Prevalence of Glomerulonephritis in the U.S. Medicare Population

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Introduction

- Glomerulonephritis (GN) is serious disorder that can lead to end-stage renal disease (ESRD), other serious morbidity, or death.
- Little is know about the epidemiology of GN, since no large-scale examination of GN incidence and prevalence is available.
- Using U.S. Medicare data, our objectives were to determine incidence and prevalence of GNs, progression to ESRD, and hospitalization burden.

Methods

- The 20% Medicare sample was used for this retrospective cohort study of adults aged ≥65 years from 2007-2011.
- We divided GNs into those arising from a systemic immunologic disease (e.g., lupus) versus those that were primary in nature (that is, limited to the kidney).
- To identify primary GNs, we used a relatively specific approach requiring 2 ICD-9-CM claims ≥ 30 days apart for a GN, plus an additional claim for a manifestation of renal disease (e.g., hematuria, proteinuria).
- To identify GNs from primary immunologic disorders, we required ≥ 3 claims at least 3 days apart, plus 2 claims for a GN or manifestation of renal disease ≥30 days apart.
- We calculated the prevalence of GNs per 100,000 patients by dividing the number of GN cases by the total number of individuals in the database.
- Incidence rates were calculated by dividing cases of newly diagnosed GNs by total follow-up time, which started from 1 year after enrollment; censoring occurred at the development of ESRD, death, or end of the final year of observation.

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Results

Table 1. Basic demographic and clinical characteristics of the incident GN patients in the 20% Medicare and EGHP samples

	Medicare		EGHP	
	Total (N)	%	Total (N)	%
Incident patients	31,409		5,246	
Age	75.9 ± 7.0		54.6 ± 14.3	
Gender				
Male	15,059	47.9	2,827	53.9
Female	16,350	52.1	2,419	46.1
Race				
White	26,153	83.3		
Black	3,391	10.8		
Asian	554	1.8		
Hispanic	673	2.1		
Other/unknown	638	2.0		
Comorbidity				
Hypertension	27,153	86.5	3,535	67.4
Diabetes	15,593	49.7	2,395	45.7
ASHD	14,265	45.4	903	17.2
CHF	10,828	34.5	630	12.0
CVA	5,496	17.5	290	5.5
PVD	9,060	28.9	518	9.9
Dysrhythmia	11,418	36.4	601	11.5
Other CVD	9,129	29.1	684	13.0
COPD	7,721	24.6	534	10.2
CKD	17,535	55.8	2,312	44.1
GI	2,581	8.2	136	2.6
Liver disease	1,060	3.4	135	2.6
Cancer	5,578	17.8	384	7.3
Anemia	15,514	49.4	1,201	22.9

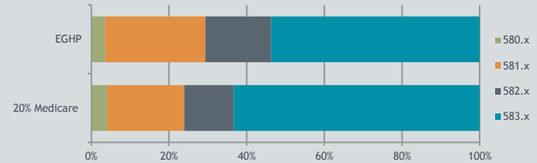
Table 2. Incidence and prevalence of glomerulonephritis, 2007-2011, by GN category (primary vs. secondary)

		GNs from systemic immunologic diseases		Primary GNs	
Prevalence	Total enrollees (n)	Cases	per 100,000 persons	Cases	per 100,000 persons
Period, 2007-2011	5,442,495	49,930	917	16,664	306
end-of-year point, 2007	4,942,171	25,584	518	6034	122
end-of-year point, 2008	4,549,022	30,237	668	8007	177
end-of-year point, 2009	4,216,214	32,131	762	9007	214
end-of-year point, 2010	3,927,205	31,468	801	9409	240
end-of-year point, 2011	3,670,775	26,443	720	8756	239

Incidence	Total patient years	Cases	per 100,000 person-years
Total, 2007-2011	16,443,847 (primary)	22,000	134
	16,458,919 (systemic d/o)	9409	57

Note: A 1-year look-back period was required to assure there were no GN claims in order to determine true incidence; therefore, incidence was not calculated for 2007.

Figure 1. Distribution of ICD-9-CM codes for primary GNs found in the 20% Medicare and EGHP samples



580.x, acute GNs; 581.x, nephrotic syndrome; 582.x, chronic GN; 583.x, nephritis and nephropathy

Table 3. Rates of ESRD and death in incident GN patients, per 1000 patient-years, by category (primary versus secondary)

Etiology of GN	Cases (n)	Cases reaching ESRD (n)	ESRD rate*	Cases reaching death	Death rate
Primary GNs	9409	1245	72.9	2172	127
GNs from systemic immunologic disorders	22,000	1017	24.1	7851	186
General patients	5,442,495	47,159	2.2	1,030,498	48

*Per 1000 patient-years

Table 4. Hospitalization rates in incident patients with GN, per 1000 patient-years, by category (primary versus secondary)

Etiology of GN	Number of GNs	Number of 1st hospitalizations	Total number of hospitalizations	1st hospitalization rate*	Total hospitalization rate*
Primary GNs	9409	7195	24,327	948	1459
GNs from systemic immunologic diseases	22,000	19,112	74,722	1332	1829
General patients	5,442,495	2,819,951	7,178,678	184	333

*Per 1000 patient-years

Table 5. Hospitalization burden, in days, in incident patients with GN, by category (primary versus secondary)

	Total days	Mean ± SD	25th percentile	Median	75th percentile
Primary GNs	145,732	20.3 ± 20.8	6	14	27
GNs from systemic immunologic diseases	481,097	25.2 ± 24.4	9	19	34
General patients	36,642,355	13.0 ± 17.5	3	7	16

Conclusions

- For the first time, incidence and prevalence of GNs have been estimated in the Medicare population.
- Primary GNs have higher incidence, but lower prevalence, than GNs resulting from systemic immunologic diseases.
- However, progression to ESRD in incident patients with a primary GN is roughly three times as common as in patients with a GN from a systemic disease. Both rates of progression are far higher than for the general population, as would be expected.
- Hospitalization burden in GNs is substantial, with patients who have GNs experiencing far more days in the hospital, on average, than patients without GNs.
- Limitations include the facts that (1) detailed, patient-level data from the medical record is not available in this administrative dataset, and (2) this claims-based approach for identifying disease has not validated by medical records review, although it has been used before (Feldman CH et al, Arthritis Rheum 65:753, 2013).