

Supplementary Table 1.: Pre-intervention high users classified into quartiles by their pre-intervention visit emergency severity: Comparing mean emergency severity in the pre- vs. post-intervention periods

Pre-intervention High-users classified by their mean emergency severity pre-intervention*	Pre-intervention period (Aug 16, 2009 – Aug 15, 2011)		Post-intervention period (Aug 16, 2011 – Aug 15, 2014)	
	Number of patients	Mean ESI (range)	Returning high-users in the post-intervention period	Mean ESI (SD) (range 1-5 for all groups)
Total**	5,124	3.51 (1.0-5.0)	2,985	3.61 (0.81)
Quartile 1**	2,005	2.65 (1.0-3.0)	1,129	3.30 (0.79)
Quartile 2**	723	3.39 (3.1-3.5)	463	3.55 (0.76)
Quartile 3**	1,562	3.93 (3.5-4.0)	907	3.76 (0.74)
Quartile 4**	834	4.66 (4.0-5.0)	486	4.09 (0.70)

\*ESI Quartile cut-points are 3.0, 3.5, 4.0, and 5.0, respectively.

Note: Quartile groups are imbalanced because the variation in ESI score is limited. We identified the ESI cut-points nearest to the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles and classified all patients with that level to the respective quartile.

\*\* Statistically significant at 0.001 level for the difference between pre- and post- ESI.

Abbreviation: ESI, Emergency severity index.

Supplementary Table 2.: Pre-intervention high-user patients aged 18-64 years, classified by insurance status: Annual visit rate and mean emergency severity in the pre- vs. post-intervention periods

Pre-int. high-users classified by insurance status	Pre-intervention period (Aug 16, 2009 – Aug 15, 2011)				Post-intervention period (Aug 16, 2011 – Aug 15, 2014)			
	No. of Pre-int. high-user patients	Total ED visits (2 years)	Mean annual visits per patient <sup>@</sup> (range)	Mean ESI (SD) (range 1-5 for all groups)	Pre-int. High-users with visit(s) in post-intervention period	Total visits (3 years)	Mean annual visits per patient (range)	Mean ESI (SD) (range 1-5 for all groups)
All high-users aged 18-64 years	4,110	12,452	1.52** (0.5-27.5)	3.42* (0.83)	2,416	10,159	1.42** (0.3-16.0)	3.51* (0.82)
Insured at all ED visits <sup>#</sup>	1,801	5,149	1.44 (0.5-13.5)	3.58* (0.87)	896	3,702	1.42 (0.3-16.0)	3.72* (0.87)
Uninsured at one or more ED visits	2,309	7,303	1.58* (0.5-27.5)	3.29* (0.77)	1,520	6,457	1.42* (0.3-13.7)	3.38* (0.76)

\*p<0.01 for pre- vs. post- difference.

\*\*p=0.012 for pre- vs. post- differences in mean annual visit rate.

<sup>#</sup>Insurance source includes Medicare, Medicaid, and Private/ Other.

Abbreviation: ESI: Calculated discharge ESI (using AHRQ classification of severity) and reverse-coded, higher ESI = higher severity; Int.: Intervention.

Supplementary Appendix 1: List of adult ambulatory care sensitive conditions, ICD codes used to identify them and comments

	<b>Ambulatory Care Sensitive Conditions (adults)</b>	<b>ICD-9 Codes</b>	<b>Comments</b>
1	Gangrene <sup>1</sup>	785.4	
2	Hypokalemia or Hypopotassemia <sup>1</sup>	276.8	
3	Pyelonephritis <sup>1</sup>	590.0,590.1, 590.8	
4	Perforated or bleeding ulcer <sup>1</sup>	531.0, 531.2, 531.4, 531.6, 532.0, 532.2, 532.4, 532.6, 533.0, 533.1, 533.2, 533.4, 533.5, 533.6	
5	Grand mal status and other epileptic convulsions <sup>2</sup>	345	
6	Convulsions "B" <sup>2</sup>	780.3	Age > 5
7	Severe ear, nose, and throat infections <sup>2</sup>	382, 462, 463, 465, 472.1	Exclude otitis media cases [382] with myringotomy with insertion of tube [20.01]
8	Pulmonary tuberculosis <sup>2</sup>	011	
9	Other tuberculosis <sup>2</sup>	012-018	
10	Cellulitis <sup>1,2</sup>	681, 682, 683, 686	Exclude cases with a surgical procedure [01-86.99], except incision of skin and subcutaneous tissue [86.0] where it is the only listed surgical procedure
11	Skin grafts with cellulitis <sup>2</sup>	*primary diagnosis of 681.00, 681.01, 681.02, 681.10, 681.11, 682.0, 682.1, 682.2, 682.3, 682.4, 682.5, 682.6, 682.7, 682.8, 682.9, 707.0, 707.1, 707.8, or 707.9 AND primary or secondary procedure code of 85.82, 85.83, 85.84, 85.85, 86.22, 86.4, 86.60, 86.61, 86.62, 86.63, 86.65, 86.66, 86.69, 86.70, 86.71, 86.72, 86.73, 86.74, 86.75, 86.91, or 86.93	Exclude admissions from skilled nursing facilities or intermediate care facilities
12	Hypoglycemia <sup>2</sup>	251.2	
13	Pediatric and adult Gastroenteritis <sup>2,4</sup>	558.9	
14	Pneumonia <sup>1, 2, 3, 4</sup>	481, 482, 482.2, 482.3, 482.9, 483, 485, 486	Exclude case with secondary diagnosis of sickle cell [282.6] and patients < 2 months
15	Hypertension <sup>1, 2, 3, 4</sup>	401.0, 401.9, 402.0, 402.9, 402.10, 403.0, 404.0, 405.0,	Exclude cases with the following

		437.2	procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7
16	Dehydration <sup>3,4</sup>		
17	Asthma <sup>1,2,3,4</sup>	493	
18	Urinary tract infection <sup>3,4</sup>		
19	Chronic obstructive pulmonary disease (COPD) <sup>2,3,4</sup>	491, 492, 494, 496, 466.0	Acute bronchitis [466.0] only with secondary diagnosis of 491, 492, 494, 496
20	Perforated appendix <sup>1,3,4</sup>	540.0, 540.1	
21	Diabetes: Uncontrolled diabetes, long and short term complications <sup>1,2,3,4</sup>	250.0, 250.1, 250.2, 250.3, 250.8, 250.9, 251.0	
22	Angina without procedure <sup>2,3,4</sup>	411.1, 411.8, 413	Exclude cases with a surgical procedure [01-86.99]
23	Congestive heart failure <sup>1,2,3,4</sup>	428, 402.01, 402.11, 402.91, 518.4	Exclude cases with the following surgical procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7
24	Lower-extremity amputation among patients with Diabetes <sup>3,4</sup>		

\*conditions which required a primary diagnosis code and a primary or secondary procedure code were not marked as ACSC on the excel spreadsheet

#### References

1. AHRQ (2007). Guide to Prevention Quality Indicators: hospital admission for ambulatory care sensitive conditions. Rockville, MD: Agency for Healthcare Research and Quality; March 12, 2007. Version 3.1.
2. AHRQ Quality Indicators—Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality, 2001. AHRQ Pub. No. 02-R0203.
3. Weissman JS, Gatsonis C, Epstein AM. Rates of Avoidable Hospitalization by Insurance Status in Massachusetts and Maryland. *JAMA*. 1992;268(17):2388-2394. doi:10.1001/jama.1992.03490170060026.
4. Billings J, Weinick RM. Monitoring the Health Care Safety Net—Book I: A Data Book for Metropolitan Areas. Rockville, MD: Agency for Healthcare Research and Quality; 2003. AHRQ Publication No. 03-0025.

## Supplementary Appendix 2: Detailed description of the primary care clinic

At the time of this study, the clinic charged a modest fee that was determined by a sliding scale which began at 200% of poverty line for uninsured patients. Patient's family size and dependents were accounted for under this scale. If the uninsured patients were identified as high hospital utilizers, they qualified for and were enrolled in sub program through the clinic where they were seen at the clinic, and were able to obtain hospital outpatient procedures such as labs and imaging free of charge. All patients were required to submit some sort of proof of income, pay stubs and letters from the unemployment office stating that the patient was not currently employed were accepted. The clinic also filed for Medicaid and or Medicare reimbursement for qualifying patients. It was staffed by an internal medicine physician (PCP, Doctor of Osteopathy), a Nurse Practitioner, registered nurse, social worker (the latter to assist with the socio-medical needs of chronically ill patients, and liaise with charity care sources for laboratory and imaging investigations and for medications), and medical assistants. The clinic PCP and staff provided a primary care medical home environment, including acute patient care, patient education, chronic disease management, social work services, and connection to other community resources including but not limited to health screenings, psychiatric care and counseling, vocational rehabilitation, housing opportunities, and sources of fresh and healthy food. Patients were encouraged during their regular outpatient visits to facilitate self-management of their chronic conditions. The clinic was open Monday to Wednesday 8-00AM to 4-30PM, Thursday 10-00AM to 7-00PM, and Friday 8-00AM to 12-00PM, and was supplemented by phone access to on-call physicians (for registered clinic patients) during off-clinic hours and weekends. After-hours call duties are shared by the PCPs of three of the hospital's office-based practices including the clinic. The on-call physician logged in remotely to access the electronic medical record system (EMR), evaluated the patient's medical history and resolved the call as appropriate (verbal advice or reassurance, calling in repeat prescriptions, or advice to visit the clinic the following day or the ED immediately). Reduced cost or free clinical consultation at the hospital's expense was complemented by orchestrating existing charity care facilities and options operating in the region. The clinic social worker assisted patients with paperwork to access prescriptions through Welvista, a statewide, South Carolina based charitable donation-supported mail-order pharmacy that dispenses free prescription drugs donated by leading pharmaceutical companies to uninsured patients. This resource was reinforced by GoodRx, and internet based discount prescription program, and low-cost generic drug offerings by large retailers (such as Walmart). This resulted in almost full access for indigent patients either free or at negligible cost to most state-of-art prescription drugs. For needed laboratory work, the clinic negotiated very low patient co-pays (about \$5 for basic lab investigations) with the leading corporate provider of outpatient lab services in the Midlands of South Carolina, the balance of more specialized labs being a charitable donation by the firm on a case to case basis. Similar arrangements were in place for radiology services, supplemented by gratuitous service by the hospital's own physicians and infrastructure when the external arrangements were beyond financial reach for a patient. Limited specialist services were provided through a low-cost referral network program facilitated by the local county hospital, which the clinic was a participant, in addition to some gratuitous services provided by the hospital's specialist providers when needed. Most patients and conditions though, were managed by the clinic internist and nurse-practitioner. The clinic was designed to be a welcoming medical home to any indigent patient needing primary care, regardless of having visited the hospital's ED. Patients were encouraged to, and did tell friends and relatives with similar health care needs about the clinic with the idea that this word of mouth dissemination would pre-empt avoidable ED use by potential ED users.