Verification of Predictive Modeling in the Management of Rare, Chronic Diseases

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Outline

- **Background**
- **Objectives**
- **Methodology**
- **Results**
- **Next Steps**
- **Q&A**

Background

- **Accordant Health Services is a Disease Management Organization (DMO) that specializes in managing chronic conditions for two primary categories:**
  - **Common (Asthma, CAD, CHF, COPD, and Diabetes)**
  - **Rare (ALS, CF, CIDP, Crohn's, Gaucher, Hemophilia, Lupus, MS, Myasthenia Gravis, Myositis, Parkinson's, RA, Scleroderma, Sickle Cell disease, and Seizure disorders)**
- **Independence Blue Cross (IBC) is a Managed Care Organization (MCO) headquartered in Philadelphia, PA.**
  - **Approximately 3.4 million insured members**
  - **Utilize Accordant's services as a provider of rare disease management**

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Objectives

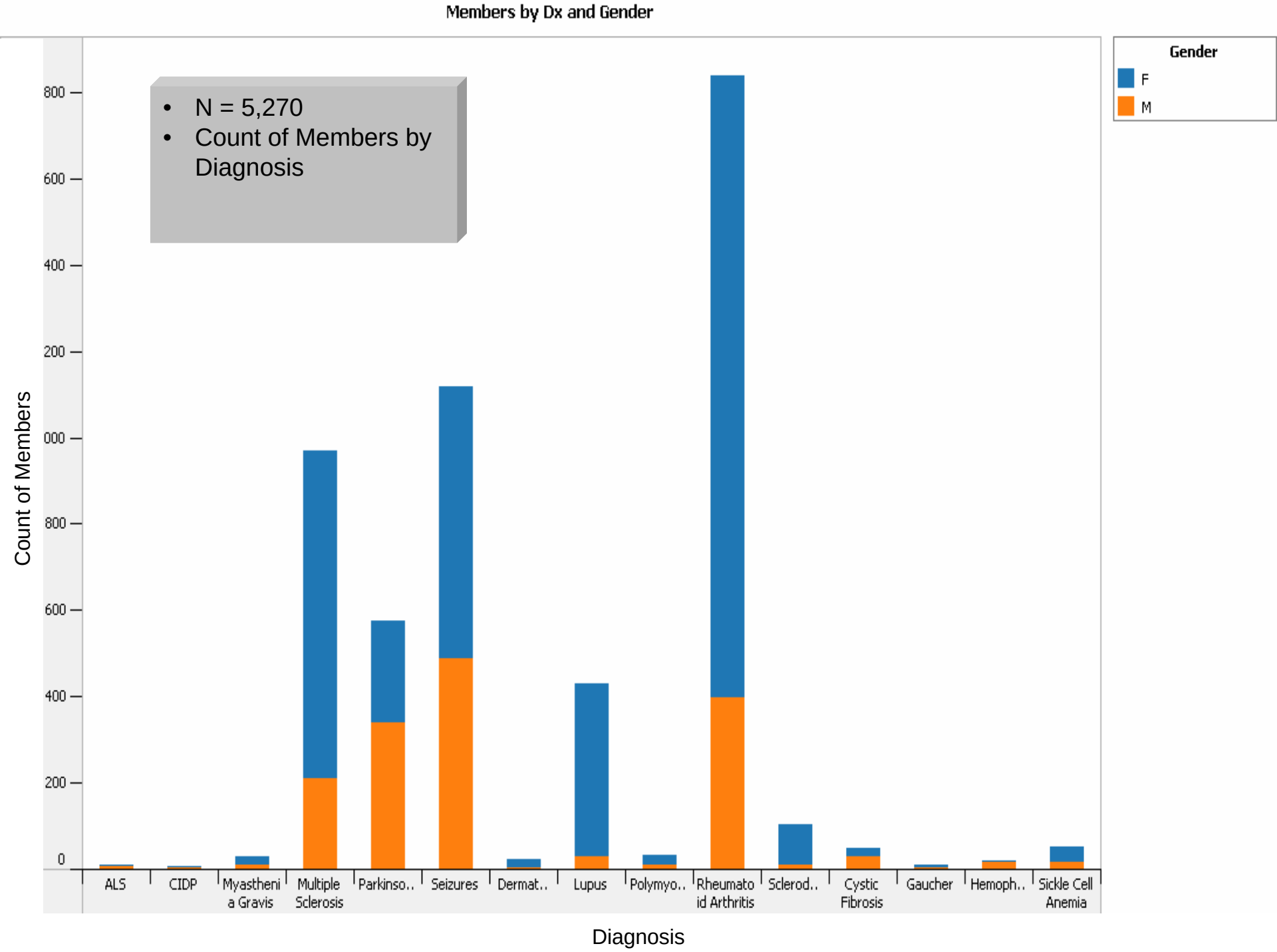
- **Study Symmetry's Episode Treatment Group (ETG) and Episode Risk Group (ERG) predictive modeling tools for analyses of IBC's members and determination of risk relevance to rare, chronic population**
- **Determine statistically relevant risk category groupings**
- **Consider how best to incorporate results for novel approaches to clinical intervention strategies**

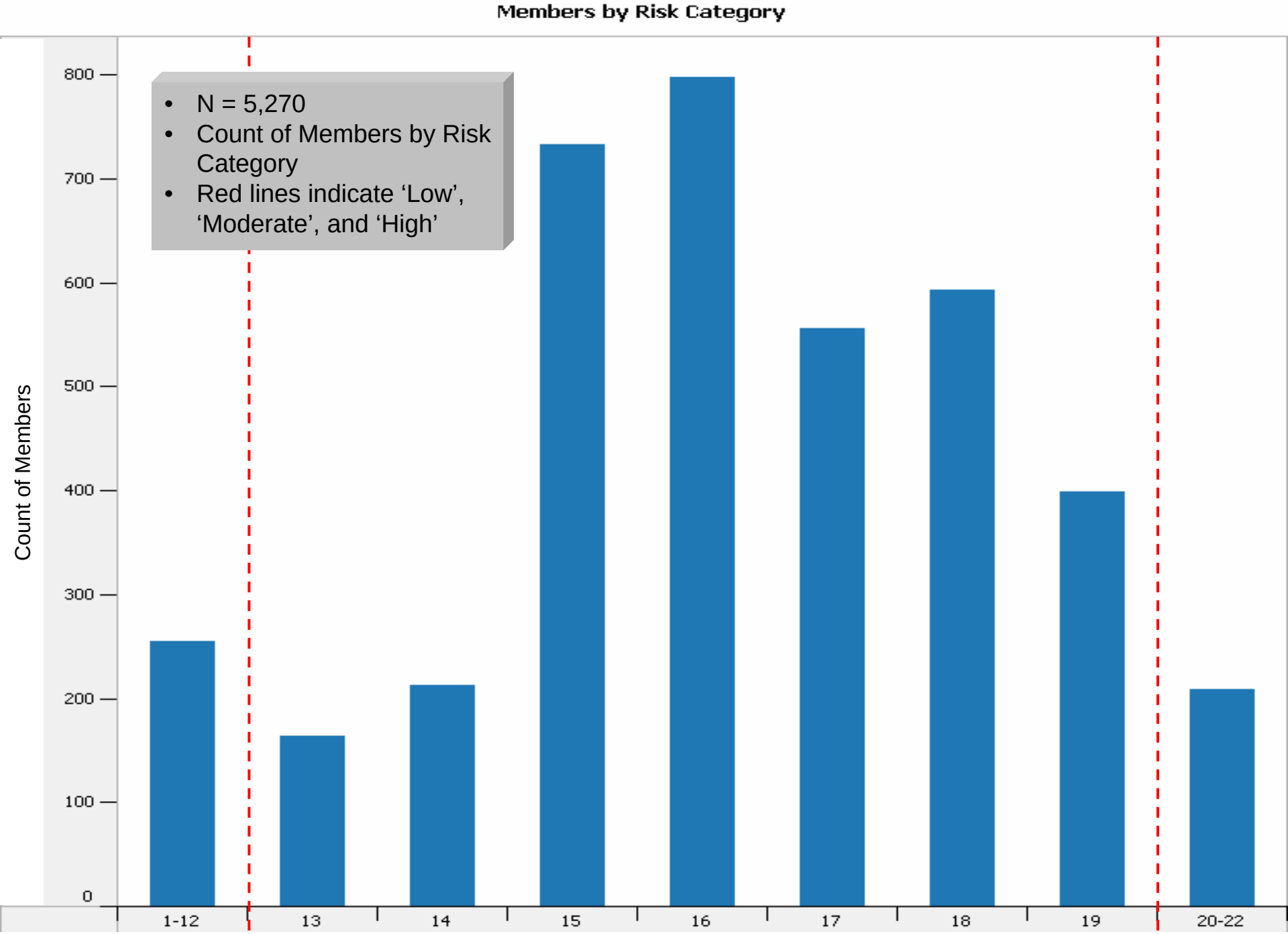
Methodology

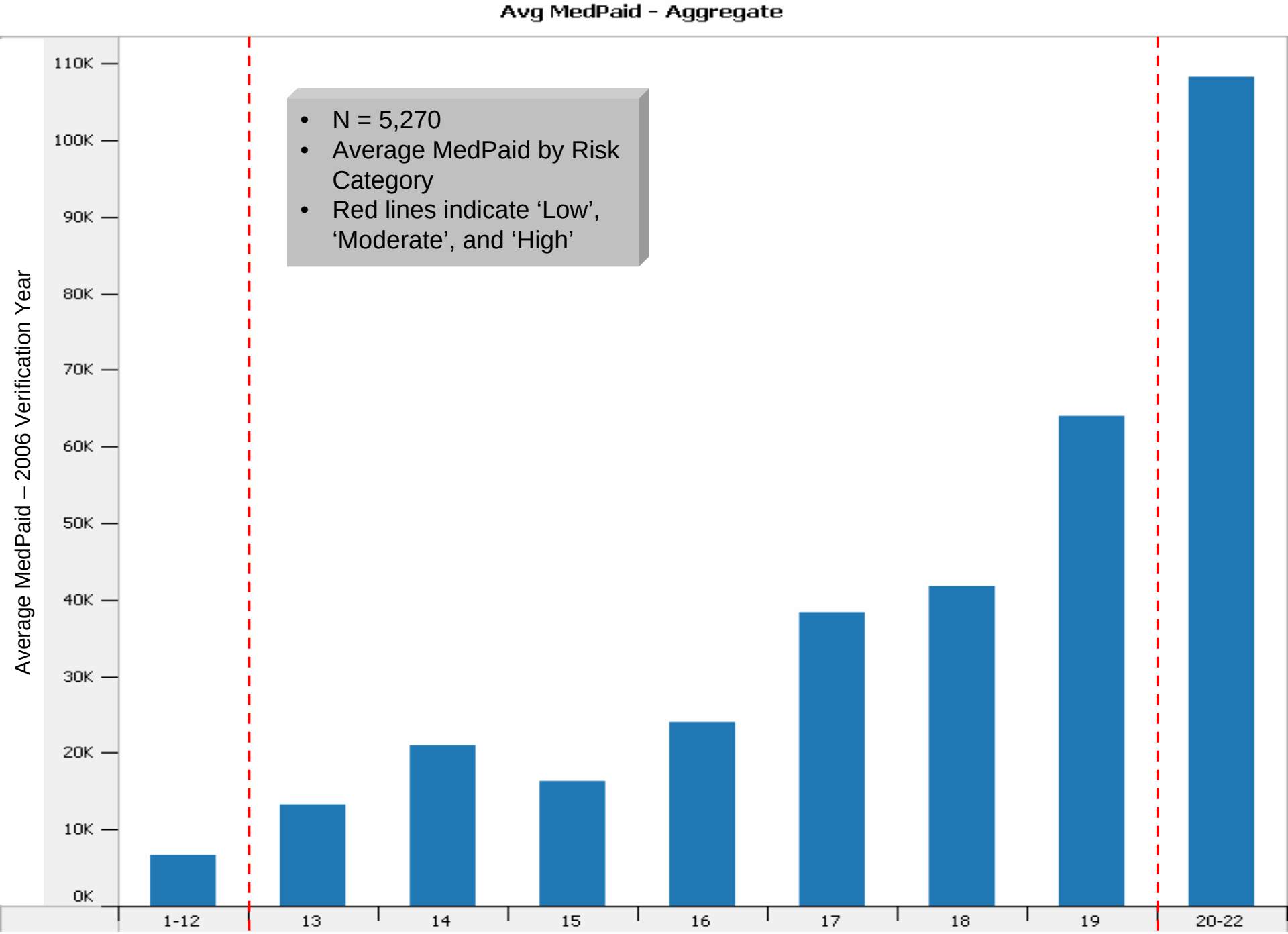
- **Matched member approach: IBC eligible members in Accordant rare program for at least nine months of each study year**
- **Model year: 10/01/05 – 09/30/06. Used to generate prospective risk scores for each member**
- **Verification Year: 10/01/06 – 09/30/07. Used to determine cost and utilization totals to verify Symmetry's risk scores**
- **For all matched members:**
  - **Medical Claims**
  - **Rx Claims**
  - **Diagnosis (Primary Managed Condition)**

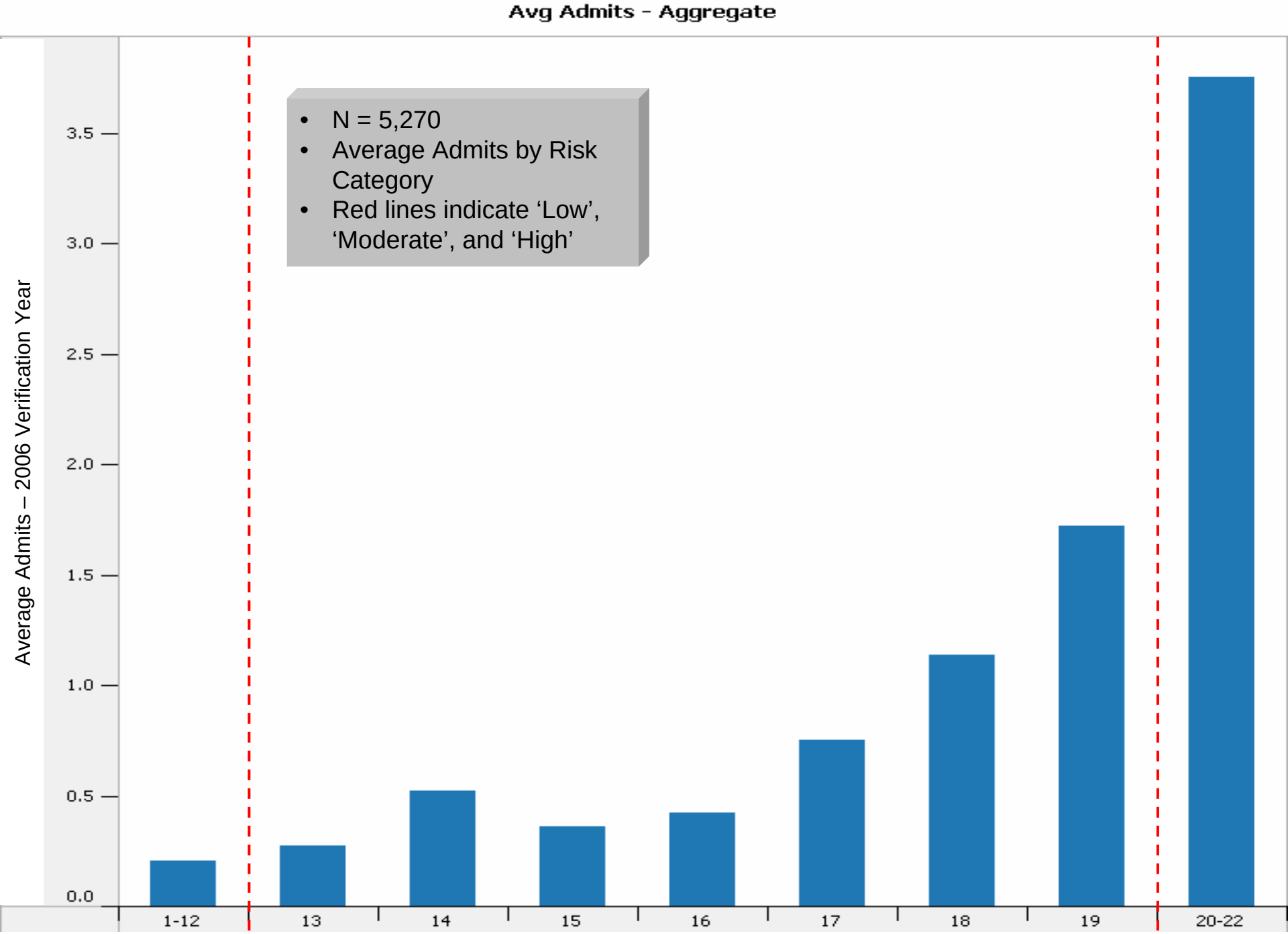
Methodology (cont.)

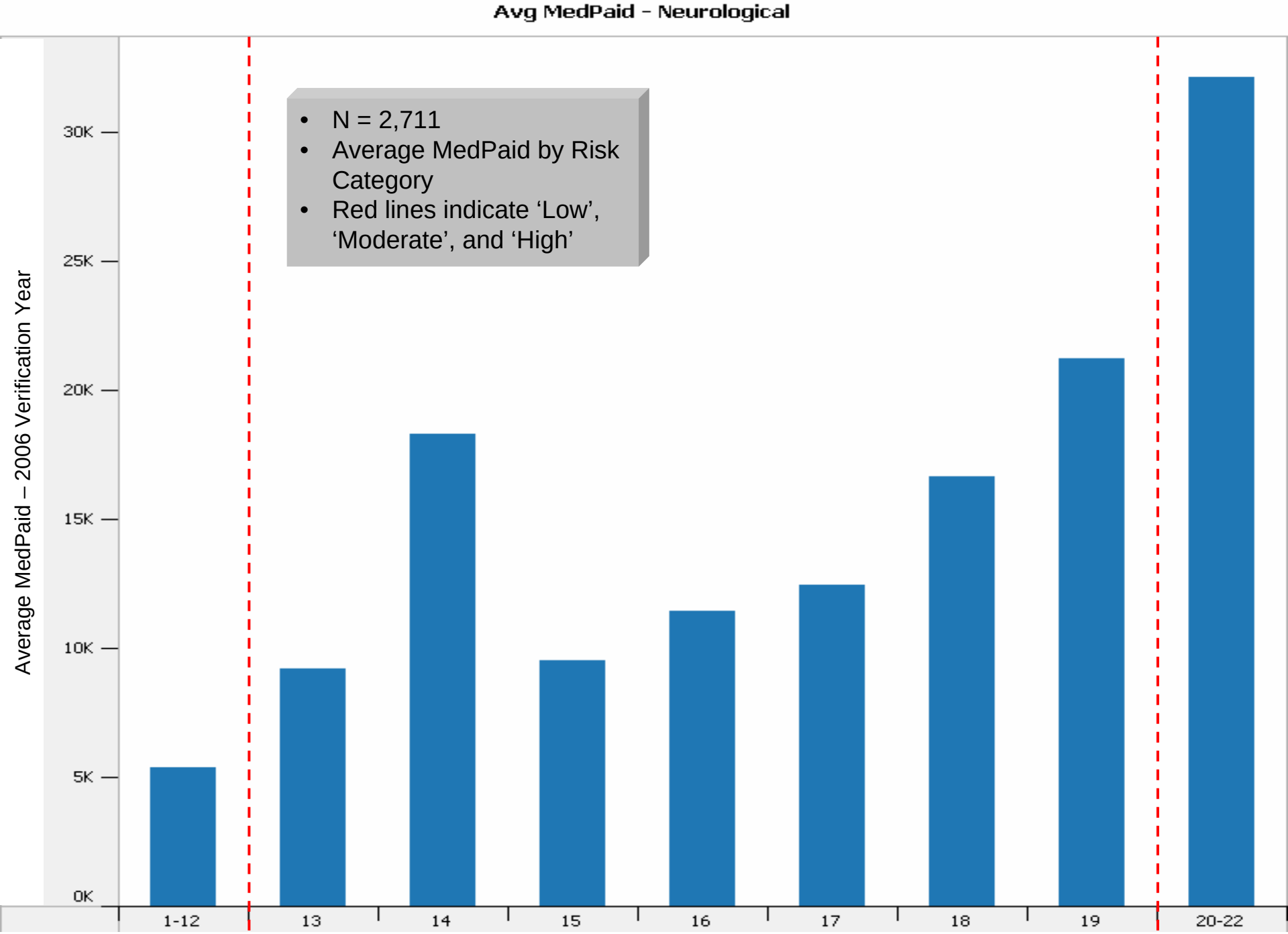
- **Originally considered five diagnosis groups:**
  - **Gastroenterology (n = 0): Crohn's**
  - **Hematology (n = 79): Gaucher, Hemophilia, Sickle Cell disease**
  - **Neurology (n = 2711): ALS, CIDP, Myasthenia Gravis, MS, Parkinson's, and Seizures**
  - **Pulmonary (n = 50): Cystic Fibrosis**
  - **Rheumatology (n = 2430): Lupus, Myositis, RA, and Scleroderma**
- **Crohn's not included in later study stages due to null population (a new program for IBC)**
- **Hematology and pulmonary not included in later study stages due to low 'n' size and higher statistical variability**

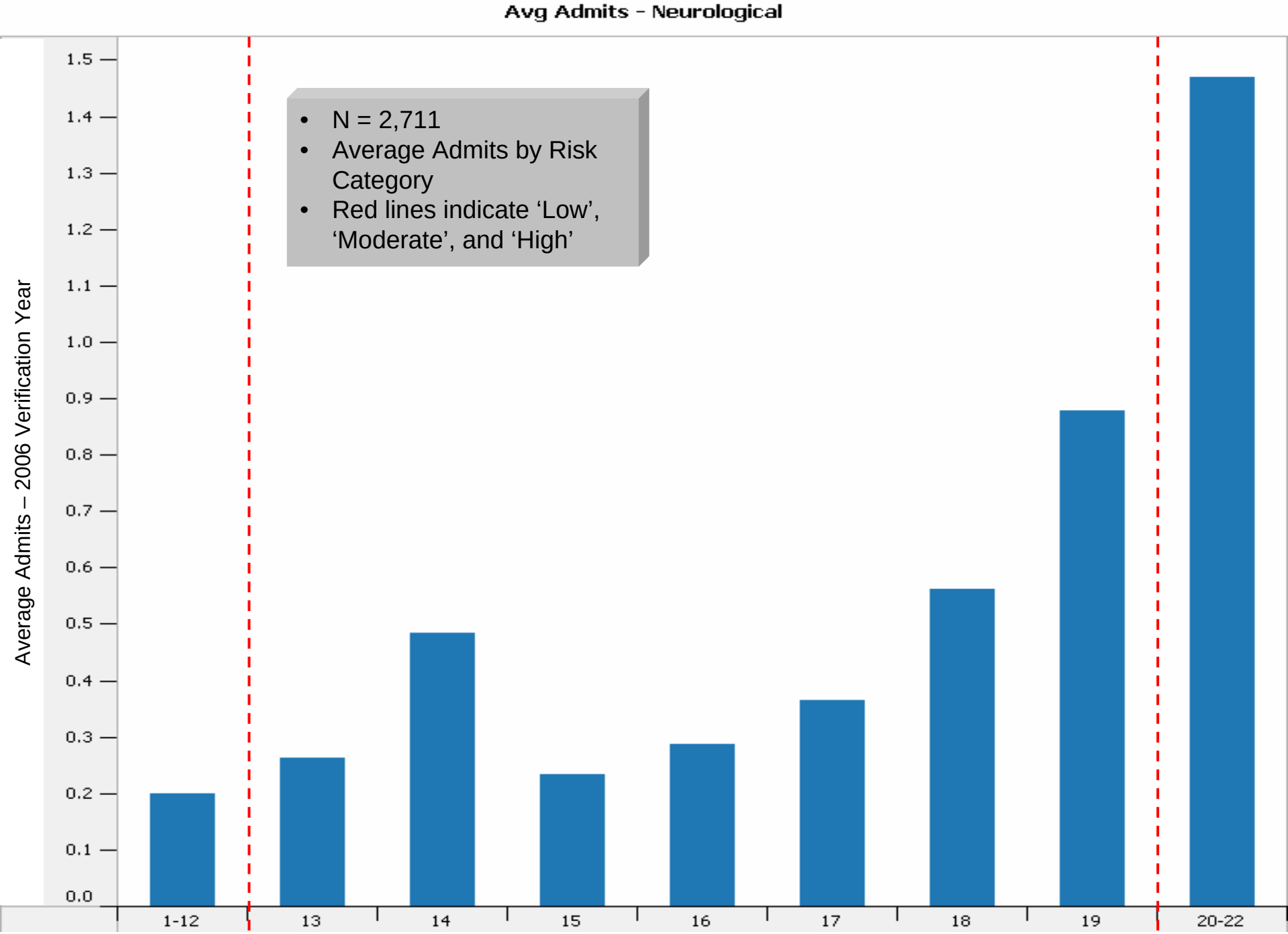

Members by Dx and Gender
Gender
F
M
• N = 5,270
• Count of Members by Diagnosis
Count of Members
800
600
400
200
000
800
600
400
200
0
ALS
CIDP
Myasthenia Gravis
Multiple Sclerosis
Parkinso..
Seizures
Dermat..
Lupus
Polymyo..
Rheumatoid Arthritis
Sclerod..
Cystic Fibrosis
Gaucher
Hemoph..
Sickle Cell Anemia
Diagnosis

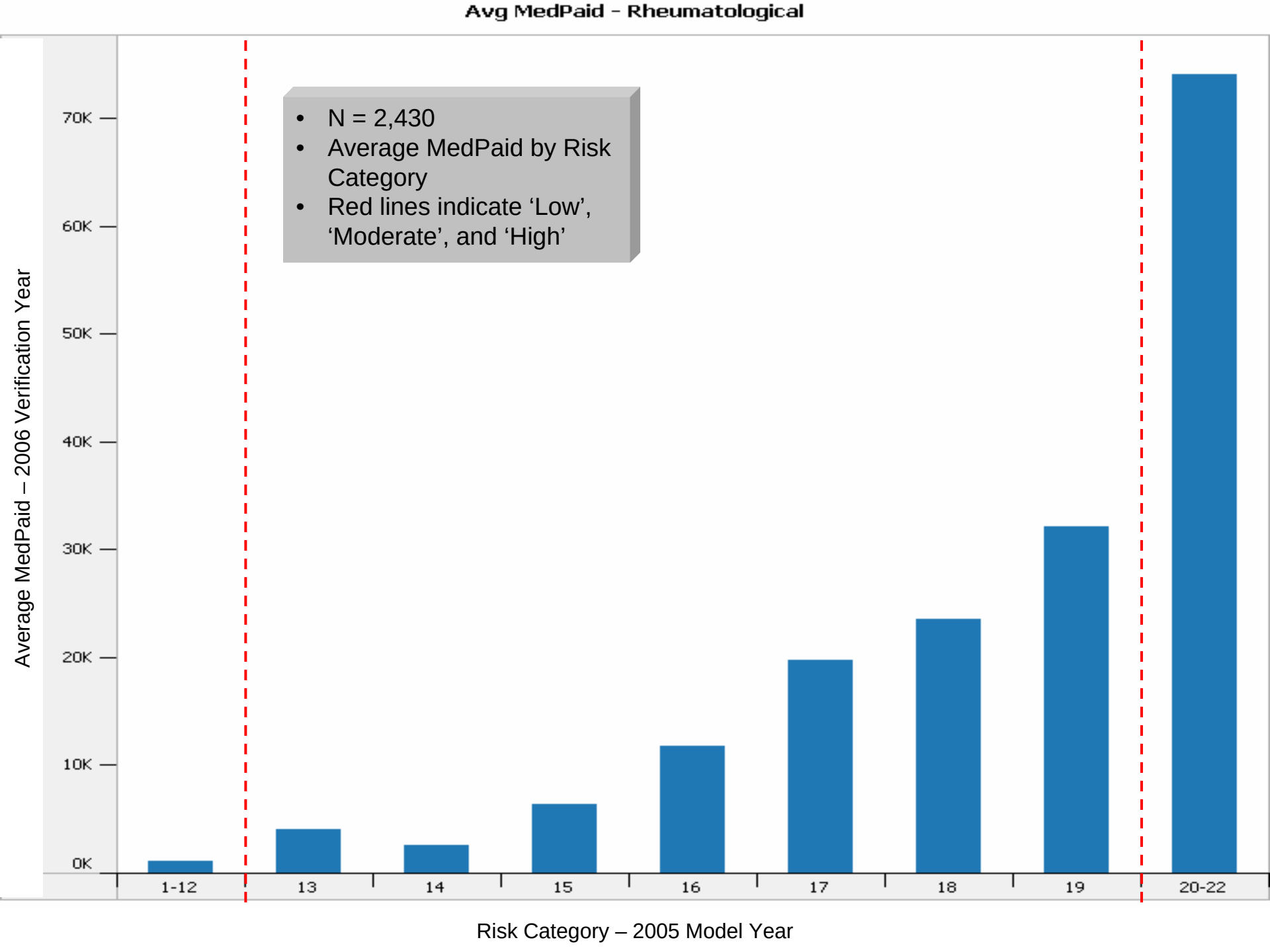

Members by Risk Category
N = 5,270
Count of Members by Risk Category
Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Count of Members
800
700
600
500
400
300
200
100
0
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year

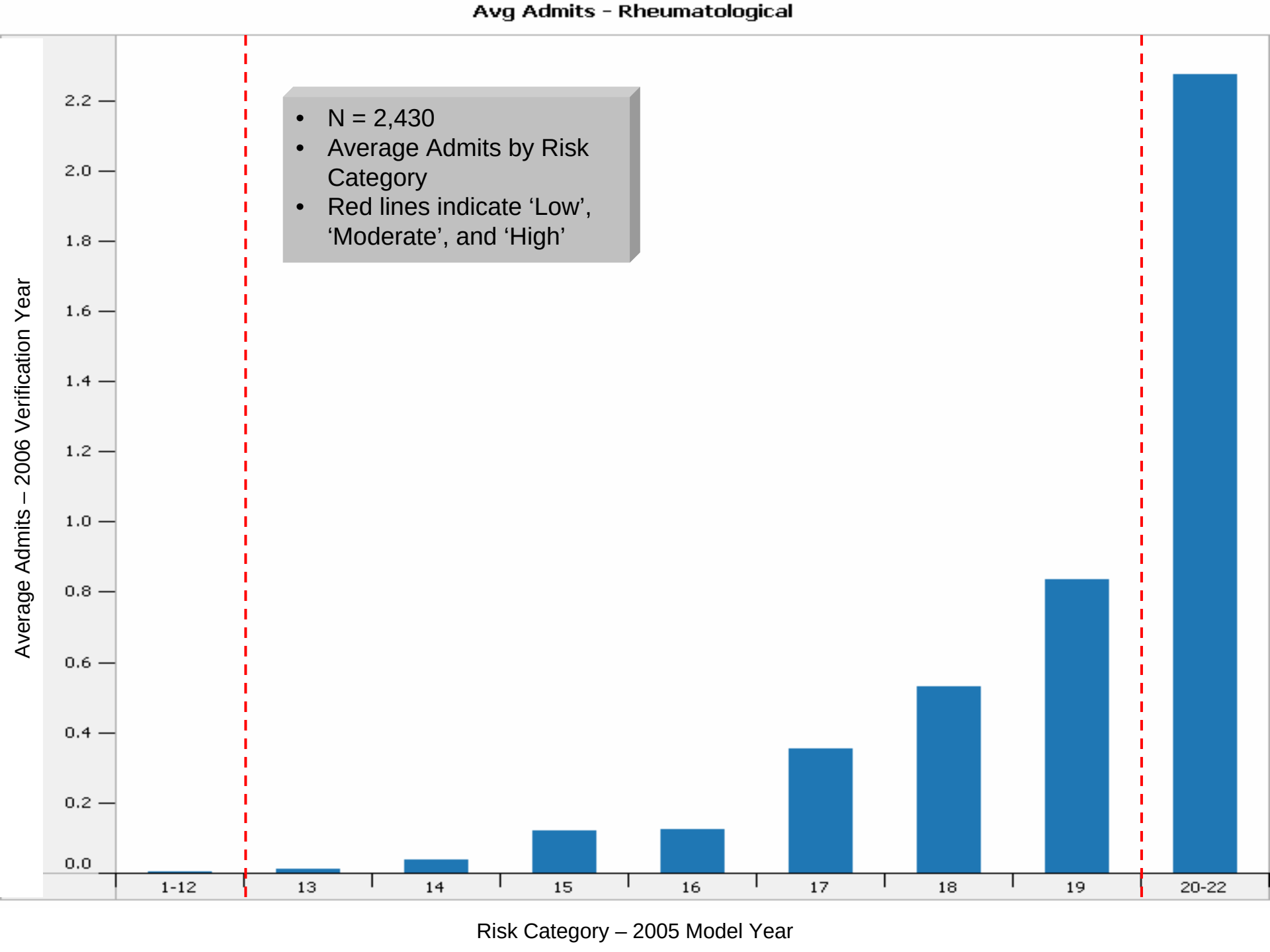

Avg MedPaid - Aggregate
110K
100K
90K
80K
70K
60K
50K
40K
30K
20K
10K
0K
Average MedPaid – 2006 Verification Year
• N = 5,270
• Average MedPaid by Risk Category
• Red lines indicate 'Low', 'Moderate', and 'High'
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year


Avg Admits - Aggregate
N = 5,270
Average Admits by Risk Category
Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Average Admits – 2006 Verification Year
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year


Avg MedPaid - Neurological
N = 2,711
Average MedPaid by Risk Category
Red lines indicate 'Low', 'Moderate', and 'High'
30K
25K
20K
15K
10K
5K
0K
Average MedPaid – 2006 Verification Year
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year


Avg Admits - Neurological
N = 2,711
Average Admits by Risk Category
Red lines indicate 'Low', 'Moderate', and 'High'
Average Admits – 2006 Verification Year
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year


Avg MedPaid - Rheumatological
N = 2,430
Average MedPaid by Risk Category
Red lines indicate 'Low', 'Moderate', and 'High'
Average MedPaid – 2006 Verification Year
70K
60K
50K
40K
30K
20K
10K
0K
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year


Avg Admits - Rheumatological
• N = 2,430
• Average Admits by Risk Category
• Red lines indicate 'Low', 'Moderate', and 'High'
Average Admits – 2006 Verification Year
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1-12
13
14
15
16
17
18
19
20-22
Risk Category – 2005 Model Year

Non-Parametric Analyses
Kruskal-Wallis Tests

- **H_0: The mean ranks of [Medical Paid Amounts, Admits, ER Visits] are equivalent amongst the [Risk Categories].**

- **H_1: The mean ranks of [Medical Paid Amounts, Admits, ER Visits] are significantly different amongst the [Risk Categories].**

Kruskal-Wallis Tests

- **Defined Risk Categories (based on Symmetry's Prospective Risk):**
  - **Lower (Risk < 13)**
  - **Moderate (13 ≥ Risk ≤ 19)**
  - **Higher (Risk > 19)**

	Aggregate (n=5270)	***Neuro (n=2711)***	***Rheuma (n=2430)***
MedPaid	p < 0.05	p < 0.05	p < 0.05
Admits	p < 0.05	p < 0.05	p < 0.05
ER Visits	*p > 0.05*	p < 0.05	*p > 0.05*

Neurology Population

Dx Related	
Description	*ETG / Count*
Minor inflammation of skin & subcutaneous tissue	~678~ / n = 404
Neurological diseases signs & symptoms	~185~ / n = 381
Infections of lower genitourinary system, not sexually transmitted	~574~ / n = 173
Inflammatory diseases of eye, w/o surgery	~206~ / n = 120
Otitis media, w/o surgery	~329~ / n = 107

Non-Dx Related	
Description	*ETG / Count*
Routine exam	~794~ / n = 442
Benign neoplasm of skin	~682~ / n = 212
Isolated signs, symptoms & non-specific diagnoses or conditions	~900~ / n = 201
Fungal skin infections, w/o surgery	~675~ / n = 173
Tonsillitis, adenoiditis or pharyngitis, w/o surgery	~331~ / n = 155

Rheumatology Population

Dx Related	
Description	*ETG / Count*
Minor inflammation of skin & subcutaneous tissue	~678~ / n = 441
Benign neoplasm of skin	~682~ / n = 203
Fungal skin infections, w/o surgery	~675~ / n = 180
Gastroenterology diseases signs & symptoms	~486~ / n = 133
Infections of lower genitourinary system, not sexually transmitted	~574~ / n = 127

Non-Dx Related	
Description	*ETG / Count*
Routine exam	~794~ / n = 350
Isolated signs, symptoms & non-specific diagnoses or conditions	~900~ / n = 165
Acute bronchitis, w/o comorbidity, age 5 & older	~384~ / n = 117
Acute sinusitis	~333~ / n = 104
Otolaryngology diseases signs & symptoms	~354~ / n = 103

Conclusions

- **Symmetry's risk categories were verified against IBC's rare, chronic study population**
- **Prospective risk appears to identify those members with a higher likelihood of increased medical spend and/or utilization**
- **Determined significant difference in groups of risk (Low, Moderate, High)**
- **Established that Symmetry captures both rare condition diagnoses and non-diagnoses related episodes of care**

Next Steps

- **Additional analyses to consider correlations between member's participation status and risk, as well as a member's level of acuity and risk**
- **Determine relevant segmentation for impacting clinical intervention strategies:**
  - **Common traits of risk inclined members**
  - **Exclusionary parameter considerations**
  - **Collaborate with Clinical Operations to develop a segmentation strategy**
  - **Pilot a prospective study to measure segmentation strategy impact**

Questions?

Thank You...

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