Fludarabine and Busulfan (Flu/Bu, Bu/Flu) Conditioning for Allogeneic Transplant

Care Team Contact Information: _____

Pharmacy Contact Information: _____

Diagnosis: _____

- This treatment is used as conditioning chemotherapy before an allogeneic stem cell transplant for acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), chronic myeloid leukemia (CML), and myelodysplastic syndromes (MDS).
- It may also be used for other reasons.

Goal of Treatment: _____

Treatment Regimen

This treatment is often called Flu/Bu or Bu/Flu:

- **Flu**: Fludarabine
- **Bu**: Busulfan

Treatment Name	How the Treatment Works	How the Treatment is Given
Fludarabine (floo-DARE-a-been): Fludara (floo-DARE-a)	Damages the DNA in cancer cells, which stops them from growing and causes them to die.	Infusion into a vein (intravenous (IV) infusion).
Busulfan (byoo-SUL-fan): Busulfex (byoo-SUL-feks), Myleran (MY-ler-an)	Damages the DNA in cancer cells, which stops them from growing and causes them to die.	Infusion into a vein (intravenous (IV) infusion).

Treatment Administration and Schedule

Treatment is typically 6 days before the infusion of your autologous stem cells. This is called stem cell "conditioning" chemotherapy. Your care team may measure the levels of busulfan in your bloodstream to guide or adjust busulfan dosing.

	Conditioning Chemotherapy Schedule						
Treatment Name	**Day -6**	**Day -5**	**Day -4**	**Day -3**	**Day -2**	**Day -1**	**Day 0**
Fludarabine	✓	✓	✓	✓			
Busulfan	✓	✓	✓	✓			
Stem Cell Infusion							✓

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Appointments

Appointments may include regular check-ups with your care team, treatment appointments, lab visits, and imaging tests. It's important to keep your appointments whenever you can. If you miss an appointment, call your care team as soon as possible to reschedule it.

Supportive Care to Prevent and Treat Side Effects

Description	Supportive Care Given at the Clinic or Hospital	Supportive Care Taken at Home
To help prevent or treat nausea and vomiting		
To help lower the risk of infections		
To help lower the risk of seizures		
To help lower the risk of liver injury (SOS/VOD)		
Other		

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Common Side Effects

Side Effect	Important Information
Low White Blood Cell (WBC) Count (Neutropenia) and Increased Risk of Infection (Boxed Warning)	Description: WBCs help protect your body from infections. A low WBC count increases your risk of infection. Recommendations: • Wash your hands often and bathe regularly. • Avoid crowded places and close contact with people who are sick. • Follow food safety and wound care advice from your care team. • Your care team may prescribe medicine to help your WBCs recover. Talk to your care team if you have: • Fever of 100.4°F (38°C) or higher • Chills • New or worsening cough or sore throat • Painful urination or signs of a urinary infection • Feeling much more tired than usual • Red, swollen, warm, or painful areas on the skin (possible skin infection)
Low Platelet Count (Thrombocytopenia) (Boxed Warning)	Description: Platelets help your blood clot and wounds heal. A low platelet count increases your risk of bruising and bleeding. Recommendations: • Blow your nose gently and avoid picking it. • Brush your teeth gently with a soft toothbrush and keep good oral hygiene. • Use an electric razor for shaving and a nail file instead of nail clippers. • Avoid over-the-counter medicines that can increase bleeding risk (for example, nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen). • Talk with your care team or dentist before medical or dental procedures — you may need to pause treatment. Talk to your care team if you have: • A nosebleed lasting more than 5 minutes despite pressure • A cut that continues to bleed • Heavy gum bleeding when brushing or flossing • Sudden or severe headache • Blood in your urine or stool • Blood in your spit after coughing
Low Red Blood Cell (RBC) Count and Hemoglobin (Hgb) (Anemia) (Boxed Warning)	Description: RBCs and Hgb carry oxygen to your body's tissues and remove carbon dioxide. Low RBC or Hgb (anemia) can make you feel weak or very tired, or may make you look pale. Recommendations: • Aim for 7 to 8 hours of sleep each night. • Do not drive, operate heavy machinery, or do other dangerous activities if you are very tired. • Balance activity and rest — stay as active as you can, but rest when needed. • Eat a balanced diet and follow any nutrition or supplement advice from your care team. Talk to your care team if you have: • Shortness of breath • Dizziness or fainting • Fast or irregular heartbeats • Sudden or severe headache

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<table>
<tr><td>Fatigue</td><td>Description: Fatigue is a constant and sometimes strong feeling of tiredness.

Recommendations:
Routine exercise can help reduce fatigue. Talk with your care team to find the right type and amount of activity for you.
Ask family and friends for help with daily tasks and for emotional support.
Try healthy ways to feel better, such as meditation, journaling, yoga, or guided imagery, to reduce anxiety and improve well-being.
Aim for 7 to 8 hours of sleep each night. Limit daytime naps to help you sleep better at night.
Do not drive, operate heavy machinery, or do other potentially dangerous activities if you are very tired.
Talk to your care team if you have:
Tiredness that affects your daily life or prevents you from doing normal activities
Tiredness that does not get better with rest
Dizziness or weakness along with severe tiredness</td></tr>
<tr><td>Swelling of the hands and feet (Edema)</td><td>Description: Swelling and fluid retention can occur in different areas of the body, like the legs or hands. You might notice areas feel puffy or tighter than usual.

Recommendations:
Weigh yourself daily and keep a record to notice sudden weight gain.
Elevate swollen legs when sitting and avoid standing for long periods.
Wear compression stockings if your care team recommends them.
Remove rings if your fingers begin to swell.
Limit salt (sodium) intake and follow any fluid restrictions your care team gives.
Stay active and do gentle movement to improve circulation.
Talk to your care team if you have:
Swelling that suddenly worsens or spreads to other areas
Pain, redness, or warmth in the affected area
Shortness of breath or difficulty breathing
Persistent swelling that does not improve with home management
Unexpected weight gain
Note: Your care team may ask you to contact them if your weight increases by a certain amount over a certain time period.</td></tr>
<tr><td>Fast Heartbeat (Tachycardia)</td><td>Description: Tachycardia means your heart is beating faster than normal.

Talk to your care team if you have:
Fast or irregular heartbeat
Dizziness
Feeling faint
Chest discomfort
Shortness of breath</td></tr>
</table>

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High Blood Pressure (Hypertension)	Description: High blood pressure means the force of blood against your artery walls is too high. Treatment can raise your blood pressure or make it harder to control. Recommendations: • Exercise regularly, maintain a healthy weight, and limit alcohol and salt (sodium). • Take blood pressure medicines as prescribed. Your care team may change your medicines if needed. • Your care team may ask you to check and record your blood pressure at home. Bring readings to appointments. • Follow diet and lifestyle advice from your care team. Talk to your care team if you have: • Severe or new headaches • Dizziness or lightheadedness • Blurred vision • Trouble breathing • Nosebleeds that do not stop • A pounding sensation in your chest, neck, or ears • Irregular or fast heartbeats • Chest pain or pressure
Mouth Sores or Irritation (Mucositis or Stomatitis)	Description: Treatment can irritate the lining of the mouth. In some cases, this can cause redness, sores, pain, and swelling. Recommendations: • Rinse your mouth after meals and at bedtime; rinse more often if sores develop. • Brush your teeth gently with a soft toothbrush or use a cotton swab after meals. • Use a mild, non-alcohol mouth rinse at least 4 times daily (after meals and at bedtime). Example: 1/8 teaspoon salt + 1/4 teaspoon baking soda in 8 oz warm water. • Avoid acidic, hot, spicy, rough, or crunchy foods and drinks that can irritate your mouth. • Avoid tobacco, alcohol, and alcohol-based mouthwash. • Your care team may prescribe medicines or mouth treatments to help with pain and healing. Talk to your care team if you have: • Painful mouth sores or throat pain • Trouble eating or significant weight loss

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Low Appetite	Description: Loss of appetite can lead to weight loss and low energy. Small changes in when and what you eat can help maintain strength and nutrition. Recommendations: • Be as active as you can. Do light physical activity before a meal (check with your care team before starting an exercise program). • Note times of day when your appetite is best and eat your largest meal then. • Eat 5 or 6 small meals or snacks each day. • Choose high-protein foods (beans, chicken, fish, meat, yogurt, tofu, eggs). Eat protein first during meals. • Choose higher-calorie foods (avoid “low-fat”, “fat-free”, or “diet” options when trying to gain/maintain weight). • If you feel full quickly, avoid drinking 30 minutes before a meal and drink liquids between meals; choose calorie-containing drinks rather than diet drinks. • Have a bedtime snack that’s easy to digest (for example, peanut butter and crackers). If you have reflux, wait at least 1 hour before lying down. • Try nutritious beverages (high-protein shakes or smoothies) if solid food is unappealing. • Ask your care team about liquid nutrition supplements and ways to add protein or calories (protein powder, yogurt, ice cream). Talk to your care team if you have: • Unintentional weight loss • Little or no appetite for several days • Excessive tiredness or low energy

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<table>
<tr><td>Nausea and Vomiting</td><td>Description: Nausea is an uncomfortable feeling in your stomach or the need to throw up. You may or may not vomit.
Recommendations:
Eat smaller, more frequent meals.
Avoid fatty, fried, spicy, or highly sweet foods.
Eat bland foods at room temperature and drink clear liquids.
If you vomit, start with small sips of water, broth, or other clear liquids. If these stay down, try soft foods (such as gelatin, plain cornstarch pudding, yogurt, strained soup, or strained cooked cereal) and gradually return to solid foods.
Your care team may prescribe medicine for these symptoms.
Talk to your care team if you have:
Vomiting for more than 24 hours
Nonstop vomiting
Signs of dehydration (very thirsty, dry mouth, dizziness, or dark urine)
Blood in your vomit or vomit that looks like coffee grounds
Severe stomach pain that does not go away after vomiting</td></tr>
<tr><td>Liver Problems</td><td>Description: Treatment can cause liver injury. Your care team may check your liver with blood tests before and during treatment.
Talk to your care team if you have:
Yellowing of your skin or the white part of your eyes (jaundice)
Severe nausea or vomiting
Pain on the right side of your stomach area (abdomen)
Dark, tea-colored urine
Bleeding or bruising more easily than normal</td></tr>
<tr><td>Diarrhea</td><td>Description: Diarrhea means having bowel movements more often than usual. Your stools may also be loose or watery.
Recommendations:
Keep track of how often you have diarrhea.
Drink 8 to 10 glasses of water or fluids each day. Do this unless your care team tells you otherwise.
Eat small meals with low-fiber foods. Try bananas, applesauce, potatoes, chicken, rice, or toast.
Avoid high-fiber foods. These include raw vegetables, fruit, and whole grains.
Avoid foods that may cause gas. These include broccoli and beans.
Avoid milk, yogurt, and other dairy foods.
Avoid spicy, fried, or greasy foods.
Your care team may recommend medicine for diarrhea. One example is loperamide (Imodium).
Talk to your care team if you have:
An increase of 4 or more bowel movements than usual in one day.
Dizziness or lightheadedness while you have diarrhea
Signs of dehydration, such as feeling very thirsty, dizzy, or having dark urine
Blood in your stool</td></tr>
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<table>
<tr><td>Lung Problems</td><td>Description: Busulfan can cause people to develop lung problems after treatment. These problems may include lung inflammation (interstitial pneumonitis), lung scarring (pulmonary fibrosis), and breathing problems associated with high levels of oxygen and/or intravenous fluids. Your care team will check your lungs with breathing tests called pulmonary function tests (PFTs).

Recommendations:
Avoid scuba diving. The increased pressure underwater and high oxygen levels may cause further lung damage.
Tell your surgeon, anesthesiologist, and other healthcare providers about your medical history before any scheduled procedures that may require oxygen.
Avoid breathing high levels of oxygen unless needed. Too much oxygen may cause further lung damage. If you need oxygen, your care team will monitor your oxygen levels and give you the amount you need.
Get the pneumococcal (pneumonia) vaccine when directed by your care team.
Get yearly influenza (flu) vaccines when directed by your care team.
Don’t smoke. If you currently smoke, talk to your care team about a program to help you quit.
Talk to your care team if you have:
Shortness of breath
A new dry cough
Wheezing
Chest discomfort
Fever</td></tr>
<tr><td>Headache</td><td>Description: Headaches are pain in your head that can vary in intensity, frequency, and location.

Recommendations:
Keep a headache diary to track the frequency, duration, intensity, and triggers of your headaches.
Stay hydrated by drinking plenty of water, as dehydration can contribute to headaches.
Apply a cold or warm compress to your forehead or neck to help ease headache pain.
Get adequate sleep (7 to 8 hours per night) and establish a regular sleep schedule.
Limit caffeine intake.
Your care team may recommend medicine for headaches.
Talk to your care team if you have:
Severe headache
More frequent or worsening headaches
Dizziness or feeling faint
Confusion
Changes in vision</td></tr>
</table>

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High Blood Sugar (Hyperglycemia)	Description: Treatment may cause high blood sugar levels. Your care team may perform blood tests to check for these changes and treat you if needed. Recommendations: • Eat a well-balanced diet. • Limit sugary drinks and foods. • Eat smaller, more frequent meals. • Be physically active for at least 30 minutes most days. • Your care team may ask you to check your blood sugar at home. If you are already doing this, they may ask you to do it more frequently. Talk to your care team if you have: • Frequent urination • Drowsiness • Increased thirst • Loss of appetite • Blurred vision • Fruity smell on your breath • Confusion • Nausea, vomiting, or stomach pain • It becomes harder to control your blood sugar
Rash or Itchy Skin	Description: Rash or itchy skin can cause redness, skin darkening, swelling, and a variety of bumps or patches (small red spots, welts, blisters, or scaly dry areas). Recommendations: • Keep your skin moisturized with creams or lotions to reduce rash and itchiness. • Wear loose-fitting clothing. • Avoid perfumes and colognes, as they may worsen rash symptoms. • Limit time spent in the heat to prevent worsening symptoms. • Avoid sun exposure, especially between 10 AM and 4 PM, to lower the risk of sunburn. • Wear long-sleeved clothing with ultraviolet (UV) protection and broad-brimmed hats. • Apply broad-spectrum sunscreen (UVA/UVB) with sun protective factor (SPF) 30 or higher as directed. • Use lip balm with SPF 30 or higher. • Avoid tanning beds. • Your care team may recommend medicines for symptoms. Talk to your care team if you have: • Rash or itching that continues to worsen

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Changes in Electrolytes and Other Laboratory Results	Description: Treatment may cause low levels of calcium, potassium, and magnesium in your blood. Your care team will perform blood tests to check for these changes and will treat you if needed. Talk to your care team if you have: • Severe muscle weakness, twitches, tremors, cramps, or spasms • Tingling or numbness around the mouth, hands, or feet • New weakness or trouble breathing • Confusion, fainting, or seizures • Sudden weight gain • Swelling of your arms, hands, legs, or ankles • Irregular, fast, or pounding heartbeat, or chest pain • Severe dizziness, fainting, or lightheadedness • Severe constipation or stomach-area (abdominal) pain • Extreme fatigue • Numbness or tingling in your fingers or toes • Nausea, vomiting, or loss of appetite • Seizures

Select Rare Side Effect

Side Effect	Talk to Your Care Team if You Have Any of These Signs or Symptoms
Infusion-Related Reactions	Your care team may slow or temporarily stop the infusion if you have a reaction. Treatment may be permanently stopped for a severe reaction. • Chills or shaking • Itching, rash, or flushing • Trouble breathing, wheezing, or tongue swelling • Dizziness or feeling faint • Feeling of impending doom • Fever of 100.4°F (38°C) or higher • New or severe pain in your back or neck
Serious Liver Problems	Treatment can cause a serious liver problem called veno-occlusive disease (VOD), also known as sinusoidal obstruction syndrome (SOS). This condition causes blockage of the small veins in the liver. Your care team may check your liver with blood tests before and during treatment. • Yellowing of your skin or the white part of your eyes (jaundice) • Severe nausea or vomiting • Pain on the right side of your stomach area (abdomen) • Rapid or unusual weight gain • Dark, tea-colored urine • Bleeding or bruising more easily than normal • Swollen or tight stomach area (abdomen)
Brain Problems	• Headache • Dizziness • Confusion • Memory problems • Difficulty concentrating • Fatigue • Seizures • Muscle weakness • Tremors • Changes in mood or behavior • Sensory disturbances (such as tingling or numbness)

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Risk of New Cancers	There is a risk of developing one or more new cancers during or after treatment. Talk with your care team about this risk, and ask about the signs and symptoms to watch for.

Before starting treatment, ask your care team when to call 9-1-1 or seek emergency help.
If you experience any new, worsening, or uncontrolled side effects, contact your care team immediately.

Intimacy, Pregnancy, and Breastfeeding

- Treatment may **change how you feel about intimacy and your body.** However, physical closeness—such as holding hands and hugging—remains safe. It is common to have questions about intimacy. If needed, talk to your care team for guidance.
- Treatment may **harm an unborn baby**.
    - If you are able to become pregnant:
        - Your care team will verify your pregnancy status before treatment.
        - Use an effective method of birth control during treatment and for 6 months after your last dose of fludarabine and busulfan.
        - If you think you might be pregnant or if you become pregnant, tell your care team right away.
    - If your partner is able to become pregnant, use an effective method of birth control—such as condoms—during treatment and for 3 months after your last dose of fludarabine and busulfan.
- **Do not breastfeed** during treatment and for 1 week after your last dose of fludarabine and busulfan.

Handling Body Fluids and Waste

Some drugs you receive may stay in your urine, stool, sweat, or vomit for many days after treatment. Because many cancer drugs are toxic, your body waste may also be dangerous to touch. To help protect yourself, your loved ones, and the environment, **follow these instructions** for at least 4 days after each dose of fludarabine and busulfan:

- People who are pregnant should avoid touching anything that may be soiled with body fluids from the patient.
- You can use your usual toilet. Always close the lid and flush to discard all waste. If you have a low-flow toilet, flush twice.
- If the toilet or seat is soiled with urine, stool, or vomit, clean the surface after each use before others use it.
- Wash your hands with soap and water for at least 20 seconds after using the toilet.
- If you need a bedpan, inform your caregiver so they can wear gloves and assist with cleanup. Wash the bedpan with soap and water daily.
- If you cannot control your bladder or bowels, use a disposable pad with a plastic back, a diaper, or a sheet to absorb waste.
- Wash any skin exposed to body waste with soap and water.
- Wash soiled linens or clothing separately from other laundry. If you don’t have a washer, place them in a plastic bag until they can be washed.
- Wash your hands with soap and water after touching soiled linens or clothing.

Additional Information

- **Tell your care team about all the medicines you take**.

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This includes prescriptions, over-the-counter drugs, vitamins, and herbal products. Before starting any new medicine, supplement, or vaccine, ask your care team first.

- **This Patient Education Sheet may not describe all possible side effects.**
  Call your care team for medical advice about side effects. You may report side effects to the FDA at 1-800-FDA-1088.

Notes

Updated Date: October 26, 2026

Scan the QR code below to access this education sheet.

Important Notice:
The Association of Cancer Care Centers (ACCC), Hematology/Oncology Pharmacy Association (HOPA), Network for Collaborative Oncology Development & Advancement, Inc. (NCODA), and Oncology Nursing Society (ONS) have collaborated to gather information and develop this patient education guide. This guide is a summary of the medication, based on information provided by the drug manufacturer and other sources.

This guide does not cover all information available on the possible uses, directions, doses, precautions, warnings, interactions, adverse effects, or risks associated with this medication. It should not be used as a substitute for the advice of a qualified healthcare professional. The provision of this guide is for informational purposes only. It does not constitute or imply endorsement, recommendation, or favoring of this medication by ACCC, HOPA, NCODA, or ONS, who assume no liability for and cannot ensure the accuracy of the information presented. All decisions regarding this medication should be made with the guidance and direction of a qualified healthcare professional.

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