



Count Your Smiles

The Oral Health of Michigan's Children

2015-2016



Acknowledgements

The 2015-2016 Count Your Smiles report is a document that shares the data collected from open mouth screenings of 3rd grade children across Michigan. Special acknowledgement goes to the following individuals who significantly contributed to this project and a *special thank you to all of the schools* who supported this project:

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Executive Summary

This summary is intended to highlight important findings on dental disease and dental access for 3rd grade children in Michigan. This summary also addresses important regional concerns for oral health. Additional information is available in the full text of the Count Your Smiles Report. The data was collected from 2,647 3rd grade students in 103 schools across Michigan during the 2015-2016 school year.

Oral Disease:

- One in nine 3rd grade children in Michigan, 11.4%, have immediate dental care needs with signs or symptoms of pain, infection, or swelling. Children lacking dental insurance, children of lower socioeconomic status, and children who are African American were most likely to have immediate needs.
- Oral pain can impact a child's learning, nutrition and sleeping. Nearly one in eight parents of 3rd grade children in Michigan, 12.3%, reported their child had a toothache when biting or chewing in the past six months. Toothaches were more common among minority children, children on government dental insurance and those of lower socioeconomic status.
- One in four Michigan 3rd grade children, 25.0%, have untreated dental disease. Higher proportions of untreated dental disease were seen in children with government or no dental insurance, children enrolled in the Free/Reduced Lunch program, minority children and children attending schools in the City of Detroit and the Upper Peninsula.

Access to Oral Health Services:

- Nearly one in twelve Michigan 3rd grade children, 8.0%, encountered problems that prevented them from getting dental care in the past year. Children attending school in the Upper Peninsula and children without dental insurance were more likely to have trouble getting dental care.
- Most children (83.7%) visited a dentist in the past year, as reported by parents.

Introduction

In 2000, the United States Surgeon General's Report: *Oral Health in America* documented a "silent epidemic of oral disease affecting our most vulnerable citizens" (USDHHS, 2000). This report identified a substantial unmet need for dental care and disparities in oral disease. Oral health care is essential to overall health and well-being. Poor oral health can contribute to difficulties learning, nutritional deficiencies, and low self-esteem (Holt & Barzel, 2013). Routine dental visits provide opportunities to prevent or delay dental disease. However, substantial disparities exist in the access of routine preventive dental care (Flores & Lin, 2013).

Additional preventive measures include the use of sealants, which are a transparent or opaque material that covers and protects the pit and fissure surfaces of teeth. Sealants, when retained, provide a cost-effective method of decay prevention (Chi, van der Goes & Ney, 2014). Often, children encounter barriers to accessing dental care and preventive dental services. These access-related barriers range from a lack of insurance to the inability to speak English (Finlayson, Gansky, Shain, & Weintraub 2014).

In an effort to improve dental outcomes, several objectives aimed at preventing and treating oral disease in children as well as improving access to dental services have been included in Healthy People 2020 (HP2020). The "Count Your Smiles" (CYS) survey was designed to address dental outcomes in Michigan that pertain to Healthy People objectives. In addition, CYS provides a follow-up to statewide estimates of child dental disease in Michigan from CYS surveys conducted in 2005-2006 and 2009-2010. These surveys track trends of oral health in the state and contribute to Michigan's overall oral health surveillance system. The CYS survey addressed health disparities among children for both dental disease and access to dental care.

Methods

SELECTION OF SCHOOLS

Michigan elementary schools were randomly selected through systematic probability proportional to size (PPS) sampling from ordered lists of schools in four regions of the state: the Upper Peninsula, the Northern Lower Peninsula, the Southern Lower Peninsula, and Wayne/Oakland/Macomb counties (metropolitan Detroit). The sampling frame was based upon school enrollment information from the 2014-2015 school year. The number of schools chosen in each region was proportional to state public school 3rd

grade school enrollment figures, with the exception of the Upper Peninsula and Northern Lower Peninsula regions, which were over sampled for better representation of these regions. Exclusion criteria included private schools, home-schooled children, schools with fewer than 15 third grade students, and both accelerated and special education classrooms. School sampling varied within each of the study-defined geographic regions in Michigan, with a total of 100 schools selected. In cases of school refusal, school closure, or poor school response rate, replacement schools were selected with a random probability proportional to size school selected from the same sampling interval as the refusing school. Free and reduced lunch enrollment served as a proxy for socioeconomic status. Of the original 100 selected schools, 46 schools refused to participate. There were participating replacements for 44 of these 46 refusing schools. In four cases the originally refusing school ended up participating and one additional school was screened by mistake, resulting in a total of 103 schools participating in the survey.

Upper Peninsula

This region included all counties of the Upper Peninsula of Michigan. This large area has a smaller dispersed population. Though this region if sampled proportional to population would only have had two school selections, it is considered an important area of the state to have oral health estimates. To achieve reasonable representation for this area of the state, schools were over sampled to select eight schools. The sampling list of schools was sorted geographically by county to provide for implicit stratification geographically in the systematic PPS sampling.

Northern Lower Peninsula

This region consisted of all Lower Peninsula counties north of and including Mason, Lake, Osceola, Clare, Gladwin, and Arenac counties. Again, to achieve better representation for this region, the number of schools selected in this region was increased from six to twelve to enhance the precision of prevalence estimates for the region. Sampling for the Northern Lower Peninsula again employed the school list being ordered geographically to ensure geographic dispersion of the sampled schools for this region.

Southeast Michigan

This region consisted of the three counties (Oakland, Macomb, Wayne) that comprise the metropolitan Detroit area. Ordering of the sample selection list provided for implicit stratification by county for the three counties, and separate selection of Detroit City School District, schools. Within these subdivisions schools were sorted by free/reduced lunch program eligibility to provide for further implicit stratification on socioeconomic status (SES). Thirty-five schools were selected to participate from this region.

Southern Lower Peninsula

This region consisted of all remaining Michigan Lower Peninsula counties. This region has a mixture of urban and rural areas, so sample selection employed implicit stratification on urban and rural school district based on Rural Urban Commuting Area (RUCA) codes tied to school district zip codes as designated by the Rural Health Research Center in Washington. Schools were sorted into rural and urban districts, and by percent eligible for free/reduced lunch program to achieve implicit stratification on urbanicity and SES in the sample for this region. Forty-five schools were selected to participate from this region.

RECRUITMENT OF PARTICIPANTS

Participants were recruited from 103 consenting elementary schools. Consent to work with the schools was first obtained through mailings to district superintendents. Upon confirmation, the school principal was contacted to obtain school consent, and a person to contact for follow-up. Consent forms were sent out to 8,318 parents for signed approval to permit their child to participate in the survey. In addition, children in participating classrooms received an oral health kit that included a toothbrush. Children who participated in the screening and teachers in participating classrooms also received a water bottle, and oral health education materials. Overall, 3,373 consent forms were returned, and 2,647 of these had a positive consent. However, only 2,056 children were present at the time of the screening by the hygienists.

SURVEY OF PARENTS

Consent forms sent to parents included a 16 question survey about their and their child's access to dental care along with questions on beliefs and attitudes on community water fluoridation. Parent responses were linked to child screening information through confidential identification numbers. Survey questions asked parents about their and their child's history of a toothache, time since last dental visit, reason for last dental visit, problems in obtaining dental care, source of dental insurance, race/ethnicity of the child, child eligibility for free/reduced lunch program, and whether a language other than English was spoken in the home. Surveys were available in English, Spanish, and Arabic.

ORAL SCREENING OF CHILDREN

Licensed dental hygienists performed the oral screenings while following standard precautions for infection control. Prior to the screenings, the dental hygienists attended

a training session to standardize measurement of dental disease and to facilitate the school screening.

ANALYSIS

Analysis sample weights were calculated for each child in the survey based on the sampling design employed. Weight calculations were based on the stratification of schools by region, and within region sample stratification based on geography, urbanicity, and/or socio-economic status (using percentage of children on free reduced lunch as a proxy measure) depending on the region. As described in the previous section on selection of schools, sampling intervals were created based on these stratification factors. Screened children were assigned weights based on their probability of selection from children within their sampling interval. Weights therefore reflect the number of Michigan 3rd grade children that each screened child represented.

These analysis weights and sample design stratification and clustering specifications were used with SAS 9.4 statistical software to generate valid population-based estimates of results. The Michigan Department of Health and Human Services Institutional Review Board reviewed this survey.

Results

Demographics

Characteristic	%
Region	
Upper Peninsula	7.9
Northern Lower Peninsula	11.3
City of Detroit	2.3
Suburban Detroit	30.4
Southern Lower Peninsula	48.2
Age	
7-8 years	51.7
9-10 years	48.3
Gender	
Male	46.3
Female	53.7
Race	
White	70.4
Black/African American	8.3
Hispanic/Latino	11.0
Asian	6.2
Other	4.2
Dental Insurance	
Private	58.5
Government Program	32.6
None	7.9
Other Characteristic	
Free/Reduced Lunch Program	42.2

OPEN MOUTH SCREENING RESULTS

Caries Experience

The presence of a cavitated lesion or a filling (permanent or temporary), a crown, or a tooth that is missing because it was extracted as a result of caries will be considered caries experience. Only missing permanent first molars were considered missing due to caries.

	Primary Caries Experience	Permanent Caries Experience	Primary or Permanent Caries Experience
	% (95% CI)	% (95% CI)	% (95% CI)
Michigan	49.3 (45.7-52.8)	18.2 (15.4-21.0)	54.3 (51.0-57.7)
Upper Peninsula	58.4 (43.5-73.2)	16.0 (12.5-19.6)	63.1 (50.6-75.6)
Northern Lower Peninsula	60.3 (46.4-74.3)	19.9 (12.9-27.0)	62.5 (48.2-76.7)
City of Detroit	47.9 (26.5-69.3)	11.2 (0.4-21.9)	57.2 (41.3-73.1)
Suburban Detroit	43.8 (38.3-49.3)	16.2 (11.5-20.8)	48.3 (42.2-54.4)
Southern Lower Peninsula	51.5 (47.4-55.6)	20.7 (16.4-25.1)	56.6 (52.5-60.7)
Age			
7-8 years	45.1 (40.6-49.7)	14.1 (11.1-17.1)	49.4 (44.5-54.2)
9-10 years	53.0 (48.4-57.5)	22.9 (18.9-26.9)	59.3 (55.4-63.1)
Gender			
Male	51.2 (47.4-55.0)	16.8 (13.1-20.4)	55.4 (51.2-59.6)
Female	47.2 (42.1-52.3)	19.4 (15.8-23.0)	53.0 (48.9-57.1)
Race/Ethnicity			
White	45.6 (41.0-50.1)	17.1 (14.1-20.1)	49.7 (45.5-53.8)
Black/African American	50.7 (35.1-66.3)	25.5 (18.4-32.6)	60.0 (46.4-73.6)
Hispanic/Latino	64.0 (57.0-71.0)	17.4 (10.7-24.1)	69.0 (62.3-75.8)
Asian American	46.1 (36.1-56.0)	10.1 (2.3-18.0)	48.9 (39.0-58.8)
Other	56.9 (46.1-67.6)	22.4 (3.5-41.4)	65.2 (54.9-75.4)
Dental Insurance			
Private	42.2 (37.8-46.5)	12.8 (9.9-15.7)	46.0 (41.4-50.7)
Public	57.7 (49.7-65.6)	25.7 (19.7-31.8)	64.4 (58.0-70.9)
No Insurance	55.2 (44.0-66.5)	20.6 (12.6-28.7)	57.7 (46.1-69.3)
Free/Reduced Lunch			
Enrolled	58.0 (52.3-63.3)	24.6 (20.4-28.7)	64.5 (59.9-69.0)
Not Enrolled	39.5 (34.9-44.0)	11.3 (8.6-14.0)	43.0 (38.4-47.6)

Untreated Decay

An untreated cavitated lesion.

	Primary Untreated Decay	Permanent Untreated Decay	Primary or Permanent Untreated Decay
	% (95% CI)	% (95% CI)	% (95% CI)
Michigan	21.0 (17.0-25.1)	8.1 (5.5-10.7)	25.0 (20.4-29.6)
Upper Peninsula	28.4 (13.0-43.9)	4.9 (0.5-9.3)	31.0 (15.9-46.2)
Northern Lower Peninsula	17.8 (7.8-27.7)	5.8 (2.7-9.0)	21.6 (10.3-32.9)
City of Detroit	28.8 (0.0-63.1)	2.8 (0.0-8.5)	31.5 (0.0-67.0)
Suburban Detroit	22.4 (16.0-28.8)	8.4 (4.2-12.6)	26.1 (18.4-33.7)
Southern Lower Peninsula	18.9 (15.3-22.5)	9.3 (5.0-13.5)	23.3 (18.7-28.0)
Age			
7-8 years	20.1 (15.2-25.1)	6.9 (4.7-9.1)	23.9 (18.4-29.5)
9-10 years	21.4 (17.1-25.8)	9.5 (5.6-13.5)	25.7 (20.7-30.7)
Gender			
Male	22.0 (17.7-26.4)	7.2 (4.5-10.0)	25.5 (20.6-30.3)
Female	19.6 (14.5-24.6)	8.8 (5.7-11.9)	24.0 (18.4-29.6)
Race/Ethnicity			
White	18.4 (15.0-21.8)	6.6 (4.5-8.8)	21.8 (18.1-25.5)
Black/African American	31.2 (15.5-46.8)	14.4 (6.6-22.3)	37.7 (19.1-56.2)
Hispanic/Latino	18.3 (8.1-28.6)	5.1 (1.0-9.2)	19.5 (9.0-29.9)
Asian American	24.8 (14.2-35.3)	1.9 (0.0-3.9)	25.9 (15.4-36.4)
Other	26.2 (17.1-35.3)	21.3 (2.8-39.8)	38.9 (25.6-52.2)
Dental Insurance			
Private	15.7 (12.4-18.9)	5.1 (3.4-6.9)	18.4 (14.7-22.1)
Government	27.7 (19.9-35.5)	11.6 (5.3-17.9)	33.0 (24.0-42.0)
No Insurance	30.1 (20.8-39.5)	12.8 (5.3-20.4)	35.2 (24.3-46.2)
Free/Reduced Lunch			
Enrolled	26.4 (19.9-32.8)	4.3 (2.7-5.8)	31.5 (23.9-39.1)
Not Enrolled	14.6 (11.6-17.6)	10.9 (6.7-15.0)	17.0 (13.7-20.3)

Sealants

Dental sealants are a transparent or opaque material applied to teeth to protect the pit and fissure surfaces from dental decay. To be considered as having sealants present, a sealant must be present on at least one permanent first molar.

	Sealants Present on First Molars
	% (95% CI)
Michigan	37.6 (33.5-41.8)
Upper Peninsula	58.6 (39.2-78.0)
Northern Lower Peninsula	39.3 (29.7-49.0)
City of Detroit	28.3 (5.7-50.8)
Suburban Detroit	35.3 (26.7-43.9)
Southern Lower Peninsula	39.6 (34.6-44.7)
Age	
7-8 years	37.7 (32.3-43.1)
9-10 years	37.2 (31.8-42.7)
Gender	
Male	37.6 (31.7-43.5)
Female	37.7 (33.7-41.7)
Race/Ethnicity	
White	38.9 (35.1-42.8)
Black/African American	29.5 (16.3-42.7)
Hispanic/Latino	43.8 (31.2-56.4)
Asian American	29.8 (17.0-42.7)
Other	42.0 (27.8-56.2)
Dental Insurance	
Private	40.1 (34.9-45.3)
Government	37.0 (31.4-42.6)
No Insurance	30.8 (17.8-43.7)
Free/Reduced Lunch	
Enrolled	35.6 (29.9-41.3)
Not Enrolled	40.9 (35.1-46.8)

Treatment Urgency

The examiner's recommendation of how soon the child should visit the dentist for clinical diagnosis and any necessary treatment. "No obvious problem" corresponded to no dental problems observed. "Early dental care is needed" corresponded to a cavitated lesion without accompanying signs or symptoms or when there were suspicious white or red soft tissue areas, with a recommendation that the child should see a dentist soon. "Immediate dental care is needed" corresponded to signs or symptoms of pain, infection, or swelling, with a recommendation that the child should be seen by a dentist as soon as possible.

	Treatment Urgency		
	No Obvious Problem	Early Dental Care Needed	Immediate Dental Care Needed
	% (95% CI)	% (95% CI)	% (95% CI)
Michigan	58.8 (53.1-64.6)	29.7 (23.6-35.9)	11.4 (7.5-15.3)
Upper Peninsula	48.1 (19.1-77.2)	49.3 (19.8-78.9)	2.5 (0.2-4.9)
Northern Lower Peninsula	78.1 (68.5-87.7)	14.2 (6.1-22.3)	7.8 (2.4-13.1)
City of Detroit	18.3 (0.0-41.2)	59.6 (22.2-97.0)	22.1 (0.0-50.1)
Suburban Detroit	52.2 (42.0-62.4)	28.8 (19.8-37.8)	19.0 (11.4-26.6)
Southern Lower Peninsula	69.4 (62.6-76.3)	25.8 (19.0-32.7)	4.7 (1.7-7.8)
Age			
7-8 years	61.8 (55.9-67.7)	27.1 (20.5-33.7)	11.1 (5.6-16.6)
9-10 years	55.6 (48.4-62.8)	33.2 (25.8-40.6)	11.2 (7.6-14.8)
Gender			
Male	58.8 (52.1-65.6)	30.5 (24.0-37.0)	10.6 (6.7-14.6)
Female	59.2 (52.8-65.6)	29.2 (22.1-36.3)	11.6 (7.1-16.2)
Race/Ethnicity			
White	67.3 (61.7-72.8)	23.4 (18.4-28.3)	9.4 (5.3-13.4)
Black/African American	30.7 (13.4-48.0)	48.2 (25.8-70.7)	21.1 (5.2-36.9)
Hispanic/Latino	63.3 (51.7-74.9)	29.9 (13.7-46.0)	6.9 (0.1-13.7)
Asian American	55.0 (31.4-78.5)	30.4 (12.2-48.6)	14.6 (2.3-26.9)
Other	47.7 (32.9-62.6)	35.2 (20.8-49.7)	17.0 (6.0-28.0)
Dental Insurance			
Private	68.0 (61.5-74.6)	24.8 (18.8-30.7)	7.2 (3.6-10.8)
Government	49.0 (40.6-57.5)	34.2 (23.0-45.4)	16.8 (9.1-24.4)
No Insurance	52.5 (39.8-65.3)	33.3 (23.0-43.6)	14.2 (6.0-22.3)
Free/Reduced Lunch			
Enrolled	51.5 (44.3-58.7)	33.1 (24.6-41.6)	15.4 (8.5-22.3)
Not Enrolled	71.6 (64.4-78.8)	21.7 (15.6-27.9)	6.6 (3.4-9.8)

DENTAL BEHAVIOR RESULTS

Toothache in the Past 6 Months

Parents reported if their child had a toothache more than once when biting or chewing in the past month.

	Toothache in past 6 months
	% (95% CI)
Michigan	12.3 (10.3-14.4)
Upper Peninsula	7.6 (3.1-12.1)
Northern Lower Peninsula	10.6 (7.8-13.3)
City of Detroit	17.6 (9.7-25.4)
Suburban Detroit	14.9 (10.6-19.2)
Southern Lower Peninsula	10.2 (7.6-12.8)
Age	
7-8 years	12.6 (10.1-15.1)
9-10 years	12.2 (9.4-14.9)
Gender	
Male	10.5 (7.8-13.1)
Female	14.3 (11.6-17.0)
Race/Ethnicity	
White	8.6 (6.5-10.7)
Black/African American	18.4 (12.2-24.6)
Hispanic/Latino	23.0 (17.4-28.7)
Asian American	9.8 (4.0-15.6)
Other	11.0 (2.4-19.5)
Dental Insurance	
Private	8.1 (6.0-10.3)
Government	18.5 (13.0-24.0)
No Insurance	11.7 (6.3-17.1)
Free/Reduced Lunch	
Enrolled	17.8 (13.7-21.9)
Not Enrolled	6.7 (4.9-8.5)

Last Dental Visit

Parent reported the last time their child visited the dentist including orthodontists, oral surgeons, other dental specialists, and dental hygienists.

	Last Dental Visit			
	Less than 6 months ago	6 months to 1 year	More than 1 year	Never
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Michigan	68.2 (65.2-71.2)	15.5 (13.2-17.8)	12.3 (9.8-14.7)	2.4 (1.5-3.2)
Upper Peninsula	75.6 (61.0-90.2)	14.1 (3.4-24.7)	9.7 (4.5-14.9)	0.6 (0.0-1.8)
Northern Lower Peninsula	74.7 (64.8-84.5)	13.0 (7.5-18.5)	7.2 (3.3-11.1)	4.2 (1.0-7.3)
City of Detroit	51.4 (42.7-60.1)	24.8 (15.5-34.2)	16.2 (1.9-30.6)	-
Suburban Detroit	69.1 (64.1-74.1)	16.0 (11.9-20.0)	11.3 (8.1-14.5)	2.5 (0.7-4.4)
Southern Lower Peninsula	69.4 (64.8-74.0)	13.9 (10.7-17.1)	13.0 (9.0-16.9)	2.5 (1.4-3.6)
Age				
7-8 years	68.6 (65.4-71.8)	15.3 (12.3-18.2)	11.1 (8.4-13.8)	3.2 (1.9-4.4)
9-10 years	67.6 (63.2-72.0)	15.8 (12.4-19.3)	13.5 (9.6-17.3)	1.6 (0.6-2.7)
Gender				
Male	68.4 (64.0-72.8)	16.4 (12.6-20.3)	12.3 (9.5-15.2)	1.8 (0.9-2.7)
Female	68.3 (64.5-72.0)	13.9 (10.9-16.9)	12.6 (9.3-15.9)	2.9 (1.6-4.3)
Race/Ethnicity				
White	75.9 (72.7-79.2)	11.0 (9.0-13.1)	10.1 (7.7-12.6)	1.8 (1.0-2.7)
Black/African American	45.4 (35.3-55.6)	28.6 (23.0-34.2)	18.6 (10.5-26.6)	3.5 (0.3-6.7)
Hispanic/Latino	62.6 (48.9-76.2)	15.6 (7.0-24.3)	18.2 (8.9-27.5)	0.5 (0.0-1.2)
Asian American	66.6 (55.4-77.7)	17.1 (10.7-23.6)	8.7 (3.4-14.0)	7.6 (2.5-12.8)
Other	62.7 (48.0-77.5)	19.0 (9.1-28.8)	12.4 (0.0-29.8)	4.7 (0.0-10.5)
Dental Insurance				
Private	79.5 (76.1-82.9)	11.7 (8.9-14.5)	7.0 (4.5-9.5)	1.6 (0.7-2.5)
Government	59.6 (54.4-64.8)	18.6 (14.5-22.7)	16.7 (11.6-21.8)	2.5 (1.1-4.0)
No Insurance	47.5 (35.0-60.1)	17.1 (10.3-23.8)	29.1 (20.3-37.9)	4.7 (0.9-8.6)
Free/Reduced Lunch				
Enrolled	59.8 (54.4-65.3)	19.3 (16.1-22.5)	16.0 (11.5-20.4)	2.4 (1.2-3.7)
Not Enrolled	82.2 (79.1-85.3)	9.8 (7.5-12.2)	5.7 (3.8-7.7)	2.2 (1.0-3.3)

- Sample size too small to report a rate

No Dental Care in Past Year

Parents reported if there was a time in the last year their child needed dental care but could not get it at the time.

	Could not get care in past year
	% (95% CI)
Michigan	8.0 (6.5-9.6)
Upper Peninsula	13.4 (4.7-22.1)
Northern Lower Peninsula	7.9 (2.8-13.1)
City of Detroit	1.5 (0.0-4.7)
Suburban Detroit	9.2 (5.7-12.8)
Southern Lower Peninsula	8.1 (6.1-10.0)
Age	
7-8 years	6.8 (4.9-8.7)
9-10 years	9.3 (7.0-11.5)
Gender	
Male	7.9 (5.2-10.6)
Female	8.3 (6.1-10.6)
Race/Ethnicity	
White	6.0 (4.6-7.5)
Black/African American	10.6 (5.8-15.4)
Hispanic/Latino	9.8 (5.4-14.3)
Asian American	3.6 (0.1-7.0)
Other	23.3 (13.4-33.2)
Dental Insurance	
Private	3.3 (2.1-4.4)
Government	13.2 (9.6-16.7)
No Insurance	18.5 (11.5-25.5)
Free/Reduced Lunch	
Enrolled	12.8 (9.7-15.8)
Not Enrolled	2.7 (1.5-3.8)

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