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Policy Evaluation: Oral Multivitamin Prior Authorization (PA)

Research Questions:

- Did the cost per member per month of multivitamins decrease after the PA policy was implemented?
- Was there a change in the diagnoses associated with patients prescribed multivitamins?
- What is the final disposition of PA status (no PA request, PA approved, PA denied) for patients encountering a PA requirement for multivitamins?
- What percent of patients encountering a PA requirement have a paid multivitamin claim within 14 days?

Conclusions:

- The implementation of the current PA policy led to a 44% reduction in the cost per member per month.
- No changes were observed in the diagnoses associated with patients prescribed multivitamins.
- About 98% of patients encountering a PA requirement had no PA request. Of the 21 (2%) of PAs requested, only 2 were denied.
- Out of the initially denied index claims, only 2.3% of patients received a multivitamin within 14 days.

Recommendations:

- Maintain the current PA policy.
- Further discussion regarding possible harms in patients with inadequate multivitamin supplementation should be considered.

Background:

The Oregon Health Plan (OHP) fee-for-service (FFS) program implemented PA criteria for the use of multivitamins, multivitamins with minerals, and multivitamins with antioxidants on August 1, 2014 (see criteria in Appendix 1). The goal of the FFS PA policy was to limit use of multivitamins in non-pregnant adults to patients with a documented nutritional deficiency or indications associated with sufficient evidence to support efficacy and safety.

The Dietary Guidelines Advisory Committee (DGAC) recommendations for review of efficacy, safety, quality, and consistency of vitamins and supplements in the United States (U.S.) were published in 2007 and updated in 2010.[1] The recommendations included the Dietary Supplement Ingredient Database-2 (DSID-2) which defines multivitamins as a supplement containing 3 or more vitamins with or without minerals or antioxidants. While the DGAC recommendations and DSID-2 database have improved information about vitamins and supplements, in particular multivitamins, it also identified major gaps in knowledge and quality. DGAC 2010 proposed further randomized controlled trials (RCTs) be conducted to test health outcomes, safety and risk assessment of multivitamins and supplements.

The original OHP FFS multivitamin class review was initiated because of the overwhelming general use of dietary supplements and multivitamins in North America as well as in populations with cardiovascular diseases (CVD).[2] Debate existed about the efficacy and safety of vitamin use, including potential adverse effects, contamination of preparations and mislabeling of products. In addition, a lack of standardization amongst products and guidelines existed. Overall, in the general population and in patients with cardiovascular disease, there was evidence of no benefit on all-cause mortality or CV events and a small reduction in

overall cancer incidence in men only after 11-12 years follow-up. The only other small benefit noted was a reduction in functional loss of patients with severe macular degeneration.

Since the previous review, several RCTs and systematic reviews looked at chronic disease states and overall cardiovascular morbidity and mortality outcomes in healthy populations. Conflicting with previous studies, one large RCT from the U.S. showed a small decrease in total cancer incidence in healthy men taking a multivitamin.[3] However, this was a physician population that may have had better health literacy and overall wellness compared to the general population. This study has little effect on the overall evidence base, which remains inconclusive and insufficient to support the use of multivitamins as preventative treatment for overall mortality benefit, cardiovascular outcome improvement, or reduction in risk of major cancers.[1]

However, several Australian studies were published which show small improved outcomes in mental or behavioral health traits in healthy populations. Five different Australian RCTs of modest size and one from the United Kingdom showed various brain and cognitive improvements with use of daily multivitamins.[1] Additionally, two international meta-analysis including 8 and 10 RCTs each showed psychiatric improvements and immediate free memory enhancement.[1] However, various multivitamins were used and not standardized throughout comparison of these trials. Treatment effects included cognitive recognition time and multitasking, reduction in perceived stress, and immediate memory recall improvement amongst patients with decreased psychiatric symptoms and stress. These findings warrant further investigation and additional RCTs.

Additional studies for patient populations with specific nutritional needs or varying deficiencies continue to be published since DGAC's most recent recommendations. These studies are in line with the current PA policy which approves multivitamin use for nutritional deficiencies or conditions which may lead to a nutritional deficiency, such as Celiac disease, gastric bypass surgery, fractures and trauma, amongst others.

Oregon reimbursed pharmacies $93,500 in the second quarter of 2015 for all multivitamin products (including prenatal and pediatric) prior to the implementation of this PA policy. Despite improved studies on multivitamin use in healthy populations, there is currently no evidence to support their use other than for a documented nutritional deficit. Thus, there was an opportunity to decrease unnecessary spending and promote cost effective use of multivitamins. The goal of this evaluation is to assess whether the current policy has met its intended goal.

The aims of this policy evaluation are to: 1) determine if the cost per member per month of multivitamins decreased after the PA policy was implemented; 2) determine if there is a change in the diagnoses associated with patients prescribed multivitamins; 3) determine the final disposition of PA status for patients encountering a PA requirement (no PA request, PA approved, PA denied); and 4) determine percent of patients encountering a PA requirement have a paid multivitamin claim within 14 days.

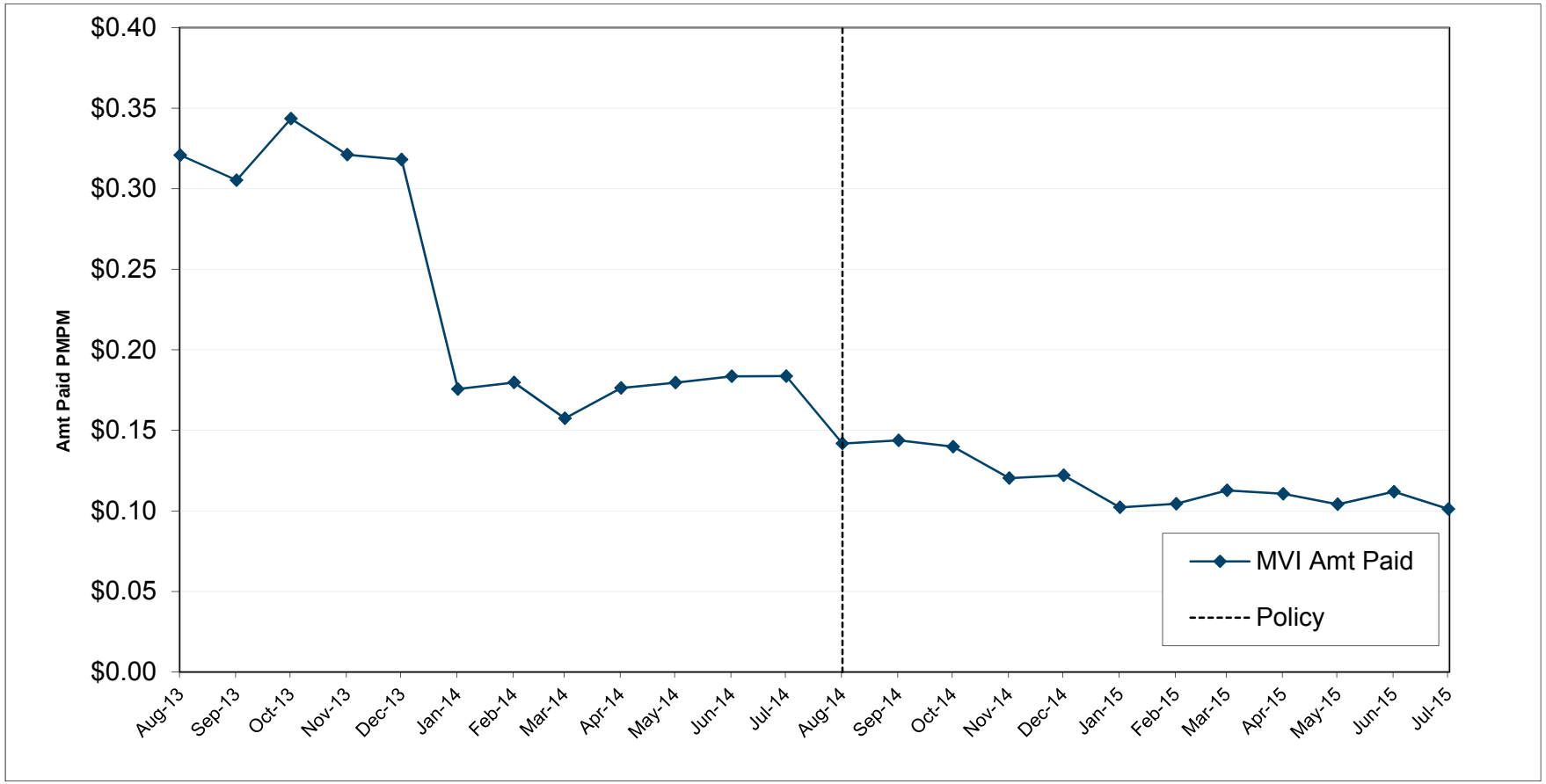
Methods:
The cost trend analysis included all patients with a paid FFS drug claim for a multivitamin (see Appendix 2) from August 1, 2013 through July 31, 2015.

The policy analysis is a pre-/post- observational cohort. The pre-policy group included patients with a new (no prior claim within 100 days for any multivitamin) paid FFS drug claim from August 1, 2013 through July 31, 2014. The post-policy group included patients with a new (no prior claim within 100 days for any multivitamin) paid FFS drug claim for a multivitamin or denied FFS drug claim for a multivitamin with an Explanation of Benefit Code (EOB) equal to 1056 (prior authorization required) and without an EOB of 2017 (patient in managed care) from August 1, 2014 through July 31, 2015. The first claim per patient is the "index claim". All patients with a denied index event were evaluated for a record of a PA request for a multivitamin. Patients were then categorized as follows: No PA request, PA requested-Approved, PA requested-Not approved.

The sub-analysis of associated diagnoses excluded patients that were less than 12 years old on the date of index claim or were patients with Medicare coverage as indicated by benefit packages BMM, BMD, MED, and MND. Patients were also excluded if they had less than 75% of eligible days (FFS or coordinating care organization) during the 12 months prior to the index claim. The exclusions limit the sub-analysis to those most likely to have a complete claim record. Patients were flagged if they had a paid FFS or encounter claim with any of the diagnoses of interest in Appendix 3 during the 12 months prior to the index claim. Patients were then categorized into diagnostic groups as follows: funded nutritional/mineral deficiencies; funded diagnoses associated with increased nutritional need; funded diagnoses associated with malabsorption; non-funded diagnoses associated with nutritional deficit; and none of the above.

Results:
Figure 1 depicts the amount paid per multivitamin claim per member per month (PMPM) from August 2013 to July 2015. A dramatic decrease in PMPM is noted in January 2014 due to the increased number of enrollees attributable to the implementation of the Affordable Care Act (ACA). Following PA implementation in August 2014, spending decreased from $0.18 PMPM to $0.14 PMPM. By the end of 2015 costs had decreased to $0.10 PMPM. The amount spent after implementation of the policy has remained steady and fairly consistent.

Figure 1. FFS Amount Paid Per Member per Month (PMPM) for Multivitamins



There were 2311 unique patients with FFS paid or denied multivitamin index claims identified between August 2013 and July 2015 (Table 1a). The demographics of the control group and the study group were similar at baseline. The majority of claims were for patients >64 years old (56%) in both groups and 60% of claims were women with approximately 80% of the claims for whites. The majority of claims in the study group were denied (96.1%). Patients with Medicare benefits made up a large proportion of the overall study population (72%).

Table 1a. Demographics, All New Starts

	Control Group		Study Group					
	Index Event Paid		Index Event Paid + Denied		Index Event Paid		Index Event Denied	
N=	1,206	%	1,105	%	43	3.9%	1,062	96.1%
Mean age (years)	65.3	(1-105)	64.6	(3-100)	72.2	(7-99)	64.3	(3-100)
< 12	11	0.9%	13	1.2%	2	0.2%	11	1.0%
12-18	55	4.6%	39	3.5%	2	0.2%	37	3.3%
19-64	455	37.7%	430	38.9%	6	0.5%	424	38.4%
> 64	685	56.8%	623	56.4%	33	3.0%	590	53.4%
Female	757	62.8%	674	61.0%	28	2.5%	646	58.5%
White	993	82.3%	883	79.9%	41	3.7%	842	76.2%
Medicare	878	72.8%	792	71.7%	37	3.3%	755	68.3%

There were 336 unique patients with FFS paid or denied multivitamin index claims between August 2013 and July 2015 (Table 1b) and included in the diagnostic sub-analysis. This population excluded patients with Medicare, those <12 years old and those with <75% of eligibility during the year prior to the index event. The major difference seen in the subgroup is the average age is significantly lower (37 years) but was similar between the control and study groups. Similarly to the previous analysis, the majority of claims in the study group were denied (97.9%). Also of note, this subpopulation demonstrated greater racial diversity as only 56-57% of patients were white.

Table 1b. Demographics, All New Starts, Sub-Analysis Population

	Control Group		Study Group					
	Index Event Paid		Index Event Paid + Denied		Index Event Paid		Index Event Denied	
N=	147	%	189	%	4	2.1%	185	97.9%
Mean age (range)	34.8	(12-66)	39.6	(12-80)	21.3	(16-30)	39.9	(12-80)
12-18	40	27.2%	32	16.9%	2	1.1%	30	15.9%
19-64	106	72.1%	152	80.4%	2	1.1%	150	79.4%
> 64	1	0.7%	5	2.6%	0	0.0%	5	2.6%
Female	85	57.8%	107	56.6%	1	0.5%	106	56.1%
White	88	59.9%	92	48.7%	4	2.1%	88	46.6%

Table 2 represents the distribution of denied index claims by PA request for the entire study group and sub-analysis population. The majority of these denied claims never followed through for a PA request (n=1038; 97.7%). Only 24 PA requests were made (2.0%) and the majority of these were approved (88%). In the sub-population analysis similar results were demonstrated. Out of the total denials (n=185) only 3 PA requests were submitted (1.6%) and all 3 were approved.

Table 2. PA Status for Patients with Denied Pharmacy Claim as Index Event

	Denied		PA Requested					
	Total	No PA Request		Approved		Denied		Cancelled	
Study Group	**1,062**	1,038	97.7%	21	2.0%	2	0.2%	1	0.1%

	Denied		PA Requested					
	Total	No PA Request		Approved		Denied		Cancelled	
Study Group, Sub-Analysis	**185**	182	98.4%	3	1.6%	0	0.0%	0	0.0%

Table 3. Conditions in Year Prior to Index Claim

	Control Group		Study Group					
	Index Event Paid Pharmacy		Index Event Pharmacy + Denied		Index Event Paid Pharmacy		Index Event Denied Pharmacy	
N=	147	%	189	%	4	%	185	%
Funded Nutritional/Mineral Deficiency	**31**	**21.1%**	**48**	**25.4%**	**4**	**2.1%**	**44**	**23.3%**
Kwashiorkor		0.0%		0.0%		0.0%		0.0%
Nutritional marasmus	1	0.7%		0.0%		0.0%		0.0%
Other severe protein calorie malnutrition		0.0%	7	3.7%	4	2.1%	3	1.6%
Other and unspecified protein calorie malnutrition	9	6.1%	8	4.2%		0.0%	8	4.2%
Vitamin A Deficiency		0.0%		0.0%		0.0%		0.0%
Thiamine and niacin deficiency states	2	1.4%	2	1.1%		0.0%	2	1.1%
Deficiency of b complex components	1	0.7%	4	2.1%		0.0%	4	2.1%
Ascorbic Acid Deficiency		0.0%		0.0%		0.0%		0.0%
Vitamin D deficiency	15	10.2%	18	9.5%	1	0.5%	17	9.0%
Other Nutritional Deficiencies	3	2.0%	1	0.5%	1	0.5%		0.0%
Disorders of mineral metabolism	6	4.1%	10	5.3%	1	0.5%	9	4.8%
Hypopotassemia	10	6.8%	16	8.5%		0.0%	16	8.5%
Funded diagnoses Associated with Increased Nutritional Need	**29**	**19.7%**	**36**	**19.0%**	**0**	**0.0%**	**36**	**19.0%**
Alcohol dependence syndrome	17	11.6%	18	9.5%		0.0%	18	9.5%
Sicca Syndrome		0.0%	2	1.1%		0.0%	2	1.1%
Osteoporosis or Pathologic fractures	2	1.4%	2	1.1%		0.0%	2	1.1%
Fracture of Skull		0.0%	3	1.6%		0.0%	3	1.6%
Fracture Of Spine And Trunk	1	0.7%	2	1.1%		0.0%	2	1.1%
Fracture Of Lower Limb	7	4.8%	15	7.9%		0.0%	15	7.9%
Fracture Of Upper Limb	7	4.8%	15	7.9%		0.0%	15	7.9%
Late effect of fracture of extremities or burn	1	0.7%	2	1.1%		0.0%	2	1.1%
Second and third degree burns of face head and neck		0.0%	1	0.5%		0.0%	1	0.5%
Second and third degree burns of trunk		0.0%	1	0.5%		0.0%	1	0.5%
Second and third degree burns of upper limb	2	1.4%	2	1.1%		0.0%	2	1.1%
Second and third degree burns of lower limb	1	0.7%		0.0%		0.0%		0.0%
Second and third degree burns of multiple specified and unspecified sites		0.0%	2	1.1%		0.0%	2	1.1%
Burn of internal organs		0.0%		0.0%		0.0%		0.0%
Funded Diagnoses Associated with Malabsorption	**8**	**5.4%**	**4**	**2.1%**	**0**	**0.0%**	**4**	**2.1%**
Cystic fibrosis	2	1.4%		0.0%		0.0%		0.0%
Achalasia and cardiospasm; Regional enteritis (includes Crohn's disease); Intestinal malabsorption (includes celiac disease)		0.0%		0.0%		0.0%		0.0%
Dysphagia	6	4.1%	3	1.6%		0.0%	3	1.6%
Non-Funded Diagnoses Associated with Nutritional Deficit	**0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**
None of the Above	**79**	**53.7%**	**101**	**53.4%**	**0**	**0.0%**	**101**	**53.4%**

Table 3 displays the associated conditions categorized by indication type and OHP funded or unfunded status for the control and study groups. The majority of paid claims in the control group were associated with unspecified diagnoses (53.7%). Additionally, the evidence-supported diagnoses most associated with a paid index claim were nutritional deficiencies (21.1%) or conditions associated with nutritional need (19.7%). In the study group (after PA implementation) the number of claims with diagnoses not associated with the FDA- and OHA-approved list remained approximately the same (53.4%) but none were paid. However, 84 (45%) of the denied claims in the study group were associated with an appropriate diagnosis and only 4 (2.1%) were paid.

Discussion:

The OHP FFS program spent less on multivitamins PMPM after the new policy was implemented. After implementation of the PA policy in August 2014, the PMPM cost decreased immediately by approximately 22% and stabilized at $0.10 PMPM (a 44% reduction) and avoided approximately $200,000 in drug costs over the study period.

Prior to August 2014, over half of the paid claims for multivitamins (53.7%) were not associated with a documented nutritional deficiency or diagnosis associated with a deficiency. Of the patients with an appropriate indication, the majority of paid events (21.1%) were patients with a nutritional or mineral deficiency, most commonly vitamin D deficiency. The second most covered (19.7%) were diagnoses associated with increased nutritional need. Diagnoses associated with malabsorption had the least amount covered. After the PA policy was implemented, the distribution of diagnoses associated with multivitamin used remained the same but 98% of claims were rejected for PA with no subsequent PA request. The high rejection rate could indicate unnecessary use of multivitamins prior to the PA. However, there was still a significant number (44.4%) of denied claims associated with an appropriate diagnosis so implementation of this PA may have prevented some medically appropriate use. A limitation of this study is that the time frame of the documented diagnosis cannot be directly associated with the index claim, and we cannot be entirely sure what the associated diagnoses for each index claim is. Additionally, it would be very difficult to track the impact or outcomes associated with inadequate supplementation in these patients.

The majority of patients had no PA requested. Of the few PA requests made, the majority were approved. Similar outcomes where seen in the sub-group analyses. A high rate of claims without a follow-up PA request has been seen in other policy evaluations;[4] however this is an alarmingly high percentage, particularly when over a third of patients did have a documented nutritional deficiency or associated condition. The administrative barrier of requesting the PA may be a root cause. In addition, the emphasis on medical importance of taking a multivitamin may be represented differently than other medications typically seen as more vital to one's health. Patients may pay cash or those who have dual coverage through Medicare Part D may have coverage of multivitamins; neither scenario is represented in the OHP FFS utilization data. Lastly, it is possible that some of the patients received monovitamins (vitamin D, potassium supplement) for their nutritional deficiency, which were not evaluated in this study.

A small percentage of patients with a denied claim (<3%) post-PA policy received a multivitamin within 14 days of the denied claim. One limitation of these data are that it only shows patients that got their multivitamin as a prescription and does not show patients who paid for their multivitamins as an over-the-counter product. In this Medicaid population, it is unlikely that many patients paid for these medications out-of-pocket. Thus, this limitation likely does not change the results. It is unclear if not receiving multivitamin caused harm in these patients and it would be extremely difficult to evaluate these outcomes because negative nutritional outcomes develop over a long period of time and are highly confounded by patients' other health conditions.

Overall, the implementation of the PA policy in August 2014 led to decreased spending by the state of Oregon on multivitamins and minerals. However, it is unclear if any harms are associated with denying coverage of multivitamins in patients with a medically appropriate indications. A discussion surrounding the possible harms in patients with inadequate multivitamin supplementation should be addressed before continuation of this policy.

References:

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3. Bailey RL, Gahche JJ, Lentino CV, Dwyer JT, Engel JS, Thomas PR, Betz JM, Sempos CT, Picciano MF. Dietary supplement use in the United States, 2003–2006. J Nutr. 2011;141:261–6.
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Multivitamins

Goals:

- Restrict use for documented nutritional deficiency or diagnosis associated with nutritional deficiency (e.g. Cystic Fibrosis)
- Prenatal and pediatric multivitamins are not subject to this policy.

Length of Authorization:

Up to 12 months

Requires PA:

- All multivitamins in HIC3 = C6B, C6G, C6H, C6I, C6Z

Covered Alternatives:

Upon PA approval, only vitamins generically equivalent to those listed below will be covered:

GSN	Generic Name	Example Brand
002532	MULTIVITAMIN	DAILY VITE OR TAB-A-VITE
039744	MULTIVITS, TH W-FE, OTHER MIN	THEREMS-M
002523	MULTIVITAMINS, THERAPEUTIC	THEREMS
064732	MULTIVITAMIN/ IRON/ FOLIC ACID	CEROVITE ADVANCED FORMULA
048094	MULTIVITAMIN W-MINERALS/ LUTEIN	CEROVITE SENIOR
002064	VITAMIN B COMPLEX	VITAMIN B COMPLEX
058801	MULTIVITS-MIN/ FA/ LYCOPENE/ LUT	CERTAVITE SENIOR-ANTIOXIDANT
047608	FOLIC ACID/ VITAMIN B COMP W-C	NEPHRO-VITE
022707	BETA-CAROTENE(A) W-C & E/MIN	PROSIGHT
061112	VIT A,C & E/ LUTEIN/ MINERALS	OCUVITE WITH LUTEIN
066980	MULTIVAMIN/ FA/ ZINC ASCORBATE	SOURCECF
067025	PEDIATRIC MULTIVIT #22/ FA/ ZINC	SOURCECF
058068	MULTIVITAMIN/ ZINC GLUCONATE	SOURCECF
068128	PEDIATRIC MULTIVIT #32/ FA/ ZINC	AKEDAMINS
061991	PEDI MULTIVIT #40/ PHYTONADIONE	AQUADEKS
066852	MULTIVITS & MINS/ FA/ COENZYME Q10	AQUADEKS
068035	MULTIVITS & MINS/ FA/ COENZYME Q10	AQUADEKS

Approval Criteria		
1. What diagnosis is being treated?	Record ICD10 code.	
2. Is this an OHP-funded diagnosis?	**Yes:** Go to #3	**No:** Pass to RPh; Deny (not covered by OHP)
3. Does the patient have a documented nutrient deficiency **OR** Does the patient have an increased nutritional need resulting from severe trauma (e.g. severe burn, major bone fracture, etc.) **OR** Does the patient have a diagnosis resulting in malabsorption (e.g. Crohns disease, Cystic Fibrosis, bowel resection or removal, short gut syndrome, gastric bypass, renal dialysis, dysphagia, achalasia, etc.) **OR** Does the patient have a diagnosis that requires increased vitamin or mineral intake?	**Yes:** Approve up to 1 year	**No:** Pass to RPh; Deny for medical appropriateness.

P&T / DUR Action: *3/16 (MH/KK); 3/14 (MH/KK)*
Implementation: *4/1/2014*

Appendix 2: All multivitamins in HIC3 = C6Z, C6I and C6G

HIC3	GSN	Generic Name	FormDesc	PDL	CMSTapeFlag	NDCCount
C6B	002064	VITAMIN B COMPLEX	CAPSULE	Y	N	9
C6B	047608	FOLIC ACID/VITAMIN B COMP W-C	TABLET	Y	N	5
C6G	048094	MULTIVITAMIN W-MINERALS/LUTEIN	TABLET	Y	N	44
C6H	067025	PEDI MULTIVIT #22/VIT D3/VIT K	TAB CHEW	Y	N	1
C6I	061112	VIT A,C & E/LUTEIN/MINERALS	TABLET	Y	N	14
C6Z	002523	MULTIVITAMINS,THERAPEUTIC	TABLET	Y	N	9
C6Z	002532	MULTIVITAMIN	TABLET	Y	N	101
C6Z	022707	BETA-CAROTENE(A) W-C & E/MIN	TABLET	Y	N	15
C6Z	039744	MULTIVITS,TH W-FE,OTHER MIN	TABLET	Y	N	2
C6Z	058801	MULTIVIT-MIN/FA/LYCOPENE/LUT	TABLET	Y	N	36
C6Z	064732	MULTIVITAMIN/IRON/FOLIC ACID	TABLET	Y	N	45
C6Z	066852	MULTIVITS&MINS/FA/COENZYME Q10	TAB CHEW	Y	N	1
C6Z	068035	MULTIVITS&MINS/FA/COENZYME Q10	CAPSULE	Y	N	1
C6Z	045263	MULTIVIT, MIN CMB#20/IRON/FA	TABLET	N	Y	1
C6Z	059252	FA/MU-VITS-MIN TH/LYCOPENE/LUT	TABLET	N	Y	2
C6Z	061804	MULTIVIT, IRON, MIN #5, FA	TABLET	N	Y	1
C6Z	063200	MV, MIN CMB #6/FA/LUT/LYCO/Q10	TABLET	N	Y	1
C6Z	063575	OM-3/DHA/EPA/B12/FA/B6/PHYTOST	CAPSULE	N	Y	1
C6Z	065035	MV,MIN #10/FA/D3/ALIP ACID/LUT	TABLET	N	Y	1
C6Z	068247	M-TETRAHYROFOLATE/NIACIN/CU/ZN	TABLET	N	Y	1
C6Z	068314	FOLIC ACID/MULTIVIT-MINERALS	TAB CHEW	N	N	30
C6Z	073170	LMEFOLATE/B3/COPP/ZN/SEL/CHROM	TABLET	N	N	1
C6G	002242	IRON/VITAMIN B COMP W-C	TABLET		N	2
C6G	002246	MULTIVITAMIN W/IRON, MINERALS	ELIXIR		N	1
C6G	002247	MULTIVITAMIN W/IRON, MINERALS	LIQUID		N	3
C6G	002248	MULTIVITAMIN W/IRON, MINERALS	TABLET		N	19
C6G	002250	MULTIVITAMIN WITH MINERALS	CAPSULE		N	3
C6G	002251	MULTIVITAMIN WITH MINERALS	ELIXIR		N	2
C6G	002253	MULTIVITAMIN WITH MINERALS	TABLET		N	5
C6G	064191	FOLIC ACID/MULTIVIT-MIN/LUTEIN	TAB CHEW		N	1
C6G	064653	MV, MIN CMB#16/FA/LUTEIN/LYCOP	TABLET		N	1
C6G	067887	FOLIC ACID/MULTIVIT-MIN/LUTEIN	TAB CHEW		N	1
C6G	069227	B1/B2/B3/B5/B6/IRON/METH/CHOLN	LIQUID		N	2
C6G	069237	MV, MIN #36/IRON,CARBONYL/FA	TABLET		N	2
C6G	073816	B1,B2,B3,B6,B12/DEXPAN/ZN/MANG	ELIXIR		N	1
C6I	060165	VIT C/VITE AC/LUT/COPPER/ZNOX	CAPSULE		N	2
C6I	062498	VIT A/VIT C/VIT E/ZINC/COPPER	CAPSULE		N	5
C6I	062518	MULTIVIT W-MN/FA/LYCOP/LUT/ALA	TABLET		N	1
C6I	063995	VIT C/VIT E/LUTEIN/MIN/OMEGA-3	CAPSULE		N	1

C6I	066656	VIT A/VIT C/VIT E/ZINC/COPPER	TABLET	N	3
C6I	067715	ANTIOX#10/OM3/DHA/EPA/LUT/ZEAX	CAPSULE	N	1
C6I	068363	ANTIOX #11/OM3/DHA/EPA/LUT/ZEA	CAPSULE	N	1
C6I	069474	ANTIOX#12/OM3/DHA/EPA/LUT/ZEAN	COMBO. PKG	N	1
C6I	070984	ANTIOX#13/MIN/FA/LUTEIN/ZEAXAN	TABLET ER	N	1
C6I	071924	VIT A/VIT C/VIT E/ZINC/COPPER	TABLET DR	N	1
C6I	073059	VIT A/VIT C/VIT E/SELENIUM YST	TABLET	N	1
C6I	073140	FA/VIT C/E/ZINC/COPPER/LUT/ZEA	CAPSULE	N	1
C6I	073275	FA/VIT C/E/ZINC/COPPER/LUT/ZEA	CAPSULE	N	1
C6I	073893	A/C/E/ZINC OX/CUPRIC OX/LUTEIN	TABLET	N	2
C6I	073955	FA/VIT C/E/ZINC/COPPER/LUT/ZEA	CAPSULE	N	1
C6Z	001829	AMINO ACIDS/MV,FE,OTHER MIN	TABLET	N	1
C6Z	002460	VITAMINS A AND D	CAPSULE	N	10
C6Z	002464	B COMPLEX WITH VITAMIN C	CAPSULE	N	7
C6Z	002470	B COMPLEX WITH VITAMIN C	TABLET	N	34
C6Z	002472	B COMPLEX WITH VITAMIN C	TABLET ER	N	1
C6Z	002477	MULTIVITS,STRESS FORMULA/ZINC	TABLET	N	19
C6Z	002482	MULTIVITS,STRESS FORMULA	TABLET	N	17
C6Z	002485	MULTIVITS,TH W-FE,OTHER MIN	TABLET	N	5
C6Z	002487	MULTIVITAMIN W/IRON, MINERALS	CAPSULE	N	2
C6Z	002488	MULTIVITAMIN W/IRON, MINERALS	ELIXIR	N	1
C6Z	002489	MULTIVITAMIN W/IRON, MINERALS	TABLET	N	13
C6Z	002490	MULTIVITAMIN W/IRON, MINERALS	TABLET ER	N	3
C6Z	002492	MULTIVITS,TH W-CA,FE,OTH MIN	TABLET	N	5
C6Z	002493	MULTIVIT WITH CALCIUM,IRON,MIN	TABLET	N	12
C6Z	002494	MULTIVIT WITH CALCIUM,IRON,MIN	COMBO. PKG	N	1
C6Z	002503	MULTIVITS W-IRON,HEMATINIC	TABLET	N	8
C6Z	002508	MULTIVITAMINS WITH IRON	TABLET	N	46
C6Z	002510	MULTIVITAMINS,THER W-MINERALS	CAPSULE	N	4
C6Z	002511	MULTIVITAMINS,THER W-MINERALS	TABLET	N	8
C6Z	002512	MULTIVITAMIN WITH MINERALS	CAPSULE	N	2
C6Z	002514	MULTIVITAMIN WITH MINERALS	LIQUID	N	3
C6Z	002515	MULTIVITAMIN WITH MINERALS	SYRUP	N	1
C6Z	002516	MULTIVITAMIN WITH MINERALS	TABLET	N	45
C6Z	002518	MULTIVITAMIN WITH MINERALS	TABLET ER	N	3
C6Z	002522	MULTIVITAMINS,THERAPEUTIC	LIQUID	N	1
C6Z	002524	MULTIVITAMIN	CAPSULE	N	2
C6Z	002530	MULTIVITAMIN	LIQUID	N	4
C6Z	002533	MULTIVITAMIN	TAB CHEW	N	5

C6Z	006381	LECITHIN/PYRIDOXINE/KELP	CAPSULE	N	3
C6Z	006382	LECITHIN/PYRIDOXINE/KELP	TABLET	N	6
C6Z	012063	MULTIVITAMIN	COMBO. PKG	N	2
C6Z	014142	VITAMIN B COMP W-C/ZINC	TABLET	N	1
C6Z	017103	MULTIVITAMIN W-MINERALS/HERBS	TABLET	N	8
C6Z	019167	BETA-CAROTENE(A) W-C & E/MIN	CAPSULE	N	2
C6Z	021902	MULTIVITAMIN W/IRON, MINERALS	TAB CHEW	N	1
C6Z	023723	IRON/LYSINE/VIT B COMP/FA	LIQUID	N	1
C6Z	023800	FE GLUCONATE/VIT B COMP/FA/ZN	LIQUID	N	1
C6Z	024671	AMINO ACIDS/MV,TH W-FE,MN	LIQUID	N	2
C6Z	030824	MULTIVITAMIN W-MINERALS/GIN	CAPSULE	N	1
C6Z	034648	CALCIUM/VIT B12/FA/PYRIDOXINE	TABLET	N	1
C6Z	039739	MULTIVITS,THERAP W-FE,HEMATIN	TABLET	N	1
C6Z	039740	MULTIVITS,THERAP W-FE,HEMATIN	TABLET	N	2
C6Z	039746	MULTIVITAMIN W/IRON, MINERALS	TABLET	N	1
C6Z	039747	MULTIVIT,THER IRON,CA,FA & MIN	TABLET	N	19
C6Z	039748	MULTIVIT WITH CALCIUM,IRON,MIN	TABLET	N	9
C6Z	039750	MULTIVITS W-IRON,HEMATINIC	TABLET	N	14
C6Z	044590	MV/GNK/S.GINSENG/GRP/KLP	TABLET	N	1
C6Z	046562	MULTIVITS W-FE,OTHER MIN/LUT	TABLET	N	10
C6Z	047971	FOLIC ACID/NIACINAMIDE/ZINC	TABLET	N	1
C6Z	048133	MV/GNK BI EX/K.GINSG	TABLET	N	9
C6Z	048782	FOLIC ACID/MV,FE,OTHER MIN	TABLET	N	1
C6Z	049255	MULTIVITAMIN W/IRON, MINERALS	COMBO. PKG	N	1
C6Z	049257	BIOFLAVONOIDS/MV,FE,OTHER MIN	COMBO. PKG	N	1
C6Z	049962	AMINO AC/FA/MV-MN/DIETARY 3	CAPSULE	N	1
C6Z	050890	CAL/MAG/B COMP/VIT D3/HRB61	TABLET	N	1
C6Z	050900	MV/DIETARY 4/DNA/RNA	CAPSULE	N	1
C6Z	050919	BCOMP&C/ST.JHN WRT/S.GINSG/KGN	TABLET	N	2
C6Z	053093	MULTIVITS,TH W-FE,OTHER MIN	TABLET	N	1
C6Z	053300	FE FUMARATE/FA/VIT BCOMP&C	TABLET	N	1
C6Z	053572	MV,FE,OTHER MIN/GR TEA LFXT	TABLET	N	3
C6Z	053650	FOLIC ACID/MULTIVIT-MINERALS	TABLET	N	13
C6Z	057794	FOLIC ACID/MV,FE,OTHER MIN	TABLET	N	8
C6Z	058134	MULTIVIT WITH CALCIUM,IRON,MIN	TABLET	N	7
C6Z	058276	ALPHA LIPOIC ACID/FA/MV-MN/LUT	COMBO. PKG	N	1
C6Z	058285	FOLIC ACID/MULTIVIT-MIN/LUTEIN	COMBO. PKG	N	1
C6Z	058289	FOLIC ACID/MULTIVIT-MIN/LUTEIN	COMBO. PKG	N	1
C6Z	058653	MV,FE,OTHER MIN/GR TEA LFXT	TABLET	N	1

C6Z	059184	FOLIC ACID/MV,FE,OTHER MIN	TAB CHEW	N	3
C6Z	059312	B2/VIT A,C & E/LUT/ZEAXANTH/MN	TABLET ER	N	2
C6Z	059577	FOLIC ACID/MULTIVIT-MIN/LUTEIN	TABLET	N	2
C6Z	059663	MULTIVIT-MIN/FA/LYCOPENE/LUT	TABLET	N	2
C6Z	059784	FOLIC ACID/MV,FE,OTHER MIN/LUT	TABLET	N	3
C6Z	060168	FA/MV,CA,IRON,MIN/LYCOPENE/LUT	TABLET	N	9
C6Z	061454	MULTIVIT, IRON, MIN #4, FA	TAB CHEW	N	1
C6Z	061763	MULTIVITS-MINERALS/FA/LYCOPENE	CAPSULE	N	1
C6Z	062002	MV, MIN, CA, IRON& AMINO ACIDS	CAPSULE	N	1
C6Z	062003	MV, MIN, CA, IRON& AMINO ACIDS	CAPSULE	N	1
C6Z	062047	MULTIVIT-MIN/FA/LUTEIN/ZEAXANT	TABLET DR	N	2
C6Z	062722	MULTIVIT, IRON, MIN #7, FA	TAB CHEW	N	1
C6Z	062980	MULTIVITS-MINERALS/FA/LYCOPENE	TABLET	N	6
C6Z	062991	MV,IRON,MIN/FA/UBIDEC/LYC/LUT	TABLET	N	1
C6Z	063259	MULTIVIT,CA,IRON,MIN/FA/HRB145	TABLET	N	3
C6Z	063270	MV,IRON,MIN/FA/INOS/CHOL/PABA	TABLET	N	2
C6Z	063288	MULTIVIT,CA,IRON,MIN/FA/HRB146	TABLET	N	2
C6Z	063385	MULTIVITAMINS WITH MIN NO.7/FA	CAPSULE	N	2
C6Z	063851	MV,CA,IRON,MIN/FA/PHYTOSTEROL	TABLET	N	6
C6Z	063893	MV,CA,IRON,MN/FA/LUT/LYC/HB153	CAPSULE	N	1
C6Z	063897	MV,CA,IRON,MN/FA/CHOL/INO/PABA	CAPSULE	N	1
C6Z	063914	MULTIVITS-MIN/FA/DIETARY NO 19	CAPSULE	N	1
C6Z	063961	MULTIVIT-MIN/CAL/BIOTIN/D3/FA	TABLET	N	1
C6Z	064457	MV,CA,MIN/IRON/FA/LYC/LUT/PHYT	TABLET	N	2
C6Z	064478	CA COMB NO.1/VIT D3/B-6/FA/B12	TABLET	N	2
C6Z	064479	CA COMB NO.1/D3/B-6/FA/B12/AV	TABLET	N	2
C6Z	064545	MV,CA,MIN/IRON FUM/FA/LYCO/LUT	TABLET	N	17
C6Z	065118	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	8
C6Z	065178	MV,MINERALS/FA/LYCOPENE/GINKGO	TABLET	N	4
C6Z	065576	MULTIVIT&MIN/IRON FUM/FOLIC AC	TABLET	N	2
C6Z	065735	MULTIVIT, MIN NO.21/FOLIC ACID	TABLET DR	N	2
C6Z	065983	MULTIVITS-MIN/IRON/FA/GINSENG	TABLET	N	4
C6Z	065992	MULTIVITS,CA,MIN/IRON/FA/LYCOP	TABLET	N	8
C6Z	066148	MULTIVITAMINS-MIN/FA/GINKGO	TABLET	N	6
C6Z	066186	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	1
C6Z	066214	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	2
C6Z	066217	MULTIVITS W-MIN/FERROUS GLUC	LIQUID	N	6
C6Z	066252	MULTIVIT, CALC, MIN/FOLIC ACID	TABLET	N	1
C6Z	066267	MULTIVIT/FOLIC ACID/ZINC/VIT C	CAPSULE	N	1

C6Z	066366	VIT A/BETA-CAROT/D2/E/SELENIUM	TABLET	N	1
C6Z	066494	FOLIC ACID/MULTIVIT-MIN/LUTEIN	TABLET	N	2
C6Z	066514	MULTIVIT-MIN/FA/LYCOPENE/LUT	TABLET	N	13
C6Z	066556	MV-MN/IRON/FA/LUT/LYC/HERB#175	CAPSULE	N	1
C6Z	066735	MULTIVIT &MINERALS/FERROUS FUM	LIQUID	N	2
C6Z	066842	MV, MIN CMB#24/IRON PS CMP/FA	TABLET	N	1
C6Z	066909	MV W-CA/IRON/FA/LUTEIN/HRB#179	TABLET	N	4
C6Z	066915	MV-MN/FA/LYCOPENE/LUT/HB#178	TABLET	N	5
C6Z	066948	MULTIVIT-MIN/FE FUM/FA/VIT K	CAPSULE	N	1
C6Z	066985	MV-MN/FA/COQ10/LYCOPENE/LUTEIN	TABLET	N	1
C6Z	067026	MV,CA,MIN/IRON/FA/EGCG/CAFFEIN	TABLET	N	1
C6Z	067104	B&C/FA/ZINC/COPPER OXIDE/VIT E	TABLET	N	1
C6Z	067125	MULTIVITS-MIN/IRON/FA/LUTEIN	TABLET	N	8
C6Z	067468	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	3
C6Z	067526	MULTIVIT&MIN/FA/LYCOPENE/BORON	TABLET	N	1
C6Z	067537	VITB&C/IRON FUM/FA/VIT E/AA#16	TABLET	N	1
C6Z	067538	MV-MN/FE PICOLIN/FA/CAL/D3/AA	TABLET	N	2
C6Z	067540	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	11
C6Z	067552	VIT B COMP & C/CALCIUM CARB	TABLET	N	1
C6Z	067853	OM-3/DHA/EPA/D3/B12/FA/B-6/PHY	CAPSULE	N	2
C6Z	067982	MV, MIN CMB#9/FA/SAW PALMET XT	TABLET	N	1
C6Z	068235	MULTIVIT,CA,MINS/FA/BIOFLAV#4	COMBO. PKG	N	1
C6Z	068366	MV,MINERALS/FA/LYCOPENE/GINKGO	TABLET	N	2
C6Z	068370	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	3
C6Z	068550	MV-MIN/FA/D3/OM-3/DHA/EPA/FISH	CAPSULE	N	2
C6Z	068668	MULTIVITAMIN/FOLIC ACID/DHA	TAB CHEW	N	2
C6Z	068673	MV,CA,MIN/IRON/FA/GUARANA/CAFF	TABLET	N	2
C6Z	068858	MV,FE/FA/D3/OM-3/DHA/EPA/FISH	CAPSULE	N	2
C6Z	069033	MULTIVITS-MINERALS/FA/LYCOPENE	TABLET	N	9
C6Z	069034	MULTIVIT-MIN/FA/LYCOPENE/LUT	TABLET	N	9
C6Z	069173	MV,CA,MIN/IRON GLUC/FA/BIOTIN	TABLET	N	1
C6Z	069205	MULTIVIT, CA, MIN/FA/SOY ISOFL	TABLET	N	1
C6Z	069214	MV,CA,MIN/IRON/FA/LUTEIN	TABLET	N	1
C6Z	069220	MV,CA,MIN/IRON/FA/GUARANA/CAFF	TABLET	N	3
C6Z	069221	MULTIVITS,CA,MINERALS/IRON/FA	TABLET	N	1
C6Z	069292	MULTIVITAMIN WITH FOLIC ACID	TABLET	N	8
C6Z	069372	MULTIVIT&MIN/IRON FUM/FOLIC AC	TABLET	N	2
C6Z	069635	FOLIC ACID/MULTIVIT-MIN/LUTEIN	TAB CHEW	N	1
C6Z	069679	MULTIVIT-MIN/FA/CA CARB/VIT K	TABLET	N	3

C6Z	069904	MULTIVITAMIN/FERROUS GLUCONATE	LIQUID	N	2
C6Z	069927	IRON FUM/FA/B COMPLEX & C/MIN	TABLET	N	1
C6Z	070020	MV-MN/IRON/FA/VIT K/K.GINSENG	TABLET	N	2
C6Z	070085	MV,IRON,MIN/FA/DIETARY CMB.24	TABLET	N	2
C6Z	070086	MV/K/O3/D3/MAG/C/ALA/GRN T/CHR	COMBO. PKG	N	1
C6Z	070189	MULTIVITS W-MIN/FERROUS GLUC	LIQUID	N	1
C6Z	070275	MULTIVITS-MIN/FA/K/LYCOPENE	TABLET	N	2
C6Z	070276	MV-MN/IRON/FA/CA CARB/VIT K	TABLET	N	1
C6Z	070441	MV-MN/FE/FA/K/D3/CHOL/DHA/FISH	COMBO. PKG	N	1
C6Z	070442	MULTIVIT-MIN/FOLIC ACID/VIT K	TABLET	N	1
C6Z	070452	MV-MN/IRON/FA/K/GREEN TEA XT	TABLET	N	1
C6Z	070594	MV,CA,MIN/IRON FUM/FA/VIT K	TABLET	N	1
C6Z	070790	MULTIVIT-MIN/FOLIC ACID/VIT K	TABLET	N	2
C6Z	071094	MULTIVIT-MIN/GLUTATHIONE/CYST	TABLET	N	1
C6Z	071297	MV,CA,MIN/IRON FUM/FA/VIT K	TAB CHEW	N	1
C6Z	071298	MULTIVIT-MIN/FA/LYCOPENE/LUT	TABLET	N	2
C6Z	071481	MULTIVIT-MIN/FA/LUTEIN/ZEAXANT	TABLET	N	1
C6Z	071588	MV-MIN/IRON FUM/FA/K/LYCO/LUTN	TABLET	N	1
C6Z	071973	MULTIVITAMIN NO.44/VIT D3/K	CAPSULE	N	1
C6Z	072250	MV-MIN/MFOLAT/COQ10/DIET NO.26	CAPSULE	N	1
C6Z	072324	MV,IRON,MIN/FOLIC ACID/BIOTIN	CAPSULE	N	1
C6Z	072420	MV-MIN/MFOL/COQ10/DHA/EPA/#27	CAPSULE	N	1
C6Z	072556	MULTIVIT-MIN/FOLIC ACID/BIOTIN	TABLET	N	1
C6Z	072614	IRON,CARBONYL/FA/MULTIVIT-MIN	TAB CHEW	N	1
C6Z	072890	A/C/E/ZINC/SOD SELENATE/COPPER	TABLET	N	2
C6Z	072942	MV-MN/FA/INOSI/CHOLINE/BIOFLAV	CAPSULE	N	1
C6Z	073355	MULTIVIT-MIN/FA/GUARANA/CAFF	TABLET EFF	N	4
C6Z	073399	MV-MN/FA/VIT K/LYCOP/LUT/COQ10	CAPSULE	N	1
C6Z	074027	MULTIVIT-MINERALS/FA/CAFFEINE	TAB CHEW	N	1
C6Z	074255	MULTIVIT & MIN NO.49/IRON/FA	LIQUID	N	1
C6Z	074399	MV-MN/FA/VIT K/LYCOP/LUT/ZEAXA	TABLET	N	1
C6Z	074503	MV,IRON,MIN/FOLIC ACID/BIOTIN	TABLET	N	2
C6Z	074516	MULTIVIT-MIN/FA/HERBAL NO.245	TAB CHEW	N	1
C6Z	074517	MULTIVIT/IRON/FA/K/HERB NO.244	TABLET	N	1
C6Z	074601	MULTIVITAMIN/FERROUS SULFATE	TABLET	N	1
C6Z	074639	MV. MIN CMB#50/IRON,CARB/FA	TABLET	N	1

Appendix 3: FDA and OHA Approved Indications for Multivitamin Use

Diagnoses	ICD9 codes
Kwashiorkor	260
Nutritional marasmus	261
Other severe protein calorie malnutrition	262
Other and unspecified protein calorie malnutrition	263
Vitamin A Deficiency	264
Vitamin B	265
Deficiency of b complex components	266
Vitamin C	267
Vitamin D	268
Deficiency of Vitamin K	269.0
Deficiency of other vitamins	269.1
Unspecified vitamin deficiency	269.2
Other diagnosis	
Celiac Disease	579.0
Osteoporosis	733.0
Achalasia and cardiospasm	530.0
Sicca Syndrome	710.2
Dysphagia	787.2
Renal dialysis status	V45.11
Cystic fibrosis	277.0
Regional enteritis	555
Other and unspecified postsurgical nonabsorption	579.3
Alcohol Dependence	303
Minerals	
Hypocalcemia	275.41
Disorders of magnesium metabolism	275.2
Disorders of phosphorus metabolism	275.3
Hypopotassemia	276.8
Trauma	
Burn of face head and neck unspecified degree	941.0
Burn of trunk to unspecified degree	942.0
Burn of upper limb except wrist and hand unspecified degree	943.0

Burn of wrists and hands unspecified degree	944.0
Burn of lower limbs unspecified degree	945.0
Burns of multiple specified sites	946
Burn unspecified site	949
Burn with epidermal loss due to burn (second degree) unspecified site	949.2
Full thickness skin loss due to burn (third degree nos) unspecified site	949.3
Fracture	
Fracture of unspecified bones	829
Fracture of unspecified bone closed	829.0
Fracture of unspecified bone open	829.1
Procedures	
High gastric bypass	44.31
Incision, excision, and anastomosis of intestine	45