

Exploratory Analysis of Selected Blood Test Results Among Residents of Porter Ranch and Two Control Populations, 2011-2019

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Background

The community of Porter Ranch is situated in the north San Fernando Valley region of Los Angeles County, adjacent to the Aliso Canyon Underground Gas Storage Facility, the largest underground gas storage facility in California and one of the largest in the United States. On October 23, 2015, a gas leak was detected at one of the wells at the facility. This leak was subsequently characterized as a “blowout” given the magnitude of the emissions, which continued for nearly 4 months until the well was sealed on February 15, 2016, following multiple unsuccessful well-kill attempts. During the period of the blowout, an estimated 109,000 metric tons of methane were released, constituting the largest uncontrolled release of methane in U.S. history. In addition to methane, emissions included sulfur-containing odorants present to detect leaks given that methane is an odorless gas. Because the underground gas storage facility was a former oil production site, there was also concern about the presence of volatile organic compounds, including benzene, and other potentially toxic oil byproducts in the emissions.

During the blowout period, many residents of Porter Ranch and other nearby communities reported a range of symptoms, including but not limited to cough, throat irritation, nosebleeds, eye irritation, headache, nausea, vomiting, diarrhea, and skin rashes. Once the well was sealed, many residents continued to experience symptoms and expressed deep concerns about potential future health effects due to exposures from the blowout. Based on the continued symptoms as well as the magnitude of the disaster, funding of \$25 million for a health study was included as part of a settlement agreement (Consent Decree) reached on August 8, 2018 between the Southern California Gas Company, the operator of the facility, and the County of Los Angeles, City of Los Angeles, and State of California. As specified in the Consent Decree, the health study will be conducted by an independent research group selected through a competitive solicitation process administered by the Los Angeles County Department of Public Health (DPH) and will be overseen by a Scientific Oversight Committee.

Chief among the health concerns raised by community members has been potential exposure to benzene before, during, and after the blowout given their proximity to the facility. Benzene is a known carcinogen, with long-term exposure being associated with a particular type of blood cell cancer called acute myeloid leukemia, or AML.¹ Because benzene is toxic to the bone marrow, the body’s organ that produces blood cells, a potentially sensitive indicator of benzene exposure could be reduced or altered production of these cells.^{2,3}

Community concerns about benzene were heightened with the findings of a data analysis conducted by a local physician in collaboration with a researcher at the University of Southern California (USC) Keck School of Medicine. The analysis was done with data from a commercial clinical laboratory on complete blood counts (CBC) from adult residents of Porter Ranch (zip code 91326) and adult residents of three other zip codes that were physically distant from the site, 90265 (Malibu), 93534 (Lancaster), and 93012 (Camarillo). Residents from the latter three zip codes were combined and served as a control group in the analysis.

The analysis indicated that during the period from 2008 through 2018, most annual average counts for specific CBC components (e.g., hemoglobin, hematocrit, white blood cell count,



counts of white blood cell sub-types, and platelet count) were lower among Porter Ranch residents than among those in the control group, suggesting possible bone marrow suppression among some residents in the Porter Ranch group. One exception was a higher average count for lymphocytes in Porter Ranch residents than in the comparison group.

The analysis was significantly limited because it only included data on persons who had sought medical care, and at locations that used this commercial lab. The analysis was further limited by the lack of information on why persons were tested and what medical conditions they had that could influence CBC results. Both factors could have introduced error in comparisons of the two populations given that they were not accounted for in the analysis. In addition, the analysis did not include children because of an insufficient number of test results.

In response to community requests, DPH agreed to pursue data from a larger clinical laboratory to include both children and adults and to conduct a similar analysis, with the understanding that the new study would have the same limitations as the previous study and, thus, the results from the new analysis would be viewed as exploratory. By exploratory, we mean that these results by themselves would not be sufficient to conclude that blood components in Porter Ranch residents were affected or not affected by the Aliso Canyon blowout. These exploratory findings may be informative for future research including the Consent Decree-funded health study.

Methods

Data Source.

A de-identified dataset with results for selected blood tests was obtained from Quest Diagnostics, a large commercial clinical laboratory, through a data licensing agreement. The dataset included all blood test results from 2011 through 2019 for residents 5 years of age and older from the Porter Ranch zip code (91326), the same three control zip codes used in the prior analysis (90265, 93534, and 93012, together referred to as Control Population 1 in the present analysis), plus three additional zip codes, 91030 (South Pasadena), 90041 (Eagle Rock), and 91214 (La Crescenta-Montrose). The latter three zip codes were combined to serve as an additional control group (referred to as Control Population 2) and were selected because they had similar demographic profiles to that of the Porter Ranch zip code, were physically distant from the underground gas storage facility, and did not have large oil or gas operations in their zip code areas.

The specific data elements in the dataset included: a coded patient ID, patient's gender, patient's age (in years), patient's zip code of residence, date of the blood test, type of test, and test result. The following types of blood tests were included: CBC, liver enzyme tests (alanine aminotransferase and aspartate aminotransferase) and kidney function tests (blood urea nitrogen and serum creatinine). The liver enzyme and kidney function tests were included because two published studies had found increases in the average levels of these test results in a sample of residents exposed to benzene from an oil flaring incident at an oil refinery in Texas compared with an unexposed control group.^{4,5}



Analysis.

Separate analyses were conducted for children 5-17 years old and adults 18 years and older. For each group, the analyses included two components. First, to assess the impact of the blowout on blood test results among Porter Ranch residents, temporal trends in average (mean) values for each blood test were examined for adults and children in Porter Ranch across four time periods: before the blowout when the facility was fully operational, during the blowout (when exposures would have presumably been at their highest), after the blowout when the facility was offline for a period of 17 months (when exposures would have presumably been at their lowest), and after the blowout when the facility was back online but at a reduced capacity. Trends were analyzed by month/year for adults and by quarter/year for children. The lesser frequency of results for children was due to the smaller number of test results in this group.

Second, to further assess potential impacts from possible benzene exposures among Porter Ranch residents over the 9-year study period, annual mean values of blood test results for these residents were compared with results from residents in Control Population 1 (as had been done in the earlier study) and Control Population 2. The second control population was included to assess consistency of findings and the degree to which results might vary across zip codes due to factors unrelated to the blowout. Results for the three populations were further compared by month/year for adults and quarter/year for children over the 9-year period.

Differences in mean values were evaluated for statistical significance with an Analysis of Variance (ANOVA). Differences associated with p-values less than 0.05 were considered statistically significant. The analysis plan was reviewed and approved by the DPH Institutional Review Board.

Results

Blood test results from 21,345 residents of Porter Ranch, 53,274 residents of Control Population 1, and 44,267 residents of Control Population 2 were included in the analysis. The three populations have similar gender and age group distributions (Table 1).

Trends in mean values of test results by month/year among adults 18 years of age and older in Porter Ranch are shown in Figures 1-12. For hemoglobin and hematocrit results, trends are also presented by gender because the normal range for these two tests differ for adult males and females (Figures 2 and 4). The trends in mean values for test results by quarter/year among children 5-17 years of age in Porter Ranch are shown in Figures 13-22. The normal range for each test is shown in Table 2.

As shown in the figures, variation from month-to-month among adults and quarter-to-quarter among children is evident for all test results. No clear deviations in the trends are discernable in temporal association with the periods of the pre-blowout, blowout, or post-blowout (demarcated with vertical lines in the figures). There is a slight downward trend in mean hematocrit levels



among adult males and females during the post-blowout period when the facility was offline although the mean values do not deviate from the pre-blowout period (Figure 4). There is also an increase in mean white blood cell counts among adults over several months during the post-blowout period when the facility was offline (Figure 5). This increase is also discernible and more prominent for mean lymphocyte counts among adults (Figure 7). A similar pattern is not seen among children (Figures 15 and 17). Mean platelet counts increase from mid-2013 to mid-2017 among adults and from late-2015 to late-2017 among children (Figures 8 and 18, respectively).

Comparisons of annual mean blood test results among adults in Porter Ranch and Control Populations 1 and 2 are shown in Tables 3-16. Comparisons of results among children are shown in Tables 17-26. Multiple test results show statistically significant differences between adults and children in Porter Ranch and the two control populations. However, many statistically significant differences in test results are also observed between the two control populations. Relatively few results for Porter Ranch residents show statistically significant differences with results from both control populations, denoted by superscripted numbers 1 and 2 in the tables. Results in which levels in Porter Ranch are either lower or higher than both control populations with p-values less than 0.05 are indicated in bold. For two blood tests, blood urea nitrogen and creatinine, differences between adults in Porter Ranch and both control populations are observed over multiple years but results for those in Porter Ranch are intermediate to the results from the two control populations (Tables 15 and 16).

More detailed comparisons are shown for adults by month/year in Figures 23-36 and for children by quarter/year in Figures 37-46. For all blood test results, the trend lines for Porter Ranch and the two control populations exhibit substantial overlap as well as month-to-month and quarter-to-quarter variation among adults and children, respectively. The increased mean white blood cell and lymphocyte counts among adults in Porter Ranch over a several month period when the facility was offline, referenced above in Figures 5 and 7, are not observed in the two control populations (Figures 29 and 31).

Differences in the monthly mean values across the three adult populations are also shown in Tables 27-40 for the period July 2015 (nearly 4 months prior to the onset of the blowout) through June 2017 (more than 17 months after the well was sealed). The only months in which a mean value was either lower or higher in Porter Ranch than in both control populations at a p-value less than 0.05 was in December 2016 (mean white blood cell count higher in Porter Ranch; Table 33), January 2017 (mean lymphocyte count higher in Porter Ranch; Table 35), and April 2016 (mean aspartate aminotransferase level higher in Porter Ranch; Table 38).

Differences in quarterly mean values across the three child populations are shown in Tables 41-50 for the first quarter of 2015 through fourth quarter of 2017. The only quarter in which mean values were either lower or higher in Porter Ranch than in both control populations at a p-value less than 0.05 was in the second quarter of 2015 (alanine aminotransferase and aspartate aminotransferase levels higher in Porter Ranch; Tables 47 and 48).



Discussion

In this exploratory analysis, we did not find evidence of an impact of the blowout on mean values of selected blood test results among adults and children in Porter Ranch who had blood tests conducted by Quest Diagnostics during the period of 2011 to 2019. Temporal variability in results was observed over the 9-year study period but no clear pattern of deviation was evident during or following the blowout period. Comparison of Porter Ranch results with those of the two control populations revealed multiple differences that were of relatively small magnitude but, nonetheless, were statistically significant given the large number of people included in the analysis. The differences in results between Porter Ranch and the two control populations did not exhibit a pattern in which Porter Ranch results were consistently higher or lower than the results in both control populations. Statistically significant differences in results were also observed between the two control populations, suggesting that similar differences observed with Porter Ranch could potentially be attributable to factors unrelated to the facility that were not accounted for in the analysis. In addition, given the large number of comparisons that were included in the analysis, p-values of less than 0.05 would be expected for some comparisons just by chance.

As noted earlier, the analysis has several important limitations that make it difficult to draw firm conclusions regarding the clinical significance of potential exposures to benzene or other toxic substances related to the blowout. Because the analysis was limited to past test results from a single commercial clinical lab that does not serve the entire population, results may not be representative of all residents in Porter Ranch and the control populations. In addition, because these blood tests are often done for different reasons that may influence the results (e.g., for a routine physical exam, a chronic disease, or an acute illness), the inability in the analysis to account for why persons received their blood test is a major limitation. A further potential limitation is that mean values of CBC, liver enzyme, and kidney function test results across large population groups may not be a sensitive enough indicator to detect benzene exposures that produce biological effects or present long-term health risks in some individuals.

Given these limitations, the conclusions drawn from the analysis should not be viewed as definitive. However, the findings may be used by the research group selected for the upcoming health study, or by other researchers, to inform any future related research in this area.

References

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4. D'Andrea MA, Kesava Reddy G. Hematological and hepatic alterations in nonsmoking residents exposed to benzene following a flaring incident at the British Petroleum plant in Texas City. *Environ Health* 2014;13:15.
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Tables and Figures

Table 1. Demographic characteristics of the study populations.

Characteristic	Porter Ranch	Control Population 1	Control Population 2
	No. (%)	No. (%)	No. (%)
Gender ¹			
Male	9,232 (43%)	21,846 (41%)	18,895 (43%)
Female	12,112 (57%)	31,419 (59%)	25,370 (57%)
Age Group			
5-11	650 (3%)	2,238 (4%)	1,659 (4%)
12-17	1,025 (5%)	3,033 (6%)	2,537 (6%)
18-29	2,924 (14%)	8,092 (15%)	6,360 (14%)
30-49	5,947 (28%)	13,831 (26%)	14,219 (32%)
50-64	5,445 (26%)	13,568 (25%)	10,986 (25%)
65+	5,354 (25%)	12,512 (23%)	8,506 (19%)
Total	21,345 (100%)	53,274 (100%)	44,267 (100%)

¹Numbers by gender do not add up to the total numbers because of missing gender information for some persons.



Table 2. Reference ranges, Quest Diagnostics.¹

Blood Test/Component	Reference Range(s) for Children and Adolescents ²	Reference Range(s) for Adults ²
Hemoglobin	<u>6 years old</u> Males and Females: 11.5-14.0 g/dL <u>12 years old</u> Males and Females: 11.5-15.5 g/dL	<u>18 years old</u> Males: 12.0-16.9 g/dL Females: 11.5-15.3 g/dL <u>≥18 years old</u> Males: 13.2-17.1 g/dL Females: 11.7-15.5 g/dL
Hematocrit	<u>6 years old</u> Males and Females: 34.0-42.0% <u>12 years old</u> Males and Females: 35.0-45.0 (%)	<u>18 years old</u> Males: 36.0-49.0% Females: 34.0-46.0 % <u>≥18 years old</u> Males: 38.5-50.0 % Females: 35.0-45.0 %
White blood cell count	<u>6 years old</u> Males and Females: 5.0-16.0 Thousand/ μ L <u>12 years old</u> Males and Females: 4.5-13.5 Thousand/ μ L	<u>18 years old</u> Males and Females: 4.5-13.0 Thousand/ μ L <u>≥18 years old</u> Males and Females: 3.8-10.8 Thousand/ μ L
Neutrophil count	Not available ³	<u>≥18 years old</u> Males and Females: 1500-7800 cells/uL
Lymphocyte count	Not available ³	<u>≥18 years old</u> Males and Females: 850-3900 cells/uL
Platelet count	<u>>6 months</u> Males and Females: 140-400 Thousand/ μ L	<u>>6 months</u> Males and Females: 140-400 Thousand/ μ L
Alanine aminotransferase	<u>4-12 years old</u> Males:8-30 U/L Females: 8-24 U/L <u>13-15 years old</u> Males: 7-32 U/L Females: 6-19 U/L	<u>16-19 years old</u> Males: 8-46 U/L Females:5-32 U/L <u>≥20 years old</u> Males: 9-46 U/L Females: 6-29 U/L
Aspartate aminotransferase	<u>4-6 years old</u> Males and Females: 20-39 U/L <u>7-19 years old</u> Males and Females: 12-32 U/L	<u>20-49 years old</u> Males: 10-40 U/L <u>20-44 years old</u> Females: 10-30 U/L <u>≥45 years old</u> Females: 10-35 U/L <u>≥50 years old</u>



		Males: 10-35 U/L
Blood urea nitrogen	<u>4-19 years old</u> Males and Females: 7-20 mg/dL	<u>≥20 years old</u> Males and Females: 7-25 mg/dL
Creatinine	<u>1 month-9 years old</u> Males and Females: 0.20-0.73 mg/dL <u>10-12 years old</u> Males and Females: 0.30-0.78 mg/dL <u>13-15 years old</u> Males: 0.40-1.05 mg/dL Females: 0.40-1.00 mg/dL <u>16-17 years old</u> Males: 0.60-1.20 mg/dL Females: 0.50-1.00 mg/dL	<u>18-19 years old:</u> Males: 0.60-1.26 mg/dL Females: 0.50-1.00 mg/dL <u>20-49 years old</u> Males: 0.60-1.35 mg/dL Females: 0.50-1.10 mg/dL <u>50-59 years old</u> Males: 0.70-1.33 mg/dL Females: 0.50-1.05 mg/dL <u>60-69 years old</u> Males: 0.70-1.25 mg/dL Females: 0.50-0.99 mg/dL <u>70-79 years old</u> Males: 0.70-1.18 mg/dL Females: 0.60-0.93 mg/dL <u>≥80 years old</u> Males: 0.70-1.11 mg/dL Females: 0.60-0.88 mg/dL

¹ The reference range for some tests vary by gender and age; ranges for selected age groups are shown.

²Reference ranges provided in Table 2 were retrieved from the Quest Diagnostics website and are specific to laboratory tests conducted by Quest Diagnostics. While the reference ranges do not align perfectly with the age categories used in this report, they may still be used to provide a rough idea of the approximate test result ranges for males and/or females at various ages.

³Reference ranges were not available at the time of publishing this report.



Table 3. Mean hemoglobin levels among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,279	13.45 ¹	12,850	13.53	11,962	13.48
2012	5,180	13.34^{1,2}	14,097	13.52	12,719	13.52
2013	6,286	13.42	15,576	13.46	12,460	13.45
2014	6,295	13.55	17,385	13.54 ³	13,363	13.59
2015	7,381	13.53	17,581	13.52 ³	13,963	13.57
2016	8,024	13.56	18,805	13.53 ³	14,066	13.60
2017	8,622	13.62 ²	19,838	13.59 ³	14,314	13.73
2018	9,475	13.56^{1,2}	20,470	13.62³	15,089	13.79
2019	10,335	13.61 ²	21,672	13.60 ³	16,010	13.76

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 4. Mean hemoglobin levels among males 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	1,773	14.23	5,102	14.33	4,866	14.30
2012	2,062	14.18^{1,2}	5,710	14.31	5,222	14.38
2013	2,618	14.23	6,398	14.21	5,181	14.24
2014	2,845	14.39	7,076	14.32 ³	5,521	14.40
2015	3,093	14.35 ¹	7,372	14.26 ³	5,782	14.42
2016	3,409	14.40 ^{1,2}	8,088	14.24 ³	5,899	14.49
2017	3,656	14.48 ²	8,295	14.42 ³	6,107	14.60
2018	4,039	14.44 ²	8,740	14.43 ³	6,432	14.72
2019	4,531	14.41 ²	9,205	14.42 ³	6,823	14.66

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 5. Mean hemoglobin levels among females 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	2,505	12.89 ¹	7,744	13.00 ³	7,094	12.92
2012	3,118	12.78^{1,2}	8,386	12.98³	7,496	12.93
2013	3,668	12.84 ¹	9,178	12.93	7,277	12.88
2014	4,080	12.97	10,307	13.00	7,841	13.02
2015	4,288	12.94	10,209	12.99	8,181	12.97
2016	4,614	12.95	10,717	12.99	8,167	12.97
2017	4,966	12.98 ²	11,541	13.00 ³	8,206	13.09
2018	5,436	12.90^{1,2}	11,727	13.02³	8,657	13.10
2019	5,804	12.98 ²	12,462	12.99 ³	9,187	13.10

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 6. Mean hematocrit levels among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,279	39.84 ¹	12,850	40.06	11,962	39.94
2012	5,179	39.91^{1,2}	14,096	40.38	12,718	40.43
2013	6,286	40.93	15,575	40.92	12,460	40.97
2014	6,925	40.64	17,385	40.58 ³	13,363	40.74
2015	7,381	41.34	17,581	41.25 ³	13,963	41.43
2016	8,023	41.32	18,805	41.20 ³	14,066	41.44
2017	8,622	40.55 ^{1,2}	19,836	40.38 ³	14,312	40.88
2018	9,475	40.18 ²	20,463	40.27 ³	15,088	40.83
2019	10,335	40.41 ^{1,2}	21,667	40.25 ³	16,009	40.87

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 7. Mean hematocrit levels among males 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	1,773	42.09	5,102	42.29	4,866	42.20
2012	2,062	42.33 ²	5,709	42.59 ³	5,221	42.83
2013	2,618	43.25	6,398	43.07	5,181	43.22
2014	2,845	43.03	7,076	42.83	5,521	43.03
2015	3,093	43.74 ¹	7,372	43.37 ³	5,782	43.92
2016	3,408	43.75 ¹	8,088	43.21 ³	5,899	43.99
2017	3,656	42.87^{1,2}	8,294	42.57³	6,105	43.20
2018	4,039	42.50 ²	8,734	42.35 ³	6,431	43.21
2019	4,531	42.51 ²	9,202	42.35 ³	6,822	43.15

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 8. Mean hematocrit levels among females 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	2,505	38.25 ¹	7,744	38.59 ³	7,094	38.39
2012	3,117	38.31^{1,2}	8,386	38.88	7,496	38.76
2013	3,668	39.27	9,177	39.43	7,277	39.37
2014	4,080	38.98	10,307	39.03	7,841	39.12
2015	4,288	39.60	10,209	39.71	8,181	39.68
2016	4,614	39.52	10,717	39.68	8,167	39.60
2017	4,966	38.84 ²	11,540	38.82 ³	8,206	39.16
2018	5,436	38.46^{1,2}	11,726	38.72³	8,657	39.07
2019	5,804	38.77 ²	12,460	38.70 ³	9,187	39.18

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 9. Mean white blood cell counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,279	6.55 ¹	12,851	6.72 ³	11,962	6.49
2012	5,180	6.49 ¹	14,097	6.61 ³	12,719	6.50
2013	6,286	6.59 ¹	15,576	6.71 ³	12,460	6.60
2014	6,925	6.80 ¹	17,385	6.91 ³	13,363	6.83
2015	7,381	6.69 ¹	17,581	6.85 ³	13,963	6.68
2016	8,024	6.85 ²	18,805	6.81 ³	14,066	6.53
2017	8,622	6.75 ²	19,838	6.77 ³	14,314	6.57
2018	9,475	6.65 ²	20,470	6.73 ³	15,089	6.52
2019	10,335	6.66^{1,2}	21,672	6.58³	16,010	6.45

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 10. Mean neutrophil counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean (95% CI)	No.	Mean (95% CI)
2011	3,586	4.02	10,424	4.13 ³	10,325	4.00
2012	4,399	4.05 ²	11,237	4.08 ³	10,932	3.96
2013	5,313	4.12 ¹	12,981	4.20 ³	10,883	4.06
2014	5,901	4.22 ¹	14,671	4.30 ³	11,644	4.19
2015	6,266	4.12 ¹	14,997	4.24 ³	11,986	4.10
2016	6,819	4.20 ²	15,095	4.26 ³	12,093	4.02
2017	7,136	4.06 ²	16,275	4.02 ³	12,419	3.92
2018	7,354	4.05 ²	17,076	4.06 ³	12,993	3.87
2019	7,836	4.03^{1,2}	17,679	3.97³	13,844	3.81

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.

Table 11. Mean lymphocyte counts (in thousands) among 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	3,586	1.80	10,424	1.85	10,325	1.82
2012	4,400	1.79 ²	11,237	1.86	10,932	1.87
2013	5,313	1.85	12,981	1.82 ³	10,883	1.89
2014	5,901	1.92 ²	14,671	1.89 ³	11,644	1.98
2015	6,266	1.90	14,997	1.90	11,986	1.93
2016	6,810	2.01^{1,2}	15,095	1.91	12,093	1.87
2017	7,136	1.96	16,275	1.94	12,419	1.95
2018	7,354	1.85	17,076	1.92	12,993	1.94
2019	7,836	1.87	17,679	1.84 ³	13,844	1.92

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 12. Mean platelet counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,273	231	12,817	232	11,926	230
2012	5,158	228	14,061	230	12,690	230
2013	6,267	231	15,542	233	12,424	233
2014	6,910	235	17,341	237	13,341	238
2015	7,355	238 ¹	17,529	241	13,929	240
2016	8,000	244 ²	18,758	243 ³	14,035	241
2017	8,590	250	19,805	250	14,299	249
2018	9,458	250	20,440	252	15,076	251
2019	10,323	253	21,649	253	16,001	251

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 13. Mean alanine aminotransferase levels among adults 18 years and older in Porter Ranch and two comparison populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,475	24.39	13,530	24.21	12,813	24.64
2012	5,163	23.09	14,953	23.84	13,257	24.15
2013	6,154	23.23^{1,2}	16,119	24.03	13,085	24.20
2014	6,793	24.16	17,607	24.02	13,918	23.79
2015	7,313	23.44	18,036	23.91	14,590	23.72
2016	7,893	24.12 ¹	19,195	23.32	14,675	23.43
2017	8,560	23.15	20,608	22.76	15,022	23.35
2018	9,393	23.32	21,599	22.89	16,033	23.29
2019	10,278	22.76	23,173	23.17	17,131	23.13

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 14. Mean aspartate aminotransferase levels among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,435	23.75	13,395	23.14	12,720	23.16
2012	5,130	22.83	14,852	22.96	13,177	22.63
2013	6,079	22.34 ¹	16,039	23.20 ³	13,030	22.75
2014	6,769	23.55	17,527	23.77 ³	13,869	22.71
2015	7,271	22.38	17,944	23.15 ³	14,581	22.25
2016	7,843	22.72 ²	19,129	22.83 ³	14,626	22.10
2017	8,519	22.03	20,548	22.27	14,989	21.97
2018	9,349	21.85	21,510	22.28 ³	15,993	21.84
2019	10,204	21.86 ¹	23,071	22.40 ³	17,093	21.68

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 15. Mean blood urea nitrogen levels among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,609	17.73	14,062	18.04 ³	13,361	17.43
2012	5,545	17.82 ²	15,661	18.04 ³	13,888	17.19
2013	7,034	17.80 ^{1,2}	17,157	18.28 ³	13,724	17.20
2014	7,581	17.35 ^{1,2}	18,953	18.27 ³	14,751	16.65
2015	8,225	17.26 ^{1,2}	19,668	18.45 ³	15,428	16.62
2016	9,005	17.34 ^{1,2}	20,851	18.73 ³	15,682	17.03
2017	9,610	17.53 ^{1,2}	22,258	18.63 ³	16,044	16.94
2018	10,592	17.86 ^{1,2}	23,279	18.44 ³	16,912	16.69
2019	11,342	17.47 ^{1,2}	24,807	18.50 ³	18,157	16.75

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 16. Mean creatinine levels among adults 18 years and older in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	4,750	0.96 ²	14,180	0.97 ³	13,408	0.93
2012	5,633	0.96 ¹	15,782	0.98 ³	13,931	0.94
2013	7,154	0.96 ^{1,2}	17,281	0.99 ³	13,757	0.94
2014	7,692	0.95 ^{1,2}	19,052	1.00 ³	14,774	0.93
2015	8,308	0.95 ¹	19,745	1.01 ³	15,449	0.94
2016	9,041	0.94 ¹	20,923	1.00 ³	15,716	0.95
2017	9,646	0.95 ^{1,2}	22,328	0.99 ³	16,089	0.94
2018	10,638	0.97 ^{1,2}	23,355	0.99 ³	16,960	0.92
2019	11,397	0.95 ^{1,2}	24,892	1.00 ³	18,223	0.93

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 17. Mean hemoglobin levels among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	253	13.64 ¹	1,037	13.22 ³	994	13.59
2012	317	13.49	979	13.40 ³	923	13.55
2013	285	13.46	944	13.40	822	13.47
2014	265	13.55	1,020	13.36 ³	786	13.64
2015	246	13.80 ¹	1,051	13.37 ³	809	13.64
2016	332	13.67	1,087	13.49	710	13.51
2017	356	13.60	1,030	13.53 ³	718	13.74
2018	400	13.64	1,095	13.53 ³	795	13.79
2019	439	13.54	1,004	13.54	696	13.63

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 18. Mean hematocrit levels among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	253	40.17 ¹	1,037	38.94 ³	994	40.02
2012	317	40.33 ¹	979	39.77 ³	923	40.30
2013	285	40.78	944	40.58	822	40.86
2014	265	40.33	1,020	39.79 ³	786	40.65
2015	246	41.81 ¹	1,051	40.60 ³	809	41.51
2016	332	41.43 ¹	1,087	40.81	710	40.93
2017	356	40.53	1,030	40.12 ³	718	40.77
2018	400	40.30	1,095	39.89 ³	795	40.83
2019	439	40.09	1,004	40.03 ³	696	40.53

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 19. Mean white blood cell counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	253	6.74	1,037	6.75	994	6.88
2012	317	6.95	979	6.76	923	6.68
2013	285	6.55 ²	944	6.65 ³	822	6.95
2014	265	6.88 ¹	1,020	8.52 ³	786	7.03
2015	246	6.67	1,051	6.80	809	6.87
2016	332	7.02	1,087	6.89	710	6.76
2017	356	6.94	1,030	6.78	718	6.88
2018	399	6.91	1,095	6.87	795	6.80
2019	439	6.75	1,004	6.66	696	6.61

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 20. Mean neutrophil counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	218	3.57	906	3.59	848	3.78
2012	287	3.94	842	3.69	792	3.69
2013	252	3.52	838	3.67	724	3.79
2014	245	3.63 ¹	913	4.86 ³	706	3.76
2015	221	3.55	922	3.75	676	3.81
2016	288	3.81	923	3.80 ³	600	3.55
2017	312	3.69	886	3.57	557	3.68
2018	351	3.68	935	3.62	638	3.50
2019	379	3.49	810	3.57	567	3.42

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 21. Mean lymphocyte counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	218	2.45	906	2.37	848	2.37
2012	287	2.38	842	2.37	792	2.34
2013	252	2.36	838	2.32	724	2.40
2014	245	2.54	913	2.43 ³	706	2.55
2015	221	2.38	922	2.36	676	2.41
2016	288	2.50	923	2.43	600	2.35
2017	312	2.46	886	2.45	557	2.49
2018	351	2.42	935	2.44	636	2.53
2019	379	2.43	810	2.41	567	2.49

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 22. Mean platelet counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	253	262	1,036	264	994	262
2012	317	275 ²	978	266	923	261
2013	285	274	942	266	821	265
2014	265	269	1,019	278 ³	785	267
2015	246	268	1,051	274	809	271
2016	331	283	1,087	277	709	279
2017	355	292	1,030	284	718	288
2018	399	282 ¹	1,095	294	795	292
2019	439	294	1,004	291	696	297

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 23. Mean alanine aminotransferase levels among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	185	20.38	665	19.42	709	19.21
2012	211	17.09	676	19.70	688	17.25
2013	207	19.88	680	18.80	599	17.50
2014	196	19.92	732	18.38	648	18.15
2015	193	22.59^{1,2}	754	18.33	637	17.82
2016	262	18.87	823	21.25	587	18.00
2017	288	21.42	842	19.22	616	17.73
2018	326	21.00	878	19.81	716	18.13
2019	361	17.08	829	17.22	656	18.74

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 24. Mean aspartate aminotransferase levels among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	185	22.37	666	23.00	709	22.89
2012	211	21.79	675	22.29	688	21.07
2013	206	21.82	678	22.45	599	21.44
2014	196	22.83	733	23.37	648	22.00
2015	194	24.57^{1,2}	752	22.05	636	20.96
2016	262	20.81	824	25.35	586	22.06
2017	285	22.05	839	22.41	618	21.02
2018	327	22.39	882	22.22	715	21.66
2019	362	20.52	827	21.72	656	21.10

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 25. Mean blood urea nitrogen among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	168	13.54	669	12.80	698	12.73
2012	208	13.04	669	12.98	690	12.77
2013	184	12.64	641	13.13 ³	591	12.62
2014	172	13.16	700	12.90	621	12.71
2015	177	12.38	729	12.47	568	12.63
2016	252	13.14	773	12.75	570	12.91
2017	261	12.81	708	12.82	577	12.78
2018	291	14.73^{1,2}	807	12.59	674	12.99
2019	310	13.02	732	12.68	589	12.80

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 26. Mean creatinine among children 5-17 years of age in Porter Ranch and two control populations, 2011-2019.

Year	Porter Ranch		Control Population 1		Control Population 2	
	No.	Mean	No.	Mean	No.	Mean
2011	169	0.67	668	0.65	702	0.65
2012	209	0.65	672	0.65	693	0.65
2013	185	0.68	642	0.66	594	0.66
2014	172	0.69	703	0.65	621	0.67
2015	177	0.66	731	0.67	567	0.69
2016	256	0.67	779	0.66	571	0.64
2017	261	0.65	719	0.65	577	0.65
2018	292	0.72^{1,2}	810	0.66	675	0.66
2019	312	0.68	733	0.70 ³	588	0.67

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 27. Mean hemoglobin levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	647	13.58 ¹	1,463	13.39	1,227	13.49
	August	563	13.41	1,557	13.44	1,063	13.46
	September	560	13.49	1,400	13.39	1,175	13.50
	October	654	13.53	1,508	13.46	1,219	13.58
	November	600	13.49	1,282	13.63	1,065	13.48
	December	643	13.56	1,391	13.56	1,129	13.64
2016	January	649	13.48	1,410	13.45	1,105	13.54
	February	694	13.55	1,560	13.41	1,173	13.46
	March	711	13.57	1,663	13.52	1,350	13.65
	April	670	13.50	1,568	13.49	1,230	13.59
	May	640	13.52	1,564	13.52	1,134	13.56
	June	667	13.43	1,602	13.53	1,229	13.59
	July	634	13.59	1,549	13.55	1,133	13.54
	August	681	13.58	1,720	13.54	1,229	13.63
	September	686	13.62	1,540	13.55	1,158	13.54
	October	705	13.65	1,604	13.55 ³	1,148	13.73
	November	628	13.58	1,550	13.65	1,069	13.65
	December	659	13.69	1,475	13.56 ³	1,108	13.78
2017	January	735	13.72 ¹	1,737	13.55 ³	1,157	13.79
	February	657	13.68	1,609	13.56 ³	1,143	13.73
	March	778	13.52	1,747	13.58	1,296	13.67
	April	651	13.53 ²	1,565	13.60 ³	1,146	13.78
	May	704	13.65	1,753	13.69	1,227	13.71
	June	770	13.61	1,669	13.62	1,236	13.72

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 28. Mean hemoglobin levels among males 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	288	14.31	597	14.20	495	14.30
	August	235	14.32	665	14.12	451	14.25
	September	244	14.34	588	14.05 ³	483	14.40
	October	261	14.34	617	14.10 ³	503	14.49
	November	251	14.38	555	14.33	441	14.25
	December	259	14.43	586	14.31	501	14.46
2016	January	268	14.37	637	14.13 ³	486	14.43
	February	285	14.30	676	14.07	506	14.22
	March	311	14.39	711	14.28 ³	560	14.52
	April	305	14.34	673	14.14 ³	520	14.46
	May	265	14.38	669	14.19 ³	459	14.48
	June	280	14.15 ²	683	14.19 ³	519	14.49
	July	254	14.34	649	14.32	447	14.45
	August	302	14.44	712	14.28 ³	512	14.54
	September	284	14.53	671	14.28	489	14.41
	October	309	14.54	664	14.31 ³	491	14.59
	November	269	14.37	704	14.36	428	14.53
	December	277	14.56	639	14.29 ³	482	14.73
2017	January	313	14.58 ¹	718	14.30 ³	490	14.68
	February	279	14.55	692	14.31 ³	493	14.58
	March	324	14.31	722	14.35	571	14.49
	April	259	14.28	650	14.40	495	14.57
	May	310	14.55	757	14.53	535	14.68
	June	316	14.53	718	14.43	523	14.66

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 29. Mean hemoglobin levels among females 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	359	13.00	866	12.84	732	12.95
	August	328	12.75	892	12.94	612	12.88
	September	316	12.84	812	12.90	692	12.87
	October	393	13.00	891	13.01	716	12.94
	November	349	12.86 ¹	727	13.09	624	12.93
	December	384	12.98	805	13.02	628	12.99
2016	January	381	12.86	773	12.90	619	12.84
	February	409	13.03	884	12.91	667	12.88
	March	400	12.93	952	12.96	790	13.03
	April	364	12.80	895	12.99	710	12.95
	May	375	12.92	895	13.02	675	12.94
	June	387	12.92	919	13.04	710	12.94
	July	380	13.08	900	12.99	686	12.95
	August	379	12.89	1,008	13.03	717	12.98
	September	402	12.97	869	12.99	669	12.90
	October	396	12.96	940	13.02	657	13.09
	November	359	12.98	846	13.06	641	13.07
	December	382	13.06	836	13.00	626	13.04
2017	January	422	13.08	1,019	13.01	667	13.14
	February	378	13.05	917	13.00	650	13.09
	March	454	12.96	1,025	13.04	724	13.01
	April	392	13.03	915	13.03	651	13.18
	May	394	12.93	996	13.06	692	12.97
	June	454	12.97	950	13.02	713	13.03

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 30. Mean hematocrit levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	647	41.62 ¹	1,463	41.03	1,227	41.31
	August	563	41.26	1,557	41.28	1,063	41.39
	September	560	41.53	1,400	41.18	1,175	41.62
	October	654	41.83	1,508	41.59	1,219	42.00
	November	600	41.56	1,282	42.05	1,065	41.61
	December	643	41.74	1,391	41.73	1,129	41.99
2016	January	648	41.35	1,410	41.20	1,105	41.49
	February	694	41.41	1,560	41.01	1,173	41.20
	March	711	41.46	1,663	41.29 ³	1,350	41.70
	April	670	41.34	1,568	41.32	1,230	41.59
	May	640	41.34	1,564	41.32	1,134	41.51
	June	667	40.96	1,602	41.25	1,229	41.44
	July	634	41.31	1,549	41.16	1,133	41.17
	August	681	41.28	1,720	41.20	1,229	41.44
	September	686	41.27	1,540	41.07	1,158	41.05
	October	705	41.47	1,604	41.16 ³	1,148	41.61
	November	628	41.15	1,550	41.35	1,069	41.42
	December	659	41.42	1,475	41.02 ³	1,108	41.68
2017	January	735	41.29	1,737	40.84 ³	1,157	41.54
	February	657	41.16	1,609	40.76 ³	1,143	41.28
	March	778	40.93	1,747	41.21	1,296	41.36
	April	651	40.29 ²	1,565	40.30 ³	1,146	40.90
	May	704	40.38	1,753	40.41	1,227	40.53
	June	770	40.28	1,668	40.14 ³	1,236	40.57

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 31. Mean hematocrit levels among males 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	288	43.81	597	43.40	495	43.62
	August	235	43.97	665	43.22	451	43.72
	September	244	44.07 ¹	588	43.14 ³	483	44.27
	October	261	44.20	617	43.45 ³	503	44.66
	November	251	44.16	555	44.14	441	43.85
	December	259	44.24	586	43.92	501	44.42
2016	January	267	44.00 ¹	637	43.09 ³	486	44.10
	February	285	43.62	676	42.86	506	43.42
	March	311	43.82	711	43.42 ³	560	44.22
	April	305	43.76	673	43.23 ³	520	44.09
	May	265	43.94	669	43.19 ³	459	44.13
	June	280	43.06 ²	683	43.09 ³	519	44.05
	July	254	43.44	649	43.35	447	43.74
	August	302	43.84	712	43.30 ³	512	44.00
	September	284	43.89	671	43.13	489	43.60
	October	309	44.07	664	43.34 ³	491	44.12
	November	269	43.50	704	43.41	428	43.97
	December	277	43.94 ¹	639	43.13 ³	482	44.42
2017	January	313	43.73	718	42.96 ³	490	44.06
	February	279	43.71	692	42.92 ³	493	43.71
	March	324	43.20	722	43.42	571	43.74
	April	259	42.23	650	42.32	495	42.98
	May	310	42.75	757	42.54	535	43.06
	June	316	42.72	717	42.22 ³	523	43.01

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 32. Mean hematocrit levels among females 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	359	39.87	866	39.40	732	39.74
	August	328	39.33	892	39.83	612	39.67
	September	316	39.56	812	39.75	692	39.77
	October	393	40.26	891	40.30	716	40.12
	November	349	39.69 ¹	727	40.45	624	40.03
	December	384	40.04	805	40.13	628	40.05
2016	January	381	39.49	773	39.64	619	39.43
	February	409	39.88	884	39.60	667	39.51
	March	400	39.63	952	39.69	790	39.92
	April	364	39.32	895	39.89	710	39.76
	May	375	39.51	895	39.92	675	39.73
	June	387	39.44	919	39.88	710	39.53
	July	380	39.90	900	39.59	686	39.49
	August	379	39.24	1,008	39.72	717	39.60
	September	402	39.42	869	39.49	669	39.18
	October	396	39.43	940	39.62	657	39.74
	November	359	39.40	846	39.64	641	39.72
	December	382	39.59	836	39.41	626	39.56
2017	January	422	39.47	1,019	39.34	667	39.70
	February	378	39.28	917	39.14	650	39.43
	March	454	39.32	1,025	39.65	724	39.48
	April	392	39.01	915	38.87	651	39.32
	May	394	38.51	996	38.80	692	38.57
	June	454	38.57	950	38.57	713	38.79

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.

Table 33. Mean white blood cell counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	647	6.83	1,463	6.71	1,227	6.63
	August	563	6.62	1,557	6.76	1,063	6.65
	September	560	6.71	1,400	6.85	1,175	6.74
	October	654	6.80	1,508	6.86	1,219	6.56
	November	600	6.61	1,282	6.79	1,065	6.71
	December	643	6.90	1,391	7.05	1,129	6.78
2016	January	649	6.96	1,410	6.96	1,105	6.71
	February	694	6.83	1,560	6.92 ³	1,173	6.45
	March	711	6.71	1,663	6.82 ³	1,350	6.46
	April	670	6.61	1,568	6.76	1,230	6.54
	May	640	6.82	1,564	6.81 ³	1,134	6.55
	June	667	6.71	1,602	6.80 ³	1,229	6.51
	July	634	6.75	1,549	6.83	1,133	6.59
	August	681	6.62	1,720	6.81 ³	1,229	6.40
	September	686	6.90	1,540	6.75	1,158	6.60
	October	705	6.88	1,604	6.75	1,148	6.57
	November	628	7.20 ²	1,550	6.88	1,069	6.57
	December	659	7.22^{1,2}	1,475	6.71	1,108	6.47
2017	January	735	7.44 ²	1,737	6.99	1,157	6.68
	February	657	6.99 ²	1,609	6.76	1,143	6.60
	March	778	6.81	1,747	6.91 ³	1,296	6.54
	April	651	6.63	1,565	6.90	1,146	6.52
	May	704	6.92	1,753	6.84	1,227	6.48
	June	770	6.66	1,669	6.73	1,236	6.55

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 34. Mean neutrophil counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	543	4.17	1,291	4.11	1,038	4.01
	August	483	4.16	1,339	4.19	912	4.12
	September	473	4.14	1,222	4.21	1,014	4.13
	October	561	4.12	1,248	4.21	1,042	4.10
	November	521	4.07	1,035	4.26	942	4.12
	December	537	4.16	1,129	4.38	961	4.21
2016	January	554	4.33 ²	1,124	4.35 ³	965	4.07
	February	592	4.29 ²	1,250	4.24 ³	986	3.96
	March	592	4.08	1,324	4.17 ³	1,157	4.00
	April	569	4.17	1,220	4.24	1,059	4.06
	May	534	4.35 ²	1,229	4.22 ³	967	4.03
	June	582	4.08	1,284	4.29 ³	1,060	4.00
	July	550	4.11	1,246	4.26 ³	971	4.03
	August	591	4.14	1,428	4.23 ³	1,035	3.97
	September	576	4.13	1,242	4.28 ³	995	4.07
	October	596	4.17	1,305	4.28 ³	993	3.98
	November	508	4.31 ²	1,255	4.30 ³	937	4.07
	December	566	4.33 ²	1,188	4.20 ³	968	3.96
2017	January	625	4.26	1,398	4.41 ³	1,021	4.10
	February	538	4.25	1,325	4.22	999	4.07
	March	672	4.24	1,423	4.31 ³	1,104	4.03
	April	557	4.05	1,264	4.07	1,002	3.92
	May	594	4.13	1,451	3.96	1,047	3.91
	June	650	4.11 ²	1,357	4.02 ³	1,072	3.82

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 35. Mean lymphocyte counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	543	1.96	1,291	1.85	1,038	2.00
	August	483	1.88	1,339	1.87	912	1.89
	September	473	1.90	1,222	1.96	1,014	1.98
	October	561	1.95	1,248	2.03	1,042	1.85
	November	521	1.86	1,035	1.87	942	1.97
	December	537	2.00	1,129	1.93	961	1.94
2016	January	554	1.94	1,124	1.93	965	1.98
	February	592	1.94	1,250	2.01	986	1.85
	March	592	1.99	1,324	1.98	1,157	1.85
	April	569	1.78	1,220	1.88	1,059	1.86
	May	534	1.80	1,229	1.97	967	1.83
	June	582	1.99	1,284	1.85	1,060	1.85
	July	550	2.03	1,246	1.91	971	1.94
	August	591	1.85	1,428	1.90	1,035	1.79
	September	576	2.11 ¹	1,242	1.82	995	1.88
	October	596	2.10	1,305	1.84	993	1.98
	November	508	2.32 ²	1,255	1.92	937	1.82
	December	566	2.27 ²	1,188	1.90	968	1.86
2017	January	625	2.59^{1,2}	1,398	1.90	1,021	1.93
	February	538	2.07	1,325	1.87	999	1.86
	March	672	1.92	1,423	1.93	1,104	1.86
	April	557	1.84	1,264	2.16	1,002	1.86
	May	594	2.13	1,451	2.17	1,047	1.89
	June	650	1.85	1,357	1.94	1,072	1.95

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 36. Mean platelet counts (in thousands) among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	645	242	1,462	245	1,221	239
	August	562	245	1,554	243	1,061	240
	September	557	235	1,391	240	1,171	237
	October	653	239	1,507	236	1,217	240
	November	597	239	1,279	238	1,063	242
	December	640	241	1,386	245	1,128	239
2016	January	648	244	1,408	242	1,105	243
	February	689	248	1,559	241	1,171	242
	March	711	243	1,660	244	1,349	241
	April	666	245	1,562	244	1,226	240
	May	639	247	1,563	247	1,130	245
	June	663	244	1,600	245	1,218	239
	July	634	244	1,544	241	1,132	237
	August	679	240	1,713	244 ³	1,227	237
	September	686	240	1,535	238	1,157	239
	October	703	241	1,600	244	1,146	240
	November	625	244	1,541	242	1,067	242
	December	657	244	1,473	244	1,107	241
2017	January	729	244	1,734	248	1,156	244
	February	654	245	1,606	242	1,142	242
	March	772	247	1,747	245	1,294	239
	April	648	259	1,556	253	1,143	256
	May	698	256	1,747	251	1,224	254
	June	767	253	1,665	248	1,235	252

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 37. Mean alanine aminotransferase levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	646	22.96	1,492	23.10	1,271	22.99
	August	564	22.34	1,537	23.39	1,093	22.68
	September	559	23.38	1,456	23.31	1,252	23.00
	October	662	22.13	1,567	22.96	1,274	23.40
	November	599	23.34	1,342	23.12	1,123	24.25
	December	633	24.07	1,453	23.26	1,182	24.26
2016	January	675	26.08	1,457	25.03	1,134	24.87
	February	674	24.94 ¹	1,581	22.06 ³	1,211	24.90
	March	693	24.90	1,712	23.53	1,402	23.11
	April	639	25.43	1,625	23.15	1,246	23.00
	May	618	22.18	1,553	22.60	1,169	23.11
	June	633	23.76	1,651	22.58	1,271	23.42
	July	611	22.98	1,591	22.77	1,126	21.91
	August	655	22.74	1,695	23.48	1,308	22.72
	September	673	23.90	1,560	23.50	1,239	23.50
	October	701	24.76 ²	1,636	22.86	1,229	22.46
	November	663	23.79	1,591	23.79	1,149	24.18
	December	658	23.62	1,543	24.63	1,191	24.13
2017	January	787	25.60	1,759	23.57	1,172	23.63
	February	659	23.20	1,656	22.81	1,205	25.15
	March	758	23.46	1,865	22.78	1346	23.25
	April	667	22.51	1,615	22.99	1184	21.57
	May	679	24.18 ¹	1,800	22.13	1259	23.24
	June	738	22.61	1,772	22.90	1308	23.04

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 38. Mean aspartate aminotransferase levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	643	21.73	1,485	22.35	1,268	21.70
	August	559	21.88	1,527	22.61	1,089	21.86
	September	556	22.17	1,444	22.75	1,247	21.93
	October	655	21.26	1,556	22.70	1,270	22.56
	November	597	22.17	1,336	22.82	1,119	22.37
	December	631	21.82	1,453	22.66	1,182	22.98
2016	January	672	24.36	1,447	24.14	1,130	22.62
	February	673	22.45	1,578	22.48	1,205	23.17
	March	691	22.94	1,706	22.84	1,395	21.80
	April	636	24.94^{1,2}	1,622	22.57	1,245	21.62
	May	615	21.37	1,548	22.30	1,164	22.01
	June	631	22.21	1,651	22.82	1,270	22.58
	July	604	22.27	1,587	22.52	1,122	21.30
	August	650	22.37	1,689	23.17	1,305	22.00
	September	667	22.91	1,556	23.44	1,233	22.41
	October	690	22.71	1,628	22.21	1,222	21.39
	November	662	22.22	1,586	22.58	1,145	22.21
	December	652	21.74	1,531	23.04	1,190	22.05
2017	January	784	22.67	1,766	22.42	1,173	22.41
	February	656	21.76	1,648	22.30	1,204	23.11
	March	753	21.81	1,858	22.19	1,343	21.68
	April	664	21.45	1,607	22.35 ³	1,181	20.79
	May	671	23.22	1,791	22.44	1,256	21.34
	June	733	22.14	1,768	22.75	1,306	21.88

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 39. Mean blood urea nitrogen levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	732	17.19 ¹	1,675	18.86 ³	1,330	16.49
	August	638	16.82 ¹	1,696	18.38 ³	1,183	16.47
	September	616	17.08 ¹	1,615	18.86 ³	1,315	16.93
	October	765	17.45 ^{1,2}	1,707	18.44 ³	1,365	16.24
	November	698	16.83 ¹	1,451	18.19 ³	1,176	16.79
	December	695	17.10 ¹	1,592	18.56 ³	1,258	16.87
2016	January	751	17.44 ¹	1,596	18.99 ³	1,202	17.28
	February	746	17.45 ¹	1,748	18.90 ³	1,305	16.97
	March	796	17.38 ¹	1,833	18.43 ³	1,492	16.71
	April	743	18.02 ^{1,2}	1,745	19.20 ³	1,326	16.99
	May	734	16.89 ¹	1,696	18.44 ³	1,260	17.28
	June	751	17.30 ¹	1,773	18.56 ³	1,382	17.24
	July	706	17.14 ¹	1,726	19.01 ³	1,226	17.22
	August	750	17.67 ^{1,2}	1,830	18.57 ³	1,394	16.73
	September	752	17.47 ¹	1,713	19.11 ³	1,310	17.05
	October	789	16.84 ¹	1,786	18.31 ³	1,308	16.70
	November	751	17.18 ¹	1,748	19.02 ³	1,213	17.29
	December	736	17.36 ¹	1,657	18.30 ³	1,264	16.99
2017	January	841	17.85 ¹	1,927	19.12 ³	1,258	17.20
	February	744	17.45 ¹	1,797	18.84 ³	1,288	16.83
	March	883	17.46	2,007	18.27 ³	1,433	17.17
	April	740	17.41 ¹	1,711	18.97 ³	1,275	16.71
	May	776	17.92	1,941	18.47 ³	1,348	16.99
	June	826	17.38 ¹	1,881	18.77 ³	1,380	16.89

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 40. Mean creatinine levels among adults 18 years and older in Porter Ranch and two control populations, July 2015-June 2017.

Year	Month	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	July	744	0.95 ¹	1,683	1.02 ³	1,334	0.93
	August	642	0.94 ¹	1,705	1.02 ³	1,183	0.96
	September	623	0.96	1,619	1.02 ³	1,316	0.97
	October	775	0.96	1,717	1.00 ³	1,368	0.95
	November	704	0.93	1,459	0.99	1,177	0.95
	December	700	0.94 ¹	1,596	1.01 ³	1,258	0.94
2016	January	760	0.95	1,608	1.02	1,206	0.98
	February	753	0.93 ¹	1,751	1.00	1,306	0.96
	March	799	0.94 ¹	1,839	0.99 ³	1,495	0.92
	April	745	0.98	1,750	1.00 ³	1,331	0.95
	May	734	0.91 ¹	1,703	0.98	1,259	0.95
	June	751	0.94	1,781	0.98	1,384	0.96
	July	707	0.94 ¹	1,731	1.00 ³	1,231	0.95
	August	753	0.99	1,840	1.00 ³	1,398	0.94
	September	755	0.97	1,718	1.01 ³	1,311	0.96
	October	795	0.91 ¹	1,787	0.97 ³	1,315	0.93
	November	752	0.91 ¹	1,756	1.02 ³	1,214	0.95
	December	737	0.93	1,659	0.97	1,266	0.94
2017	January	843	0.93 ¹	1,932	1.02 ³	1,261	0.94
	February	747	0.92 ¹	1,802	1.00 ³	1,291	0.94
	March	887	0.94	2,012	0.97 ³	1,435	0.93
	April	740	0.91 ¹	1,714	1.00 ³	1,279	0.92
	May	782	0.97	1,949	0.98 ³	1,351	0.94
	June	830	0.95	1,889	0.99 ³	1,384	0.93

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 41. Mean hemoglobin levels among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	53	13.74 ¹	259	13.18	178	13.45
	Quarter 2	65	13.50	285	13.38	202	13.61
	Quarter 3	57	13.96 ¹	294	13.41 ³	211	13.70
	Quarter 4	71	13.99 ¹	213	13.54	218	13.77
2016	Quarter 1	80	13.56	255	13.29	180	13.33
	Quarter 2	78	13.69	284	13.45	169	13.58
	Quarter 3	101	13.56	296	13.56	201	13.57
	Quarter 4	73	13.93	252	13.64	160	13.57
2017	Quarter 1	97	13.52	268	13.57	165	13.56
	Quarter 2	100	13.53	246	13.51	182	13.71
	Quarter 3	76	13.85 ¹	286	13.44 ³	219	13.81
	Quarter 4	83	13.53	230	13.59	152	13.88

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 42. Mean hematocrit levels among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	53	41.15	259	39.78	178	40.51
	Quarter 2	65	40.74	285	40.31	202	41.10
	Quarter 3	57	42.44 ¹	294	40.89 ³	211	41.88
	Quarter 4	71	42.80	213	41.57	218	42.34
2016	Quarter 1	80	41.07	255	40.30	180	40.45
	Quarter 2	78	41.67	284	40.79	169	41.29
	Quarter 3	101	41.06	296	40.96	201	41.09
	Quarter 4	73	42.07	252	41.18	160	40.89
2017	Quarter 1	97	40.72	268	40.69	165	40.67
	Quarter 2	100	40.11	246	40.00	182	40.51
	Quarter 3	76	40.92 ¹	286	39.65 ³	219	40.79
	Quarter 4	83	40.47	230	40.20	152	41.13

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 43. Mean white blood cell counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	53	7.12	259	6.88	178	7.07
	Quarter 2	65	6.46	285	6.86	202	6.91
	Quarter 3	57	6.40	294	6.59	211	6.82
	Quarter 4	71	6.75	213	6.92	218	6.72
2016	Quarter 1	80	7.32	255	6.89	180	6.68
	Quarter 2	78	7.14	284	6.80	169	6.79
	Quarter 3	101	6.72	296	6.83	201	6.69
	Quarter 4	73	6.95	252	7.05	160	6.93
2017	Quarter 1	97	7.33	268	6.96	165	7.28
	Quarter 2	100	6.62	246	6.99	182	6.74
	Quarter 3	76	6.82	286	6.55	219	6.72
	Quarter 4	83	6.96	230	6.61	152	6.85

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 44. Mean neutrophil counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	47	3.75	225	3.80	153	4.01
	Quarter 2	59	3.45	259	3.87	161	3.76
	Quarter 3	53	3.23	258	3.50	181	3.76
	Quarter 4	62	3.77	180	3.84	181	3.73
2016	Quarter 1	71	4.10 ²	212	3.88	151	3.48
	Quarter 2	69	3.94	251	3.70	152	3.58
	Quarter 3	88	3.54	244	3.75	172	3.44
	Quarter 4	60	3.70	216	3.88	125	3.73
2017	Quarter 1	90	4.03	225	3.76	122	4.06
	Quarter 2	90	3.48	205	3.62	140	3.55
	Quarter 3	65	3.67	246	3.44	174	3.52
	Quarter 4	67	3.51	210	3.45	121	3.66

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 45. Mean lymphocyte counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	47	2.45	225	2.39	153	2.40
	Quarter 2	59	2.37	259	2.31	161	2.45
	Quarter 3	53	2.38	258	2.37	181	2.48
	Quarter 4	62	2.32	180	2.38	181	2.32
2016	Quarter 1	71	2.56	212	2.38	151	2.41
	Quarter 2	69	2.38	251	2.39	152	2.50
	Quarter 3	88	2.60	244	2.51	172	2.50
	Quarter 4	60	2.40	216	2.42	125	2.42
2017	Quarter 1	90	2.48	225	2.46	122	2.48
	Quarter 2	90	2.41	205	2.55	140	2.48
	Quarter 3	65	2.46	246	2.40	174	2.52
	Quarter 4	67	2.51	210	2.39	121	2.48

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 46. Mean platelet counts (in thousands) among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	53	266	259	277	178	273
	Quarter 2	65	273	285	271	202	270
	Quarter 3	57	272	294	271	211	275
	Quarter 4	71	263	213	276	218	266
2016	Quarter 1	79	283	255	280	179	278
	Quarter 2	78	278	284	273	169	286
	Quarter 3	101	292	296	273	201	279
	Quarter 4	73	276	252	282	160	274
2017	Quarter 1	96	288	268	276	165	281
	Quarter 2	100	291	246	295	182	292
	Quarter 3	76	281	286	279	219	293
	Quarter 4	83	307 ²	230	287	152	284

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 47. Mean alanine aminotransferase levels among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	48	17.15	198	20.77	137	21.90
	Quarter 2	38	32.00^{1,2}	203	17.44	143	15.33
	Quarter 3	47	21.11	195	17.47	174	17.45
	Quarter 4	60	22.13	158	17.49	183	17.06
2016	Quarter 1	62	19.95	201	21.99	140	17.19
	Quarter 2	60	19.50	205	24.52	136	17.56
	Quarter 3	76	17.61	213	19.57	171	18.51
	Quarter 4	64	18.73	204	19.00	140	18.61
2017	Quarter 1	81	28.04 ¹	210	17.30	142	18.85
	Quarter 2	80	22.51	204	21.35	155	16.83
	Quarter 3	62	16.50	233	18.04	180	16.94
	Quarter 4	65	16.51	195	20.45	139	18.60

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 48. Mean aspartate aminotransferase levels among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	48	21.21	197	23.26	137	22.04
	Quarter 2	38	35.05^{1,2}	202	21.99	143	19.72
	Quarter 3	48	23.10	195	21.79	173	20.60
	Quarter 4	60	21.80	158	20.94	183	21.45
2016	Quarter 1	62	22.08	201	26.08	139	21.17
	Quarter 2	60	21.12	205	27.17	136	22.87
	Quarter 3	76	20.33	213	25.44	171	22.23
	Quarter 4	64	19.86	205	22.74	140	21.96
2017	Quarter 1	80	23.16	210	20.50	142	21.65
	Quarter 2	78	22.68	203	24.91	155	20.29
	Quarter 3	62	21.84	232	21.75	180	21.34
	Quarter 4	65	20.14	194	22.63	141	20.77

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 49. Mean blood urea nitrogen among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	40	12.65	190	12.44	130	12.85
	Quarter 2	41	12.76	193	12.85	132	12.97
	Quarter 3	42	11.88	195	12.06	152	12.43
	Quarter 4	54	12.28	151	12.55	154	12.34
2016	Quarter 1	61	13.41	193	12.88	128	12.31
	Quarter 2	56	12.98	188	12.87	137	13.16
	Quarter 3	73	12.90	210	12.26	174	12.94
	Quarter 4	62	13.29	182	13.06	131	13.21
2017	Quarter 1	74	12.46	179	12.98	131	12.73
	Quarter 2	71	13.31	165	12.92	137	12.97
	Quarter 3	57	13.32	203	12.76	178	12.47
	Quarter 4	59	12.15	161	12.64	131	13.05

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Table 50. Mean creatinine among children 5-17 years of age in Porter Ranch and two control populations, 2015-2017.

Year	Quarter	Porter Ranch		Control Population 1		Control Population 2	
		No.	Mean	No.	Mean	No.	Mean
2015	Quarter 1	40	0.63	190	0.67	130	0.71
	Quarter 2	41	0.67	193	0.67	131	0.71
	Quarter 3	42	0.66	196	0.67	152	0.68
	Quarter 4	54	0.67	152	0.66	154	0.67
2016	Quarter 1	61	0.66	193	0.66	129	0.64
	Quarter 2	56	0.65	188	0.66	137	0.65
	Quarter 3	73	0.67	212	0.66	174	0.64
	Quarter 4	66	0.68	186	0.65	131	0.65
2017	Quarter 1	74	0.64	182	0.65	131	0.66
	Quarter 2	71	0.64	168	0.63	137	0.64
	Quarter 3	57	0.66	207	0.64	178	0.63
	Quarter 4	59	0.66	162	0.66	131	0.66

¹ For Porter Ranch vs. Control Population 1, the difference in means has a p-value of less than 0.05.

² For Porter Ranch vs. Control Population 2, the difference in means has a p-value of less than 0.05.

³ For Control Population 1 vs. Control Population 2, the difference in means has a p-value of less than 0.05.



Figure 1. Mean Hemoglobin Levels among Adults (18+ Years), Porter Ranch, 2011-2019

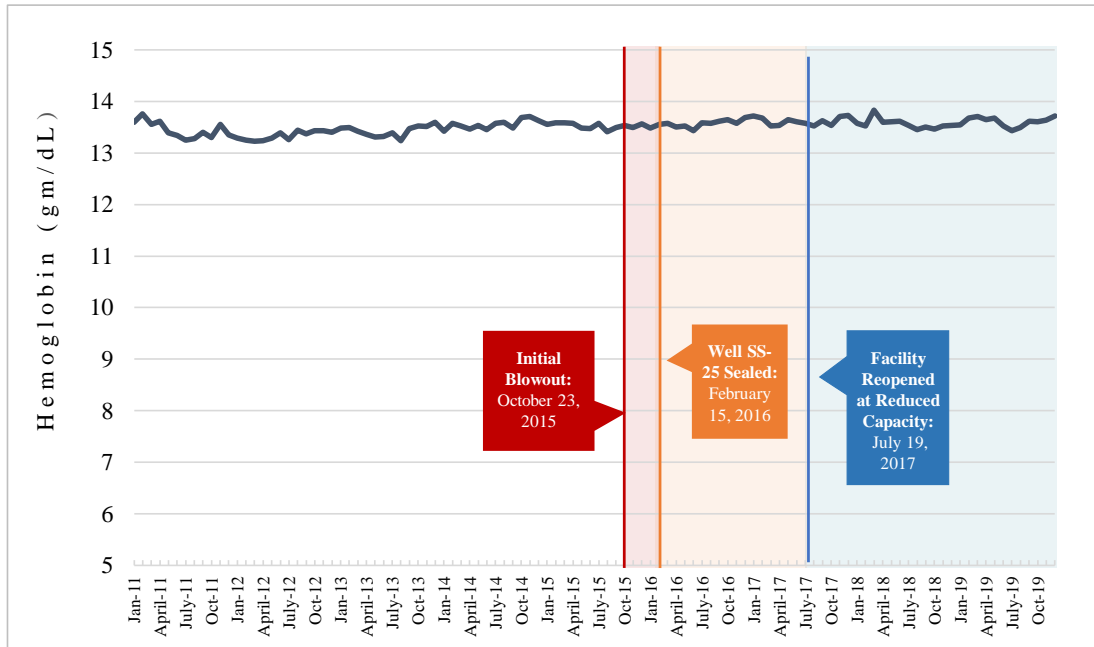


Figure 2. Mean Hemoglobin Levels among Adults (18+ Years),by Gender, Porter Ranch, 2011-2019

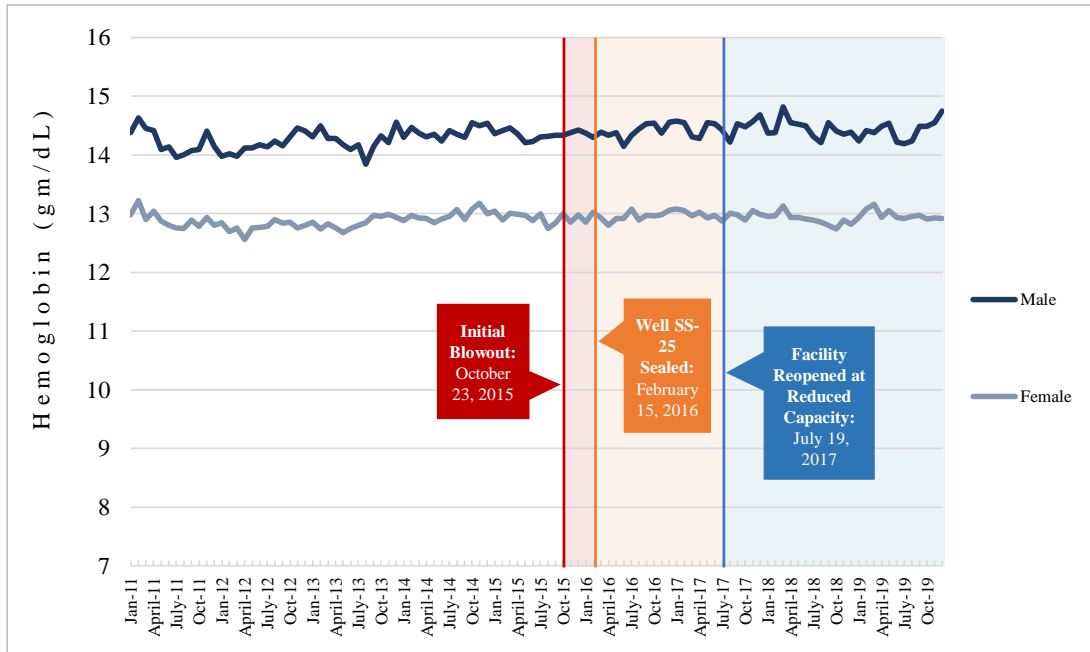


Figure 3. Mean Hematocrit Levels among Adults (18+ Years), Porter Ranch, 2011-2019

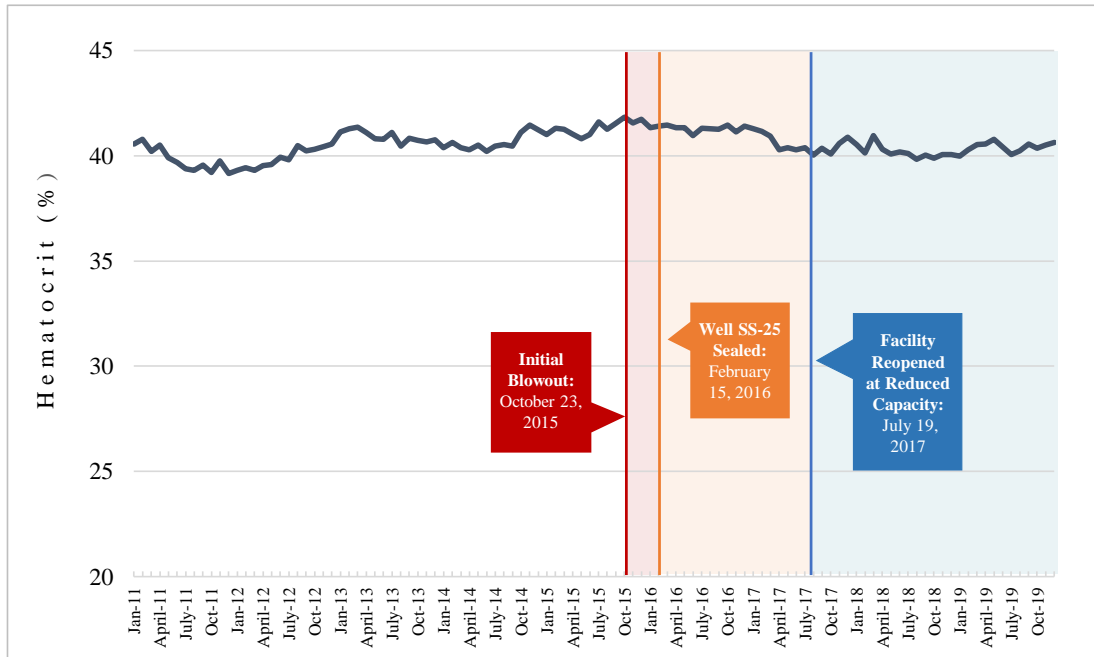


Figure 4. Mean Hematocrit Levels among Adults (18+ Years), by Gender, Porter Ranch, 2011-2019

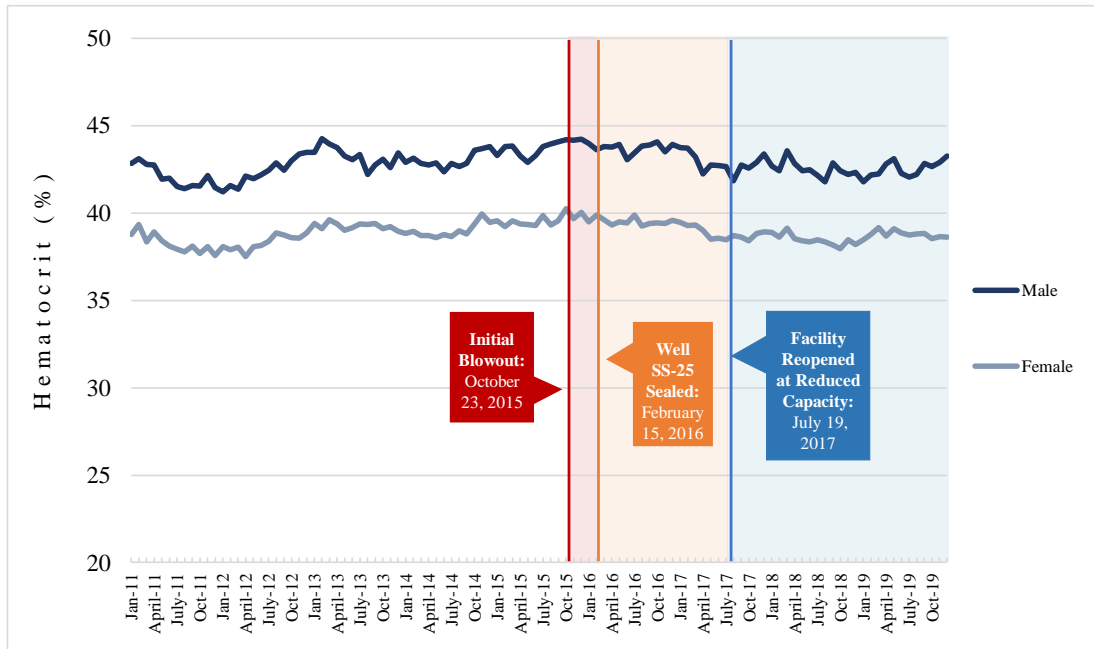


Figure 5. Mean White Blood Cell Counts among Adults (18+ Years), Porter Ranch, 2011-2019

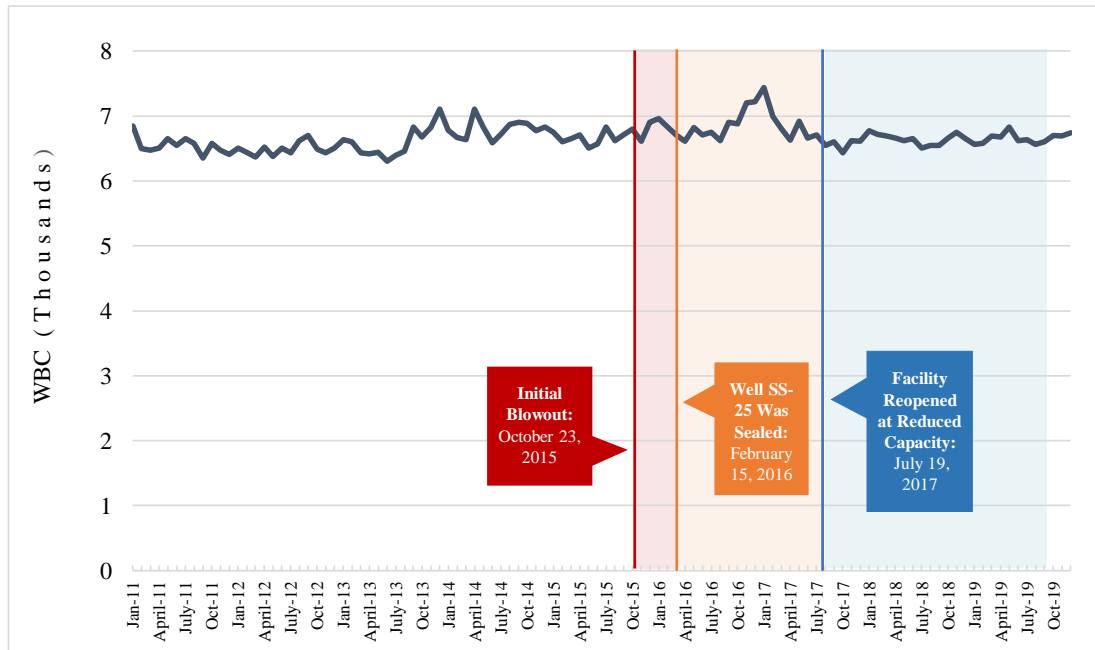


Figure 6. Mean Neutrophil Counts among Adults (18+ Years), Porter Ranch, 2011-2019

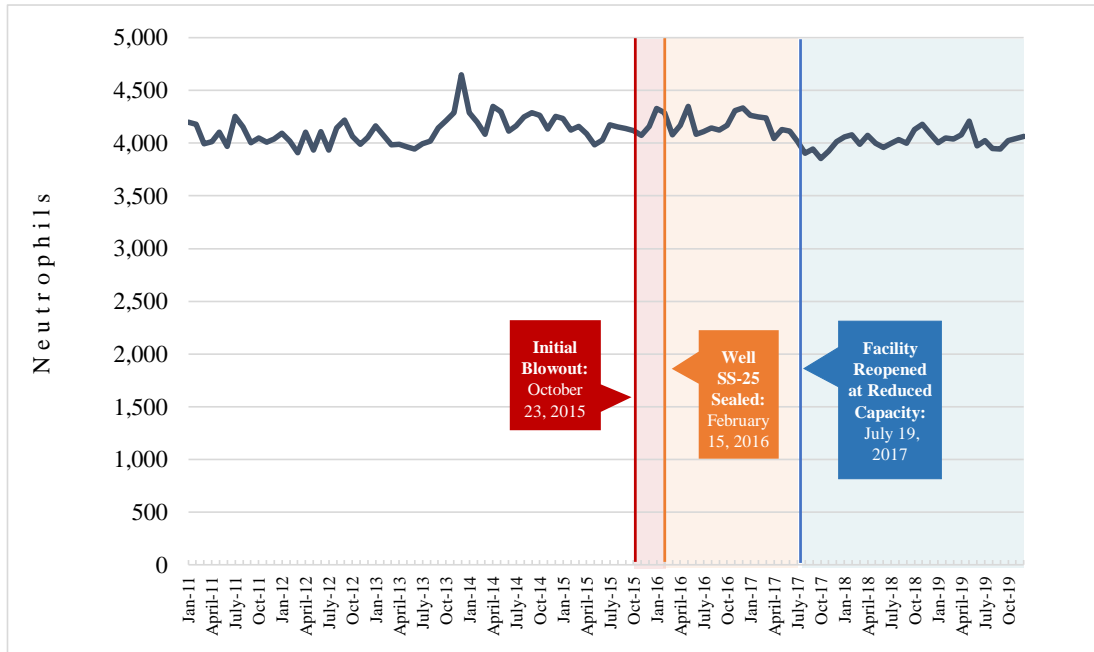


Figure 7. Mean Lymphocyte Counts among Adults (18+ Years), Porter Ranch, 2011-2019

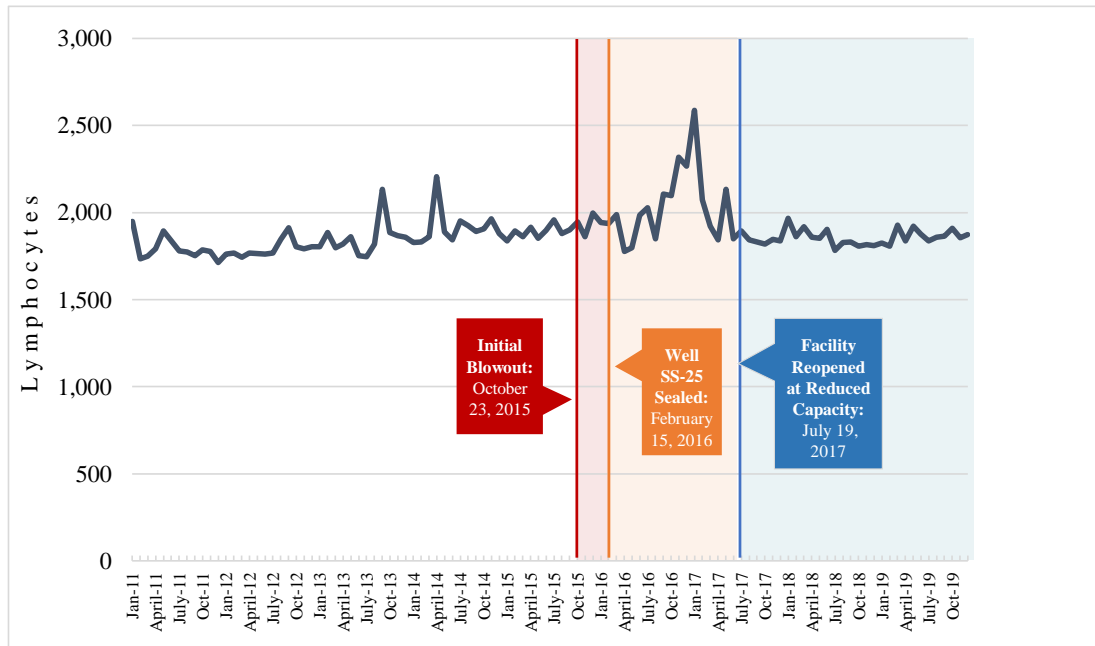


Figure 8. Mean Platelet Counts among Adults (18+ Years), Porter Ranch, 2011-2019

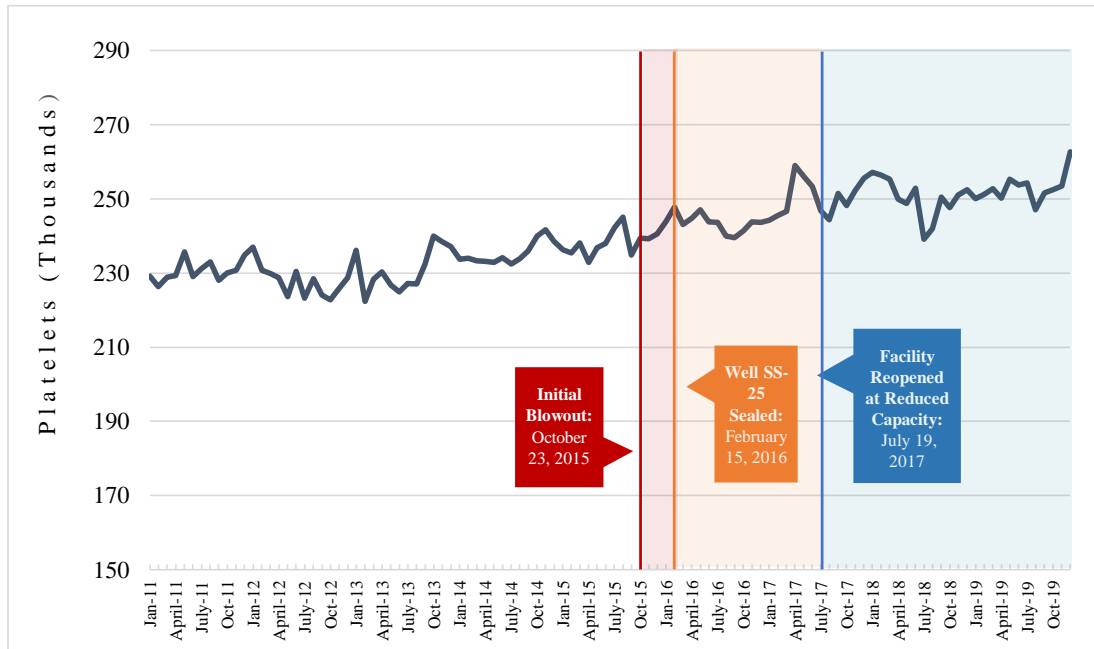


Figure 9. Mean Alanine Aminotransferase Levels among Adults (18+ Years), Porter Ranch, 2011-2019

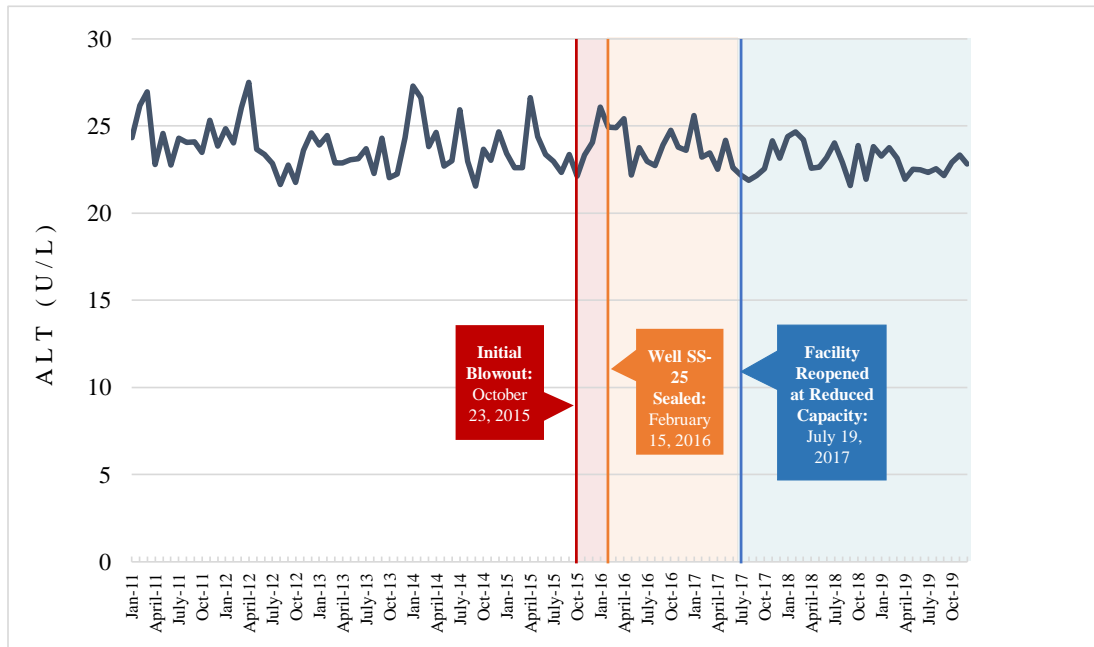


Figure 10. Mean Aspartate Aminotransferase Levels among Adults (18+ Years), Porter Ranch, 2011-2019

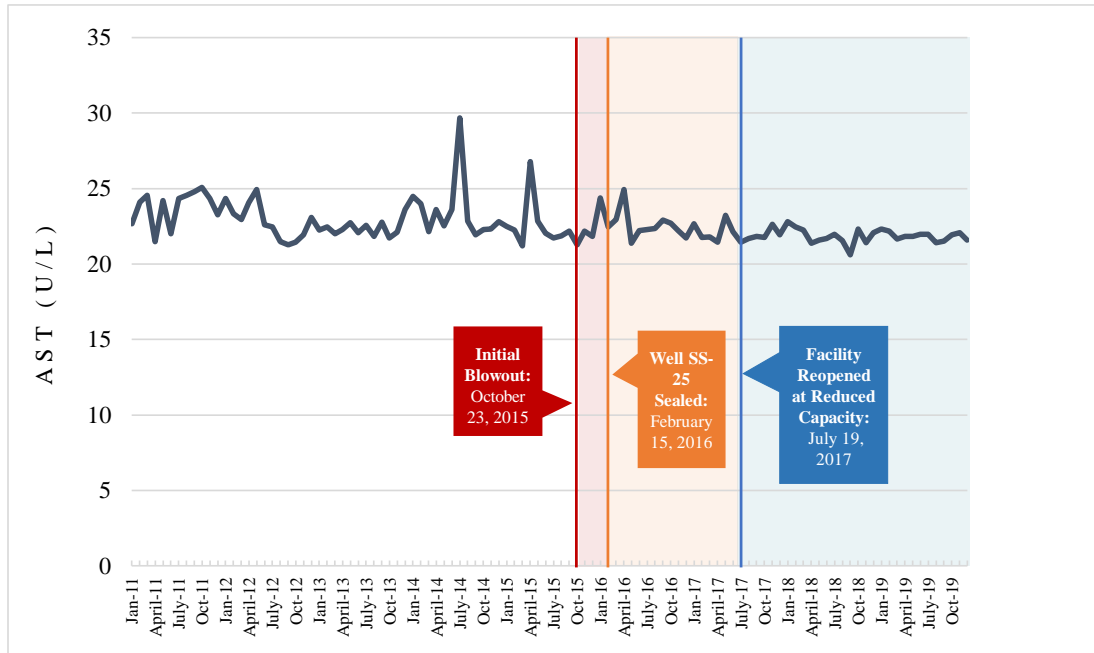


Figure 11. Mean Blood Urea Nitrogen Levels among Adults (18+ Years), Porter Ranch, 2011-2019

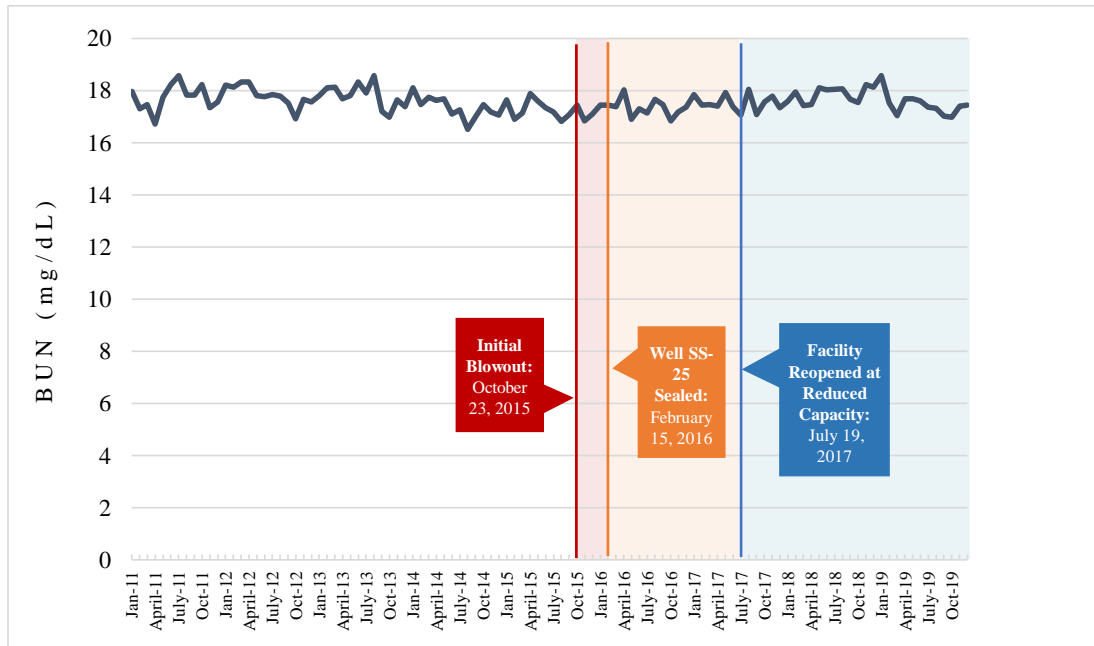


Figure 12. Mean Creatinine Levels among Adults (18+ Years), Porter Ranch, 2011-2019

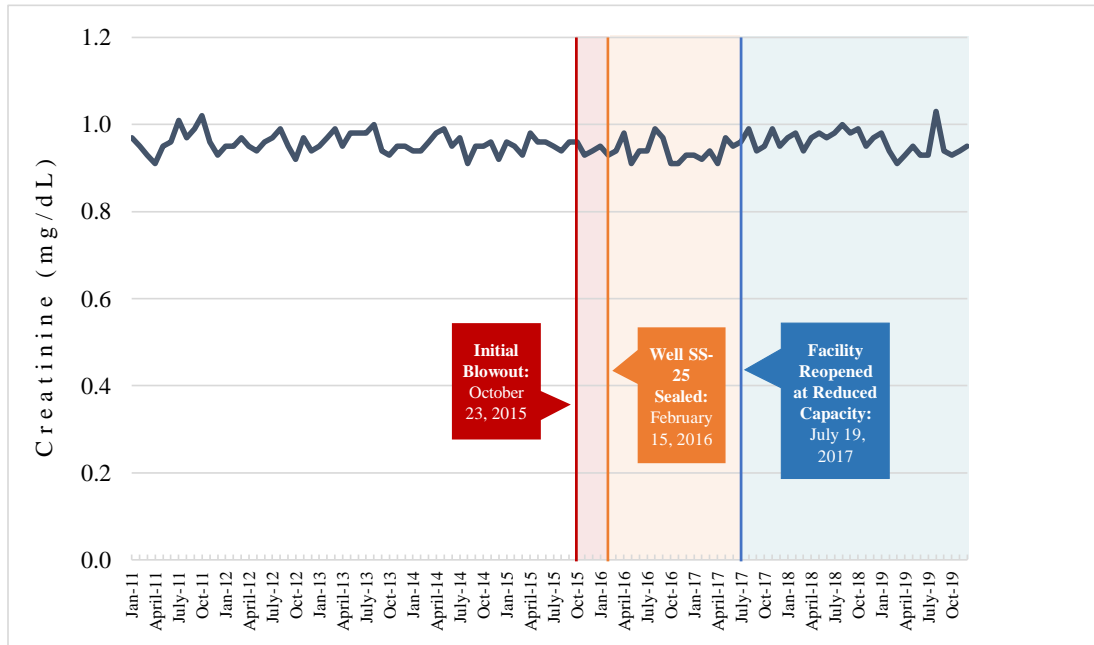


Figure 13. Mean Hemoglobin Levels among Children (5-17 Years), Porter Ranch, 2011-2019

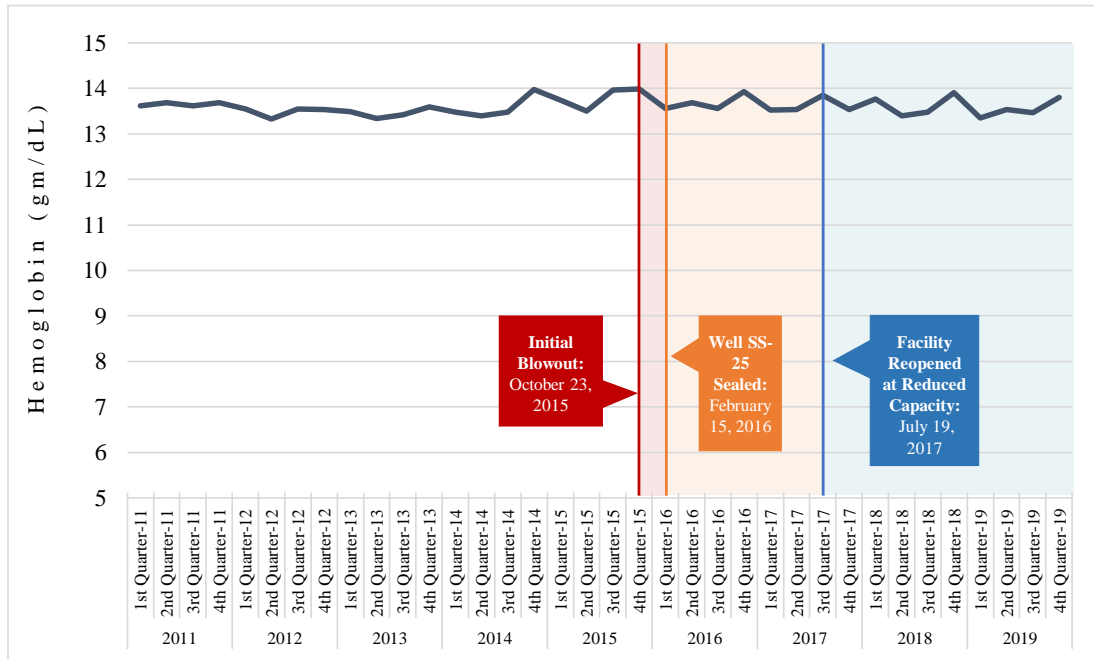


Figure 14. Mean Hematocrit Levels among Children (5-17 Years), Porter Ranch, 2011-2019

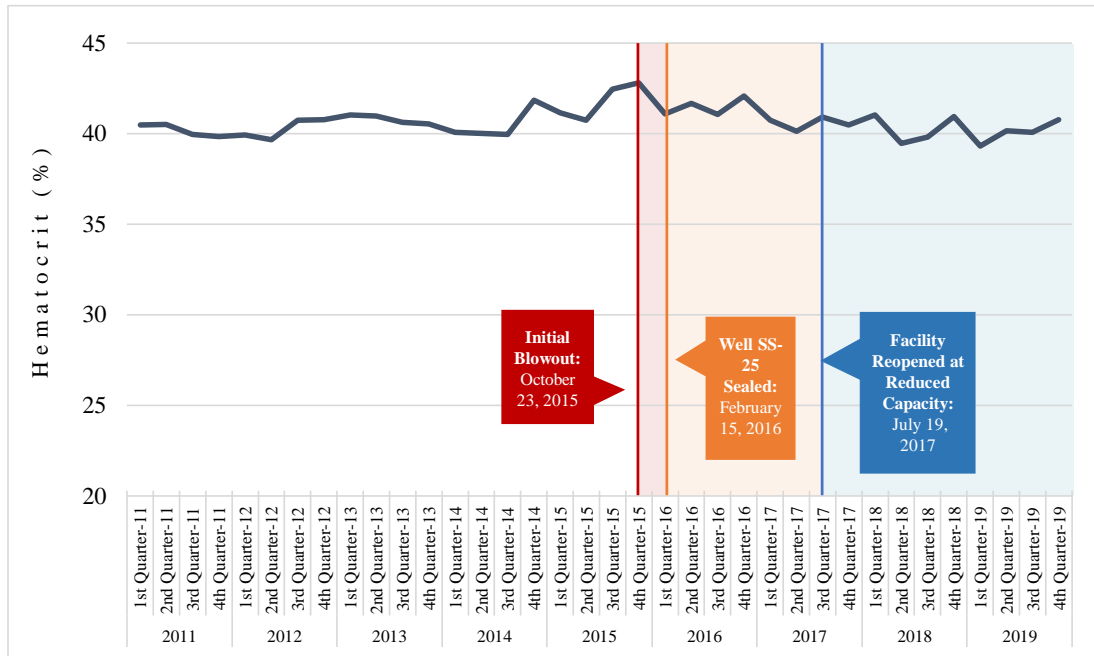


Figure 15. Mean White Blood Cell Counts among Children (5-17 Years), Porter Ranch, 2011-2019

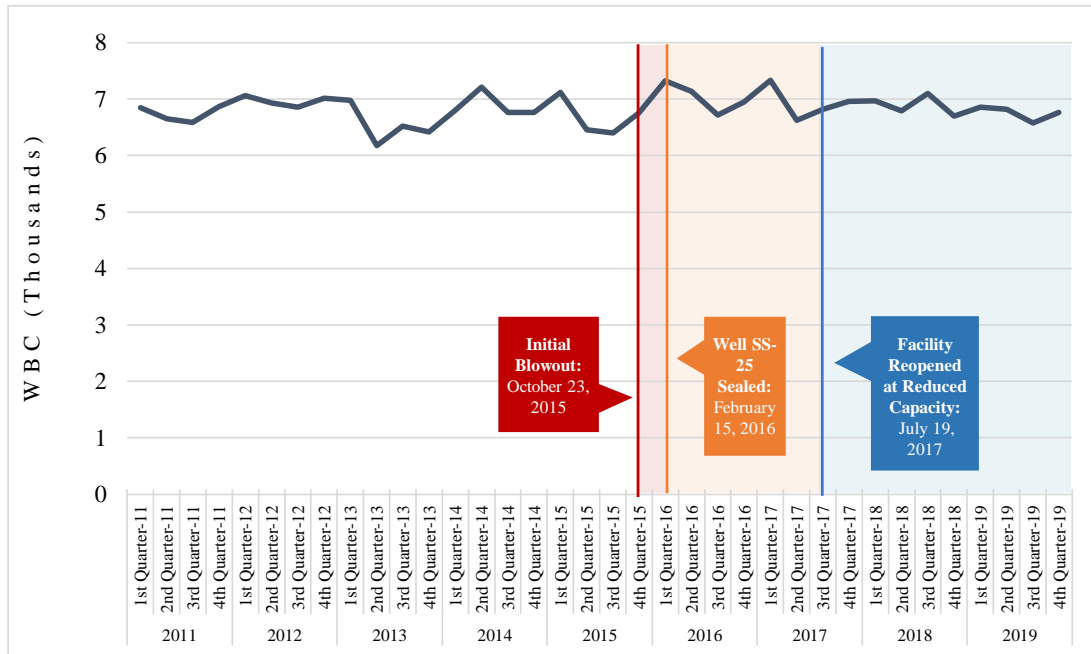


Figure 16. Mean Neutrophil Counts among Children (5-17 Years), Porter Ranch, 2011-2019

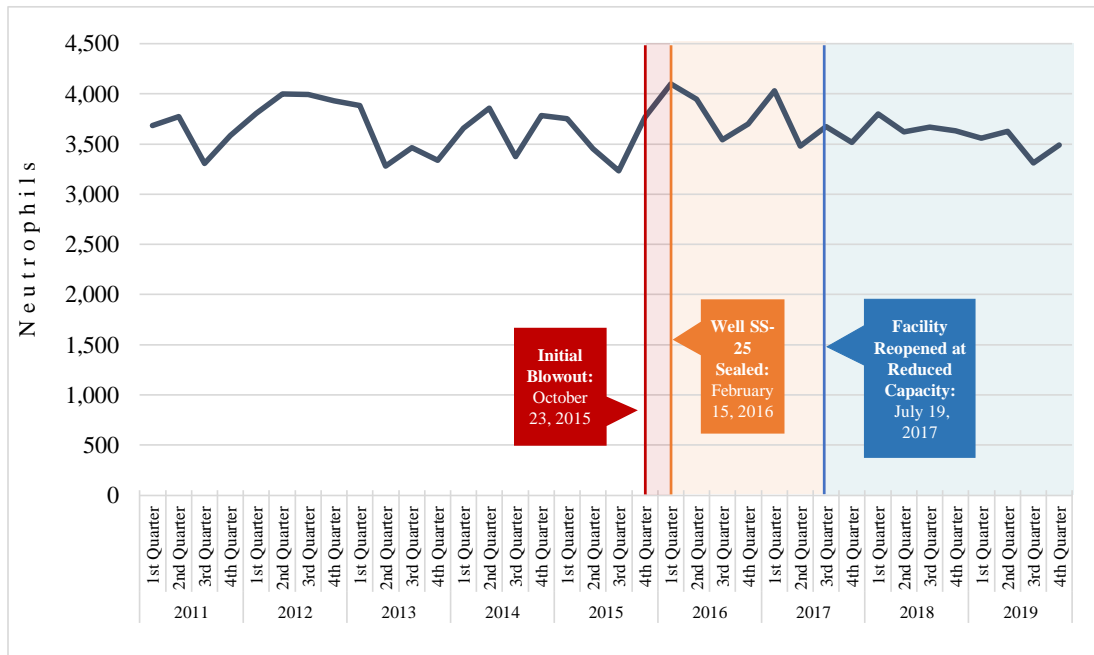


Figure 17. Mean Lymphocyte Counts among Children (5-17 Years), Porter Ranch, 2011-2019

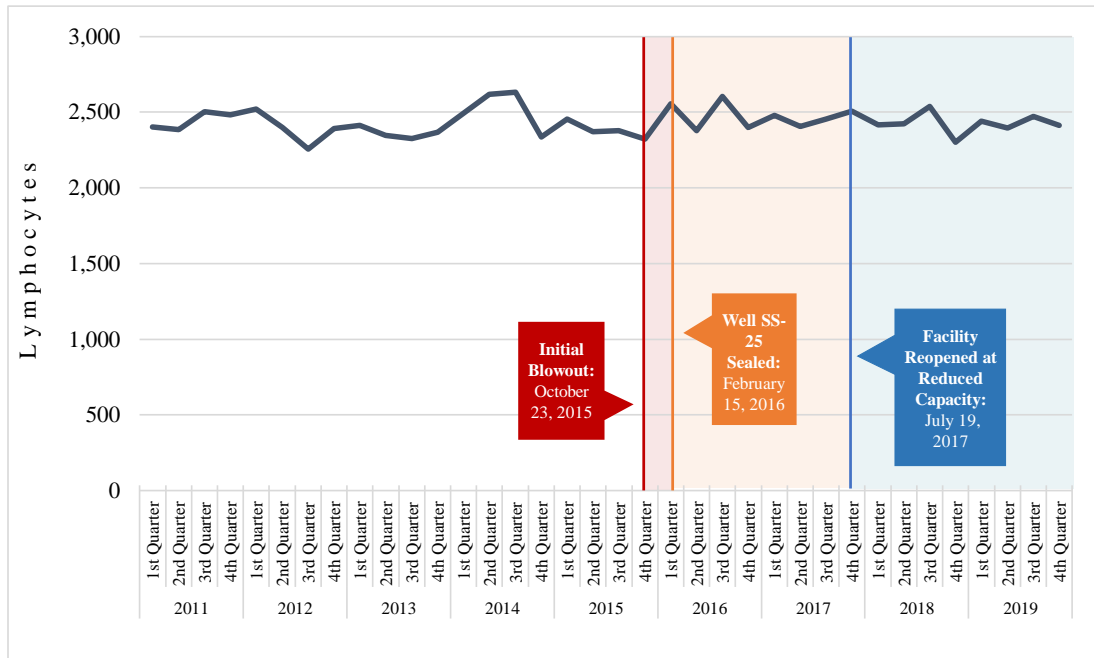


Figure 18. Mean Platelet Counts among Children (5-17 Years), Porter Ranch, 2011-2019

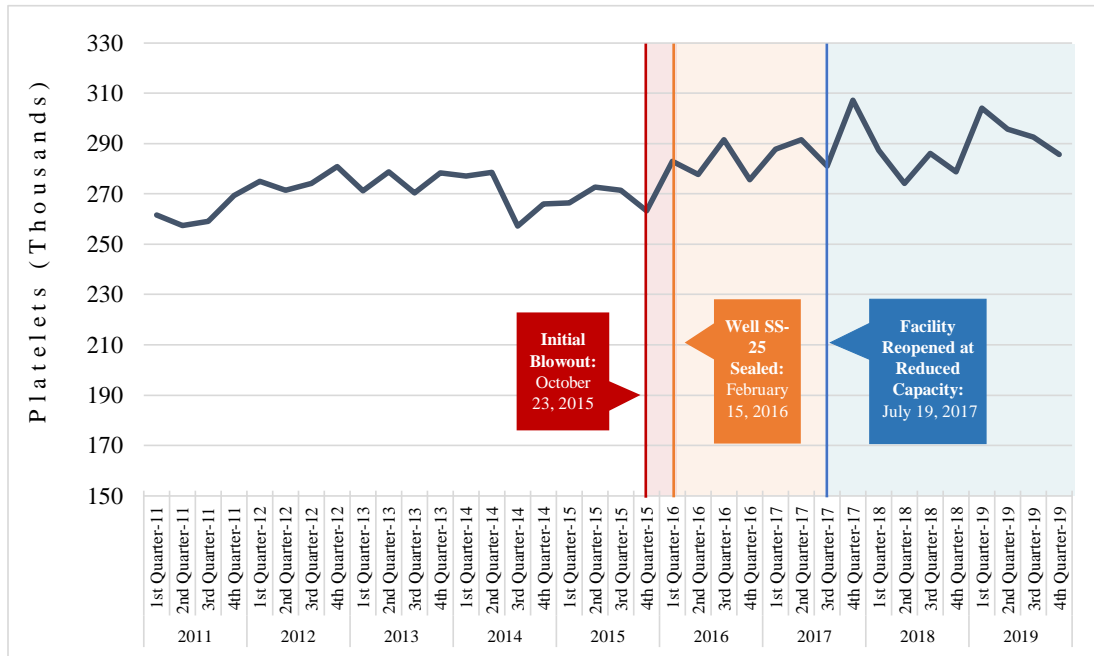


Figure 19. Mean Alanine Aminotransferase Levels among Children (5-17 Years), Porter Ranch, 2011-2019

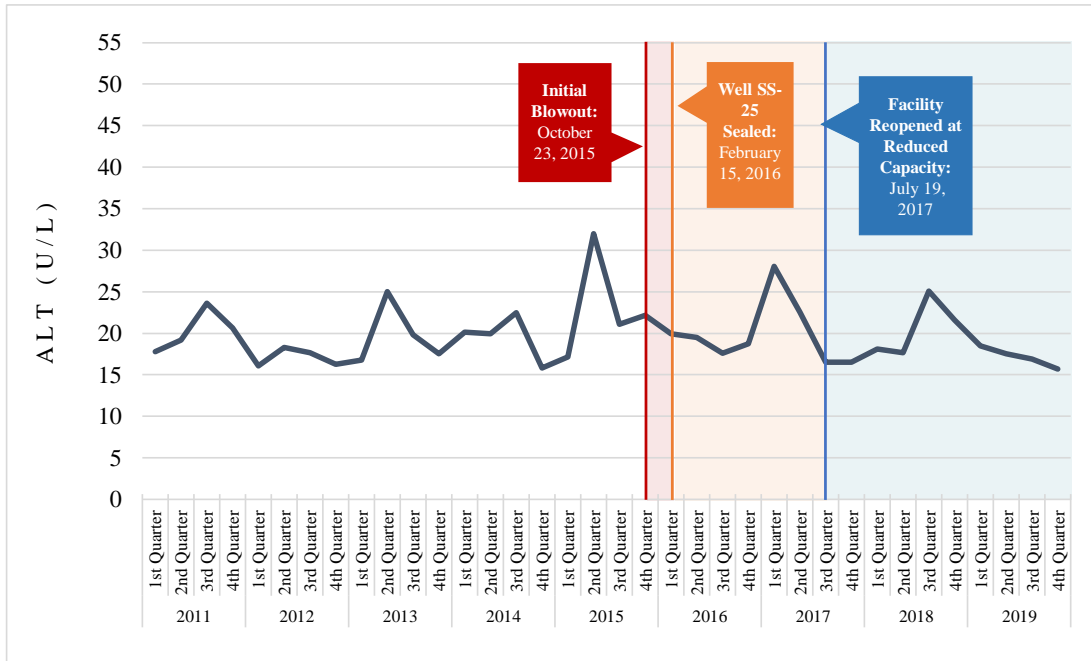


Figure 20. Mean Aspartate Aminotransferase Levels among Children (5-17 Years), Porter Ranch, 2011-2019

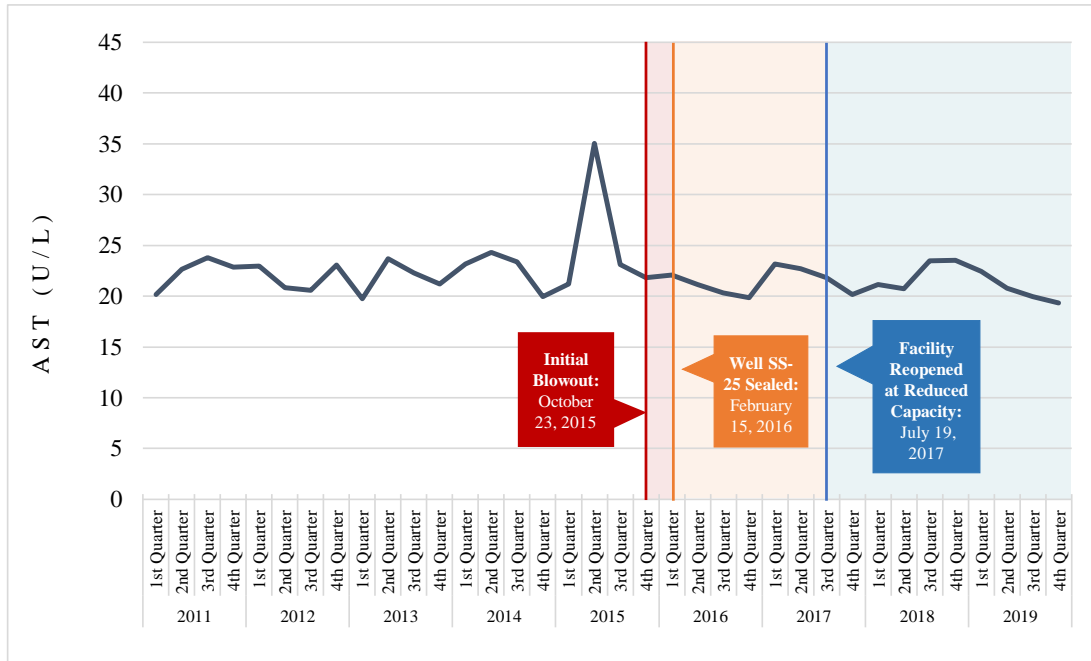


Figure 21. Mean Blood Urea Nitrogen Levels among Children (5-17 Years), Porter Ranch, 2011-2019

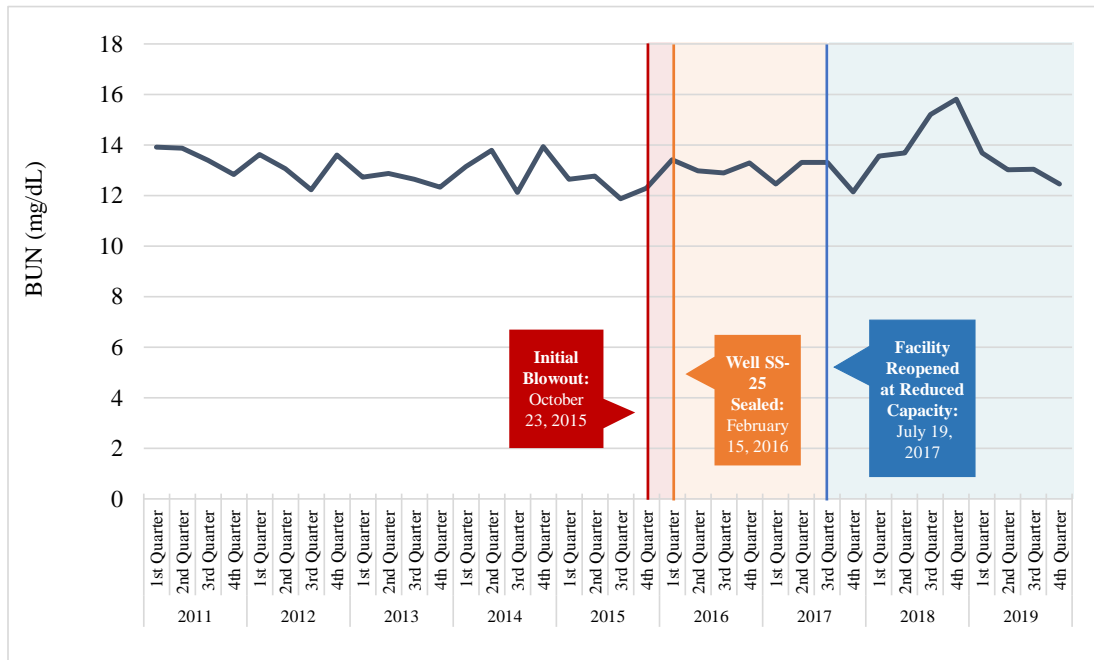


Figure 22. Mean Creatinine Levels among Children (5-17 Years), Porter Ranch, 2011-2019

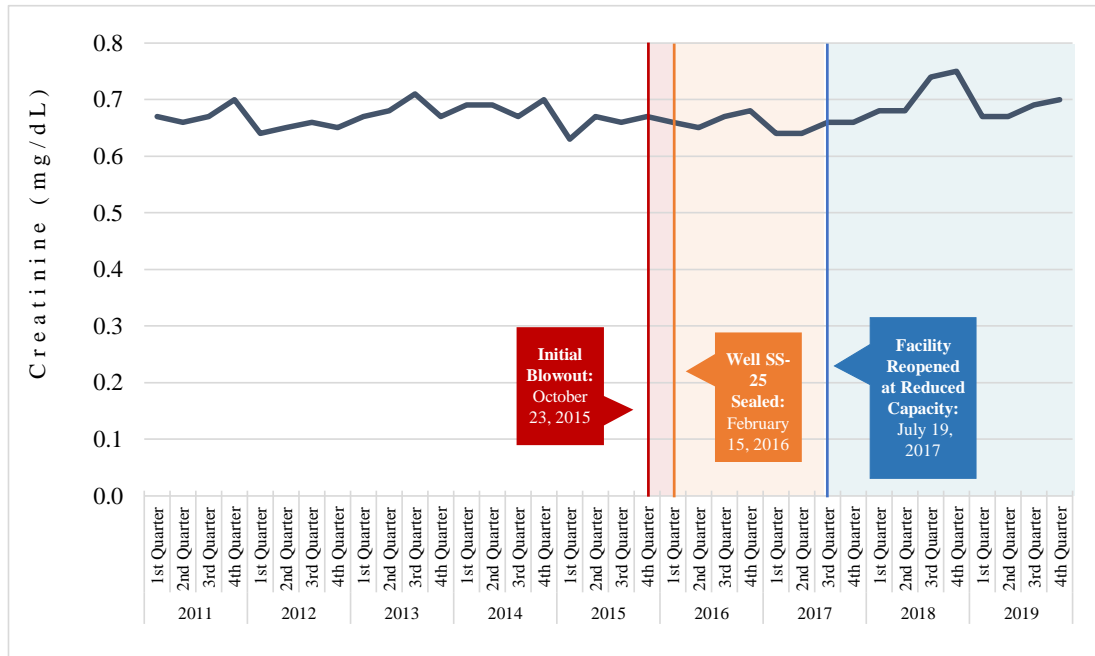


Figure 23. Mean Hemoglobin Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

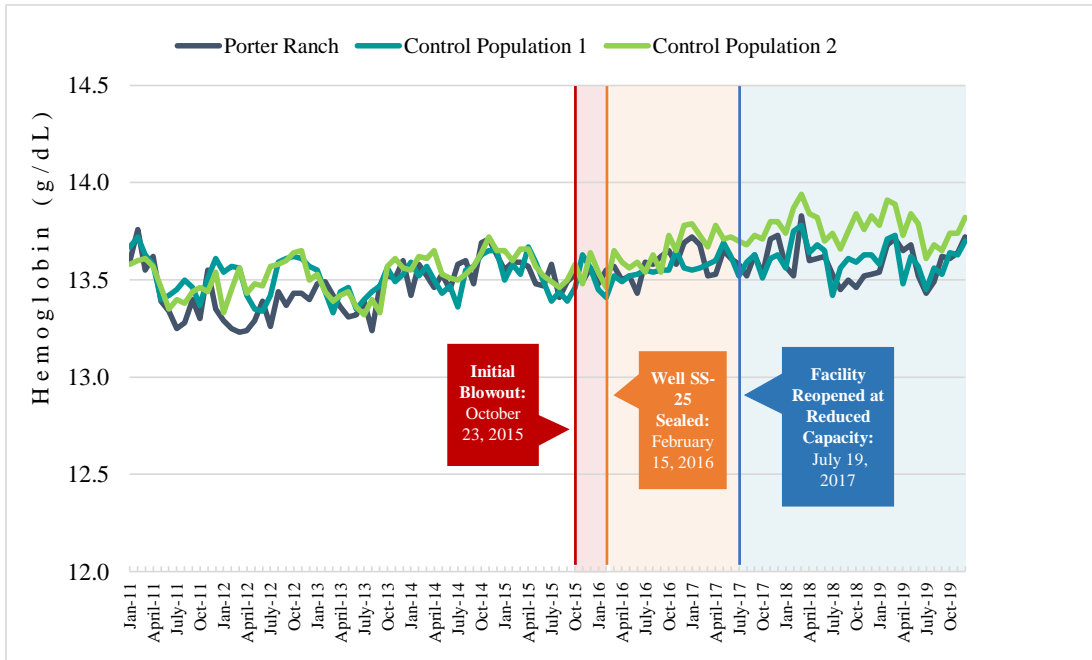


Figure 24. Mean Hemoglobin Levels among Male Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

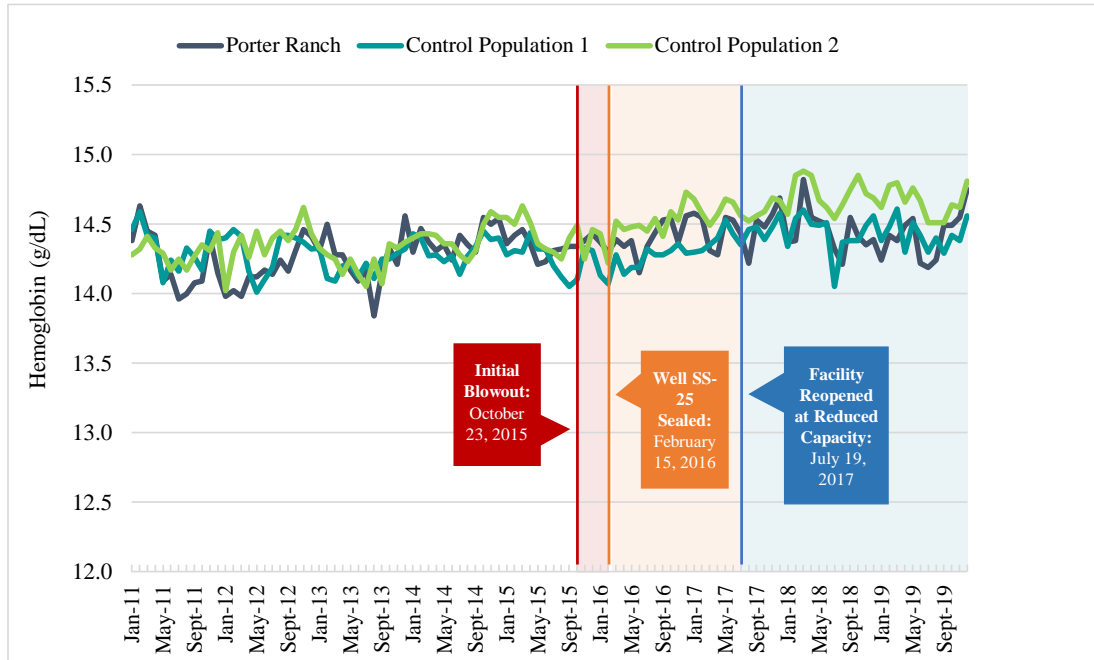


Figure 25. Mean Hemoglobin Levels among Female Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

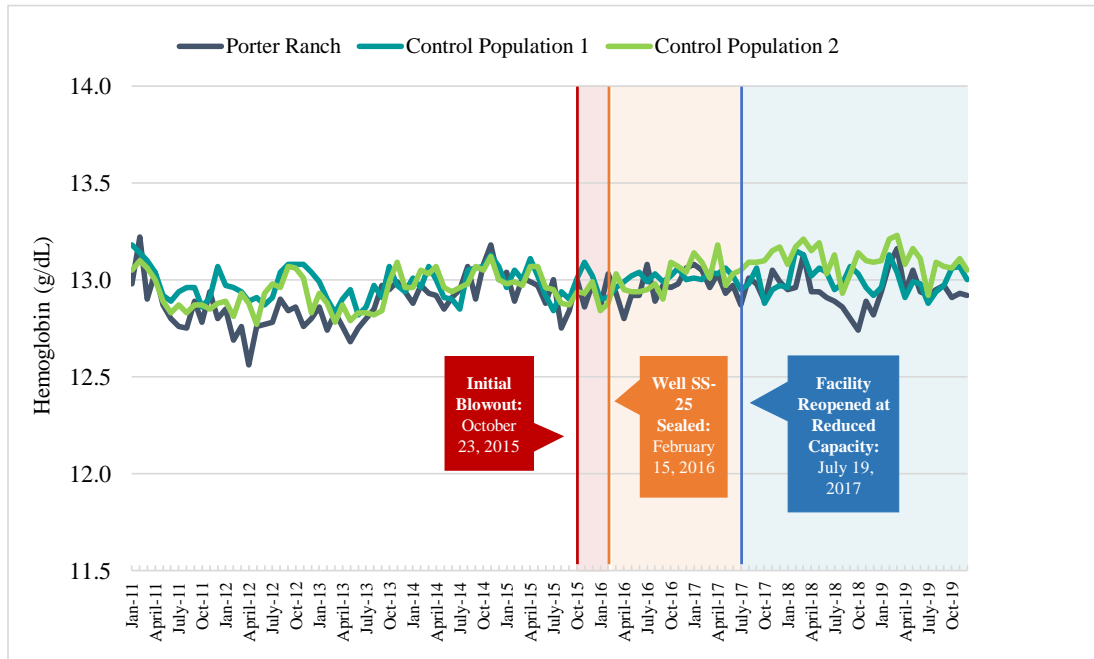


Figure 26. Mean Hematocrit Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

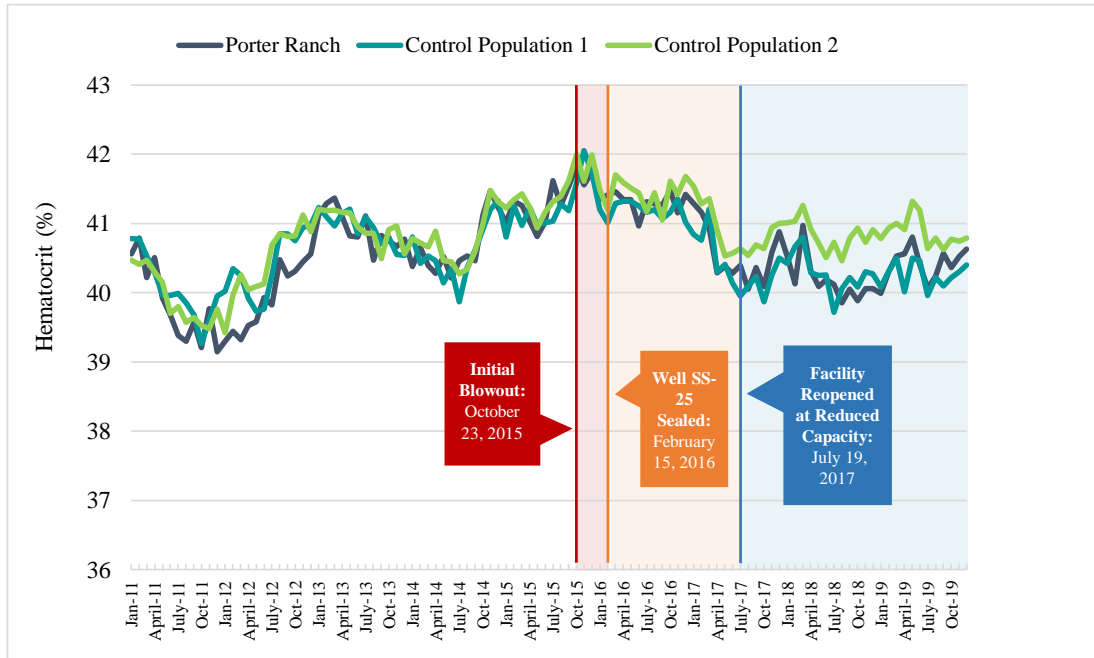


Figure 27. Mean Hematocrit Levels among Male Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

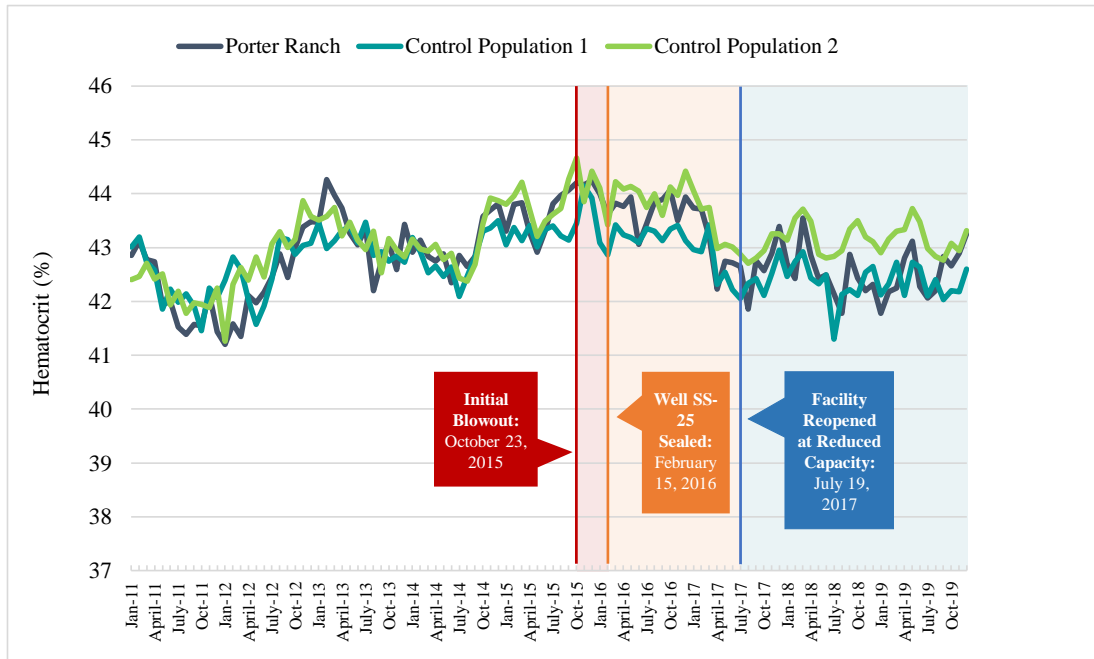


Figure 28. Mean Hematocrit Levels among Female Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

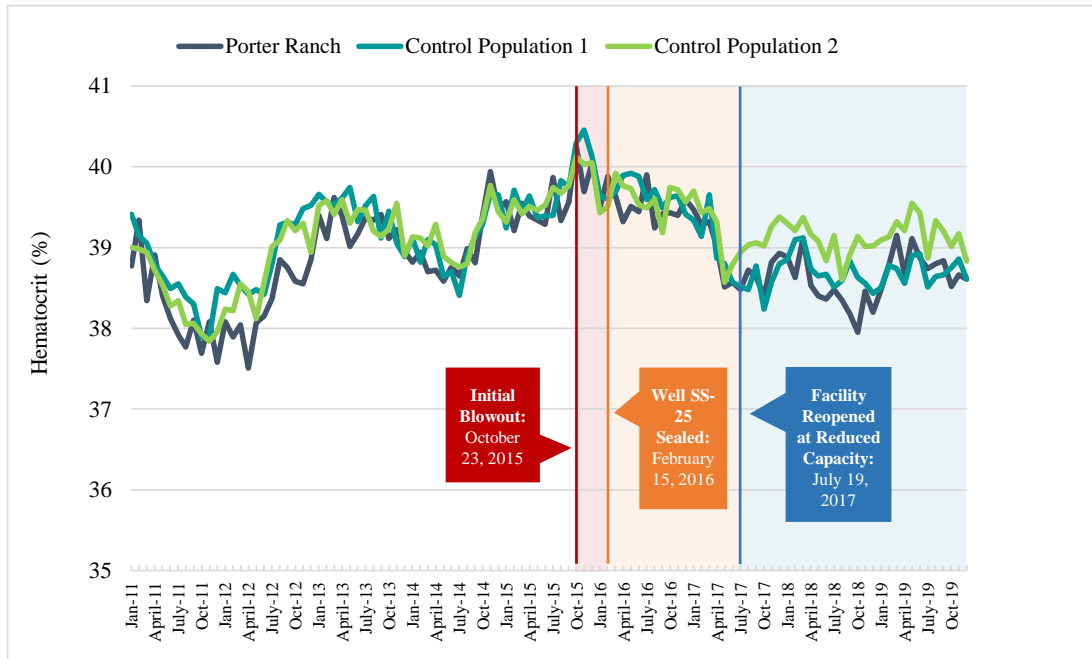


Figure 29. Mean White Blood Cell Counts among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

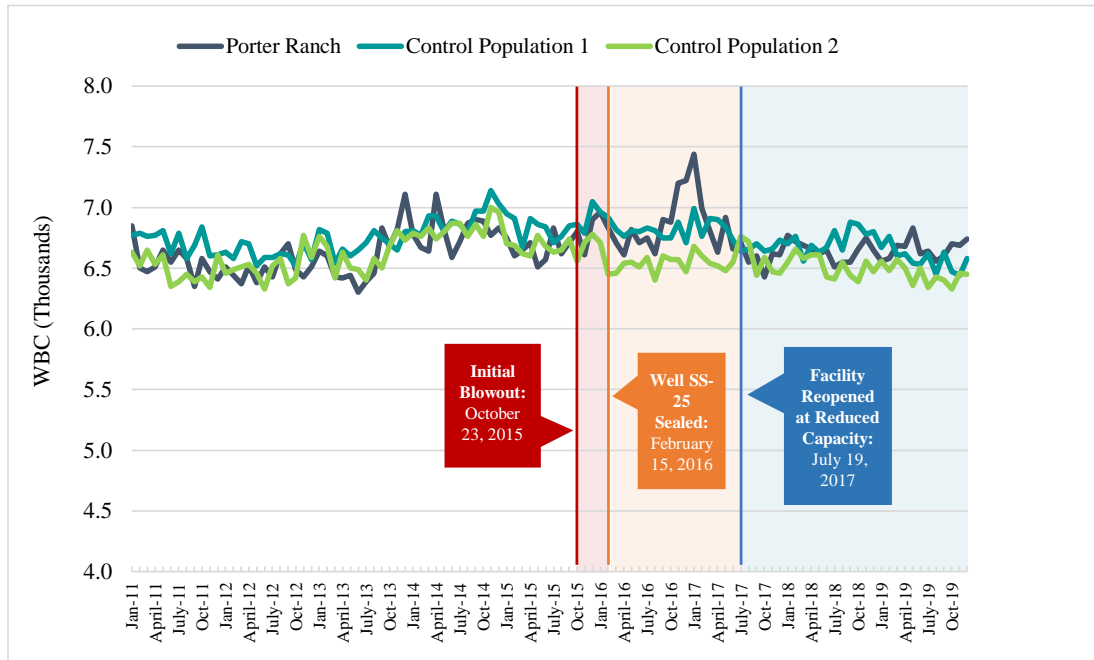


Figure 30. Mean Neutrophil Counts among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

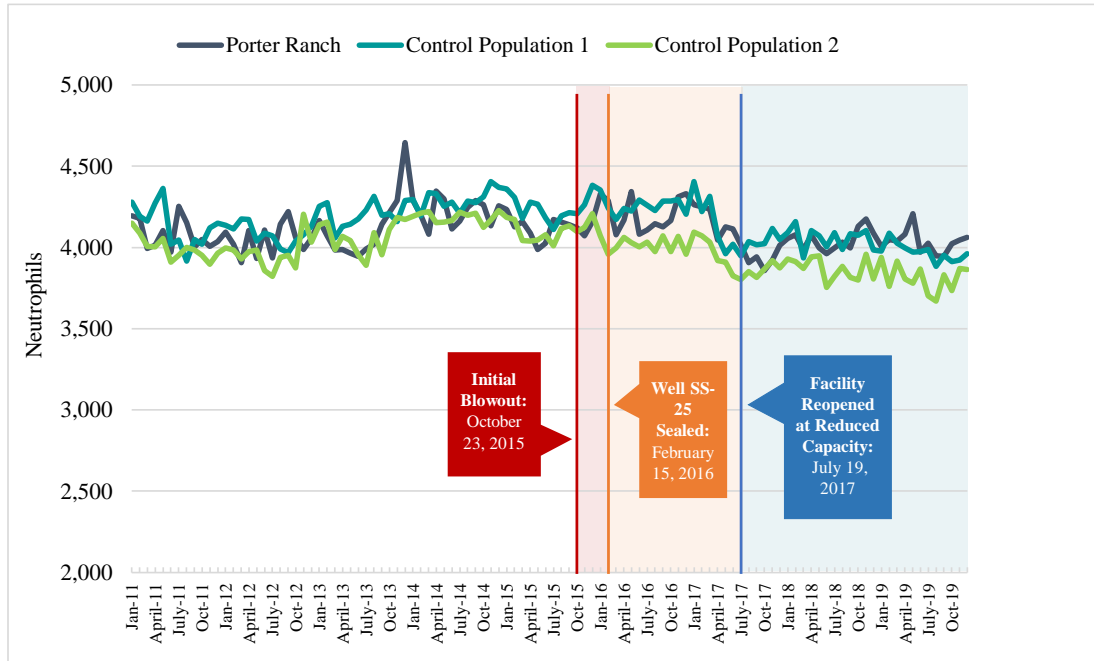


Figure 31. Mean Lymphocyte Counts among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

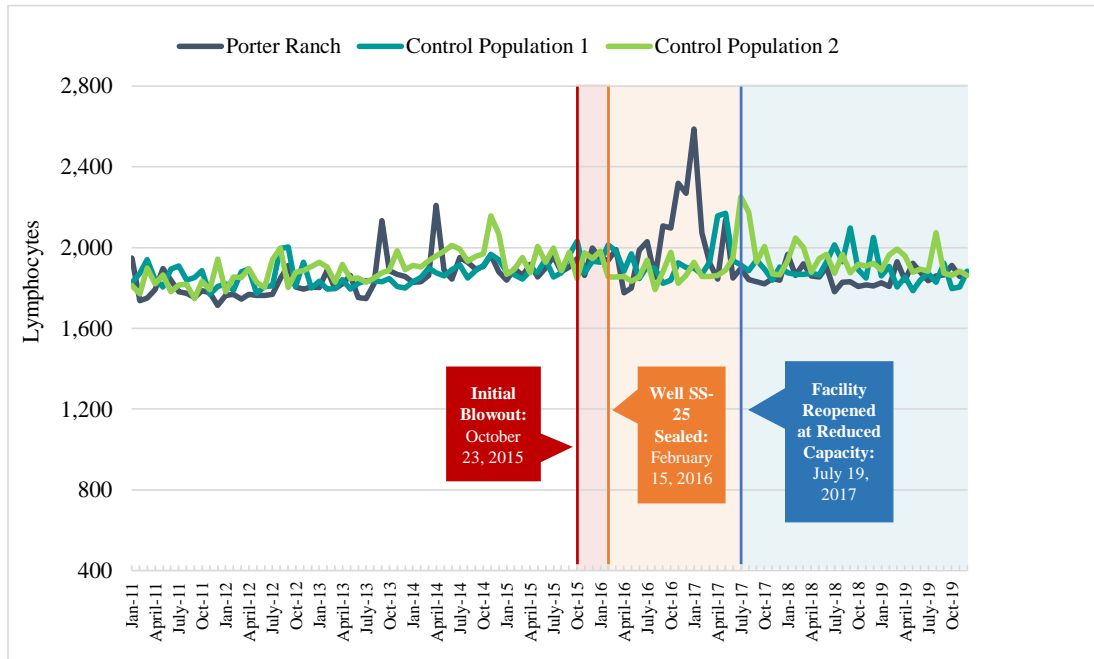


Figure 32. Mean Platelet Counts among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

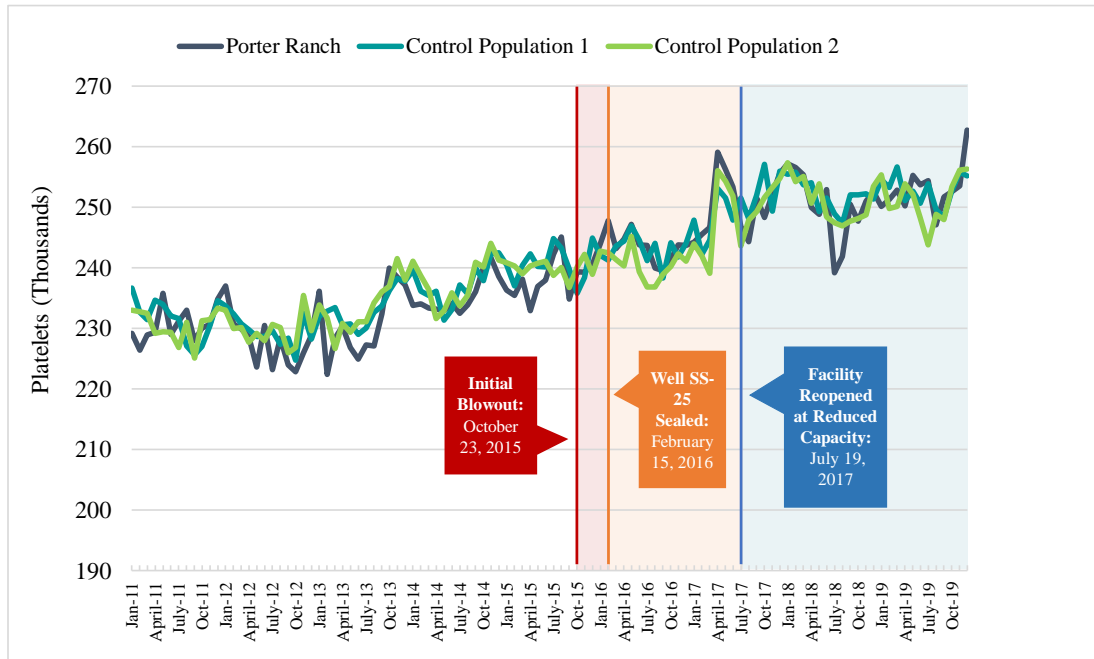


Figure 33. Mean Alanine Aminotransferase Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

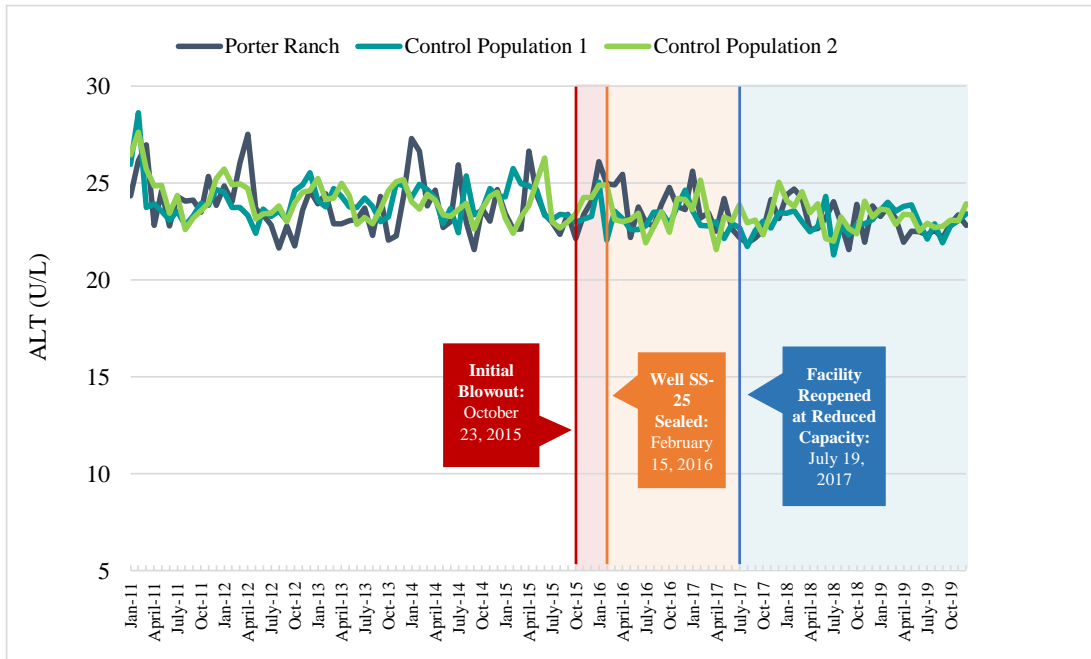


Figure 34. Mean Aspartate Aminotransferase Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

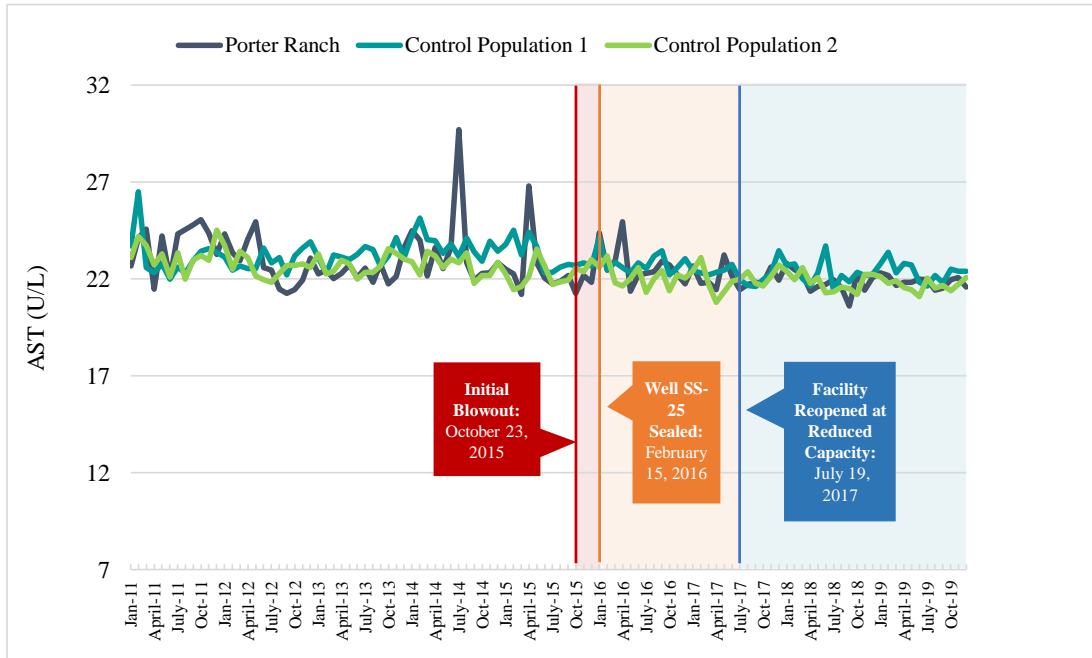


Figure 35. Mean Blood Urea Nitrogen Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

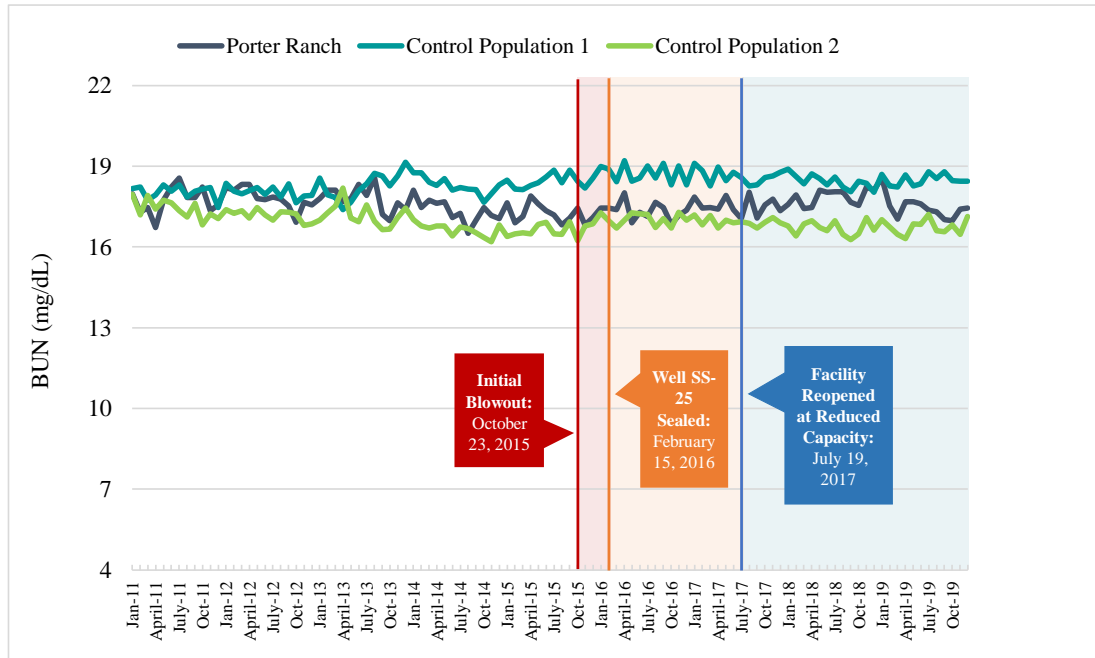


Figure 36. Mean Creatinine Levels among Adults (18+ Years), Porter Ranch vs Control Populations, 2011-2019

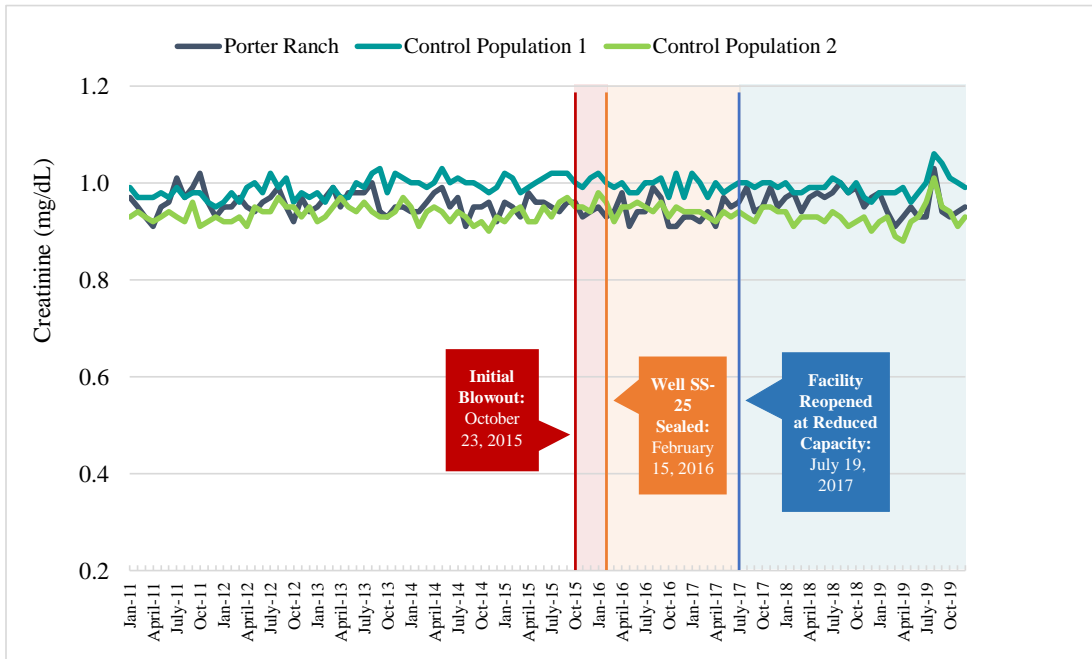


Figure 37. Mean Hemoglobin Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

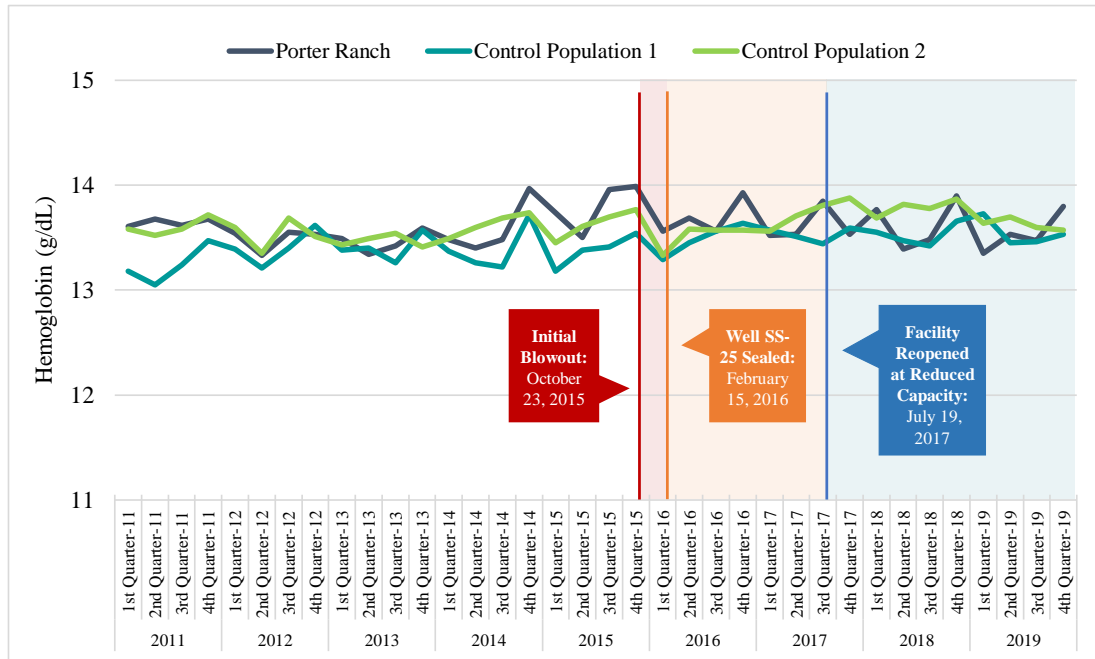


Figure 38. Mean Hematocrit Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

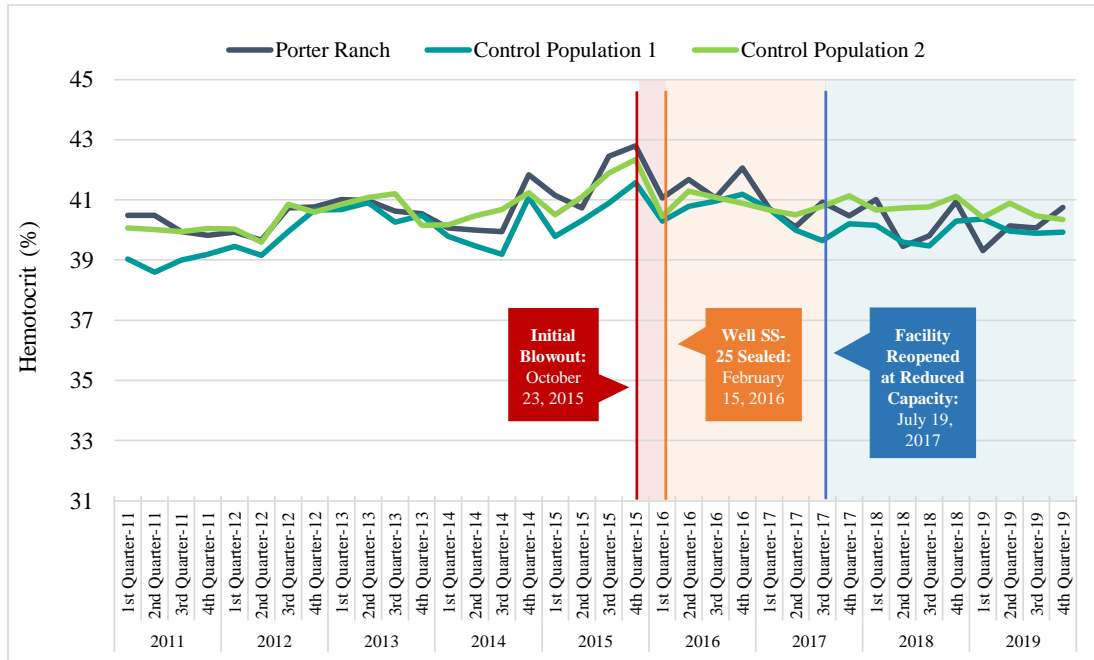


Figure 39. Mean White Blood Cell Counts among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

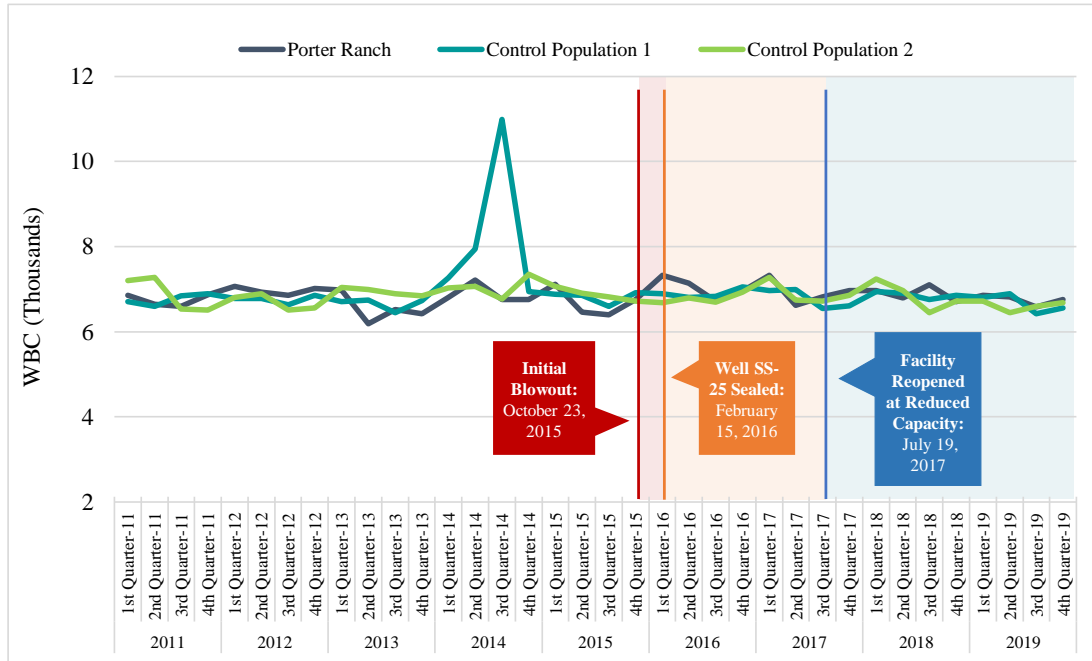


Figure 40. Mean Neutrophil Counts among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

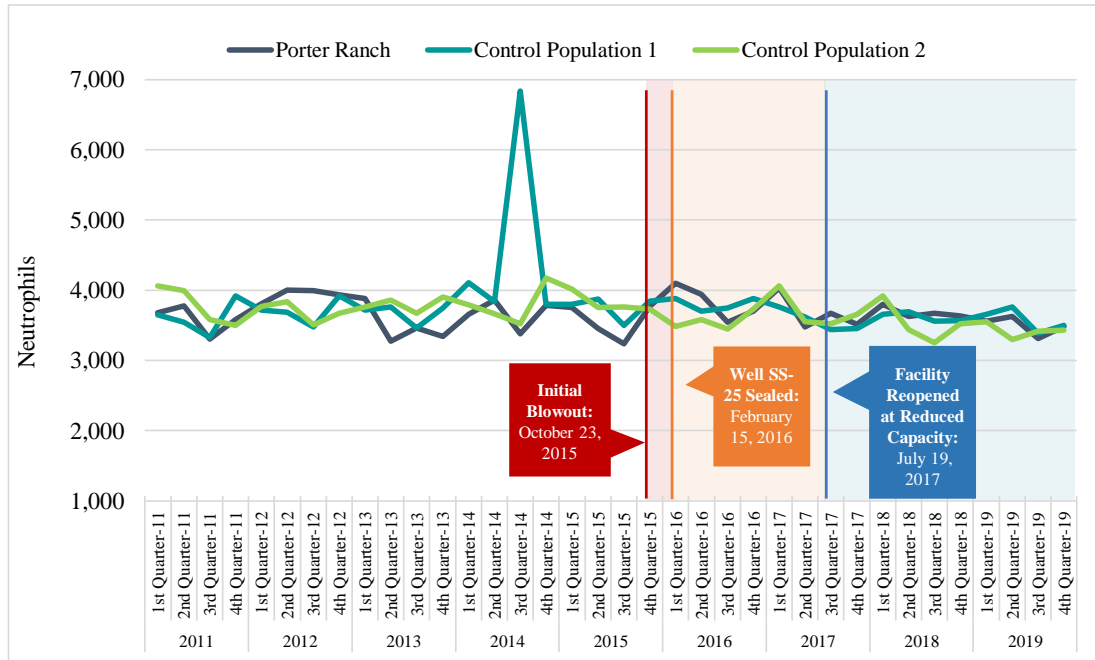


Figure 41. Mean Lymphocyte Counts among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

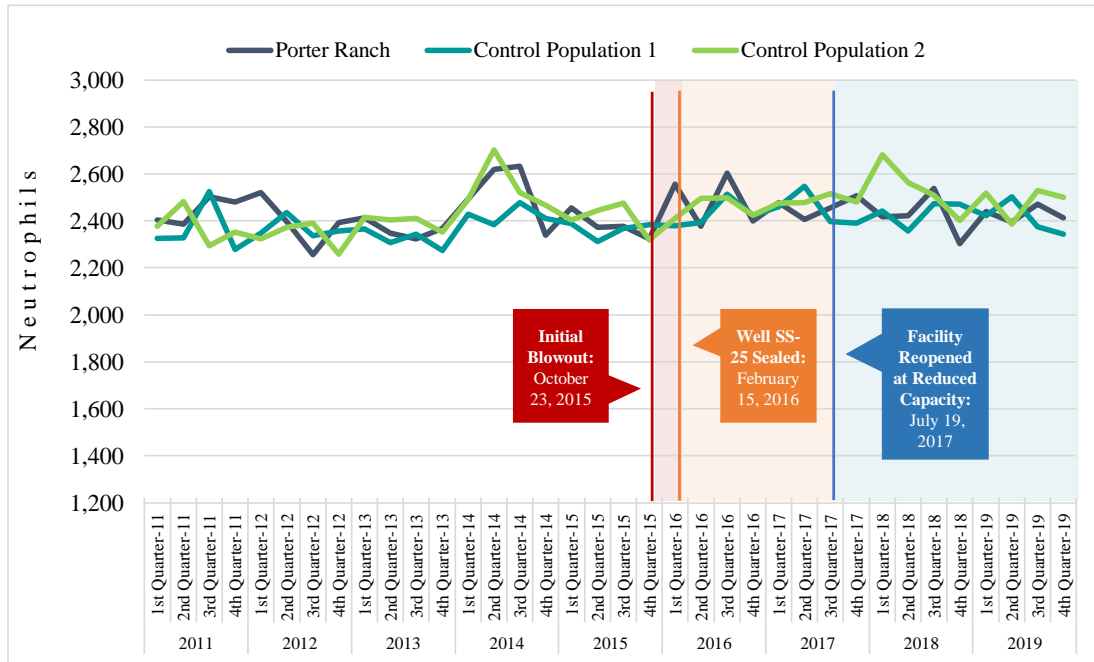


Figure 42. Mean Platelet Counts among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

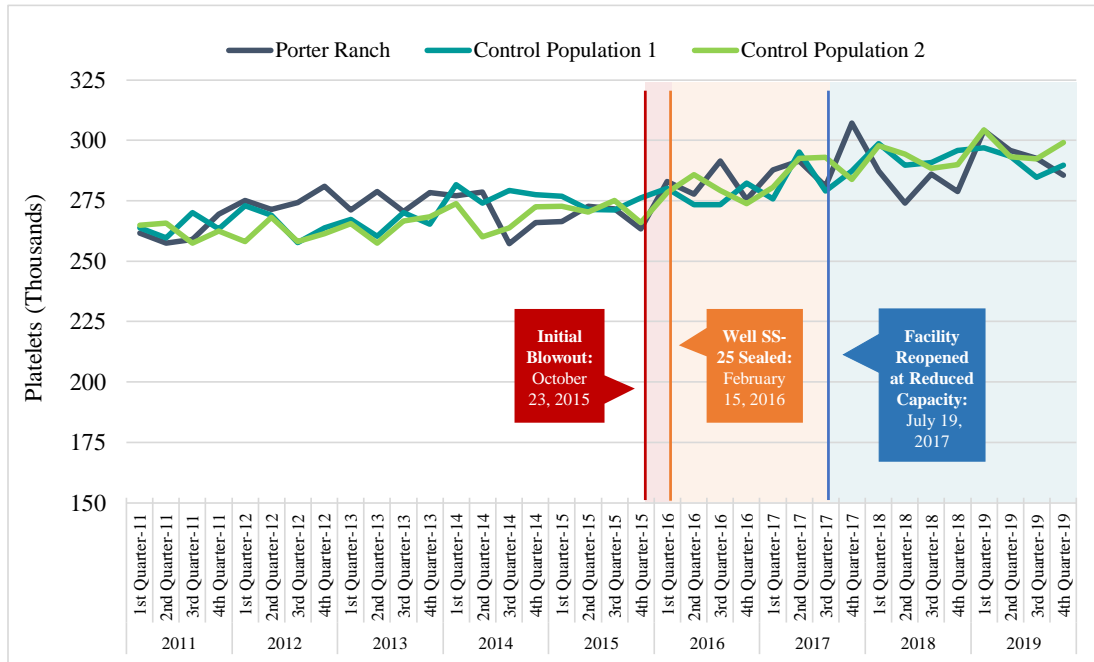


Figure 43. Mean Alanine Aminotransferase Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

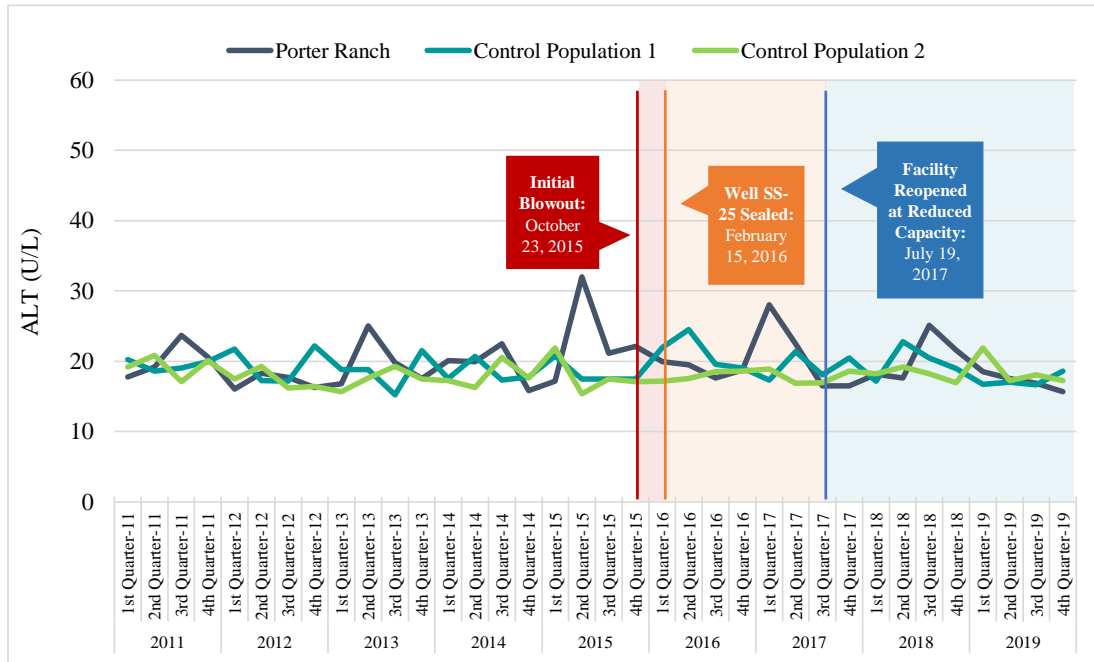


Figure 44. Mean Aspartate Aminotransferase Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

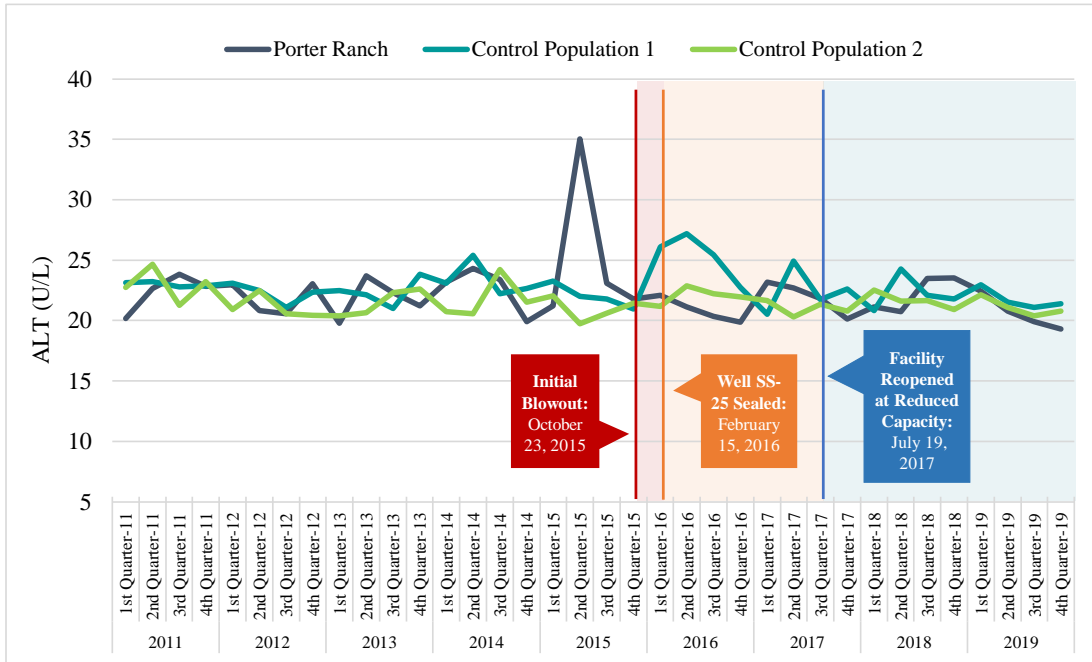


Figure 45. Mean Blood Urea Nitrogen Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

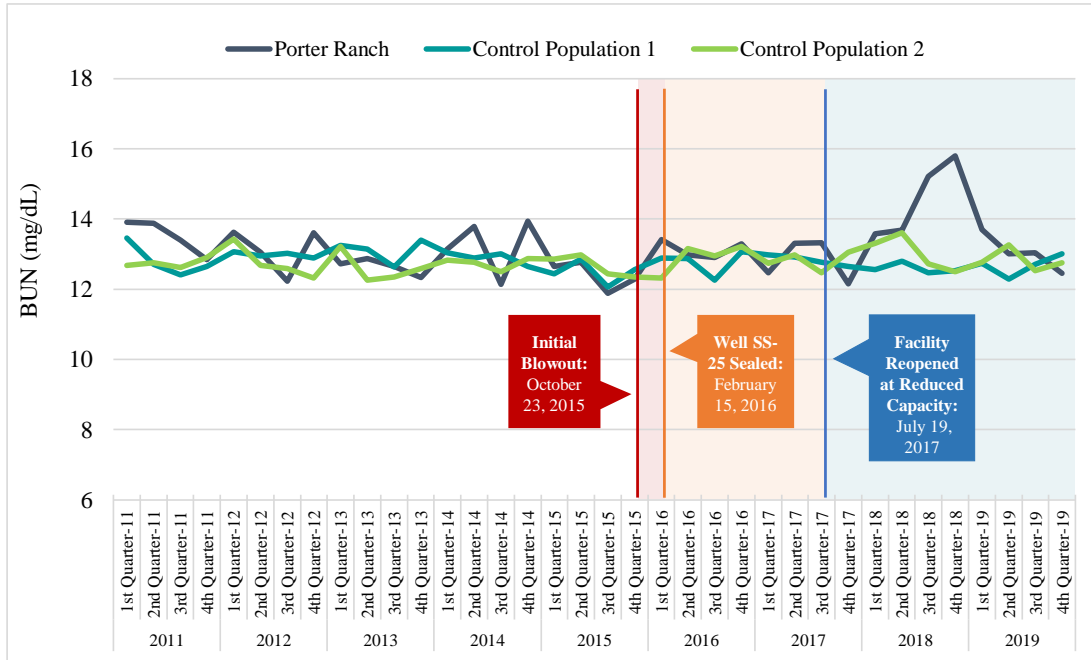


Figure 46. Mean Creatinine Levels among Children (5-17 Years), Porter Ranch vs Control Populations, 2011-2019

