Supplemental Table 1. ICD-9 for principal diagnosis.

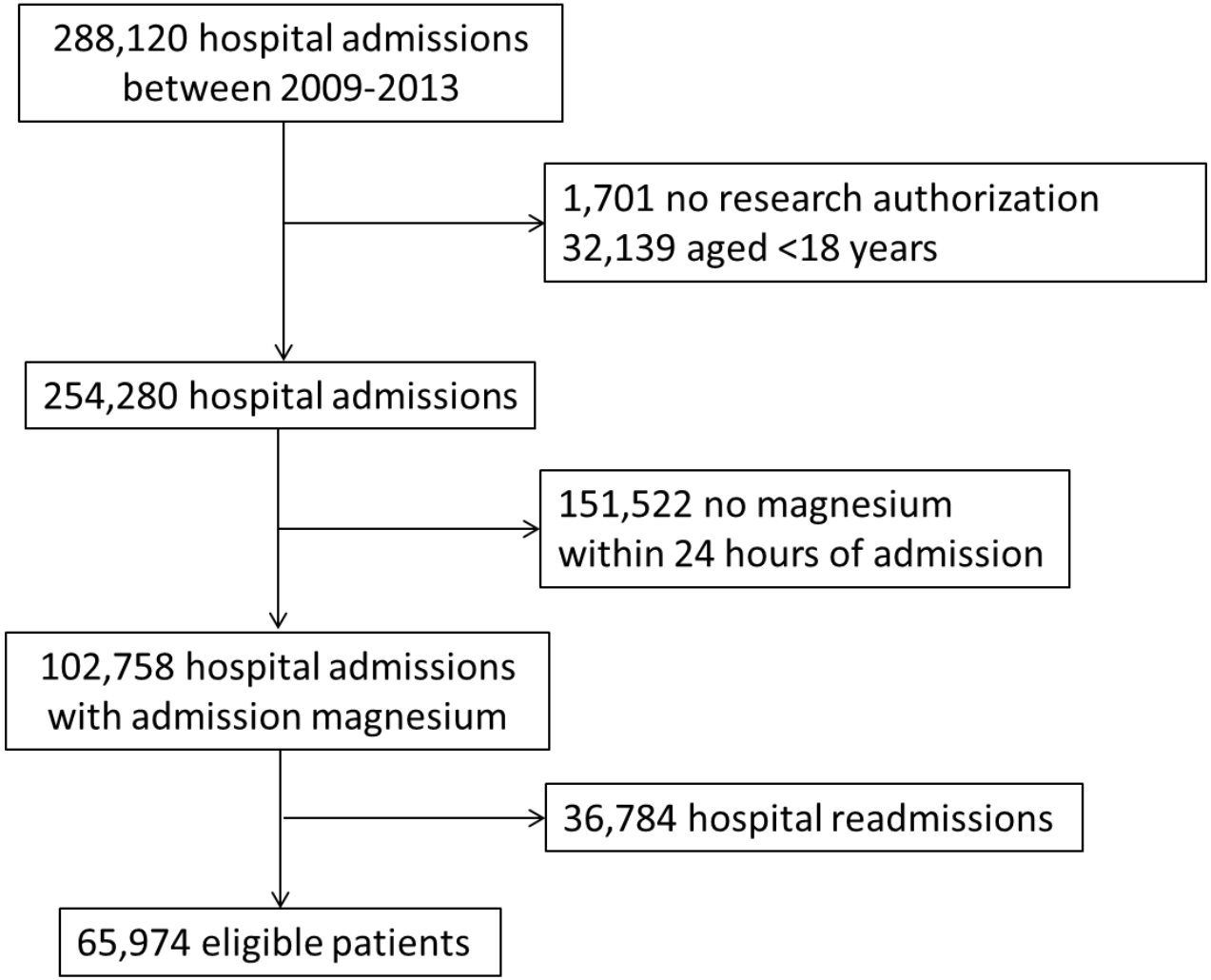
Principal diagnosis group	ICD – 9 code
Cardiovascular disease	390-459
Hematology/oncology	280-289, 140-239
Infectious disease	001-139
Endocrine and metabolic disease	240-279
Respiratory disease	460-519
Gastrointestinal disease	520-579
Injury and poisoning	800-999
Other	290-319,320-359,360-389,580-629,630-679,680-709,710-739,740-759,760-779,780-799,

Supplemental Statistics

Missing data were not imputed; lower counts were reported.

The models were generated sequentially to determine the successive influence of potential confounders on the relationship between admission Mg level (reference group, 1.7-1.89 mg/dL) and outcomes; model 1: unadjusted; model 2: adjusted for age, sex, eGFR and Charlson score; model 3: adjusted for all factors in model 2 and principal diagnosis. The data distribution on LOS was skewed to the shorter LOS; consequently, the data was log transferred before entering the model. A two-tailed *p* value of <.05 was considered significant. Unless specified, JMP statistical software (version 9.0, SAS Institute Inc., Cary, NC) was used for analyses.

Supplemental Figure 1. The study flow chart.



Supplemental Results

We performed statistical analysis comparing the baseline characteristics of patients with and without admission Mg measurement. We found that 41% of the patients without admission Mg were comprised of psychiatric diseases, Ob-GYN problems, and acute symptoms of no clear attributable systemic illness or organ dysfunction, as versus 18% of the patients with admission Mg belong to the same category. Patients without Mg were much younger, 56±19 years, as versus 62±17 years in patients with admission Mg.

Supplemental Table 2. Characteristics in patients with hypermagnesemia (Mg ≥ 2.3 mg/dL) (n=7908).

variables	Serum Mg level at hospital admission (mg/dl)				
	2.3-2.49	2.5-2.69	2.7-2.89	≥2.9	p
N	5,123	1,649	586	550	
Age (year)	64±17	66±16	67±17	62±20	<.001
Male	3,090 (60)	982 (60)	385 (66)	295 (54)	.001
Caucasian	4674 (91)	1500 (91)	521 (89)	475 (86)	.001
Charlson score	2.1±2.5	2.3±2.6	2.5 (2.6	2.3±2.5	<.001
eGFR (ml/min/1.73m2)	66±32	56±33	44±32	42±34	<.001
Alcohol dependence	296 (6)	102 (6)	28 (5)	41 (7)	.25
DM	1074 (21)	426 (26)	152 (26)	158 (29)	<.001
Principal diagnosis					.001
- Cardiovascular	1796 (35)	560 (34)	201 (34)	135 (25)	
- Hematology/Oncology	521 (10)	166 (10)	59 (10)	28 (5)	
- Infectious disease	173 (3)	64 (4)	29 (5)	41 (7)	
- Endocrine/metabolic	180 (4)	74 (4)	34 (6)	36 (7)	
- Respiratory	289 (6)	118 (7)	41 (7)	31 (6)	
- Gastrointestinal	540 (11)	174 (11)	45 (8)	54 (10)	
- Injury/poisoning	653 (13)	174 (11)	51 (9)	36 (7)	
- Other	971 (19)	319 (19)	126 (22)	189 (34)	
Mg supplement prior to admission	542 (11)	178 (11)	48 (8)	74 (13)	.04
Potassium at admission (mEQ/L)	4.4±0.7	4.5±0.8	4.6±0.9	4.7±1.0	<.001
Albumin at admission (g/dL) n=2,272	3.59±0.66	3.52±0.68	3.45±0.68	3.36±0.70	<.001
Ionized Ca (mg/dL) n = 4,208	4.83±0.39	4.78±0.40	4.75±0.58	4.75±0.57	<.001
Phosphorus (mg/dL) n = 4,899	4.00±1.26	4.37±1.51	5.04±2.16	5.52±2.32	<.001

Continuous data are presented as mean±SD; categorical data presented as counts (percentage)

Supplemental Table 3. Outcomes in patients with hypermagnesemia (Mg ≥ 2.3 mg/dL).

3a) Hospital mortality

Outcome	Serum Mg level at hospital admission (mg/dl)			
	2.3-<2.49	2.5-<2.69	2.7-<2.89	≥2.9
Hospital mortality	156 (3.0)	73 (4.4)	52 (8.9)	60 (10.9)
Hospital Mortality, OR (95%CI)				
- Model 1: unadjusted	1.75 (1.43-2.14)	2.58 (1.97-3.34)	5.42 (3.94-7.34)	6.82 (5.04-9.10)
- Model 2: age, sex, eGFR and Charlson score	1.45 (1.18-1.79)	1.85 (1.40-2.43)	3.46 (2.47-4.77)	4.53 (3.27-6.20)
- Model 3: Model 2 and principal diagnosis	1.42 (1.15-1.76)	1.82 (1.37-2.40)	3.50 (2.48-4.86)	4.71 (3.37-6.52)
- Model 4: model 3 and phosphate	1.49 (1.16-1.90)	1.88 (1.36-2.56)	2.42 (1.58-3.60)	3.36 (2.27-4.91)

3b) Hospital length of stay

Outcome	Serum Mg level at hospital admission (mg/dl)			
	2.3-<2.49	2.5-<2.69	2.7-<2.89	≥2.9
LOS, day, median (IQR)	4 (2-7)	5 (3-8)	6 (3-10)	6 (3-11)
LOS, relative prolongation (95% CI)				
- Model 1: unadjusted	1.02 (1.00-1.05)	1.20 (1.15-1.26)	1.37 (1.28-1.48)	1.43 (1.32-1.54)
- Model 2: age, sex, eGFR and Charlson score	1.00 (0.97-1.03)	1.15 (1.10-1.21)	1.29 (1.19-1.39)	1.33 (1.23-1.44)
- Model 3: Model 2 and principal diagnosis	1.02 (0.99-1.05)	1.18 (1.13-1.24)	1.33 (1.24-1.43)	1.40 (1.30-1.52)
- Model 4: model 3 and phosphate	1.01 (0.97-1.05)	1.14 (1.08-1.21)	1.29 (1.18-1.41)	1.25 (1.14-1.37)

3c) Discharge disposition[+]

Outcome	Serum Mg level at hospital admission (mg/dl)			
	2.3-2.49	2.5-2.69	2.7-2.89	≥2.9
Hospital survivor	4,967	1,576	534	490
Discharge disposition				
- Home	3,695 (74)	1,040 (66)	349 (65)	303 (62)
- Home Health Care	352 (7)	157 (10)	63 (12)	56 (11)
- Hospital rehab	102 (2)	33 (2)	6 (1)	10 (2)
- Skilled Nursing facility	772 (16)	323 (20)	110 (21)	117 (24)
- Swing bed	46 (1)	23 (1)	6 (1)	4 (1)
Discharge to a care facility, OR (95% CI)				
- Model 1: unadjusted	1.20 (1.10-1.30)	1.67 (1.47-1.89)	1.56 (1.27-1.92)	1.93 (1.56-2.36)
- Model 2: age, sex, GFR and Charlson score	1.10 (1.01-1.20)	1.47 (1.28-1.68)	1.39 (1.11-1.73)	2.09 (1.65-2.63)
- Model 3: Model 2 and principal diagnosis	1.10 (1.01-1.21)	1.50 (1.31-1.72)	1.44 (1.15-1.81)	2.07 (1.63-2.62)
- Model 4: model 3 and phosphate	1.16 (1.03-1.30)	1.55 (1.30-1.84)	1.57 (1.20-2.05)	1.95 (1.47-2.58)

Mg 1.7-1.89 mg/dL as a reference group

Supplemental Table 4. Outcomes in cardiovascular patients (n=16647).

4a) Hospital mortality

Outcome	Serum Mg level at hospital admission (mg/dl)					
	<1.5	1.5-1.69	1.7-1.89	1.9-2.09	2.1-2.29	≥2.3
n	569	1,366	2,984	4,758	4,278	2,692
Hospital mortality	16 (2.8)	47 (3.4)	72 (2.4)	101 (2.1)	93 (2.2)	98 (3.6)
Hospital mortality, OR (95% CI)						
- Model 1: unadjusted	1.33 (0.75-2.21)	1.64 (1.15-2.32)	1.14 (0.84-1.54)	1 (ref)	1.02 (0.77-1.36)	1.74 (1.31-2.31)
- Model 2: age, sex, eGFR and Charlson score	1.17 (0.66-1.95)*	1.60 (1.12-2.27)	1.13 (0.83-1.54)	1 (ref)	0.99 (0.74-1.31)	1.40 (1.05-1.87)

*Note: The patient number in those with Mg <1.5 mg/dL was small and OR for death was 1.17, but the 95% CI spanned a wide range, 0.66-1.95, a result likely due to the limited patient number.

4b) Hospital length of stay

Outcome	Serum Mg level at hospital admission (mg/dl)					
	<1.5	1.5-1.69	1.7-1.89	1.9-2.09	2.1-2.29	≥2.3
LOS, day, median (IQR)	5 (3-8)	4 (3-7)	4 (2-6)	4 (2-6)	4 (2-6)	5 (3-7)
LOS, relative prolongation (95% CI)						
- Model 1: unadjusted	1.29 (1.19-1.39)	1.17 (1.11-1.23)	1.03 (0.993-1.07)	1 (ref)	1.03 (0.99-1.06)	1.23 (1.18-1.28)
- Model 2: age, sex, eGFR and Charlson score	1.24 (1.16-1.34)	1.15 (1.10-1.21)	1.03 (0.995-1.07)	1 (ref)	1.02 (0.98-1.05)	1.16 (1.12-1.21)