Pediatric Health Maintenance Technical Guide
Routine Health Monitoring

Blood Pressure

Rationale: Children and adolescents with IBD are at increased risk of hypertension due to:

- Use of corticosteroids
- Renal complications secondary to medications
- Underlying disease

Recommendation

- Blood pressure should be monitored at routine visit and annual health maintenance visit. *(Rufo, 2023)*

Height, weight, and BMI

Rationale: Children and adolescents with IBD are at increased risk for growth failure and weight loss. Comprehensive monitoring and early intervention can help mitigate long-term growth stunting, nutritional deficits, and pubertal delays. *(Rufo, 2023)*

Consider monitoring growth parameters:

- At diagnosis
- During routine office visits
- Based on status of disease
    - Quiescent Disease Every 4–6 months
    - Active Disease More frequently *(Rufo, 2023)*

Based on nutrition and growth assessments, children and adolescents with IBD can be classified as:

Growth status

- Satisfactory
- At risk
- In failure
- Post puberty

(ImproveCareNow, 2022)

Weight/BMI status

- Satisfactory
- At risk
  - mild malnutrition
  - moderate malnutrition
- In failure
  - severe malnutrition
- Obese

(ImproveCareNow, 2022)

Tanner Staging

Rationale: Children and adolescents with IBD are at risk for pubertal delay thought to be secondary to chronic inflammation, nutritional deficiencies, and growth deficiencies.

- Delayed puberty is defined as >2–3SD from mean age of puberty in general population (>12–13 years of age for girls and >13–14 years of age for boys)
- Stunted puberty is lack of progression of pubertal development 2–3 years after onset.

(Teitelbaum, 2023)

Recommendations

Tanner staging: Should be done annually for girls starting at age 9 and boys starting at age 10
(Rufo, 2023; Ishige, 2019, Rosen et al., 2015)

Routine laboratory studies

Rationale: Laboratory studies may serve as an indirect measure of disease activity and nutritional status. They can assist with therapeutic monitoring and monitoring for complications of IBD.

There are no absolute guidelines for routine laboratory screening. Frequent considerations include:

Purpose	Laboratory studies	Frequency
Measures of disease activity	• CBC • BMP or CMP • Hepatic function • Inflammatory markers • Stool calprotectin	• Quiescent disease: every 6–12 months • If abnormal or during active disease: more frequently *(Rufo, 2023)*
Nutritional status	• 25OH vitamin D	• Every 6–12 months
	• B12	• Consider in those with ileal disease, ileal resection, macrocytic anemia, or ileal pouch
	• Folate	• Consider in those on methotrexate or sulfasalazine

	• Iron studies	• Consider at diagnosis and at least annually. If abnormal or during active disease: more frequently • Consider every 3–6 months for those with extensive ileal disease, resection, ileal pouch and/or SIBO *(Goyal et al., 2020)*
	• Calcium	• Consider in those with vitamin D deficiency, decreased bone mineralization, active small bowel disease, and/or chronic diarrhea
	• Zinc	• Consider in those with skin conditions, chronic diarrhea, increased ostomy output, and/or fistula
	• Magnesium • Phosphorus	• Consider in those with chronic diarrhea, active small bowel disease, and/or malnutrition with concern for refeeding syndrome
Complications of IBD/therapy	• GGT	• Annual assessment. If abnormal: more frequently
	• Urinalysis	• Annual assessment for those on ASA or mesalamine. If abnormal: more frequently

(Lee, 2022; Fritz et al., 2019)

Immunizations

Receiving immunizations to deter vaccine-preventable diseases is important for general health and well-being. Children and adolescents with inflammatory bowel disease (IBD) may be at risk for certain vaccine-preventable disease(s) due to immunosuppression from underlying immune dysregulation and immunosuppression from medications used in the treatment of IBD.

Those who are considered immunosuppressed include those
• On prednisone/equivalent of   ○ More than 20 mg/day for more than 14 days   ○ More than or equal to 2 mg/kg/day for more than 14 days in those who weigh <10 kg
• On biologic response modifiers (BRMs) *
• With significant protein calorie malnutrition *(Mitchel & Grossman, 2023; Lu & Bousvaros, 2014)*

* BRMs are medications that modify or interact with the host immune system (cytokines, chemokines, or antibodies). They are used to restore, enhance, or inhibit the immune response in the treatment of autoimmune disease or disease caused by immune dysregulation in IBD. Frequently used BRMs include

methotrexate, thiopurines, anti-TNFs, monoclonal antibodies (IL-12 or IL-23), and anti-integrin α and small molecule (JAK inhibitors and Sp1 inhibitors). *(Davies, 2016)*

Immunosuppression can further be categorized as low-level or high-level immunosuppression.	
Low-Level Immunosuppression	High-Level Immunosuppression
• Prednisone/equivalent of ○ less than 20 mg/day ○ less than or equal to 2 mg/kg/day in those who weigh <10 kg • Methotrexate ○ less than or equal to 0.4 mg/kg per week • Azathioprine ○ less than or equal to 3 mg/kg per day • Mercaptopurine ○ less than or equal to 1.5 mg/kg per day	• Prednisone doses as listed above • Methotrexate ○ more than 0.4 mg/kg per week • Azathioprine ○ more than 3 mg/kg per day • Mercaptopurine ○ more than 1.5 mg/kg per day • biologic response modifiers (BRMs)

(Rufo, 2023)

To minimize risks and optimize health through immunization practices, the following recommendations are important for children and adolescents with IBD.

Recommendations	
Check immunization history at time of IBD diagnosis and prior to initiation of immune suppression with biologic response modifiers (BRMs). *(Mitchel & Grossman, 2023; Davies, 2016; Lu & Bousvaros, 2014)*	
It is important to evaluate the immunization history. *(Mitchel & Grossman, 2023; Rufo, 2023)*	If feasible, efforts should be made to: • adhere to CDC schedule for vaccine administration, • facilitate catch-up on delinquent immunizations, • administer live virus vaccines prior to immunosuppression* (See page 12 for additional guidance.) • consider use of an expedited vaccine schedule prior to the initiation of immunosuppression per CDC guidelines *(Pittet & Posfay-Barb, 2021)*
Check status of immunity to certain vaccine-preventable diseases at time of IBD diagnosis and prior to initiation of immune suppression with biologic response modifiers (BRMs).	
It is important to evaluate the status of immunity against certain vaccine-preventable diseases in those with IBD. • It is suggested that immunity to measles, hepatitis B, and varicella be evaluated.	

- Titers are helpful to check for adequate antibody response, especially if vaccine history is unclear.

(Mitchel & Grossman, 2023; Rufo, 2023; Davis, 2016)

Measles and Hepatits B	Varicella
Rationale: Those with immunosuppression are at risk for severe illness from measles. They are at risk for the development of diarrhea, hepatitis, stomatitis, appendicitis, mesenteric lymphadenitis, keratitis, scleral ulcers, myocarditis, endocarditis, measles, inclusion body encephalitis, and giant cell pneumonia and may require hospitalization. (Gans & Maldonado, 2023) Rationale: Those with immunosuppression are at risk for the development of fulminant hepatitis B infection and/or reactivation of hepatitis B. *(Rufo, 2023)* It is suggested that: • Titers for measles and hepatitis B be routinely checked at the time of diagnosis and/or prior to starting long term immunosuppressive therapy. *(Broderick, 2023; Mitchel & Grossman, 2023; Rufo, 2023)* **Titers:** • Measles: IgM and IgG • Hepatitis B triple screen Triple screen helps to identify acute infection, past or chronic infection in those at risk for reactivation from immunosuppression and those in need for immunization. It includes: ○ Hepatitis B surface antigen (HBsAg) ○ Hepatitis B surface antibody (HBsAb) ○ Hepatitis B core antibody (HBc) Consider HBc IgM if concerns for acute infection. If positive, additional studies may be indicated. Adjustment to planned medical management of IBD and consultation with infectious disease specialist may be warranted**.** *(Conners et al., 2023)*	Rationale: Those with immunosuppression are at risk for development of disseminated varicella infection and complications, which includes encephalitis, hepatitis, and pneumonia. Current recommendations are to document varicella immunity at the time of diagnosis and/or prior to starting biologic response modifiers (BRMs) by: • history of infection (documented by healthcare provider) or • confirmation of receipt of vaccination *(Mitchel & Grossman, 2023; Rufo, 2023)* Consider obtaining varicella titers (IgM and IgG) if documentation of infection and/or receipt of immunization are unknown. *(Mitchel & Grossman, 2023; Rufo, 2023; Davis, 2016)*

What Titers Indicate				
IgM	IgG	Hepatitis B Surface Antigen (HBsAg)	Hepatitis B Core Antibody (HBc)	Hepatitis B Surface Antibody (HBsAb)
Assessment of acute infection.	Assessment of immunity.	Assessment of hepatitis B infection.	Assessment of previous or chronic infection.	Assessment of immunity.
		Clinical manifestations and diagnosis of hepatitis B virus infection in children and adolescents. *UpToDate*. Accessed July 2024. *(Broderick, 2023)*		

Titer Results and Recommendations		
Hepatitis B titers		
Result	Implication	Recommendations
• Negative HBsAg • Negative HBc	No infection	
• Positive HBs antibody	Immunity from immunization or previous infection (see details below)	
• Negative HBs antibody	Non-immune	Recommendations for those who are non-immune. Consider immunization: If patient has never received vaccine: Option A: Give three-dose hepatitis B vaccine series. **For children 11–15 years of age** Option B: Give two-dose series of hepatitis B adult formulation given 4 months apart. **For those >18 years of age** Option A: Give either two- or three-dose hepatitis B series. Option B: Give combination of hepatitis A+B vaccines. Child Immunization Schedule Notes. *CDC*. Accessed July 2024. *(CDC, 2023)*

		If previously vaccinated, but non-immune: Option A: Give 1–3 doses hepatitis B vaccine. Recheck antibody titer after each dose. If positive response after 1st or 2nd dose, no need for further vaccination. *(Brenner et al., 2019)* Option B: Repeat three-dose hepatitis B series once. Recheck antibody titer 2 months after the 3rd dose. *(Rufo, 2023)* • If adequate response (≥10mIU/ml), immunity confirmed. • If still has inadequate response (<10mIU/ml): ○ Option A: Give a double dose of hepatitis B vaccine. ○ Option B: Give combination hepatitis A/B vaccine. *(CDC, 2023; Mitchel & Grossman, 2023)*
• Positive HBs antibody • Negative HBsAg • Negative HBc	Immune due to immunization	
• Positive HBsAg • Positive HBc • Positive HBc IgM • Negative HBs antibody	Acute infection	Management includes prophylaxis of those exposed, surveillance of status, severity and progression of disease, and consideration for treatment. *(Broderick, 2023)*
• Negative HBsAg • Positive HBc • Positive HBs antibody	Prior infection (inactive)	
• Positive HBsAg • Positive HBc • Negative HBc IgM • Negative HBs antibody	Chronic infection	Management includes surveillance of status, severity and progression of disease, and consideration for treatment. *(Broderick, 2023)*
Those with evidence of acute or chronic hepatitis B infection are at risk for development of fulminate hepatitis or reactivation of hepatitis B with immunosuppressive medications. *(Loomba & Liang, 2023)* For those at risk for reactivation of hepatitis B infection, hepatitis B prophylaxis should be given prior to administration and immunosuppression. Ongoing monitoring is required. *(Lok & Bonis, 2023; Loomba & Liang, 2017)*		
Measles titers		

Result	Implication	Recommendations
Positive Measles (Rubeola) IgM	Active infection	Follow CDC recommendations. https://www.cdc.gov/measles/hcp/clinical-overview/?CDC_AAref_Val=https://www.cdc.gov/measles/hcp/index.html *(CDC, 2024)* *(Gans & Maldonado, 2023; CDC, 2020)*
Positive Measles (Rubeola) IgG	Immunity	
Negative Measles (Rubeola) IgG	Non-immune	Recommendations for those who are non-immune: • Consider vaccination of non-immune patients **prior to** starting on immunosuppression, if feasible. • Live virus vaccines are **not recommended** to be given to those who are immunosuppressed. *(Mitchel & Grossman, 2023)* Follow CDC recommendations. Routine Measles, Mumps, and Rubella Vaccination. *(CDC, 2021 Last* viewed July 2024)
Varicella titers		
If unable to confirm immunity by history of vaccine or infection, consider obtaining titers. (Rufo, 2022)		
Result	Implication	Recommendations
Positive varicella (varicella zoster) IgM	Active infection	Follow CDC recommendations. https://www.cdc.gov/chickenpox/hcp/clinical-overview/?CDC_AAref_Val=https://www.cdc.gov/chickenpox/hcp/index.html *(CDC, 2024)* Treatment of varicella (chickenpox) infection. *UpToDate*. Accessed July 2024. *(Albrecht, 2023)*
Positive varicella (varicella zoster) IgG	Immunity	
Negative varicella (varicella zoster) IgG	Non-immune	Recommendations for those who are non-immune: • Consider vaccination of non-immune patients **prior** to starting on immunosuppression, if feasible. Follow CDC recommendations for schedule intervals. Varicella Vaccine Recommendations. *CDC*. Accessed July 2024 *(CDC, 2021)* • In general, live virus vaccines are **not recommended** to be given to those who are immunosuppressed. *(Mitchel & Grossman, 2023)*

In general, immunizations are categorized as those that are inactivated/attenuated and those that are live vaccines. *Recommendations for vaccine administration are periodically updated. Please see CDC website for most recent updates.

Inactivated vaccines

Inactivated vaccines	
Hepatitis A vaccine Hepatitis B vaccine	Inactivated influenza vaccine*
Diphtheria, tetanus, and pertussis vaccine (DPT, DTaP, Tdap, DT)	Pneumococcal vaccine*
Inactivated polio (IPV)	Human papillomavirus (HPV)*
Hemophilus influenza (HIB)	COVID-19 (mRNA) vaccine*
Meningitis	Herpes zoster (Shingrix)*

Inactivated vaccines

- Are safe for those with IBD, including those who are immunosuppressed.
- Should be administered as per the CDC vaccination schedule.
  See CDC recommendations for vaccines.

  Birth-18 Years Immunization Schedule, By Medical Condition. *CDC*. Accessed July 2024.
  (CDC, 2023)

- Should be brought up to date if delinquent and schedule maintained.
  (Rufo, 2023; Pittet & Posfay-Barb, 2021; DeFilippis, Sockolow, & Barfield, 2016)

- See CDC recommendations for catch-up vaccines.
  Recommended Catch-up Immunization Schedule for Children and Adolescents Who Start Late or Who Are More than 1 Month Behind. *CDC*. Accessed July 2024
  (CDC, 2023)

- If possible, inactivated vaccines should be given at least two weeks prior to planned immunosuppression due to possibility of blunted immune response.
  (Mitchel & Grossman, 2023; Rufo, 2023)

Inactivated vaccines are recommended for all children and adolescents with IBD.

Rationale: Those with IBD (particularly those who are immunosuppressed) may be at increased risk for:

- Significant illness from infection from vaccine-preventable disease(s)
- Increased risk for hospitalization due to infection and/or exacerbation of their disease
- Increased risk for complications from vaccine-preventable diseases

Special considerations for those with IBD

Those with IBD may benefit from immunization against influenza, pneumococcus, HPV, HSV, and COVID-19. *(Mitchel & Grossman, 2023; Rufo, 2023; Pittet & Posfay-Barb, 2021)*

Inactivated influenza vaccine

Rationale: Children and adolescents with IBD who are immunosuppressed have increased risk of severe infection, significant illness and need for hospitalization from influenza.

Vaccine	Recommendations	
Inactivated flu vaccine	Annually	All patients with IBD who are greater than 6 months of age ○ Live virus nasal vaccine is contraindicated

(Mitchel & Grossman, 2023; DeFilippis et al., 2016)

Pneumococcal vaccine

Rationale: There is an increased risk for invasive pneumococcal disease in immunocompromised patients with IBD. Children with IBD should receive standard pneumococcal vaccine. Those who are immunocompromised may require additional vaccines to decrease risk of invasive pneumococcal illness.

There are 2 categories of pneumococcal vaccines:

- **pneumococcal conjugate (PCV) which are produced attaching a weak antigen (often polysaccharide, protein or peptide) to a stronger protein antigen to prompt a strong immune response**
- **pneumococcal polysaccharide vaccines are produced by covering an antigen in a polysaccharide (sugar) encasement prompting a strong immune response.**

There are several versions of PCV pneumococcal conjugate vaccine. The difference between PCVs is the number and types of pneumococcal serotypes covered.

- PCV7 (no longer available)
- PCV13
- PCV15
- PCV20

There is one version of the pneumococcal polysaccharide vaccine

- PPSV23 (polysaccharide)

Both PCV20 and PPSV23 cover additional pneumococcal serotypes not found in PCV13 or 15. Depending on the age of diagnosis, many IBD patients may have received partial or completed immunizations using earlier versions of PCV.

The current preferred vaccination is for PCV20.

Recommendations to optimize their pneumococcal coverage is listed below.

Recommendations		
Vaccine	Recommendations	Special circumstances
PCV (PCV13, PCV15, or PCV20)	In all children <5 years of age, PCV13, 15, or 20 are routine immunization for children 2 months to 5 years of age.	Primary series: Four-dose series given at 2, 4, 6 and 12–15 months *(CDC, 2023; Mitchel & Grossman, 2023)* Current recommendations are to initiate and/or complete the primary series with PCV15 or PCV20. PCV20 is preferred (if available*).* *(Tuomanen & Yildirim, 2023)* Pediatric IBD patients without immunosuppression should follow recommendations for healthy individuals: For those with incomplete primary series, the total doses needed may vary based on number of previously completed doses and/or age when immunizations started. See catch-up schedule: Recommended Catch-up Immunization Schedule for Children and Adolescents Who Start Late or Who Are More than 1 Month Behind. *CDC*. Accessed July 2024 *(CDC, 2023)*
	Children 2 – 18 years of age with certain medical conditions (this includes those who are immunosuppressed) who **have not received or completed PCV immunizations** before 5 years of age.	For immunocompromised pediatric IBD patients • Age 2–5 years with incomplete series, • the total doses needed to complete the primary series may vary based on number of previously completed doses and/or age when immunizations started. *(Tuomanen & Yildirim, 2023)* For immunocompromised pediatric IBD patients • Age 6–18 years **who have completed** initial PCV series, • additional PCV may be recommended. *(Tuomanen & Yildirim, 2023)* For immunocompromised Pediatric IBD patients • Age 6–18 years **who have not completed** the primary series, • additional PCV may be recommended. *(Tuomanen & Yildirim, 2023)* *CDC* has set up a website to help determine how many and which pneumococcal vaccines are needed:

		Pneumococcal Vaccine Recommendations. CDC. Accessed July 2024. *(CDC, 2023)*
Pneumococcal polysaccharide vaccine (PPSV23)	Children and adolescents 2–18 years of age with certain medical conditions (this includes those who are immunosuppressed)	PPSV23 covers some serotypes that are not in PCV13, 15 or 20. It does not promote immunogenicity in children less than 2 years of age. • It is not to be used as a primary series. Primary series should be updated prior to use of PPSV23. • First dose can be given after 2 years. Second dose is given 5 years after the first dose. No more than 2 doses total before 65 years of age in those with IBD. Recommendations for the use of PPSV23 may change if PCV20 is given at any time. *(Tuomanen & Yildirim, 2023)* • (See Immunizations of High-Risk Children and Adolescents – Age-based immunization recommendations): Pneumococcal vaccination in children. UpToDate. Accessed July 2024. *(Tuomanen & Yildirim, 2023)*

HPV vaccine	
Rationale: To help prevent cervical, vulvar, and vaginal cancer in females, penile cancer in males, and oropharyngeal and anal cancer in both. (Cox & Palefsky, 2023; DeFilippis et al., 2016) To decreased risk of high-grade cervical dysplasia and cervical cancer for patients with IBD who are immunocompromised. *(Cox & Palefsky, 2023; Allegretti et al., 2015)* To decrease risk of HPV-associated nasopharyngeal and gastrointestinal cancers in patients with IBD. *(Carman et al., 2019)*	
Recommendations	
• Recommended to be given routinely for both males and females at age 11 to 12 years regardless of whether or not they are receiving immunosuppressive therapy. • HPV vaccine can be given at any time beginning at 9 years of age to 26 years of age**.**	
• Two-dose series for immunocompetent patients if **the** series started **before** 15th birthday ○ given at 0 and 6–12 months	• Three-dose series if immunosuppressed or if series started after the 15th birthday ○ Given at 0, 1 to 2 months, and 6 months *(Cox & Palefsky, 2023)*

COVID-19 vaccine
Rationale: To decrease risk of severe illness, hospitalization, ICU admissions, and severe complications from COVID-19 infection (i.e., MISc and long COVID).
Recommendations: CDC recommends COVID-19 vaccinations for all who are eligible. Doses vary based on age, immune status, and vaccination status. Primary and booster doses of COVID-19 mRNA vaccines (Moderna

COVID-19 or Pfizer COVID-19) are recommended for those who are immunocompromised. Individuals should receive the most updated vaccine available.

For the most up-to-date information, please see CDC recommendations:
COVID-19 vaccination guidance for people who are moderately or severely immunocompromised. *CDC*. Accessed July 2024.
(CDC, 2023)

Herpes zoster vaccine	
Rationale: Those with immunosuppression may be at risk for reactivation of varicella. Those on JAK inhibitors may be at increased risk.	
Vaccine	Recommendations
Inactivated herpes zoster vaccine	Consider for patients who are 18 years of age or older being treated with JAK inhibitors or other high-dose immunosuppression.

Live virus vaccines

Live virus vaccines are contraindicated for those with IBD who are immunosuppressed.

(Mitchel & Grossman, 2023; Rufo, 2023)

Live virus vaccines	
Rotavirus vaccine	Smallpox
Intranasal flu vaccine	Yellow fever
Measles, mumps and rubella (MMR)	Oral polio
Chickenpox (varicella vaccine)	Shingles (herpes zoster - Zostavax)

Consider vaccination with live virus vaccines prior to starting on immunosuppression or upon completion of immunosuppression, if feasible. *(Mitchel & Grossman, 2023; Rufo, 2023)*

Special considerations for live virus vaccines	
BEFORE IMMUNOSUPPRESSIVE THERAPY **Administration of live virus vaccines needs to be completed at least 4–6 weeks prior to initiation of immunosuppressive therapy. There should be no plans or anticipation of initiating immunosuppressive therapy within 4–6 weeks of live virus vaccination administration.** (Mitchel & Grossman, 2023; Steinberg & Charabaty, 2020)	**AFTER IMMUNOSUPPRESSIVE THERAPY** Live virus vaccines **should not** be given to those who have been on immunosuppressive therapy during the previous 3 months.* *(Mitchel & Grossman, 2023; Steinberg & Charabaty, 2020)* Immunosuppressive therapy should be discontinued for at least 3 months before administering live vaccines except corticosteroids, which should be discontinued for at least 1 month. *(Mitchel & Grossman, 2023; Lu & Bousvaros, 2014)*

*There is controversy regarding safety in administration of the varicella vaccine in those who are non-immune and on long-term low-level immunosuppression. (See definition on page 3.) The risk vs. benefit of varicella vaccination vs. infection from varicella vaccine vs. the risk of community-acquired varicella infection in those with low-level immunosuppression continue to be debated. There are currently no guidelines to address this issue.
(Rufo, 2023)

Other Special Considerations

Vaccination of immunocompetent household members of immunocompromised patients		
Immunocompetent household members can receive		
Inactivated vaccines as recommended by CDC schedule.	Starting at 6 months of age, the yearly influenza vaccine.	Live virus vaccines, including MMR, rotavirus, varicella, and zoster vaccines. Oral polio vaccine should NOT be given.
Immunocompromised patients should avoid		
Handling diapers after infants in the household receive the rotavirus vaccine for 4 weeks. (O'Ryan, 2023)	Contact with household members or anyone who develops skin lesions after varicella or zoster until lesions are clear. *(Rufo, 2023)*	Live vaccines for travel are contraindicated in those with immunosuppression. This includes yellow fever and oral typhoid vaccines for travel. *(Freedman & Leder, 2023)*

Screening and Prevention

Cancer Prevention

Colon cancer		
Rationale: Those with IBD are at increased risk for colorectal cancer. The risk increases with duration of disease, degree of inflammation, extent of disease in those with Crohn's disease and ulcerative colitis. There is an increase in those with coexistence of primary sclerosing cholangitis. (Mitchel & Grossman, 2023)		
Test/Procedure	Disease	Frequency
Screening via colonoscopy with biopsies should be performed in those with:	• Ulcerative colitis (UC) • Crohn's colitis that involves at least 1/3 of the colon	**Initial surveillance** screen should start: • 8–10 years from the time first symptoms and/or diagnosis *(Mitchel & Grossman, 2023; Murthy et al., 2021; Clarke & Feuerstein, 2018)* **Ongoing surveillance:** Although there is no true consensus, recommendations include: If initial surveillance is negative, • continued surveillance every 1 – 5 year(s) based on risk factors. Risk factors may include: severity of disease by history and current status, extent of disease, number of years living with IBD, long term immune suppression, family history of colorectal cancer, and history of previous dysplasia.

	AND • primary sclerosing cholangitis (PSC)	• every 1–3 years *(Mitchel & Grossman, 2023; DeFilippis et al., 2016)*

Skin cancer screening		
Rationale: Those with IBD are at increased risk for the development of melanoma and nonmelanoma skin cancer (basal and squamous cell carcinoma). Risk factors include the use of thiopurines and anti-TNF therapies. *(Mitchel & Grossman, 2023; DeFilippis et al., 2016)*		
Primary prevention	All children and adolescents with IBD should use sun protection	• Wear sun-protective clothing • Use sunscreen with SPF of 30 or higher • Seek shade • Limit activities outdoors between 10 am and 4 pm • Avoid indoor tanning booths
Screening	All children and adolescents with IBD	Annual skin surveillance • Self-exam • Provider exam Dermatology referral for anyone with new or suspicious skin lesion. *(Mitchel & Grossman, 2023; Rufo, 2017)* • Those on immunosuppression should be followed by a dermatologist annually. *(Mitchel & Grossman, 2023; Mir et al., 2018; Farraye et al., 2017)* • Those with a history of skin cancer should be seen by a dermatologist every 4–6 months. *(Farraye et al., 2017; Mir et al., 2018)*

Cervical cancer screening	
Women with inflammatory bowel disease who are on BRMs may have increased risk of high-grade cervical dysplasia and cervical cancer. *(Reich, Wasan, & Farraye, 2017)* Current recommendations include primary prevention through HPV vaccination.	
Recommendations	
• Cervical cancer screening for immunosuppressed women with IBD should follow guidelines for screening for immunocompromised women without HIV. *(Robinson, 2023)*	
These include: • Annual cytology screening starting at 21 years of age	If negative X 3, then every 3 years *(Moscicki et al., 2019; Robinson, 2023)*

Women with inflammatory bowel disease who are not on immunosuppressive therapy (BRMs) are not at an increased risk and should follow screening guidelines for the general population. *(ACOG -Updated Cervical Cancer Screening Guidelines, 2021)*	
These include: • Annual cytology screening starting at 21 years of age	If negative, then every 3 years

Bone health screening	
Rationale: Children and adolescents with IBD may be at risk for bone mineral deficiencies and decreased bone density due to inflammation, use of corticosteroids, malabsorption, inactivity, and inadequate intake of calcium and vitamin D.	
Vitamin D	Recommendations:
There is no true consensus for monitoring nutritional deficiencies for children and adolescents with IBD.	
• Some sources suggest annual monitoring of 25OH vitamin D levels. ○ Level >30 ○ Some sources suggest that levels 35–50 are needed to optimize antioxidant and anti-inflammatory effects of vitamin D • Primary prevention includes measures to optimize bone strength through: ○ dietary measures ○ supplementation ○ increasing weight-bearing activities • Treatment includes: optimizing nutrition, management of underlying disease, decreasing steroid use, increasing weight-bearing exercise, and dietary supplementation with calcium and vitamin D as needed. *(Mitchel & Grossman, 2023; Rufo, 2023)*	
DEXA	Recommendations:
There is no true consensus on DEXA for children and adolescents with IBD	
The International Society for Clinical Densitometry recommends that DEXA be considered (when feasible):	At baseline: • DEXA of total body minus head (TBMH) should be attempted for children and adolescents with IBD. • Should be repeated no less than 6-month intervals for those found to have abnormal results. For those at risk* • DEXA of total body minus head (TBMH) or spine should be considered for children and adolescents who are at risk every 1–2 years for those with z score of < -1 at any point. *(Rufo, 2023; DeFilippis et al., 2016; Breglio & Rosh, 2013; Pappa et al., 2011)*
The Crohn's & Colitis Foundation recommends that DEXA should be considered:	At diagnosis • DEXA should be

	○ Repeated every 2 years after diagnosis. ○ May be repeated more frequently if abnormal. Health Maintenance Checklists. *Crohn's & Colitis Foundation*. Accessed July 2024.
NASPGHAN recommends that DEXA should be considered:	• At baseline for those at risk* • DEXA should be ○ Repeated every 1–2 years for those with z score of < -1 at any point. *(Rufo, 2023)*

*Children and adolescents with IBD at risk:	
Those with • Suboptimal growth velocity • Height z score <-2SD • Decline in height across percentiles • Poor weight gain • Weight or BMI <-2SD • Decline in weight or BMI across percentiles	• Amenorrhea (Primary or Secondary) • Pubertal delay • Severe IBD course (with hypoalbuminemia (<3) • Continuous steroid use for > 6 months • History of low trauma fractures

Eye health

Children and adolescents with IBD have increased risk of ocular manifestations of IBD, which can include: uveitis, conjunctivitis, episcleritis, scleritis, keratopathy, and risk of increased IOP from corticosteroids. *(Rufo, 2023; DeFilippis et al., 2016)*

Recommendations

Optometry/Ophthalmology examination to include:	• visual acuity • slit lamp examination • measurement of intraocular pressure • examination of anterior and posterior chambers	How often: • Every 1–2 years for those who are asymptomatic. • Referral to ophthalmology for those with symptoms or history of long-term steroids. *(Mitchel & Grossman, 2023; Rufo, 2023; DeFilippis et al., 2016)*

Mental health

Rationale: Like those with any chronic illness, children and adolescents with IBD are at risk for psychosocial concerns, including those that impact mental health (depression, anxiety, body image issues, adjustment

disorders), as well as social issues (school absences, social isolation, peer pressures, and adherence issues). These can impact quality of life and adjustment.

Signs and symptoms may include:

- School/work absences
- School difficulties
- Smoking, alcohol and substance abuse
- Risk-taking behaviors
- Relationship issues
- Divorce rates
- Non-adherence with prescribed regimens

Recommendations

It is recommended that routine assessment of depression and anxiety in IBD patients be performed annually and as needed. Those of concern should be referred for mental health counseling. Access to multidisciplinary services (including psychology, psychiatry, and social work) is essential.

At routine office visits, it is important to inquire about:

- changes in mood
- behavior changes
- performance

Frequently used assessment tools available to assist with screening for anxiety and depression include:

Depression

- Patient health questionnaire
  - PHQ 2: A two-question screening tool
  - PHQ 9: A nine-item validated assessment tool

  Other validated tools include:
  - Kutcher Adolescent Depression Scale 6-item
  - Columbia Depression Scale (parent or teen version)
  - Children's Depression Inventory
  - Beck Depression Inventory
- Depression screening tool kit
  - Guidelines for Adolescent Depression in Primary Care Tool Kit
  - Depression screening tool kit (ImproveCareNow) available to those with ImproveCareNow HUB access

Anxiety

- General Anxiety Disorder (GAD 7)
- Screen for Child Anxiety Related Disorders (SCARED)
- Pediatric Anxiety Rating Scale (PARS)

Screening for risky behaviors		
Smoking		
Cigarettes	Obtaining a smoking history should be considered at health maintenance visits as appropriate.	If positive, patients should be encouraged to stop smoking. *(Mitchel & Grossman, 2023; Reich, Wasan, & Farraye, 2017)* Anticipatory guidance about the risk of tobacco smoking and IBD should be provided during health maintenance visits and as needed.
Vaping	Obtaining a vaping history should be considered at health maintenance visits as appropriate. • E-cigarette use has increased 900% among high school students from 2011 to 2015. • Nicotine use during adolescence can cause effects such as addiction, reduced impulse control, decreased attention/cognition, mood disorders, and harm to a developing brain. • Carcinogens and toxic heavy metals have been found in e-cigarette aerosols. *(U.S. Department of Health and Human Services, 2016)*	If positive, patients should be encouraged to stop vaping. Anticipatory guidance about the risk of vaping should be provided during health maintenance visits and as needed.
Substance abuse		
Marijuana	Marijuana use among adolescents and young adults with IBD is common. *(Hoffenberg et al., 2018)* Obtaining a marijuana use history should be considered at health maintenance visits as appropriate.	
Alcohol	Obtaining an alcohol use history should be considered at health maintenance visits as appropriate.	If positive, patients should receive anticipatory guidance on the risks of alcohol abuse and IBD flares, interactions with IBD medication, and overall health effects.

Sexual health			
Birth control			Counsel female patients on birth control options.
	Type	Category	
Birth control options for females with IBD:	IUD – Copper IUD – Levonorgestrel	1	Categories of medical eligibility criteria for contraceptive use: 1 no restriction 2 advantage of method generally outweighs proven/theoretical risks 3 proven/theoretical risk usually outweighs advantages of method 4 unacceptable risk *(Curtis et al., 2016)*
	Implants	1	
	Injectables Depot medroxyprogesterone acetate (DMPA)	2	
	Progesterone-only pill	2	
	Combined hormonal contraceptives Combination estrogen-progestin OCP: There is no absolute contradiction for the use or combination of OCP in females with IBD. Due to concern for thromboembolic risk, the use of low-estrogen or no-estrogen OCP is preferred.	2/3	
STDs			
Those with IBD may have:	Increased risk of infection if immunosuppressed. May need to delay or hold immunosuppression if active infection. *(Kucharzik et al., 2021)*		Counseling on safe sex practices. Counsel on associated risks
Sexual health resources for patients			
Adolescent Medicine Providers Planned Parenthood Bedsider.org Youngwomenshealth.org Youngmenshealthsite.org			

Medication used in treatment of IBD and associated risk for sexual health	Rationale	Recommendations
	Females Methotrexate • Methotrexate is an abortifacient and teratogenic. Thiopurines • There is limited data on the effect of thiopurines and fertility. • Thiopurines may be associated with preterm birth but no low birth weight or congenital anomalies. Prednisone • Prednisone is a risk for orofacial cleft, adrenal insufficiency, GDM, PROM, preterm birth, and/or infant infections. Biologics Anti-TNF • Current data shows no increased risk of preterm labor, spontaneous miscarriage, congenital defects, or low birth weight with maternal or paternal exposure to anti-TNF therapy. Anti-integrin • Limited data available. Does not appear to increase risk of preterm labor, spontaneous miscarriage, congenital defects, or low birth weight. IL-12/23 or IL-23 inhibitors • Limited data available.	Females Methotrexate • Counseling should be provided for every female patient of childbearing age on methotrexate on teratogen risk and recommend two forms of contraception and take folic acid. • Recommendations are to discontinue methotrexate 3 to 6 months prior to trying to conceive. Thiopurines • Counseling should be provided. Prednisone • Counseling on the risk of prednisone. Limit use of steroids. Biologics Anti-TNF • Counseling should be provided. • Current recommendations are to continue anti-TNF therapy through pregnancy. • Avoid live virus vaccines for the first 6 months (rotavirus) in infants born to mothers treated with anti-TNF during pregnancy. Anti-integrin • Counseling should be provided. • Current recommendations are to continue through pregnancy. IL-12/23 or IL-23 inhibitors

		• Counseling should be provided. • Limited data available.
	Small molecule • Limited data available. • May have teratogenic effects. Males Methotrexate • Methotrexate may decrease sperm quality. Reversible with discontinuation of methotrexate. • Methotrexate has not been shown to increase risk of poor birth outcomes. Thiopurines • Paternal exposure to thiopurines has not been shown to increase risk of poor birth outcomes. • If there is a history of miscarriage or infertility, discontinuation of thiopurines can be considered if another cause is not identified. Sulfasalazine • Sulfasalazine causes oligospermia, reduced sperm motility, and alteration in morphology of sperm. (McConnell et al., 2016) Biologics • Paternal preconception use of anti-TNF, anti-integrin inhibitors and IL-12/23 inhibitors has not been found to be associated with poor birth outcomes, prematurity, or congenital defects.	Small molecule • Counseling should be provided. • Not recommended during pregnancy. Males Methotrexate • Counseling should be provided for every male patient of childbearing age on methotrexate. • Recommendations to discontinue methotrexate at least three months prior to trying to conceive. Evidence to support this recommendation is limited. Thiopurines • Counseling should be provided. Sulfasalazine • Counseling should be provided. Biologics • Counseling should be provided.

(Peppercorn & Mahadevan, 2023)

Special Considerations

Rationale: Children and adolescents with IBD may be at risk for latent tuberculosis. There is no consensus on the frequency of TB testing. In general:	
TB screening is recommended to be done:	• At the time of diagnosis **and** • Prior to the initiation of immunosuppression and/or use of biologic response modifiers (BRMs) *(Rufo, 2023; Ardura et al., 2016)*
Type of testing	• PPD (TST) • IGRA testing ○ Quantiferon TB Gold ○ T spot • CXR • Consider using both TST and IGRA to improve sensitivity of testing *(Ardura et al., 2016)* If positive, get CXR
Consider repeat assessment for:	• Those with TB risk factors (see below) • Those on BRMs with TB risk factors should be screened annually • For those on BRMs with no TB risk factors and previous negative screening, repeat assessment may not be necessary *(Winthrop, 2023)*
Assessment includes:	• Performance of a risk factor assessment annually • If positive risk factor assessment, consider repeat TB screening test

TB risk factors	
• Birthplace (in endemic regions) • Travel to endemic regions • Disease exposure • Exposure to high-risk populations • Those who are homeless, HIV positive, living in shelters • Those with foreign travel to endemic areas	• Those who are symptomatic ○ Fever ○ Fatigue ○ Poor weight gain ○ Night sweats ○ Weight loss ○ Persistent cough for >2 weeks

Special testing
EBV titers Data suggests possible increased risk of HLH in patients with Crohn's disease who have not had a prior infection with EBV, especially with thiopurines. *(DeFilippis, Sockolow, & Barfield, 2016)*
Recommendations
• Consider obtaining Epstein-Barr virus (EBV) titers before starting thiopurines.

Screening for endemic fungal infections (Coccidioides, Histoplasma, and Cryptococcus)
• Should be considered for those who live in geographic regions with increased risk or travel to endemic areas.

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