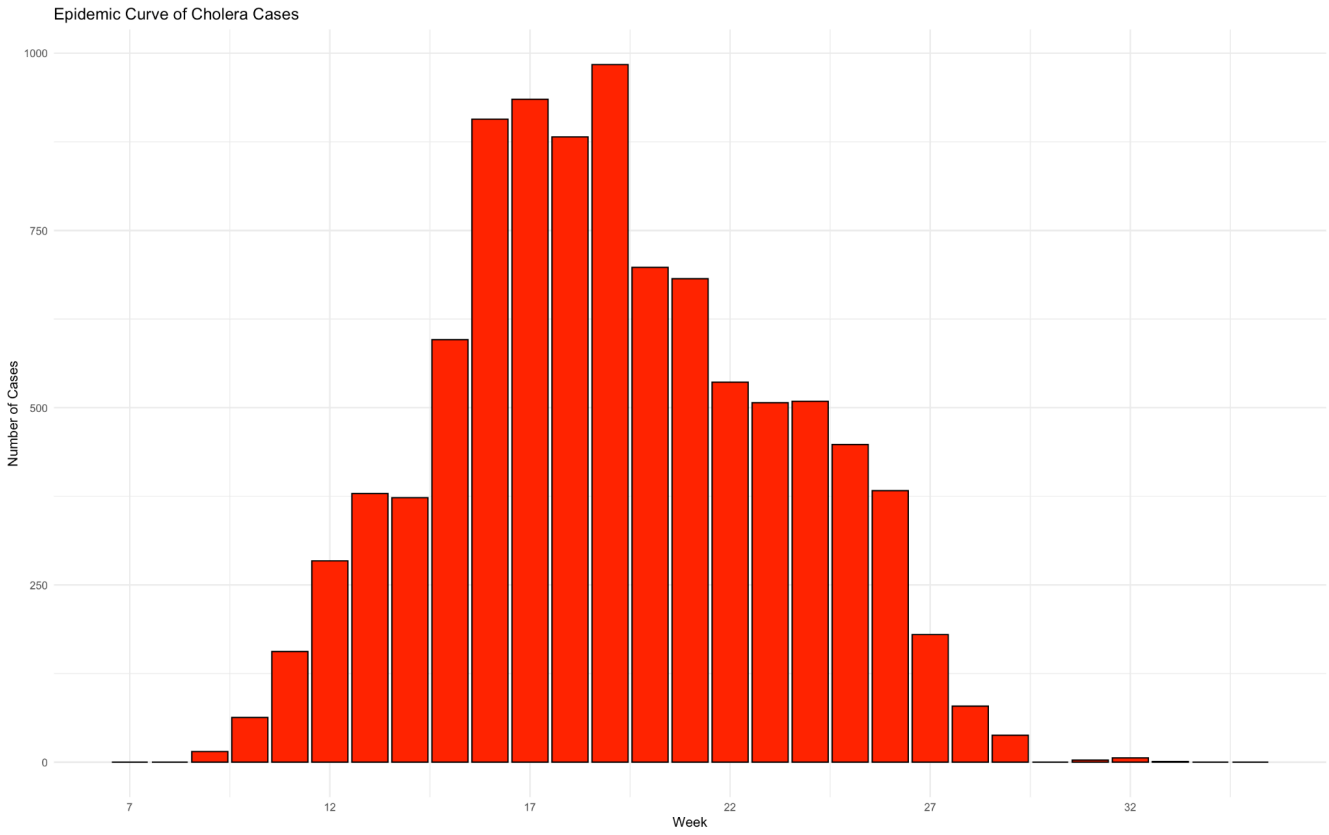
Question 1

The first case was recorded in week 9.

Question 2

The epidemic plot is given below.



The epidemic peaked at week 19.

Question 3

The case fatality rate (CFR) is 0.59 %

Question 4

CFR before treatment center: 8.12 %

CFR after treatment center: 0.4 %

From the Results, we can see that the CFR decreased significantly after the opening of the treatment center. We also know that ORT is extremely effective in preventing deaths due to Cholera, so it makes sense that the treatment center, which was primarily administering ORT, would help reduce the number of deaths due to Cholera.

Question 5

Characteristic	N	Event N	OR[1]	95% CI[1]	p-value
Drinking Water Source					
BoreholeTap water	158	38	—	—	
Well	172	72	2.27	1.42, 3.68	<0.001
Contact with Diarrhea Patient					
Do not Know	60	28	—	—	
No	194	62	0.54	0.30, 0.97	0.039
Yes	76	20	0.41	0.20, 0.83	0.015
Food Source					
Both	46	27	—	—	
FoodSellers	92	14	0.13	0.05, 0.28	<0.001
Neighbours	83	25	0.30	0.14, 0.64	0.002
None	109	44	0.48	0.23, 0.95	0.038
Waste Disposal Method					
Backyard	154	49	—	—	
BackyardBush	87	43	2.09	1.22, 3.61	0.007
Burning	33	6	0.48	0.17, 1.16	0.12
Bush	56	12	0.58	0.27, 1.18	0.15
Recent Travel					
No	240	72	—	—	
Yes	90	38	1.71	1.03, 2.81	0.037
Participation in Gatherings					
No	229	64	—	—	
Yes	101	46	2.16	1.33, 3.51	0.002

[1] OR = Odds Ratio, CI = Confidence Interval

After running a univariate regression we see the Odds Ratio for each of the events. Any event with an OR > 1, then exposure increases the odds of disease and If OR <1, then exposure decreases the odds of disease. The risk factors appear to be the following:

- Disposing water in the backyard bush
- Participating in gatherings
- Travelling recently
- Drinking from the Well

This indicates that the well may have been affected by the Cholera bacteria through the disposal method backyard bush. Gatherings may have used the water from the well which made it spread even faster.

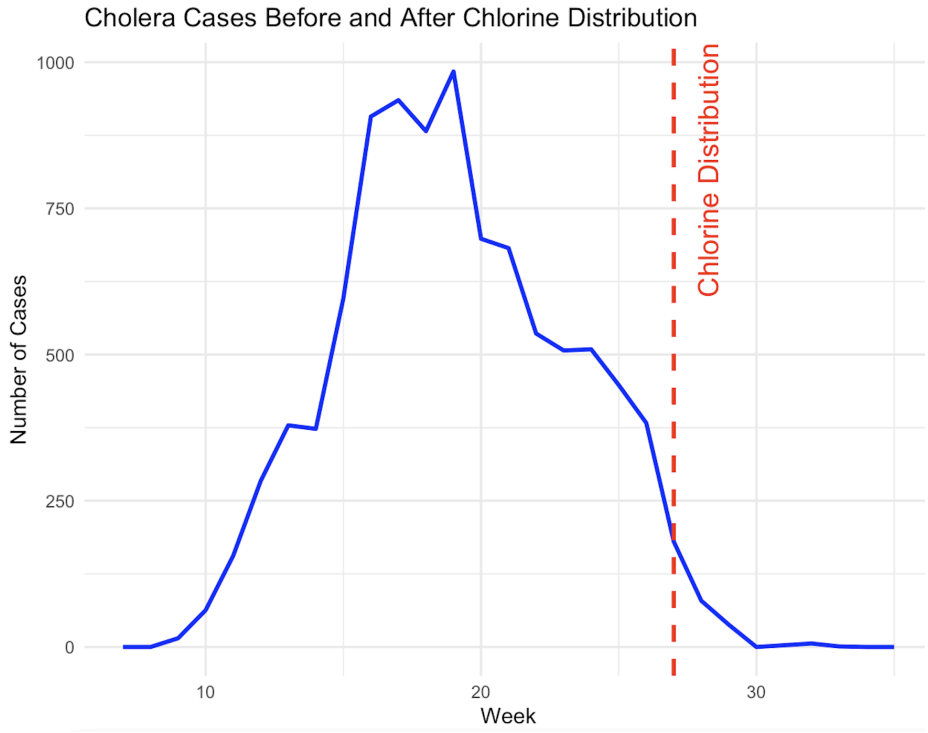
Question 6

Yes, the assessment of risk factors may be influenced by several potential biases and errors inherent in interview data. First, recall bias can occur if participants, particularly those who are ill, can remember their exposures (like the type of water they drank or their contact with sick individuals) more vividly or differently than the control group. On the other hand, if a person who was very sick had someone else do the form for them, they might not have been able to identify the exposures accurately.

Second, selection bias can arise from the way controls are chosen, for instance, if they live close to or share similar environments with cases, which means we do not have a proper representation of the population.

Third, reporting bias may creep in if participants choose to underreport or overreport certain practices because they feel judged or wish to provide a more socially acceptable answer. All of these factors can skew the association between risk factors and cholera infection, leading to misinterpretation of the true effect.

Question 7



From the data and the Plot, we can see that there was a downward trend before the Chlorine Distribution was implemented. It is hard to attribute the entire reduction to the Chlorine distribution, however, we can say that it did help reduce any new cases from happening. Since Chlorine kills bacteria, the water was not contaminated and hence the number of cases did not increase. That's why we can see that the number of cases becomes an almost flat line a few weeks after the introduction of chlorine.