In-Service Training Program

Caring for the Resident with Diabetes Mellitus
OBJECTIVES

1. Define diabetes mellitus (DM).
2. Name four complications of DM.
3. State the signs and symptoms of hypoglycemia and hyperglycemia and how both are treated.
4. Explain two nursing interventions used to care for a resident with DM.
INTRODUCTION

Diabetes mellitus (DM) is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin production, insulin action or both. Over time, hyperglycemia damages nerves and blood vessels.
INTRODUCTION

Diabetes can be associated with serious complications and premature death but steps can be taken to control the disease and lower the risk of complications.
PART I: OVERVIEW OF DIABETES

When we eat, our body digests food into organic compounds, one of which is glucose. The cells of our bodies use glucose as a source of energy for movement, growth, repair and other functions.
PART I: OVERVIEW OF DIABETES

However, before the cells can use glucose, it must move from the bloodstream into the individual cells. This process requires insulin.
PART I: OVERVIEW OF DIABETES

Insulin is a hormone secreted by the beta cells in the islet of Langerhans in the pancreas. Normally when glucose enters the blood, the pancreas automatically produces the appropriate amount of insulin to lower glucose levels. When this does not occur, diabetes mellitus develops.
PART I: OVERVIEW OF DIABETES

People with type 1 diabetes produce no insulin. People with type 2 diabetes do not always produce enough insulin. Please refer to the handout to learn more about the types of diabetes and the characteristics of insulin.
PART I: OVERVIEW OF DIABETES

Statistics
Diabetes is a serious health problem that affects many people:

- 18.2 million people in the United States, or 6.3 percent of the population have diabetes.
- 8.6 million people age 60 years or older have diabetes.
- 1.3 million people age 20 years or older are newly diagnosed each year.
- 5.2 million people are unaware that they have diabetes.
- The risk for death among people with diabetes is about twice that of people without diabetes.
PART I: OVERVIEW OF DIABETES

How Diabetes and Pre-Diabetes are Diagnosed

Often diabetes is not diagnosed because its symptoms appear insignificant. Early detection of symptoms and treatment can decrease the chance of developing complications.
PART I: OVERVIEW OF DIABETES

Pre-diabetes is a term used to distinguish people at increased risk of developing diabetes. People with pre-diabetes have impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Some people may have both IFG and IGT.

Please refer to the handouts section of this in-service to learn more about these tests.
PART I: OVERVIEW OF DIABETES

Progression to diabetes among those with pre-diabetes is not inevitable. Weight loss and increased physical activity among people with pre-diabetes can help to prevent or delay diabetes and may return blood glucose levels to normal.
PART I: OVERVIEW OF DIABETES

Three tests are used to diagnose diabetes or pre-diabetes:

- Fasting plasma glucose
- Oral glucose tolerance
- Random plasma glucose

Please refer to the handouts section to learn more about these tests.
PART I: OVERVIEW OF DIABETES

The two main types of diabetes are type 1 and type 2.

Type 1 Diabetes:

- Previously called insulin-dependent diabetes (IDDM) or juvenile-onset diabetes
- Usually strikes children and young adults, although disease onset can occur at any age
PART I: OVERVIEW OF DIABETES

- Accounts for 5 to 10 percent of all diagnosed cases of diabetes
- Risk factors include autoimmune, genetic and environmental
PART I: OVERVIEW OF DIABETES

Type 2 Diabetes:

- Previously called non-insulin dependent diabetes (NIDDM) or adult-onset diabetes
- Most common form of diabetes
- Can develop at any age
- Accounts for 90 to 95 percent of all diagnosed cases of diabetes
PART I: OVERVIEW OF DIABETES

- Begins as insulin resistance; over time, the body loses the ability to secrete a sufficient amount of insulin in response to meals
- Associated with advanced age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity and race/ethnicity
PART I: OVERVIEW OF DIABETES

Risk Factors for Type 2 Diabetes
Several risk factors that contribute to type 2 diabetes include:

- Age 45 or older
- Overweight
- Close family member(s) with diabetes
PART I: OVERVIEW OF DIABETES

- Ethnicity: African American; American Indian; Asian American; Pacific Islander; or Hispanic American/Latino
- Had gestational diabetes or gave birth to at least one baby weighing more than nine pounds.
PART I: OVERVIEW OF DIABETES

- Blood pressure is 140/90 or higher
- HDL cholesterol ("good" cholesterol) is 35 or lower
- Triglyceride level is 250 or higher
- Inactive lifestyle
PART I: OVERVIEW OF DIABETES

Signs and Symptoms of Diabetes
The following symptoms for type 1 diabetes appear suddenly:

- Extreme thirst
- Constant hunger
- Frequent urination
- Unexplained weight loss
- Weakness
- Fatigue
One or more of these symptoms may appear before diabetes is diagnosed. Symptoms for type 2 diabetes appear gradually and can go undetected for many years while damaging the eyes, nerves, kidneys, heart and arteries.
PART I: OVERVIEW OF DIABETES

In addition to the symptoms of type 1 diabetes, type 2 symptoms also include the following:

- Blurred vision or other changes in sight
- Tingling or numbness in legs, feet or fingers
- Wounds that are slow to heal
- Frequent skin infections or itchy skin
- Drowsiness
COMPLICATIONS OF DIABETES

Diabetes can affect any part of the body. Over time, diabetes can lead to heart and blood vessel disease, blindness, kidney failure and foot ulcers, among other conditions.
Heart Disease, Hypertension and Stroke

People with diabetes tend to have higher lipid levels in their blood due to higher blood glucose levels. These lipids clog and narrow the blood vessels and make them less elastic which decreases circulation.
COMPLICATIONS OF DIABETES

- Leading cause of diabetes-related deaths; two to four times higher than adults without diabetes.
- Risk for stroke is two to four times higher among people with diabetes.
COMPLICATIONS OF DIABETES

- About 73 percent of adults with diabetes have blood pressure greater than or equal to 130/80 mm Hg or use prescription medications for hypertension.
COMPLICATIONS OF DIABETES

Eye Complications

➢ Diabetes is the leading cause of new cases of blindness among adults ages 20 to 74.

➢ Glaucoma

• People with diabetes are 40 percent more likely to suffer from glaucoma than people without diabetes. The longer someone has had diabetes, the more common glaucoma is. Risk also increases with age.
COMPLICATIONS OF DIABETES

• Glaucoma occurs when pressure builds up in the eye. In most cases the pressure causes drainage of the aqueous humor to slow down, resulting in build up in the anterior chamber. The pressure pinches the blood vessels that carry blood to the retina and optic nerve. Vision is gradually lost because the retina and nerve are damaged.
COMPLICATIONS OF DIABETES

- Cataracts
  - Many people without diabetes develop cataracts but people with diabetes are 60 percent more likely to develop cataracts. People with diabetes also tend to develop cataracts at a younger age and have faster progression. With cataracts, the eye’s clear lens clouds, blocking light.
COMPLICATIONS OF DIABETES

- Retinopathy
  - Diabetic retinopathy causes 12,000 to 24,000 new cases of blindness each year.
COMPLICATIONS OF DIABETES

Kidney Disease

- Diabetes can damage the kidneys and make them unable to filter out waste products.
- Diabetes is the leading cause of end-stage renal disease, accounting for 44 percent of new cases.
COMPLICATIONS OF DIABETES

- In 2001, more than 42,800 people with diabetes began treatment for end-stage renal disease.
- In 2001, nearly 143,000 people with end-stage renal disease due to diabetes were living on chronic dialysis or with a kidney transplant.
COMPLICATIONS OF DIABETES

Neuropathy and Nerve Damage

- About 60 to 70 percent of people with diabetes have mild to severe forms of nervous system damage causing impaired sensation, pain in the feet or hands, slowed digestion of food in the stomach and carpal tunnel syndrome.

- Severe forms of diabetic nerve disease are a major contributing cause of lower-extremity amputations.
COMPLICATIONS OF DIABETES

Foot Complications

- More than 60 percent of non-traumatic lower-limb amputations occur among people with diabetes.
- As of 2001, about 82,000 non-traumatic lower-limb amputations were performed each year among people with diabetes.
COMPLICATIONS OF DIABETES

Skin Complications

- As many as one-third of people with diabetes will have a skin disorder caused or affected by diabetes at some time in their lives.
- Skin conditions include bacterial infections, fungal infections and itching.
- Skin problems specific to diabetes include diabetic dermopathy, necrobiosis lipoidica diabeticorum, diabetic blisters and eruptive xanthomatosis.
COMPLICATIONS OF DIABETES

Dental Disease

- Periodontal (gum) disease is more common among people with diabetes.
- Almost one-third of people with diabetes have severe periodontal disease with loss of attachment of the gums to the teeth.
COMPLICATIONS OF DIABETES

Dehydration

➢ May occur with persistent glucose elevations.
COMPLICATIONS OF DIABETES

Other Disorders

- Gastroparesis affects people with both type 1 and type 2 diabetes. Nerves to the stomach are damaged or stop working resulting in decreased time to empty stomach contents.
- Acute illnesses and infections can affect blood glucose levels.
COMPLICATIONS OF DIABETES

- Uncontrolled diabetes often leads to biochemical imbalances that can cause acute life-threatening events such as diabetic ketoacidosis and hyperosmolar (nonketotic) coma.
- Susceptibility to other illnesses, including increased risk of dying from pneumonia or influenza.
CONDITIONS AND TREATMENTS

Four conditions commonly occur with type 2 diabetes:

1. Hypoglycemia
2. Hyperglycemia
3. Hyperosomolar hyperglycemic nonketotic syndrome
4. Ketoacidosis

Please refer to the handouts section of this course to learn about these conditions and methods of treating them.
PART II: CARING FOR THE RESIDENT WITH DIABETES

Goal of Treatment
The goal is to keep the resident’s blood glucose level as close to normal as possible. The degree to which this treatment goal can be achieved varies, depending on the type of diabetes, type of treatment chosen and other medical conditions.
PART II: CARING FOR THE RESIDENT WITH DIABETES

The Medical Director, in cooperation with attending physicians, should establish standard glucose-monitoring parameters to assist nursing staff in administering timely treatments.
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Medical Treatment

Medical treatment for diabetes consists of the following:

- Diet tailored to resident’s needs
- Exercise appropriate for the resident
- Medication, as appropriate
- Surgery for related complications
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People with type 1 diabetes must have insulin delivered by injection or pump. People with type 2 diabetes can control their blood glucose by following a careful diet and exercise program, losing excess weight and taking oral medication.
Many people with diabetes also need to take medications to control their cholesterol and blood pressure.
Nutrition

Proper nutrition is essential in preventing diabetes-related complications and to maintain tissue integrity. Several factors contribute to poor or impaired nutritional status:

- Swallowing difficulties resulting from stroke and/or neurological diseases
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Poor absorption of food due to intestinal disease
- Dental problems, mouth ulcers and poorly fitting dentures
- Anorexia due to disease or medications
- Inactivity
- Loneliness and/or depression
- Inadequate food intake
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Several guiding nutritional principles are used for individuals with diabetes:

- Maintenance of an ideal body weight
- Limitation of fat and cholesterol
- Establishment of goals for glucose levels and ongoing monitoring, especially if food intake is variable or changing
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- Medication adjustment when glucose levels are outside of target ranges for the individual or if diet changes for any reason (choice, acute illness, treatment of other conditions)
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For residents with inadequate nutritional intake, the following strategies can be implemented:

- Nutritional evaluation by a dietitian
- Diet prescribed with protein and caloric content sufficient to meet metabolic needs
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➢ Assistance with meals as needed, including the following:
  • Preparing food: opening food containers, cutting meat and seasoning
  • Elevating the head of the bed to allow the resident to eat or be fed
  • Providing an environment conducive to eating
  • Allowing sufficient time and assistance for optimal oral intake
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When residents are unable to consume adequate amounts of nutrients, tube feedings or parenteral alimentation should be considered. Resident and family preferences and the overall goals of treatment should guide these decisions.
Exercise

Exercise is an important component of diabetic care. As with medications and nutrition, exercise must be tailored to the individual’s preferences, abilities and overall medical condition.
When an exercise program is initiated, monitoring for the effect of exercise on the blood glucose level is important to ensure that the activity can be undertaken safely.
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Continued monitoring of the glucose level with exercise will usually not be necessary unless the individual experiences marked variations in glucose levels or the amount of exertion changes. Staff supervising the activity should be aware of residents who have diabetes and the signs of hypoglycemia.
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If hypoglycemia occurs with exercise or activities, the physician should be notified for recommendations (adjusting medications, testing glucose before exercise, pre-treating with a snack and/or timing of exercise) to minimize problems related to glucose control during exercise.
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Monitoring Blood Glucose Levels

- Blood glucose monitoring is the primary mechanism used to check diabetes control.
- Monitoring regimens for diabetes vary depending on the type of diabetes, type of treatment and goals for glucose control.
- Individuals with diet-controlled diabetes may have their blood glucose tested infrequently (weekly or monthly).
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- Individuals with type 2 diabetes, who are treated with oral agents, may be tested several times per week at varying times.
- Individuals being treated with insulin, whether type 1 or type 2, should have testing based on goals for treatment and stability of the disease.
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- Testing may range from two to four times per day to additional testing when acute illness or other factors affect the level of glucose control.

- Attending physicians set the blood glucose monitoring schedule according to the specific needs of the individual, although diabetes residents with a terminal illness may choose to minimize the monitoring.
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Blood glucose monitoring provides data for the healthcare team to identify and evaluate the following:

- Trends in glucose control
- Factors that may cause high or low glucose levels, such as illness or infection
- Impact of food, activity or medications
- Needed changes in the treatment plan
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Some situations require more-frequent blood glucose checks:

- Periods of stress, illness or surgery
- When low blood glucose is suspected
- When the resident is experiencing low or high blood glucose symptoms
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- When changes are made in the treatment program, such as changed medication doses, meal plan or activities.
- When taking new medications like steroids
- Elevated hemoglobin A1c
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Physician Notification

Facilities should adopt a systematic approach for notifying the physician. In general, it is appropriate to notify the physician as soon as possible if the resident shows any of the following conditions:

- Blood glucose level less than 60 mg/dl or less than 75 mg/dl with signs and symptoms suggestive of hypoglycemia.
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- Two or more blood glucose values greater than 250 mg/dl, if this is a new or markedly different situation accompanied by a change in condition or functional status
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- Blood glucose values greater than 300 mg/dl during all or part of three consecutive days (unless this represents an improvement from recent values or existing orders specify how the resident’s hyperglycemia should be managed)
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- Poor oral intake for two or more days with additional symptoms such as fever, hypotension, lethargy, confusion, abdominal pain or respiratory distress
In the case of very frail or difficult-to-control residents, the physician may write specific glucose or symptom parameters that signal a need to be notified.
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Medications

- Pharmacologic treatment of diabetes includes a spectrum of different oral agents and insulin preparations.
- Insulin therapy usually involves a combination of short, intermediate and/or long-acting preparations.
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- When the blood glucose level is not stabilized, a sliding scale may be used. Oral agents may be used alone, combined with other oral agents or with insulin.

- Nursing staff should be trained on proper medication administration and methods to identify and manage hyperglycemia or hypoglycemia.

For specific information about the various types of medications used to treat diabetes and educational information on hypoglycemia and hyperglycemia, please refer to the handouts section of this in-service.

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PART II: CARING FOR THE RESIDENT WITH DIABETES

Guidelines for Foot Care

Foot problems can develop quickly in the diabetic resident. Good foot care adheres to these guidelines:

- Inspect feet daily for the following:
  - Cuts, blisters, corns, calluses or reddened areas
  - Change in temperature (hot or cold)
  - Change in color (pale, red, blue)
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Swelling
- Pain
- Dry and cracking skin
- Sweaty skin
- Rashes
- Signs and symptoms of infection
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Wash feet with mild soap and water
- Dry feet carefully, especially between toes
- Use lotion on the feet but not between the toes
- A podiatrist should provide foot care (cutting toenails, removing calluses, corns)
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Ensure that the resident wears properly fitting socks and shoes
- Instruct the resident not to cross legs
- Support heels and ankles to avoid rubbing on bed linens
- Immediately report signs of cuts, scratches, foot wounds or skin changes to the Charge Nurse
Skin Care, Protection and Hygiene

Diabetes can affect every part of the body, including the skin. Skin care, protection, and hygiene are the most important preventive measures.
PART II: CARING FOR THE RESIDENT WITH DIABETES

The following procedures should be used:

- Use Standard Precautions
- Observe skin at least daily during bathing and incontinence care; any changes in skin condition should be reported to the Charge Nurse
- Use a mild cleansing agent
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Avoid hot water and excessive friction
- Apply a nonalcohol-based moisturizing lotion
- Avoid massaging over bony prominences
- Use dry lubricants, such as cornstarch or apply barrier dressings, such as transparent films and hydrocolloids, to prevent mechanical injury from friction
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Assess and treat incontinence
- Check incontinent residents every two hours; cleanse the skin promptly when soiled and at intervals consistent with good hygiene
- Use pressure-relieving devices to help restore blood supply to bony areas
- Use draw sheets to avoid skin injury due to friction and/or shearing
Pressure Reduction

Turning and positioning correctly and comfortably are measures that help relieve pressure. Many pressure-relieving devices are available.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- *Air mattress.* This type of mattress is filled with air and continuously changes pressure areas. Some air mattresses are motorized and change air distribution on an automatic, timed sequence. Only a single sheet should be applied over this mattress. Examples include alternating-pressure mattress and air-flow mattress.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Gel-foam cushions or mattress. These products are used in chairs to prevent pressure ulcers. Air-inflatable rings (donuts) should not be used because they tend to increase pressure in the center of the ring.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- *Water mattress.* This type of mattress redistributes body weight and conforms to body shape. However, it is difficult to move the resident and a puncture can ruin a water mattress.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- **Sheepskin or lamb’s wool pads.** When placed between the resident’s skin and bed linen, these pads greatly reduce friction and rubbing. They serve well as heel and elbow pads, but must be removed daily to allow air to circulate around the affected area.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Pressure on heels can be reduced with foot elevation and pressure on toes can be relieved with the use of a foot cradle.
PART II: CARING FOR THE RESIDENT WITH DIABETES

- *Specialized beds*. These beds are the most effective treatment for pressure ulcers and many types are available. High cost is a significant drawback.
PART II: CARING FOR THE RESIDENT WITH DIABETES

Documentation

Documentation should be concise and present an accurate picture of the resident. Remember the three “C’s” when documenting in the medical record:

1. Clarity - will others be able to understand what I wrote?
2. Conscientiousness - is all pertinent information included? and
3. Consistency - are notes accurate and complete?
PART II: CARING FOR THE RESIDENT WITH DIABETES

Clear and accurate documentation adheres to these guidelines:

- Document notes so they are descriptive of an incident, activity or change
- Read notes to ensure accuracy
- Document events in chronological order with specific times
PART II: CARING FOR THE RESIDENT WITH DIABETES

- Document notification of the physician, as appropriate
- Record actual comments by the resident, as appropriate
- Complete all assessment forms
- Document legibly in dark ink
- Include the correct date and time
- Sign your name and include your title
PREVENTION OR DELAY OF DIABETES

No known methods exist to prevent type 1 diabetes. Lifestyle changes can prevent or delay the onset of type 2 diabetes among high-risk adults. Working together, people with diabetes and their healthcare providers can reduce both the incidence and progression of diabetes-related complications through the following methods:
PREVENTION OR DELAY OF DIABETES

Controlling blood glucose levels

➤ In general, for every one percent reduction in results of hemoglobin A1c blood tests (e.g., from eight to seven percent), the risk of developing microvascular diabetic complications (eye, kidney, and nerve disease) is reduced by 40 percent.
PREVENTION OR DELAY OF DIABETES

Controlling blood pressure

- In general, for every 10 kg of weight loss, systolic blood pressure can be reduced 5-20 millimeters of mercury (mm/Hg).

PREVENTION OR DELAY OF DIABETES

Controlling blood lipids

- Improved control of lipids (cholesterol, HDL, LDL, and triglycerides) can reduce cardiovascular complications by 20 to 50 percent.
PREVENTION OR DELAY OF DIABETES

Preventative care, such as routine dilated-eye and foot examinations and influenza and pneumococcal vaccinations. Detecting and treating diabetic eye disease with laser therapy can reduce the development of severe vision loss by an estimated 50 to 60 percent. Comprehensive foot-care programs can reduce amputation rates by 45 to 85 percent.
PREVENTION OR DELAY OF DIABETES

Detecting and treating early diabetic kidney disease by lowering blood pressure can reduce the decline in kidney function by 30 to 70 percent. Treatment with ACE inhibitors and angiotensin receptor blockers (ARBs) are more effective in reducing the decline in kidney function than other blood pressure-lowering drugs.
PREVENTION OR DELAY OF DIABETES

Lifestyle interventions, such as diet and increased physical activity.

See nutrition and exercise under “Part II: Caring for the Resident with Diabetes.”
SUMMARY

Caring for the resident with diabetes requires an interdisciplinary approach. Overall interdisciplinary goals for the resident should include the following:

- Individual treatment plan addressing the resident’s type and treatment of diabetes, concurrent disease(s) and individual needs.
SUMMARY

- Identification of blood glucose target ranges.
- Appropriate meals and snacks to maintain determined blood glucose levels.
SUMMARY

- Development of appropriate recreational activities (Recreational staff should be aware of the diagnosis and know when to notify the Charge Nurse when the resident experiences signs and symptoms suggestive of hypoglycemia).
SUMMARY

Care by the medical and nursing staff should include the following:

- Developing protocols for diabetes medications, timing them with meals and activities.
- Developing protocols for blood glucose monitoring, skin and foot care.
SUMMARY

- Identification of blood glucose levels that require immediate physician notification versus blood glucose level patterns that require notification on a more routine basis.

- Establishing facility protocols for handling hypoglycemia, hyperglycemia, and blood glucose levels that are persistently out of goal range.