

Michigan and MOSAIC Data Review



2017 ANNUAL WORKSHOP

4/26/2017

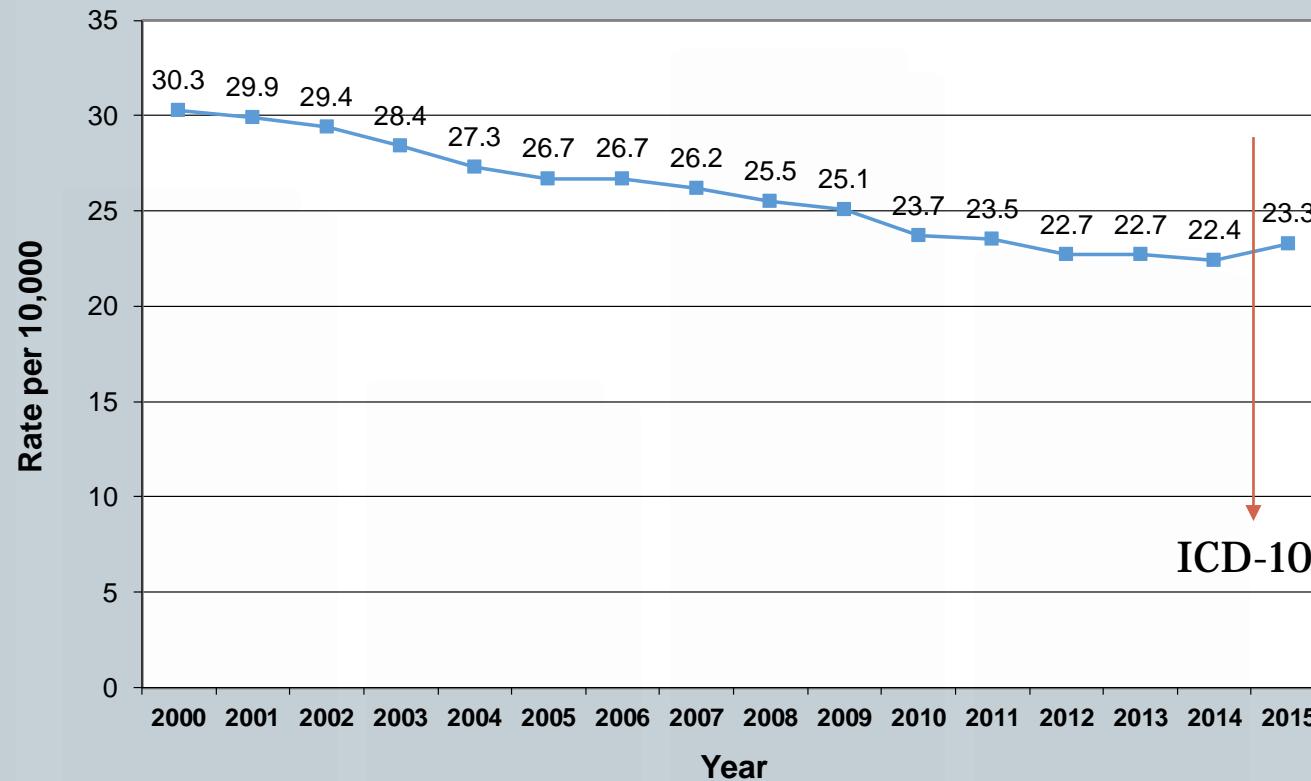
Adrienne Nickles, MPH

Overview



- Stroke in Michigan: trends in hospitalization, mortality and risk factors
- Data Use: How are participating hospitals using their data?
- Hospital Arrival Mode and Door-to-needle time measurements (DIT, ITN, DTN)
- Future Directions of Post-hospital Follow-up Project

Age-adjusted Stroke Hospitalization Rates, Michigan, 2000-2015

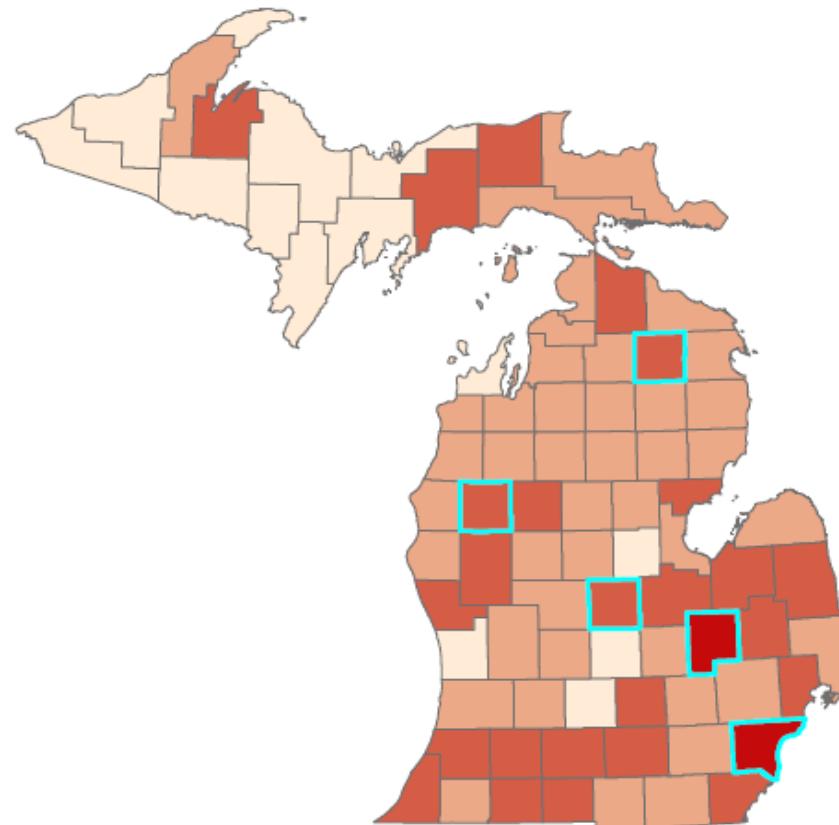
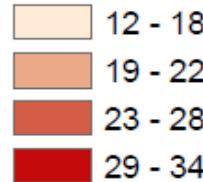


Denominator used from 2000-20014: ICD-9
ICD-10 used to calculate hospitalization rates starting in 2015.

Stroke Hospitalization Rates 2010 - 2015

State Average: 23.0 (per 10,000)
Top five counties outlined

Age-Adjusted Hospitalization
Rate per 10,000 population

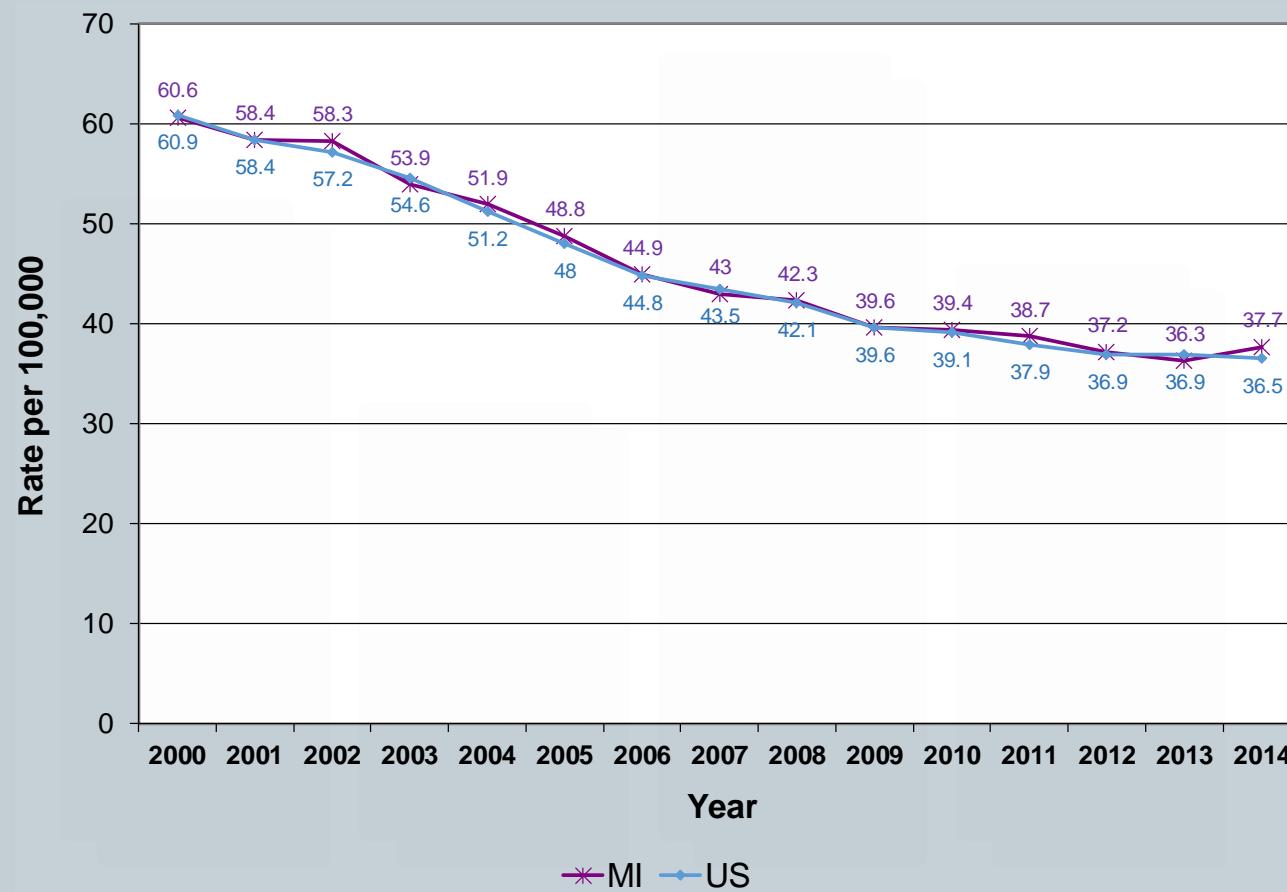


Source: Michigan Resident Inpatients Data Files, Division for Vital Records
and Health Statistics, MDCH

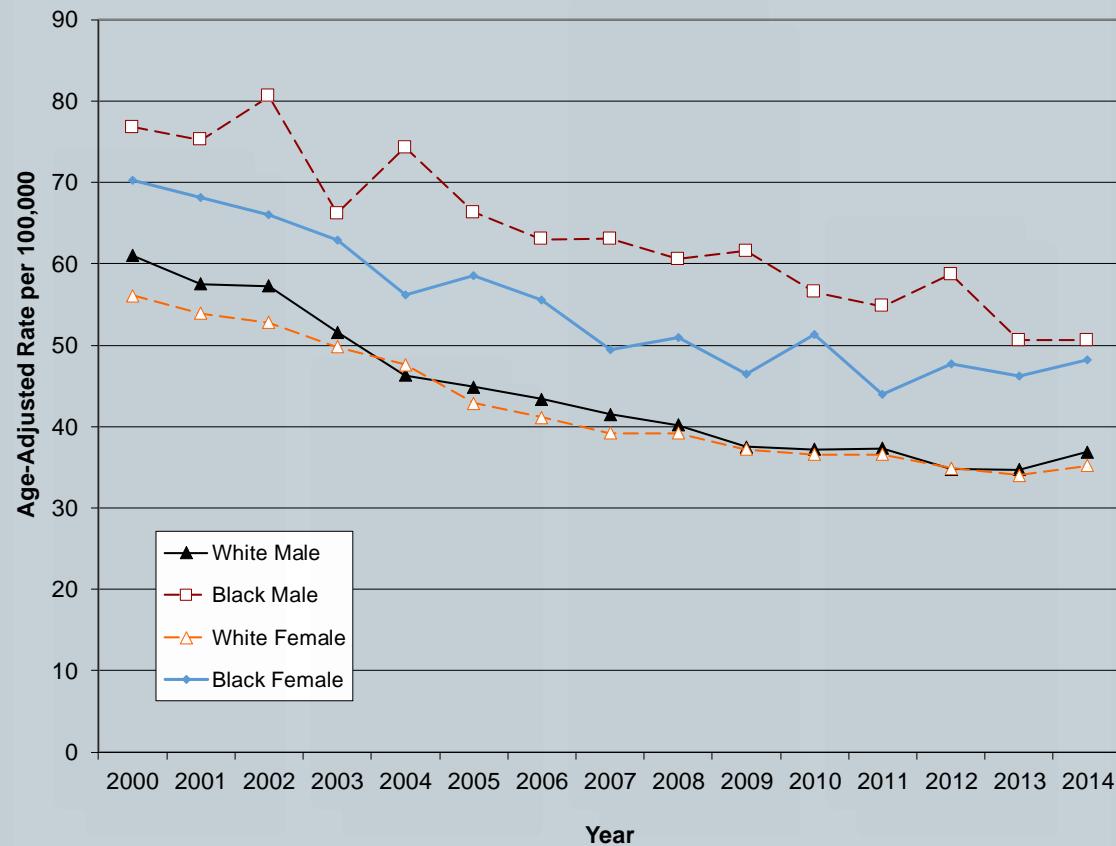


Source: Michigan Resident Inpatient Files
Division for Vital Records and Health Statistics,
MDCH.
ICD-10: 100-178; ICD-9: 390-434, 436-448.
Age-adjusted to the 2000 U.S. standard
population.
Henry Miller and Adrienne Nickles; April 4, 2016

Age-adjusted Stroke Mortality Rates, Michigan, 2000-2014



Age-adjusted stroke mortality rates by race and gender, Michigan, 2000 to 2014



Prevalence of CVD Risk Factors, Michigan Adults 1990-2015

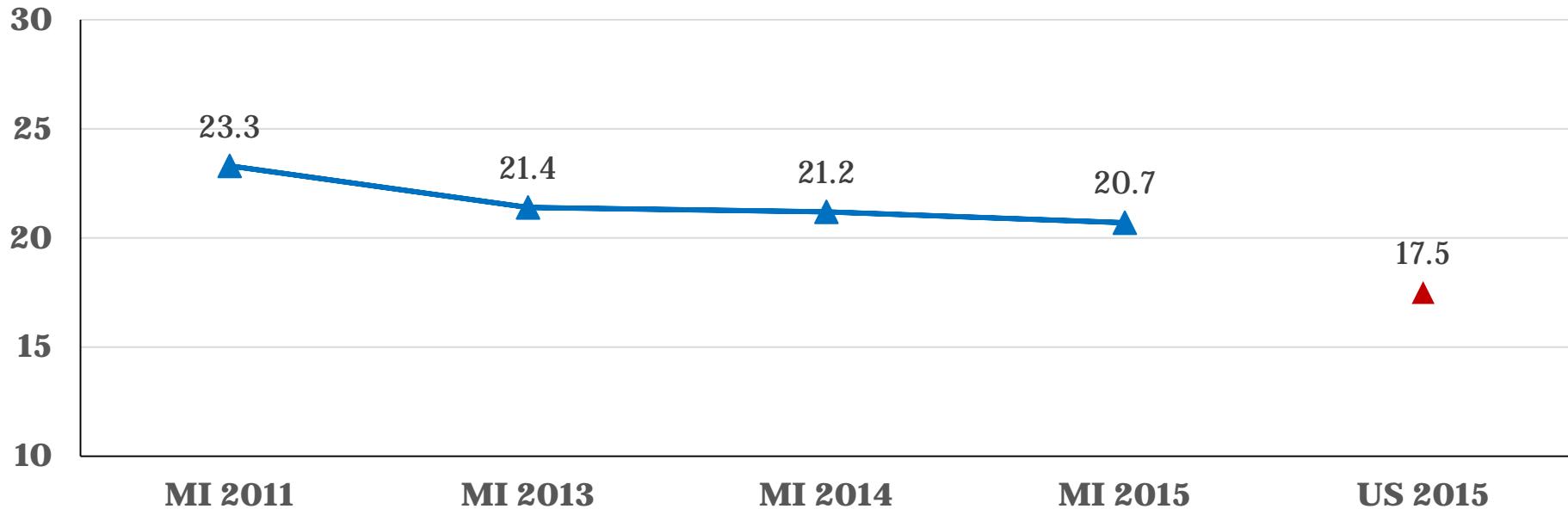
Compared to 2015 National Prevalence



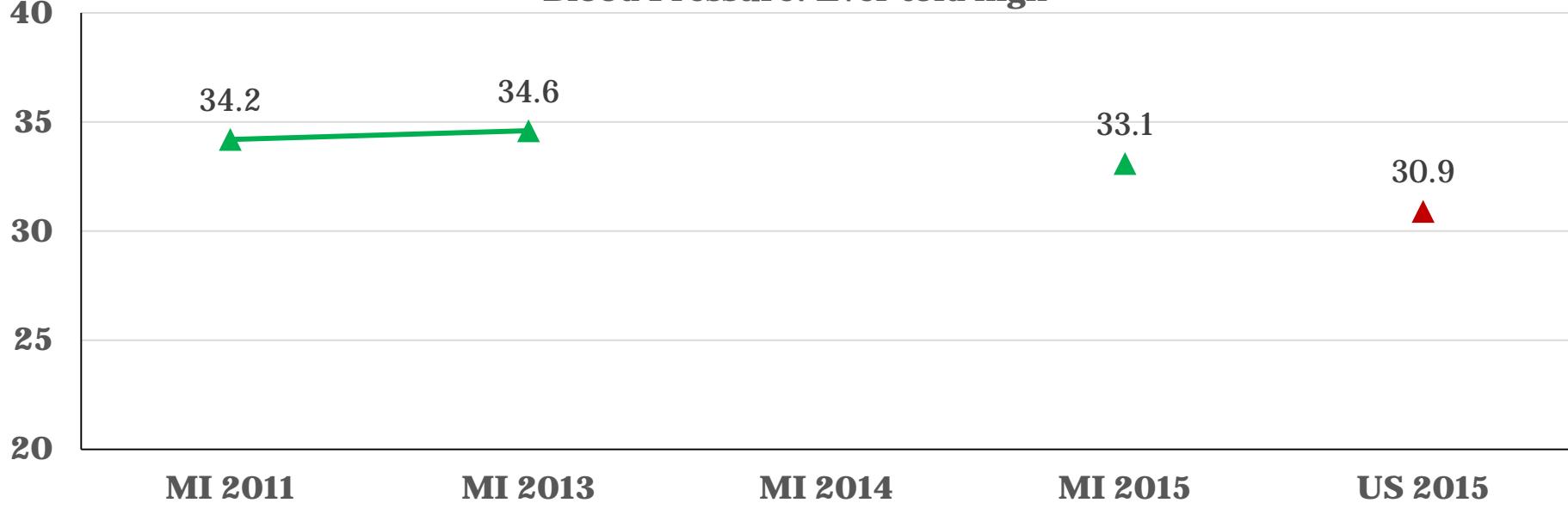
RISK FACTOR	MI 2011	MI 2013	MI 2014	MI 2015	US 2015	2015 NATIONAL RANKING
Current Smoking	23.3	21.4	21.2	20.7	17.5	11
Blood Pressure: Ever Told High	34.2	34.6	NA	33.1	30.9	18
Cholesterol: Ever Told High	41.8	40.6	NA	38.2	36.4	12
Overweight (BMI>25)	34.2	34.7	34.9	35.1	35.5	32^{tied}
Obese (BMI>30)	31.3	31.5	30.7	31.2	29.8	16
No Leisure Time Physical Activity	23.6	24.4	25.5	25.5	26.2	27
Diabetes	10.0	10.4	10.4	10.7	10.0	18^{tied}

Local Health Department data can be found at www.michigan.gov/brfs

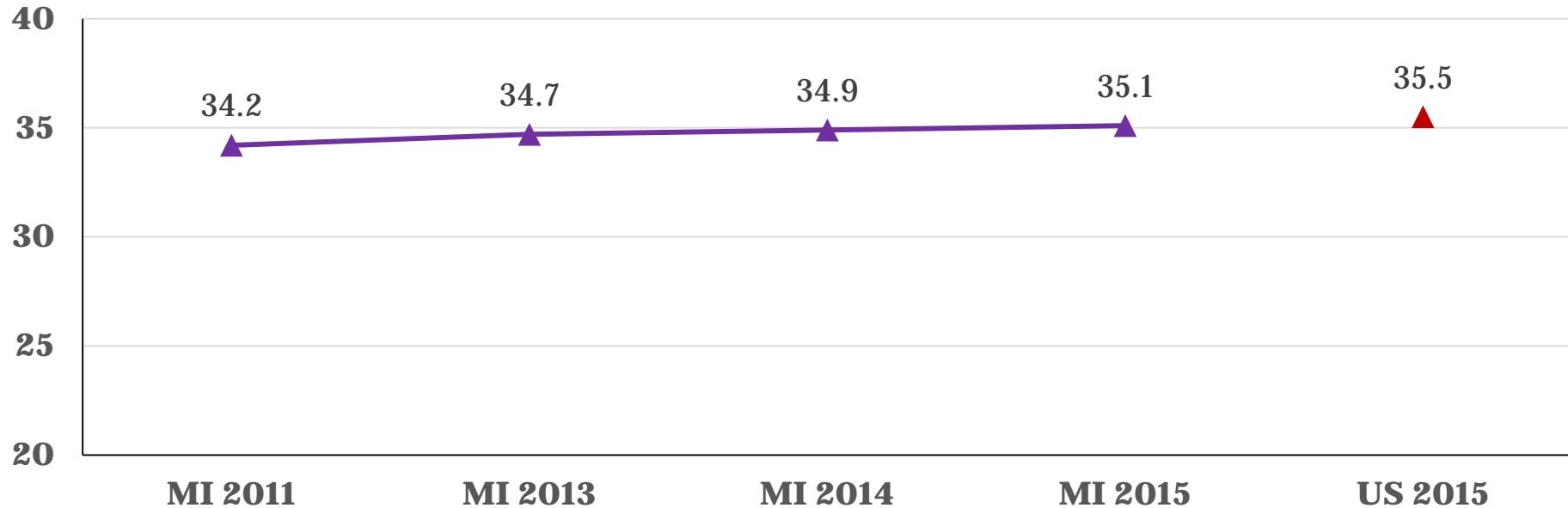
Current Smoking



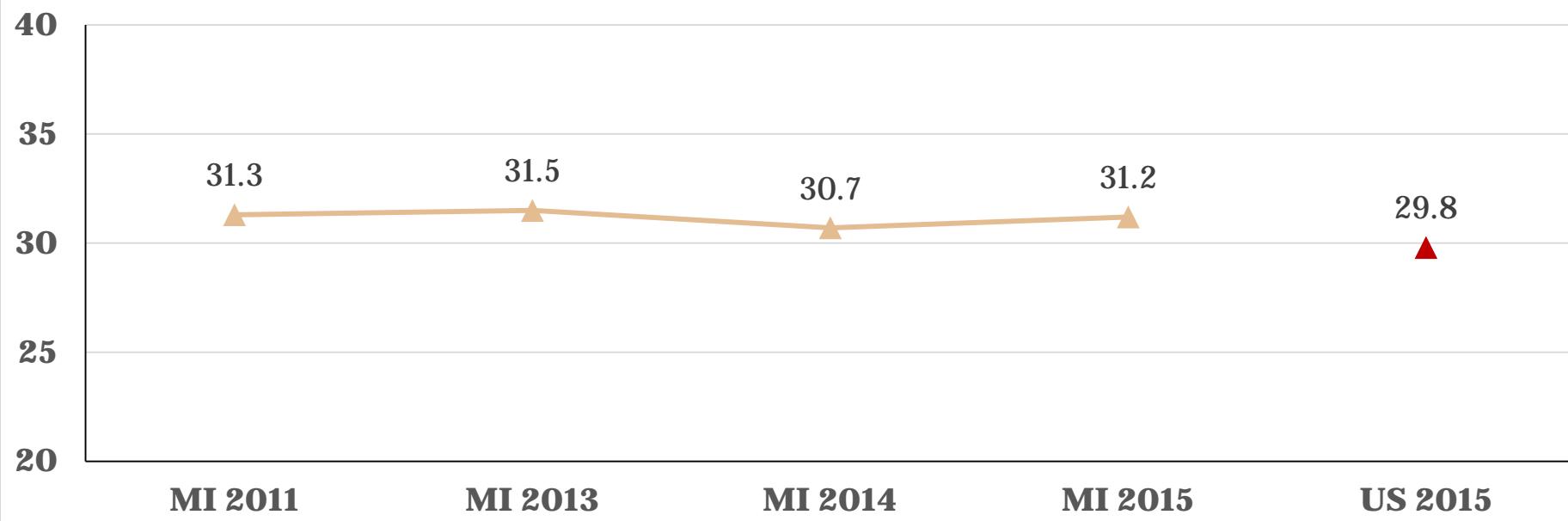
Blood Pressure: Ever told high



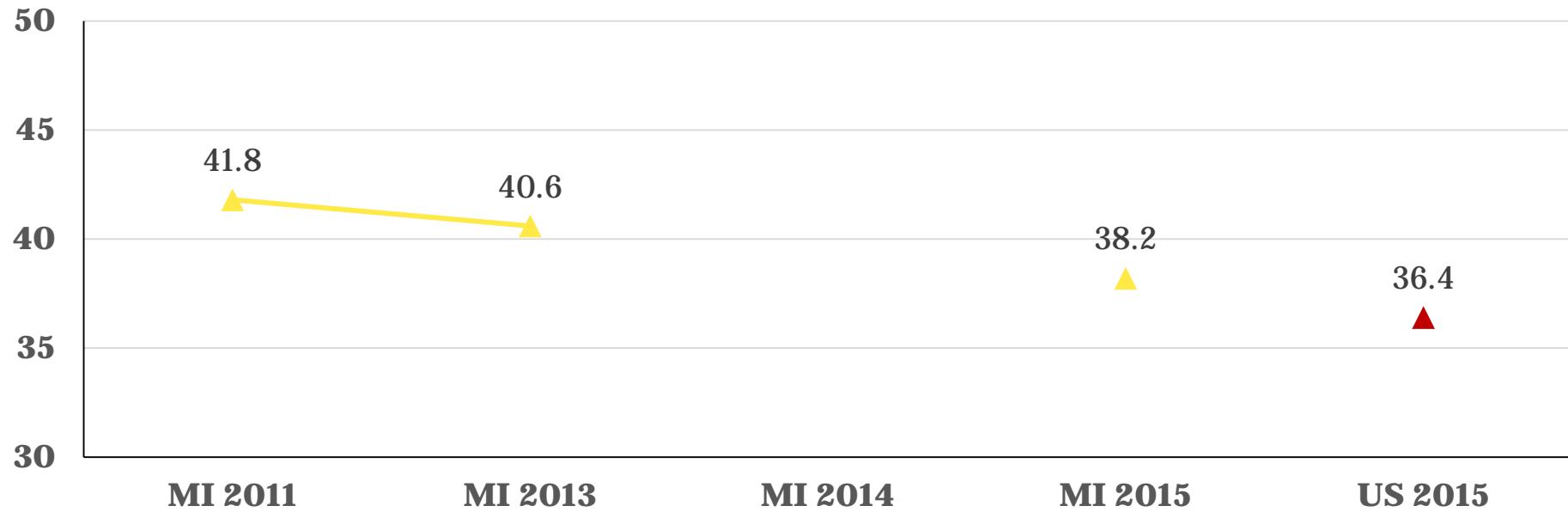
Overweight (BMI>25)



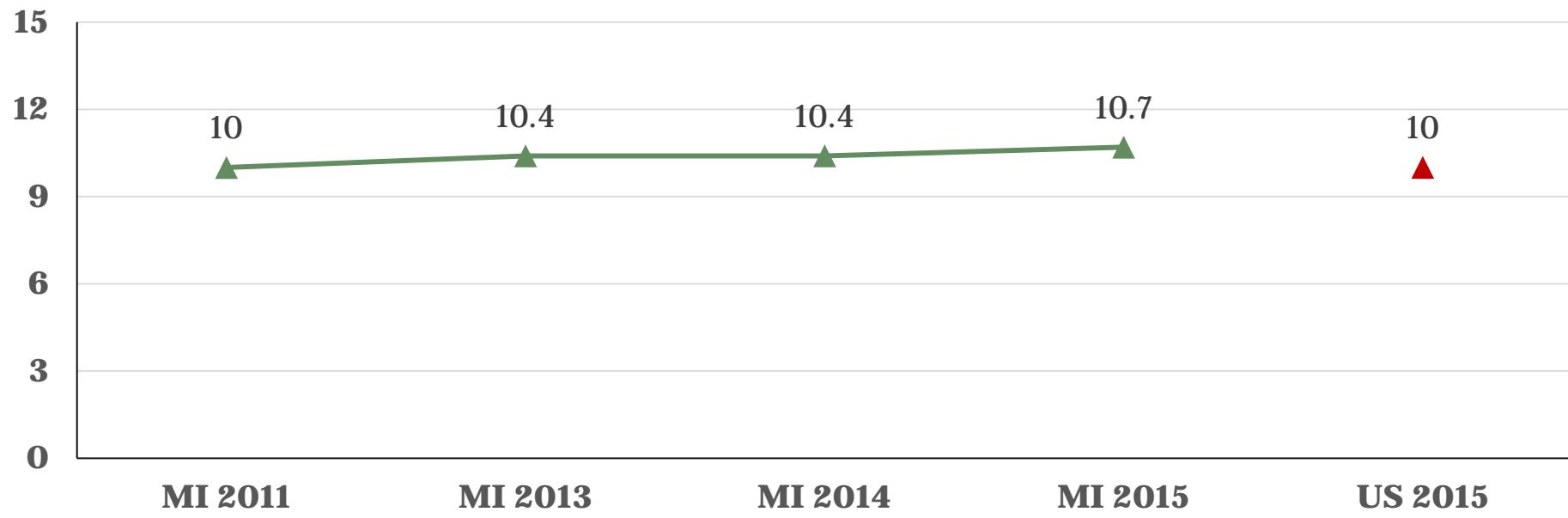
Obese (BMI>30)



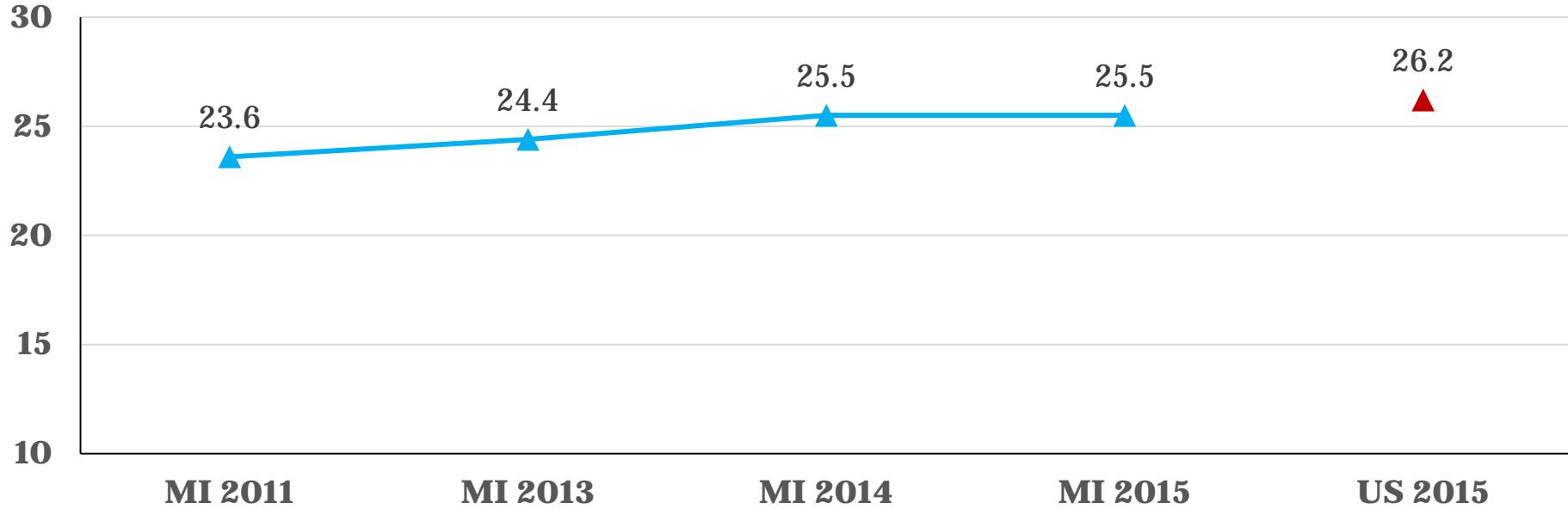
Cholesterol: Ever told high



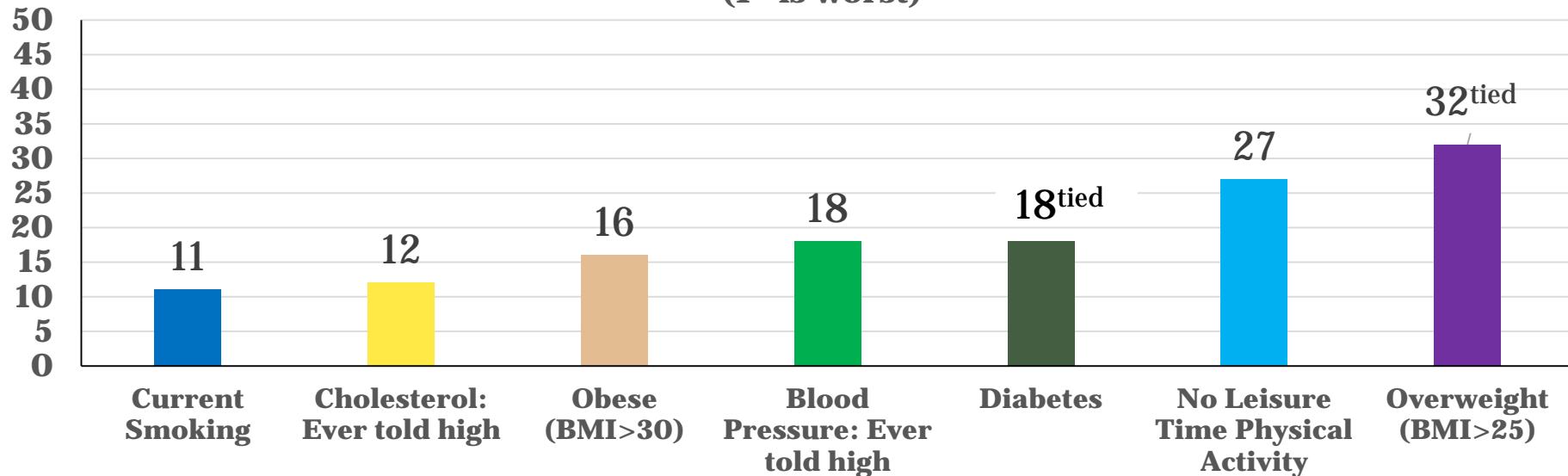
Diabetes



No Leisure Time Physical Activity



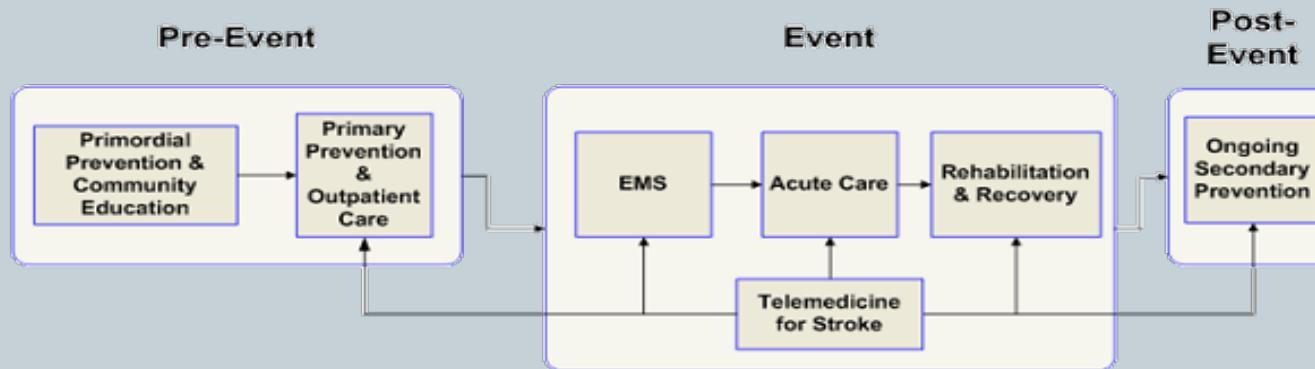
2015 NATIONAL RANKING (1st is worst)



MOSAIC 2015-2020



- ▶ Focus of Grant: Developing Stroke Systems of Care
 - ▶ Community Awareness
 - ▶ EMS
 - ▶ In-hospital QI
 - ▶ Transition of Care Post-Discharge



Pre-hospital Care

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AVAILABLE DATA

EMS/MOSAIC Data Linkage



- The MOSAIC Team continues to link data from the Michigan EMS Information System (MiEMSIS) to MOSAIC Data
 - Reports have been created for and reviewed by the Tri-County Area MCA and Detroit East MCA.
 - This work will expand to other MCA regions that serve hospitals participating in MOSAIC.

Hospital Name

Table 1: All Cases Transported to Coverdell Facilities via EMS with a Primary or Secondary Impression of Stroke			Table 2: All Cases with a Primary or Secondary Impression of Stroke Confirmed as Stroke by Hospital			Table 3: Patient Outcomes Among Cases Confirmed as Stroke by Hospital		
Total:	N	%	Total:	N	%	Total:	N	%
Cases Transported by Hospital:			Cases Transported by Hospital:			Stroke type		
Sparrow			Sparrow			Ischemic		
McLaren-Greater Lansing			McLaren-Greater Lansing			Hemorrhagic		
N/A						TIA		
DEMOGRAPHICS			DEMOGRAPHICS			Stroke Not Specified		
Age			Age					N =
Mean			Mean			Received t-PA?(Ischemic Stroke Cases Only)		
Median			Median			Yes		
Range			Range			No		
Gender			Gender			Length of Stay		
Female			Female			Mean		
Male			Male			Median		
Not Available			Not Available			Range		
Race			Race			Comfort Measures Only		
Black or African American			Black or African American			Yes		
White			White			No		
Asian			Asian			Timing Unclear		
Other Race			Other Race					
Not Applicable			Not Applicable					
Performance Measure			Recorded by EMS			Discharge Disposition		
All Cases with Primary or Secondary Impression of Stroke			1.On-scene time ≤15 minutes			Home		
1.On-scene time ≤15 minutes			2.Blood Glucose level checked and recorded			Hospice-Home		
2.Blood Glucose level checked and recorded			3.EMS called in a stroke alert / pre-notification			Hospice-Healthcare Facility		
3.EMS called in a stroke alert / pre-notification			4.Stroke screen completed and recorded			Acute Care Facility		
4.Stroke screen completed and recorded			5.Time last known to be well was documented			Other Healthcare Facility		
5.Time last known to be well was documented			Recorded by Hospital			Expired		
			EMS called in a stroke alert / pre-notification			Left Against Medical Advice/AMA		

GWTG Special Initiatives Tab



- A free tab that can be enabled in GWTG
- The purpose of the tab is to collect data concerning patient hand-off from EMS

Stroke Patient ID: Created: 03/14/2016 14:19:41 GMT-04:00 Last Updated:
Active element groups: Stroke, Coverdell, EMS

Legend: Clear Selection Open Calendar

Patient ID:

[Admin](#) [Clinical Codes](#) [Admission](#) [Hospitalization](#) [Discharge](#) [Optional](#) [Core Measures](#) [Measures](#) **Special Initiatives** [Historic](#)

Patient care record available at time of patient arrival? Yes No/ND

Patient care record available at a later time during hospitalization? Yes No/ND

EMS agency name or number Unknown

Run/Sequence number Unknown

Date/Time call received by responding EMS agency:

MM/DD/YYYY HH24:MI
MM DD YYYY HH MI

Dispatched as suspected stroke? Yes No Not Documented

MM/DD/YYYY HH24:MI
MM DD YYYY HH MI

Arrival at scene by EMS responding agency, Date/Time:

Blood Glucose level (mg/dL): Not Documented

Blood Glucose value

Glucometer Not Available Too High

Too Low

Date/Time patient last known to be well as documented by EMS:

MM/DD/YYYY HH24:MI
MM DD YYYY HH MI

Date/Time of discovery of stroke symptoms as documented by EMS:

MM/DD/YYYY HH24:MI
MM DD YYYY HH MI

Pre-hospital stroke screen performed? Yes No Not documented

Suspected stroke? Yes No Not documented

Was a Thrombolytic Checklist used?

Directed to designated stroke center by protocol

Directed to nearest facility by protocol

Patient/Family choice

Online Medical Direction

Closest facility

Other

Unknown/Not Documented

How was destination decision made?

If Other, Specify:

[Admin](#) [Clinical Codes](#) [Admission](#) [Hospitalization](#) [Discharge](#) [Optional](#) [Core Measures](#) [Measures](#) **Special Initiatives** [Historic](#)

MOSAIC: Participating Hospitals



Aspirus Keweenaw Hospital (Laurium)

Aspirus Grand View Hospital

Aspirus Iron River Hospital

Aspirus Ontonagon Hospital

Bixby Medical Center

Bronson Methodist Hospital

Covenant Health Care

Detroit Receiving Hospital

Genesys Regional Medical Center

Henry Ford Hospital*

Herrick Medical Center

Huron Valley-Sinai Hospital

Lakeland Regional Medical Center*

McLaren Bay Regional Medical Center

McLaren Greater Medical Center

McLaren Macomb Hospital

McLaren Northern MI Hospital*

McLaren Oakland Medical Center

McLaren Port Huron Hospital

McLaren Regional Medical Center*

Mercy Health Saint Mary's Hospital

Metro Health Hospital

Munson Medical Center*

ProMedica Monroe Regional Hospital

Sparrow Hospital*

St Joseph Mercy - Ann Arbor

St Joseph Mercy Chelsea

St Joseph Mercy Livingston Hospital

St Mary Mercy

St. Mary of Michigan Hospital

U of M Hospital

Hospital Infrastructure

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Among all participating hospitals, the average number of:

- ❖ Licensed beds was 374 (range: 25 to 1059 beds).
- ❖ Inpatient discharges was 17,076 (range: 1,064 to 48,916 patients).
- ❖ Acute stroke discharges (primary diagnosis only) was 417 (range: 34 to 982 patients).

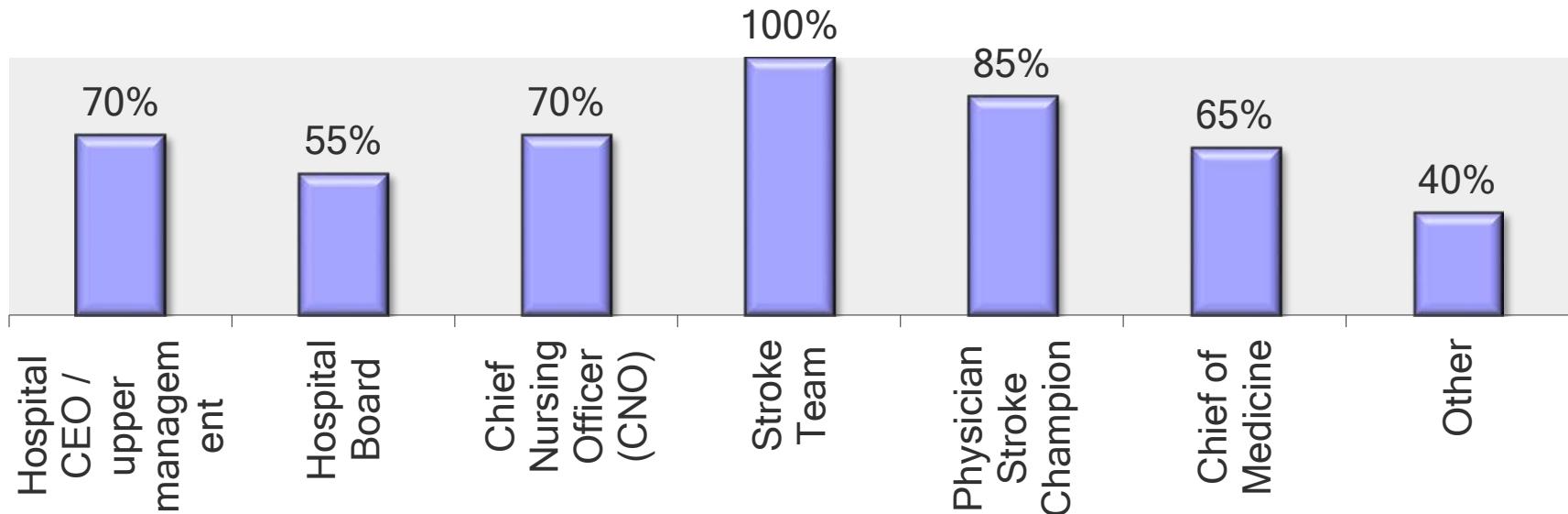
Case Demographics: MOSAIC Registry

Variables	N(%) or statistics (Total N=68,906)	Variables	N(%) or statistics (Total N=68,906)
Age at admission (years)		Health insurance	
Median	71.0	Medicaid	2,284 (4.5)
Range	18.0 - 106.0	Medicaid,Private	211 (0.4)
Mean (SE)	69.7(0.1)	Medicare	16,863 (33.6)
		Medicare, Medicaid	2,313 (4.6)
Gender			125 (0.2)
Male	32,886 (47.7)	Medicare,Medicaid,Private	
Female	36,015 (52.3)	Medicare,Private	13,640 (27.2)
		ND	268(0.5)
Race		No insurance	2,123 (4.2)
African American	9,900 (19.7)	Private	12,356 (24.6)
AIAN	132 (0.3)		
Asian	320 (0.6)	Arrival mode	
More than one race	44 (0.1)	EMS	21,052 (42.9)
Unknown	3,679 (7.3)	Private	19,313 (39.3)
White	36,190 (72.0)	transportation/other	
Missing	70	Transfer from another hospital	7,733(15.7)
Ethnicity		ND or unknown	1021 (2.1)
Hispanic or Latino	804 (1.6)	Missing	1,216
Others	49,531 (98.4)		

Data Use

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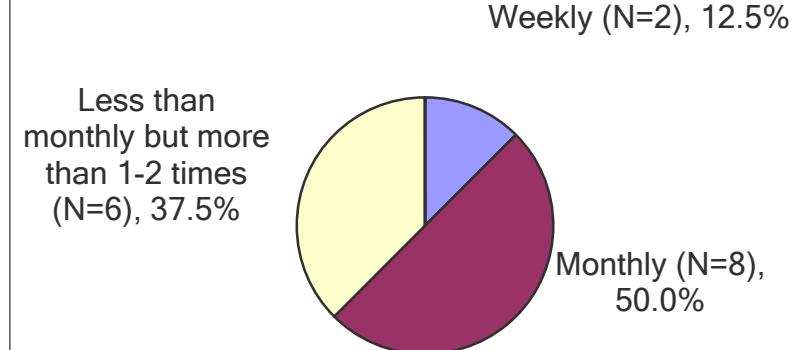
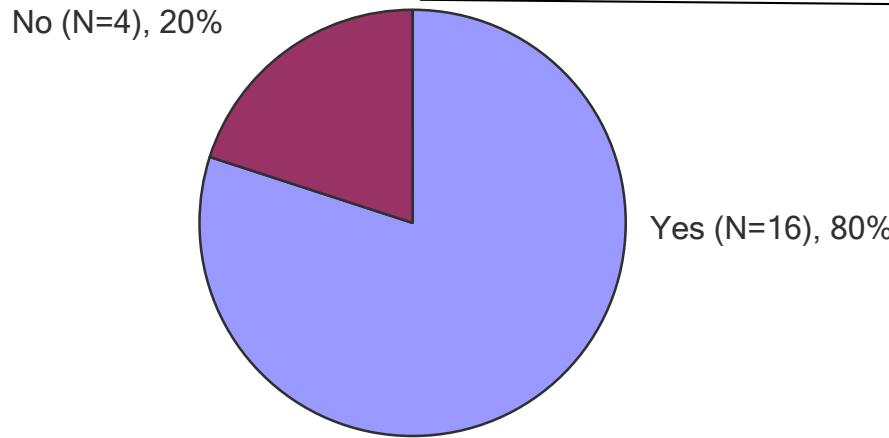
Who receives data reports on your stroke quality of care?



Data Use

22

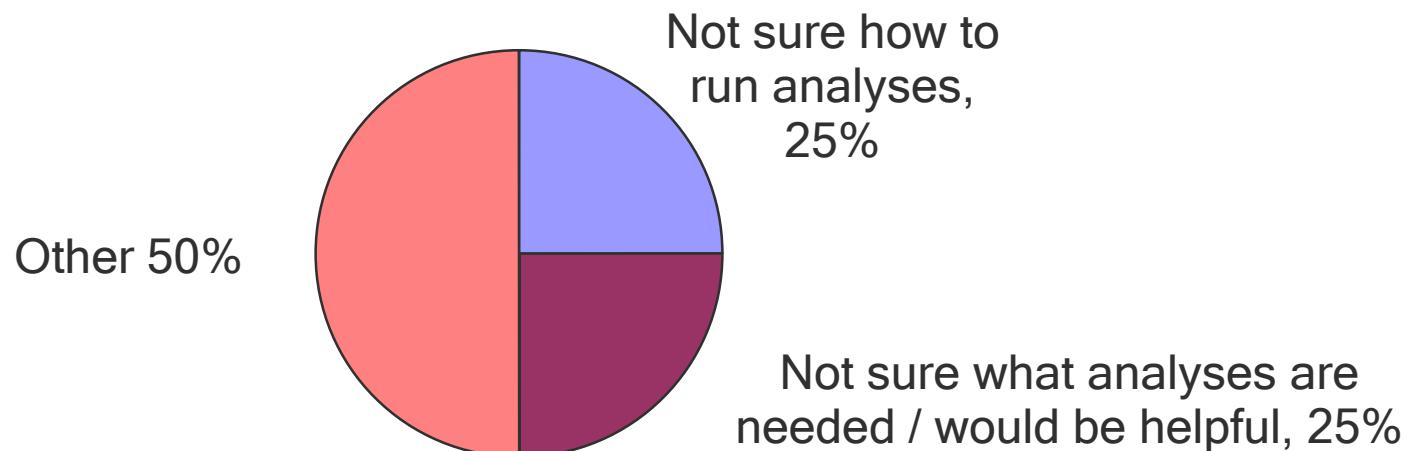
- 1) In the most recent calendar year, have you run additional analyses (beyond what was required for reporting) on your hospital's own stroke data?
- 2) How frequently have you run and used the analyses generated?



Data Use

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What is the main reason you do not run your own additional analyses? (Select one best answer)



Data Use

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In the most recent calendar year, what reports did you run?

81.3%

Pre-programmed/automated reports in the
data collection tool (e.g. GWTG)

68.8%

Additional reports beyond pre-
programmed reports from the tool

Data Use

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How do you use these analyses/ reports?

81.3%



Inform quality improvement
(QI) efforts and/or plan
“action items”

68.8%



Report to management /
administration on our
progress

37.5%



Other

If you run additional analysis, what action items / QI efforts did you plan as a result of these reports?

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- Discharge education, intensive statin use.
- Door to tPA time and dysphagia.
- Review data between spoke & hub hospitals regarding transfers, IV-tPA administration, Mechanical thrombectomy and SAH.
- QI efforts were addressed in the department involving calling Stroke Alert on call for cases with FAST symptoms.
- ED Medical Director works with team to fix fallouts and problematic areas. We have seen improvement.
- Process changes (i.e. fallout emails to RN, manager) physician queries.
- Increased documentation of NIHSS, ownership from individual units regarding stroke quality improvement goals.
- Daily dysphagia screening, determination of who/what team responsible for documenting initial NIHSS, looking at patients beyond 2h LKW arrival.

Hospital Arrival Mode, Door-to Needle and Pre-Notification Reports, 2016



Percent of Cases Who Arrived via EMS, MOSAIC, 2009-2016

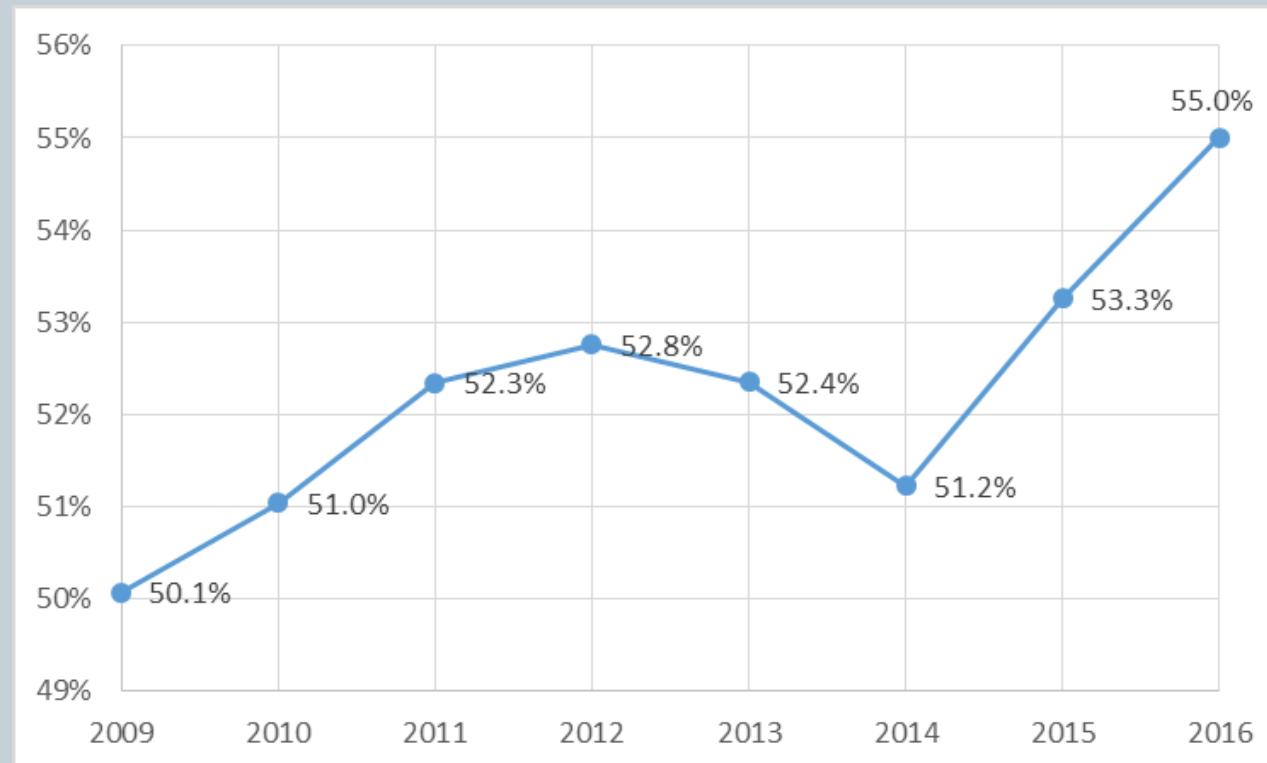


Table 1. Arrival Mode among Stroke Cases by Demographics, MOSAIC, 2016

Demographics	MOSAIC Aggregate			
	Arrival Mode			
	EMS	Private Mode		
N=3496	55.0%	N=2938	45.0%	
Stroke Type				
Ischemic	2558	54.2%	2164	45.8%
Hemorrhagic	560	72.8%	209	27.2%
TIA	378	47.8%	413	52.2%
Age Group				
< 50 Years	233	43.3%	305	56.7%
50-79 Years	1982	49.7%	2008	50.3%
≥ 80 Years	1379	68.8%	625	31.2%
Sex				
Female	1933	57.6%	1422	42.4%
Male	1661	52.3%	1516	47.7%
Race				
Black	659	53.0%	584	47.0%
White	2824	55.7%	2248	44.3%
Other/ Missing	111	51.2%	106	48.8%

Table 2. Door-to-Needle Times by Arrival Mode among Stroke Cases, MOSAIC 2016

Time Elements (in Minutes)	MOSAIC Aggregate			
	Number of Patients	Mean (Minutes)	Median (Minutes)	Range (Minutes)
Door-to-Image	4901	57.5	40.0	0.0-270.0
Arrived via EMS	2767	46.3	27.0	0.0-270.0
Arrived via Private Transportation	2134	72.0	57.0	0.0-262.0
Door-to-Image (among t-PA treated)	492	15.5	13.0	0.0-97.0
Arrived via EMS	370	12.5	11.0	0.0-84.0
Arrived via Private Transportation	122	24.3	21.5	2.0-97.0
Image-to Needle **	492	50.0	45.0	7.0-209.0
Arrived via EMS	370	50.3	46.0	7.0-209.0
Arrived via Private Transportation	122	48.3	42.0	9.0-177.0
Door-to Needle **	492	65.5	57.0	20.0-218.0
Arrived via EMS	370	62.9	56.0	20.0-218.0
Arrived via Private Transportation	122	72.6	65.0	29.0-206.0

*Included ischemic or hemorrhagic cases with times that were less or equal to 270 minutes, (4.5 hours)

**Transferred cases were excluded

Table 3. Pre-Notification among Stroke Cases Who Arrived Via EMS by Demographics, MOSAIC, 2016

Demographics	All Hospitals			
	Pre-Notification			
	Yes		No	
N=2,015	58.4%	N=1,437	41.6%	
Stroke Type				
Ischemic	1523	62.2%	924	37.8%
Hemorrhagic	306	56.6%	235	43.4%
TIA	142	38.1%	231	61.9%
Age Group				
< 50 Years	133	60.7%	86	39.3%
50-79 Years	1105	58.5%	784	41.5%
≥ 80 Years	777	57.8%	567	42.2%
Sex				
Female	1075	57.8%	786	42.2%
Male	940	59.1%	651	40.9%
Race				
Black	307	51.7%	287	48.3%
White	1657	60.2%	1097	39.8%
Other	51	49.0%	53	51.0%

MOSAIC Transitions of Care Project



- Post-discharge data collection tool is being implemented into Outcome Science as a tab

Post-Discharge & Transition of Care

- ▶ Reporting on changes within 30 days of discharge from hospital via follow-up calls/chart review
 - Interval events
 - Physician follow-up visits
 - Lifestyle changes
 - Lab assessments
 - Medication management/adherence
 - Rehab & Functional outcomes
 - Falls

MOSAIC Website



www.Michigan.gov/stroke

Thank You



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