

# HW1

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Code available at [https://github.com/zl2974/P8130\\_hw1\\_zl2974/](https://github.com/zl2974/P8130_hw1_zl2974/)

## Problem 1

### Descriptive statistics to the data

Table 1: Data summary

Name	sur_df
Number of rows	1491
Number of columns	5
Column type frequency:	
factor	3
numeric	2
Group variables	None

#### Variable type: factor

skim_variable	n_missing	complete_rate	ordered	n_unique	top_counts
smell	0	1	FALSE	3	Alt: 1047, Nor: 410, Una: 34
gender	0	1	FALSE	2	Fem: 981, Mal: 510
age_category	0	1	FALSE	3	31-: 810, 51+: 363, 18-: 318

#### Variable type: numeric

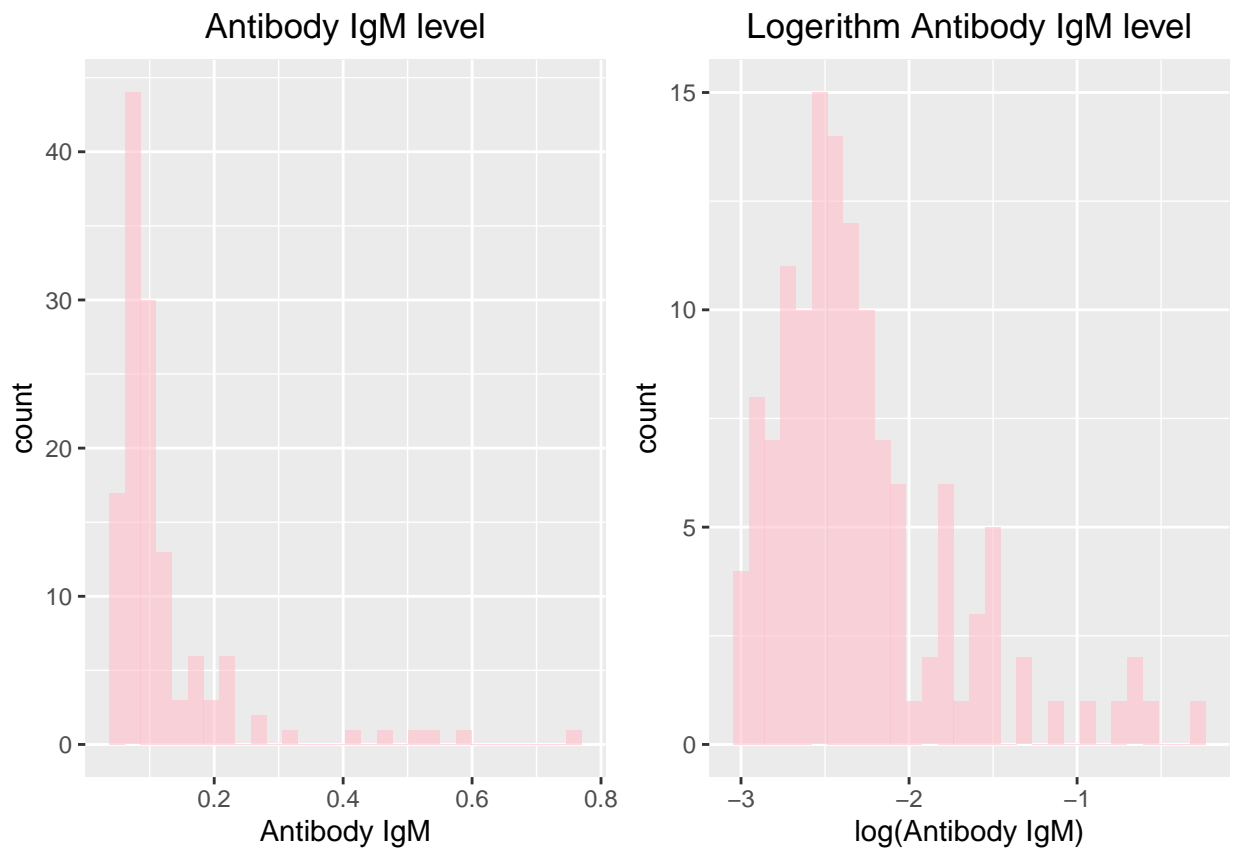
skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
subject	0	1.00	1413.75	881.07	1.00	632.50	1373.00	2190.50	2917.00	
antibody_ig_m	1224	0.18	0.12	0.11	0.05	0.07	0.09	0.13	1.05	

```
##
## Table: Catagorical Variable Statistics
##
## | Overall (N=1491) |
## |-----|:-----:|
## |age_category      |
## |- 18-30         | 318 (21.3%) |
```

```
## |- 31-50          | 810 (54.3%) |
## |- 51+           | 363 (24.3%) |
## |- Missing       | 0           |
## |smell           |             |
## |- Normal        | 410 (27.5%) |
## |- Altered       | 1047 (70.2%)|
## |- Unanswered/Others | 34 (2.3%)  |
## |- Missing       | 0           |
## |gender          |             |
## |- Female        | 981 (65.8%) |
## |- Male          | 510 (34.2%) |
## |- Missing       | 0           |
```

## Distribution of IgM

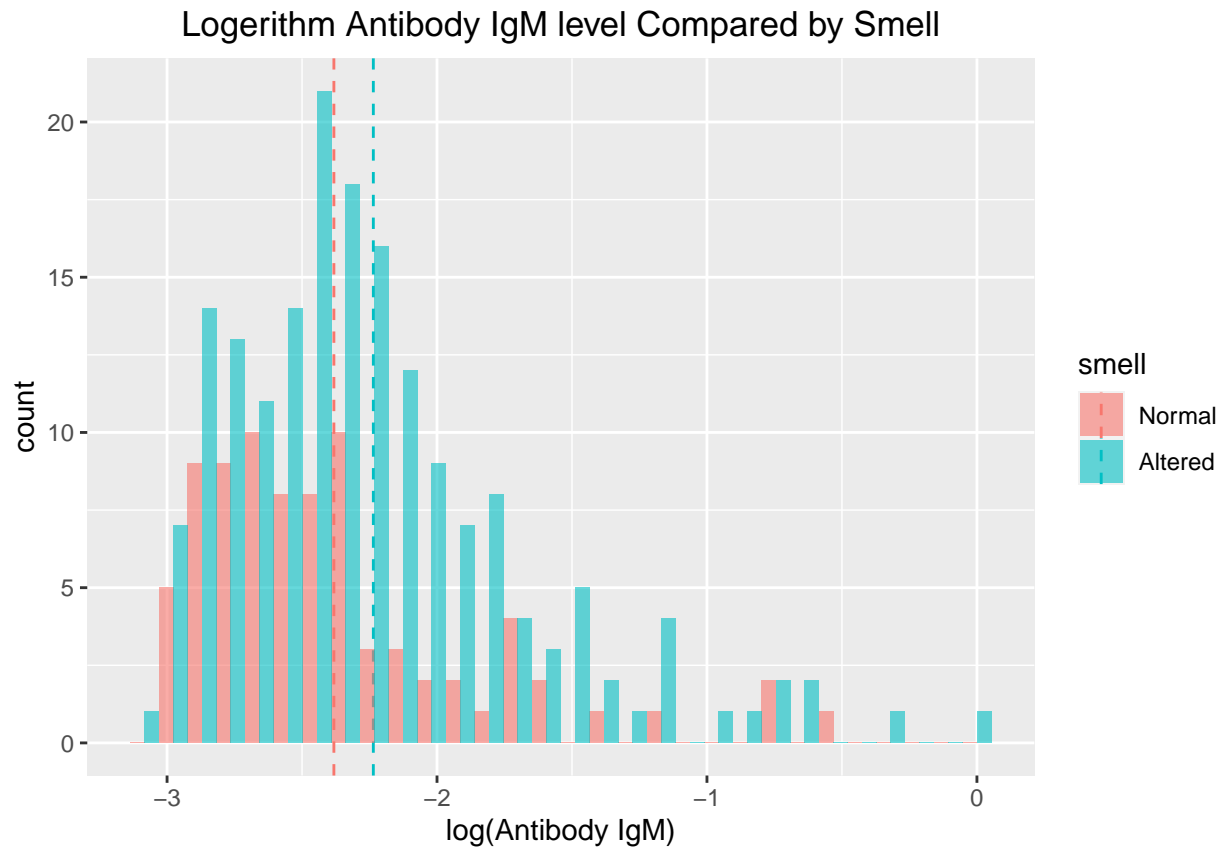
One can first notice from descriptive statistics above that antibody IgM's level is extreme left skewed. To detail, Both histograms of antibody level and the logarithm of antibody level were provided. As shown below, even adjusted skewness with logarithm.



## Smell Alter and Normal comparison

```
##
## Table: Smell
##
## |           | Normal (N=81) | Altered (N=178) |
```

##	:	-----:	:	-----:	:
##		antibody_ig_m			
##		- Mean (SD)		0.110 (0.092)	0.130 (0.119)
##		- Median (Q1, Q3)		0.081 (0.065, 0.107)	0.097 (0.072, 0.137)
##		- Min - Max		0.049 - 0.589	0.048 - 1.048
##		gender			
##		- Female		47 (58.0%)	120 (67.4%)
##		- Male		34 (42.0%)	58 (32.6%)
##		age_category			
##		- 18-30		13 (16.0%)	36 (20.2%)
##		- 31-50		43 (53.1%)	101 (56.7%)
##		- 51+		25 (30.9%)	41 (23.0%)



Grouped subjects with altered smell and normal, we have seen that subjects from group smell altered have higher antibody level compared with normal group.