Dear Healthcare Professional,

Enclosed is an update regarding the potential for reduced battery performance that can lead to sudden loss of therapy in a small percentage of SynchroMed® II pumps. Medtronic first communicated about this issue in a July 2009 letter to physicians. The enclosed letter provides an update regarding the scope and occurrence, and emphasizes previously communicated patient management recommendations. Medtronic is not retrieving the SynchroMed II pump from the field or recommending prophylactic replacement of the devices.

Please:

- Review the enclosed Urgent: Medical Device Correction
- Complete and return the “Reply Card”

To comply with FDA regulations, Medtronic requires confirmation that you have received and understand this information. Please respond promptly to prevent additional requests for confirmation.

Note: if you do not implant and/or manage SynchroMed II pumps, or if you received this document in error, please email Medtronic at Neuro.Quality@medtronic.com.

Sincerely,

Jill Smith
Vice President, Quality
Medtronic Neuromodulation

Enclosures:
- Dear Healthcare Professional communication
- Reply Card
- Postage Paid Return Envelope
Urgent: Medical Device Correction

Battery Performance of the Model 8637 SynchroMed® II Implantable Drug Infusion Pumps

Update to the 2009 Communication

Dear Healthcare Professional:

In July 2009, Medtronic sent a Medical Device Correction letter to Healthcare Professionals regarding the potential for reduced battery performance that can lead to sudden loss of therapy in a small percentage of Medtronic Model 8637 SynchroMed® II pumps. The purpose of this communication is to provide you with updated information regarding the scope and occurrence of this issue, and to emphasize previously communicated patient management recommendations. Medtronic is not retrieving the SynchroMed II pump from the field or recommending prophylactic replacement of the devices.

Nature of the Device Issue:
Reduced battery performance is caused by the formation of a resistive film within the SynchroMed II pump battery. Pumps may exhibit Low Battery Reset (critical alarm), premature Elective Replacement Indicator (non-critical alarm), or premature End of Service (critical alarm). For affected pumps, the minimum timeframe of 90 days between Elective Replacement Indicator and End of Service may also be reduced. Refer to the enclosed Pump Event Information for: 1) a description of Low Battery Reset, Elective Replacement Indicator, and End of Service, and 2) screenshots depicting how the Medtronic N'Vision® Model 8840 clinician programmer displays these events.

Potential Severity of the Issue:
A patient with a pump exhibiting reduced battery performance may experience return of underlying symptoms and/or withdrawal symptoms. Patients receiving intrathecal baclofen therapy are at risk for baclofen withdrawal syndrome, which can lead to a life threatening condition if not promptly and effectively treated. One patient death has been attributed to this issue, and it was determined to be due to baclofen withdrawal syndrome. For information on other drugs, please refer to the product labeling for the drug being administered. Patients with pumps experiencing Low Battery Reset or premature Elective Replacement Indicator due to this issue will require surgical revision to replace or remove their pump.

As of May 31, 2011, there have been 55 confirmed cases from approximately 139,653 SynchroMed II pump implants worldwide. Returned product analysis of these pumps showed that the alarms were functioning as designed. The SynchroMed II pump was designed to last up to 84 months.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Confirmed Occurrences*</th>
<th>Implant Duration at time of issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Battery Reset</td>
<td>45</td>
<td>45 – 78 months</td>
</tr>
<tr>
<td>Premature Elective Replacement Indicator</td>
<td>10</td>
<td>47 – 77 months</td>
</tr>
</tbody>
</table>

* All but one of the reports occurred in pumps with batteries manufactured prior to March 17, 2005.
Scope:

**Pumps with batteries manufactured prior to March 17, 2005:** As of May 31, 2011, statistical analysis of the confirmed cases has estimated the cumulative probability for pump failure due to this issue to be 1.1% at 84 months post implant with an upper bound estimate of 1.9%. Note that this 1.1% cumulative probability applies to a patient newly implanted, and reflects the risk over the full 7 years of expected pump life. The majority of pumps currently implanted were manufactured 6 years ago and therefore the probability for pump failure between now and end of service life is less than 1.1%. These rates are within the overall rates estimated in the July 2009 communication.

**Pumps with batteries manufactured on or after March 17, 2005:** As of May 31, 2011, statistical analysis of the confirmed case has estimated the cumulative probability for pump failure due to this issue to be 0.03% at 72 months post implant with an upper bound estimate of 0.2%.

For additional detail on SynchroMed II failure rates and survival analyses, refer to the enclosed *Pump Survival* document.

The enclosed *Physician Patient Detail Report* contains information on your patients who, according to our records, are implanted with a SynchroMed II pump. The data are segregated based on whether the batteries were manufactured *prior to March 17, 2005* or *on or after March 17, 2005*. The following website can also be used to determine the battery manufacture timeframe based on serial number: [http://synchromed2battery.medtronic.com](http://synchromed2battery.medtronic.com).

**Recommendations:**

Medtronic does not recommend prophylactic replacement of SynchroMed II pumps because of the estimated low occurrence rates, the presence of pump alarms, and the risks associated with replacement surgery. This position has been reviewed and is supported by an experienced external physician panel. However, appropriate consideration should be given to individual patient medical needs. When the critical or non-critical alarms noted below occur, Medtronic strongly recommends that replacement surgery be scheduled as soon as possible for these patients.

Refer to the enclosed *Pump Event Information* for: 1) a description of Low Battery Reset (critical alarm), Elective Replacement Indicator (non-critical alarm), and End of Service (critical alarm), and 2) screenshots depicting how events are displayed and reported with the N’Vision Model 8840 clinician programmer.

If Low Battery Reset (critical alarm) Occurs: **Replacement surgery should be scheduled as soon as possible.** Although you may be able to reprogram the pump, the issue may reoccur *at any time*. Alternative medical management should be considered if appropriate.

If premature Elective Replacement Indicator (non-critical alarm) or End of Service (critical alarm) Occurs: **Replacement surgery should be scheduled as soon as possible.** In the case of premature Elective Replacement Indicator, the minimum timeframe of 90 days between Elective Replacement Indicator and End of Service may be reduced due to this battery issue. The date for scheduled replacement of the pump that is displayed on the Model 8840 N’Vision clinician programmer may not be accurate for those pumps experiencing reduced battery performance. Alternative medical management should be considered if appropriate. Elective Replacement Indicator may be considered premature if it occurs sooner than expected based on implant duration and flow rate.

Contact Medtronic Technical Services (1-800-707-0933) for assistance determining if an Elective Replacement Indicator message can be considered premature.
Ongoing Patient Management Recommendations:

- Increase the critical alarm frequency to improve the probability of early identification of a Low Battery Reset (critical alarm) condition. Medtronic recommends changing the critical alarm interval frequency to sound every 10 minutes. Refer to the enclosed Alarm Information sheet for details.

- Remind patients, their caregivers, and your appropriate staff members to be alert for pump alarms. At implant or follow-up visits, perform an alarm test to provide an opportunity for patients and caregivers to hear and differentiate between the critical and non-critical pump alarms. Refer to the enclosed Alarm Information sheet for details.

- Reinforce with patients and caregivers information on the signs and symptoms of withdrawal due to therapy cessation, and the importance of contacting their provider immediately.

- Refer to the enclosed Lioresal™ Intrathecal (Baclofen Injection) Emergency Procedures sheet for patient management recommendations associated with baclofen withdrawal. Patients receiving intrathecal baclofen therapy are at higher risk for adverse events, as baclofen withdrawal can lead to a life threatening condition if not promptly and effectively treated.

- Inform patients about the importance of keeping their pump refill appointments and contacting their physician immediately if their pump alarm sounds or if they notice a change in symptoms. Remind patients to always carry their patient identification card.

- A sample patient informational letter is attached for use with your patients.

Additional Information:
The US Food and Drug Administration (FDA) has been made aware of this SynchroMed II pump issue. Medtronic is working with the FDA to implement a battery change that is intended to prevent this issue from occurring in future pumps. We will inform you when SynchroMed II pumps with the new battery will be available within the US. This battery change has been implemented in several regions, including Europe, Australia, New Zealand, Canada, Africa and India.

Please report any malfunction or adverse event related to a device to Medtronic Neuromodulation Technical Services, 24 hours a day, seven days a week, at 1-800-707-0933 and FDA’s MedWatch Program (www.fda.gov/medwatch).

We are committed to answering your questions and keeping you informed. Medtronic continues to monitor post market performance and investigate this issue and will provide you with an update if our recommendations change.

As always, Medtronic requests you return any explanted products to Medtronic Returned Products Analysis. If you have questions please contact your Medtronic field representative, or contact Medtronic Neuromodulation Technical Services at 1-800-707-0933. This important patient management information is also available at http://www.professional.medtronic.com under the heading Product Advisory.

Sincerely,

Jill Smith
Vice President Quality
Medtronic Neuromodulation
Enclosures:

- Pump Event Information
- Pump Survival
- Alarm Information Sheet
- Lioresal Emergency Procedures Sheet
- Sample Patient Letter
- Physician Patient Detail Report(s)
- Physician Reply Card
- Postage Paid Return Envelope
# Pump Event Information

## SynchroMed® II Battery Performance

<table>
<thead>
<tr>
<th>Event</th>
<th>What it means</th>
<th>Type of Alarm</th>
<th>Therapeutic Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Battery Reset</td>
<td>LBR occurs when battery voltage momentarily drops below 1.975 volts. If the voltage drop causes any data loss or corruption in pump memory, a <em>safe state</em> event will be triggered, resulting in infusion at the <em>minimum rate mode</em> of 6 microliters/day (0.006 milliliters/day) rather than the previously programmed rate. Although you may be able to reprogram the pump, the issue may reoccur at any time.</td>
<td>Critical</td>
<td>If safe state is triggered, the pump will go into minimum rate mode: 6 microliters/day (0.006 milliliters/day) rather than the previously programmed rate. The minimum rate mode in effect during a pump <em>safe state</em> is non-therapeutic and can result in loss of drug effect and drug withdrawal.</td>
</tr>
<tr>
<td>Elective Replacement Indicator</td>
<td>ERI activates when the pump nears the end of its service life (EOS). At ERI, the pump continues to infuse at the programmed rate.</td>
<td>Non-Critical</td>
<td>A normal pump will operate for a minimum of 90 days at rates up to 1.5 mL/day prior to EOS. In the case of premature ERI**, the minimum timeframe of 90 days between ERI and EOS may be reduced. This means that the date for scheduled replacement of the pump that is displayed on the N’Vision® Model 8840 clinician programmer may not be accurate.</td>
</tr>
<tr>
<td>End Of Service</td>
<td>EOS activation indicates the pump has reached the end of its service life. At EOS, the pump permanently stops infusing, but telemetry is available until the pump battery is depleted.</td>
<td>Critical</td>
<td>Pump will permanently stop delivering drug.</td>
</tr>
</tbody>
</table>

* Note: *safe state* does not mean a clinically safe rate of infusion. The minimum rate mode in effect during a pump *safe state* is non-therapeutic and can result in loss of drug effect and/or drug withdrawal. Patients receiving intrathecal baclofen therapy are at higher risk for adverse events, as baclofen withdrawal can lead to a life threatening condition if not promptly and effectively treated.

** Note: ERI may be considered premature if it occurs sooner than expected based on implant duration and flow rate. Contact Medtronic Technical Services (1-800-707-0933) for assistance determining if an ERI message can be considered premature.
**Low Battery Reset**

**8840 N’Vision Programmer Screen**

- **8840 Dialog Box** – Notification for reset to safe state
- **8840 Pump Status** – Shows pump in safe state, and Infusion mode at “Minimum Rate”

**8840 N’Vision Programmer Printouts**

- **Print Report**
- **Event Log** – Specifies it was a Low Battery Reset
- **Print Report** – Shows “Reset Occurred”

*Safe state* does not mean a clinically safe rate of infusion. The minimum rate mode in effect during a pump safe state is non-therapeutic and can result in loss of drug effect and/or drug withdrawal.
Elective Replacement Indicator

8840 N’Vision Programmer Screen

[Attention Dialog Box]

8840 Dialog Box –
Notification of ERI with calculated 90 day replacement date

8840 Pump Status –
Shows ERI Occurred, and calculated 90 day window to EOS

8840 N’Vision Programmer Printouts

[Print Report]

Print Report --
Shows ERI Occurred, and calculated 90 day window to EOS

[Event Log]

Event Log --
Specifies ERI Occurred

The minimum timeframe of 90 days between ERI and EOS may be reduced in an affected pump; therefore the scheduled replacement date displayed on the Print Report may not be accurate.
End of Service

8840 N’Vision Programmer Screen

[Attention Dialog Box]

[8840 Dialog Box – Notification for Terminal Event and EOS Occurred]

[8840 Pump Status – Notification for Terminal Event and EOS Occurred]

8840 N’Vision Programmer Printouts

[Print Report]

[Event Log]

[Event Log -- Shows Date that the EOS event was triggered]

[Print Report -- Shows EOS Occurred]

At EOS, the pump stops infusing drug. This will result in loss of drug effect and/or potentially drug withdrawal. Telemetry is available until the pump battery is depleted.
Figures 1 and 2 show the cumulative survival probability for SynchroMed II pumps from this battery performance issue by length of implant time. These graphs were generated using US device registration and returned product analysis data as of May 31, 2011.

- As shown in Figure 1, SynchroMed II pumps in the before group (pumps with batteries manufactured prior to March 17, 2005) show 98.9% survival from the battery performance issue 84 months post implant.

- As shown in Figure 2, SynchroMed II pumps in the after group (pumps with batteries manufactured on or after March 17, 2005) show 99.97% survival from the battery performance issue 72 months post implant.

The pump has two different alarms, a critical (two tone) alarm and a non-critical (single tone) alarm.

<table>
<thead>
<tr>
<th>Alarm Type</th>
<th>Alarm Sound</th>
<th>Alarm Meaning</th>
<th>Available Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Two tone</td>
<td>Pump has stopped or will stop soon; immediate physician attention is needed</td>
<td>10 minute increments from 10 minutes to 2 hours</td>
</tr>
<tr>
<td>Non-critical</td>
<td>Single tone</td>
<td>Not as urgent; prompt physician attention is needed</td>
<td>1 hour increments from 1 to 6 hours</td>
</tr>
</tbody>
</table>
EMERGENCY PROCEDURE

Symptoms of Underdose
Pruritus, hypotension, paresthesias, fever, and altered mental state.

Symptoms of Intrathecal Baclofen Withdrawal
High fever, altered mental status, exaggerated rebound spasticity and muscle rigidity that in rare cases has advanced to rhabdomyolysis, multiple organ system failure and death. The condition may resemble autonomic dysreflexia, sepsis, malignant hyperthermia, and neuroleptic-malignant syndrome.

Medtronic SynchroMed Infusion System
The SynchroMed Infusion System consists of an implantable programmable pump, intraspinal catheter and neuroleptic-malignant syndrome.

Suggested Treatment for Intrathecal Baclofen Underdose/Withdrawal

Initiate life-sustaining measures if indicated.

If a patient receiving ITB Therapy® (Intrathecal Baclofen Therapy) presents with the signs and symptoms suggestive of baclofen withdrawal (above), the following approach is consistent with that suggested by a panel of therapy-experienced clinicians convened to explore this issue:1

1. Immediately contact a physician experienced in ITB Therapy, preferably the physician managing the therapy for the patient in question; follow the recommendations of this physician. This step is important even if the patient’s signs and symptoms seem mild.

2. If an ITB Therapy physician is unavailable, consider instituting one or more of the following options, unless otherwise contraindicated:
- high-dose oral* or enteral baclofen
- restoration of intrathecal baclofen infusion
- intravenous benzodiazepines by continuous or intermittent infusion, titrating the dosage until the desired therapeutic effect is achieved

*Note: Oral baclofen should not be relied upon as the sole treatment for intrathecal baclofen withdrawal syndrome.

The physician experienced with ITB Therapy should expeditiously attempt device troubleshooting. This may include, but is not limited to:
- interrogation of the pump status using the Medtronic pump programmer
- radiologic examination of the pump and catheter system
- a pump refill procedure with the appropriate concentration of baclofen
- system troubleshooting procedures to determine the cause of ITB Therapy interruption
- surgical repair, revision, or replacement of system components

Baclofen withdrawal has been identified during post-approval use of Lioresal® Intrathecal (baclofen injection). Because this reaction is reported spontaneously from a population of uncertain size, it is not possible to reliably estimate the frequency.

Abrupt withdrawal of intrathecal baclofen, regardless of the cause, has, in rare cases, resulted in a life-threatening syndrome that included high fever, altered mental status, exaggerated rebound spasticity and muscle rigidity that progressed to rhabdomyolysis, multiple organ-system failure, and death.

All patients receiving ITB Therapy are potentially at risk. Some clinical characteristics of the advanced intrathecal baclofen withdrawal syndrome may resemble autonomic dysreflexia, or infection (sepsis), malignant hyperthermia, neuroleptic-malignant syndrome, and other conditions associated with a hypermetabolic state or widespread rhabdomyolysis. A rapid and accurate diagnosis is important in an emergency room or intensive care setting before initiating treatment in order to prevent the potentially life-threatening central nervous and systemic effects of intrathecal baclofen withdrawal.

Contact Information

ITB Therapy® Physician

Name: ______________________________ Phone: ____________________________
City: ______________________________ State: ____________________________

Report incident to Medtronic, Inc. In the U.S. call 1-800-707-0933. In other world areas contact your Medtronic representative.

Refer to the drug manufacturer’s package insert for a complete list of indications, contraindications, warnings, precautions, adverse events, and dosage and administration information.


Lioresal® is a registered trademark of Novartis Pharmaceuticals Corporation.
**EMERGENCY PROCEDURE**

**Symptoms of Overdose**
Drowsiness, lightheadedness, dizziness, somnolence, respiratory depression, seizures, rostral progression of hypotonia and loss of consciousness progressing to coma.

There is no specific antidote for treating overdoses of Lioresal® Intrathecal (baclofen injection). However, anecdotal reports suggest that intravenous physostigmine may reverse central side effects, notably drowsiness and respiratory depression.²

**Medtronic SynchroMed Infusion System**
The SynchroMed Infusion System consists of an implantable programmable pump, intraspinal catheter and pump programmer. The pump is implanted in the lower abdomen and dispenses medication from its reservoir through the catheter to the intrathecal or epidural space. Some pumps are equipped with a catheter access port that bypasses the pump reservoir, permitting direct catheter access to the intrathecal or epidural space.

**Suggested Treatment for Intrathecal Baclofen Overdose**

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**Emergency Procedure to Empty the Pump Reservoir**

**Equipment:**
- 22-gauge or smaller needle (1.5 in./3.8 cm or 2 in./5.1 cm)
- 20 mL luer-lock syringe
- Antiseptic agent

1. Locate the pump (right or left abdomen) by palpation.
   - Pump diameter is approximately 3 in./7 cm.
   - The reservoir fill port is located in the CENTER of the pump.

2. Prepare injection site by cleansing area using an antiseptic agent; allow skin to dry.
3. If not contraindicated, withdraw 30-40 mL CSF by lumbar puncture or through the catheter access port to reduce baclofen concentration in the CSF.
   - For instructions on how to withdraw CSF through the catheter access port, please contact Medtronic Technical Services. In the U.S. call 1-800-707-0933.
   - In other world areas contact your Medtronic representative.

4. If not contraindicated, administer physostigmine if not contraindicated.
   - Adult Dosage: 0.5 to 1.0 mg IM or IV @ slow controlled rate of not >1mg/min.
   - (May repeat every 10-30 min. if desired patient response is not obtained.)
   - Pediatric Dosage: 0.02 mg/kg IM or IV, not >0.5 mg/min. May repeat every 5-10 min. up to 2 mg max.

5. Notify patient’s ITB Therapy™ Physician (see right).
6. Continue to monitor closely for symptom recurrence.

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**Medtronic SynchroMed Pump Descriptions**

- **SynchroMed Ii Pumps**
- **SynchroMed EL Pumps**

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**Contact Information**

**ITB Therapy™ Physician**

Name: __________________________ Phone: __________________________

City: __________________________ State: __________________________

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In the U.S. emergency technical support is available 24 hours/day for clinicians managing patients with Medtronic SynchroMed® Infusion System implants: 800-707-0933. In other world areas contact your Medtronic representative.
Dear Patient or Caregiver,

Medtronic recently updated doctors about a possible battery issue in a small percentage of SynchroMed® II drug pumps. You may have already heard about this issue. It was first shared with doctors in 2009.

What you should know about this issue:

- Medtronic calls this the “battery performance” issue.
- The chance of this happening is low.
- If this occurs it may affect drug delivery and your pump alarm will sound.
- If an alarm sounds or your symptoms return, it is very important that you call your doctor’s office as soon as possible.
- Medtronic recommends early pump replacement if your alarm sounds because of this issue.

Important reminders:

Pump Alarms
- Your pump has two different alarms, a three-second two-tone alarm and a one-second single-tone alarm.
  - The two tone alarm means your pump has stopped or will stop soon. This requires immediate physician attention.
  - The single tone alarm is not as urgent as the two tone alarm, but still requires prompt physician attention.
- Your doctor can perform an alarm test if you are unsure of what the alarms sound like.

Pump Management
- Be aware of the signs and symptoms of withdrawal for the drug in your pump.
- Keep all scheduled refill appointments.
- Contact your doctor’s office or clinic immediately if you hear your pump alarm or if you notice a change in symptoms.
- Always carry your patient identification card.

Your safety is important to us. If you have any device related questions, you may contact Medtronic Patient Services toll-free at 1-800-510-6735, Monday – Friday, 8 a.m. to 5 p.m. CST. Please direct any questions concerning your personal health or your medical treatment to your doctor.

Sincerely,

Jill Smith
Vice President Quality
Medtronic Neuromodulation