

ESRD Outpatient Medications Project

Final Report Prepared By

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and

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I. EXECUTIVE SUMMARY

The goal of this project was to identify key drug-related issues that will help CMS understand the implications of decisions and benefit design on beneficiaries with ESRD (CKD stage 5 only). Based on a review of the top 50 medications used by this population (according to CMS data); consideration of common ESRD co-morbid conditions; a drug-by-drug evaluation of those medications in the United States Pharmacopoeia (USP) Model guidelines; comments made by those in the renal community; clinical expertise; and knowledge of the primary literature, a technical expert panel (TEP) offered input on medications that should always be available and medications that should be avoided in the ESRD population. Under guidance by the TEP, the project team identified 91 active ingredients that should be available to this patient population as well as 29 active ingredients that should be avoided in ESRD patients. Additional input by the TEP was provided regarding drug utilization review.

A report was generated using CMS data on those medications that should always be available and those that should be avoided. Range of use for the always-available medications ranged from a low of .05% to a high of 39.8%. For the medications to avoid, prevalence of use ranged from .03% to 2.3%. There were some apparent differences between the two states studied. Further investigation is necessary for subpopulations within the CKD population, namely early stage CKD patients, pediatric ESRD patients, and transplant patients. Additional investigation is also necessary to investigate the costs associated with inappropriate medication use, the relationship with use of these medications and specific outcomes, and how benefit designs influence use of these medications.

II. INTRODUCTION

In 2002, there were over 300,000 End Stage Renal Disease (ESRD) patients in the United States. While the exact numbers of prescribed medications are not known, it has been estimated that the average ESRD patient takes between 7 to 14 different medications each day.

Given the extensive utilization of outpatient medications in the ESRD population, coupled with the impending implementation of the Part D prescription program, the Centers for Medicare & Medicaid Services (CMS) contracted with Network 8, Inc., and the Department of Pharmacy Administration at The University of Mississippi School of Pharmacy to conduct the ESRD Outpatient Medications Project. Following a review of the literature, a baseline of common medication use by ESRD patients in Mississippi and Alabama was established.

Once baseline medication usage was reviewed, the project focus shifted to identifying drug-related issues, identifying medications not recommended, and identifying essential medications that have specific coverage issues in the ESRD population. To meet these goals, a TEP was formed, composed of nephrologists, nephrology pharmacists, a kidney transplant recipient, and representatives of pharmaceutical companies that produce medications for this population.

Currently, the Part D benefit is a “one-size-fits-all” approach and this project was conducted to identify key medication-related issues that will help CMS understand the implications of their decisions and benefit design on the ESRD population.

III. DISCUSSION

A. Technical Expert Panel Comments

Two face-to-face TEP meetings, and one TEP teleconference were held. TEP meetings 1 and 2 were both followed with a comment period allowing experts in the renal community to provide input into the comments being made by the TEP.

i. TEP Meeting 1

In the first meeting, the TEP was asked to develop assumptions that would guide the project. As previously noted, the project focus was that of the ESRD population – those who were in CKD Stage 5 requiring dialytic therapy, either peritoneal dialysis or hemodialysis. Since patients with functioning renal transplants are no longer considered CKD Stage 5, medication issues related to renal transplants were not addressed.

Once the assumptions were developed, the TEP was asked to consider the disease states commonly found in the ESRD population and to identify medications that should be avoided or used with extreme caution in ESRD patients.

Just before these comments were prepared for distribution to the renal community for comment, the USP Model Guidelines were published. Given that a classification scheme was part of the deliverables, TEP comments were fitted into that classification scheme and distributed to the renal community for comments.

ii. TEP Meeting II

While relatively few comments were received from the renal community, many detailed and referenced comments were prepared by Dr. Wendy St. Peter and the Nephrology Practice Research Network (PRN) of the American College of Clinical Pharmacy. Using the USP Model Guideline framework at the second meeting, the TEP provided additional comments. They decided to narrow their medication comments to those medications that should be completely avoided in this population and those medications that should be always available. While doing so, they refined the USP Model Guidelines to be ESRD-specific.

Immediately following this TEP meeting, an ESRD Stakeholders Meeting was held and the preliminary findings/comments of the project were presented. While most comments about the project were positive, CMS and the project team believed that some nephrologists and experts did not have or take the opportunity to comment during the first comment period. As a result, the project team worked with CMS to offer a second comment period. During this second comment period for the renal community, 125 comments were received.

iii. TEP Meeting III

A third, and final, TEP meeting (via conference call) was held on June 20, 2005. At this meeting, the TEP discussed comments received during the final renal community comment period. After reviewing comments, the medication list was modified by adding a few agents to the avoid list, removing some agents from the avoid list, and adding some agents to the list of medications that should always be available.

The final list, documenting those medications that should be avoided, those that should be available, other rationale supporting the TEP input, and the categorization scheme created based on the comments of the TEP, is appended to this summary.

B. Demographic Profiles

Patients were identified as being ESRD patients based on the following criteria.

1. Patients were identified as being residents of either Alabama or Mississippi and had at least one month of ESRD coverage in the specified year. Coverage was defined as being (a) patient certified ESRD, (b) having Medicare Part A or Part B, and (c) receiving renal treatment during the coverage period.

OR

2. A patient who had at least one month of ESRD coverage in the specified year (Coverage was defined as being (a) patient certified ESRD, (b) having Medicare Part A or Part B, and (c) receiving renal treatment during the coverage period) AND received service in Alabama or Mississippi for the following services: a. dialysis bills; b. inpatient stay bills; c. transplant bills or UNOS transplant report; d. UNOS transplant follow-ups; e. Medical evidence form (2728); or f. death notice form (2746). These patients were further limited to those who were considered to be dually enrolled in both Medicare and Medicaid during the period of interest in addition to meeting the criteria above. All frequencies are based on Medicaid Statistical Information System (MSIS) data received from CMS.

Table 1. Demographics ESRD vs. non-ESRD 2002

Gender					
ESRD	Male	Percentage of Total	Female	Percentage of Total	Average Age
Alabama	1480	40.9%	2137	59.1%	61
Mississippi	1557	43.1%	2053	56.9%	61
Total	3037	42.0%	4190	58.0%	
Dually Enrolled	Male	Percentage of Total	Female	Percentage of Total	
Alabama	60,018	32.2%	126,151	67.8%	69
Mississippi	52,569	35.3%	96,317	64.7%	69
Total	112,587	33.6%	222,468	66.4%	

C. Medication Prevalence

The TEP requested that the analysis team report on the top 50 medications used by this population to ensure that frequently encountered medication-related issues were identified. The following table is a list of the top 50 medications. The number reported is the number of unique beneficiaries who had at least one prescription filled for each medication listed.

Information requested by the TEP was augmented and facilitated by medication prevalence reports generated using the Prescription Continuity of Care System (PCCS), an existing medications database. These reports were in four categories – Most Commonly Used Medications (Top 50 medications), Drug-Drug Interactions, Drugs to Avoid, and Therapeutic Duplication. The top 50 medications taken in the ESRD population can be found in Table 2.

All analyses were limited to those patients who were dually-enrolled in both Medicare and Medicaid during the years 2000 and 2002. Data from two states, Mississippi and Alabama, were analyzed, as these were the only data provided to the research team by CMS.

Table 2: Medication Prevalence

Rank	DRUG	Total Benes	%	Facts and Comparisons		USP Model Guidelines
					Categories	
1	Acetaminophen	3605	49.9%	Acetaminophen		**Non-Rx, not included**
2	Folic acid	3117	43.1%	Vitamin		**Non-Rx, not included**
3	Tocopherol	2873	39.8%	Vitamin/emollient		**Non-Rx, not included**
4	Niacin	2857	39.5%	Vitamin		Cardiovascular/ Dyslipidemics/Lipid absorption inhibitors
5	Sevelamer	2337	32.3%	Polymeric phosphate binder		Gastrointestinal Agents, Other
6	Hydrocodone	2275	31.5%	Narcotic analgesic		Analgesics/ Opioid Analgesics
7	Calcium acetate	1945	26.9%	Antacid/mineral		Therapeutic nutrients/Minerals/Electrolytes// Electrolytes/Minerals
8	Amlodipine	1911	26.4%	Calcium channel blocker		Cardiac agents/CCB/Dihydropyridines
9	Propoxyphene	1814	25.1%	Narcotic analgesic		Analgesics/Opioid analgesics/Opioid analgesics, short-acting
10	Clonidine	1521	21.0%	Antiadrenergic/sympatholytic, central acting; central analgesic		Cardiovascular agents/Alpha-adrenergic agents
11	Insulin	1461	20.2%	Antidiabetic agent		Blood glucose regulators/Insulins
12	Levofloxacin	1423	19.7%	Fluroquinolone		Antibacterials/Quinalones/ Quinolones, fluorinated
13	Cephalexin	1149	15.9%	Cephalosporin		Antibacterials/Beta-lactam, cephalosporins/Cephalosporins, 1 st generation
14	Metoprolol	1116	15.4%	Antiadrenergic/sympatholytic; Beta adrenergic blocking agent		Cardiovascular agents/Beta-adrenergic blocking agents/Cardioselective beta-adrenergic blocking agents
15	Metoclopramide	1111	15.4%	Antiemetic/antivertigo/ gastrointestinal stimulant; antidopaminergic		Antiemetics/Antiemetics (non-5-HT3 antagonists)
16	Promethazine	1080	14.9%	antiemetic/antivertigo/ antihistamine		Antiemetics/Antiemetics (non-5-HT3 antagonists)
17	Azithromycin	1011	14.0%	Macrolide		Antibacterials/Macrolides/Non-erythromycins, non-ketolides
18	Amoxicillin	1004	13.9%	Penicillin		Antibacterials/Beta-lactam, penicillins/Amino derivative penicillins
19	Ranitidine	941	13.0%	Histamine H2 antagonist		Gastrointestinal agents/H2 blocking agents
20	Ciprofloxacin	898	12.4%	Fluroquinolone		Antibacterials/Quinolones/ Quinolones, fluorinated
21	Potassium chloride	885	12.2%	Electrolyte		Therapeutic Nutrients/Minerals/Electrolytes// Electrolytes/Minerals
22	Sulfamethoxazole	858	11.9%	Sulfonamide		Antibacterials/Sulfonamides
23	Famotidine	849	11.7%	Histamine H2 antagonist		Gastrointestinal agents/H2 blocking agents
24	Lidocaine	834	11.5%	Antiarrhythmic agent/local anesthetic		Dermatological agents/Dermatological anesthetics AND Anesthetics/Local anesthetics
25	Oxycodone	827	11.4%	Narcotic agonist analgesic		Analgesics/Opioid analgesics/Opioid analgesics, short-acting
26	Furosemide	789	10.9%	Diuretic; loop diuretic		Cardiovascular agents/Diuretics/Loop

Rank	DRUG	Total Benes	%	Facts and Comparisons Categories	USP Model Guidelines
					diuretics
27	Prilocaine	775	10.7%	Local anesthetic	Dental and Oral agents
28	Iron	760	10.5%	Trace element	Therapeutic nutrients/Minerals/Electrolytes// Electrolytes/Minerals
29	Atenolol	742	10.3%	Antiadrenergic/sympatholytic; Beta adrenergic blocking agent	Autonomic Agents/ Sympatholytics/Beta-Adrenergic Blocking//Cardiovascular Agents/Beta-adrenergic blocking agents/Cardioselective
30	Minoxidil	739	10.2%	Peripheral vasodilator	Cardiovascular Agents/Vasodilators
31	Calcium carbonate	726	10.0%	Antacid/mineral	**Non-Rx, not included**
32	Codeine	681	9.4%	Narcotic agonist analgesic	Analgesics/Opioid analgesics/Opioid analgesics, short-acting
33	Atorvastatin	678	9.4%	Antihyperlipidemic; HMG-Co A reductase inhibitor	Cardiovascular Agents/Dyslipidemics/HMG CoA reductase inhibitors
34	Prednisone	652	9.0%	Adrenocortical steroid; glucocorticoid	Hormonal Agents, Stimulating/Replacement/ Modifying
35	Nifedipine	648	9.0%	Calcium channel blocker	Cardiovascular Agents/Calcium Channel Blocking Agents/Dihydropyridines
36	Warfarin	615	8.5%	Anticoagulant	Blood Products/Modifiers/Volume Expanders//Anticoagulants//Anticoagulants, oral
37	Gabapentin	608	8.4%	Anticonvulsant	Anticonvulsants/GABA augmenting agents
38	Hydroxyzine	595	8.2%	Antianxiety/antihistamine	Antiemetics/Antiemetics (non-5-HT3 antagonists)
39	Albuterol	591	8.2%	Sympathomimetic; bronchodilator	Respiratory Tract Agents/ Bronchodilators, sympathomimetic
40	Lansoprazole	577	8.0%	Proton pump inhibitor	Gastrointestinal agents/Proton pump inhibitors
41	Clopidogrel	569	7.9%	Antiplatelet; aggregation inhibitor	Blood Products/Modifiers/Volume Expanders//Platelet aggregation inhibitors
42	Nitroglycerin	555	7.7%	Vasodilator; nitrate	Cardiovascular Agents/Vasodilators
43	Pantoprazole	540	7.5%	Proton pump inhibitor	Gastrointestinal Agents/Proton Pump Inhibitors
44	Aspirin	527	7.3%	Salicylate	**Non-Rx, not included**
45	Zolpidem	525	7.3%	Sedative/hypnotic, nonbarbiturate	Sedatives/Hypnotics
46	Mupirocin	508	7.0%	Topical antibiotic	Dermatological Agents/Dermatological antibacterials
47	Enalapril	486	6.7%	Angiotensin converting enzyme inhibitor; renin angiotensin system antagonist	Cardiovascular agents/Renin-angiotensin-aldosterone System Inhibitors/ACE Inhibitors
48	Enalaprilat	485	6.7%	Angiotensin converting enzyme inhibitor; renin angiotensin system antagonist	Cardiovascular agents/Renin-angiotensin-aldosterone System Inhibitors/ACE Inhibitors
49	Guaifenesin	482	6.7%	Expectorant	Respiratory Tract Agents/Respiratory Tract agents, other

Rank	DRUG	Total Benes	%	Facts and Comparisons Categories	USP Model Guidelines
50	Quinine	479	6.6%	Antimalarial	Antiparasitics/Antiprotozoals/ Antimalarials
TOTAL Patients		7227	100.0%		

Benes = Dually enrolled, ESRD Beneficiaries

Table 3: Top Supplements that were in the TOP 50 medications used by dually enrolled, ESRD population

	DRUG	Total 2000*	DRUG	Total 2002*
1	folic acid	2751	folic acid	3117
2	vitamin D	2623	vitamin D	3005
3	cyanocobalamin	2623	ascorbic acid	3004
4	ascorbic acid	2621	vitamin C	3004
5	vitamin C	2621	cyanocobalamin	2994
6	beta-carotene	2606	beta-carotene	2986
7	vitamin A	2606	vitamin A	2986
8	vitamin B complex	2606	vitamin B complex	2986
9	vitamin B complex with C	2606	vitamin B complex with C	2986
10	vitamin B12	2606	vitamin B12	2986
11	zinc	2469	zinc	2890
12	multiple vitamins	2446	multiple vitamins	2873
13	pyridoxine	2445	pyridoxine	2873
14	copper	2445	copper	2873
15	tocopherol	2445	tocopherol	2873
16	vitamin E	2445	vitamin E	2873
17	niacin	2429	niacin	2857
18	inositol	2427	inositol	2852
19	choline	2427	choline	2850
20	thiamine	2427	thiamine	2850
21	bioflavonoids	2427	bioflavonoids	2850
22	lecithin	2427	lecithin	2850
23	pantothenic acid	2427	pantothenic acid	2850
24	riboflavin	2427	riboflavin	2850
25	selenium	2427	selenium	2850
26	therapeutic multivitamins	2427	therapeutic multivitamins	2850
27	vitamin B1	2427	vitamin B1	2850
28	vitamin B2	2427	vitamin B2	2850
29	vitamin B3	2427	vitamin B3	2850
30	vitamin B5	2427	vitamin B5	2850
31	vitamin B6	2427	vitamin B6	2850
32	pork	1208	pork	1330
33	iron	937	dextrose	882
34	dextrose	841	iron	760
	Total DE ESRD Patients in 2000	6198	Total DE ESRD Patients in 2002	7227

* Total represents the total number of unique beneficiaries who had at least one claim for the supplement listed.

Table 4: TOP 50 drugs taken by the Dually Enrolled population

	DRUG	Total DE 2000*	DRUG	Total DE 2002*
1	acetaminophen	90161	acetaminophen	105864
2	furosemide	52145	hydrocodone	63187
3	hydrocodone	51974	potassium	57438
4	potassium	51974	furosemide	54195
5	hydrochlorothiazide	47511	hydrochlorothiazide	53504
6	propoxyphene	43878	propoxyphene	45957
7	cephalexin	35297	levofloxacin	38574
8	amoxicillin	33720	amoxicillin	36772
9	levofloxacin	31270	amlodipine	36295
10	ciprofloxacin	30904	ranitidine	36047
11	amlodipine	28088	cephalexin	35945
12	omeprazole	27067	azithromycin	30785
13	albuterol	26853	albuterol	29961
14	azithromycin	26126	ciprofloxacin	29760
15	trimethoprim	26065	promethazine	24891
16	digoxin	25418	insulin	24601
17	sulfamethoxazole	25357	guaifenesin	24480
18	celecoxib	24001	trimethoprim	24178
19	lansoprazole	23549	sulfamethoxazole	23541
20	insulin	22675	tramadol	22989
21	promethazine	20795	pseudoephedrine	22873
22	guaifenesin	20734	digoxin	22067
23	tramadol	20221	metoprolol	22004
24	conjugated estrogens	20033	levothyroxine	21194
25	ranitidine	19342	atorvastatin	21135
26	nitroglycerin	18925	naproxen	20975
27	aspirin	18510	aspirin	20776
28	rofecoxib	18081	conjugated estrogens	20491
29	pseudoephedrine	17784	metformin	20151
30	levothyroxine	17698	chlorpheniramine	19700
31	ibuprofen	17651	codeine	19042
32	codeine	17521	ibuprofen	18414
33	lisinopril	17372	prednisone	18393
34	prednisone	16898	gabapentin	18324
35	naproxen	16548	lisinopril	18280
36	chlorpheniramine	16431	lansoprazole	18200
37	lorazepam	16411	lorazepam	17621
38	amitriptyline	15596	nitroglycerin	17609
39	metformin	15489	clopidogrel	17510
40	meclizine	15182	warfarin	16737
41	triamterene	15166	fluticasone	16592
42	warfarin	15135	sertraline	16484
43	loratadine	15110	celecoxib	15953
44	hydroxyzine	14906	famotidine	15863
45	clarithromycin	14304	amitriptyline	15532
46	diltiazem	14122	hydroxyzine	15355
47	triamcinolone	13810	clonidine	15241
48	betamethasone	13315	meclizine	15175

49	sertraline	13254	ipratropium	14864
50	clonidine	13082	metoclopramide	14537
	TOTAL Dually		Total Dually	
	Enrolled 2000	292,916	Enrolled 2002	335,054

*** Total represents the total number of unique beneficiaries who had at least one claim for the medication listed.**

D. ESRD-Specific Medication Classes and Associated Assumptions

Using the USP Model Guidelines as a template, the TEP provided comments to refine the guidelines so that they were ESRD-specific. In so doing, several assumptions were made in accordance with anticipated benefit design.

1. Because of CMS regulations that require at least two pharmaceutical products from a specific USP therapeutic category be available in a Prescription Drug Plan (PDP) formulary, the TEP assumed that two medications would be available in each therapeutic class. As a result, the TEP was comfortable not making a recommendation to have a specific agent available if at least two in the class would be available. For example, the TEP did not make a recommendation about H2 antagonists (cimetidine, ranitidine) or insulins, because it was assumed that at least two would be available, and that practitioners would have adequate ability to treat with two available options. However, in most instances if the medication was critical to ESRD, the TEP made a recommendation about it.
 2. It was assumed that generically available products would be available. Thus, in the determination of Medications that Should Always Be Available, the TEP assumed coverage of certain vital medications. For example, in the ESRD population, furosemide as a loop diuretic is vital to patient care and well being, and should always be available; however, the TEP did not specifically include furosemide on the “Always Available” list because it is both generic and inexpensive. If CMS and the PDPs begin to restrict the use of generics, the TEP suggested the evaluation of generically available agents in the same manner as the medications defined within this report.
 3. With rare exceptions, those medications available in IV forms only were not considered by the TEP. It was assumed that these medications would be either administered in inpatient or office settings and therefore would not be covered under the Part D benefit.
1. Medications that are available over the counter (OTC) were not included in the comments made by the TEP. The exceptions to this are those products that are critical to the ESRD population, such as OTC phosphate binding agents.

The TEP reviewed the published USP guidelines, and used the architecture to deliver its specific comments to CMS. In so doing, the panel noted several USP categories that were inadequate in regard to outlining a categorization of medications specific for the ESRD population. In such instances, the TEP suggested new categories with increased granularity to meet the needs of the ESRD community:

- The TEP felt that certain binding agents were necessary and distinct, and requested the creation of the following classification under the USP heading “Gastrointestinal Agents, Other”
 - Non-calcium, non-aluminum, non-metal containing phosphate binding agents
 - Non-calcium, non-aluminum, metal-based phosphate binding agents
 - Calcium containing phosphate binding agents
 - Aluminum containing phosphate binding agents
 - Magnesium containing phosphate binding agents
- The TEP noted that currently certain nutritional agents were not covered. Due to the absolute necessity of these agents for treatment of ESRD patients, the TEP requested reclassifying those agents, which include:
 - Iron preparations
 - B vitamins
 - Carnitine, and
 - Renal vitamin preparation

E. Medications that should Always be Available

Based on the comments made by the TEP, 91 active drug substances were identified to be essential to the ESRD population. Those medications, and the prevalence of their use in the dually enrolled, ESRD, and Medicaid populations are detailed in Table 5. The numbers in the table are the number of beneficiaries who had at least one claim for a drug product that contains the active ingredient listed during the calendar year of 2002. See Appendix for the complete list of “must be available” medications.

TABLE 5: Medications that Must be Available for ESRD (CKD Stage 5) Patients

2002 Active Ingredients	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Celecoxib	2984 (1.6%)	33 (0.91%)	4202 (0.82%)	12969 (8.7%)	146 (4.0%)	16600 (3.1%)	15953	179	2.5%	20802
Valdecoxib	739 (0.4%)	1 (0.03%)	1081 (0.21%)	4234 (2.8%)	31 (0.86%)	5935 (1.1%)	4973	32	0.44%	7016
Lidocaine	3097 (1.7%)	195 (5.4%)	8182 (1.6%)	2167 (1.5%)	639 (17.7%)	4749 (0.89%)	5264	834	11.5%	12931
Cefaclor	910 (0.49%)	17 (0.47%)	5334 (1.04%)	1646 (1.1%)	39 (1.1%)	10658 (2.0%)	2556	56	0.77%	15992
Cefamandole	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0	0	0.00%	0
Cefonicid	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0	0	0.00%	0
Cefazolin	135 (0.07%)	28 (0.77%)	192 (0.04%)	74 (0.05%)	29 (0.8%)	103 (0.02%)	209	57	0.79%	295
Cephalexin	16951 (9.1%)	516 (14.3%)	62860 (12.3%)	18994 (12.8%)	633 (17.5%)	66967 (12.6%)	35945	1149	15.9%	129827
Cefixime	285 (0.15%)	11 (0.30%)	4191 (0.82%)	246 (0.17%)	4 (0.11%)	4281 (0.80%)	531	15	0.21%	8472
Ceftazidime	107 (0.06%)	17 (0.47%)	171 (0.03%)	77 (0.05%)	26 (0.72%)	106 (0.02%)	184	43	0.59%	277
Dicloxacillin	223 (0.12%)	11 (0.30%)	658 (0.13%)	330 (0.22%)	18 (0.50%)	861 (0.16%)	553	29	0.40%	1519
Erythromycin	3498 (1.9%)	93 (2.6%)	19611 (3.8%)	3156 (2.1%)	107 (3.0%)	16720 (3.1%)	6654	200	2.8%	36331

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Azithromycin	13431 (7.2%)	400 (11.1%)	96219 (18.8%)	17354 (11.7%)	611 (16.9%)	100628 (18.9%)	30785	1011	14.0%	196847
Clarithromycin	4477 (2.4%)	63 (1.7%)	19173 (3.8%)	8616 (5.8%)	157 (4.4%)	35033 (6.6%)	13093	220	3.0%	54206
Ciprofloxacin	11949 (6.4%)	350 (9.7%)	32039 (6.3%)	17811 (12.0%)	548 (15.2%)	35782 (6.7%)	29760	898	12.4%	67821
Gatifloxacin	3852 (2.1%)	110 (3.0%)	6932 (1.4%)	4901 (3.3%)	165 (4.6%)	8190 (1.5%)	8753	275	3.8%	85
Levofloxacin	17625 (9.5%)	528 (14.6%)	29301 (5.7%)	20949 (14.1%)	895 (24.8%)	32497 (6.1%)	38574	1423	19.7%	61798
Moxifloxacin	2863 (1.5%)	37 (1.0%)	5590 (1.1%)	4985 (3.4%)	64 (1.7%)	8108 (1.5%)	7848	101	1.4%	13698
Doxycycline	5338 (2.9%)	123 (3.4%)	15039 (2.9%)	6805 (4.6%)	270 (7.5%)	18125 (3.4%)	12143	393	5.4%	33164
Vancomycin	139 (0.07%)	14 (0.39%)	193 (0.04%)	115 (0.08%)	9 (0.25%)	143 (0.03%)	254	23	0.32%	336
Clindamycin	1693 (0.91%)	61 (1.7%)	9635 (1.9%)	2550 (1.7%)	122 (3.4%)	11930 (2.2%)	4243	183	2.5%	21565
Lincomycin	46 (0.02%)	0 (0.00%)	52 (0.01%)	48 (0.03%)	0 (0.00%)	69 (0.01%)	94	0	0.00%	121
Linezolid	54 (0.03%)	7 (0.19%)	107 (0.02%)	118 (0.08%)	10 (0.28%)	169 (0.03%)	172	17	0.24%	276
Metronidazole	5382 (2.9%)	162 (4.5%)	23856 (4.7%)	5613 (3.7%)	193 (5.4%)	25579 (4.8%)	10995	355	4.9%	49435
Gabapentin	7257 (3.9%)	198 (5.5%)	13501 (2.6%)	11067 (7.4%)	410 (11.4%)	16883 (3.2%)	18324	608	8.4%	30384
Metoclopramide	6912 (3.7%)	442 (12.2%)	16383 (3.2%)	7625 (5.1%)	669 (18.5%)	13507 (2.5%)	14537	1111	15.4%	29890
Fluconazole	6939 (3.7%)	183 (5.1%)	22927 (4.5%)	7118 (4.8%)	232 (6.4%)	22601 (4.3%)	14057	415	5.7%	45528
Voriconazole	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0	0	0.00%	0

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Rifapentine	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0	0	0.00%	0
Prednisone	8671 (4.7%)	314 (8.7%)	23849 (4.7%)	9722 (6.5%)	338 (9.4%)	19684 (3.7%)	18393	652	9.0%	43533
Isoniazid	69 (0.04%)	6 (0.17%)	149 (0.03%)	95 (0.06%)	2 (0.06%)	143 (0.03%)	164	8	0.11%	292
Rifampin	263 (0.14%)	30 (0.83%)	473 (0.09%)	378 (0.25%)	44 (1.2%)	563 (0.11%)	641	74	1.0%	1036
Clofazimine	2 (0.00%)	0 (0.00%)	3 (0.00%)	1 (0.00%)	0 (0.00%)	1 (0.00%)	3	0	0.00%	4
Quinine	2015 (1.1%)	116 (3.2%)	2893 (0.57%)	4045 (2.7%)	363 (10.1%)	4896 (0.92%)	6060	479	6.6%	7789
Acyclovir	1175 (0.63%)	71 (2.0%)	5334 (1.0%)	1394 (0.94%)	72 (2.0%)	6007 (1.1%)	2569	143	2.0%	11341
Abacavir	89 (0.05%)	7 (0.19%)	254 (0.05%)	146 (0.10%)	9 (0.25%)	347 (0.07%)	235	16	0.22%	601
Lamivudine	234 (0.13%)	24 (0.66%)	771 (0.15%)	453 (0.3%)	31 (0.86%)	1138 (0.21%)	687	55	0.76%	1909
Zidovudine	157 (0.08%)	10 (0.28%)	617 (0.12%)	303 (0.20%)	20 (0.55%)	878 (0.16%)	460	30	0.42%	1495
Clonazepam	4770 (2.6%)	125 (3.5%)	10525 (2.1%)	4417 (3.0%)	97 (2.7%)	7747 (1.5%)	9187	222	3.1%	18272
Lorazepam	9885 (5.3%)	177 (4.9%)	16224 (3.2%)	7736 (5.2%)	167 (4.6%)	11153 (2.1%)	17621	344	4.8%	27377
Tocopherol	6284 (3.4%)	961 (26.6%)	10409 (2.0%)	3374 (2.3%)	1912 (53.0%)	5873 (1.1%)	9658	2873	39.8%	16282
Carvedilol	1547 (0.83%)	72 (2.0%)	2321 (0.45%)	2879 (1.9%)	144 (4.0%)	3670 (0.69%)	4426	216	3.0%	5991
Clonidine	6856 (3.7%)	674 (18.6%)	13586 (2.7%)	8385 (5.6%)	847 (23.5%)	13124 (2.5%)	15241	1521	21.0%	26710
Nateglinide	462 (0.25%)	8 (0.22%)	777 (0.15%)	779 (0.52%)	23 (0.64%)	1054 (0.20%)	1241	31	0.43%	1831

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Repaglinide	274 (0.15%)	8 (0.22%)	458 (0.09%)	681 (0.46%)	14 (0.39%)	882 (0.17%)	955	22	0.30%	1340
Glipizide	4461 (2.4%)	102 (2.8%)	7224 (1.4%)	6325 (4.3%)	113 (3.1%)	8804 (1.7%)	10786	215	3.0%	16028
Pioglitazone	3222 (1.7%)	68 (1.9%)	5560 (1.1%)	4767 (3.2%)	145 (4.0%)	6721 (1.3%)	7989	213	3.0%	12281
Rosiglitazone	2562 (1.4%)	71 (2.0%)	4183 (0.82%)	4162 (2.8%)	138 (3.8%)	5916 (1.1%)	6724	209	2.9%	10099
Darbepoetin alfa	17 (0.01%)	3 (0.08%)	25 (0.00%)	66 (0.04%)	21 (0.58%)	91 (0.02%)	83	24	0.33%	116
Epoetin alfa	412 (0.22%)	69 (1.9%)	572 (0.11%)	686 (0.46%)	110 (3.1%)	886 (0.17%)	1098	179	2.5%	1458
Aspirin	12729 (6.8%)	301 (8.3%)	18053 (3.5%)	8047 (5.4%)	226 (6.3%)	11745 (2.2%)	20776	527	7.3%	29798
Clopidogrel	6829 (3.7%)	212 (5.9%)	9099 (1.8%)	10681 (7.2%)	357 (9.9%)	12835 (2.4%)	17510	569	7.9%	21934
Clonidine	6856 (3.7%)	674 (18.6%)	13586 (2.7%)	8385 (5.6%)	847 (23.5%)	13124 (2.5%)	15241	1521	21.1%	26710
Midodrine	97 (0.05%)	29 (0.80%)	131 (0.03%)	205 (0.14%)	68 (1.9%)	251 (0.05%)	302	97	1.3%	382
Aiodarone	1231 (0.66%)	67 (1.9%)	1545 (0.30%)	1876 (1.3%)	131 (3.6%)	2199 (0.41%)	3107	198	2.7%	3744
Amlodipine	13540 (7.3%)	718 (19.9%)	20648 (4.0%)	22755 (15.3%)	1193 (33.1%)	31206 (5.9%)	36295	1911	26.4%	51854
Digoxin	9008 (4.8%)	145 (4.0%)	11094 (2.2%)	13059 (8.8%)	289 (8.0%)	15371 (2.9%)	22067	434	6.0%	26465
Ethacrynic acid	5 (0.00%)	0 (0.00%)	6 (0.00%)	9 (0.01%)	0 (0.00%)	12 (0.00%)	14	0	0.00%	18
Atorvastatin	8071 (4.3%)	233 (6.4%)	12831 (2.5%)	13064 (8.8%)	445 (12.3%)	17344 (3.3%)	21135	678	9.4%	30175
Pravastatin	3058 (1.6%)	58 (1.6%)	4803 (0.94%)	4203 (2.8%)	91 (2.5%)	5327 (1.0%)	7261	149	2.1%	10130

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Benazepril	4494 (2.4%)	79 (2.2%)	7501 (1.5%)	9123 (6.1%)	226 (6.3%)	13033 (2.5%)	13617	305	4.2%	20534
Captopril	1848 (0.99%)	63 (1.7%)	2824 (0.55%)	3500 (2.4%)	101 (2.8%)	4633 (0.87%)	5348	164	2.3%	7457
Enalapril	3918 (2.1%)	184 (5.1%)	5905 (1.2%)	5675 (3.8%)	302 (8.4%)	7530 (1.4%)	9593	486	6.7%	13435
Enalaprilat	3571 (1.9%)	184 (5.1%)	5346 (1.1%)	4843 (3.3%)	301 (8.3%)	6420 (1.21%)	8414	485	6.7%	11766
Fosinopril	2269 (1.2%)	81 (2.2%)	4254 (0.83%)	2595 (1.7%)	196 (5.4%)	3447 (0.65%)	4864	277	3.8%	7701
Lisinopril	8013 (4.3%)	176 (4.9%)	11714 (2.3%)	10267 (6.9%)	204 (5.7%)	13489 (2.5%)	18280	380	5.3%	25203
Moexipril	807 (0.43%)	7 (0.19%)	1388 (0.27%)	1354 (0.91%)	21 (0.58%)	1924 (0.36%)	2161	28	0.39%	3312
Perindopril	213 (0.11%)	6 (0.17%)	392 (0.08%)	576 (0.39%)	7 (0.19%)	796 (0.15%)	789	13	0.18%	1188
Quinapril	2265 (1.2%)	51 (1.4%)	3649 (0.71%)	4080 (2.7%)	136 (3.8%)	5667 (1.1%)	6345	187	2.6%	9316
Ramipril	3480 (1.9%)	93 (2.6%)	5570 (1.1%)	4608 (3.1%)	77 (2.1%)	6145 (1.2%)	8088	170	2.4%	11715
Trandolapril	603 (0.32%)	13 (0.36%)	1012 (0.20%)	1843 (1.2%)	123 (3.4%)	2746 (0.52%)	2446	136	1.9%	3758
Minoxidil	369 (0.20%)	190 (5.3%)	541 (0.11%)	855 (0.57%)	549 (15.2%)	1047 (0.20%)	1224	739	10.2%	1588
Lidocaine	3097 (1.7%)	195 (5.4%)	8182 (1.6%)	2167 (1.5%)	639 (17.7%)	4749 (0.9%)	5264	834	11.5%	12931
Mupirocin	3988 (2.1%)	196 (5.4%)	19959 (3.9%)	5606 (3.8%)	312 (8.6%)	23647 (4.4%)	9594	508	7.0%	43606
Calcitriol	225 (0.12%)	119 (3.3%)	395 (0.08%)	311 (0.21%)	154 (4.3%)	429 (0.08%)	536	273	3.8%	824
Doxercalciferol	42 (0.02%)	35 (0.97%)	53 (0.01%)	170 (0.11%)	122 (3.4%)	205 (0.04%)	212	157	2.2%	258

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Paricalcitol	1 (0.00%)	1 (0.03%)	2 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1	1	0.01%	2
Esterified estrogens	617 (0.33%)	1 (0.03%)	1239 (0.24%)	686 (0.46%)	4 (0.11%)	1243 (0.23%)	1303	5	0.07%	2482
Megestrol	3797 (2.0%)	97 (2.7%)	4360 (0.9%)	3900 (2.6%)	246 (6.8%)	4380 (0.82%)	7697	343	4.8%	8740
Cyclosporine	162 (0.09%)	64 (1.8%)	305 (0.06%)	100 (0.07%)	25 (0.69%)	191 (0.04%)	262	89	1.2%	496
Mycophenolate	188 (0.10%)	117 (3.2%)	289 (0.06%)	195 (0.13%)	92 (2.6%)	289 (0.05%)	383	209	2.9%	578
Sirolimus	14 (0.01%)	9 (0.25%)	26 (0.01%)	26 (0.02%)	15 (0.42%)	37 (0.01%)	40	24	0.33%	63
Tacrolimus	233 (0.13%)	95 (2.6%)	2413 (0.47%)	250 (0.17%)	76 (2.1%)	1909 (0.36%)	483	171	2.4%	4322
Oseltamivir	495 (0.27%)	9 (0.25%)	1985 (0.39%)	1057 (0.71%)	12 (0.33%)	3656 (0.69%)	1552	21	0.29%	5641
Dapsone	73 (0.04%)	11 (0.30%)	202 (0.04%)	86 (0.06%)	7 (0.19%)	200 (0.04%)	159	18	0.25%	402
Cyclophosphamide	13 (0.01%)	0 (0%)	37 (0.01%)	45 (0.03%)	5 (0.14%)	66 (0.04%)	58	5	0.07%	103
Lactulose	3167 (1.7%)	152 (4.2%)	7983 (1.6%)	4223 (2.8%)	208 (5.8%)	7002 (1.3%)	7390	360	5.0%	11225
Polyethylene Glycol	3859 (2.1%)	143 (4.0%)	9724 (1.9%)	5128 (3.4%)	250 (7.0%)	8267 (1.6%)	8987	393	5.45%	17991
Somatropin	11 (0.01%)	6 (0.17%)	183 (0.04%)	8 (0.01%)	1 (0.03%)	88 (0.02%)	19	7	0.10%	271
Levetiracetam	346 (0.19%)	6 (0.17%)	1141 (0.22%)	368 (0.25%)	19 (0.53%)	783 (0.15%)	714	25	0.35%	1924
Gentamicin	2540 (1.4%)	45 (1.2%)	7392 (1.5%)	2185 (1.5%)	51 (1.4%)	10594 (2.0%)	4725	96	1.3%	17986

F. Medications that should be Avoided

Based on the comments made by the TEP, 29 active drug substances were identified as medications that should be avoided in the ESRD population. Those medications, and the prevalence of their use in the dually enrolled, ESRD, and Medicaid populations are detailed in Table 6. The numbers in the tables are the number of beneficiaries who had at least one claim for a drug product that contains the active ingredient listed during the calendar year of 2002. **Medications listed in the Appendix that do not appear in the list below were not present in the 2002 dataset.**

TABLE 6: Medications to Avoid in ESRD (CKD Stage 5) Patients

2002 Active Ingredients	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Acetazolamide	274 (0.15%)	5 (0.14%)	477 (0.09%)	355 (0.24%)	10 (0.28%)	518 (0.10%)	629	15	0.21%	995
Acetohexamide	1 (0.00%)	0 (0%)	1 (0.00%)	11 (0.01%)	0 (0%)	12 (0.00%)	12	0	0%	13
Amiloride	121 (0.06%)	0 (0%)	267 (0.05%)	413 (0.28%)	1 (0.03%)	571 (0.11%)	534	1	0.01%	838
Anisindione	1 (0.00%)	0 (0%)	1 (0.00%)	0 (0%)	0 (0%)	0 (0%)	1	0	0%	1
Baclofen	1038 (0.56%)	6 (0.17%)	2530 (0.50%)	946 (0.64%)	11 (0.30%)	1736 (0.33%)	1984	17	0.24%	4266
Bendroflumethiazide	76 (0.04%)	0 (0%)	128 (0.3%)	57 (0.04%)	0 (0%)	77 (0.01%)	133	0	0%	205
Chlorothiazide	11 (0.01%)	0 (0%)	93 (0.2%)	37 (0.02%)	0 (0%)	46 (0.01%)	48	0	0%	139
Chlorthalidone	558 (0.30%)	2 (0.06%)	879 (0.17%)	1403 (0.94%)	8 (0.22%)	2004 (0.38%)	1961	10	0.14%	2883
Choline and Magnesium	122 (0.07%)	0 (0%)	182 (0.04%)	55 (0.04%)	0 (0%)	96 (0.02%)	177	0	0%	278
Chlorpropamide	64 (0.03%)	0 (0%)	81 (0.02%)	163 (0.11%)	4 (0.11%)	91 (0.02%)	227	4	0.06%	172
Demeclocycline	33 (0.02%)	1 (0.03%)	44 (0.01%)	17 (0.01%)	1 (0.03%)	28 (0.01%)	50	2	0.03%	72

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Dofetilide	1 (0.00%)	0 (0%)	1 (0.00%)	6 (0.00%)	0 (0%)	6 (0.00%)	7	0	0%	7
Fenofibrate	954 (0.51%)	14 (0.39%)	1646 (0.32%)	1214 (0.82%)	14 (0.39%)	1620 (0.30%)	2168	28	0.39%	3266
Hydrochlorothiazide	19713 (10.6%)	71 (1.96%)	32494 (6.39%)	33866 (22.7%)	97 (2.69%)	49593 (9.31%)	53579	168	2.3%	82087
Indapamide	749 (0.40%)	5 (0.14%)	1011 (0.20%)	1324 (0.89%)	5 (0.14%)	1666 (0.31%)	2073	10	0.14%	2677
Ketorolac	1332 (0.72%)	24 (0.66%)	3927 (0.77%)	2291 (1.54%)	36 (0.99%)	5434 (1.02%)	3623	60	0.83%	9361
Meperidine	484 (0.26%)	10 (0.28%)	1247 (0.24%)	388 (0.26%)	10 (0.28%)	1536 (0.29%)	872	20	0.28%	2783
Metformin	8097 (4.35%)	16 (0.44%)	14590 (2.87%)	12088 (8.12%)	22 (0.61%)	17990 (3.38%)	20185	38	0.53%	32580
Methenamine	1350 (0.73%)	8 (0.22%)	3012 (0.59%)	2125 (1.42%)	6 (0.17%)	4733 (0.89%)	3475	14	0.19%	7745
Methyclothiazide	51 (0.03%)	0 (0%)	59 (0.01%)	82 (0.06%)	0 (0%)	93 (0.02%)	133	0	0%	152
Metolazone	1862 (1.0%)	51 (1.4%)	2546 (0.50%)	2481 (1.7%)	93 (2.6%)	3052 (0.57%)	4343	144	2.0%	5598
Nicardipine	61 (0.03%)	1 (0.03%)	71 (0.01%)	165 (0.11%)	14 (0.39%)	183 (0.03%)	226	15	0.21%	254
Nitrofurantoin	4313 (2.3%)	24 (0.66%)	15029 (3.0%)	5308 (3.6%)	37 (1.0%)	15173 (2.9%)	9621	61	0.84%	30202
Oxytetracycline	0 0%	0 (0%)	0 (0%)	5 (0.00%)	0 (0%)	6 (0.00%)	5	0	0%	6
Polythiazide	4 (0.00%)	0 (0%)	4 (0.00%)	10 (0.01%)	0 (0%)	12 (0.00%)	14	0	0%	16
Probenecid	195 (0.10%)	1 (0.03%)	288 (0.06%)	517 (0.35%)	4 (0.11%)	670 (0.13%)	712	5	0.07%	958
Ribavirin	55 (0.03%)	0 (0%)	123 (0.02%)	112 (0.08%)	2 (0.06%)	230 (0.04%)	167	2	0.03%	353

2002	ALABAMA Beneficiaries			MISSISSIPPI Beneficiaries			TOTALS			
Active Ingredients	Dually enrolled	ESRD	Medicaid	Dually enrolled	ESRD	Medicaid	Total Dually enrolled	Total ESRD	% of All ESRD	Total Medicaid
Sucralfate	1527 (0.82%)	28 (0.77%)	3199 (0.63%)	1555 (1.04%)	40 (1.11%)	2648 (0.50%)	3082	68	0.94%	5847
Tetracycline	1091 (0.59%)	25 (0.69%)	2834 (0.56%)	1532 (1.0%)	43 (1.2%)	3405 (0.63%)	2623	68	0.94%	6239
Tolazamide	12 (0.01%)	0 (0%)	16 (0.00%)	34 (0.02%)	2 (0.06%)	37 (0.01%)	46	2	0.03%	53
Tolbutamide	30 (0.02%)	0 (0%)	36 (0.01%)	39 (0.03%)	0 (0%)	44 (0.01%)	69	0	0%	80
Trichlormethiazide	2 (0.00%)	0 (0%)	3 (0.00%)	4 (0.00%)	0 (0%)	7 (0.00%)	6	0	0%	10
Low Molecular Weight Heparins*	508 (0.27%)	16 (0.44%)	779 (0.15%)	734 (0.49%)	21 (0.58%)	1027 (0.19%)	1242	37	0.51%	1806

* Includes Dalteparin, Enoxaparin, Tinzaparin

G. Drug Utilization Review

During the first TEP meeting, it was noted that Drug Utilization Review (DUR) will be an important component of the Part D benefit in regard to appropriate prescribing patterns for the ESRD population. Potential criteria for DUR development include appropriate dosage adjustments, drug-drug interactions, and the use of medications that represent a particular risk to the ESRD population. Additionally, the TEP recognized the ability of a “negative list” or a list of medications that should not be used in ESRD, to be applied in the restriction of treatment at the PDP level. Thus, the Medications to Avoid List was created to restrict use of those medications as close as possible to zero, and it represents an immediate use of the list for prospective DUR in the treatment of the ESRD population.

In terms of research using retrospective DUR, the TEP felt that both the Medications to Avoid List and the list of Medications that should Always Be Available could serve as resources for analysis and assessment of quality in ESRD care. At a higher level, the application of appropriate dosages based on CrCl could also be applied.

IV. Areas of Further Investigation

As the implementation of the MMA unfolds, certain information needs are apparent. These needs can be grouped into 4 phases.

Further Investigation

Because of the complexity of care in the CKD population, the TEP focused the determination of Medications to Avoid and Medications that Should Always Be Available in the ESRD (CKD Stage 5) population. For the most part, this eliminated the consideration of certain populations including the CKD stages 1-4 populations, the pediatric CKD patient population, and the renal transplant population.

Early Stage Chronic Kidney Disease Patients

The population of patients with CKD stages 1 – 4 has the potential to have different restrictions of medication treatment or uniquely necessary treatments. It was noted, for example, that while HCTZ is rarely, if ever, appropriate in the ESRD population, it is beneficial in the treatment of patients with GFR greater than 15ml/min.

Pediatric ESRD

Pediatric ESRD represents a population that requires unique dosage adjustments, a potentially unique list of Medications to Avoid, and a unique list of Medications that Should Always Be Available. For example, there exist a large variety of vaccines and treatments such as growth hormones that are necessary for pediatric populations, but would not be included on a list built for the treatment of adult ESRD.

Post-transplant ESRD

The treatment of patients post-kidney transplant requires a unique set of agents and would result in wholly separate lists of Medications to Avoid and Medications that Should Always Be Available. For example, the TEP did not, for the most part, consider the appropriateness of graft rejection agents necessary in the prevention of transplant rejection. It was also noted that certain medications potentially exist that must be avoided in this population, but that may remain appropriate in a population on dialysis.

Medication Cost Issues

Once medication issues have been identified, there is a need to understand the impact of those medications and medication issues on costs to CMS. These costs are unadjusted costs associated with medication use and unadjusted costs associated with inappropriate medication use.

Performance Measures

After medication issues and their associated costs have been evaluated, CMS has the need for prescription-specific performance indicators for this population. These performance indicators (or quality measures) are necessary to direct quality improvement initiatives, track performance of quality improvement initiatives, and monitor the quality of care received by ESRD beneficiaries.

Benefit Design

Once CMS has identified medication issues, determined the associated costs, developed performance measures, and is able to monitor the quality of care received by ESRD patients, there is a need to “fine tune” the benefit offered to these patients. These activities can include, but are not limited to designing formularies and coverage parameters that improve or maintain the quality of care, while at the same time save CMS money. These analyses can include analyses that investigate adjusted cost estimates, comparative effectiveness, cost effectiveness, and patient safety associated with medications and benefit parameters.

APPENDIX

FINAL REPORT TO CMS

MEDICATION CATEGORIZATION SCHEME FOR CKD STAGE V PATIENTS

- **Medications that should Always be Available**
- **Medications to Avoid**

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Analgesics	Opioid Analgesics	Opioid Analgesics, Long-acting	Levomethadyl	Acetate			
				Hydrochloride			
			Levorphanol	Tartrate			
			Methadone	Hydrochloride			
			Morphine	Sulfate			
			Opioid Analgesics, Short-acting	Alfentanil	Hydrochloride		
				Buprenorphine			
				Butorphanol	Tartrate		
				Codeine	Phosphate		
					Sulfate		
			Fentanyl				
				Citrate			
			Hydromorphone	Hydrochloride	Must be available	Frequently used short-acting agent.	
			Meperidine	Hydrochloride	AVOID	Metabolite (normeperidine) accumulation in ESRD leading to potential seizures	
			Nalbuphine	Hydrochloride			
			Opium				
			Oxycodone	Hydrochloride			
			Oxymorphone	Hydrochloride			
			Pentazocine	Lactate			
			Propoxyphene	Hydrochloride			
			Napsylate				
		Remifentanil					
		Sufentanil	Citrate				
		Tramadol	Hydrochloride				
	Non-opioid Analgesics	Cyclooxygenase-2 (COX-2) Inhibitors					
			Celecoxib				
			Valdecoxib –Removed from market 4/05				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Analgesics	Non-opioid Analgesics	Nonsteroidal Anti-inflammatory Drugs, Nonspecific	Duloxetine	Hydrochloride		
			Choline and Magnesium		AVOID	Mg++ accumulation-potentially life-threatening
			Salicylates			
			Diclofenac	Potassium		
				Sodium		
			Diflunisal			
			Etodolac			
			Fenoprofen	Calcium		
			Flurbiprofen			
			Ibuprofen			
		Nonsteroidal Anti-inflammatory Drugs, Nonspecific	Indomethacin			
			Ketoprofen			
			Ketorolac	Tromethamine	AVOID (Oral form)	> 90% drug/metabolites are renally excreted
			Magnesium Salicylate			
			Meclofenamate	Sodium		
			Mefenamic Acid			
			Meloxicam			
			Nabumetone			
			Naproxen			
			Sodium			
		Oxaprozin				
		Piroxicam				
		Salsalate				
		Sodium Thiosalicylate				
		Sulindac				
		Tolmetin	Sodium			
Anesthetics		Local Anesthetics	Articaine	Hydrochloride		
			Bupivacaine	Hydrochloride		
			Chloroprocaine	Hydrochloride		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Anesthetics		Local Anesthetics	Levobupivacaine		Inj. and topical must be available	For use in HD prior to access cannulation.	
			Lidocaine	Hydrochloride			
			Mepivacaine	Hydrochloride			
			Procaine	Hydrochloride			
			Tetracaine	Hydrochloride			
Antibacterials	Beta-lactam, Cephalosporins	Cephalosporin Antibacterials, 1st Generation			Must be available	Due to pharmacokinetics unique to ESRD and need for gram positive coverage	
			Cefadroxil				
			Cefazolin				
			Cephalexin				
				Hydrochloride			
			Cephapirin				
			Cephradine				
			Cephalosporin Antibacterials, 2nd Generation			Any two in this list are acceptable for use in ESRD	
				Cefaclor			
				Cefamandole	Nafate		
	Cefonicid						
	Cefotetan						
	Cefoxitin						
	Cefprozil						
	Cefuroxime	Axetil					
	Cephalosporin Antibacterials, 3rd Generation						
		Cefdinir					
			Cefditoren				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Antibacterials	Beta-lactam, Cephalosporins	Cephalosporin Antibacterials, 3rd Generation	Cefixime		Must be available	3 rd generation oral agent.		
			Cefoperazone					
			Cefotaxime					
			Cefpodoxime	Proxetil				
			Ceftazidime		Must be available	Pseudomonal coverage. Post-dialysis dosing schedule.		
			Ceftibuten					
			Ceftizoxime					
			Ceftriaxone					
		Cephalosporin Antibacterials, 4th Generation						
			Cefepime		Must be available	For treatment of PD-related peritonitis.		
	Beta-lactam, Penicillins	Amino Derivative Penicillins						
			Amoxicillin					
			Amoxicillin and Clavulanate	Potassium				
			Ampicillin					
						Sodium		
					Ampicillin and Sulbactam	Sodium		
					Bacampicillin	Hydrochloride		
				Extended Spectrum Penicillins				
					Carbenicillin	Indanyl Sodium		
						Disodium		
					Mezlocillin	Sodium		
					Piperacillin	Sodium		
					Piperacillin and Tazobactam	Sodium		
					Ticarcillin	Disodium		
			Ticarcillin and Clavulanic Acid					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antibacterials	Beta-lactam, Penicillins	Antibacterials	Cloxacillin	Sodium			
			Dicloxacillin	Sodium	Must be available	Gram positive coverage	
			Flucloxacillin	Sodium			
			Methicillin	Sodium			
			Nafcillin	Sodium			
				Oxacillin	Sodium		
		Beta-lactam, Other	Carbacephem Antibacterials				
				Loracarbef			
		Macrolides	Erythromycins				
				Erythromycin		Must be available	Broad spectrum coverage
					Estolate		
					Ethylsuccinate		
					Lactobionate		
					Stearate		
				Ketolides			
			Telithromycin				
		Macrolides (Non-erythromycins, Non-ketolides)					
			Azithromycin		Must be available	Broad spectrum coverage	
			Clarithromycin		Must be available		
			Dirithromycin				
			Troleandomycin				
	Quinolones	Quinolones, Fluorinated					
			Ciprofloxacin		Must be available	Gram positive and gram negative coverage. Longer half-life allows for daily to every-other day dosing.	
			Gatifloxacin		Must be available		
			Gemifloxacin				
			Levofloxacin		Must be available		
	Lomefloxacin						

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antibacterials	Quinolones	Quinolones, Fluorinated	Moxifloxacin	Hydrochloride	Must be available	As noted above.	
			Norfloxacin				
			Ofloxacin				
			Quinolones, Non-fluorinated				
		Sulfonamides		Nalidixic Acid			
				Sulfadiazine			
				Sulfadiazine and Trimethoprim			
				Sulfamethizole			
				Sulfanilamide			
				Sulfisoxazole			
					Acetyl		
				Sulfamethoxazole and Trimethoprim		Must be available	Treatment of peritonitis.
		Tetracyclines					
				Demeclocycline	Hydrochloride	AVOID	Potential for excessive systemic accumulation of drug and possible liver toxicity
			Doxycycline		Must be available		
				Calcium			
				Hyclate			
			Minocycline	Hydrochloride			
			Oxytetracycline	Hydrochloride	AVOID	Potential for excessive systemic accumulation of drug and possible liver toxicity	
			Tetracycline		AVOID	Potential for excessive systemic accumulation of drug and possible liver toxicity, may still be used for bone biopsy.	
				Hydrochloride			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Antibacterials	Antibacterials, Other	Antifolate Antibacterials						
			Trimethoprim					
		Glycopeptide Antibacterials						
				Vancomycin	Hydrochloride	Both oral and IV forms must be available	Necessary for resistant strains of many organisms. Common occurrence of MRSA in HD population. .	
		Lincomycin Antibacterials						
				Clindamycin	Hydrochloride	Must be available		
					Palmitate			
					Hydrochloride			
					Phosphate			
				Lincomycin	Hydrochloride	Must be available		
		Nitrofurantoin Antibacterials						
				Furazolidone				
					Nitrofurantoin		AVOID	Therapeutic concentrations are not achieved when GFR < 60 ml/min
		Oxazolidinone Antibacterials						
		Linezolid			Must be available	For vancomycin resistant organisms.		
Miscellaneous Antibacterials								
		Bacitracin						
		Chloramphenicol						
				Palmitate				
		Daptomycin						
		Fosfomycin		Tromethamine				
		Methenamine		Hippurate	AVOID	Contraindicated with renal failure		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antibacterials	Antibacterials, Other	Miscellaneous Antibacterials		Mandelate			
			Metronidazole		Must be available	C. Difficile coverage	
				Hydrochloride			
				Calcium			
				Neomycin	Sulfate		
				Rifaximin			
Anticonvulsants	Calcium Channel Modifying Agents						
			Ethosuximide				
			Methsuximide				
			Trimethadione				
		Gamma-aminobutyric Acid (GABA) Augmenting Agents		Zonisamide			
				Divalproex	Sodium		
				Gabapentin		Must be available	Treatment of diabetic neuropathic pain.
				Primidone			
				Tiagabine	Hydrochloride		
				Valproate	Sodium		
				Valproic Acid			
	Glutamate Reducing Agents		Felbamate				
			Lamotrigine				
			Topiramate				
	Sodium Channel Inhibitors		Carbamazepine				
			Ethotoin				
			Fosphenytoin	Sodium			
			Oxcarbazepine				
			Phenytoin	Sodium			
		Anticonvulsants (Other)					
			Levetiracetam		Must Be Available	For pediatric seizure disorders	

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antidementia Agents	Cholinesterase Inhibitors		Donepezil	Hydrochloride			
			Galantamine				
			Rivastigmine	Tartrate			
			Tacrine	Hydrochloride			
	Glutamate Pathway Modifiers		Memantine				
	Antidementia Agents, Other		Ergoloid Mesylates				
	Antidepressants	Monoamine Oxidase (Type A) Inhibitors		Phenelzine	Sulfate		
				Tranylcypromine	Sulfate		
Reuptake Inhibitors		Selective Serotonin Reuptake Inhibitors (SSRIs)		Citalopram	Hydrobromide		
				Escitalopram	Oxalate		
				Fluoxetine	Hydrochloride		
				Fluvoxamine	Maleate		
			Paroxetine	Hydrochloride			
			Sertraline	Hydrochloride			
		Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs)		Duloxetine	Hydrochloride		
				Nefazodone	Hydrochloride		
Tricyclics		Venlafaxine	Hydrochloride				
		Amitriptyline	Hydrochloride				
		Amoxapine					
		Clomipramine	Hydrochloride				
		Desipramine	Hydrochloride				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Antidepressants	Reuptake Inhibitors	Tricyclics	Doxepin	Hydrochloride				
			Imipramine	Hydrochloride				
				Pamoate				
			Nortriptyline	Hydrochloride				
			Protriptyline	Hydrochloride				
			Trimipramine	Maleate				
	Antidepressants, Other							
			Bupropion	Hydrochloride				
			Maprotiline	Hydrochloride				
			Mirtazapine					
			Trazodone	Hydrochloride				
Antiemetics		5-Hydroxytryptamine 3 (5-HT ₃) Antagonists						
			Dolasetron	Mesylate				
			Granisetron	Hydrochloride				
			Ondansetron	Hydrochloride				
			Palonosetron	Hydrochloride				
			Antiemetics (Non-5-HT ₃ Antagonists)					
					Aprepitant			
					Chlorpromazine	Hydrochloride		
					Dimenhydrinate			
					Diphenhydramine	Hydrochloride		
					Dronabinol			
					Droperidol			
					Hydroxyzine	Pamoate		
					Meclizine	Hydrochloride		
					Metoclopramide		Must be available	Useful in diabetic gastroparesis
					Perphenazine			
			Prochlorperazine	Edisylate				
				Maleate				
			Promethazine	Hydrochloride				
			Scopolamine					
			Thiethylperazine	Maleate				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Antiemetics		Antiemetics (Non-5-HT3 Antagonists)	Trimethobenzamide	Hydrochloride		
Antifungals		Allylamine Antifungals				
			Terbinafine	Hydrochloride		
		Azole Antifungals				
			Butoconazole	Nitrate		
			Clotrimazole			
			Fluconazole		Must be available	
			Itraconazole			
			Ketoconazole			
			Miconazole	Nitrate		
			Terconazole			
			Voriconazole		Must be available	Treatment of Aspergillus infection
		Polyene Antifungals				
			Amphotericin B			
			Amphotericin B Cholesteryl Complex	Sulfate		
			Amphotericin B Lipid Complex			
			Amphotericin B Liposomal Complex			
			Nystatin			
		Pyrimidine Antifungals				
			Flucytosine			
		Antifungals (Other)				
			Griseofulvin			
Antigout Agents		Renal Tubular Blocking Agents				
			Probenecid		AVOID	Ineffective at low GFR
			Sulfapyrazone			
		Xanthine Oxidase Inhibitors				
			Allopurinol			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Antigout Agents		Antigout Agents (Non-renal Tubular Blocking Agents and Non-xanthine Inhibitors)				
			Colchicine			
Anti-inflammatories	Glucocorticoids					
			Prednisone		Must be available	Commonly used anti-inflammatory agent.
	Nonsteroidal Anti-inflammatory Drugs	Cyclooxygenase-2 (COX-2) Inhibitors				
			Celecoxib			
			Valdecoxib— Removed from market 4/05			
		Nonsteroidal Anti-inflammatory Drugs, Non-specific				
			Choline and Magnesium Salicylates		AVOID	Potential for Mg++ accumulation.
			Diclofenac	Potassium Sodium		
			Diflunisal			
			Etodolac			
			Fenoprofen	Calcium		
			Flurbiprofen			
			Ibuprofen			
Anti-inflammatories	Nonsteroidal Anti-inflammatory Drugs	Nonsteroidal Anti-inflammatory Drugs, Non-specific	Indomethacin			
			Ketoprofen			
			Ketorolac	Tromethamine	AVOID (Oral form)	Risk of GI bleed. > 90% drug/metabolites renally excreted.
			Magnesium Salicylate			
			Meclofenamate	Sodium		
			Mefenamic Acid			
			Meloxicam			
			Nabumetone			
			Naproxen			
				Sodium		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Anti-inflammatories	Nonsteroidal Anti-inflammatory Drugs	Nonsteroidal Anti-inflammatory Drugs, Non-specific	Oxaprozin				
			Piroxicam				
			Salsalate				
			Sodium Thiosalicylate				
			Sulindac				
			Tolmetin	Sodium			
Antimigraine Agents	Abortive	Ergot Alkaloids					
			Dihydroergotamine	Mesylate			
			Ergotamine	Tartrate			
			Triptans				
				Almotriptan			
				Frovatriptan	Succinate		
				Naratriptan	Hydrochloride		
				Rizatriptan	Benzoate		
				Sumatriptan			
				Zolmitriptan			
		Prophylactic		Beta-adrenergic Blocking Agents			
			Propranolol		Hydrochloride		
			Timolol		Maleate		
		Antimigraine Agents, Prophylactic (Non-beta-adrenergic Blocking Agents)					
			Divalproex	Sodium			
			Topiramate				
Antimycobacterials	Antituberculars						
			Aminosalicylate	Sodium			
			Capreomycin	Sulfate			
			Cycloserine				
			Ethambutol	Hydrochloride	Must be available	Necessary for tuberculosis treatment	
			Ethionamide				
			Isoniazid		Must be available	Necessary for tuberculosis treatment.	
Pyrazinamide		Must be available					
Rifampin		Must be available					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antimycobacterials	Antituberculars		Rifampin and Isoniazid				
			Rifampin, Isoniazid, and Pyrazinamide				
			Rifapentine				
	Antimycobacterials, Other			Clofazimine			
				Dapsone		Must be available	Common alternative for PCP prophylaxis in sulfa allergic patients.
				Rifabutin			
Antineoplastics	Alkylating Agents		Altretamine				
			Busulfan				
			Carmustine				
			Chlorambucil				
				Cyclophosphamide		Must be available	Used for treatment of Goodpasture's Disease or Wegener's vasculitis.
				Dacarbazine			
				Ifosfamide			
				Lomustine			
				Mechlorethamine	Hydrochloride		
				Melphalan			
					Hydrochloride		
				Procarbazine	Hydrochloride		
				Temozolomide			
				Thiotepa			
				Uracil Mustard			
			Antimetabolites				
					Azacitidine		
			Capecitabine				
			Cytarabine				
			Floxuridine				
			Fluorouracil				
			Gemcitabine				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Antineoplastics	Antimetabolites		Hydroxyurea					
			Mercaptopurine					
			Methotrexate					
					Sodium			
					Pemetrexed	Disodium	Clinical restriction based on GFR and/or toxicity	*See note.
					Pentostatin			
			Thioguanine					
	Immune Modulators and Vaccines							
				Aldesleukin		Clinical restriction based on GFR and/or toxicity	*See note.	
				BCG Vaccine (Live)				
	Molecular Target Inhibitors							
				Bortezomib				
				Erlotinib				
				Gefitinib				
				Imatinib	Mesylate			
				Tretinoin				
	Nucleoside Analogs							
				Cladribine				
				Fludarabine	Phosphate	Clinical restriction based on GFR and/or toxicity	*See note.	
	Protective Agents							
				Amifostine				
				Dexrazoxane				
				Leucovorin	Calcium			
				Mesna				
				Rasburicase				
	Topoisomerase Inhibitors							
				Etoposide				
					Phosphate			
				Irinotecan	Hydrochloride			
				Teniposide				
			Topotecan		Clinical restriction based on GFR and/or toxicity	*See note.		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Antineoplastics	Antineoplastics, Other					
			Arsenic Trioxide		Clinical restriction based on GFR and/or toxicity	*See note.
			Asparaginase			
			Bexarotene			
			Carboplatin			
			Cisplatin			
			Denileukin	Diftitox		
			Oxaliplatin			
			Pegaspargase			
			Porfimer	Sodium		
Antiparasitics	Anthelmintics					
			Albendazole			
			Ivermectin			
			Mebendazole			
			Praziquantel			
			Pyrantel	Pamoate		
			Thiabendazole			
	Antiprotozoals	Antimalarials				
			Atovaquone and Proguanil	Hydrochloride		
			Chloroquine	Phosphate		
				Hydrochloride		
			Hydroxychloroquine	Sulfate		
			Iodoquinol			
			Mefloquine	Hydrochloride		
			Primaquine	Phosphate		
			Pyrimethamine			
			Quinine	Sulfate	Must be available	Treatment of leg cramps.
			Sulfadoxine and Pyrimethamine			
		Antiprotozoals (Non-antimalarials)				
			Atovaquone			
			Nitazoxanide			
			Pentamidine	Isethionate		
			Tinidazole			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Antiparasitics	Antiprotozoals	Antiprotozoals (Non-antimalarials)	Trimetrexate	Glucuronate		
			Pediculicides/ Scabicides			
			Lindane			
			Malathion			
			Permethrin			
Antiparkinson Agents	Catechol O-methyltransferase (COMT) Inhibitors		Entacapone			
			Tolcapone			
	Dopamine Agonists		Amantadine	Hydrochloride		
			Carbidopa			
			Carbidopa and Levodopa			
			Levodopa			
			Pergolide	Mesylate		
			Pramipexole	Dihydrochloride Monohydrate		
			Ropinirole	Hydrochloride		
Antiparkinson Agents	Antiparkinson Agents, Other		Benzotropine			
			Biperiden	Hydrochloride		
			Bromocriptine			
			Diphenhydramine	Hydrochloride		
			Procyclidine	Hydrochloride		
			Selegiline	Hydrochloride		
			Trihexyphenidyl	Hydrochloride		
Antipsychotics	Non-phenothiazines		Haloperidol	Decanoate		
				Lactate		
			Loxapine	Succinate		
			Molindone	Hydrochloride		
			Pimozide			
			Thiothixene	Hydrochloride		
			Ziprasidone	Hydrochloride		
				Mesylate		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Antipsychotics	Non-phenothiazines/ Atypicals		Aripiprazole				
			Clozapine				
			Olanzapine				
			Quetiapine	Fumarate			
			Risperidone				
		Phenothiazines		Chlorpromazine	Hydrochloride		
				Fluphenazine	Hydrochloride		
					Decanoate		
					Enanthate		
					Hydrochloride		
				Mesoridazine	Besylate		
				Perphenazine			
				Prochlorperazine			
					Edisylate		
					Maleate		
				Thioridazine	Hydrochloride		
		Trifluoperazine	Hydrochloride				
Antivirals	Anti-cytomegalovirus (CMV) Agents						
	*Note: Certain agents were identified with clinical restrictions based on GFR and/or toxicity. Accordingly, combination products were considered inappropriate because of the inability to differentially dosage adjust in ESRD. For these medications, single agents are preferable.			Cidofovir			
				Foscarnet	Sodium		
				Ganciclovir			
					Sodium		
				Valganciclovir	Hydrochloride		
			Antiherpetic Agents				
				Acyclovir			Must be available
				Famciclovir			
				Foscarnet	Sodium		
				Valacyclovir	Hydrochloride		
	Anti-human Immunodeficiency Virus (HIV) Agents, Fusion Inhibitors						
			Enfuvirtide				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Antivirals	Anti-HIV Agents, Non-nucleoside Reverse Transcriptase Inhibitors		Delavirdine	Mesylate		
			Efavirenz			
			Nevirapine			
	Anti-HIV Agents, Nucleoside and Nucleotide Reverse Transcriptase Inhibitors		Abacavir	Sulfate	Must be available	Allows independent dosing of critical anti-HIV medication
		Abacavir, Lamivudine, and Zidovudine		AVOID	*See note.	
		Didanosine				
		Emtricitabine				
		Emtricitabine and Tenofovir		Disoproxil Fumarate	AVOID	*See note.
		Lamivudine			Must be available	Allows independent dosing of critical anti-HIV medication
		Lamivudine and Zidovudine			AVOID	*See note.
		Stavudine				
		Tenofovir		Disoproxil Fumarate		
		Zalcitabine				
			Zidovudine		Must be available	Allows independent dosing of critical anti-HIV medication
	Anti-HIV Agents, Protease Inhibitors		Amprenavir			
		Atazanavir	Sulfate			
		Fosamprenavir	Calcium			
		Indinavir	Sulfate			
		Lopinavir and Ritonavir			Must be available	Not available as single agents.
			Nelfinavir	Mesylate		
			Ritonavir			
			Saquinavir			
				Mesylate		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Antivirals	Anti-influenza Agents		Amantadine	Hydrochloride				
			Osetamivir	Phosphate	Must be available	Needed to treat influenza, particularly in high risk patients		
			Rimantadine	Hydrochloride				
			Zanamivir					
			Antivirals, Other		Adefovir	Dipivoxil		
					Ribavirin		AVOID	Oral route is contraindicated in patient with CrCl < 50 ml/min.
Anxiolytics	Antidepressants		Doxepin	Hydrochloride				
			Escitalopram	Oxalate				
			Paroxetine	Hydrochloride				
			Sertraline	Hydrochloride				
		Benzodiazepines		Clonazepam		Must be available	Critical issue for ESRD patients-- medication for treatment-related anxiety is necessary to ensure patients are optimally cared for and anxiety does not go untreated.	
			Lorazepam					
	Anxiolytics, Other		Buspirone	Hydrochloride				
			Meprobamate					
	Anxiolytics, Other --Restless legs syndrome/leg cramps		Clonazepam		Must be available	RLS affects roughly 20-40% ESRD patients. Benzodiazepines are proven agents of choice for this co-morbidity.		
		Lorazepam						
		Quinine						
		Tocopherol						

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Autonomic Agents	Parasympatholytics							
			Ambenonium	Chloride				
			Edrophonium	Chloride				
			Neostigmine	Methylsulfate				
			Pyridostigmine	Bromide				
	Parasympathomimetics							
			Guanidine	Hydrochloride				
	Sympatholytics	Alpha-adrenergic Blocking Agents						
				Alfuzosin	Hydrochloride			
				Doxazosin	Mesylate			
				Hydrochloride				
			Phenoxybenzamine	Hydrochloride				
			Phentolamine	Mesylate				
			Prazosin	Hydrochloride				
			Tamsulosin	Hydrochloride				
			Terazosin	Hydrochloride				
			Beta-adrenergic Blocking Agents					
				Acebutolol	Hydrochloride			
				Atenolol				
				Betaxolol	Hydrochloride			
	Bisoprolol	Fumarate						
		Carteolol	Hydrochloride					
					Must be available	Specific benefits/indications for CHF which has high prevalence in ESRD		
			Carvedilol					
			Esmolol	Hydrochloride				
			Labetalol	Hydrochloride				
				Hydrochloride				
			Metoprolol	Tartrate				
				Succinate				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Autonomic Agents	Sympatholytics	Beta-adrenergic Blocking Agents		Tartrate		
			Nadolol			
			Penbutolol	Sulfate		
			Pindolol			
			Propranolol	Hydrochloride		
			Sotalol	Hydrochloride		
			Timolol	Maleate		
Autonomic Agents	Sympathomimetics	Alpha-adrenergic Agonists				
			Clonidine	Hydrochloride	Oral & transdermal must be available	Commonly used anti-hypertensive.
			Guanabenz	Acetate		
			Guanfacine	Hydrochloride		
			Mephentermine	Sulfate		
			Metaraminol	Bitartrate		
			Methoxamine	Hydrochloride		
			Methyldopa			
			Methyldopate	Hydrochloride		
						Midodrine
			Phenylephrine	Hydrochloride		
		Alpha-beta-adrenergic Agonists				
			Ephedrine	Sulfate		
			Epinephrine	Hydrochloride		
			Norepinephrine	Bitartrate		
		Beta-adrenergic Agonists				
			Dobutamine	Hydrochloride		
			Dopamine	Hydrochloride		
			Dopamine/Dextrose	Hydrochloride		
			Isoproterenol	Hydrochloride		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Bipolar Agents			Divalproex	Sodium				
			Lithium	Carbonate				
				Citrate				
			Ziprasidone	Hydrochloride				
				Mesylate				
Blood Glucose Regulators	Antihypoglycemics		Diazoxide					
			Glucagon	Hydrochloride				
	Hypoglycemics, Oral	Alpha Glucosidase Inhibitors		Acarbose				
				Miglitol				
				Biguanides				
				Metformin	Hydrochloride	AVOID (includes any combination product)	Contraindicated in renal failure	
			Meglitinides					
				Nateglinide				
				Repaglinide		Must be available	Dose reduction not necessary in ESRD,	
			Sulfonylureas					
				Acetohexamide		AVOID	Contraindicated.	
			Chlorpropamide		AVOID	Contraindicated.		
			Glimepiride					
			Glipizide		Must be available			
			Glyburide					
			Tolazamide		AVOID	Contraindicated.		
			Tolbutamide		AVOID	Contraindicated.		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Blood Glucose Regulators	Hypoglycemics, Oral	Thiazolidinediones				
			Pioglitazone		Must be available	Dose reduction not needed in ESRD.
			Rosiglitazone	Maleate	Must be available	Dose reduction not needed in ESRD.
	Insulins					
		Insulin, Rapid-acting				
			Insulin Aspart			
			Insulin Lispro			
		Insulin, Short-acting				
			Insulin (Purified pork)			
			Insulin Human			
		Insulin, Intermediate-acting				
			Insulin (Purified pork)	Zinc		
			Insulin Human	Zinc		
			Isophane Insulin (Beef/pork)			
			Isophane Insulin (Purified pork)			
			Isophane Insulin Human			
		Insulin, Long-acting				
			Insulin Glargine			
			Insulin Human (Extended)	Zinc		
Blood Products/Modifiers/Volume Expanders	Anticoagulants	Anticoagulants, Oral				
			Anisindione		AVOID	No dosing information provided for renal dysfunction and agent is not dialyzable.
			Warfarin	Sodium	Must be available	Commonly used anticoagulant in ESRD patients.

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Blood Products/Modifiers/ Volume Expanders	Anticoagulants	Anticoagulants, IV and SQ				
			Ardeparin	Sodium	AVOID if unable to monitor factor Xa	
			Certoparin			
			Dalteparin			
			Enoxaparin			
			Nadroparin			
			Parnaparin			
			Reviparin			
			Tinzaparin			
	Blood Formation Products					
			Darbepoetin Alfa		Must be available	Critical medications for treatment of anemia of ESRD.
			Epoetin Alfa		Must be available	
	Coagulants					
			Aminocaproic Acid			
			Antihemophilic Factor (Cryoprecipitated)			
			Antihemophilic Factor (Human)			
			Antihemophilic Factor (Porcine)			
			Antihemophilic Factor (Recombinant)			
			Anti-inhibitor Coagulant Complex			
			Appportioning			
			Factor VIIa			
			Factor IX (Human)			
			Factor IX Complex (Human)			
			Phytonadione			
			Tranexamic Acid			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Blood Products/Modifiers/ Volume Expanders	Platelet Aggregation Inhibitors		Abciximab					
			Aspirin		Must be available	CVD indications.		
			Cilostazol					
			Clopidogrel	Bisulfate	Must be available	CVD indications. Does not require does reduction.		
			Dipyridamole					
			Eptifibatide					
			Ticlopidine	Hydrochloride				
			Tirofiban	Hydrochloride				
		Cardiovascular Agents	Alpha-adrenergic Agonists		Clonidine	Hydrochloride	Must be available	Commonly used. Oral and transdermal forms necessary.
					Guanabenz	Acetate		
	Guanfacine			Hydrochloride				
	Mephentermine			Sulfate				
	Metaraminol			Bitartrate				
	Methoxamine			Hydrochloride				
	Methyldopa							
	Methyldopate			Hydrochloride				
	Midodrine			Hydrochloride	Must be available	Dialysis-related hypotension and/or orthostatic hypotension.		
	Phenylephrine			Hydrochloride				
	Alpha-adrenergic Blocking Agents				Doxazosin	Mesylate		
				Phenoxybenzamine	Hydrochloride			
				Phentolamine	Mesylate			
				Prazosin	Hydrochloride			
		Terazosin	Hydrochloride					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Cardiovascular Agents	Antiarrhythmics	Antiarrhythmics - Classes IA, B, and C		Disopyramide	Phosphate		
				Flecainide	Acetate		
				Lidocaine	Hydrochloride		
				Mexiletine	Hydrochloride		
				Moricizine	Hydrochloride		
				Procainamide	Hydrochloride		
				Propafenone	Hydrochloride		
				Quinidine	Bisulfate		
					Gluconate		
					Polygalacturonate		
				Sulfate			
				Tocainide	Hydrochloride		
			Antiarrhythmics - Class II				
				Acebutolol	Hydrochloride		
				Esmolol	Hydrochloride		
				Propranolol	Hydrochloride		
			Antiarrhythmics - Class III				
				Amiodarone	Hydrochloride	Must be available	Commonly used antiarrhythmic agent. Does adjustment not necessary.
				Bretylum	Tosylate		
				Dofetilide		AVOID	Contraindicated if CrCl is < 20 mls/min
				Ibutilide	Fumarate		
				Sotalol	Hydrochloride		
			Antiarrhythmics - Class IV				
		Bepridil	Hydrochloride				
		Diltiazem	Hydrochloride				
		Verapamil	Hydrochloride				
	Antiarrhythmics (Other)						
		Adenosine	Phosphate				

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Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Cardiovascular Agents	Beta-adrenergic Blocking Agents	Alpha-beta-adrenergic Blocking Agents	Labetalol	Hydrochloride	Must be available	CHF treatment. Reduces morbidity and mortality in dialysis patients with dilated cardiomyopathy.		
			Carvedilol					
		Cardioselective Beta-adrenergic Blocking Agents	Acebutolol	Hydrochloride				
			Atenolol					
			Betaxolol	Hydrochloride				
			Bisoprolol	Fumarate				
			Esmolol	Hydrochloride				
			Metoprolol	Succinate				
				Tartrate				
			Nonselective Beta-adrenergic Blocking Agents	Carteolol	Hydrochloride			
	Nadolol							
	Penbutolol	Sulfate						
	Pindolol							
	Propranolol	Hydrochloride						
	Sotalol	Hydrochloride						
	Timolol	Maleate						
	Calcium Channel Blocking Agents	Dihydropyridines			Amlodipine		Must be available	Commonly used in both ESRD and CKD. Effectively reduces BP.
					Felodipine			
					Isradipine			
			Nicardipine		Hydrochloride	AVOID immediate release formation		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Cardiovascular Agents	Calcium Channel Blocking Agents	Dihydropyridines	Nifedipine					
			Nimodipine					
			Nisoldipine					
				Calcium Channel Blocking Agents (Non-dihydropyridines)				
					Bepidil	Hydrochloride		
					Diltiazem	Hydrochloride		
					Verapamil	Hydrochloride		
			Direct Cardiac Inotropics					
					Digoxin		Must be available	Commonly used in ESRD with congestive heart failure.
					Inamrinone	Lactate		
			Milrinone	Lactate				
	Diuretics	Carbonic Anhydrase Inhibitors						
				Acetazolamide		AVOID	Contraindicated in ESRD.	
					Sodium			
				Methazolamide		Must be available	Used for treatment of glaucoma. Dosage reduction not necessary in ESRD.	
			Loop Diuretics					
				Bumetanide				
				Ethacrynic Acid		Must be available	Only loop diuretic for use in patients with sulfa allergy.	
				Ethacrynate	Sodium			
				Furosemide				
				Torsemide				
		Osmotic Diuretics						
			Glycerin					
			Mannitol					
			Urea					
		Potassium-sparing Diuretics						
			Amiloride	Hydrochloride	AVOID	Ineffective at low GFR and enhances risk of hyperkalemia.		

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale			
Cardiovascular Agents	Diuretics	Potassium-sparing Diuretics	Triamterene						
		Thiazide Diuretics			AVOID all as SOLE diuretic	Ineffective at GFR < 15 mls/min. (except Metolazone)			
			Bendroflumethiazide						
			Chlorothiazide						
				Sodium					
			Chlorthalidone						
			Hydrochlorothiazide						
			Hydroflumethiazide						
			Indapamide						
			Methyclothiazide						
			Metolazone						
			Polythiazide						
			Trichlormethiazide						
			Dyslipidemics	Bile Acid Sequestrants					
							Cholestyramine	Resin	
							Colesevelam	Hydrochloride	
							Colestipol	Hydrochloride	
		Fibrates							
			Clofibrate						
			Fenofibrate		AVOID	Contraindicated in ESRD due to fenofibric acid accumulation.			
			Gemfibrozil		Must be available	Dosage adjustment not necessary.			
		3-hydroxy-3-methylglutaryl coenzyme A (HMG CoA) Reductase Inhibitors							
			Atorvastatin	Calcium	Must be available	Dosage adjustment not necessary.			
			Fluvastatin	Sodium					
			Lovastatin						
			Pravastatin	Sodium	Must be available	Dosage adjustment not necessary.			
			Rosuvastatin	Calcium					
			Simvastatin						

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Cardiovascular Agents	Dyslipidemics	Lipid Absorption Inhibitors				
			Ezetimibe			
		Nicotinic Acid				
			Niacin			
	Renin-angiotensin-aldosterone System Inhibitors	Aldosterone Receptor Antagonists				
			Eplerenone			
			Spirolactone			
		Angiotensin-converting Enzyme (ACE) Inhibitors			At least two agents must be available	Critically important class of medication. Evidence does not exist to specify a particular agent with the possible exception of lisinopril and ramapril.
		Benazepril	Hydrochloride			
			Captopril			
			Enalapril	Maleate		
			Enalaprilat			
			Fosinopril	Sodium		
			Lisinopril			
			Moexipril	Hydrochloride		
			Perindopril	Erbumine		
			Quinapril	Hydrochloride		
			Ramipril			
			Trandolapril			
		Angiotensin II Receptor Antagonists				
			Candesartan	Cilexetil		
			Eprosartan	Mesylate		
			Irbesartan			
			Losartan	Potassium		
			Olmesartan	Medoxomil		
			Telmisartan			
		Valsartan				
	Vasodilators					
			Amyl Nitrite			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Cardiovascular Agents	Vasodilators		Bosentan				
			Diazoxide				
			Epoprostenol	Sodium			
			Ethaverine	Hydrochloride			
			Fenoldopam	Mesylate			
			Hydralazine	Hydrochloride			
			Isosorbide	Dinitrate			
				Mononitrate			
				Isoxsuprine	Hydrochloride		
				Minoxidil		Must be available	Treatment of refractory hypertension.
				Papaverine	Hydrochloride		
				Nesiritide			
				Nitroglycerin			
				Nitroprusside	Sodium		
		Treprostinil	Sodium				
Central Nervous System Agents	Amphetamines						
			Dextroamphetamine	Sulfate			
			Dextroamphetamine and Amphetamine	(Mixed salts)			
		Methamphetamine	Hydrochloride				
	Non-amphetamines						
			Atomoxetine	Hydrochloride			
			Dexmethylphenidate	Hydrochloride			
			Doxapram	Hydrochloride			
			Methylphenidate	Hydrochloride			
			Modafinil				
		Pemoline					
	Riluzole						
Dental / Oral Agents							
			Amlexanox				
			Cevimeline	Hydrochloride			
			Chlorhexidine	Gluconate			
			Doxycycline	Hyclate			
			Minocycline				
		Palifermin					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Dental / Oral Agents			Pilocarpine	Hydrochloride			
			Prilocaine	Hydrochloride			
			Triamcinolone	Acetonide			
Dermatological Agents	Dermatological Anesthetics		Cocaine	Hydrochloride			
			Lidocaine	Hydrochloride	Both topical and injectable must be available	Anesthetic of choice prior to cannulation of internal access with large bore needles.	
			Prilocaine/Lidocaine combination		Must be available	As above. Either lidocaine topical or combination topical product must be available.	
		Dermatological Antibacterials		Tetracaine	Hydrochloride		
			Gentamicin	Sulfate			
			Mafenide	Acetate			
			Metronidazole				
				Mupirocin		Must be available	Treatment of PD exit site infections as well as nasal carriage of MRSA.
				Silver Sulfadiazine			
		Dermatological Antifungals		Amphotericin B			
			Butenafine				
			Ciclopirox				
			Clotrimazole				
			Econazole	Nitrate			
			Ketoconazole				
			Miconazole	Nitrate			
			Naftifine	Hydrochloride			
			Nystatin				
			Oxiconazole	Nitrate			
		Sertaconazole	Nitrate				
		Sulconazole	Nitrate				
			Terbinafine	Hydrochloride			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Dermatological Agents	Dermatological Anti-inflammatory		Diclofenac	Sodium			
	Dermatological Antipruritic Agents		Doxepin	Hydrochloride			
			Pramoxine and Hydrocortisone	Hydrochloride and Acetate			
	Dermatological Antivirals		Acyclovir				
			Penciclovir	Sodium			
	Dermatological Keratolytics		Chloroxine				
			Podofilox				
			Podophyllum	Resin			
			Selenium	Sulfide			
	Dermatological Photochemotherapy Agents	Porphyrin Derivative Photochemotherapy	Aminolevulinic Acid	Hydrochloride			
		Psoralen Photochemotherapy		Methoxsalen			
					Trioxsalen		
	Dermatological Retinoids		Acitretin				
			Alitretinoin				
			Tazarotene				
			Tretinoin				
	Dermatological Tar Derivatives		Anthralin				
	Dermatological Vitamin D Analogs		Calcipotriene				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Dermatological Agents	Dermatological Wound Care Agents		Becaplermin			
		Wound Debriding Agents				
			Collagenase			
Deterrents/ Replacements	Alcohol Deterrents		Acamprosate	Calcium	AVOID	Avoid in patients with CrCl < 30 mls/min.
			Disulfiram			
Enzyme Replacements/ Modifiers			Agalsidase Beta			
			Alglucerase			
			Betaine	Anhydrous		
			Cysteamine	Bitartrate		
			Imiglucerase			
			Laronidase			
			Miglustat			
			Nitisinone			
			Pancrelipase			
			Pegademase Bovine			
			Sacrosidase			
			Sodium Phenylbutyrate			
Gastrointestinal Agents	Antispasmodics, Gastrointestinal		Atropine	Sulfate		
			Belladonna			
			Dicyclomine			
				Hydrochloride		
				Glycopyrrolate		
				Hyoscyamine		
					Sulfate	
				Mepenzolate	Bromide	
				Methscopolamine	Bromide	
		Propantheline	Bromide			
		Scopolamine				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Gastrointestinal Agents	Histamine2 (H2) Blocking Agents		Cimetidine		At least one H2 blocker (not Cimetidine) should be on Part D formulary.	These agents are commonly used. While available OTC, many ESRD patients cannot afford such.
				Hydrochloride		
			Famotidine			
			Nizatidine			
			Ranitidine	Hydrochloride		
	Irritable Bowel Syndrome Agents					
			Alosetron			
			Tegaserod	Maleate		
	Protectants					
			Misoprostol			
			Sucralfate		AVOID concomitant use of citrates	Due to liberation of aluminum, citrate-containing medications should not be used with aluminum based medications
	Proton Pump Inhibitors					
			Esomeprazole	Magnesium		
			Lansoprazole			
			Omeprazole			
			Pantoprazole	Sodium		
				Sodium		
			Sesquihydrate			
			Rabeprazole			
	Gastrointestinal Agents, Other					
			Cisapride			
			Dehydrocholic Acid			
			Difenoxin and Atropine	Hydrochloride and Sulfate		
			Diphenoxylate and Atropine	Hydrochloride and Sulfate		
			Lactulose		Must be available.	Commonly used to treat constipation in dialysis patients.

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Gastrointestinal Agents	Gastrointestinal Agents, Other		Lanthanum	Carbonate			
			Loperamide	Hydrochloride			
			Octreotide				
			Polyethylene Glycol 3350 NF			Must be available	Commonly used to treat constipation in dialysis patients.
			Ursodiol				
Gastrointestinal Agents, Phosphate binders	Non-calcium, non-aluminum, non-metal containing phosphate binding agents		Sevelamer			Must be available	Renal osteodystrophy/ mineral metabolism derangements are inherent in the ESRD population. Due to differences in clinical indications for agents, all must be available (including OTC formulations) for optimal prevention and treatment of significant co-morbidities.
			Non-calcium, non-aluminum, metal based phosphate binding agents				
			Lanthanum	Carbonate		Must be available	
			Calcium containing phosphate binding agents				
			Calcium	Acetate		Must be available	
			Calcium	Carbonate		Must be available	
			Aluminum containing phosphate binding agents				
			Aluminum	Hydroxide		Must be available	
	Magnesium containing phosphate binding agents						
			Magnesium	Hydroxide		Must be available	
Genitourinary Agents	Antispasmodics, Urinary		Darifenacin				
			Flavoxate	Hydrochloride			
			Hyoscyamine				
				Sulfate			
			Oxybutynin				
				Chloride			
			Solifenacin	Succinate			
			Tolterodine	Tartrate			
		Trospium	Chloride				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Genitourinary Agents	Benign Prostatic Hypertrophy Agents	Alpha1-adrenergic Blocking Agents	Alfuzosin	Hydrochloride			
			Doxazosin	Mesylate			
			Tamsulosin	Hydrochloride			
			Terazosin	Hydrochloride			
		5 Alpha-reductase Inhibitors					
			Dutasteride				
			Finasteride				
		Impotence Agents	Phosphodiesterase Inhibitors				
				Sildenafil *	Citrate	* Either of these two agents must be available	Safety in ESRD documented.
				Tadalafil *			
	Prostaglandins		Vardenafil	Hydrochloride			
			Alprostadil				
Hematopoietic Support Agents	Iron preparations		(Sodium) Ferric	Gluconate (Parenteral)	Two agents from each category must be available. Either iron sucrose or iron gluconate should be placed on formulary. Iron dextran has a higher risk of anaphylaxis.	Adequate iron stores are essential to support erythropoiesis stimulated by recombinant human erythropoietin or darbepoetin alfa.	
			Ferrous	Fumarate (Oral)			
				Gluconate (Oral)			
				Sulfate (Oral)			
			Heme Iron Polypeptide				
			Iron	Dextran (Parenteral)			
				Polysaccharide (Oral)			
				Sucrose (Parenteral)			
		B vitamins		Folic Acid			
				Cobalamin			
				Pyridoxine			
				B- complex preparation			
		Other		Carnitine		Must be available	Treatment of dialysis-related carnitine deficiency.
			Renal vitamin preparation		Must be available	Replacement of vitamins lost with HD.	

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale			
Hormonal Agents, Stimulant/ Replacement/ Modifying	Adrenal	Glucocorticoids							
				Betamethasone					
						Sodium Phosphate			
						Sodium Phosphate and Acetate			
						Budesonide			
						Cortisone	Acetate		
						Dexamethasone			
							Acetate		
							Sodium Phosphate		
						Hydrocortisone			
							Acetate		
							Sodium Phosphate		
							Sodium Succinate		
						Methylprednisolone			
							Acetate		
							Sodium Succinate		
						Prednisolone			
							Acetate		
							Acetate and Sodium Phosphate		
							Sodium Phosphate		
						Prednisone		Must be available	Commonly used anti-inflammatory agent.
						Triamcinolone			
							Acetonide		
				Diacetate					
				Hexacetonide					
		Glucocorticoids- Topical-Low Potency							
			Alclometasone	Dipropionate					
			Cloclortolone	Pivalate					
			Desonide						
			Dexamethasone						
				Sodium Phosphate					
			Flumethasone	Pivalate					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Hormonal Agents, Stimulant/ Replacement/ Modifying	Adrenal	Glucocorticoids- Topical-Low Potency	Hydrocortisone	Acetate		
		Glucocorticoids- Topical-Medium Potency	Betamethasone	Benzoate		
				Valerate		
			Desoximetasone			
			Fluocinolone	Acetonide		
			Flurandrenolide			
			Fluticasone	Propionate		
			Hydrocortisone	Butyrate		
				Probutate		
				Valerate		
			Mometasone	Furoate		
		Prednicarbate				
		Triamcinolone	Acetonide			
		Glucocorticoids- Topical-High Potency	Amcinonide			
			Betamethasone			
				Dipropionate		
			Desoximetasone			
			Diflorasone	Diacetate		
			Fluocinolone	Acetonide		
			Fluocinonide			
Halcinonide						
Triamcinolone	Acetonide					
Glucocorticoids- Topical-Very High Potency	Betamethasone	Dipropionate				
	Clobetasol	Propionate				
	Diflorasone	Diacetate				
	Halobetasol	Propionate				
	Mineralocorticoids	Fludrocortisone	Acetate			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Hormonal Agents, Stimulant/Replacement/Modifying	Parathyroid/Metabolic Bone Disease Agents	Bisphosphonates	Alendronate	Sodium			
			Etidronate	Disodium			
			Pamidronate	Disodium			
			Risedronate	Sodium			
			Tiludronate	Disodium			
			Zoledronic Acid				
		Calcium Regulating Hormones		Calcitonin, Salmon			
				Teriparatide			
		Vitamin D–related Agents/Metabolic Bone Disease Agents		Calcitriol		Must be available (both IV and PO form)	Necessary agent for treatment of bone and mineral metabolism disorders in ESRD patients. Calcitriol may be necessary for hypocalcemia due to calcemic action.
				Doxercalciferol			
				Paricalcitol			
			Parathyroid/Metabolic Bone Disease Agents (Other)				
				Gallium	Nitrate	AVOID	Should be avoided in patients with renal disease.
		Pituitary					
				Chorionic Gonadotropin			
			Desmopressin	Acetate			
			Oxytocin				
			Somatrem				
			Somatropin, Recombinant		Must be available	Commonly used in pediatric ESRD patients.	
			Vasopressin				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale			
Hormonal Agents, Stimulant/ Replacement/ Modifying	Prostaglandins		Alprostadil						
			Carboprost	Tromethamine					
			Dinoprostone						
			Misoprostol						
	Sex Hormones/Modifiers	Androgens/Anabolic Steroids		Danazol					
				Fluoxymesterone					
				Methyltestosterone					
				Nandrolone	Decanoate				
			Phenpropionate						
				Oxandrolone					
				Oxymetholone					
				Testosterone		Cypionate			
						Enanthate			
						Propionate			
				Estrogens		Dienestrol			
					Estradiol		Acetate		
						Cypionate			
						Hemihydrate			
						Valerate			
						Estrogens, Conjugated		Must be available	Used to treat uremic bleeding
		Estrogens, Conjugated Synthetic							
		Estrogens, Esterified							
		Estrone							
		Estropipate							
			Ethinyl Estradiol		Must be available	Low-dose transdermal estrogens applied as a patch BIW has been found to reduce recurrent GI bleeding.			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Hormonal Agents, Stimulant/ Replacement/ Modifying	Sex Hormones/Modifiers	Progestins	Hydroxyprogesterone	Caproate				
			Levonogestrel					
			Medroxyprogesterone	Acetate				
			Megestrol	Acetate	Must be available	Important agent for use in appetite stimulation for the malnourished		
			Norethindrone					
				Acetate				
			Norgestrel					
			Progesterone					
				Selective Estrogen Receptor Modifying Agents				
						Raloxifene	Hydrochloride	Must be available
Hormonal Agents, Suppressant	Thyroid		Levothyroxine	Sodium				
			Liothyronine	Sodium				
			Liotrix					
			Thyroid					
Hormonal Agents, Suppressant	Adrenal		Aminoglutethimide					
			Mitotane					
	Pituitary		Abarelix					
			Bromocriptine	Mesylate				
			Cabergoline					
			Goserelin	Acetate				
			Histrelin	Acetate				
			Leuprolide	Acetate				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Hormonal Agents, Suppressant	Pituitary		Nafarelin	Acetate			
			Octreotide	Acetate			
			Pegvisomant				
			Triptorelin	Pamoate			
	Sex Hormones/Modifiers	Antiandrogens					
			Bicalutamide				
			Dutasteride				
			Finasteride				
			Flutamide				
		Nilutamide					
		Antiestrogens/Modifiers					
			Anastrozole				
			Estramustine	Phosphate Sodium			
			Exemestane				
	Fulvestrant						
			Letrozole				
			Tamoxifen	Citrate			
			Testolactone				
			Toremifene	Citrate			
	Thyroid						
			Methimazole				
			Propylthiouracil				
		Parathyroid					
			Cinacalcet	Hydrochloride	Must be available	Only drug in this class. Useful in treatment of secondary hyperparathyroidism.	
Immunological Agents	Immune Stimulants	Vaccines			Must be available	ALL vaccines need to be covered in this immunocompromised population, including routine pediatric vaccines.	
				Anthrax Vaccine Adsorbed			
			Diphtheria and Tetanus Toxoids and Acellular Pertussis Vaccine Adsorbed				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Immunological Agents	Immune Stimulants	Vaccines	Diphtheria and Tetanus Toxoids and Acellular Pertussis Vaccine Adsorbed, Hepatitis B (Recombinant) and Inactivated Poliovirus Vaccine			
			Haemophilus B Conjugate Vaccine			
			Haemophilus B Conjugate Vaccine and Hepatitis B Vaccine (Recombinant)			
			Hepatitis A Vaccine Inactivated			
			Hepatitis A Virus Vaccine Inactivated and Hepatitis B Virus Vaccine Recombinant			
			Hepatitis B Virus Vaccine Inactivated		Must be available	May require additional doses for seroconversion
			Hepatitis B Virus Vaccine Recombinant		Must be available	May require additional doses for seroconversion
			Influenza Virus Vaccine		Must be available	Routine, preventive vaccination.
			Japanese Encephalitis Virus Vaccine Inactivated			
			Lyme Disease Vaccine			
			Measles Virus Vaccine Live			
			Measles, Mumps, and Rubella Virus Vaccine Live			
			Meningococcal Polysaccharide Vaccine			
			Mumps Virus Vaccine Live			
			Pneumococcal Conjugate Vaccine			
			Pneumococcal Vaccine Polyvalent		Must be available	Routine, preventive vaccination.

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Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Immunological Agents	Immune Stimulants	Vaccines	Poliovirus Vaccine Inactivated				
			Poliovirus Vaccine Live Oral				
			Rabies Vaccine				
			Rubella Virus Vaccine				
			Typhoid Vaccine Live Oral				
			Typhoid Vi Polysaccharide Vaccine				
			Varicella Virus Vaccine				
			Yellow Fever Vaccine				
			Immune Stimulants (Non-vaccines)				
			Interferon Alfa-2a, Recombinant				
	Interferon Alfa-2b, Recombinant						
	Interferon Alfa-n3						
	Interferon Alfacon-1						
	Interferon Beta-1a						
	Interferon Beta-1b						
	Interferon Gamma-1b, Recombinant						
	Peginterferon Alfa-2b Ribavirin and Interferon Alfa-2b						
	Immune Suppressants	Tumor Necrosis Factor (TNF) Inhibitors					
			Adalimumab				
			Etanercept				
		Infliximab					

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Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale		
Immunological Agents	Immune Suppressants	Immune Suppressants (Non-TNF Inhibitors)	Alefacept			*Increasing numbers of ESRD patients have undergone successful organ transplants, other than kidney. Immunosuppressants must be covered to reduce risk of rejection. Additionally, as therapeutic Cyclosporine levels vary from brand to brand, ALL forms should be available.		
			Anakinra					
			Azathioprine				Must be available*	
					Sodium			
			Basilixumab					
			Cyclosporine				Must be available *	
			Daclizumab					
			Efalizumab					
			Muromonab-CD3					
			Mycophenolate		Mofetil		Must be available *	
					Mofetil Hydrochloride			
			Natalizumab					
			Penicillamine					
			Sirolimus				Must be available *	
			Tacrolimus				Must be available *	
				Immunomodulators				
					Auranofin			
					Glatiramer		Acetate	
					Gold		Sodium thiomalate	
		Imiquimod						
		Leflunomide						
		Omalizumab						
		Pimecrolimus						
		Tacrolimus						
		Thalidomide						

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Inflammatory Bowel Disease Agents	Glucocorticoids		Betamethasone				
				Sodium Phosphate and Acetate			
				Budesonide			
				Cortisone	Acetate		
				Dexamethasone			
					Acetate		
					Sodium Phosphate		
				Hydrocortisone			
					Acetate		
					Sodium Succinate		
					Sodium Phosphate		
				Methylprednisolone			
					Acetate		
					Sodium Succinate		
				Prednisolone			
					Acetate		
					Acetate and Sodium Phosphate		
					Sodium Phosphate		
				Prednisone			
				Triamcinolone			
			Acetonide				
			Diacetate				
	Salicylates						
			Balsalazide	Disodium			
			Mesalamine				
			Olsalazine	Sodium			
	Sulfonamides						
			Sulfasalazine				
Ophthalmic Agents	Ophthalmic Anti-allergy Agents						
			Azelastine	Hydrochloride			
			Cromolyn	Sodium			
			Emedastine	Difumarate			
			Ketotifen	Fumarate			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Ophthalmic Agents	Ophthalmic Anti-allergy Agents		Levocabastine	Hydrochloride		
			Lodoxamide	Tromethamine		
			Naphazoline	Hydrochloride		
			Nedocromil	Sodium		
			Olopatadine	Hydrochloride		
			Pemirolast	Potassium		
	Ophthalmic Antibacterials					
			Bacitracin			
			Chloramphenicol			
			Ciprofloxacin	Hydrochloride		
			Gentamicin	Sulfate	Must be available	Used for treatment of PD exit site infections
			Erythromycin			
			Gatifloxacin			
			Levofloxacin			
			Moxifloxacin	Hydrochloride		
			Natamycin			
			Ofloxacin			
			Sulfacetamide	Sodium		
			Tobramycin			
	Ophthalmic Antifungals					
			Natamycin			
	Ophthalmic Antiglaucoma Agents	Alpha-adrenergic Agonists, Ophthalmic				
			Apraclonidine	Hydrochloride		
			Brimonidine			
			Dipivefrin	Hydrochloride		
		Beta-adrenergic Blocking Agents, Ophthalmic				
			Betaxolol	Hydrochloride		
			Carteolol	Hydrochloride		
			Levobetaxolol	Hydrochloride		
			Levobunolol	Hydrochloride		
			Metipranolol	Hydrochloride		
			Timolol	Hemihydrate		
				Maleate		

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Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Ophthalmic Agents	Ophthalmic Antiglaucoma Agents	Carbonic Anhydrase Inhibitors, Ophthalmic	Acetazolamide				
				Sodium			
			Brinzolamide				
			Dorzolamide	Hydrochloride			
			Methazolamide				
			Miotics, Ophthalmic	Carbachol			
				Demecarium	Bromide		
				Echothiophate	Iodide		
				Physostigmine	Salicylate		
					Sulfate		
	Pilocarpine						
		Hydrochloride					
		Nitrate					
	Osmotic Agents, Ophthalmic	Glycerin					
		Mannitol					
		Urea					
		Prostaglandins, Ophthalmic	Bimatoprost				
	Latanoprost						
	Travoprost						
	Unoprostone		Isopropyl				
	Ophthalmic Anti-inflammatories			Dexamethasone			
					Sodium Phosphate		
Diclofenac				Sodium			
Fluorometholone							
				Acetate			
Flurbiprofen				Sodium			
Ketorolac				Tromethamine			
Loteprednol							
Medrysone							

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Ophthalmic Agents	Ophthalmic Anti-inflammatories		Prednisolone	Acetate			
				Sodium Phosphate			
			Rimexolone				
	Ophthalmic Antivirals		Ganciclovir				
			Idoxuridine				
			Trifluridine				
	Ophthalmic Agents, Other		Botulinum Toxin Type A				
			Cyclosporine				
			Dapiprazole	Hydrochloride			
		Ophthalmic Agents, Other		Fomiversen	Sodium		
				Hydroxypropyl Cellulose			
				Pegaptanib	Sodium		
				Verteporfin			
	Otic Agents	Otic Antibacterials		Ofloxacin			
Otic Anti-inflammatories			Dexamethasone	Sodium Phosphate			
Respiratory Tract Agents	Antihistamines	Histamine1 (H1) Blocking Agents, Mildly/Non-sedating		Azelastine			
				Cetirizine	Hydrochloride		
				Desloratadine			
			Fexofenadine	Hydrochloride			
		H1 Blocking Agents, Sedating		Brompheniramine	Maleate		
				Chlorpheniramine	Maleate		
			Clemastine	Fumarate			
			Dexchlorpheniramine	Maleate			
			Dimenhydrinate				
			Diphenhydramine	Hydrochloride			
			Promethazine	Hydrochloride			
		Hydroxyzine	Hydrochloride				
				Pamoate			

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Respiratory Tract Agents	Antihistamines	H1 Blocking Agents, Sedating	Azatadine	Maleate			
			Cyproheptadine	Hydrochloride			
	Antileukotrienes		Montelukast	Sodium			
			Zafirlukast				
			Zileuton				
	Bronchodilators, Anticholinergic		Ipratropium	Bromide			
			Tiotropium	Bromide Monohydrate			
	Bronchodilators, Anti-inflammatory		Beclomethasone	Dipropionate			
				Dipropionate Monohydrate			
				Budesonide			
				Dexamethasone	Sodium Phosphate		
				Flunisolide			
				Fluticasone	Propionate		
				Mometasone	Furoate		
					Monohydrate		
				Triamcinolone	Acetonide		
	Bronchodilators, Phosphodiesterase 2 Inhibitors (Xanthines)		Aminophylline				
			Dyphylline				
			Oxytriphylline				
			Theophylline				
	Bronchodilators, Sympathomimetic		Albuterol	Sulfate			
			Ephedrine	Sulfate			
			Epinephrine				
				Bitartrate			
			Formoterol	Fumarate			
				Dihydrate			
			Isoetharine				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Respiratory Tract Agents	Bronchodilators, Sympathomimetic		Isoproterenol	Hydrochloride			
			Levalbuterol	Hydrochloride			
			Metaproterenol	Sulfate			
			Pirbuterol	Acetate			
			Salmeterol	Xinafoate			
			Terbutaline	Sulfate			
		Mast Cell Stabilizers		Cromolyn	Sodium		
				Nedrocromil			
		Mucolytics		N-Acetylcysteine			
				Dornase Alfa			
		Respiratory Tract Agents, Other		Alpha 1-proteinase Inhibitor, Human			
				Benzonatate			
				Bosentan			
				Guaifenesin			
			Iodinated Glycerol				
			Oxygen				
			Potassium	Iodide			
			Tetrahydrozoline	Hydrochloride			
Sedatives+A50/ Hypnotics			Chloral Hydrate				
			Eszopiclone				
			Zaleplon				
			Zolpidem	Tartrate			
Skeletal Muscle Relaxants			Atracurium	Besylate			
			Baclofen		AVOID	Risk of Baclofen intoxication.	
			Botulinum Toxin Type A				
			Botulinum Toxin Type B				
			Carisoprodol				

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Skeletal Muscle Relaxants			Chlorphenesin	Carbamate		
			Chlorzoxazone			
			Cisatracurium			
			Cyclobenzaprine	Hydrochloride		
			Dantrolene	Sodium		
			Doxacurium	Chloride		
			Metaxalone			
			Methocarbamol			
			Orphenadrine	Citrate		
				Hydrochloride		
			Pancuronium	Bromide		
			Rocuronium	Bromide		
			Succinylcholine	Chloride		
			Tizanidine	Hydrochloride		
			Vecuronium	Bromide		
Therapeutic Nutrients/Minerals/ Electrolytes	Electrolytes/Minerals		Ammonium	Chloride		
			Calcium	Acetate		
				Chloride		
				Glucaptate		
				Gluconate		
			Chromic	Chloride		
			Cupric	Chloride		
				Sulfate		
			Fluoride			
				Sodium		
				Stannous		
			Strong Iodine			
			Iron	Dextran		
				Polysaccharide		
				Sucrose		
Magnesium	Chloride					
	Sulfate					
Manganese	Chloride					

COMPREHENSIVE LISTING OF MEDICATIONS IN THE USP MODEL GUIDELINES

Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale	
Therapeutic Nutrients/Minerals/ Electrolytes	Electrolytes/Minerals		Molybdate	Ammonium			
			Potassium	Acetate			
				Bicarbonate			
				Bicarbonate and			
				Citrate			
				Chloride			
				Citrate			
				Citrate and Citric Acid			
				Gluconate			
				Gluconate and Chloride			
				Gluconate and			
				Citrate			
				Phosphates			
				Potassium, Monobasic Potassium and Sodium	Phosphates	Must be available (Neutra Phos K)	Treatment of Hypophosphatemia
					Citrates		
					Phosphates	Must be available (Polycitra)	Treatment of metabolic acidosis
				Selenium			
				Sodium	Acetate		
					Bicarbonate		
					Lactate		
			Citrate and Citric Acid	Must be available (Shol's solution, Bicitra)	Treatment of metabolic acidosis		
			Chloride				
			Ferric Gluconate Complex	Must be available	Adequate iron stores essential for erythropoiesis		
			Phosphates	Must be available (Neutra Phos)	Treatment of Hypophosphatemia		
			Tricitrates				
			Trikates				
			Zinc	Chloride			

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Therapeutic Category	Pharmacologic Class	Formulary Key Drug Types	Pharmaceutical Preparations	Salts/Esters	TEP Comments	Rationale
Therapeutic Nutrients/Minerals/ Electrolytes	Vitamins	Prenatal Vitamins				
Toxicologic Agents	Opioid Antagonists					
			Nalmefene	Hydrochloride		
			Naloxone	Hydrochloride		
			Naltrexone	Hydrochloride		

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