmacy Services, United Kingdom Medicines Information
- Medication Safety Officers Network