

Measuring Air Quality in Smoking and Non-smoking Areas of Nevada Casinos (Reno/Sparks): Potential Exposure of Minors to Secondhand Smoke

Eric Crosbie, PhD, MA



Unhealthy
for sensitive
groups



150



200

100

50

300

0

500

Air Quality
INDEX



Introduction/Background



Introduction/Background

MORE GAMES **TOTAL CREDITS** 143,175 **ADD CREDITS** **LEVEL** 19 **COLLECT BONUS !! NOW !!**

PROGRESSIVE JACKPOTS
23,694,811 (10,000 MIN. BET)
2,309,481 (1000 MIN. BET)
230,948 (100 MIN. BET)

7 **7** **7**

WILD **WILD** **WILD**

BET 888,850 **WIN** 8,888,882,500

PAYS **BET LESS** **BET MORE** **BET MAX** **ADD CREDITS** **SPIN**
HOLD FOR AUTOSPIN

Restaurants



Spas



Arcade



Ice Skating



Social Acceptability of Smoking

Airplanes



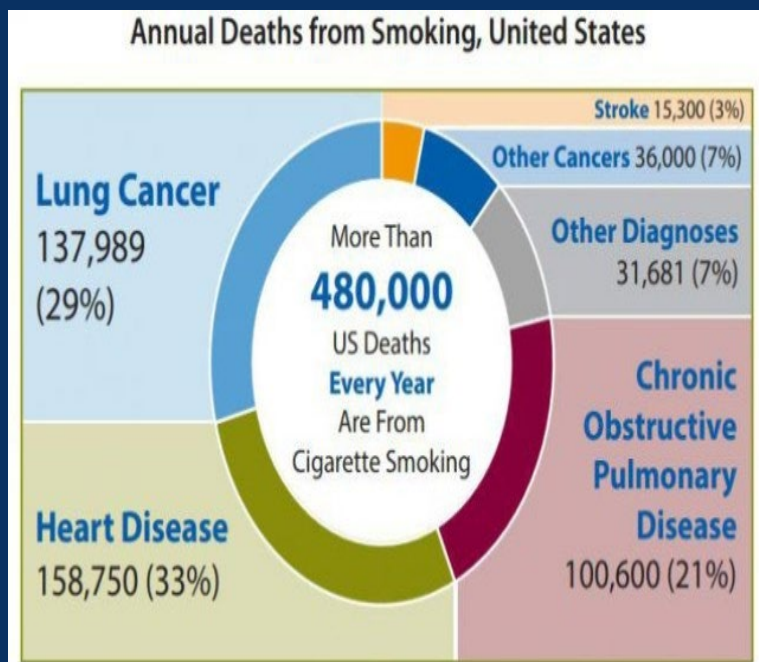
Hospitals



Restaurants



Secondhand Smoke/Vape Facts



Secondhand smoke causes the premature death of:

41,000 adults
and more than
400 infants
each year.

There is **no safe** level of exposure to **secondhand smoke.**

Source: USDHHS, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*, 2006.



Secondhand Smoke/Vape Facts

American Society of Heating, Refrigerating
and Air-Conditioning Engineers



ASHRAE Position Document on Environmental Tobacco Smoke

significantly, cardiovascular disease and lung cancer. No cognizant authorities have identified an acceptable level of ETS exposure to non-smokers, nor is there any expectation that further research will identify such a level.

there is no currently available or reasonably anticipated ventilation or air cleaning system that can adequately control or significantly reduce the health risks of ETS to an acceptable level.



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Methods

- **Selection criteria**
 - 14 gaming, non-gaming locations in Reno/Sparks area
- **Monitoring procedures**
 - 10-minute visits to six locations
 - Outdoor locations (control)
 - Gaming (slots), non-gaming (arcade)
- **Counting patrons**
 - Handheld clickers-smokers, non-smokers, minors



**AtmoTube PRO
portable air monitor**

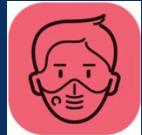


**Mobile app accessing
real-time air quality data**



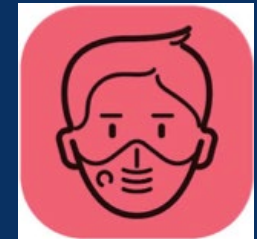
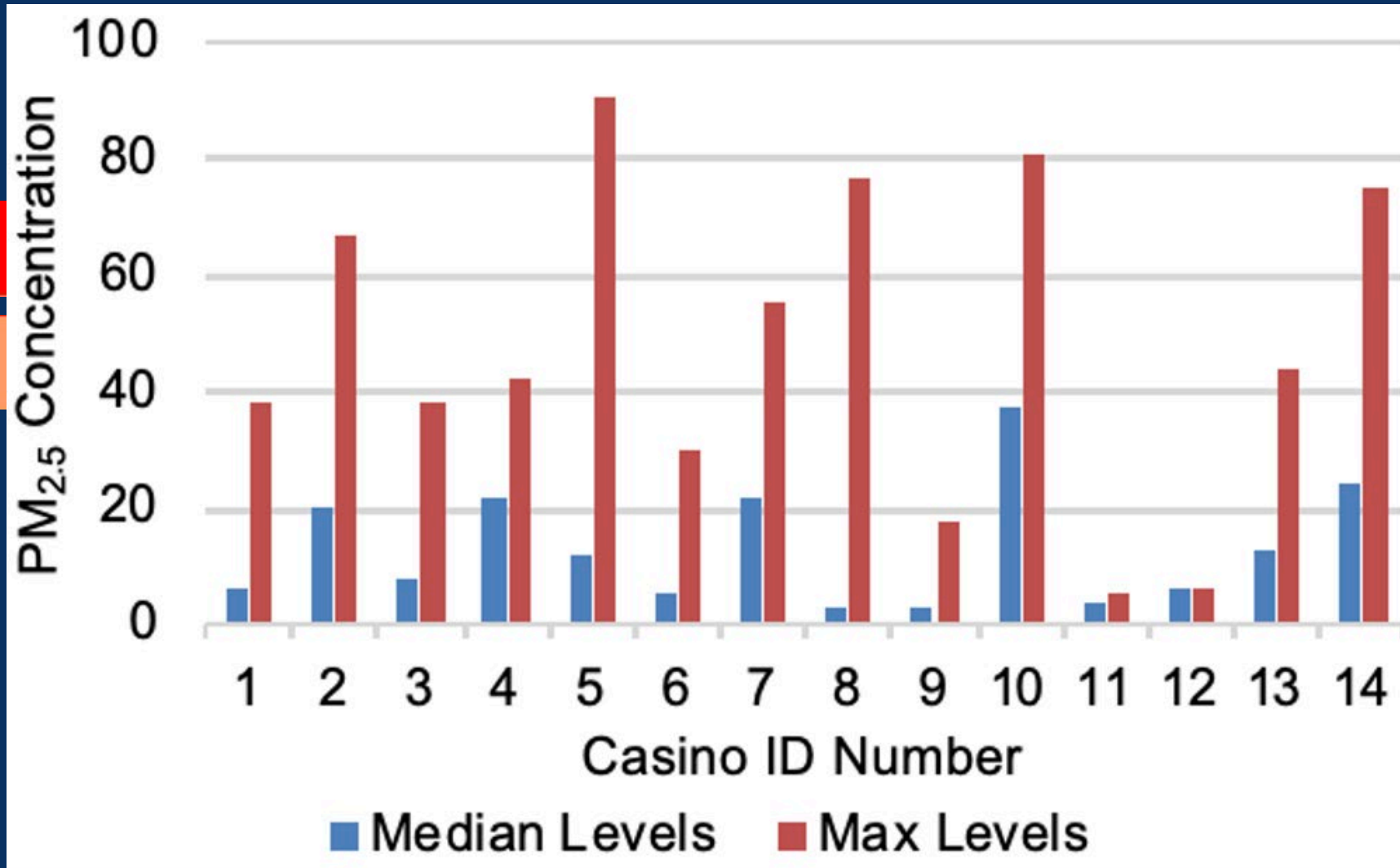
Air Quality Index

Level of Health Concern	Corresponding Particle Level	
Very Hazardous	> 500	$\mu\text{g}/\text{m}^3$
Hazardous	250 - 500	$\mu\text{g}/\text{m}^3$
Very Unhealthy	150 – 250	$\mu\text{g}/\text{m}^3$
Unhealthy	65 – 150	$\mu\text{g}/\text{m}^3$
Unhealthy for Sensitive Groups	40 – 65	$\mu\text{g}/\text{m}^3$
Moderate	15 – 40	$\mu\text{g}/\text{m}^3$
Good	0 – 15	$\mu\text{g}/\text{m}^3$



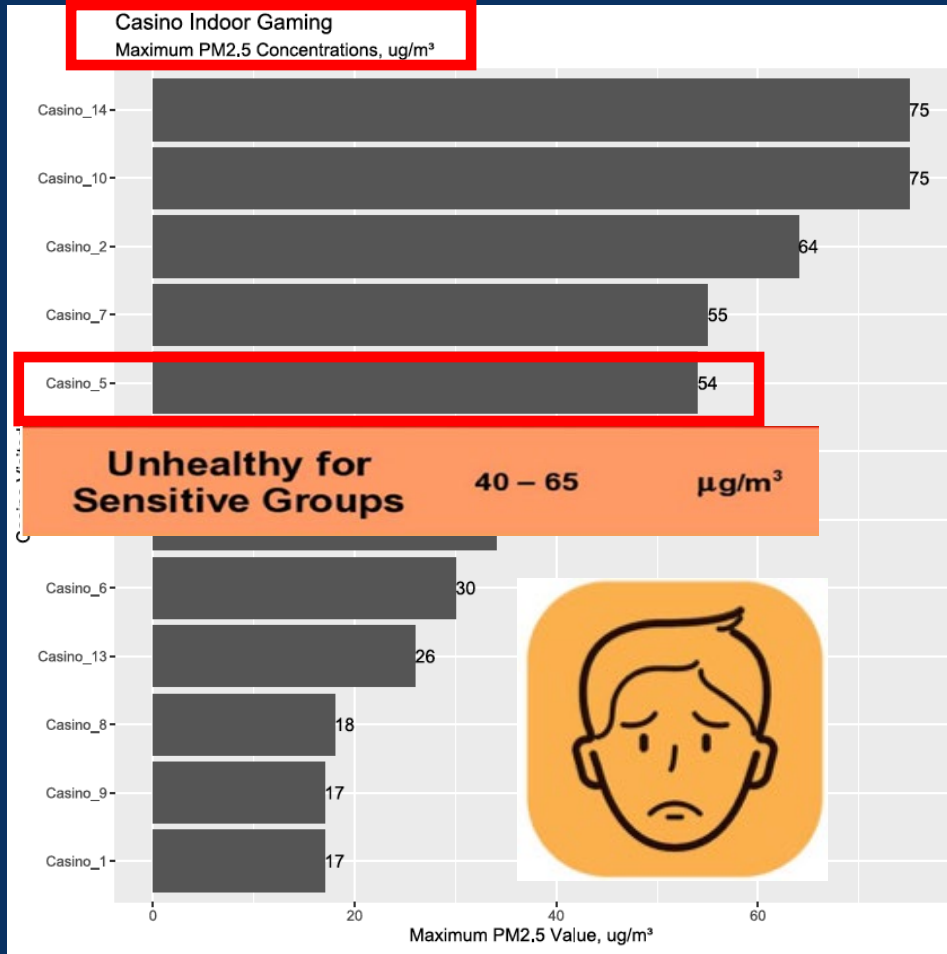
Results

Unhealthy	65 - 150	$\mu\text{g}/\text{m}^3$
Unhealthy for Sensitive Groups	40 - 65	$\mu\text{g}/\text{m}^3$



Particle Concentrations

Gaming vs Non-gaming areas



Particle Concentrations

Concentrations Aggregated By Casino Location With Minors

Location	N	Mean	StdDev	Max	Min	Median
Hallway	52	23	15	91	4	21.5
Outdoors	225	7	11	67	1	3
Bar / Lounge	103	23	12	64	2	21
Tables	16	52	11	64	31	56.5
Restaurant	132	24	15	63	2	25
Slots	118	17	11	54	2	18
Skyway	47	12	7.7	30	1	12
Arcade	181	9.6	5.7	22	1	10
Play Area	14	3.3	5.8	17	1	1
Food Court	39	7.7	1.9	10	3	8
Bowling Alley	11	3.3	1.6	8	2	3
Concert Hall	2	6	0	6	6	6
Ballroom	12	2.8	0.87	5	2	3
Lobby	12	2.5	0.52	3	2	2.5

Unhealthy

65 – 150

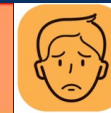
μg/m³



Unhealthy for Sensitive Groups

40 – 65

μg/m³



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Particle Concentrations

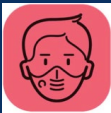
Concentrations Aggregated By Casino Location By Smoker Presence

Location	Are Smokers Present?	N	Mean	StdDev	Max	Min	Median
Hallway	NO	40	17	20	91	2	8.5
Restaurant	NO	221	28	19	77	1	27
Transition	NO	34	19	21	77	2	9
Bar / Lounge	NO	39	17	16	59	2	9
Restroom	NO	34	36	15	57	4	43.5
Outdoors	NO	344	3.8	5.4	50	1	3
Gift shop	NO	14	12	12	44	1	10
Arcade	NO	181	9.6	5.7	22	1	10
Event Center	NO	22	14	1.8	17	13	13
Food Court	NO	39	7.7	1.9	10	3	8
Bowling Alley	NO	11	3.3	1.6	8	2	3
Cargo Concert Hall	NO	2	6	0	6	6	6
Ballroom	NO	12	2.8	0.87	5	2	3
In a Vehicle	NO	25	2.7	0.56	4	2	3
Driving to Casino	NO	6	2.5	0.55	3	2	2.5
Lobby	NO	12	2.5	0.52	3	2	2.5
Walking outside	NO	6	2.7	0.52	3	2	3
Walking to car	NO	3	2.3	0.58	3	2	2

Unhealthy

65 – 150

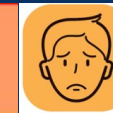
µg/m³



Unhealthy for Sensitive Groups

40 – 65

µg/m³



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Particle Concentrations

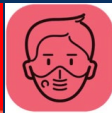
Concentrations Aggregated By Casino Location By Smoker Presence

Location	Are Smokers Present?	N	Mean	StdDev	Max	Min	Median
Hotel Registration	YES	11	28	11	48	13	29
Hallway	YES	36	22	7.8	46	4	22
Skyway	YES	47	12	7.7	30	1	12
Play Area	YES	14	3.3	5.8	17	1	1
Lobby	YES	10	60	14	81	44	56.5
Slots	YES	245	22	15	75	2	20
Outdoors	YES	216	7.3	12	67	1	3
Transition	YES	17	20	16	67	1	18
Bar / Lounge	YES	115	19	11	64	2	20
Tables	YES	16	52	11	64	31	56.5
Restaurant	YES	22	43	12	63	16	44

Unhealthy

65 – 150

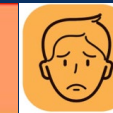
$\mu\text{g}/\text{m}^3$



Unhealthy for Sensitive Groups

40 – 65

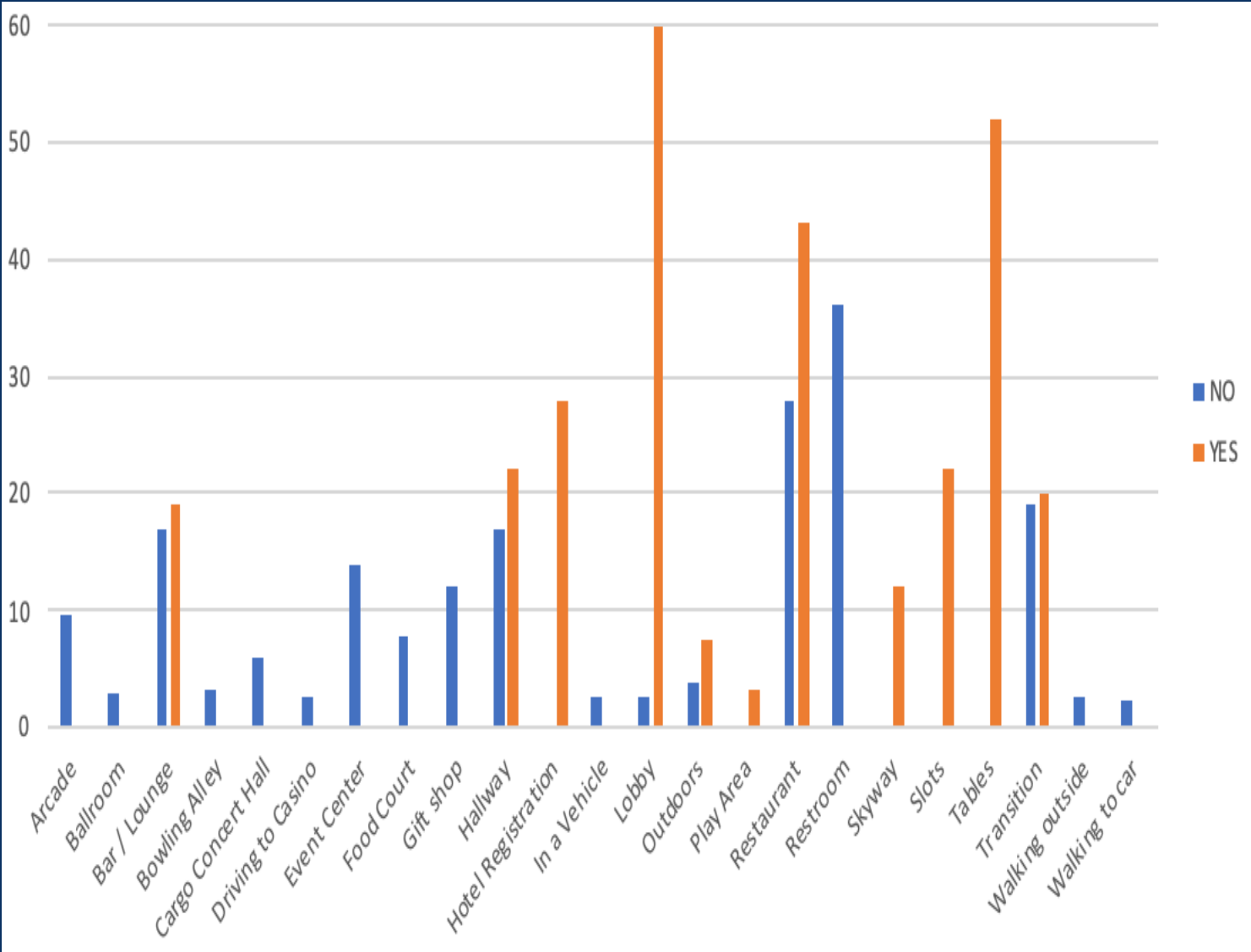
$\mu\text{g}/\text{m}^3$



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Particle Concentrations

Concentrations Aggregated By Casino Location By Smoker Presence



Observations of Patrons

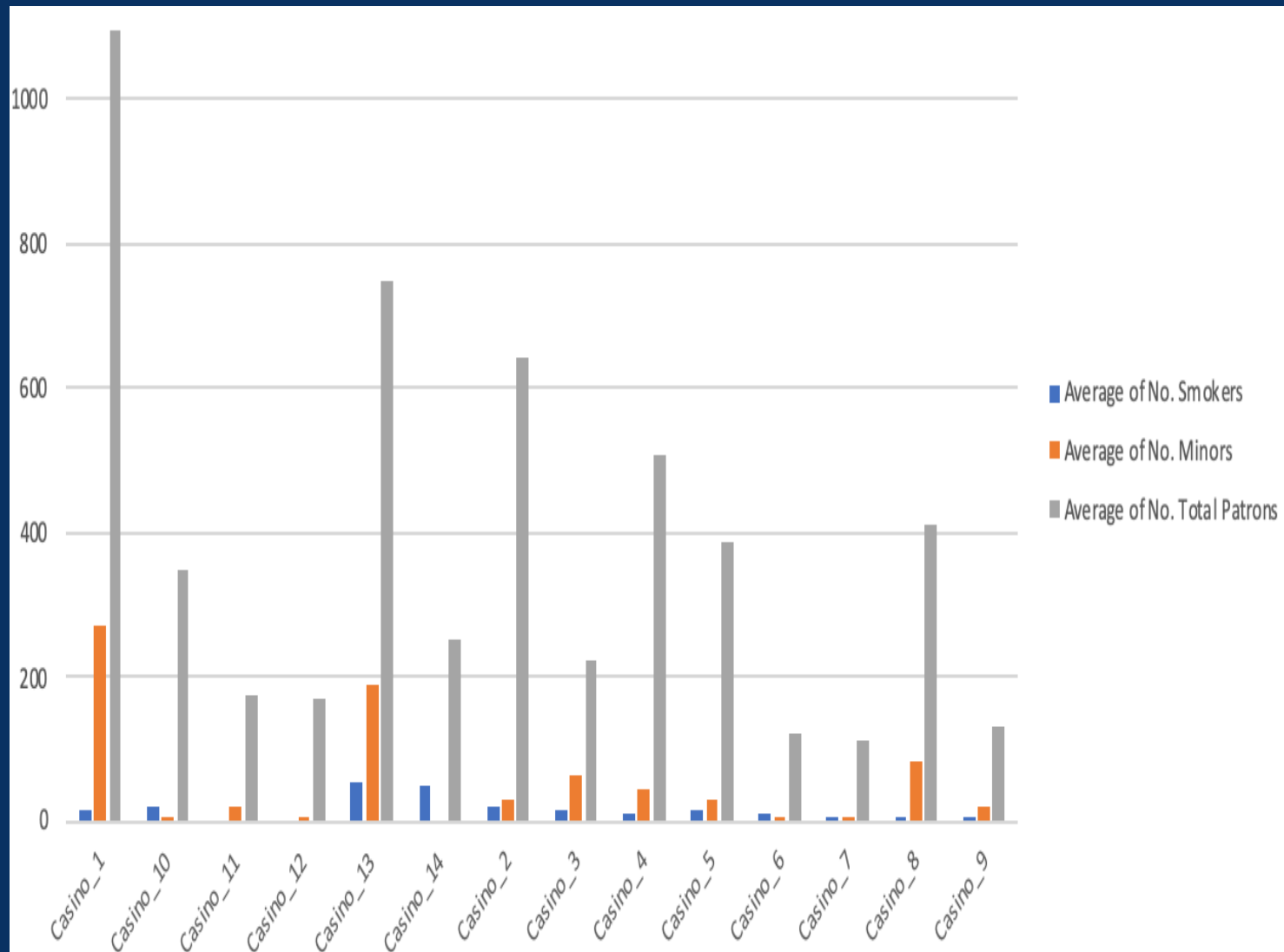
Number of Smokers, Minors and Total Patrons (By Casino)

SiteID	No. Smokers	No. Minors	No. Total Patrons	Smoker Percentage
Casino_11	0	19	172	0 %
Casino_12	0	7	169	0 %
Casino_1	15	269	1096	1.4 %
Casino_8	7	81	411	1.7 %
Casino_4	12	43	508	2.4 %
Casino_9	4	20	129	3.1 %
Casino_2	21	29	643	3.3 %
Casino_5	16	27	386	4.1 %
Casino_7	5	5	110	4.5 %
Casino_10	20	5	349	5.7 %
Casino_3	14	61	220	6.4 %
Casino_6	8	4	123	6.5 %
Casino_13	55	186	746	7.4 %
Casino_14	49	0	249	20 %



Observations of Patrons

Number of Smokers, Minors and Total Patrons (By Casino)



Conclusion

- Particulate matter can be high regardless of ventilation and with few or no smokers
- Minors/workers can be exposed to elevated particulate matter in non-gaming areas
- 100% smoke-free casinos are the only way to protect workers and patrons visiting

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Original Article

Measuring air quality in smoking and nonsmoking areas of Nevada casinos (Reno/Sparks): Potential exposure of minors to secondhand smoke

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Abstract
To understand the potential exposure to tobacco smoke in Washoe County (Reno/Sparks), Nevada casinos by measuring air quality in smoking areas relative to non-smoking/non-gaming areas in which minors may be present. To act as a pilot study in community-based health research and policy campaigns by evaluating low-cost air monitors to measure



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