



## CLINICAL PRACTICE GUIDELINE

# Niki t34 syringe pump: continuous subcutaneous infusion management

This document should be read in conjunction with the [Disclaimer](#)

### Aim

To guide staff in the appropriate commencement and management of the NIKI T 34 syringe pump which is a very useful alternative when the oral route is not possible or practical e.g. when the patient is unable to swallow safely, has intractable vomiting, intestinal obstruction or is unable to absorb oral medications for any reason.

### Background

The Nikki pump is an ingenious system that is able to deliver a continuous infusion of medications via the subcutaneous route, for symptom control. It is most frequently used in palliative care settings and persistent pain syndromes.

### Key points

1. Prior to looking after a patient with this pump, all staff must have received instruction on how to operate the pump.
2. Advise the patient that the pump must not get wet. A protective plastic bag should be used in the shower.

### The system consists of:

1. A subcutaneous catheter (Saf T Intima) which is placed in the subcutaneous tissue and held in place by a clear dressing. A clear dressing is preferred because it allows easy inspection of the insertion site.
2. The cannula is connected to the Nikki pump via a variable length of sterile tubing.
3. The Nikki pump is a small portable machine which drives a syringe. It is powered by a 9 volt battery. The pump itself is enclosed in sturdy plastic container which can be locked and is tamper proof.
4. A syringe which can contain a variety of medications that is needed for symptom control. This can be adjusted as necessary for optimum symptom control. The pump pushes the plunger of the syringe steadily over 24 hours so that a consistent dose of medication is delivered continuously and a steady blood level of medications is maintained.

### Advantages of the Nikki System

1. Consistent 24 hour delivery of medications ensuring constant optimal blood levels and hence steady symptom control.
2. It can be used when medications cannot be taken orally

3. It is easy to use and does not require venous access
4. The cannula is to be changed every 7 days, reducing the need for repeated punctures to the skin and is therefore less traumatic for the patient.

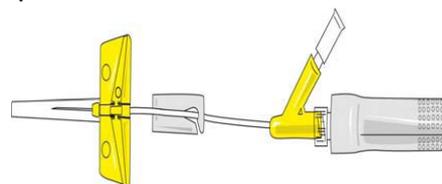
### Disadvantages of the Nikki System:

1. As it involves puncturing the skin, infection can occur. However, the infections are generally superficial, uncommon and easy to diagnose and manage.
2. It involves use of a small machine that needs to be carried by the ambulant patient. It is not water proof and needs either to be disconnected or covered by a plastic bag when showering.
3. Only some medications can be delivered by the subcutaneous route (Please refer to Palliative Care Consultant).
4. With the initial set up and with any change of medications, it will take about 3 hours for the blood levels to stabilise. It is therefore not useful for instant symptom control. Its main use is the delivery of medications to maintain background levels for symptom control similar to slow release formulations for example MS Contin.
5. It does not have a bolus function for delivering rescue medications for control of break through symptoms.

***If in doubt, please contact the Palliative Care Consultant.***

### Equipment

- Subcutaneous Infusion Chart (MR 809.01) Prescription and Monitoring a Subcutaneous Syringe Driver (NIKI T43) with documented prescription by RMO
- NIKI T34 syringe pump, rigid locked box and carry pouch
- SAF-T-Intima™ catheter. Saf-T-Intima™ catheters are used to reduce local site reactions and therefore increase longevity and reduce needle stick injuries.
- 70% isopropyl alcohol 2% chlorhexidine cleansing swab
- Subcutaneous drug additive label
- Gloves (non-sterile) and PPE as required
- Needleless cap (bung)
- Prescribed medication, diluent and drawing-up needles/syringe
- A valid prescription must be written on MR 809.01 Subcutaneous Niki T34Syringe Driver
- 20mL Luer Lock syringe (occasionally a 30mL may be required)
- Luer lock extension tubing min. 75cm to max. 100cm in length
- 10cm x 10cm sterile transparent dressing (e.g. tegaderm, opsite)
- 9 volt battery (ensure a spare battery is available on the ward). Always use an alkaline battery. Do not use non-alkaline or rechargeable batteries.



For Subcutaneous Use Only				
Patient ID	DOB			
Medicine/s	Amount (units)	Volume (mL)	Conc (units/mL)	
Diluent				
Date	Prepared by		Checked by	
Time				

## Procedure

Note: Attend the 5 moments of hand hygiene throughout the procedures as required.

### Day 1- Commencement of infusion

Ensure the NIKI T34 has been pre-programmed to a fixed duration of 24 hours and has the programme lock function on.

#### Fitting the Battery

1. Slide the compartment cover at the back of the pump. Place the battery into the compartment.
2. Ensure the battery terminals are aligned as per the diagram inside the compartment.

#### Battery Test

1. Always check there is enough charge to set up the infusion (usually > 20%).
2. Switch the pump on (press and hold ON/OFF button until “beeps”).
3. Press the INFO key.
4. Select ‘BATTERY LIFE’ from the menu and press YES to confirm.
5. Verify that sufficient battery charge is available to complete the current programme. If not, change the battery. Then hold the ON/OFF button until “beeps” to turn off.

#### Syringe Selection

1. The T34 is programmed to recognise most commonly used syringes from 2- 50mL

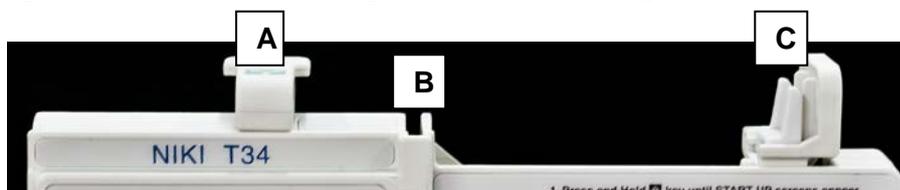
#### Loading the Syringe

1. Perform hand hygiene.
2. Draw up the prescribed medication and diluent to equal 18mL in total.
3. Connect the extension line via needleless cap (bung) to the available Y connector of the SAF-T-Intima™ catheter.
4. Connect the extension line to the Luer Lock syringe.
5. Press and hold the ON/OFF button until it beeps to turn on.
6. The version of the software will flash on the screen. The screen will then flash ‘Pre-loading’. Wait for the pump to pre load. It calibrates itself during this process.
7. Measure the drawn up syringe against the NIKI T34 and press either FF or BACK to align actuator to the syringe plunger. The actuator can only be moved in this way. Do not try and force and move the actuator manually as this could damage the device.

8. The pump will state ‘Load Syringe’.



9. Raise the barrel arm clamp and place the syringe in, then lower the barrel arm clamp. If the syringe is not placed in correctly the screen will flash at which sensor the placement is incorrect. Check the 3 sensors:  
A - Barrel Clamp Arm  
B - Syringe ear/collar sensor small metal switch. Detect the secure loading of the syringe collar.  
C - Plunger Sensor- ensure plunger between the fingers.



10. Once the syringe is correctly loaded, the screen will ask for identification of the syringe brand. Use the ▲ ▼ to select syringe brand.



11. Review and check the data on the screen- Volume, Duration, Rate e.g.18mL, 24 hours, 0.75mL / hour. Recommended rate range 0.74- 0.76 ml/hr.



12. To confirm press 'YES'
13. Display will read 'START INFUSION'. **DO NOT COMMENCE INFUSION IF THIS IS DAY 1** as the line requires priming, or if changing extension tubing and catheter.

### Priming the line

14. **Do not** manually prime the extension set, use the pump settings to do this.
15. Press the 'FF' button. The display will read 'PURGE DISCONNECT FROM PATIENT'. Note: If priming fails to be completed correctly, remove the syringe, turn the pump off and recommence from step 1.
16. Confirm disconnection by pressing 'YES'.
17. To prime the line, press and hold the 'FF' button. Maximum purge is 2mL. The screen will display: 'press YES to resume, NO for new syringe'. Press 'YES' to

resume, not NO for new syringe, otherwise pump will not have calculated for priming the line.

18. Once primed, again select the correct brand of the syringe.

19. Press 'YES' to resume.

20. The display will now show the new volume and a new duration. The rate will remain constant.

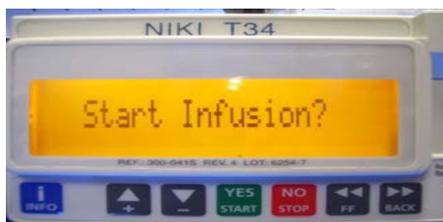


21. To confirm press 'YES'.

22. Connect the infusion line to the patient.

### Commencing the infusion

1. Pump will state 'START INFUSION?'. To confirm press 'YES'.



2. With the commencement of the pump the keypad lock needs to be activated. With the pump infusing, press and hold the INFO key until a chart is displayed showing a bar moving from left to right. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been activated.

3. During the infusion the rate will always be displayed in the middle of the screen.



4. At the bottom, the screen will alternate between brand and size of syringe and pump delivering.

5. A green light will flash intermittently above the ON/OFF key. This indicates the pump is functioning correctly.

6. Place the pump in the allocated tamper proof box and ensure it is locked. The locked box must then be placed inside the protective pouch.



7. Complete the medication additive label and place on the extension line. **Do not put the label on the syringe or any part of the pump** (this alters the syringe diameter and the volume will be miscalculated by the pump).
8. Document the date of insertion on the MR 809.01 Subcutaneous Infusion Chart.

### Day 2 onwards

1. Perform hand hygiene as per the 5 moments throughout procedure as required.
2. Prepare the medication as per the prescription. If the medication doses are not changing, then there is no need to change the extension tubing or catheter. If the medication is changing, change the tubing and the catheter and repeat the setup as per Day 1 instructions.
3. Remove the keypad lock by pressing and holding the 'INFO' button until a chart is displayed showing a bar moving from right to left. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been deactivated.
4. Press the **'NO / STOP'** BUTTON.
5. Raise the arm clamp, remove the old syringe and attach the new syringe to the infusion line and close the arm clamp.
6. Measure drawn up syringe against the NIKI T34 and press either **'FF'** or **'BACK'** to align the actuator to the syringe plunger. Refer to the loading syringe section above
7. Select the correct syringe brand.
8. Select **'NO'** for a new syringe. It is important to select 'NO' for new syringe, otherwise the pump will recalculate the rate and time incorporating the previous syringe volume.
9. Check and review the data on the screen (Volume, Duration, and Rate).
10. To confirm press **'YES'**.
11. When 'START INFUSION?' is displayed, press **'YES'**. Ensure if the tubing was clamped, that the clamp is opened prior to recommencement of infusion, otherwise an occlusion alarm will be triggered.
12. Activate the keypad lock by pressing and holding the INFO button until a chart is displayed showing a bar moving from left to right. Hold the button until the bar has moved completely across the screen and a beep is heard to confirm the lock is activated. The display will show the key pad is locked.
13. Place pump in locked box, ensure it is locked and then place in protective pouch.
14. Complete additive label and place onto extension tubing. Do not place on syringe or pump as it alters recognition of syringe size and interpretation.
15. Document the date of insertion / syringe change on the MR 809.01 Subcutaneous Infusion Chart.

## Observations and ongoing management

1. Observations hourly for the first two hours and then 4 hourly (or more frequently if clinically indicated).
2. Pump: Check the display – pump is working and infusion rate is as programmed, and document observations on the MR 809.01 Subcutaneous Infusion Chart. Include volume infused (VI) and Volume To Be Infused (VTBI), battery check (% remaining), light is flashing (pump is operational), time remaining:
  - Press the INFO button (single press) to check: VTBI and VI
  - Press the INFO button (double press) to check: Battery level – % remaining
3. Check medication solution for crystallisation or precipitation. If present, discard the solution (If a S4R/S8, the discard should be witnessed by two authorised persons, of whom at least one is to be a Registered Nurse). Record the discarded volume on MR 809.01 Subcutaneous Infusion Chart and in the relevant S4/S8 Register.
4. Pain scores:
  - Omit if the patient is sleeping.
  - If >5 and is unsatisfactory to the patient, administer PRN analgesia as prescribed on the medication chart.
  - If the pain continues to remain unsatisfactory to the patient, contact the prescriber or Medical Officer (MO).
5. Nausea: If unsatisfactory to patient, administer PRN anti-emetics as prescribed on medication chart. If unresolved, contact the prescriber/ MO.
6. Document the consciousness/ rousability status. Respiratory depression is often preceded by sedation.
7. At least daily, check the insertion site for:
  - Inflammation
  - Swelling
  - Leaking
  - Hardness
  - Bleeding
  - Pain

The site should be changed if any of these symptoms are present. The Safe-T-Intima™ should be removed and replaced on the 7<sup>th</sup> day after insertion.

  - Document the site assessment and/or site change in the Integrated Progress Notes and update the care plan as required.

## Discontinuing the syringe pump

1. Explain the procedure and reason why the pump is to be discontinued.
2. Perform hand hygiene as per the 5 moments throughout procedure as required.
3. Record the final VTBI and VI.
4. Press and hold the 'INFO' key to unlock the keypad.
5. Press the 'NO / STOP' button.
6. Extend the arm clamp and remove the syringe from the pump.
7. Press and hold down the 'ON/OFF' button until the screen turns off.
8. Remove the battery from the syringe pump.
9. Remove the extension set from the Saf-T-Intima™
10. Perform hand hygiene and don gloves/PPE.
11. Remove the Saf-T-Intima™ catheter, clean the site and apply a dressing as required.

12. Remove gloves/PPE and perform hand hygiene.
13. Dispose of any unused medications as per protocol. Document discarded volume on MR 809.01 Subcutaneous Infusion Chart.
14. Clean the syringe pump with detergent wipes. **It must not be cleaned with alcohol impregnated wipes.**

## References and resources

1. Instruction Manual- Niki t34 syringe pump  
<https://www.infusystem.com/images/manuals/Niki%20T34.pdf>
2. Check list- Niki t34 syringe pump available from  
[http://www.rch.org.au/uploadedFiles/Main/Content/rch\\_palliative/Check\\_List\\_-\\_NIKI\\_T34\\_Setup,priming\\_with\\_priming\\_software.doc](http://www.rch.org.au/uploadedFiles/Main/Content/rch_palliative/Check_List_-_NIKI_T34_Setup,priming_with_priming_software.doc).
3. Sir Charles Gairdner Hospital- Nursing Practice Guidelines. **Subcutaneous Infusions (Syringe Drivers) and Subcutaneous Fluid Administration (Practice Guideline No. 32)** 2013. Available from:  
[http://chips.ge2.health.wa.gov.au/NPG/pdf/Subcutaneous%20Infusions%20and%20Fluid%20Administration%20\(32\).pdf](http://chips.ge2.health.wa.gov.au/NPG/pdf/Subcutaneous%20Infusions%20and%20Fluid%20Administration%20(32).pdf).

## Related policies

## Related WNHS policies, procedures and guidelines

Palliative Care

Keywords:	NIKI Syringe pump, T34 Syringe pump, subcutaneous infusion for palliative pain, subcutaneous medication for palliative care, subcutaneous syringe driver for palliative pain, Saf-T-Intima,		
Document owner:	OGID		
Author / Reviewer:	O&G Clinical Guidelines Co-ordinator		
Date first issued:	08/2012		
Last reviewed:	04/05/2017	Next review date:	04/05/2020
Endorsed by:	Gynaecology Services Management Sub-Committee (GSMSC)	Date:	8/6/2017
Standards Applicable:	NSQHS Standards: 1  Governance, 3  Infection Control, 4  Medication Safety,		

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