Reviewing Established Grouping Parameters: Comorbidity Level in CMG+

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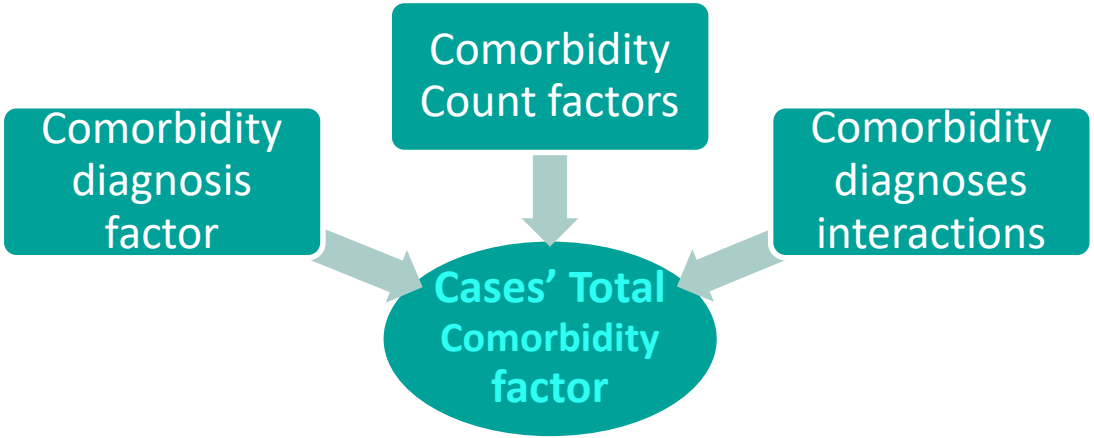
Overview

- **Brief description of Comorbidity model in CMG+**
  - What criteria are used to identify diagnoses for cost weight (RIW) and expected length of stay (ELOS) adjustments
- **What happens if we change the criteria?**
  - Impact on RIWs, GOF statistics
- **Are changes to the comorbidity model required for 2018?**

Comorbidity Level - Overview

- **Important factor in identifying cost/LOS differences in patients with varying numbers and types of comorbidities within same CMG**
- **Used in (ELOS) and (RIW) indicators**
  - Based on presence of certain “significant” comorbid diagnoses
  - Thousands of possible diagnosis codes
  - Not all have impact on cost/LOS, so not all are used
- **Assess comorbidities for comorbidity level (CL) assignment**
  - Regression models for each Major Clinical Category (MCC) separately
  - MCC specific list of Significant comorbidity diagnoses, with an associated comorbidity “factor”
  - Only significant comorbidities, currently defined as having at least 25% impact on cost, are used for CL assignment

Comorbidity Level Assignment



Comorbidity level	Impact of comorbidity conditions	Factor Range
0	No Significant Comorbidity	0-1.24
1	**1.25** up to 1.5 Times More Resource Intensive	1.25-1.49
2	1.5 up to 2 Times More Resource Intensive	1.50-1.99
3	2 up to 3 Times More Resource Intensive	2.00-2.99
4	3 or More Times More Resource Intensive	3.00-99.99
8	Comorbidity Not Applied (e.g., Normal Newborns)	n/a

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Research Question

Is the 1.25 factor threshold still best cut-off point to identify “significant” comorbidities?

Testing: The Approach

- **Apply alternative factor thresholds of 1.20, 1.30, and 1.40**
- **Test the impact on Comorbidity diagnosis list, Comorbidity level distribution, and RIW**

Testing results: Comorbidity Diagnosis List

Code	Description	Comorbidity factor	Included in Comorbdity list			
			1.20	1.25	1.30	1.40
E1164	Type 2 diabetes mellitus with poor control, so described	1.2028				
R482	Apraxia	1.2184				
E1152	Type 2 diabetes mellitus with certain circulatory complications	1.2822				
F209	Schizophrenia, unspecified	1.3553				
K219	Gastro-oesophageal reflux disease without oesophagitis	1.4346				
I635	Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries	1.4929				
N179	Acute renal failure, unspecified	1.4700				

Testing results: Comorbidity Diagnosis List

- **Fewer diagnoses included when increasing the factor thresholds**

Code	Description	Comorbidity factor	Included in Comorbdity list			
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R482	Apraxia	1.2184	✓			
E1152	Type 2 diabetes mellitus with certain circulatory complications	1.2822	✓	✓		
F209	Schizophrenia, unspecified	1.3553	✓	✓	✓	
K219	Gastro-oesophageal reflux disease without oesophagitis	1.4346	✓	✓	✓	✓
I635	Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries	1.4929	✓	✓	✓	✓
N179	Acute renal failure, unspecified	1.4700	✓	✓	✓	✓

Testing Results – CL Assignment Example

- **Patient information**

		Factor
A099	Gastroenteritis and colitis of unspecified origin	1.394
E1164	Type 2 diabetes mellitus with poor control, so described	1.203
	Comorbidity count= 1	1.026
	Comorbidity count= 2	1.027
	Assuming two comorbidities have No interaction	1.000

- **Comorbidity Level assignment**

	1.20	1.25	1.30	1.40
Total comorbidity factor	1.722	1.430	1.430	
Comorbidity level	2	1	1	**0**

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Comorbidity level	**2**	1	1	0

Testing Results: Overall Volume across CL

Results as expected, note that the most complex (CL4) have biggest change

Factor threshold	Percentage of cases				
	Total CL	CL 1	CL 2	CL 3	CL 4
1.20	**27.2**	10.5	8.5	5.3	2.9
1.25	**23.7**	**9.3**	**7.3**	**4.7**	**2.4**
1.30	**21.5**	8.8	6.6	4.0	2.1
1.40	**16.5**	8.2	4.2	2.8	1.3

Total volume: ~2.5M

Testing Results: RIW Cases Comparison

	Percentage of Cases		
% change in RIW	1.20 adjustment factor	1.30 adjustment factor	1.40 adjustment factor
> 100% change	0.18	0.14	0.22
50% to 100%	0.48	0.13	0.22
30% to 50%	1.76	0.21	0.59
10% to 30%	4.98	3.44	9.26
5% to 10%	**2.38**	**6.90**	**10.57**
0% to 5%	**19.88**	**58.80**	**57.01**
-5% to 0%	**56.58**	**21.71**	**8.69**
-10% to -5%	**9.57**	**2.99**	**3.54**
-30% to -10%	3.75	4.70	7.73
-50% to -30%	0.22	0.71	1.70
> -50% change	0.13	0.18	0.39

90%

90%

80%

Very high % of cases with RIW change within 10% of original 1.25 threshold

Total volume: ~2.5M

Testing Results: RIW GOF

- **No significant different in R-squared values across thresholds tested**

	R^2			
	1.20	1.25(current)	1.30	0.14
Overall	0.803	0.808	0.799	0.795
No CL	0.779	0.782	0.777	0.766
CL 1	0.734	0.773	0.772	0.787
CL 2	0.779	0.794	0.779	0.780
CL 3	0.795	0.805	0.795	0.789
CL 4	0.816	0.817	0.808	0.811

Testing Results: Summary

- **Changing the threshold results in changes to the comorbidity diagnosis list and volume of cases in each comorbidity level, however…**
- **The impact on RIW is minimal**
- **GOF results very similar for all approaches**
- **No compelling reason to change from 1.25**
- **Re-checking factors in all models remains an important part of ongoing process to maintain accuracy and applicability**


Questions?

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