# Supplemental Data S2: Trend Analysis using Joinpoint Regression Method

**Comprehensive analysis of the annual incidence trend of oral squamous cell carcinoma (OSCC) using Joinpoint regression analysis among all patients, stratified by age, sex, and tumor origin sites.**

## a. Trend Analysis for Total OSCC Cases
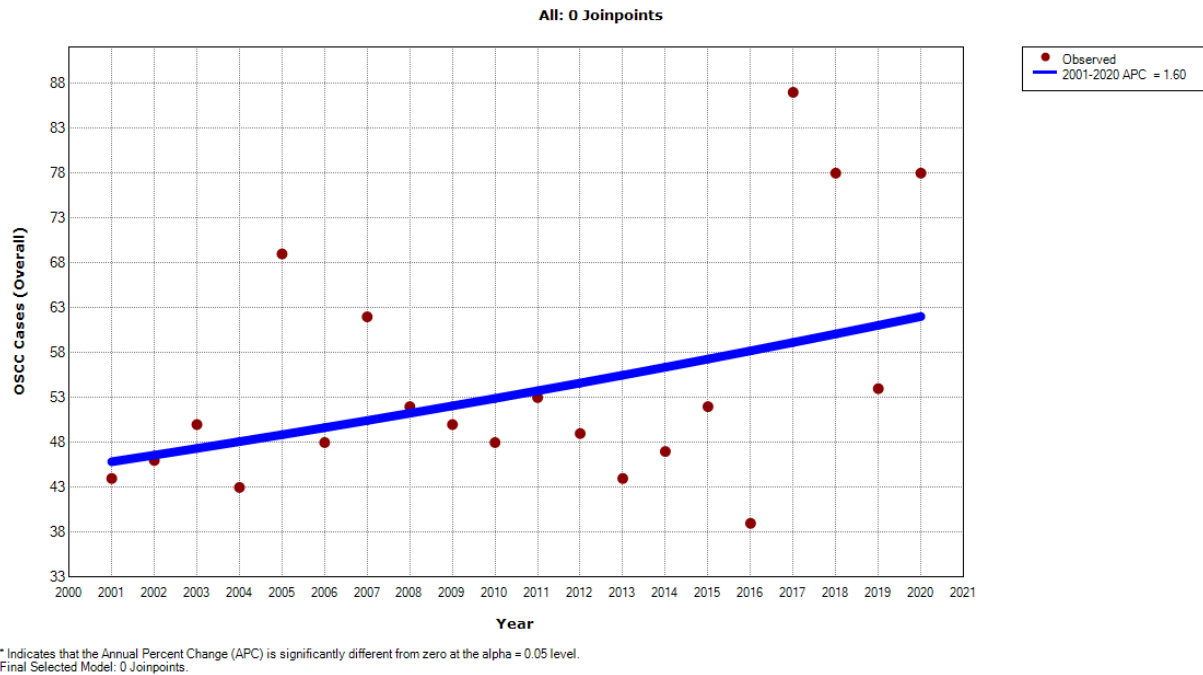
1. Graph



**Figure 1.** Trend analysis of total OSCC cases from 1,093 Indonesian patients during 2001-2020. Plotted lines represent annual percentage changes (APCs). *Significant deviation in APC from 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 1.60 | -0.07 | 3.30 | 2.02 | 0.059 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 1.60 | -0.07 | 3.30 | 2.02 | 0.059 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More | | | | | | | |

**b. Trend Analysis for OSCC Cases in Young Patients (≤45 years old)**
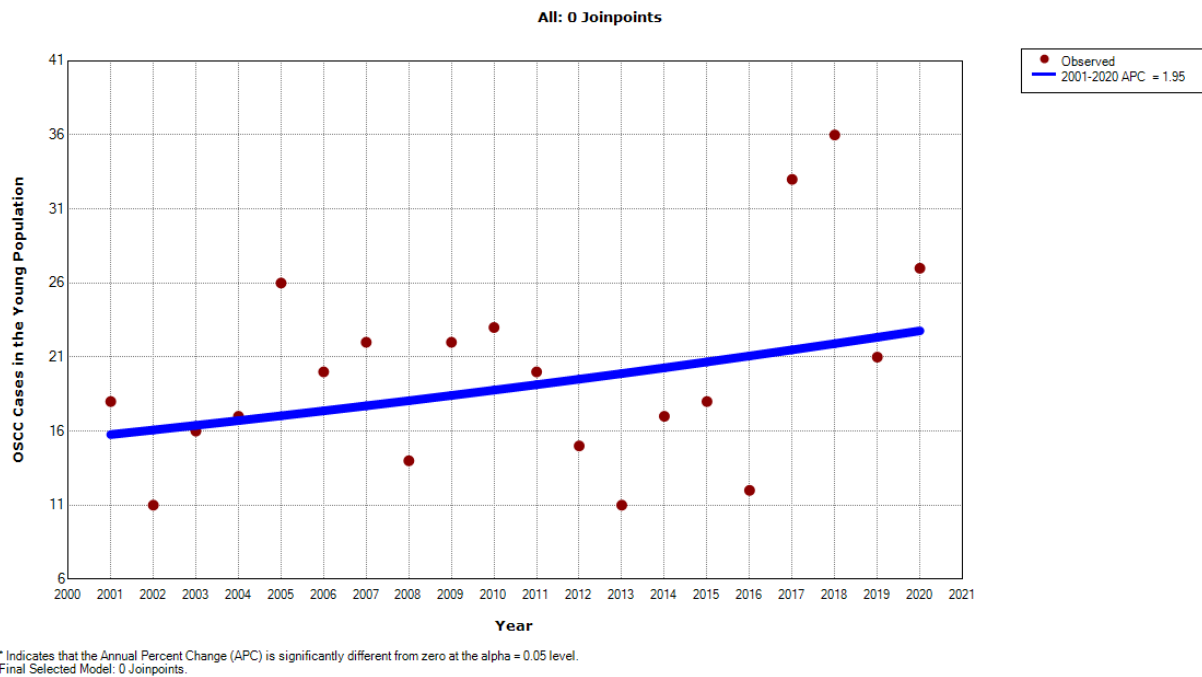
1. Graph



**Figure 2.** Trend analysis of OSCC cases in young adults (≤45 years old) in Indonesia from 2001 to 2020. The plotted lines represent the annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 1.95 | -0.64 | 4.61 | 1.58 | 0.132 |

\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| Average Annual Percent Change (AAPC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 1.95 | -0.64 | 4.61 | 1.58 | 0.132 |

\* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More

**c. Trend Analysis for OSCC Cases in Old Patients (>45 years old)**
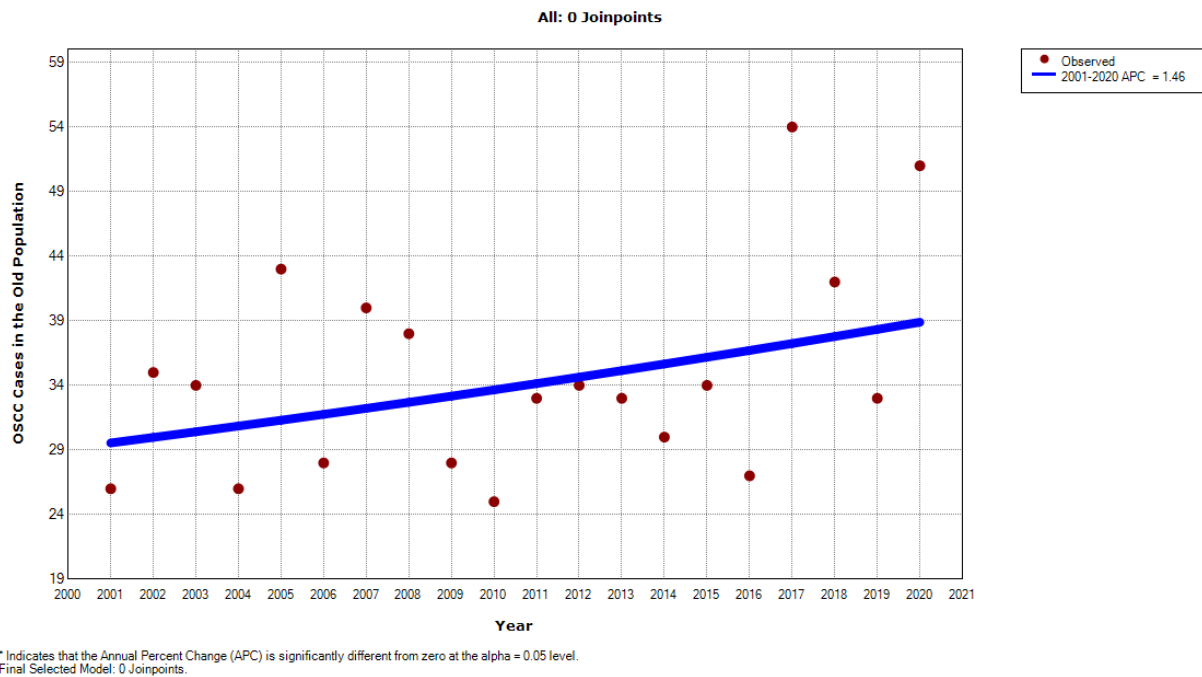
1. Graph



**Figure 3.** Trend analysis of OSCC cases in older Indonesian adults (>45 years old) from 2001 to 2020. The plotted lines represent annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 1.46 | -0.23 | 3.17 | 1.81 | 0.087 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 1.46 | -0.23 | 3.17 | 1.81 | 0.087 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More | | | | | | | |

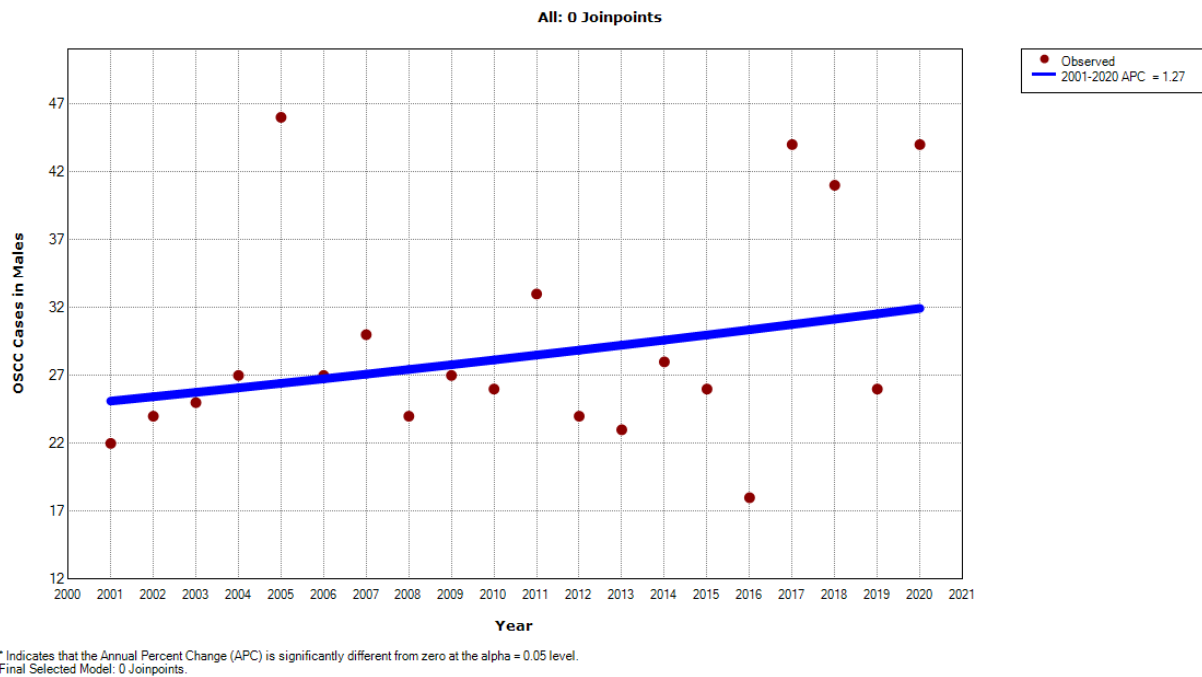**d. Trend Analysis for OSCC Cases in Males Patients**

1. Graph



**Figure 4.** Trend analysis of OSCC cases in Indonesian males from 2001 to 2020. The plotted lines represent annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 1.27 | -0.76 | 3.35 | 1.31 | 0.207 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 1.27 | -0.76 | 3.35 | 1.31 | 0.207 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More | | | | | | | |

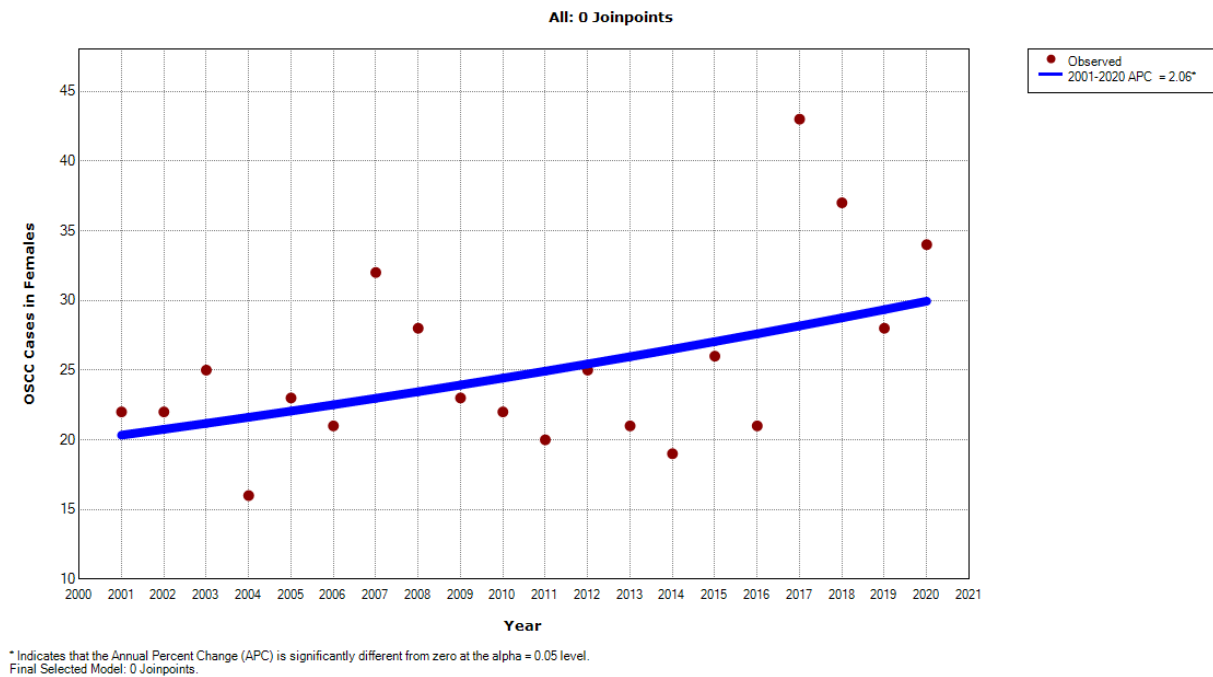**e. Trend Analysis for OSCC Cases in Females Patients**

1. Graph



**Figure 5.** Trend analysis of OSCC cases in Indonesian females from 2001 to 2020. The plotted lines represent annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| | Annual Percent Change (APC) | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 2.06* | 0.29 | 3.86 | 2.45 | 0.025 |

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| | Average Annual Percent Change (AAPC) | | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 2.06* | 0.29 | 3.86 | 2.45 | 0.025 |

* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used. See Help to Learn More

**f. Trend Analysis for OSCC Cases Originating from Tongue**

1. Graph



**All: 0 Joinpoints**

*Legend: Observed; 2001-2020 APC = 3.48\**

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
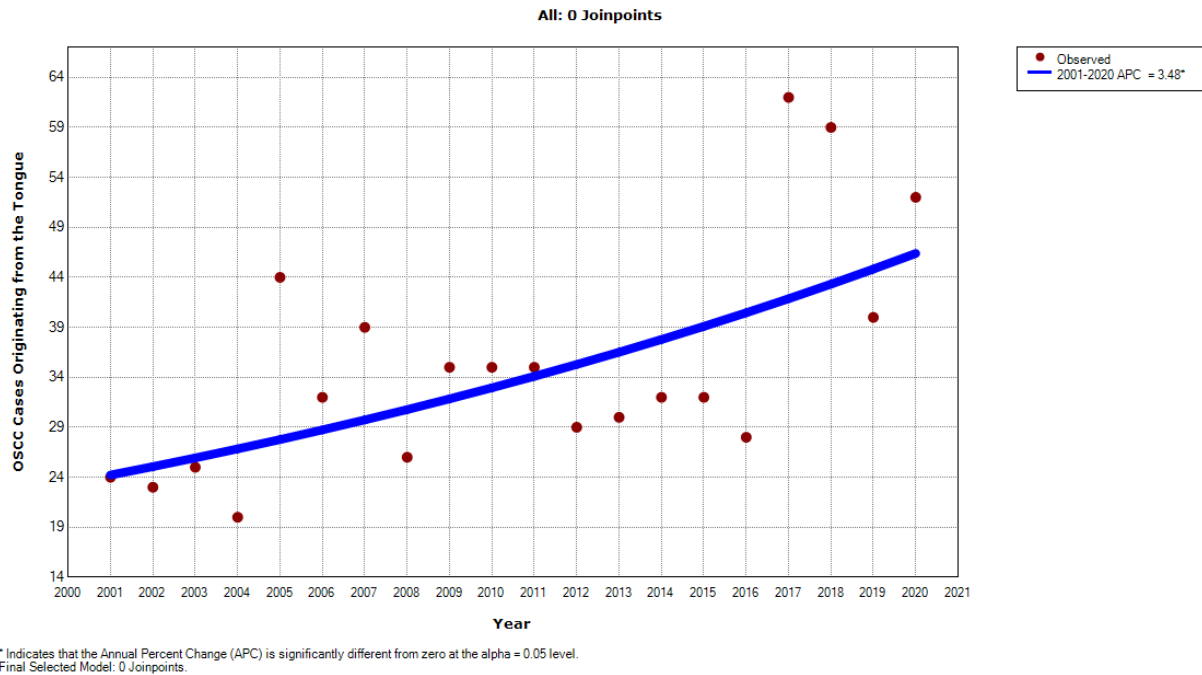Final Selected Model: 0 Joinpoints.

**Figure 6.** Trend analysis of Indonesian cases of OSCC originating from the tongue from 2001 to 2020. The plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| | | Annual Percent Change (APC) | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > ltl |
| 1 | 2001.00 | 2020.00 | 3.48* | 1.52 | 5.47 | 3.76 | 0.001 |

\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| | | Average Annual Percent Change (AAPC) | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 3.48* | 1.52 | 5.47 | 3.76 | 0.001 |

\* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used. See Help to Learn More

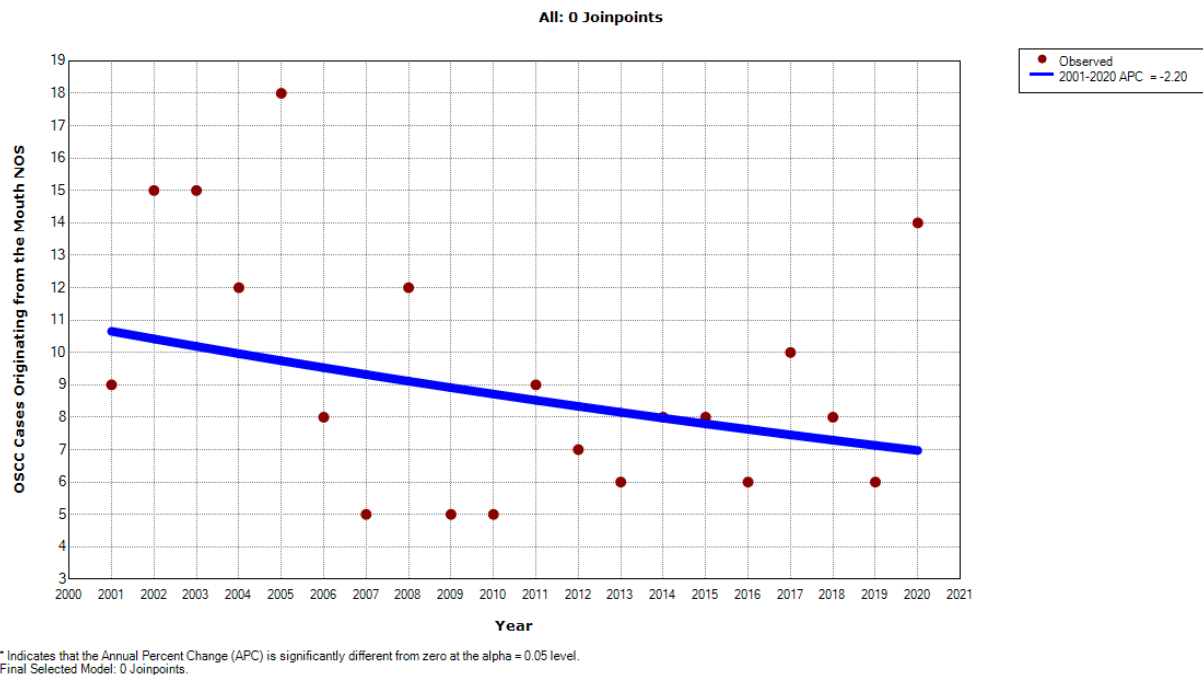## g. Trend Analysis for OSCC Cases Originating from Mouth NOS

1. Graph



**Figure 7.** Trend analysis of Indonesian cases of OSCC originating from the mouth (not otherwise specified) from 2001 to 2020. The plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | -2.20 | -5.22 | 0.90 | -1.50 | 0.152 |

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| Average Annual Percent Change (AAPC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | -2.20 | -5.22 | 0.90 | -1.50 | 0.152 |

* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More

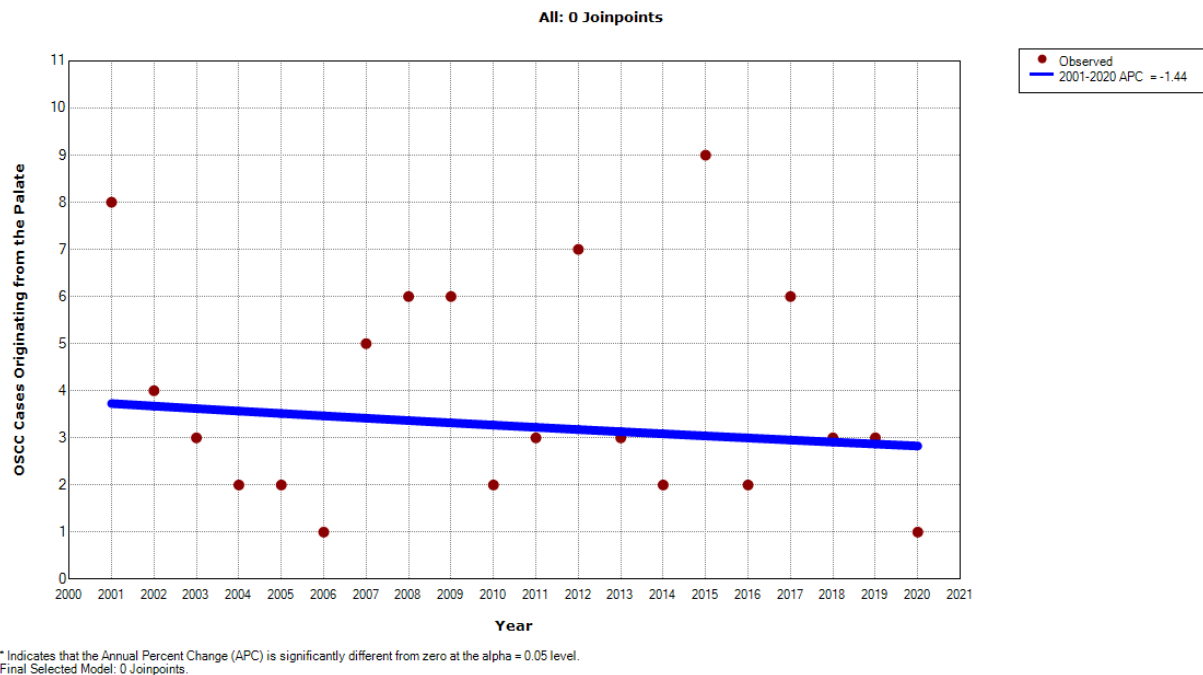## h. Trend Analysis for OSCC Cases Originating from Palate

1. Graph



**Figure 8.** Trend analysis of Indonesian cases of OSCC originating from the palate from 2001 to 2020. The plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > |t| |
| 1 | 2001.00 | 2020.00 | -1.44 | -6.54 | 3.93 | -0.58 | 0.572 |

\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| Average Annual Percent Change (AAPC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | -1.44 | -6.54 | 3.93 | -0.58 | 0.572 |

\* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More

### i. Trend Analysis for OSCC Cases Originating from Gingiva

1. Graph



**All: 0 Joinpoints**

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
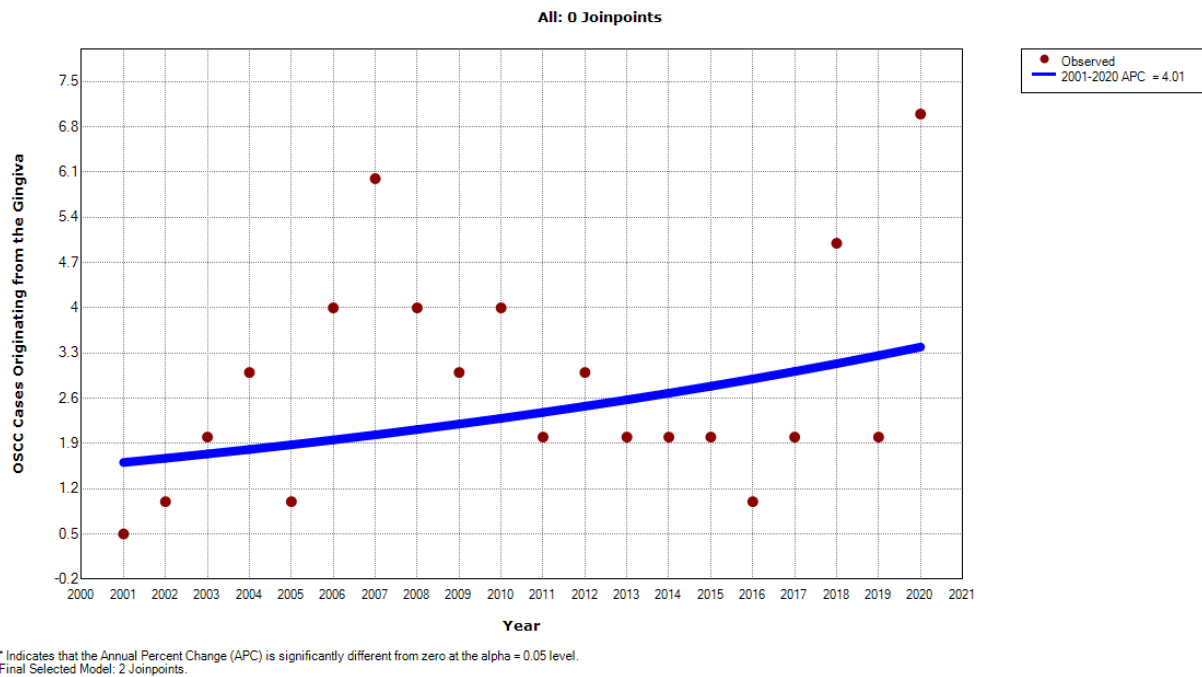Final Selected Model: 2 Joinpoints.

**Figure 9.** Trend analysis of Indonesian cases of OSCC originating from the gingiva during 2001–2020. Plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > ltl |
| 1 | 2001.00 | 2020.00 | 4.01 | -1.28 | 9.59 | 1.58 | 0.131 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 4.01 | -1.28 | 9.59 | 1.58 | 0.131 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More | | | | | | | |

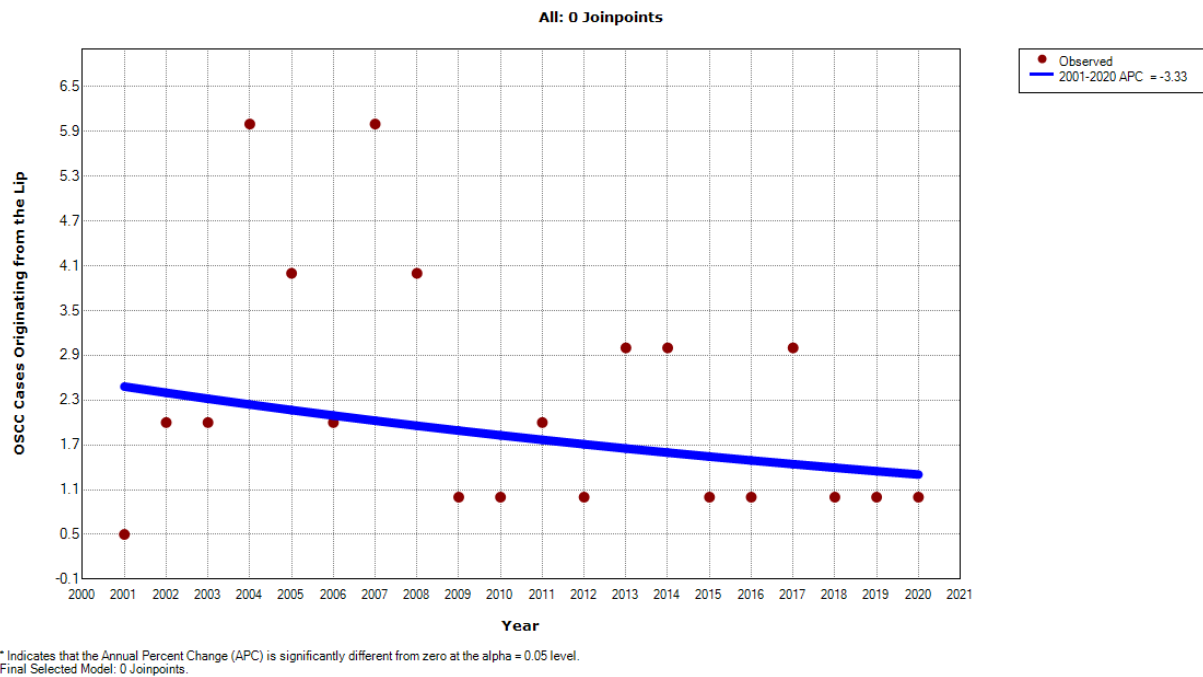## j. Trend Analysis for OSCC Cases Originating from Lip

1. Graph



**Figure 10.** Trend analysis of Indonesian cases of OSCC originating from the lip during 2001–2020. Plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | -3.33 | -8.64 | 2.28 | -1.26 | 0.223 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | -3.33 | -8.64 | 2.28 | -1.26 | 0.223 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.  See Help to Learn More | | | | | | | |

## k. Trend Analysis for OSCC Cases Originating from Buccal Mucosa

1. Graph



**All: 0 Joinpoints**

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
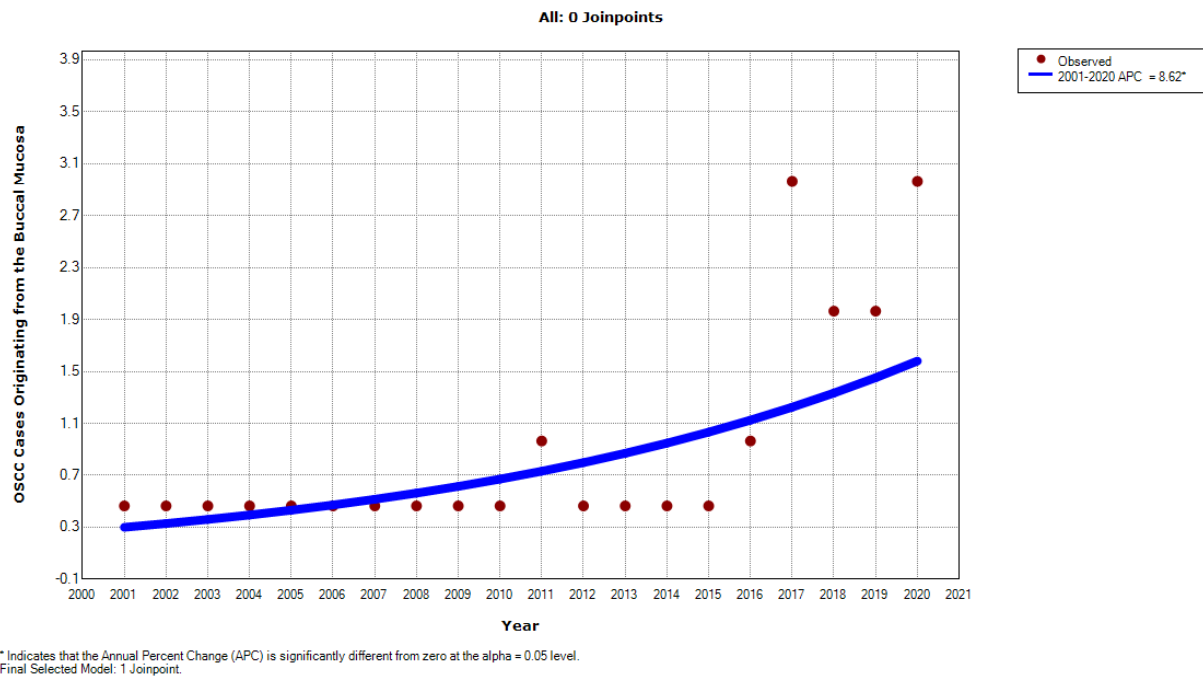Final Selected Model: 1 Joinpoint.

**Figure 11.** Trend analysis of Indonesian cases of OSCC originating from the buccal mucosa during 2001–2020. Plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | 8.62* | 4.70 | 12.70 | 4.72 | < 0.001 |
| * Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| Average Annual Percent Change (AAPC) | | | | | | | |
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | 8.62* | 4.70 | 12.70 | 4.72 | < 0.001 |
| * Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level. | | | | | | | |
| ~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used.   See Help to Learn More | | | | | | | |

## l. Trend Analysis for OSCC Cases Originating from the Floor of Mouth
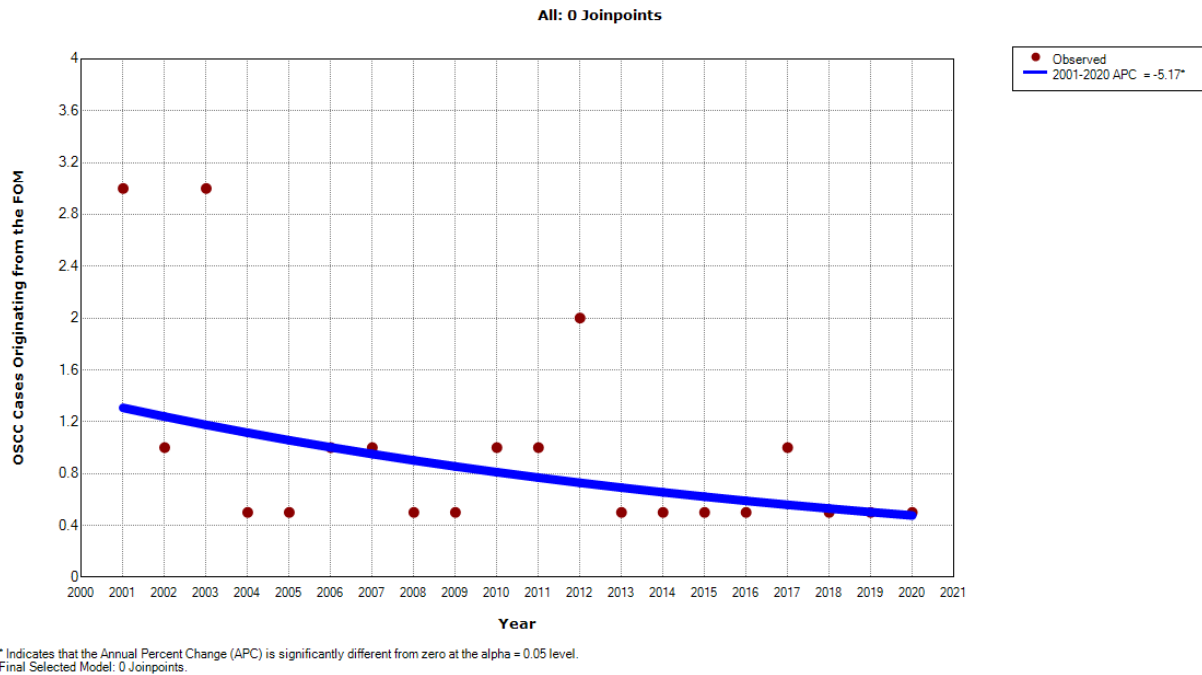
1. Graph



**Figure 12.** Trend analysis of Indonesian cases of OSCC originating from the floor of mouth (FOM) during 2001–2020. Plotted lines indicate annual percentage changes (APCs). *Significant change in APC compared to 0 (p<0.05) using the permutation model of logarithmically transformed data in Joinpoint regression analysis.

2. The significance test results obtained through the Monte Carlo permutation statistical method were used to identify the best-fitted line segment(s) in the Joinpoint regression analysis, representing significant trend changes (referred to as APC value) in the time series.

| Annual Percent Change (APC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Segment | Lower Endpoint | Upper Endpoint | APC | Lower CI | Upper CI | Test Statistic (t) | Prob > \|t\| |
| 1 | 2001.00 | 2020.00 | -5.17* | -9.23 | -0.93 | -2.55 | 0.020 |

\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

| Average Annual Percent Change (AAPC) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Range | Lower Endpoint | Upper Endpoint | AAPC | Lower CI | Upper CI | Test Statistic~ | P-Value~ |
| Full Range | 2001.00 | 2020.00 | -5.17* | -9.23 | -0.93 | -2.55 | 0.020 |

\* Indicates that the AAPC is significantly different from zero at the alpha = 0.05 level.
~ If the AAPC is within one segment, the t-distribution is used. Otherwise, the normal (z) distribution is used. See Help to Learn More