

## RN Diabetes Medication Titration Protocol

Metformin (Glucophage) – Biguanide		
<b>Medication titration:</b>		
Time 0 – APC or MD Start	Metformin 500mg (500mg in the morning, taken with food)	
Week 1	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin 1000mg (500mg in the morning and 500mg in the evening, taken with food)	
Week 2	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin 1500mg (1000mg in the morning and 500mg in the evening, taken with food)	
Week 3	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin 2000mg (1000mg in the morning and 1000mg in the evening, taken with food) – maximum effective dose	
<b>Outcome Monitoring:</b>		
Metformin 2000mg reached or maximum tolerated dose	Order A1c with an expected date of T+90 and an expired date of T+180	
<b>RN 2<sup>nd</sup> level check of exclusion criteria (at each dose increase):</b>	<b>Side effects (at each dose increase):</b>	<b>Monitoring (at time of enrollment):</b>
Review record for : <ul style="list-style-type: none"> <li>- Creatinine levels in the last 12 months               <ul style="list-style-type: none"> <li>o Contraindicated in renal disease                   <ul style="list-style-type: none"> <li>▪ SCr ≥ 1.4 for females and SCr ≥ 1.5 for males</li> <li>▪ eGFR &lt;40                       <ul style="list-style-type: none"> <li>▪ eGFR 40-59 per consult only</li> </ul> </li> </ul> </li> </ul> </li> <li>- Problem List diagnosis of hepatitis, cirrhosis, abnormal LFTs, nonalcoholic steatohepatitis</li> <li>- Age ≥ 80</li> <li>- Excessive alcohol use ( Males: ≥3 drinks/day; Females: ≥ 2 drinks/day)</li> <li>- Pregnancy</li> </ul> <b>If any of the above are present, consult clinician</b>	<ul style="list-style-type: none"> <li>- Diarrhea, nausea, vomiting, bloating, abdominal discomfort, flatulence, GI intolerance               <ul style="list-style-type: none"> <li>o If GI side effects are present, verify medication is taken with food</li> </ul> </li> <li>- Weakness</li> <li>- Metallic taste</li> <li>- Rash, headache</li> <li>- Hypoglycemia* (if used in combination with other DM agents)</li> </ul> <b>If any side effects → consult with clinician</b>	<ul style="list-style-type: none"> <li>- Creatinine and CBC every 12 months, B12 every 24 months.</li> <li>- If no creatinine or CBC results within the past 12 months, order creatinine and/or CBC. If no B12 results within the last 24 months, order B12.</li> </ul> <b>If any lab abnormalities → consult with clinician</b>
<b>Safety Instructions: Stop Metformin at the time of and for 48 hours after IV contrast studies, procedures or surgery</b>		
<b>During acute episodes of sickness, please consult clinician.</b>		

\* Signs and symptoms of hypoglycemia are sweating, hunger, rapid heart rate, irritability, weakness, confusion, tremor, shakes and dizziness.

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1) Severe hypoglycemia: An event requiring assistance of another person to actively administer carbohydrates, glucagon, or other resuscitative actions. These episodes may be associated with sufficient neuroglycopenia to induce seizure or coma. Plasma glucose measurements may not be available during such an event, but neurological recovery attributable to the restoration of plasma glucose to normal is considered sufficient evidence that the event was induced by a low plasma glucose concentration.

2) Documented symptomatic hypoglycemia: An event during which typical symptoms of hypoglycemia are accompanied by a measured plasma glucose concentration <70 mg/dl (3.9 mmol/l).

<b>Title</b>	<b>RN Diabetes Medication Titration Protocol</b>		
<b>Author : Thad Schilling, MD</b>	<b>Date of Origin</b>	10/2011	
<b>Reviewed/ Revised by</b>	Quality Assurance Committee	<b>Date(s) Reviewed/ Revised</b>	10/6/2011
<b>Approved by</b>	Clinical Leadership	<b>Date Approved</b>	11/10/2011
<b>Responsible for Implementation</b>	Thad Schilling , MD		
<b>Keywords</b>	Diabetes, Protocol, Nursing, Medication, Metformin		
<b>SharePlace Site</b>	TBD		

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Metformin ER (Glucophage XR) – Biguanide		
Time 0 – APC or MD Start	Metformin ER 500mg (500mg once daily, taken with food)	
Week 1	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin ER 1000mg (two 500mg tablets once daily, taken with food)	
Week 2	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin ER 1500mg (three 500mg tablets once daily, taken with food)	
Week 3	↓ Confirm medication adherence, review for exclusion criteria and side effects. If none increase dose to: Metformin ER 2000mg (four 500mg tablets once daily, taken with food) – max effective dose	
<b>Outcome Monitoring:</b> Metformin ER 2000mg reached or maximum tolerated dose	Order A1c with an expected date of T+90 and an expired date of T+180	
<b>RN 2<sup>nd</sup> level check of exclusion criteria (at each dose increase):</b>	<b>Side effects (at each dose increase):</b>	<b>Monitoring (at time of enrollment):</b>
Review record for : - Creatinine levels in the last 12 months <ul style="list-style-type: none"> <li>o Contraindicated in renal disease               <ul style="list-style-type: none"> <li>▪ SCr ≥ 1.4 for females and SCr ≥ 1.5 for males</li> <li>▪ eGFR &lt;40                   <ul style="list-style-type: none"> <li>▪ eGFR 40-59 per consult only</li> </ul> </li> </ul> </li> <li>- Problem List diagnosis of hepatitis, cirrhosis, abnormal LFTs, nonalcoholic steatohepatitis</li> <li>- Age ≥ 80</li> <li>- Excessive alcohol use ( Males: ≥3 drinks/day; Females: ≥ 2 drinks/day)</li> <li>- Pregnancy</li> </ul> <p><b>If any of the above are present, consult clinician</b></p>	<ul style="list-style-type: none"> <li>- Diarrhea, nausea, vomiting, bloating, abdominal discomfort, flatulence, GI intolerance               <ul style="list-style-type: none"> <li>o If GI side effects are present verify medication is taken with food</li> </ul> </li> <li>- Weakness</li> <li>- Metallic taste</li> <li>- Rash, headache</li> <li>- Hypoglycemia* (if used in combination with other DM agents)</li> </ul> <p><b>If any side effects → consult with clinician</b></p>	<ul style="list-style-type: none"> <li>- Creatinine and CBC every 12 months, B12 every 24 months.</li> <li>- If no creatinine or CBC results within the past 12 months, order creatinine and/or CBC. If no B12 results within the last 24 months, order B12.</li> </ul> <p><b>If any lab abnormalities → consult with clinician</b></p>
<b>Safety Instructions: Stop Metformin ER at the time of and for 48 hours after IV contrast studies, procedures or surgery.</b>		
<b>During acute episodes of sickness, please consult clinician.</b>		

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2) Documented symptomatic hypoglycemia: An event during which typical symptoms of hypoglycemia are accompanied by a measured plasma glucose concentration <70 mg/dl (3.9 mmol/l).

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<b>Responsible for Implementation</b>	Thad Schilling , MD		
<b>Keywords</b>	Diabetes, Protocol, Nursing, Medication, Metformin, Metformin ER		
<b>SharePlace Site</b>	TBD		

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Glimepiride (Amaryl) – Sulfonylurea		
Time 0 – APC or MD Start	Glimepiride 1mg (once daily with breakfast)	
Week 2	<p style="text-align: center;">↓</p> <p><i>Confirm medication adherence, review for exclusion criteria and side effects and assess home fasting blood glucose readings. If average fasting blood glucose is &gt;130 (minimum of 7 readings required) and no single blood glucose reading &lt;70 including a minimum of four post-prandial readings increase dose to:</i></p> <p>Glimepiride 2mg (once daily with breakfast)</p> <p style="text-align: center;">↓</p> <p><i>Confirm medication adherence, review for exclusion criteria and side effects and assess home fasting blood glucose readings. If average fasting blood glucose is &gt;130 (minimum of 7 readings required) and no single blood glucose reading &lt;70 including a minimum of four post-prandial readings increase dose to:</i></p>	
Week 4	Glimepiride 4mg (once daily with breakfast)	
<b>Outcome Monitoring:</b> Glimepiride 4mg or maximum tolerated dose	Order A1c with an expected date of T+90 and an expired date of T+180	
<b>RN 2<sup>nd</sup> level check of exclusion criteria:</b>	<b>Side effects (at each dose increase):</b>	<b>Monitoring (at each dose increase):</b>
<ul style="list-style-type: none"> <li>- Review record for sulfa allergy</li> <li>- Pregnancy</li> <li>- Age ≥ 80</li> </ul> <p><b>If present, consult clinician</b></p>	<ul style="list-style-type: none"> <li>- Hypoglycemia*               <ul style="list-style-type: none"> <li>o In the elderly population, the following symptoms may be more common: confusion, ‘funny’ spells, feeling spacey or bad dreams</li> </ul> </li> <li>- Weight gain</li> <li>- GI intolerance</li> <li>- Weakness, dizziness, headache</li> <li>- Allergic reaction</li> <li>- Sleep disturbance</li> <li>- Photosensitivity</li> </ul> <p><b>If any side effects → consult with clinician</b></p>	<ul style="list-style-type: none"> <li>- Assess for any signs or symptoms of hypoglycemia* or any low blood glucose readings &lt; 70</li> </ul> <p><b>If any abnormalities → consult with clinician</b></p>
<i>During acute episodes of sickness, please consult clinician.</i>		

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2) Documented symptomatic hypoglycemia: An event during which typical symptoms of hypoglycemia are accompanied by a measured plasma glucose concentration <70 mg/dl (3.9 mmol/l).

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<b>Reviewed/ Revised by</b>	Quality Assurance Committee	<b>Date(s) Reviewed/ Revised</b>	10/6/2011
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<b>Responsible for Implementation</b>	Thad Schilling, MD		
<b>Keywords</b>	Diabetes, Protocol, Nursing, Medication, Glimepiride ,Sulfonylurea		
<b>SharePlace Site</b>	<i>TBD</i>		

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## RN Diabetes Medication Titration Protocol

Insulin Glargine (Lantus)		
Time 0 – APC or MD Start	<p><b>Lantus insulin</b></p> <p>10 units subcutaneously at the same time each evening, <b>OR</b> 0.1- 0.2 units/kg subcutaneously at the same time each evening</p> <p><i>Confirm medication adherence, review for side effects and assess home blood glucose readings.</i></p>	
Every 3 days	<p><i>If average fasting blood glucose is <math>\leq 130</math> (minimum of 3 required readings) and no single blood glucose reading <math>&lt;70</math>, no dose change required.</i></p> <p><b>OR</b></p> <p><i>If average fasting blood glucose is 131-179 (minimum of 3 required readings) and no single blood glucose reading <math>&lt;70</math> increase dose by <b>2 units</b></i></p> <p><b>OR</b></p> <p><i>If average fasting blood glucose is <math>\geq 180</math> (minimum of 3 required readings) and no single blood glucose reading <math>&lt;70</math> increase dose by <b>4 units</b></i></p>	
If also on Glimepiride or other Sulfonylurea:	<p>Decrease sulfonylurea to half the current dose once the average fasting blood glucose is <math>&lt;180</math> (minimum of 3 readings required).</p> <p><b>Consult with clinician</b> once average fasting blood glucose is <math>&lt;140</math> (minimum of 3 readings required).</p>	
<b>Outcome Monitoring:</b> Once effective dose of lantus insulin is reached	Order A1c with an expected date of T+90 and an expired date of T+180	
<b>RN 2<sup>nd</sup> level check of exclusion criteria:</b>	<b>Side effects (at each dose increase):</b>	<b>Monitoring (at each dose increase):</b>
<ul style="list-style-type: none"> <li>- Pregnancy</li> <li>- Age <math>\geq 80</math></li> </ul> <p><b>If present, consult clinician.</b></p>	<ul style="list-style-type: none"> <li>- Hypoglycemia*               <ul style="list-style-type: none"> <li>o In the elderly population ,the following symptoms may be more common: confusion, ‘funny’ spells, feeling spacey or bad dreams</li> </ul> </li> <li>- Injection site reaction</li> <li>- Allergic reaction</li> <li>- Rash</li> <li>- Pruritus</li> <li>- Weight gain</li> <li>- Edema</li> </ul> <p><b>If any side effects → consult with clinician.</b></p>	<p>Assess for any signs or symptoms of hypoglycemia* or any low blood glucose readings <math>&lt; 70</math></p> <ul style="list-style-type: none"> <li>- Confirm patient injection technique - administration of insulin</li> </ul> <p>If any abnormalities, → consult with clinician.</p>
<b><i>During acute episodes of sickness, please consult clinician.</i></b>		

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2) Documented symptomatic hypoglycemia: An event during which typical symptoms of hypoglycemia are accompanied by a measured plasma glucose concentration <70 mg/dl (3.9 mmol/l).

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<b>Reviewed/ Revised by</b>	Quality Assurance Committee	<b>Date(s) Reviewed/ Revised</b>	10/6/2011
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<b>Responsible for Implementation</b>	Thad Schilling , MD		
<b>Keywords</b>	Diabetes, Protocol, Nursing, Medication, Lantus, Insulin		
<b>SharePlace Site</b>	<i>TBD</i>		

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Insulin Detemir (Levemir)		
Time 0 – APC or MD Start	<p><b>Levemir insulin</b></p> <p>10 units subcutaneously at the same time each evening, <b>OR</b> 0.1- 0.2 units/kg subcutaneously at the same time each evening</p> <p><i>Confirm medication adherence, review for side effects and assess home blood glucose readings.</i></p>	
Every 3 days	<p><i>If average fasting blood glucose is <math>\leq 130</math> (minimum of 3 required readings) and no single blood glucose reading <math>&lt; 70</math>, no dose change required.</i></p> <p><b>OR</b></p> <p><i>If average fasting blood glucose is 131-179 (minimum of 3 required readings) and no single blood glucose reading <math>&lt; 70</math> increase dose by <b>2 units</b></i></p> <p><b>OR</b></p> <p><i>If average fasting blood glucose is <math>\geq 180</math> (minimum of 3 required readings) and no single blood glucose reading <math>&lt; 70</math> increase dose by <b>4 units</b></i></p>	
If also on Glimepiride or other Sulfonylurea:	<p>Decrease sulfonylurea to half the current dose once the average fasting blood glucose is <math>&lt; 180</math> (minimum of 3 readings required).</p> <p><b>Consult with clinician</b> once average fasting blood glucose is <math>&lt; 140</math> (minimum of 3 readings required).</p>	
<b>Outcome Monitoring:</b> Once effective dose of Levemir insulin is reached	Order A1c with an expected date of T+90 and an expired date of T+180	
<b>RN 2<sup>nd</sup> level check of exclusion criteria:</b>	<b>Side effects (at each dose increase):</b>	<b>Monitoring (at each dose increase):</b>
<ul style="list-style-type: none"> <li>- Pregnancy</li> <li>- Age <math>\geq 80</math></li> </ul> <p><b>If present, consult clinician.</b></p>	<ul style="list-style-type: none"> <li>- Hypoglycemia*               <ul style="list-style-type: none"> <li>o In the elderly population ,the following symptoms may be more common: confusion, ‘funny’ spells, feeling spacey or bad dreams</li> </ul> </li> <li>- Injection site reaction</li> <li>- Allergic reaction</li> <li>- Rash</li> <li>- Pruritus</li> <li>- Weight gain</li> <li>- Edema</li> </ul> <p><b>If any side effects → consult with clinician.</b></p>	<p>Assess for any signs or symptoms of hypoglycemia* or any low blood glucose readings <math>&lt; 70</math></p> <ul style="list-style-type: none"> <li>- Confirm patient injection technique - administration of insulin</li> </ul> <p><b>If any abnormalities → consult with clinician.</b></p>
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<b>Author : Thad Schilling, MD</b>	<b>Date of Origin</b>		3/2013
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<b>Responsible for Implementation</b>	Thad Schilling , MD		
<b>Keywords</b>	Diabetes, Protocol, Nursing, Medication, Levemir, Insulin		
<b>SharePlace Site</b>	<i>TBD</i>		

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