

SUPPLEMENTARY MATERIALS

Medicare drug price negotiation: The complexities of selecting therapeutic alternatives for estimating comparative effectiveness

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Supplemental Table 1: ICD-10 Codes Used to Identify Indications

Condition	ICD-10 Codes
Treatment and prevention of venous thromboembolisms	I260, I269, T790, T291, T800, T817, T828, O032, O037, O047, O072, O082, Z790, O087, I824, I825, I826, I827, O871, I2782, Z86711
Atrial Fibrillation	I480, I481, I482, I489
Coronary Artery Disease	I20, I21, I22, I23, I24, I25, I200, I208, I209, I251, I252, I253, I254, I255, I257, I258, I259, Z951, Q249, Z299
Peripheral Artery Disease	I78, E105, E115, E135, I701, I702, I703, I704, I705, I706, I707, I709, I7389
Type 2 Diabetes Mellitus	E110, E111, E112, E113, E114, E115, E116, E118, E119, R730, R739, Z7984
Knee / Hip Replacement	Healthcare Common Procedure Coding System Procedure codes: 27130, 27134, 27137, 27138, 27446, 27447, 27487
Heart Failure	I501, I502, I503, I504, I508, I509
Atherosclerotic Cardiovascular Disease	I70, I2582, I251, I252, I253, I254, I255, I256, I257, I258, I259, I200, I201, I202, I208, I209, I237
Chronic kidney disease	E112, I120, I129, I130, I131, I132, N181, N182, N183, N184, N185, N186, N187, N188, N189
Rheumatoid Arthritis	M05, M060, M062, M063, M064, M068, M069, M080, M082, M083, M084
Ankylosing Spondylitis	M081, M246, M450, M451, M452, M453, M454, M455, M456, M457, M458, M459
Plaque psoriasis	L400, L408, L409
Psoriatic arthritis	L4052, L4051, L4054, L4059
Crohn's disease	K5000, K5001, K5010, K5011, K5080, K5081, K5090, K5091
Ulcerative Colitis	K510, K515, K5101, K5120, K5121, K5130, K5131, K5151, K5180, K5181, K5190, K5191
Chronic Lymphocytic Leukemia / Small Lymphocytic Lymphoma	C9110, C9111, C9112, C8300, C8301, C8302, C8303, C8304, C8305, C8306, C8307, C8308, C8309
Waldenstrom's macroglobulinemia	C880
Chronic Graft Versus Host Disease	D89811
Glycemic Control	E08, E09, E10, E11, E13, O24, Z79, E891, R730

Supplemental Table 2: Complete List of Potential Therapeutic Alternatives for Eliquis (apixaban)

FDA-Approved Indications	Potential Therapeutic Alternatives						
	<u>Within class</u>			<u>Outside of class</u>			
	Class	Generic Name	Brand Name	Class	Generic Name	Brand Name	
Treatment and prevention of VTEs	Direct factor xa inhibitor	Rivaroxaban	Xarelto	Heparins	Unfractionated heparin		
		Edoxaban	Savaysa		<i>Low molecular weight heparin</i>	Enoxaparin	Lovenox
		Fondaparinux	Arixtra			Dalteparin	Fragmin
	Direct thrombin inhibitor	Dabigatran	Pradaxa	Vitamin K antagonists	Warfarin	Coumadin	
Non-valvular atrial fibrillation	Direct factor xa inhibitor	Rivaroxaban	Xarelto	Heparins	Unfractionated heparin		
		Edoxaban	Savaysa		<i>Low molecular weight heparin</i>	Enoxaparin*	Lovenox
	Direct thrombin inhibitor	Dabigatran	Pradaxa	Vitamin K antagonists	Warfarin	Coumadin	
DVT prophylaxis in patients who have undergone hip or knee replacement surgery	Direct factor xa inhibitor	Apixaban	Eliquis	Heparins	Unfractionated heparin		
		Fondaparinux	Arixtra		<i>Low molecular weight heparin</i>	Enoxaparin	Lovenox
	Direct thrombin inhibitor	Dabigatran	Pradaxa		Dalteparin	Fragmin	
				Vitamin K antagonists	Warfarin	Coumadin	

Abbreviations: VTE = venous thromboembolism; DVT = deep venous thrombosis.

*Recommended by clinical guidelines,^{1,2} but not FDA-approved

Supplemental Table 3: Complete List of Potential Therapeutic Alternatives for Xarelto (rivaroxaban)

FDA-Approved Indications	Potential Therapeutic Alternatives						
	<u>Within class</u>			<u>Outside of class</u>			
	Class	Generic	Brand	Class	Generic	Brand	
Treatment and prevention of VTEs	Direct factor xa inhibitor	Apixaban	Eliquis	Heparins	Unfractionated heparin		
		Edoxaban	Savaysa		<i>Low molecular weight heparin</i>	Dalteparin	Fragmin
		Fondaparinux	Arixtra			Enoxaparin	Lovenox
	Direct thrombin inhibitor	Dabigatran	Pradaxa	Vitamin K antagonists	Warfarin	Coumadin	
Non-valvular atrial fibrillation	Direct factor xa inhibitor	Apixaban	Eliquis	Heparins	Unfractionated heparin		
		Edoxaban	Savaysa	<i>Low molecular weight heparin</i>	Enoxaparin*	Lovenox	
	Direct thrombin inhibitor	Dabigatran	Pradaxa	Vitamin K antagonists	Warfarin	Coumadin	
Reducing the risk of CV events in CAD/PAD	No medications in this class			Antiplatelets	Aspirin		
						Clopidogrel	Plavix
					Vorapaxar	Zontivity	
				Vitamin K antagonists	Warfarin	Coumadin	
DVT prophylaxis in patients who have undergone hip or knee replacement surgery	Direct factor xa inhibitor	Apixaban	Eliquis	Heparins	Unfractionated heparin		
		Fondaparinux	Arixtra	<i>Low molecular weight heparin</i>	Dalteparin	Fragmin	
	Direct thrombin inhibitor	Dabigatran	Pradaxa		Enoxaparin	Lovenox	
				Vitamin K antagonists	Warfarin	Coumadin	

Abbreviations: CV = cardiovascular; VTE = venous thromboembolism; CAD = coronary artery disease; PAD = peripheral artery disease; DVT = deep venous thrombosis

*Recommended by clinical guidelines,^{1,2} but not FDA-approved

Supplemental Table 4: Complete List of Potential Therapeutic Alternatives for Jardiance (empagliflozin)

FDA-Approved Indications	Potential Therapeutic Alternatives					
	<u>Within class</u>			<u>Outside of class</u>		
	Class	Generic	Brand	Class	Generic	Brand
Reduce the risk of CV death and hospitalization for HF	SGLT-2i	Dapagliflozin	Farxiga	Beta-blockers*	Bisoprolol	
		Sotagliflozin	Inpefa		Carvedilol	Coreg CR
		Canagliflozin*	Invokana		Metoprolol succinate	Lopressor, Toprol XL
		Ertugliflozin*	Steglatro			
Reduce CV death in T2D and established CVD	SGLT-2i	Dapagliflozin	Farxiga	GLP-1 agonists*	Exenatide	Byetta, Bydureon
		Sotagliflozin	Inpefa		Lixisenatide	Adlyxin
		Canagliflozin*	Invokana		Dulaglutide	Trulicity
		Ertugliflozin*	Steglatro		Liraglutide	Victoza
				Semaglutide	Ozempic, Rybelsus	
Adjunct to diet and exercise to improve glycemic control in T2D	SGLT-2i	Canagliflozin	Invokana	Biguanides	Metformin	Fortamet, Glumetza, Riomet, Glucophage, etc.
		Dapagliflozin	Farxiga		TZDs	Pioglitazone
		Ertugliflozin	Steglatro	Rosiglitazone		Avandia
				Sulfonylureas	Glimeperide	Amaryl
					Glipizide	Glucotrol
					Glyburide	Glynase
				Meglitinides	Nateglinide	Starlix
				GLP-1 agonists	Exenatide	Byetta, Bydureon
					Lixisenatide	Adlyxin
					Dulaglutide	Trulicity
					Liraglutide	Victoza
					Semaglutide	Ozempic, Rybelsus
				Alpha-glucosidase inhibitors	Miglitol	Glyset
					DPP-4 inhibitors	Saxagliptin
				Sitagliptin		Januvia
				Linagliptin		Tradjenta

				Alogliptin	Nesina	
Reduce the risk of sustained eGFR decline, ESKD, CV death and hospitalization for HF, in adults with CKD at risk of progression	SGLT-2i	Dapagliflozin	Farxiga	GLP-1 agonists*	Exenatide	Byetta, Bydureon
		Sotagliflozin	Inpefa		Lixisenatide	Adlyxin
			Dulaglutide		Trulicity	
			Liraglutide		Victoza	
			Semaglutide		Ozempic, Rybelsus	
			MRA		Finerenone	Kerendia

Abbreviations: CV = cardiovascular; T2D = type 2 diabetes; HF = heart failure; TZD = thiazolidinediones; eGFR = estimated glomerular filtration rate; GLP-1 = glucagon-like peptide 1; ESKD = end-stage kidney disease; CKD = chronic kidney disease; SGLT-2i = sodium-glucose transport protein 2 inhibitors; MRA = aldosterone receptor antagonists; DPP-4 = dipeptidyl peptidase-4

*Recommended by clinical guidelines,³⁻⁵ but not FDA-approved

Supplemental Table 5: Complete List of Potential Therapeutic Alternatives for Farxiga (dapagliflozin)

FDA-Approved Indications	Potential Therapeutic Alternatives						
	<u>Within class</u>			<u>Outside of class</u>			
	Class	Generic	Brand	Class	Generic	Brand	
Reduce the risk of CV death and hospitalization for HFrEF (NYHA - Class II-IV)	SGLT-2i	Empagliflozin	Jardiance	Beta-blockers*	Bisoprolol		
		Sotagliflozin	Inpefa		Carvedilol	Coreg CR	
		Canagliflozin*	Invokana		Metoprolol succinate	Lopressor, Toprol XL	
		Ertugliflozin*	Steglatro				
Reduce the risk of hospitalization for HF in adults with T2DM and established CVD or multiple cardiovascular risk factors	SGLT-2i	Empagliflozin	Jardiance	GLP-1 agonists*	Exenatide	Byetta, Bydureon	
		Sotagliflozin	Inpefa		Lixisenatide	Adlyxin	
		Canagliflozin*	Invokana		Dulaglutide	Trulicity	
		Ertugliflozin*	Steglatro		Liraglutide	Victoza	
				Semaglutide	Ozempic, Rybelsus		
Adjunct to diet and exercise to improve glycemic control in T2DM	SGLT-2i	Canagliflozin	Invokana	Biguanides	Metformin	Fortamet, Glumetza, Riomet, Glucophage, etc.	
		Empagliflozin	Jardiance				
		Ertugliflozin	Steglatro				
					TZDs	Pioglitazone	Actos
						Rosiglitazone	Avandia
					Sulfonylureas	Glimeperide	Amaryl
						Glipizide	Glucocetrol
						Glyburide	Glynase
					Meglitinides	Nateglinide	Starlix
					GLP-1 agonists	Exenatide	Byetta, Bydureon
						Lixisenatide	Adlyxin
						Dulaglutide	Trulicity
						Liraglutide	Victoza
						Semaglutide	Ozempic, Rybelsus
					Alpha-glucosidase inhibitors	Miglitol	Glyset
					DPP-4 inhibitors	Saxagliptin	Onglyza
						Sitagliptin	Januvia
				Linagliptin		Tradjenta	
				Alogliptin		Nesina	

Reduce the risk of sustained eGFR decline, ESKD, CV death and hospitalization for HF, in adults with CKD at risk of progression	SGLT-2i	Empagliflozin	Jardiance	GLP-1 agonists*	Exanatide	Byetta, Bydureon
		Sotagliflozin	Inpefa		Lixisenatide	Adlyxin
			Dulaglutide		Trulicity	
			Liraglutide		Victoza	
			Semaglutide		Ozempic, Rybelsus	
			MRAs	Finerenone	Kerendia	

Abbreviations: CV = cardiovascular; CVD = cardiovascular disease; T2DM = type 2 diabetes mellitus; HFrEF = heart failure reduced ejection fraction; HF = heart failure; TZD = thiazolidinediones; eGFR = estimated glomerular filtration rate; GLP-1 = glucagon-like peptide 1; ESKD = end-stage kidney disease; CKD = chronic kidney disease; SGLT-2i = sodium-glucose transport protein 2 inhibitors; MRA = aldosterone receptor antagonists; DPP-4 = dipeptidyl peptidase-4.

*Recommended by clinical guidelines,³⁻⁵ but not FDA-approved

Supplemental Table 6: Complete List of Potential Therapeutic Alternatives for Januvia (sitagliptin)

FDA- Approved Indications	Potential Therapeutic Alternatives						
	<u>Within class</u>			<u>Outside of class</u>			
	Class	Generic	Brand	Class	Generic	Brand	
Adjunct to diet and exercise to improve glycemic control in T2DM	DPP-4 inhibitors	Saxagliptin	Onglyza	Biguanides	Metformin	Fortamet, Glumetza, Riomet, Glucophage, etc.	
		Linagliptin	Tradjenta		TZDs	Pioglitazone	Actos
		Alogliptin	Nesina			Rosiglitazone	Avandia
	Sulfonylureas					Glimeperide	Amaryl
					Glipizide	Glucotrol	
					Glyburide	Glynase	
	Meglitinides				Nateglinide	Starlix	
					GLP-1 agonists	Exenatide	Byetta, Bydureon
						Lixisenatide	Adlyxin
	Dulaglutide	Trulicity					
	Liraglutide	Victoza					
	Semaglutide	Ozempic, Rybelsus					
	Alpha-glucosidase inhibitors				Miglitol	Glyset	
					SGLT-2i	Canagliflozin	Invokana
	Dapagliflozin	Farxiga					
Empagliflozin	Jardiance						
Ertugliflozin	Steglatro						

Abbreviations: T2DM = type 2 diabetes mellitus; TZD = thiazolidinediones; GLP-1 = glucagon-like peptide 1; SGLT-2i = sodium-glucose transport protein 2 inhibitors; DPP-4 = dipeptidyl peptidase-4

Supplemental Table 7: Complete List of Potential Therapeutic Alternatives for Fiasp/Novolog (Insulin Aspart)

FDA- Approved Indications	Potential Therapeutic Alternatives					
	<u>Within class</u>			<u>Outside of class</u>		
	Class	Generic	Brand	Class	Generic	Brand
Glycemic control for Diabetes	<i>Insulins</i>			<i>Insulins</i>		
	<i>Ultra-rapid acting</i>	Inhaled insulin	Afrezza	<i>Short-acting</i>	Regular	Humulin R, Novolin R, Myxredlin
	<i>Rapid-acting</i>	Lispro	Humalog, Admelog, Lyumjev	<i>Intermediate acting</i>	NPH	Humulin N, Novolin N
		Glulisine	Apidra		<i>Long-acting</i>	Detemir
				Glargine		Lantus, Basaglar, Rezvoglar, Semglee, Toujeo
				Degludec		Tresiba
				<i>Combination products</i>	70 NPH, 30 regular	Humulin 70/30, Novolin 70/30
					75 lispro protamine, 25 lispro	Humalog 75/25
					50 lispro protamine, 50 lispro	Humalog 50/50
					70 aspart protamine, 30 aspart	Novolog 70/30

Abbreviations: NPH = Neutral Protamine Hagedorn.

Supplemental Table 8: Complete List of Potential Therapeutic Alternatives for Entresto (sacubitril-valsartan)

FDA-Approved Indications	Potential Therapeutic Alternatives								
	<u>Within class</u>			<u>Outside of class</u>					
	Class	Generic	Brand	Class	Generic	Brand			
<i>Reduce the risk of CV death and hospitalization for HF in adult patients with CHF. Benefits are most clearly evident in patients with LVEF below normal</i>	ARNI	(no other drug in this class)		ACEi	Captopril				
					Enalapril	Epaned, Vasotec			
					Lisinopril	Qbrelis, Zestril			
							ARB	Candesartan	Atacand
						Losartan		Cozaar	
						Valsartan		Diovan	

Abbreviations: CV = cardiovascular; HF = heart failure; CHF = chronic heart failure; LVEF = left ventricular ejection fraction; ARNI = angiotensin receptor-neprilysin inhibitor; ACEi = angiotensin converting enzyme inhibitor; ARB = angiotensin II receptor blocker.

Based on Heidenreich 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure.³

Supplemental Table 9: Complete List of Potential Therapeutic Alternatives for Enbrel (etanercept)

FDA- Approved Indications	Potential Therapeutic Alternatives					
	<u>Within class</u>			<u>Outside of class</u>		
	Class	Generic	Brand	Class	Generic	Brand
Rheumatoid Arthritis	bDMARDs			bDMARDs		
	<i>Anti-TNFs</i>	Adalimumab	Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.	<i>T-cell costimulatory inhibitor</i>	Abatacept	Orencia
				<i>IL-6 receptor inhibitor</i>	Tocilizumab	Actemra
					Sarilumab	Kevzara
				<i>Anti-CD20 antibody</i>	Rituximab	Rituxan
		Certolizumab	Cimzia	<i>IL-1 inhibitor</i>	Anakinra	Kineret
		Infliximab	Remicade	csDMARDs	Hydroxychloroquine	Plaquenil
		Golimumab	Simponi		Sulfasalazine*	Azulfidine
					Methotrexate	Otrexup, Rasuvo, RediTrex, Trexall, Xatmep
					Leflunomide	Arava
			Cyclosporine†		Neoral, Sandimmune, Gengraf	
			tsDMARDs			
			<i>JAK inhibitors</i>	Tofacitinib	Xeljanz	
				Baricitinib	Olumiant	
				Upadacitinib	Rinvoq	
Ankylosing spondylitis	bDMARDs			bDMARDs		
	<i>Anti-TNFs</i>	Adalimumab	Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.	<i>IL-17 inhibitor</i>	Secukinumab	Cosentyx
					Ixekizumab	Taltz
	Certolizumab	Cimzia	csDMARDs	Sulfasalazine*	Azulfidine	
	Infliximab	Remicade		Methotrexate*	Otrexup, Rasuvo, RediTrex, Trexall, Xatmep	
	Golimumab	Simponi				
			tsDMARDs			

		<i>JAK inhibitors</i>	Upadacitinib† Tofacitinib	Rinvoq Xeljanz
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Supplemental Table 9 Continued

<p>Plaque Psoriasis</p>	<p>bDMARDs</p> <p><i>Anti-TNFs</i> Adalimumab Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.</p> <p>Certolizumab Cimzia</p> <p>Infliximab Remicade</p>	<p>bDMARDs</p> <p><i>IL-23 inhibitor</i> Tildrakizumab Ilumya</p> <p>Guselkumab Tremfya</p> <p>Risankizumab Skyrizi</p> <p><i>IL-17 inhibitor</i> Brodalumab Siliq</p> <p>Secukinumab Cosentyx</p> <p>Ixekizumab Taltz</p> <p><i>IL-12 inhibitor</i> Ustekinumab Stelara</p> <p>csDMARDs</p> <p>Cyclosporine Neoral, Sandimmune, Gengraf</p> <p>Acitretin</p> <p>Apremilast* Otezla</p> <p>Methotrexate Otrexup, Rasuvo, RediTrex, Trexall, Xatmep</p>
<p>Psoriatic Arthritis</p>	<p>bDMARDs</p> <p><i>Anti-TNFs</i> Adalimumab Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.</p> <p>Certolizumab Cimzia</p> <p>Infliximab Remicade</p> <p>Golimumab Simponi</p>	<p>bDMARDs</p> <p><i>T-cell costimulatory inhibitor</i> Abatacept Orenzia</p> <p><i>IL-17inhibitor</i> Brodalumab Siliq</p> <p>Secukinumab Cosentyx</p> <p>Ixekizumab Taltz</p> <p><i>IL-12 inhibitor</i> Ustekinumab Stelara</p> <p>csDMARDs</p> <p>Sulfasalazine* Azulfidine</p> <p>Cyclosporine* Neoral, Sandimmune, Gengraf</p> <p>Leflunomide* Arava</p> <p>Apremilast Otezla</p> <p>Methotrexate Otrexup, Rasuvo, RediTrex, Trexall, Xatmep</p> <p>tsDMARDs</p> <p><i>JAK inhibitors</i> Tofacitinib Xeljanz</p> <p>Upadacitinib† Rinvoq</p>

Abbreviations: TNF = tumor necrosis factor; IL = interleukin; JAK = janus kinase; bDMARDs = biologic disease modifying anti-rheumatic drugs; csDMARDs = conventional disease modifying anti-rheumatic drugs; tsDMARDs = targeted synthetic disease modifying anti-rheumatic drugs; CD20 = cluster of differentiate 20; JIA = juvenile idiopathic arthritis

*Recommended in the clinical guidelines, but not FDA-approved.⁶⁻⁹

† FDA-approved indication, but not recommended in the clinical guidelines

Supplemental Table 10: Complete List of Potential Therapeutic Alternatives for Stelara (ustekinumab)

FDA-Approved Indications	Potential Therapeutic Alternatives					
	<u>Within class</u>			<u>Outside of class</u>		
	Class	Generic	Brand	Class	Generic	Brand
Moderate to severe plaque psoriasis who are candidates for phototherapy or systemic therapy	bDMARDs			bDMARDs		
	<i>IL-12 inhibitor</i>	(no other drugs in class)		<i>IL-23 inhibitor</i>	Tildrakizumab	Ilumya
					Guselkumab	Tremfya
					Risankizumab	Skyrizi
				<i>IL-17 inhibitor</i>	Brodalumab	Siliq
					Secukinumab	Cosentyx
					Ixekizumab	Taltz
				<i>Anti-TNFs</i>	Adalimumab	Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.
					Certolizumab	Cimzia
					Infliximab	Remicade
					Etanercept	Enbrel
					csDMARDs	Cyclosporine
			Acitretin			
			Apremilast*	Otezla		
			Methotrexate	Otrexup, Rasuvo, RediTrex, Trexall, Xatmep		
Active psoriatic arthritis, as monotherapy or combination therapy with MTX	bDMARDs			bDMARDs		
	<i>IL-12 inhibitor</i>	(no other drugs in class)		<i>T-cell costimulatory inhibitor</i>	Abatacept	Orencia
				<i>IL-17 inhibitor</i>	Secukinumab	Cosentyx
					Ixekizumab	Taltz
					Brodalumab	Siliq
				<i>IL-23 inhibitor</i>	Risankizumab†	Skyrizi
					Guselkumab†	Tremfya

		<i>Anti-TNFs</i>	Adalimumab	Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.
			Certolizumab	Cimzia
			Infliximab	Remicade
			Golimumab	Simponi
			Etanercept	Enbrel
		<i>csDMARDs</i>	Sulfasalazine*	Azulfidine
			Cyclosporine *	Neoral, Sandimmune, Gengraf
			Leflunomide*	Arava
			Apremilast	Otezla
			Methotrexate	Otrexup, Rasuvo, RediTrex, Trexall, Xatmep
		<i>tsDMARDs</i>		
		<i>JAK inhibitors</i>	Tofacitinib	Xeljanz
			Upadacitinib†	Rinvoq

Supplemental Table 10 Continued

<p>Moderate to severely active Crohn's disease</p>	<p>bDMARDs</p> <p><i>IL-12 inhibitor</i> (no other drugs in class)</p>	<p>csDMARDs</p> <p>Methotrexate* Otrexup, Rasuvo, RediTrex, Trexall, Xatmep</p> <p>bDMARDs</p> <p><i>Anti-TNFs</i></p> <p>Infliximab Remicade</p> <p>Adalimumab Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma, etc.</p> <p>Certolizumab Cimzia</p> <p><i>IL-23 inhibitor</i></p> <p>Risankizumab† Skyrizi</p> <p><i>Anti-alpha-4-beta-7 inhibitor</i></p> <p>Vedolizumab Entyvio</p> <p><i>alpha-4 inhibitor</i></p> <p>Natalizumab Tysabri</p> <p>tsDMARDs</p> <p><i>JAK inhibitor</i></p> <p>Upadacitinib† Rinvoq</p>
<p>Moderate to severely active ulcerative colitis</p>	<p>bDMARDs</p> <p><i>IL-12 inhibitor</i> (no other drugs in class)</p>	<p>bDMARDs</p> <p><i>Anti-TNFs</i></p> <p>Infliximab Remicade</p> <p>Adalimumab Humira, Amgevita, Hyrimoz, Idacio, Imraldi, Yuflyma</p> <p>Golimumab Simponi</p> <p><i>Anti-alpha-4-beta-7 inhibitor</i></p> <p>Vedolizumab Entyvio</p> <p>csDMARDs</p> <p>Methotrexate* Otrexup, Rasuvo, RediTrex, Trexall, Xatmep</p> <p>tsDMARDs</p> <p><i>JAK inhibitors</i></p> <p>Tofacitnib Xeljanz</p> <p>Upadacitinib † Rinvoq</p>

Abbreviations: TNF = tumor necrosis factor; IL = interleukin; JAK = janus kinase; bDMARDs = biologic disease modifying anti-rheumatic drugs; csDMARDs = conventional disease modifying anti-rheumatic drugs; tsDMARDs = targeted synthetic disease modifying anti-rheumatic drugs; MTX = methotrexate

*Recommended in the clinical guidelines,^{6,7,10,11} but not FDA-approved

†FDA-approved indication, but not recommended in clinical guidelines

Supplemental Table 11: Complete List of Potential Therapeutic Alternatives for Imbruvica (ibrutinib)

FDA-Approved Indications	Potential Therapeutic Alternatives						
	<u>Within class</u>			<u>Outside of class</u>			
	Class	Generic	Brand	Class	Generic	Brand	
Chronic lymphocytic leukemia (CLL)/ Small lymphocytic lymphoma (SLL)	BTK inhibitors	Acalabrutinib	Calquence	BCL-2 Inhibitors	Venetoclax	Venclexta	
		Zanubrutinib	Brukinsa		Anti-CD20	Rituximab	Rituxan
		Pirtobrutinib*	Jaypirca			Obinutuzumab	Gazyva
					Anti-CD52	Alemtuzumab	Lemtrada
			PI3K inhibitor	Duvelisib	Coptikra		
				Idelalisib	Zydelig		
Waldenstrom's macroglobulinemia (WM)	BTK inhibitors	Zanubrutinib	Brukinsa	Anti-CD20	Rituximab	Rituxan	
		Acalabrutinib*	Calquence			Ofatumumab*	Arzerra
					Proteasome inhibitor	Bortezomib*	Velcade
						Carfilzomib*	Kyprolis
						Ixazomib*	Ninlaro
			BCL-2 Inhibitors	Venetoclax*	Venclexta		
Chronic graft versus host disease (cGVHD)	BTK inhibitors	no other drug approved		JAK inhibitor	Ruxolitinib	Jakafi	
				Rho-kinase inhibitor	Belumosudil	Rezurock	
				T-cell costimulatory inhibitor	Abatacept*	Orencia	
				Anti-CD52	Alemtuzumab*	Lemtrada	
				Anti-TNF	Etanercept*	Enbrel	
				Anti-CD20	Rituximab*	Rituxan	

Abbreviations: BTK = bruton tyrosine kinase; JAK = janus kinase; BCL-2 = b-cell lymphoma 2; PI3K = phosphatidylinositol 3-kinase; CD = cluster of differentiate

Limited to Category 1 and 2A National Comprehensive Cancer Network recommendations¹²

*Recommended in the clinical guidelines,¹²⁻¹⁴ but not FDA-approved

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