Forum for Injection Technique (FIT) UK provides evidence-based best practice recommendations for people with diabetes who are using injectable therapies and for clinicians who care for people with diabetes using injectable therapies. Through these recommendations, people with diabetes can achieve the best possible health outcomes by ensuring that the correct dose of medication is delivered to the correct injection site, using the correct technique. FIT UK understands that written guidelines alone will not change clinical practice unless appropriately implemented. FIT UK is committed to engaging in a range of initiatives including research, education and support for healthcare professionals, carers and people with diabetes.

Our Objectives

- To review the injection techniques currently being used by people with diabetes.
- To identify, and to provide information on ‘Best Practice’ and education programmes used in the UK.
- To raise awareness of the impact that existing and emerging research regarding injection technique may have on health outcomes and wellbeing for those with diabetes that require subcutaneous injection therapy.
- To facilitate opportunities in which best practice can be discussed, developed, implemented and evaluated across the UK.
Introduction

Over 15 years ago a small pioneering group of medical and nursing staff gathered for the first time to explore the evidence for optimal injection technique.

FIT UK was established following the 3rd International Injection Technique meeting in Athens 2009. Informed by the results of the International Injection Technique Survey(159) and contemporaneous injection technique evidence from around the world, the founders of FIT UK determined to share their findings and their passion for optimal injection technique not only in the UK but around the world.

FIT UK has grown from a single entity based in the UK and is now represented in countries including:

- Canada
- Dominican Republic
- India
- Ireland
- Philippines
- South Africa
- Switzerland

Diabetes UK estimates that more than one in 16 people in the UK has diabetes (diagnosed or undiagnosed) and that there are 3.9 million people living with diabetes in the UK. This is projected to rise to 5 million people by 2025. (192)

Diabetes diagnosis rates are equivalent to:
- more than 400 people every day
- over 17 people every hour
- around three people every ten minutes (192)
Everyone with type 1 diabetes (T1DM) will need insulin from diagnosis. Currently there are around 465,000 people over the age of 16 with T1DM using insulin. A further 26,500 children and young people use insulin in the UK. It is estimated that 28.3% of all people with diabetes are prescribed insulin injections in the UK (160). Therefore more than 3.9 million people estimated to have diabetes, almost 1 million of these will need to inject insulin. (195)

FIT UK’s overarching mission is:

‘To support people with diabetes using injectable therapies to achieve the best possible health outcomes that are influenced by correct injection technique’.

To date FIT UK has delivered many education programmes and produced the First UK Injection Technique recommendations (2010) and Safety Recommendations (2012) which have been distributed and accessed online by many thousands of health care professionals. FIT UK has also produced a range of educational support materials and e-learning modules.

FIT UK is committed to supporting the implementation of the recommendations and developing them further as new evidence emerges. We welcome any comments, suggestions and active participation in ensuring that the updated recommendations remain relevant and useful for now and in the future.

web: www.fit4diabetes.com
email: infouk@fit4diabetes.com

Meet the team.

Debbie Hicks
Nurse Consultant – Diabetes (Chair)
Barnet, Enfield & Haringey Mental Health Trust

Dr Debra Adams
Head of Infection Prevention and Control (Midlands and East). NHS Trust Development Authority

Jane Diggle
Specialist Practitioner, Practice Nurse. Church View HC South Kirkby, West Yorkshire

Carole Gelder
Childrens nurse specialist and lecturer, Leeds Childrens Hospital and University of York
New and emerging evidence shows that optimal injection technique is critical to improving health outcomes. A pioneering study by Blanco (189) demonstrated that almost two thirds of patients have lipohypertrophy due primarily to incorrect or no rotation of injection sites. Of the patients with lipohypertrophy 39.1% had unexplained hypoglycaemia and 49.1% had glycaemic variation. Patients with lipohypertrophy were found to be using much more insulin than those without, estimated to cost the Spanish Healthcare system €122million per year in excess insulin usage.

A study by Grassi (190) demonstrated that a multimodal approach to injection technique education and support could reduce HbA1c by 6mmol/mol (0.58%) in patients treated with insulin. Interestingly this was achieved using less insulin and without any weight gain. The development of FIT UK and the subsequent UK recommendations for injection technique have been supported by BD Europe. They have also been endorsed by Diabetes UK along with the pharmaceutical companies whose therapies include subcutaneous injections of insulin and GLP-1 agonists.
Advances in the treatment of diabetes have led to an increase in the number of injectable therapies available. Correct technique is of paramount importance in order to ensure the benefits of injectable therapies such as insulin and GLP-1s. The Forum for Injectable Therapy (FIT) provides comprehensive evidenced based guidelines to improve the process and education of self injection technique for people with diabetes. As a company committed to improving the care of patients with diabetes, Lilly UK welcomes the FIT initiative as an important step in supporting diabetes care in the United Kingdom.

Ian Dane, Senior Director, Eli Lilly & Company

“Diabetes UK both welcomes and supports the FIT initiative. Good injection technique leads to good blood glucose control which is vital in preventing the long term complications of diabetes. As so many people with diabetes are now being prescribed injectable medication, this is a timely and important enterprise which will bring great benefit to them.”

Simon O’Neill, Director of Health Intelligence. DIABETES UK

“Advances in the treatment of diabetes have led to an increase in the number of injectable therapies available. Correct technique is of paramount importance in order to ensure the benefits of injectable therapies such as insulin and GLP-1s. The Forum for Injectable Therapy (FIT) provides comprehensive evidenced based guidelines to improve the process and education of self injection technique for people with diabetes. As a company committed to improving the care of patients with diabetes, Lilly UK welcomes the FIT initiative as an important step in supporting diabetes care in the United Kingdom.”

Ian Dane, Senior Director, Eli Lilly & Company

“Novo Nordisk fully endorse the FIT initiative. The benefits of modern injectable medications for the treatment of diabetes can only be fully realised through the use of correct injection technique. Novo Nordisk believe it is imperative that Healthcare Professionals understand the importance of good injection technique and convey this to people with diabetes under their care. FIT is a superb initiative, from leading professionals in the diabetes care, which will make a big difference in this area.”

Kirsty Tait, Diabetes Marketing Director, Novo Nordisk Ltd.
Sanofi are a company who strive to improve the care for people with diabetes who are using insulin and GLP-1 therapy by providing a range of injectables. We are proud to support the FIT (Forum for Injection Technique) initiative which is aiming to improve current practice through demonstration of best practice and the sharing of scientific evidence. We, too, appreciate the importance of good injection technique in ensuring people with diabetes who are using injectable therapy achieve the most benefit from their medication and wish FIT every success. We look forward to working with FIT in the future.”

Nicky Barry, Divisional Director Diabetes, Sanofi

“AstraZeneca are pleased to support the FIT initiative. We are striving to provide medicines which can provide better outcomes for people with Type 2 Diabetes but this can only be achieved when they are used correctly. Adoption of the FIT guidelines in clinical practice will help ensure that the best outcome is obtained from all injectable medicines.”

Jay Ark, Head of Injectable at Diabetes Marketing, AstraZeneca

“Becton Dickinson are extremely proud of the heritage they share with the Forum for Injection Technique, and fully support the continued work of the FIT Board and FIT associates who continue to expand the boundaries of best practice within the fields of insulin injection and medication management. The first and second editions of the FIT recommendations have been shared with over 30,000 healthcare professionals, and the welcome third edition will surely continue to bring the many positive clinical benefits to patients and healthcare professionals alike. BD would like to personally congratulate the FIT board on this magnificent achievement, and look forward to supporting FIT for many years to come.”

Loïc Herve, Business Unit Director Diabetes Care BD
A Scientific Advisory Board (SAB) (Athens 2009) led the review of available evidence and decided that for the strength of a recommendation the following scale would be used:

A: STRONGLY RECOMMENDED
B: RECOMMENDED
C: UNRESOLVED ISSUE

For the scientific support the following scale was used.
1. At least one randomised controlled study
2. At least one non-randomised (or non-controlled or epidemiologic) study
3. Consensus expert opinion based on extensive patient experience.

A number of significant studies have published evidence in the intervening years since 2009. Therefore FIT UK has conducted a further review of critical evidence and included this within the 3rd edition of the Injection Technique Recommendations. The new evidence has also been subjected to the rigour of the strength scale of recommendations as above.

Thus each recommendation is followed by both a letter and number (i.e. A2). The letter indicates the weight a recommendation should have in daily practice and the number, its degree of support in the medical literature. The most relevant publications bearing on a recommendation are also cited. There are few randomised clinical trials in the field of injection technique (compared, for example, with blood pressure control) so judgements such as ‘strongly recommended’ versus ‘recommended’ are based on a combination of the weight of clinical evidence, the implications for patient therapy and the judgement of the group of experts.

These recommendations apply to the majority of people with diabetes using injectable therapy, but there will inevitably be individual exceptions for which these recommendations must be adjusted.

Acknowledgment
The New Injection Recommendations for Patients with Diabetes: Diabetes & Metabolism 2010. Vol 36. informed these recommendations and we thank the editors of Diabetes & Metabolism for permission to use material from this article.
1.0 Psychological Challenges of Injections

1.1 Children

1. Children have a lower threshold for pain than adults and sometimes find injecting uncomfortable. The healthcare professional (HCP) should ask about pain, since many young people with diabetes will not bring it up spontaneously. (18, 20) A 2

2. Younger children may be helped by distraction techniques (as long as they do not involve deception) or play therapy (e.g. practicing injections on a soft toy) while older children may respond better to Cognitive Behavioural Therapies (CBT) where available. (19) A 2

3. CBT includes relaxation training, guided imagery, graded exposure, active behavioural rehearsal, modelling and reinforcement as well as incentive scheduling. (19) A 2

1.2 Adults

1. The HCP should prepare all people with type 2 diabetes for likely future injectable therapy early in the disease pathway, by explaining the natural, progressive nature of the disease, stating that it includes injectable therapy and making clear that injectable therapy treatment is not a sign of patient failure. (30) A 2

2. Both the short-term and long-term advantages of good glucose management should be emphasised. Finding the right combination of therapies including injectables leading to optimal glucose management should be the goal. (31,32) A 2

3. Through culturally-appropriate pictures and stories, HCPs should show how injectable therapy could enhance both the duration and quality of life. (31) A 2

4. HCPs should reflect on their own perceptions of injectable therapy and avoid using any terms which imply that such therapy is a sign of failure, a form of punishment or a threat. (33,34) A 3

5. Pen devices may have psychological advantages over syringes and therefore maybe more acceptable. (31,35-37) A 2
2.0 Therapeutic Education

1. The HCP should spend time exploring the individual’s anxieties about the injecting process and the injectable therapy itself. (33,40) A 2

2. At the beginning of injection therapy (and at least every year thereafter) the HCP should discuss:
   - Injecting regimen
   - Choice and management of the devices used
   - Choice, care and self-examination of injection sites
   - Correct injection techniques (including site rotation, injection angle and possible use of skin folds)
   - Injection complications and how to avoid them
   - Optimal needle length
   - Safe disposal of used sharps (32-35, 38-41)

   Ensure that each of these topics have been fully understood. (34) A 3

3. Injection technique education should be put in place and regularly reviewed and recorded in the individuals care plan. A 3

4. Current injection practice should be discussed and if possible observed. Injection sites should be examined and palpated, if possible at each visit but at least once a year. (38,40,41) A 3
3.0 Injection Sites

The diagram shows the current recommended injection sites for injectable therapy.

Figure 1:
Recommended injection sites.
4.0 Injection Site Care

1. The site should be inspected and palpated by the individual prior to injection. (5, 6)

2. Avoid using a site showing signs of lipohypertrophy, inflammation, oedema or infection until the problem has been resolved. (15, 49, 50-55)

3. Injections should be given into a clean site using clean hands. (56)

4. The site should be cleansed with soap and water when found to be unclean. (56)

5. Disinfection of the site is usually not required; however, alcohol swabs may be used prior to injections given in the hospital or care home setting. (6, 57-60)

Keeping injection sites healthy:
A simple six step programme that patients should be supported to follow for each injection

1. The site should always be inspected prior to the injection

2. Avoid injecting into sites with lipohypertrophy, oedema, inflammation or signs of infection

3. Inject only into a clean site with clean hands

4. Cleanse the site with domestic soap and water if required

5. Always rotate sites, try to spread the time between a single injection site as much as possible (Refer to section 13)

6. Never reuse needles
5.0 Insulin Storage and Suspension

1. Store injectable medication in current use at room temperature (according to manufacturer's instructions). Avoid direct sunlight and areas of temperature extremes. Store unopened injectable medication in an area of the refrigerator where freezing is unlikely to occur. (66,67)

2. Cloudy insulin (e.g. NPH and pre-mixed insulin) must be gently rolled ten times and inverted ten times (not shaken) until the crystals go back into suspension and the solution becomes milky white. (61-65)

6.0 Reduction of Injection Pain

Tips for making injections less painful include:

- Keeping injectable therapy in use, at room temperature. (66,67)

- Using needles of shorter length and smaller diameter. (157)

- Using a new needle at each injection. (5,6,17,36,68)

- Insert the needle in a quick smooth movement through the skin. (69)

- Inject slowly and ensure that the plunger (syringe) or thumb button (pen) has been fully depressed. (69)

- Remove at the same angle and keep hand steady.

Suspension of NPH insulin before and after electronic tipping to 180° (one cycle)

A: Before (after 24 sedimentation).
B: After 7 cycles.
C: After 20 cycles.
THE INJECTION TECHNIQUE RECOMMENDATIONS

7.0 The Correct Use of Insulin Pen Devices

1 Pen devices should be primed (observing at least a drop at the needle tip) according to the manufacturer's instructions before each injection. Once flow is verified, the desired dose should be dialled and the injection administered. (36,68) A 3

2 Pen devices and cartridges are for single person use only and should never be shared due to the risk of cross contamination. (37,57) A 2

3 Pen needles should be used only once. (3,5,6,17,59,76,77) A 2

4 Using a new needle each time may reduce the risk of needle breakage in the skin, ‘clogging’ of the needle, inaccurate dosing and indirect costs (e.g. Abscess). (77) B 2

5 First the needle is inserted into the skin. After pushing the dose button in completely, the individual should count slowly for 10 seconds before withdrawing the needle in order to deliver the full dose and prevent the leakage of medication. Counting past 10 seconds may be necessary for higher doses. (61,69,71,74,78,79) A 1

6 Needles should be safely disposed of immediately after use and not left attached to the pen. This prevents the entry of air (or other contaminants) into the cartridge as well as the leakage of medication out of the cartridge, which can affect subsequent dose accuracy. (71-75) A 2

7 Injecting through clothing should be discouraged. As needle lengths are becoming shorter there is increased risk of intradermal injection. B 3

1: Make sure you have a clean site and clean hands and check the injection site.

2: Place a new needle onto your pen device and screw firmly into place, but do not over tighten.

3: Remove outer and inner cap.
7.0 The Correct Use of Insulin Pen Devices

4. If the insulin is cloudy type, gently invert 10 times and roll between palms of hands 10 times to fully mix it.

5. Test dose, set the dial to 2 units and with the needle tip pointing upwards and away from you but still visible press the dose button. You should see a bead of insulin appear at the needle tip. Repeat if no insulin appears.

6. Set your dose.

7. Hold the pen in your fist; keep your thumb away from the dose button. With the pen at 90 degrees to the skin surface, gently push the needle through the skin into the injection site.

8. Push down the dose button with your thumb. Hold the needle in the injection site for a full ten seconds after you have finished pushing the dose button. Then gently remove the needle from the skin.

9. Remove the used pen needle and place in sharps box ready for safe disposal.

8.0 The Correct Use of Syringes

1. A syringe should be used only once and disposed of safely. (3, 5, 6, 17, 59, 76, 77) A 2

2. When drawing up insulin, the air equivalent to the dose should be drawn up first and injected into the vial to facilitate easier withdrawal. A 3

3. If air bubbles are seen in the syringe, hold syringe with needle uppermost, tap the barrel to bring them to the top and then remove the bubbles by pushing the plunger to expel the air. A 3

4. Never withdraw insulin from pen cartridges or prefilled pens with a syringe. A 3

STRONGLY RECOMMENDED
RECOMMENDED
UNRESOLVED ISSUE

1. At least one randomised controlled study
2. At least one non-randomised (or non-controlled or epidemiologic) study
3. Consensus expert opinion based on extensive patient experience.
9.0 Absorption Rates

All insulin and GLP1 injections should be administered subcutaneously.

9.1 Human Insulin

1 Intramuscular (IM) injection of all human insulin should be avoided since rapid absorption and serious hypoglycaemia can result. (95,96) A 1

2 The thigh and buttocks are the preferred injection sites when using NPH (intermediate acting) as the basal insulin, since absorption is slowest from these sites. (43,97) A 1

3 The abdomen is the preferred site for soluble human insulin, since absorption is fastest there. (16,44,46,98-100) A 1

4 The absorption of soluble (short acting) human insulin in the elderly can be slow and this insulin should not be used when a rapid effect is needed. (14,101) B 1 (Note: Insulin actions may overlap)

5 For insulin in strengths other than 100units/ml (U100) please refer to manufacturers instructions for use. For those people who require very large doses of insulin U-500 insulin maybe an option instead of U-100. U-500 is only available as soluble insulin. However it has a pharmacokinetic profile more closely simulating NPH human intermediary insulin than soluble short acting human. U-100. (5,6,158) B 1

6 Massaging the site before or after injection may speed up absorption and is not generally recommended. (5,6,70) A 1

This can be short, intermediate or long acting and will absorb at different rates depending where on the body you inject.

Bolus (fast acting) insulin. The abdomen is preferred for this soluble insulin since absorption is fastest here. It will deal quickly with a rise in blood glucose after eating

Basal (intermediate acting) insulin. The thigh and buttocks are the best sites for this insulin as absorption is slowest here. Will reduce the risk of hypo overnight.
9.0 Absorption Rates Continued

9.2 Premixed Insulin

1 Intramuscular (IM) injection of all human insulin should be avoided since rapid absorption and serious hypoglycaemia can result. (95,96) A 1

2 Premixed insulin (human or analogue) should be given in the abdomen in the morning to increase the speed of absorption of the short-acting insulin in order to cover post-breakfast glycaemic excursions. (12) A 1

3 Premixed insulin should be given in the thigh or buttock before evening meal as this leads to slower absorption and decreases the risk of nocturnal hypoglycaemia. (93,97) A 1

4 Massaging the site before or after injection may speed up absorption and is not generally recommended. (5,6,70) C 2

Pre-mixed human and pre-mixed analogue insulin will absorb at different rates depending where on the body you inject.

Morning
When injected in the morning or during the day this insulin will quickly reduce blood glucose levels after meals. Acts fastest when injected into the abdomen.

Evening
Injecting into the thigh or buttock in the evening or before bed will slow the insulin absorption and help reduce risk of hypo at night.
9.0 Absorption Rates Continued

9.3 Insulin Analogues

1 **Rapid-acting** insulin analogues may be given at any of the injection sites, as absorption rates do not appear to be site-specific. (81-85) A 1

2 **Long-acting** insulin analogues may be given at any of the injection sites, as absorption rates do not appear to be site-specific. (87,88) B 2

3 IM injections of **long-acting** analogues must be avoided due to the risk of severe hypoglycaemia or erratic control. (89,90) A 1

5 Do not inject a **rapid and a long acting** analogue insulin in the same site within a 24hr period. B 2

6 Larger doses may cause a delay in the peak and increase the duration of action. (5,6) B 3

7 Massaging the site before or after injection may speed up absorption and is not generally recommended. (5,6,70) C 3

9.4 GLP-1 Agonists

1 Pending further studies, people with diabetes who inject GLP-1 agents should follow the manufacturers instructions. (72) A 2
10.0

Needle Length

10.1 Children and Adolescents

1 Insulin must always be delivered into subcutaneous tissue to help ensure predictable absorption (163-167) A 1

2 There is no clinical reason for recommending needles longer than 4mm for children and adolescents. (118,162) A 2

3 Children and adolescents using a 5 or 6mm needles must lift a skin fold with each injection. (9,83,86,110,112-117,156,157,162) A 1

4 In the majority of cases a 4mm needle may be inserted at 90 degrees without a lifted skin fold. However, considerable care must be taken to ensure there is sufficient combined subcutaneous fat and skin thickness to avoid intramuscular deposition (9,162) A 1

5 If children have only an 8 mm needle available (as is currently the case with syringe users), it is essential to use a lifted skin fold and give injections into the buttocks to minimise the risk of intramuscular injection. (111,118,119,162) A 1

6 Arms should only be used for injections if administered by a third party and using a lifted skin fold. A 3

7 Avoid pushing the pen device in to the skin thus indenting the skin during the injection, as the needle may penetrate deeper than intended and enter the muscle. B 3

10.2 Adults

1 Insulin must always be delivered into subcutaneous tissue to help ensure predictable absorption (163-167) A 1

2 There is no clinical reason for recommending needles longer than 6mm for the administration of insulin. (105,119,132,161) A 2

3 4, 5 and 6 mm needles are suitable for all people with diabetes regardless of BMI for insulin injections; they may not require a lifted skin fold; particularly if using 4 mm needles. (9,74,104,106 – 108,156,157,161) A 1

4 injections of insulin with shorter needles (4, 5, 6 mm) should be given in adults at 90 degrees to the skin surface. (9,74,106 – 108,130,161) A 1
5 To prevent possible IM injections when injecting into slim limbs and abdomens, even short needles (4,5 and 6mm) may warrant use of a lifted skin fold. (9,105,106,131,161)

6 Individuals using ≥8mm needles should ensure they are using a lifted skin fold to avoid IM injections. (105,131,161)

Any insulin injected into muscle will be absorbed too quickly into the bloodstream, which may result in high variability of blood glucose levels and increased risk of hypoglycaemia.

Injecting into muscle is also known to be more painful and might cause bleeding and bruising.

To avoid injecting into the muscle layer it is important to use a short pen needle and if necessary use a lifted skin fold.

Longer pen needles increase the chance of injecting into the muscle, therefore it is crucial to perfect the technique for the needle you are using or switch to short pen needles.
1 All people with diabetes/carers should be taught the correct technique for lifting a skin fold from the onset of injectable therapy. (see Fig 2.)

2 The lifted skin fold should not be squeezed so tightly that it causes skin blanching or pain.

3 The optimal sequence should be:
   1) Make a lifted skin fold
   2) Insert needle into skin at 90° angle
   3) Administer therapy
   4) Leave the needle in the skin for at least 10 seconds after the thumb button plunger is fully depressed
   5) Withdraw needle from the skin
   6) Release lifted skin fold
   7) Dispose of used needle safely (see section 17)

This technique can reduce the risk of intramuscular injection BUT MUST be carried out properly as directed by your nurse or doctor.

Only the thumb, index finger and middle finger should be used, and the skin fold should be held until after the pen needle is removed from the skin.

BEWARE: this technique should take up skin and subcutaneous tissue only, leaving muscle behind.

Figure 2: Correct (left) and incorrect (right) ways of performing the skin fold.
12.0 Rotation of Injecting Sites

1. Individuals should be taught an easy-to-follow rotation scheme from the onset of injection therapy. (146,147) A 2

2. One scheme with proven effectiveness involves dividing the injection site into quadrants (or halves when using the thighs or buttocks); using one quadrant per week and moving always in the same direction, either clockwise or anti-clockwise (see Figures 3 and 4). (148) A 3

3. Injections within any quadrant or half should be spaced at least 1cm from each other in order to avoid repeat tissue trauma. A 1

4. HCP should verify that the rotation scheme is being followed at each visit and should provide advice where needed. A 1

5. Use a variation of educational approaches and available tools to inform how to detect lipohypertrophy. A 1

13.0 Lipohypertrophy

1. Individuals should be taught to examine their own injection sites and how to detect lipohypertrophy. (41,138) A 2

2. Sites should be inspected and any abnormalities documented by the HCP within the individual’s care plan. For more information please refer to the FIT SDP booklet. At a minimum, each site should be examined visually as well as a tactile inspection annually (preferably at each visit). It is recommended that the FIT UK Unexplained Hypoglycemia assessment tool is used. If lipohypertrophy is already present the sites should be monitored at every review. (41,138,189). A 2

3. Using various available tools such as making two ink marks at opposite edges of the lipohypertrophy allows the lipo to be measured and its size recorded for long-term follow up. If visible the area of lipohypertrophy could also be photographed for the same purpose (189). A 3
### 14.0 Bleeding and Bruising

1. Individuals should be reassured that bleeding and bruising do not appear to have adverse clinical consequences for the absorption or action of injectable therapies. (149,150)  
   - **A 2**

2. If persistent bruising occurs review injection technique. Do not reuse.  
   - **B 2**

3. Caution is needed; too great a reduction in dose could lead to an increased risk of Diabetic Ketoacidosis in people with Type 1 Diabetes. However, too small a reduction could result in hypoglycaemia.  
   - **B 3**

4. Individuals should be advised (and rationale explained) not to inject into areas of lipohypertrophy until abnormal tissue returns to normal (which can take months to years). (139,140,189)  
   - **A 2**

5. Switching injections from areas of lipohypertrophy to normal tissue often requires a decrease of the dose of insulin injected. The amount of change varies from one individual to another and should be guided by frequent blood glucose measurements. (50,140,189)  
   - **A 2**

6. The best current preventative and therapeutic strategies for lipohypertrophy include rotation of injection sites with each injection, and non-reuse of needles. (136,137,139,141-143,189)  
   - **A 2**

   Lipoatrophy, although very rare, is a wasting of the subcutaneous tissue at injection sites. Injecting into these sites should be avoided.

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**Figure 5:** Examples of lipohypertrophy  
**Figure 6:** Cluster of injection punctures.

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<th>STRONGLY RECOMMENDED</th>
<th>RECOMMENDED</th>
<th>UNRESOLVED ISSUE</th>
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<tbody>
<tr>
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<td>3</td>
<td>Consensus expert opinion based on extensive patient experience.</td>
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Due to the paucity of evidence regarding insulin injection technique during pregnancy, the following recommendations are based upon available research and clinical experience. (168,169) During pregnancy, questions often arise from women regarding why, where and how insulin is used. The initial concerns of the mother regarding the effect of insulin injections or infusion on the foetus must be explored, to facilitate medication adherence. Ease of use and safety issues (e.g. hypoglycaemia) should also be discussed. (170)

15.1 Recommendations

1 Education regarding insulin use during pregnancy is essential for all pre-gestational women, and women with gestational diabetes who require insulin. This education should include discussion of the psychological adjustment to insulin use, changes to insulin requirements during pregnancy, appropriate injection sites and their rotation, and prevention of hypoglycaemia.

2 Shorter needles (4 mm or 5 mm) should be used to decrease the potential for intramuscular injection. (171-174)
16.0
Safety Issues

1 Sharp devices represent a risk for the transmission of blood-borne pathogens to the user in the event of a needle stick injury (NSI) or mucocutaneous blood exposure. (175) A 1

2 The priority for employers must be to secure the safest possible workplace. The Management of Health and Safety at Work Regulations 1999 make it a legal requirement for employers to carry out risk assessment of their activities. This should identify the measures they need to have in place to comply with their duties under health and safety. This should be achieved through a combination of awareness raising, information, risk assessment, preventing or controlling the risk, safe disposal of sharps and reporting incidents. See figures 1 & 2 page 29. (176) A 3

3 In accordance with a new EU Directive and its transpositions into member-state legislation, use of sharps (Clause 3: definition 4) must be carried out using safety engineered devices where available. (177) This obligation covers all sharps used in diabetes management in the hospital and healthcare sector e.g. settings both private and public where healthcare takes place and might include; hospital, primary care, ambulances, care homes, schools, prisons, nurseries, caregivers in home settings, etc. (178-191) A 1

4 The use of safety engineered devices where available should be considered for people with diabetes who self care, e.g. those known to be positive for HIV, HBV and HCV. Where there are vulnerable people within the household of someone with diabetes, safety engineered devices should be made available. This also includes those who have limited access to safe sharps disposal. B 2
16.0 Safety Issues
Continued

5 When introduced into healthcare settings where a culture of safety has been fostered and appropriate training given, safety-engineered devices can significantly and sustainably decrease the incidence of NSI. (180-185)

6 Any health care setting which uses insulin pens must follow a strict one-patient/one-pen policy. (178,186)

7 When syringes are used, only safety-engineered ones must be accepted and the protective mechanism must be integral to the device. (187)

8 All persons at risk must receive appropriate education and training on ways to minimize risk, including the importance of following optimal injection or lancing techniques, using available safety engineered devices and using Personal Protective Equipment (e.g. gloves). (188)

9 Healthcare providers must encourage reporting of NSI, near misses and incorrect technique within a ‘no blame’ culture. Central review of these reports must take place regularly to facilitate policy change and assess educational needs.

10 Procedures for what to do in the event of a NSI must be clearly communicated. Formal protocols with named clinical care contacts must be available in all areas where sharps are used.
16.0 Safety Issues

FIGURE 1 Always Events and Safety Compliance Bundle

This assessment tool is designed for all clinicians to use in their workplace. If you answer 'No' to any statement in the tool then there is a risk which needs to be addressed in your workplace.

<table>
<thead>
<tr>
<th>ALWAYS EVENTS – THE PREVENTION OF SHARPS INJURIES  Y/N. It is expected that;</th>
</tr>
</thead>
<tbody>
<tr>
<td>All healthcare providers in whatever setting will comply with the EU Council Directive 2010/32/EU by May 2013.</td>
</tr>
<tr>
<td>All healthcare providers will risk assess the need for safety engineered devices (SED) when utilizing sharps in all scenarios.</td>
</tr>
<tr>
<td>All users of sharps should be trained and instructed not to re-cap any sharps devices.</td>
</tr>
<tr>
<td>All healthcare establishments will have in place sharps safety reporting through local governance systems (e.g. Infection Prevention and Control, Occupational Health and Safety, Risk Management et al) to monitor sharps injuries, evaluate potential trends associated with sharps injuries, audit practice, and co-ordinate the trialling and introduction of SED.</td>
</tr>
<tr>
<td>Users of sharps will be involved in trialling and choosing the SED to be used.</td>
</tr>
<tr>
<td>Users of SED will be trained how to optimally use and dispose of the device.</td>
</tr>
<tr>
<td>All users of sharps/SED will be provided with appropriate sharps disposal containers for use at the point of care.</td>
</tr>
<tr>
<td>All sharps will be disposed of in a safe and appropriate manner.</td>
</tr>
<tr>
<td>All sharps disposal containers will be collected appropriately and disposed of according to National guidance.</td>
</tr>
<tr>
<td>All sharps injuries will be reported appropriately through the local reporting system.</td>
</tr>
</tbody>
</table>

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### Safety Issues

**FIGURE 2**

**ALWAYS EVENTS**

The prevention of sharps injuries score.

Alternatively Safety Bundle Approach might be as follows.

**SAFETY COMPLIANCE SCORE**

Scores <100% require an action plan to be developed and implemented.

This assessment tool is designed for all clinicians to use in their workplace. If you answer ‘No’ to any statement in the tool then there is a risk which needs to be addressed in your workplace.

<table>
<thead>
<tr>
<th>COMPLIANCE SAFETY STANDARD</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare providers are aware of the deadline (May 2013) and the implications associated with EU2010/32.</td>
<td>Y</td>
</tr>
<tr>
<td>Healthcare providers have risk assessed the need for safety engineered devices (SED) when utilizing sharps in all scenarios e.g. diabetic syringes, vaccinations, needle/syringe, cannulas, suture, lancets, blades etc.</td>
<td>Y</td>
</tr>
<tr>
<td>Users of sharps are trained to, and do not re-cap any sharps device.</td>
<td>Y</td>
</tr>
<tr>
<td>Healthcare providers have developed an Inoculation Injury Review Group (e.g. Infection Prevention and Control, Occupational Health and Safety, Risk Management et al) to monitor NSI, evaluate potential trends associated with NSI, audit practice, and co-ordinate the trialling and introduction of SED.</td>
<td>Y</td>
</tr>
<tr>
<td>Users of sharps are involved in trialling and choosing the SED to be used (see Appendix 1 of WISE). Users of “sharps” have been trained in how to optimally operate/activate, and use the SED.</td>
<td>Y</td>
</tr>
<tr>
<td>Users of sharps/SED have been provided with appropriate sharps disposal containers for use at the point of care.</td>
<td>Y</td>
</tr>
<tr>
<td>Sharps are disposed of in a safe and appropriate manner.</td>
<td>Y</td>
</tr>
<tr>
<td>Management policies have been determined to ensure that sharps disposal containers are collected promptly and are disposed of according to National guidance.</td>
<td>Y</td>
</tr>
<tr>
<td>Home users are informed of how sharps disposal containers should be stored in the home and how disposal of the boxes may be actioned.</td>
<td>Y</td>
</tr>
<tr>
<td>All sharps injuries will be reported appropriately through the local reporting system.</td>
<td>Y</td>
</tr>
</tbody>
</table>
17.0
Disposal of injecting material

1. All HCPs and individuals/carers should be aware of local regulations regarding sharps disposal. HCPs and individuals/carers should be made aware of the consequences of inappropriate disposal of sharps (e.g. needle stick injuries to others such as refuse workers). (154) A 3

2. Correct disposal should be taught to people with diabetes from the beginning of injection therapy and reinforced throughout. A 3

3. Where available, a needle clipping device could be used. It can be carried in the injection kit. A 3

4. Sharps guard (sharps box) is available on FP10. However, disposal is according to local policy. A 3

5. Under no circumstance should sharps material be disposed of into the public rubbish or household refuse system. A 3

6. Empty pen devices can be disposed of in the normal household refuse when the needle is removed. B 3

Figure 9. All needles should be disposed of in an approved sharps container after use.
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THE INJECTION TECHNIQUE RECOMMENDATIONS


135 Photographs courtesy of Lourdes Saez-de Ibarra and Ruth Gaspar, Diabetes Nurses and Specialist Educators from La Paz Hospital, Madrid, Spain.


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Contributors

All contributors who reviewed this document were professional clinicians or people with a special interest in diabetes in the UK.