Appendix Table 1. Unadjusted Sample Means of Medical Expenditures by Diabetes Among Adults With AMI and AIS[a]

Components	AMI patients		AIS patients	
	Without DM	With DM	Without DM	With DM
Inpatient stays ($)	6,383 (5,502–7,263)[b]	9,441 (8,085–10,796)	6,394 (4,624–8,163)	7,720 (6,418–9,022)
Emergency room visits ($)	609 (475–734)	844 (448–1,241)	650 (494–806)	695 (528–861)
Outpatient visits ($)	3,461 (3,114–3,808)	5,019 (4,414–5,624)	3,539 (3,124–3,953)	5,256 (4,463–6,050)
Prescription drugs ($)	3,206 (2,864–3,574)	5,336 (4,906–5,766)	3,087 (2,773–3,401)	5,664 (5,012–6,316)
Other serves ($)	1,429 (1,187–1,671)	1,969 (1,553–2,385)	2,516 (1,986–3,046)	3,265 (2,606–3,923)
Total ($)	15,087 (13,879–16,295)	22,609 (20,696–24,521)	16,185 (14,029–18,341)	22,599 (20,536–24,663)

[a]Data were from the 2008–2014 Medical Expenditure and Panel Survey. Adults refer to individuals aged ≥18 years. All statistics were appropriately weighted to ensure national representativeness. Expenditures were in 2014 U.S. dollars. AMI was identified by ICD-9-CM code 410. AIS was identified by ICD-9-CM codes 433, 434, 436. DM was identified by ICD-9-CM code 250.
[b]Values in parentheses are the 95% CI.

AMI, acute myocardial infarction; AIS, acute ischemic stroke; DM, diabetes mellitus

Appendix Table 2. Sensitivity Analysis of Estimated[a] Medical Expenditures Associated With Diabetes Among Adults With AMI and AIS[b]

	AMI patients			AIS patients		
Components	**Without DM**	**With DM**	**Excess expenditure[c]**	**Without DM**	**With DM**	**Excess expenditure**
Inpatient ($)	7,745 (7,406–8,083)[d]	9,338 (8,942–9,733)	1,593 (1,535–1,651)	6,606 (6,239–6,973)	8,238 (7,789–8,687)	1,632 (1,550–1,715)
Emergency room ($)	677 (643–711)	764 (726–801)	87 (83–91)	617 (582–653)	716 (676–757)	99 (94–104)
Outpatient ($)	3,833 (3,710–3,957)	5,053 (4,890–5,216)	1,219 (1,180–1,259)	3,712 (3,544–3,880)	5,227 (4,990–5,463)	1,514 (1,446–1,583)
Prescription drugs ($)	3,520 (3,417–3,623)	5,437 (5,278–5,596)	1,916 (1,860–1,972)	3,454 (3,361–3,547)	5,696 (5,542–5,849)	2,242 (2,181–2,302)
Other serves ($)	1,685 (1,601–1,769)	1,859 (1,767–1,951)	174 (166–182)	3,127 (2,920–3,335)	3,440 (3,212–3,668)	313 (291–334)
Total ($)	17,461 (16,899–18,022)	22,450 (21,760–23,139)	4,989 (4,858–5,120)	17,517 (16,870–18,163)	23,317 (22,505–24,128)	5,800 (5,630–5,970)

[a]Adjusted for hypertension and hyperlipidemia in addition to age group, sex, race/ethnicity, marital status, education level, geographic Census region of residence, type of health insurance coverage, current smoking status, self-rated health status, and survey year. Expenditures were in 2014 U.S. dollars.

[b]Data were from the 2008–2014 Medical Expenditure and Panel Survey. Adults refer to individuals aged ≥18 years. All statistics were appropriately weighted to ensure national representativeness. AMI was identified by ICD-9-CM code 410. AIS was identified by ICD-9-CM codes 433, 434, 436. DM was identified by ICD-9-CM code 250.

[c]Excess expenditure was calculated by the estimated expenditures for individuals with DM minus the estimated expenditures for individuals without DM.

[d]Values in parentheses are the 95% CI.

AMI, acute myocardial infarction; AIS, acute ischemic stroke; DM, diabetes mellitus

TECHNICAL APPENDIX

A generalized linear model (GLM) takes the following form:

$$EXP_{ijk} = F(\beta_0 + \beta_1 DM_{ijk} + \beta_2 X_{ijk} + \gamma_{ijk} + \epsilon_{ijk}) \quad (1)$$

Where EXP_{ijk} is the per capita annual expenditure for patient i of health condition j on healthcare component k; DM_{ijk} is an indicator for diabetes; X_{ijk} represents a set of covariates; γ_{ijk} includes year dummies for 2009 to 2014; and ϵ_{ijk} is error term. The functional form F(.) in this study is GLM with log link and gamma distribution. The Stata code for regression is *glm* with options *f(gamma)* and *link(log).*

A two-part model takes the following form:

$$EXPDUM_{ijk} = F^1(\alpha_0 + \alpha_1 DM_{ijk} + \alpha_2 X_{ijk} + \gamma_{ijk} + \omega_{ijk}) \quad (2)$$

$$EXP_{ijk} = F^2(\beta_0 + \beta_1 DM_{ijk} + \beta_2 X_{ijk} + \gamma_{ijk} + \epsilon_{ijk}) \quad (3)$$

In the first part, the dependent variable $EXPDUM_{ijk}$ is an indicator for whether a patient incurs any positive medical expenditures, and the functional form F^1 is logit. This part of the two-part model predicts the probability that a patient had positive medical expenditure. The second part is again a GLM, except that the estimation is conditional on a population of patients with positive medical expenditure. The Stata codes for the first part is *logit*, whereas for the second part is *glm* with options *f(gamma)* and *link(log).*

Parameters from the GLM and the two-part model were used to predict the model-adjusted expenditures for each individual conditional on diabetes status: (A) each individual had diabetes and (B) each individual did not have diabetes. The excess expenditure was calculated as the difference between (A) and (B). It represents the difference between the estimated expenditures

conditional on having both diabetes and AMI (or AIS) and the estimated expenditure conditional on having AMI (or AIS) but not diabetes. We then summed the component expenditures for each individual to obtain total individual-level expenditure. The Stata code for prediction is *predict* after each regression model.

Stata codes used for two-part model to estimate the excess expenditure of inpatient stays for AMI (an example):

(1) First part: logit model

- svy,subpop(if ami_indicator==1):logit inpatientdummy dm_indicator $covariates $yeardummy

/*"ami_indicator" is an indicator for having AMI; "inpatientdummy" is an indicator for having positive expenditure on inpatient stays; "dm_indicator" is an indicator for having diabetes; the global variable "$covariates" includes all variables listed in Table 1; the global variable "$yeardummy" includes year dummies for each year from 2009 to 2014.*/

*Predict the probabilities of an individual incurring any positive inpatient expenditures conditional on (A) each individual had diabetes and (B) each individual did not have diabetes.

- replace dm_indicator=1
- predict p1 if e(sample)
- replace dm_indicator=0
- predict p0 if e(sample)

(2) Second part: GLM conditional on having positive inpatient expenditures

- svy,subpop(if ami_indicator==1 & inpatientdummy==1): glm inpatient_expenditure dm_indicator $covariates $yeardummy, f(gamma) link(log)

/*"inpatient_expenditure" is the expenditure on inpatient stays, inflated into 2014 US dollars*/

*Predict inpatient expenditures conditional on (A) each individual had diabetes and (B) each individual did not have diabetes.

- replace dm_indicator=1
- predict e1 if e(sample)
- replace dm_indicator=0
- predict e0 if e(sample)

(3) Calculate the excess expenditures associated with diabetes on inpatient stays.

- g cost_without_diabetes=p0*e0 /*Estimated expenditures without diabetes */
- g cost_with_diabetes=p1*e1 /*Estimated expenditures with diabetes */
- g excess_expenditure_associated_with_diabetes= cost_with_diabetes-cost_without_diabetes