

## Supplemental materials for

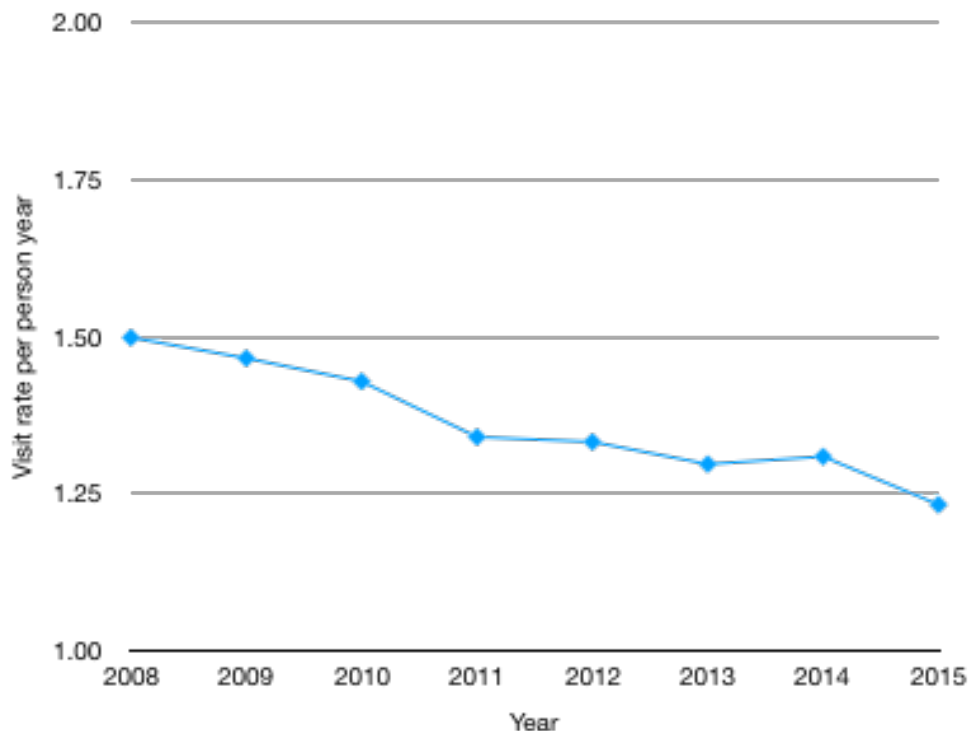
Rao A, Shi Z, Ray KN, Mehrotra A, Ganguli I. National trends in primary care visit use and practice capabilities, 2008-2015. *Ann Fam Med*. 2019;17(6):538-544.

### Supplemental Appendixes

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I. Supplemental Figure 1: National trends in primary care visits per capita, 2008 - 2015



National trends in primary care visits per capita, 2008 – 2015. Years presented as three-year rolling averages. Visit rate per person year calculated by dividing NAMCS visits by CPS population estimates per total population. 8 year trend calculated for by multiplying per year regression coefficient across study period.

## II. Supplemental Table 1

### A. Primary Visit Diagnosis

NAMCS codes the primary visit diagnosis for a given visit with a single ICD-9 (2007-2015) or ICD-10 (2016) code. We used the primary visit diagnosis and main reason for visit variables to examine the following issues addressed by primary care physicians (PCP) (Supplemental Table 1). For visits to discuss lab results, we used the National Center for Health Statistics (NCHS) “reason for visit” (RFV) coding scheme as there was no equivalent ICD-9/ICD-10 code.

Supplemental Table 1: ICD-9 and ICD-10 Codes for Primary Visit Diagnoses

<b>Condition</b>	<b>ICD-9 code</b>	<b>ICD-10 code</b>
<b>General Medical Exam</b>	V700	Z000
<b>ACUTE ISSUES</b>		
<b>Allergic rhinitis</b>		
	47702, 47789	J3002, J305, J3081 J3089, J309
<b>Back pain</b>		
Intervertebral disc disorders	7220, 7221,7222, 7223, 7224,7225, 7226, 7227,7228, 7229, 7230, 7231, 7232, 7233, 7234, 7235, 7236, 7237, 7238, 7239, 7240, 7241, 7242, 7243, 7244, 7245, 7246, 7247, 7248, 7249	M4327, M436, M4640, M4647, M4800, M503, M519, M530, M531, M533, M539, M542, M545, M546, M549, M5020, M5104, M5105, M5126, M5127, M5134, M5135, M5144, M5145, M5186, M5382, M5402, M5408, M5412, M5413, M5414, M5415, M5430, M5489, M6788, M961
Other lesions	7385, 7391, 7392, 7393, 7394	M9901, M9902, M9903, M9904, M9983, M9984
Sprains and strains	8050, 8460, 8461, 8462, 8463, 8468, 8469, 8470, 8471, 8472, 8473, 8474, 8479	S13.4XXA, S13.8XXA, S23.3XXA, S23.8XXA, S23.9XXA, S33.6XXA, S33.8XXA , S33.9XXA,
<b>Headache</b>		
Drug induced	3393	G4441
Cluster	33900, 33901, 33902, 33903, 33904, 33905, 33909	G44009, G44229, G44019, G44029, G44039, G44049, G44059, G44099
Tension	30781, 33910, 33911,33912	G44209, G44219, G44221
Post traumatic	33920, 33921, 33922	G44309, G44319, G44329
Complicated syndromes	33941, 33942, 33943, 33944	G4451, G4452, G4453, G4459
Other headache	33989	G4489
Migraine variants	3460,34601,34602,34603, 34610,34611 34612, 34613,34620, 34621, 34630,34631,34632, 34633,	G43001,G43009,G43011, G43019, G43101, G43109,G43111,G43119, G43401,G43409,G43411,G43419,G43501,G43509, G43511,G43519, G43601,G43609,G43611,

	34640, 34641, 34642, 34643, 34650, 34651, 34652, 34653, 34660, 34661, 34662, 34663, 34670, 34671, 34672, 34673, 34680, 34690, 34691, 34693	G43619,G43701,G43709,G43711,G43719,G43809, G43819, G43821, G43829, G43831, G43839, G43909, G43911, G43919, G43991
<b>Joint pain</b>		
	71530, 71531,71532, 71533, 71534,71535, 71536, 71537, 71538,71590, 71591,71592, 71593, 71594, 71595, 71596, 71597,71598, 71940,71941, 71942,71943, 71944, 71945, 71946, 71947,71948, 71949, 72610, 72611, 72612, 72613, 72619, 72620, 72630, 72631, 72632, 72633, 72639, 72640, 72650, 72660, 72661, 72662, 72663, 72664, 72665, 72669, 72670,72671, 72672,72673, 72679, 72680, 72690, 72691, 72700, 72701, 72702, 72703, 72704, 72705, 72706, 72709, 72710, 72720, 72730, 72740,72741,72743, 72749, 72750, 72751, 72759,72760,72761,72762, 72763, 72764, 72765, 72766, 72767, 72768, 72769, 72781, 72782, 72783, 72789, 72882, 72885, 72910, 72920	M159, M169, M179,M189,M778, M779, M1990, M2010, M2550, M25519, M25529, M25539, M25559, M25569, M25579,M2570, M25729, M5410, M6020, M609, M6240, M6283,M6520, M6530, M654, M6580, M65849, M65879, M659, M6610, M6618, M66239, M66249, M66259, M66269, M66339, M66349, M66369, M66829, M66879,M6688, M669, M6700, M6740, M6750, M6780, M7010, M7020, M7030, M7040, M7050, M7060, M7070, M7120, M7130, M7140, M7150, M7520, M7530, M7540, M7580, M7640, M7650, M7660, M7700, M7710, M7720, M7730, M7740, M7750, M79643, M79646
<b>Upper Respiratory Infection</b>		
Bronchitis	4660, 4661, 46611, 46619, 490	J209, J210, J218, J40
Conjunctivitis	770, 771, 772, 773, 774, 778, 779, 7798, 7799,1301, 37040, 37044, 37200, 37201, 37202, 37203, 37204, 37205, 37206, 37210, 37211, 37212, 37213, 37214, 37215, 37220, 37221, 37222, 37230, 37231, 37233, 37234, 37239	A740, B300, B302, B301, B303, B308, B309, B5809, H16209, H16299, H1033, H10239, H10019, H10029, H10229, H1013, H10219, H10409, H10429, H10439, H1044, H1045, H10509, H10529, H10539, H109, H10819, H1089
Otitis externa and impacted cerumen	38010, 38011, 38012, 38013, 38015, 38016, 38021, 38022, 38023, 3804	H6000, H6010, H6193, H60339, H6240, H628X1, H6040, H60509, H60519, H6060, H608XI, H6123
Otitis media	38100, 38101, 38102, 38103,	H65199, H6500, H65119, H6520, H6530, H65499,

and eustachian tube diagnoses	38104, 38105, 38106, 38110, 38119, 38120, 38129, 3813, 3814, 38150, 38151, 38152, 38160, 38161, 38162, 38163, 3817, 38181, 38189, 3819, 38200, 38201, 38202, 3821, 3822, 3823, 3824, 3829	H6590, H68009, H68019, H68029, H68109, H68119, H68129, H68139, H6900, H6980, H6990, H66009, H66019, H679, H6613, H6623, H663X9, H6640, H6690
Pharyngitis	340, 341, 462, 463, 7841	A389, J020, J029, J0300, J0390, R070
Sinusitis	460, 4610, 4611	J00, J0100, J0110
<b>UTI</b>		
	5950, 5951, 5952, 5953, 5954, 59581, 59582, 59589, 5959, 5970, 59780, 59781, 59789, 5990, 7881	N3000, N3001, N3010, N3011, N3020, N3021, N3030, N3031, N3040, N3041, N3080, N3081, N3090, N3091, N340, N341, N342, N343, N390,
<b>CHRONIC CONDITIONS</b>		
<b>Type II diabetes mellitus</b>		
With unspecified complication	2492, 2494, 24980, 2491, 24991, 25051, 2504, 25012, 25090, 25010	E0801, E08618, E0865, E088, E0901, E116, E118
Without mention of complication	24900, 25000, 25003, 25002, 25001, 25011, 25012, 25013	E109, E1010, E119
With renal manifestations	25040, 25042, 25043, 25041	E1021, E1029, E1121, E1129
With neurological manifestations	25051, 25060, 25061, 25063, 25062	E10311, E10319, E1040, E1140, E1165
With ophthalmic manifestations	36201, 36202, 36203, 36204, 36205, 36206, 36207, 36641, 3572	E0836, E0842, E0936, E0942, E11311, E11319, E11359, E11329, E11339, E11349
<b>HTN</b>		
Malignant HTN	4010	I110
Benign HTN	4011	I10
Unspecified HTN	4019	I119
HTN with other chronic condition	40200, 40201, 40201, 40210, 40211, 40290, 40291, 40300, 40310, 40311, 40390, 40400,	I120, I129, I130, I1310, I1311, I132, I150, I158

	40401, 40402, 40403, 40409, 40410, 40490, 40501, 40511, 40591	
<b>Mental Illness</b>		
Generalized Anxiety Disorder	3002, 3003, 3004	F42
Other anxiety disorder	29383, 29384, 29389	F061, F063, F064
MDD	29621, 29622, 29623, 29624, 29625, 29631, 29632, 29633, 29634, 29635, 29636, 30112, 311, 3090	F320, F321, F322, F323, F324, F329, F330, F331, F332, F3341, F3342, F341, F4321
Bipolar disorder	29641, 29642, 29643, 29644, 29645, 29646, 29651, 29652, 29653, 29654, 29655, 29656, 29661, 29662, 29663, 29664, 29665, 29666, 2967	F3111, F3112, F3113, F312, F3131, F3132, F314, F315, F3161, F3162, F3163, F3164, F3173, F3174, F3175, F3176, F3177, F3178, F319
Unspecified mood disorder	29690, 29699	F348, F53
Panic disorder	30000, 30001, 30002, 30009	F410, F411, F418
Alcohol dependence	30301, 30501	F1010, F10229
Opioid dependence	30400, 30403, 30413, 30442, 30550, 30550, 30553	F1110, F1120, F1121, F1321
Other drug dependence	30420, 30440, 30453, 30461, 30533, 30541, 30542	F1310, F1420, F1520, F1610, F1621, F1920
Acute stress	3083	F430
PTSD	30981	F4310

Supplemental Table 2: NCHS Reason for Visit Codes for Visits to Discuss Lab Results

<b>RFV Code</b>	<b>Main Reason for Visit</b>
61000	Glucose test results
61060	HIV test results
61100	Blood test results
62000	Urine test results
63000	Cytology results
64000	Radiological findings
65000	Other results

## B. Procedure Classification

From 2007-2016, NAMCS consistently included up to four procedures per visit using ICD-9 (2007-2015) or ICD-10 (2016) procedure codes. We focused on the eight most commonly administered procedures within NAMCS PCP visits: ultrasound, wound care, skin excision, infusion, biopsy, irrigation, joint care, and cerumen removal.

Supplemental Table 3: ICD-9 and ICD-10 Procedure Codes for Procedures Commonly Administered During PCP visits

<b>Procedure</b>	<b>ICD-9 code</b>	<b>ICD-10 code</b>
Ultrasound	88.71	BW40ZZZ
	88.72	BT10ZZZ
	88.73	B040ZZZ
	88.74	BH4CZZZ
	88.75	BW40ZZZ
	88.76	B246ZZZ
	88.77	
	88.78	
Excision or destruction of lesion or tissue of skin and subcutaneous tissue	88.79	
	8620	0HCEXZZ
	8621	0HBEXZZ
	8622	0HQEXZZ
	8623	0HE7XZX
	8624	0PC5EZZ
	8625	3E0EX4Z
8627		
8628		
Arthrocentesis	8191	0R9030Z
Injection of therapeutic substance into joint or ligament	8192	3E0U3GC
		3E0U33Z



		3E0U3EC
Immobilization, pressure, and attention to wound	935- 9456	F08G5ZZ
Biopsy	8321 8611	L98.8
Irrigation of eye, ear, or nasal passage	9651 9652 9653	3E1B78Z 0991X0Z
Infusion of therapeutic substance	9920 9921 9922 9923 9925 9929	3E033GC 3E063KZ 3E09XGC 3E0DX3Z 3E0DXGC 3E0F7GC 3E0333Z
Cerumen removal	9549	F09Z3XZ

**III. Supplemental Table 4: Percentage of Primary Care Physician (PCP) Visits including a Given Preventive Service, 2008-2015<sup>a</sup>**

	<b>2008<sup>b</sup></b> n= 6,615 <sup>c</sup> n=336,822,936 <sup>d</sup> %	<b>2015<sup>b</sup></b> n= 6,555 <sup>c</sup> n=298,516,838 <sup>d</sup> %	<b>8 year Trend, % of visits<sup>e</sup></b> (95%CI)
Cholesterol	19.1	23.5	3.5 (-1.3, 8.3)
Hemoglobin A1c	6.9	14.7	6.9 (4.7, 9.2)
Mammogram	2.7	3.5	0.70 (-0.67, 2.1)
Depression screening	1.9	7.7	5.4 (2.6, 8.3)
Colonoscopy (referral)	1.7	3.3	1.8 (0.31, 3.2)
Bone density test	0.91	1.4	0.25 (-0.19, 0.69)
Vaccine	0.59	2.8	2.5 (1.7, 3.3)
Chlamydia test	0.37	0.60	0.21 (0.13, 0.28)
Papanicolaou smear	0.28	0.23	-0.06 (-0.17, 0.04)

<sup>a</sup>Includes the nine preventive services consistently captured in NAMCS 2007-2016.

<sup>b</sup>Presented as three-year rolling averages.

<sup>c</sup>Unweighted number of NAMCS visits.

<sup>d</sup>Weighted number of NAMCS visits.

<sup>e</sup>8 year trend calculated for each subgroup by multiplying per year regression coefficient across study period.

**IV. Supplemental Table 5: Percentage of PCP Visits including a Given Procedure, 2008-2015<sup>a</sup>**

	<b>2008<sup>b</sup></b> n=6,615 <sup>c</sup> n=336,822,936 <sup>d</sup> %	<b>2015<sup>b</sup></b> n=6,555 <sup>c</sup> n=298,516,838 <sup>d</sup> %	<b>8 year Trend Effect<sup>e</sup></b> (95%CI)
Ultrasound	1.6	3.2	1.4 (0.4, 2.3)
Wound care	1.3	1.1	-0.38 (-0.64, -0.12)
Skin excision & drainage	1.2	0.57	-0.80 (-1.7, 0.1)
Infusion therapeutic substance <sup>f</sup>	0.62	1.51	0.9 (0.45, 1.4)
Biopsy	0.42	0.51	0.16 (-0.23, 0.56)
Irrigation <sup>g</sup>	0.28	0.33	0.09 (0.02, 0.17)
Joint <sup>h</sup>	0.25	0.85	0.39 (-0.12, 0.91)
Cerumen removal	0.10	0.30	0.19 (0.12, 0.3)

<sup>a</sup>Eight most common procedures administered during PCP visits. See Supplemental Methods for ICD-9/ICD-10 procedure codes.

<sup>b</sup>Presented as three-year rolling averages.

<sup>c</sup>Unweighted number of NAMCS visits.

<sup>d</sup>Weighted number of NAMCS visits.

<sup>e</sup>8 year trend calculated for each subgroup by multiplying per year regression coefficient across study period.

<sup>f</sup>Injection or infusion of therapeutic or prophylactic substance: hormone, steroid, platelet inhibitor, antibiotic, other.

<sup>g</sup>Irrigation: eye, ear, nasal passage.

<sup>h</sup>Joint: arthrocentesis, injection of therapeutic substance into joint.

V. Supplemental Table 6: Sensitivity Analysis, Mean Diagnoses and Medications per visit by PCPs with and without EMR capability

	EMR			No EMR		
	2008 <sup>a</sup> n=111 million <sup>b</sup>	2015 <sup>a</sup> n=239 million <sup>b</sup>	8 year Trend <sup>c</sup>	2008 <sup>a</sup> n=173 million <sup>b</sup>	2015 <sup>a</sup> n= 26 million <sup>b</sup>	8 year Trend <sup>c</sup> (95%CI)
Mean meds, no. per visit <sup>d</sup>	3.4	3.8	0.44 (0.16, 0.73)	2.9	3.5	0.60 (0.33, 0.87)
Mean diagnoses, no. per visit <sup>e</sup>	2.1	2.3	0.26 (0.11, 0.42)	2.0	2.2	0.19 (0.06, 0.32)

<sup>a</sup>Presented as three-year rolling averages.

<sup>b</sup>Weighted number of NAMCS Visits.

<sup>c</sup>8 year trend calculated for each subgroup by multiplying per year regression coefficient across study period

<sup>d</sup>NAMCS allows up to eight write-in medications per visit.

<sup>e</sup>NAMCS allows up to three write-in ICD-9/ICD-1