

How to Calculate the *Significant Caries Index* (SiC Index)



- without computers
- with computers
- with Internet

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Though this booklet outlines alternative ways to calculate the Significant Caries Index, the quickest and the most direct method is presented in Chapter “B. IF YOU ARE AN INTERNET USER AND HAVE EXCEL® IN YOUR COMPUTER...”, page 9.

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The Significant Caries Index

Introduction

In 1981 the World Health Assembly of the WHO declared that the global goal for oral health by the year 2000 should be that the DMFT for the 12-year-olds should not exceed 3, in all the countries. Over a period of twenty years, nearly 70% of the countries in the world have succeeded in achieving this goal, or have never exceeded this borderline value¹⁾.

Certainly these facts reflect a great achievement in the improvement of oral health. However, a detailed analysis of the caries situation in many countries show that there is a skewed distribution of caries prevalence - meaning that a proportion of 12-year-olds still has high or even very high DMFT values even though a proportion is totally caries free. Clearly, the mean DMFT value does not accurately reflect this skewed distribution leading to incorrect conclusion that the caries situation for the whole population is controlled while in reality several individuals still have caries.

A new index called the 'Significant Caries Index' (SiC) was proposed in the year 2000²⁾, in order to bring attention to those individuals with the highest caries scores in each population. The SiC Index is the Mean DMFT of the one third of the study group with the highest caries score. The index is used as a complement to the mean DMFT value.

To calculate Significant Caries Index:

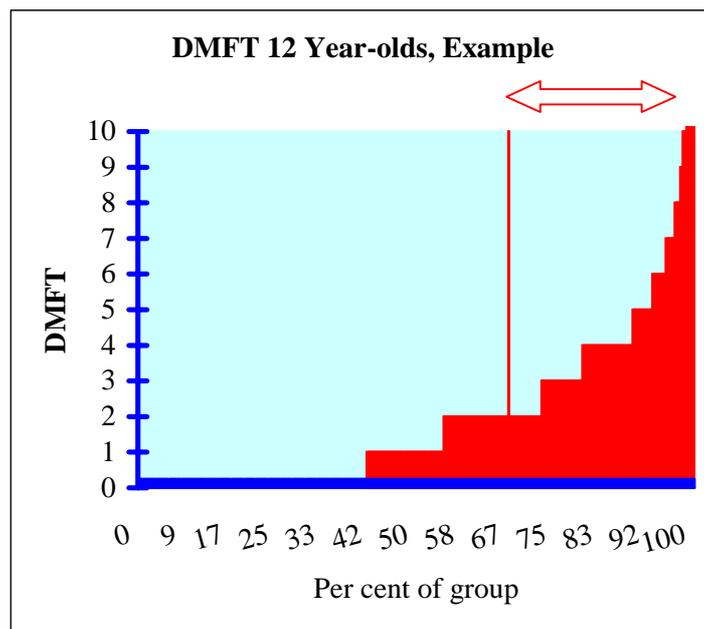
- Sort the individuals according to their DMFT
- Select the one third of the population with the highest caries values
- Calculate the Mean DMFT for this subgroup.

Simultaneously, a new oral health goal was proposed that, by the year 2015, the SiC Index should be less than 3 DMFT among the 12-year-olds, globally. When a country has reached this goal, the proposed idea is to look at provinces, districts, cities or parts of districts/cities, so that in any defined population, the SiC Index is higher than 3 DMFT. This means that it will be necessary to calculate the SiC Index at several administrative levels, hence a need for a booklet that outlines some ways to calculate this index.

Considering the wide range of information technology available in this new millennium, the aim of this booklet is therefore to provide assistance in calculating the SiC Index under different situations. It starts with a presentation of very basic methods that can be carried out with or without the computer. Then, more convenient and direct ways are provided, which uses the Internet with the Excel® program. For non-Internet users, we have described as to how to use the Excel® functions in the calculation of this new index.

References

1. Updates on epidemiological data and SiC Index will continuously be added under this Internet address: <http://www.whocollab.od.mah.se/index.html>
2. Bratthall D, Introducing the Significant Caries Index together with a proposal for a new global oral health goal for 12-year-olds. *Int Dent J* 2000, **50**: 378-384.



The graph shows caries data for a population, expressed as frequency distribution. In this example, about 45 % are caries free (DMFT=0). The mean DMFT is 1.91, and the Significant Caries Index is 4.61. Arrow and vertical line indicate the individuals that are included in the calculation of the index.

A. How to calculate the SiC Index - with or without computer

To calculate the SiC Index, the original set of data must be presented as the DMFT distribution in a population or in a group. There are two ways to express the DMFT distribution. In one order, the data set contains individual DMFT values. It means that the population is described such as “individual no. 1 has 0 DMFT, individual no. 2 has 0 DMFT, individual no. 3 has 2 DMFT”, and so on.

In the other order, the data are already grouped, such as “10 persons have 0 DMFT, 11 persons have 1 DMFT, 7 persons have 2 DMFT”, and so on. Though both orders can be changed to each other, this booklet will show separately how to calculate the SiC Index without changing the way the data is presented.

For a data set consisting of individual DMFT values

Calculating the Mean DMFT

You have a data set of individual DMFT values. Calculate the sum of all the DMFT values. Then, divide this sum by the total number of individuals to obtain the Mean DMFT (for comparison, the Mean DMFT is usually presented together with the SiC Index).

Indiv. no.	DMFT
1	0
2	0
3	2
4	1
5	0
6	5
7	0
8	14
9	2
10	0
11	3

The sum of the DMFT values:

$$0+0+2+1+0+5+0+14+2+0+3=27$$

The total number of individuals: 11

The average of the DMFT values:

$$27/11=2,4545\dots$$

Result: the Mean DMFT: 2,45

(There are seldom reasons to present the DMFT value with more than two decimals, often one decimal is enough, in this case thus 2,5.)

Please observe: To facilitate understanding of the methods we present calculations for very small populations in this booklet, like 11 individuals only in the example above. In reality much larger samples are of course needed to get a representative result.

Calculating the SiC Index

Examine how many individuals there are in 'the one third of the population'. Round the result to get the number of the subgroup for the SiC Index.

The value of the one third in the given example:
 $11/3=3.6666\dots$

The rounded number of the subgroup: 4

(When the total number of a population cannot be divided by 3, count fractions of .5 and over as units and cut away the rest.)

Sort the data numerically and select the one third of the population with the highest DMFT values.

DMFT
0
0
0
0
0
1
2
2
3
5
14

The DMFT values in the selected subgroup: 2, 3, 5, 14

Add each DMFT value in the subgroup.

The sum of the DMFT values in the subgroup:
 $2+3+5+14=24$

Divide this sum by the total number of individuals in the subgroup to get the SiC Index.

The average of the DMFT values in the subgroup:
 $24/4= 6$

Result: the SiC Index of this population: 6.0

For a set of data with breakdown of DMFT according to number of individuals

Calculating the Mean DMFT

DMFT	number
0	10
1	11
2	7
3	6
4	4
5	3
6	3
7	2
8	1
9	1
10	0
11	1
12	1
total	50

In this example, you have the data as a breakdown of DMFT - for example, 10 individuals have DMFT 0, 11 persons have 1 DMFT etc.

Multiply each DMFT index by the corresponding number of persons and add the sum all:

$$(0*10)+ (1*11)+ (2*7)+ (3*6)+ (4*4)+ (5*3)+ (6*3)+ (7*2)+ (8*1)+ (9*1)+ (10*0)+ (11*1)+ (12*1) =146$$

Divide this result by the total number of individuals in the population:

$$146/50=2.92$$

Result: the Mean DMFT: 2.9

Calculating the SiC Index

At first, calculate how many individuals there are in 'the one third of the population'. Round the result to get the number of the subgroup that will form the basis for the SiC Index.

The value of the one third:

$$50/3=16.66\dots$$

The number of individuals in the subgroup: 17

Find this number of persons starting from the highest DMFT value (in our example DMFT=12).

1 (with DMFT 12) +1 (with DMFT 11, etc) +0 +1 +1 +2
 +3 +3 +4= 16

DMFT	number	cumul.
0	10	
1	11	
2	7	
3	6	plus 1=17
4	4	16
5	3	12
6	3	9
7	2	6
8	1	4
9	1	3
10	0	2
11	1	2
12	1	1
total	50	

To get the predetermined value 17, one person from the group with DMFT3 is needed.

For the individuals as selected above, multiply each DMFT value with the corresponding number of individuals and add the sum all. This is the sum of the DMFT values in the subgroup.

The sum of the DMFT values in the subgroup:
 $(1*3) + (4*4) + (5*3) + (6*3) + (7*2) + (8*1) + (9*1) + (10*0) + (11*1) + (12*1) = 106$

Divide this sum by the number of individuals in the subgroup to get the average of the DMFT values in the selected subgroup:
 $106/17 = 6.23...$

Result: the SiC Index of this population: 6.2

(If you are using a spreadsheet program, these calculations can of course be done in the program)

Please observe: If you have the distribution in percentage, you can also apply this method. However, the value of the SiC Index may be slightly different from the true value because of the rounding procedure.

B. If you are an Internet user and have Excel® in your computer...

<http://www.whocollab.od.mah.se/expl/siccalculation.xls>

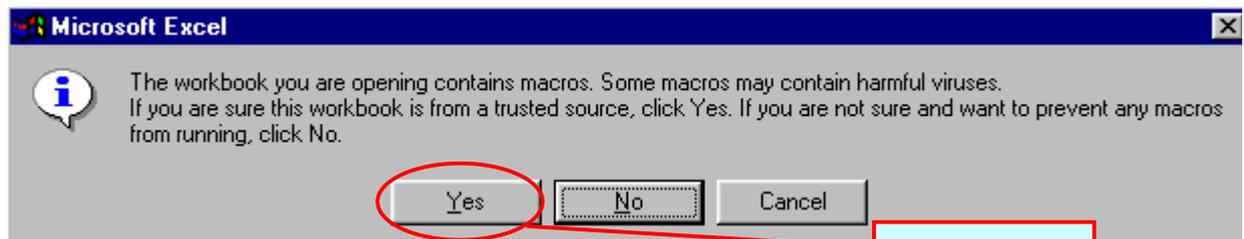
This is an address of the Web page, where you can obtain the Mean DMFT and the SiC Index very easily. Please go to this page.

Note: To see the above page, please use the Internet Explorer and not the Netscape Communicator.



Input the address and press Enter.

You will see this information box before you can view the page.



Click here.

It says that **Macros** may contain viruses. Click **Yes** button. (If you will find viruses in your computer, they have not come from this program).

Now you can see the page.

The screenshot shows an Excel spreadsheet with two main data tables. The first table, titled "For a data set consisting of individual DMFT", is located in columns B through E. It includes a header row with "individual no.", "DMFT", "mean DMFT", and "SiC". Below this, there are 17 rows of data. The second table, titled "For a set of data with breakdown of DMFT according to number of individuals", is located in columns G through J. It includes a header row with "DMFT", "number", "mean DMFT", and "SiC". Below this, there are 17 rows of data. Both tables have callout boxes explaining the values in the "mean DMFT" and "SiC" columns. The spreadsheet also has a menu bar at the top and a taskbar at the bottom.

For a data set consisting of individual DMFT				For a set of data with breakdown of DMFT according to number of individuals			
Change the values of DMFT in Column C to your own data, and you will obtain mean DMFT and SiC of your data.				Change number of individuals to correspond to your own data, and you will obtain the mean DMFT and SiC of your data.			
(For example)				(For example)			
individual no.	DMFT	mean DMFT	SiC	DMFT	number	mean DMFT	SiC
1	0	2.45454545	6	0	10	2.92	6.23529412
2	0			1	11		
3	2			2	7		
4	1			3	6		
5	0			4	4		
6	5			5	3		
7	0			6	3		
8	14			7	2		
9	2			8	1		
10	0			9	1		
11	3			10	0		
12	:			11	1		
13	:			12	1		
14	:			13	0		
15				14	0		
16				15	0		
17				16	0		

There are two tables. One is for a data set consisting of individual DMFT values (Columns B-E). The other is for a set of data with breakdown of DMFT according to number of individuals (Columns G-J).

In the tables, the examples are the same as in the preceding chapter, "A. How to calculate the SiC Index - with or without computer". Therefore you can see the same values of the Mean DMFT and the SiC Index now.

For a data set consisting of individual DMFT values

In the left table, in Column B, you can see numbers for the individuals ('patient' 11000...etc). Column C is for their corresponding DMFT values. The Mean DMFT for the entered data is found in Cell D7, and the SiC Index for the same group in Cell E7.

http://www.whocollab.od.mah.se/expl/siccalculation.xls - Microsoft Internet Ex

File Edit View Insert Format Tools Data Go Favorites Help

Back Forward Stop Refresh Home Search Favorites History T

Address http://www.whocollab.od.mah.se/expl/siccalculation.xls

	A	B	C	D	E	F	
1		For a data set consisting of individual DMFT values					
2	Significant Caries Index	Change the values of DMFT in Column C to your own data, and you will obtain mean DMFT and SiC of your data.					
3		(For example)					
4			individual no.	DMFT	mean DMFT	SiC	
5			1	0	2.454545455	6	
6			2	0			
7			3	2			
8			4	1			
9			5	0			
10			6	5			
11			7	0			
12			8	14			
13			9	2			
14			10	0			
15			11	3			
16		12	:				
17		13	:				
18		14	:				
19							
20							

This cell presents Mean value of data entered under DMFT in Column C.

This cell presents the value for Significant Caries Index based on data in Column C.

When you enter your own data in Column C, instead of the example values, the Mean DMFT and the SiC Index will be immediately calculated.

		(For example)			
		individual no.	DMFT	mean DMFT	SiC
5					
6					
7		1	0	1.909738717	4.614285714
8		2	1		
9		3	0		

For a set of data with breakdown of DMFT according to number of individuals

In the right table, in Column G, you can see DMFT indices. Column H is for their corresponding numbers of individuals. The Mean DMFT for the entered data is found in Cell I7, and the SiC Index for the same group in Cell J7.

Change number of individuals to correspond to your own data, and you will obtain the mean DMFT and SiC.

(For example)

DMFT	number	mean DMFT	SiC
0	10	2.92	6.235294118
1	11		
2	7		
3	6		
4	4		
5	3		
6	3		
7	2		
8	1		
9	1		
10	0		
11	1		
12	1		
13	0		

This cell presents Mean value of data entered under DMFT and number of individuals in Columns G and H.

This cell presents the value for Significant Caries Index based on data in Columns G and H.

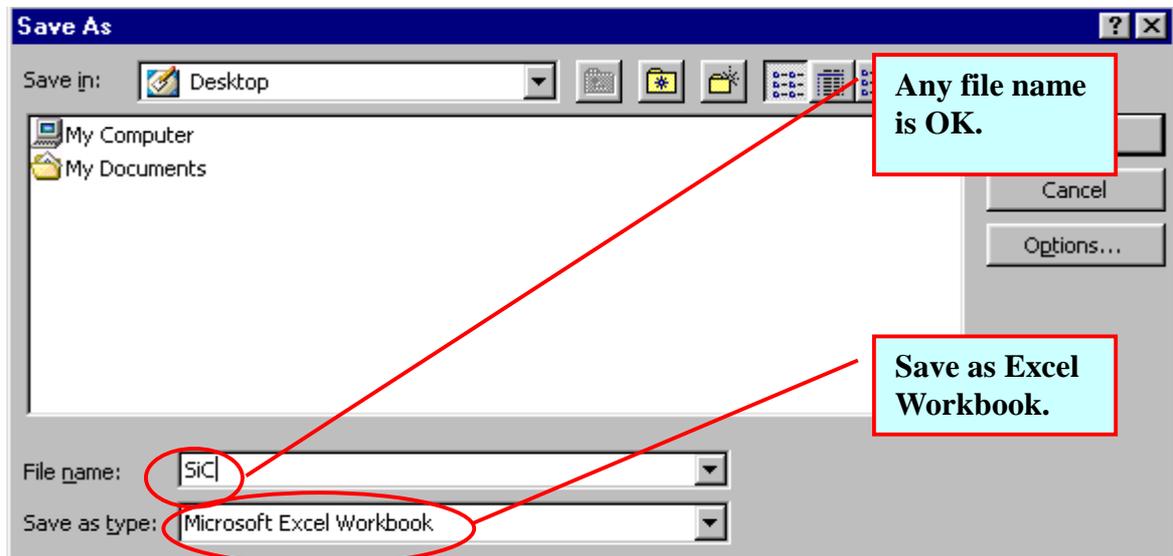
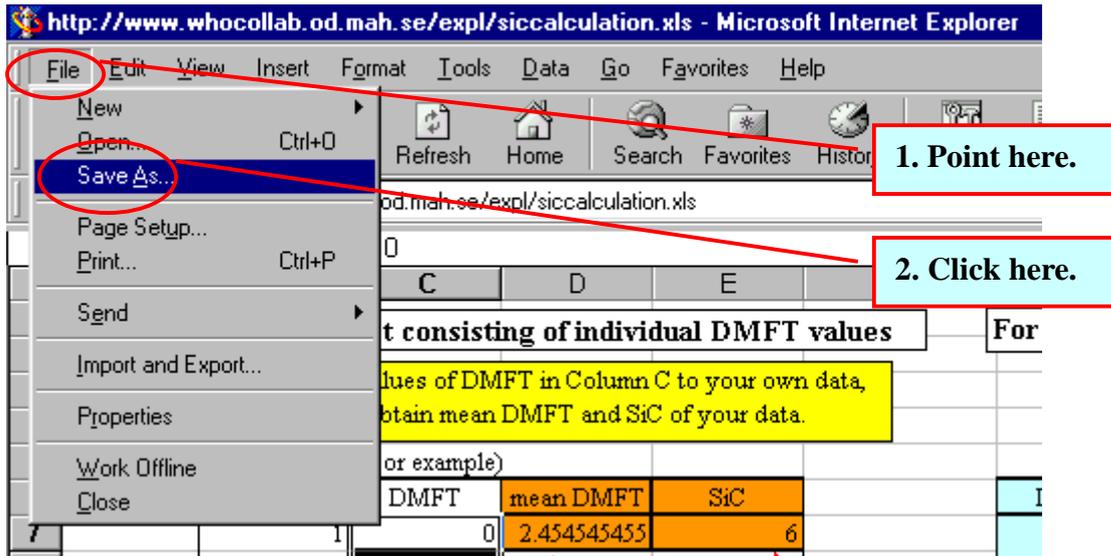
When you enter the data set you have in Column H, instead of the example values, the Mean DMFT and the SiC Index will be immediately calculated.

(For example)

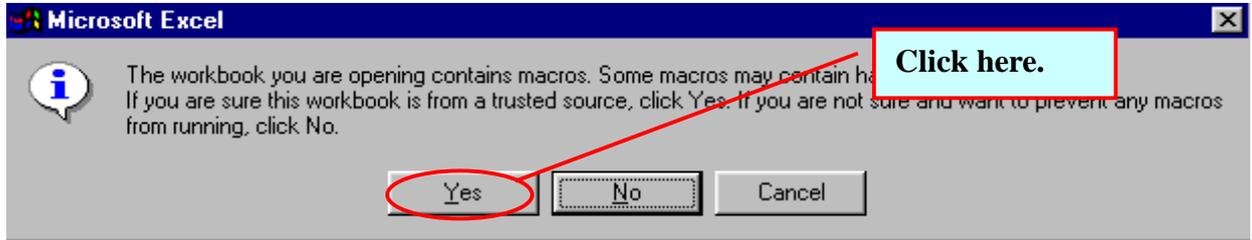
DMFT	number	mean DMFT	SiC
0	173	1.909738717	4.614285714
1	58		
2	74		

Further usage of this Web page

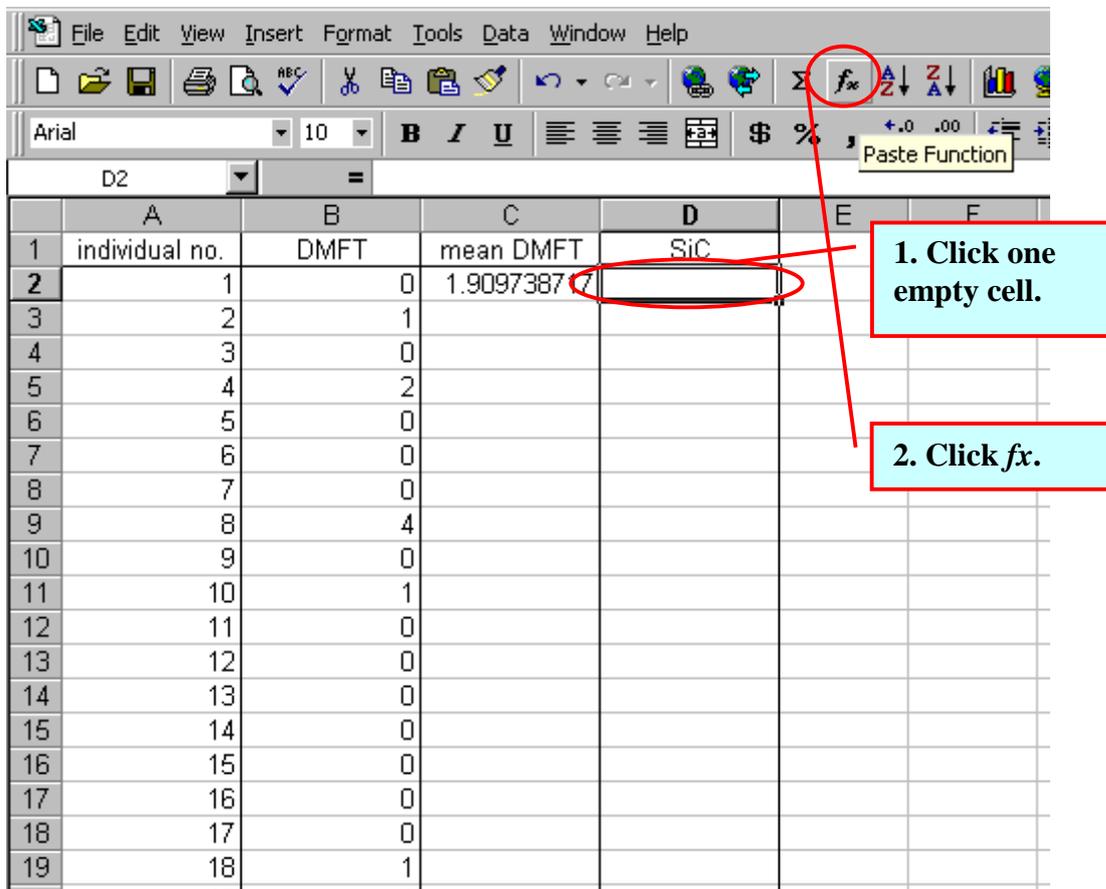
If you save this Web page as an Excel file in your computer, you can use the so-called 'user-defined functions' for the SiC Index in any cell of any Excel file, on condition that the file is open. If you already have your data in an Excel file, this way is very convenient.



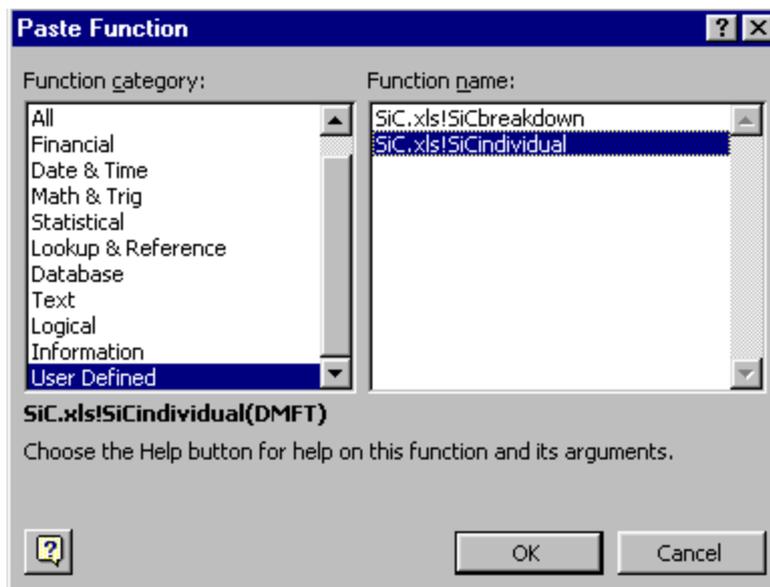
When you run this usage, you have to open this file on your computer. When you open the file, you see the information box. Click **Yes** button.



An example: you have already a data set in an Excel file like below. Click one empty cell where you would like to enter the SiC Index (for example D2). Then click the *fx* sign called **Paste Function**.

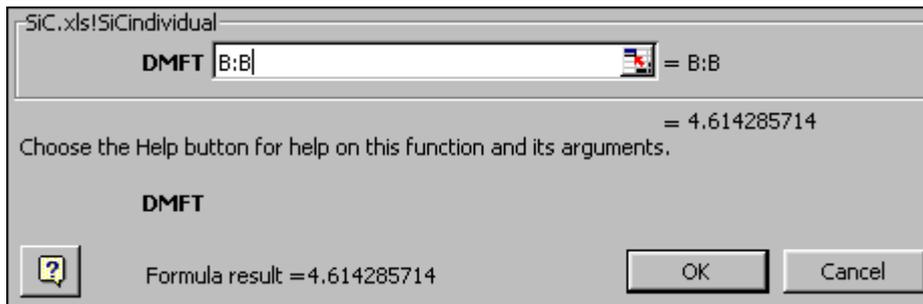


The **Paste Function** box will appear. In the **Function category** box, click **User Defined** at the last line. **SiCindividual** and **SiCbreakdown** will appear in the **Function name** box. Click **SiCindividual** for a data set consisting of individual DMFT values. Click **SiCbreakdown** for a set of data with breakdown of DMFT according to number of individuals. Then click **OK** or press **Enter**. You will see the **Formula Palette**.



- **SiCindividual**

This is Formula Palette of SiCindividual. The function works for a data set consisting of individual DMFT values. Enter the cells or column references where you put individual DMFT values, in the DMFT box (Column B in the example). Then click OK or press Enter.



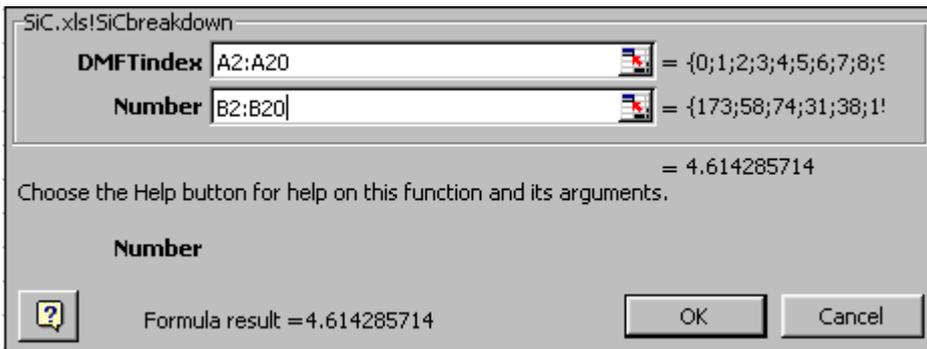
Congratulations! You have succeeded in calculation the SiC Index.

	A	B	C	D	E	F
1	individual no.	DMFT	mean DMFT	SiC		
2	1	0	1.909738717	4.614285714		
3	3	0				
4	5	0				
5	6	0				
6	7	0				
7	9	0				
8	11	0				

Please observe: if you enter for the whole column, like 'B:B', make sure that there are no other figures or values in the column, like year '2001' or so. Any value or number in Column B will be included in the calculation. (Text is possible, like 'DMFT'.)

- **SiCbreakdown**

This is **Formula Palette** of **SiCbreakdown**. The function works for a set of data with breakdown of DMFT according to number of individuals. Enter the cells or column references where you put DMFT indices, in the **DMFTindex** box. Enter the cells or column references where you put the numbers of individuals, in the **Number** box. Then click **OK** or press **Enter**.



Congratulations! You have succeeded in calculation the SiC Index.

	A	B	C	D	E
1	DMFT	number	mean DMFT	SiC	
2	0	173	1.909738717	4.614285714	
3	1	58			
4	2	74			
5	3	31			
6	4	38			
7	5	15			
8	6	10			

Please observe: DMFT indices should be whole numbers from 0 to a maximum of 32 with this program (because you don't have more than 32 teeth!).

C. If you are not an Internet user but have Excel® in your computer...

This chapter will explain how you can use Excel® for calculation of the Mean DMFT and the SiC Index, even if you cannot reach the Web page as described in the preceding chapter.

For a data set consisting of individual DMFT values

When a data set is described such as “individual no. 1 has 0 DMFT, individual no. 2 has 1 DMFT, individual no. 3 has 0 DMFT”, and so on, the Mean DMFT and the SiC Index can be calculated easily by a few basic functions in Excel®. You can also use a formula we have developed for the SiC calculation. (The latter way is more convenient, if you have large data sets.)

Entering the data

Enter the individual DMFT data in each cell of one column (for example Column B). You can enter other data in other columns such as individual number, name, date of birth, names of examiners and so on.

	A	B	C	D	E	F
1	individual no.	DMFT	mean DMFT	SiC		
2	1	0				
3	2	1				
4	3	0				
5	4	2				
6	5	0				
7	6	0				
8	7	0				

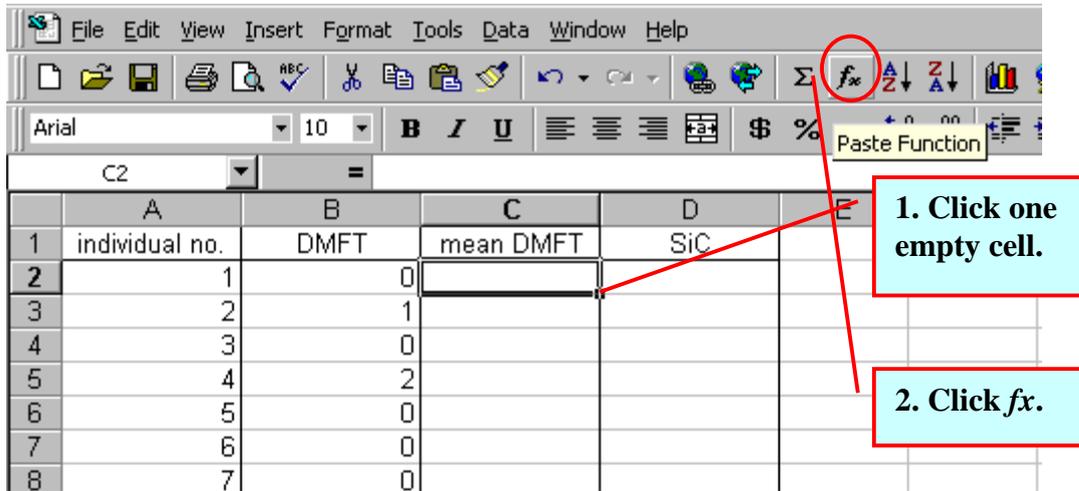
Enter the individual numbers in one column, and the corresponding DMFT values in another column.

415	414	4
416	415	0
417	416	4
418	417	0
419	418	2
420	419	0
421	420	0
422	421	0
423		

In this example, there are 421 individuals in the group.

Calculating the Mean DMFT

Click one empty cell where you would like to enter the Mean DMFT value (for example C2). Then click the *fx* sign called **Paste Function**.



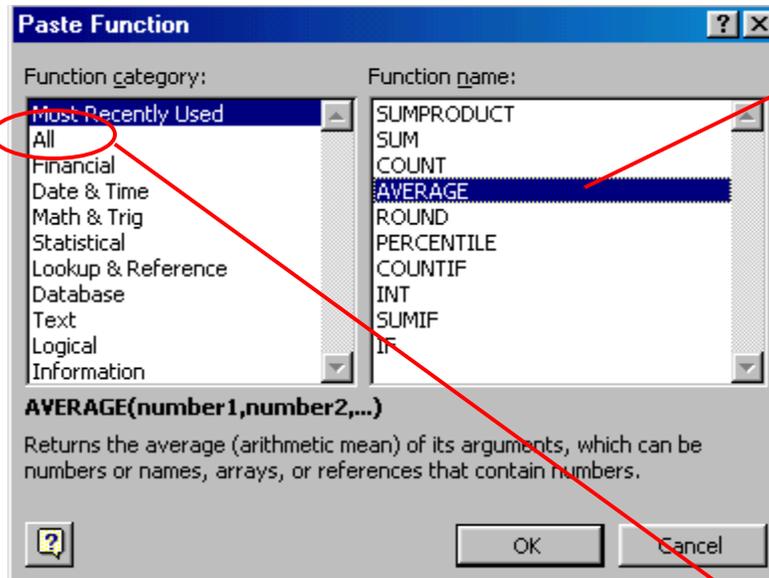
The screenshot shows the Microsoft Excel interface. The spreadsheet has the following data:

	A	B	C	D	E
1	individual no.	DMFT	mean DMFT	SiC	
2	1	0			
3	2	1			
4	3	0			
5	4	2			
6	5	0			
7	6	0			
8	7	0			

Callout 1: 1. Click one empty cell.

Callout 2: 2. Click *fx*.

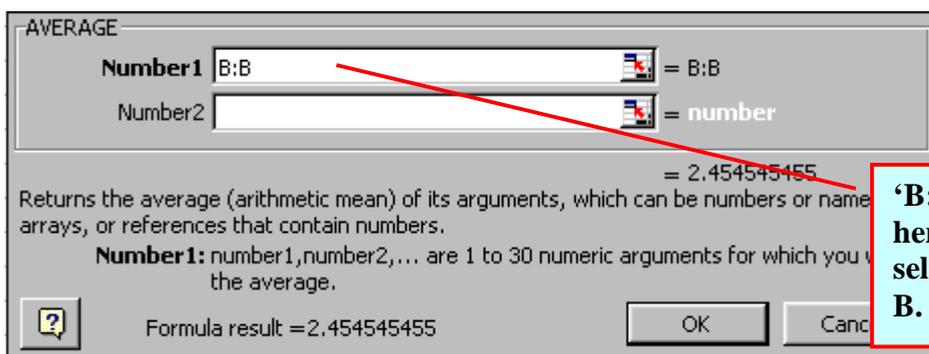
A box as shown below will appear. Click **AVERAGE** in **Function name** box and press **Enter**.



Click here and press OK (Enter).

If **AVERAGE** is not shown to the right, click 'All' in the 'Function category' box. You will then see all the Excel function names in alphabetical order and can select 'AVERAGE'.

Now you see the **AVERAGE** box, and you should specify which values the program should select for its calculation. Just click the individual DMFT column (Column B in this example) and you will get the following result:



'B:B' appears here after you select Column B.

Please observe: It is important that there is no other information in the B column, for example year, sum etc. If so, you should select only the cells in which you have entered the DMFT data.

Click **OK** or press **Enter**. You have got the Mean DMFT!

	A	B	C	D	E	F
1	individual no.	DMFT	mean DMFT	SiC		
2	1	0	1.909738717			
3	3	0				
4	5	0				
5	6	0				
6	7	0				
7	9	0				
8	11	0				

Calculating the SiC Index

Two alternative ways are presented in this section. One using basic functions following the principle of the SiC Index calculation (page 21), and the other using the formula to calculate the Index easily for large data sets (page 26).

Calculating the SiC Index with basic functions

To calculate the SiC Index, you need to 'Sort' the data. First, click the two columns including the Individual number and the DMFT values (Columns A and B in this example). On the **Data** menu, click **Sort**.

1. Click Columns A and B.

2. Click here.

	A	B	C
1	individual no.	DMFT	me
2	1	0	1.9
3	2	1	
4	3	0	
5	4	2	
6	5	0	
7	6	0	
8	7	0	

In the **Sort by** box, click the arrow button. Select the DMFT column (as you want the individuals to be sorted according to the DMFT values) and ascending. Then click **OK** or press **Enter**.



1. Click here.

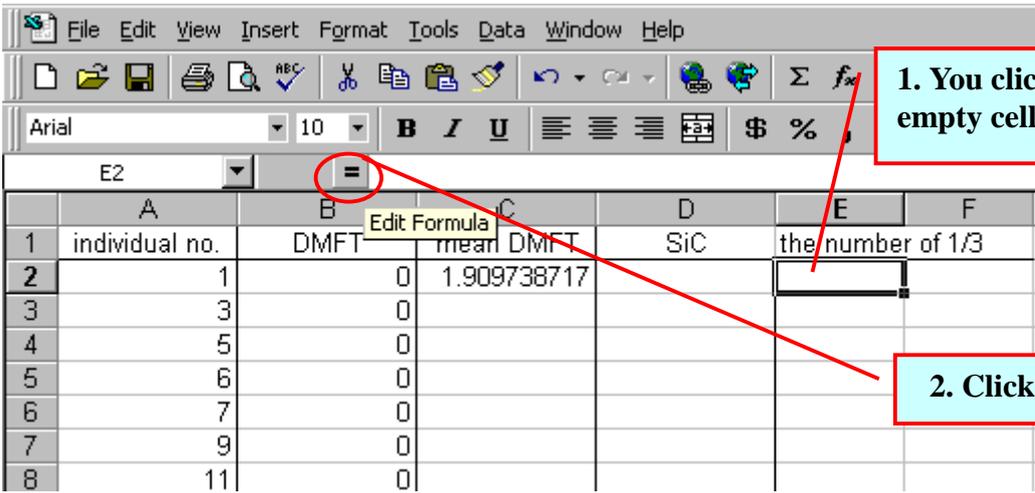
2. Select DMFT here.

3. Click here: 'Ascending'.

4. Click here.

Before you calculate the number of the one third of the population, you can write “the number of 1/3” as for memo.

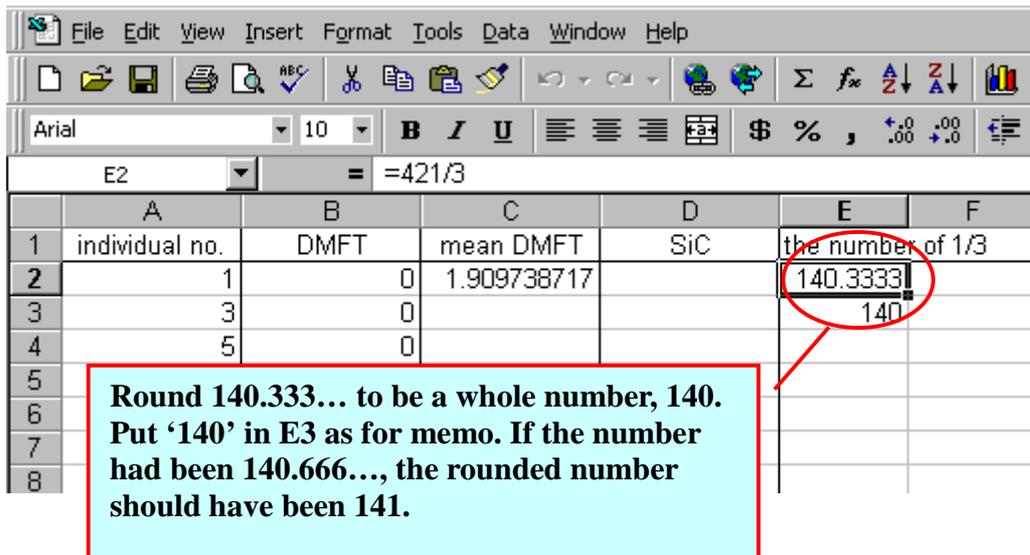
Click one empty cell (for example E2). Then click the equal sign (=) called **Edit Formula**.



1. You click one empty cell.

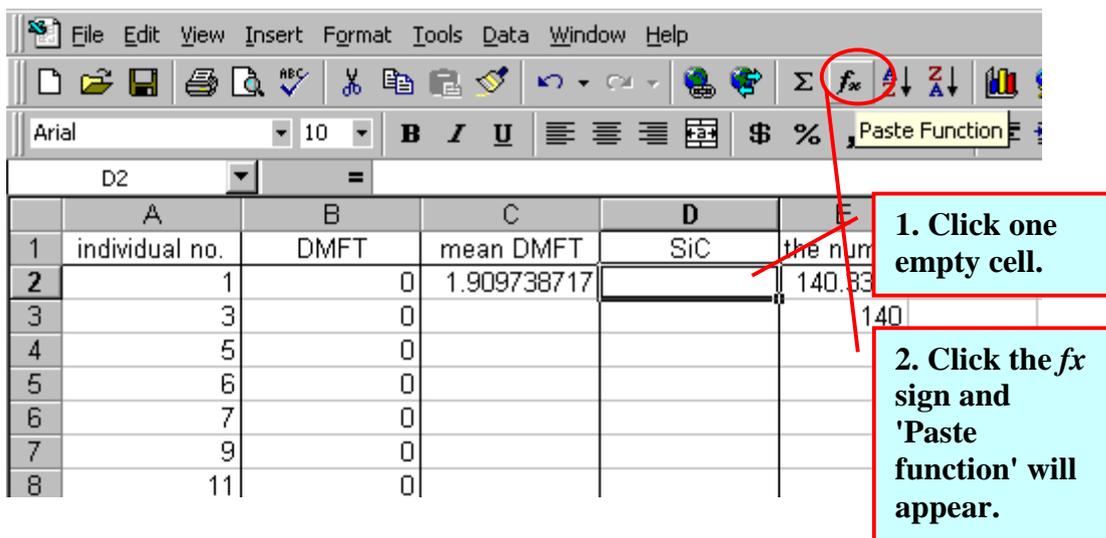
2. Click here.

In the **Formula Bar**, divide the total number of individuals (421) by 3. Thus, in this example you write " $= 421/3$ " in E2 and then press **Enter**. The result is 140.333... If the total number cannot be divided by 3, you have to round it up. In other words, if fraction is '.5 'and over, use the higher value. Enter the result in one cell (for example E3). This is the number of individuals in the subgroup.



Round 140.333... to be a whole number, 140. Put '140' in E3 as for memo. If the number had been 140.666..., the rounded number should have been 141.

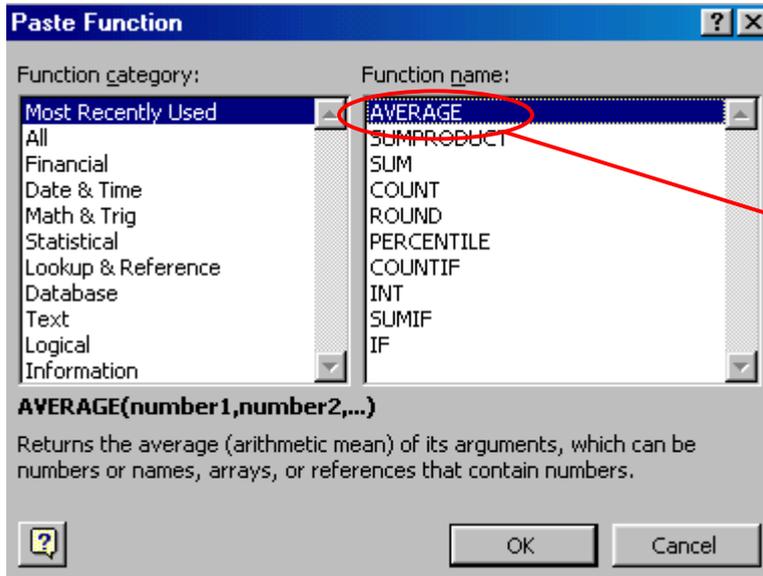
To calculate the Mean DMFT for the SiC subgroup, click one empty cell (for example D2). Then click the *fx* sign called **Paste Function**. Go on to click **AVERAGE** in **Function name** box.



1. Click one empty cell.

2. Click the *fx* sign and 'Paste function' will appear.

You can see **AVERAGE** at the first line in **Function name box**, since you used it just before.



Click here to select 'Average'

Now you need to enter the specific values on which the SiC Index should be calculated. Click the last cell among the DMFT values (in this example B422). Drag to include the number of the subgroup - you already know that it is 140 individuals. The cell references you are selecting are indicated in the **AVERAGE** box, too. Then press **Enter**.

The screenshot shows the Microsoft Excel interface. The formula bar at the top displays the formula `=AVERAGE(B283:B422)`. The spreadsheet contains data for rows 280-287 and 412-422. A red circle highlights the cell containing the text `140R x 1C`. A red arrow points from the bottom of the spreadsheet to this cell. Two red callout boxes provide instructions: the first points to the formula bar, and the second points to the `140R x 1C` cell.

280	254	2
281	272	2
282	274	2
283	275	2
284	294	2
285	295	2
286	297	2
287	300	2
412	40	9
413	221	9
414	120	10
415	148	10
416	311	10
417	121	11
418	22	14
419	357	14
420	160	16
421	185	16
422	336	18
423		

Congratulations! You have succeeded in calculation the SiC Index.

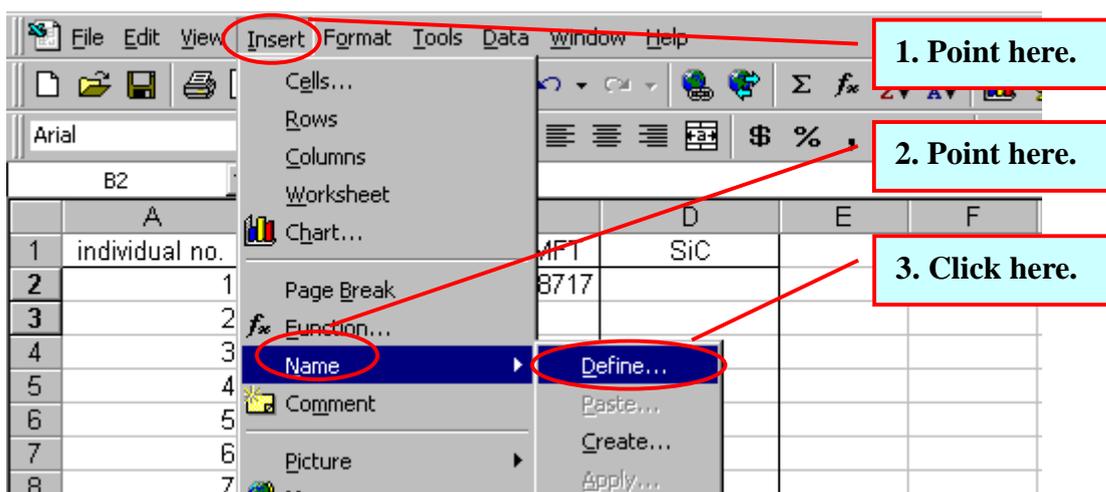
	A	B	C	D	E	F
1	individual no.	DMFT	mean DMFT	SiC	the number of 1/3	
2	1	0	1.909738717	4.614285714	140.3333	
3	3	0			140	

Calculating the SiC Index with formula

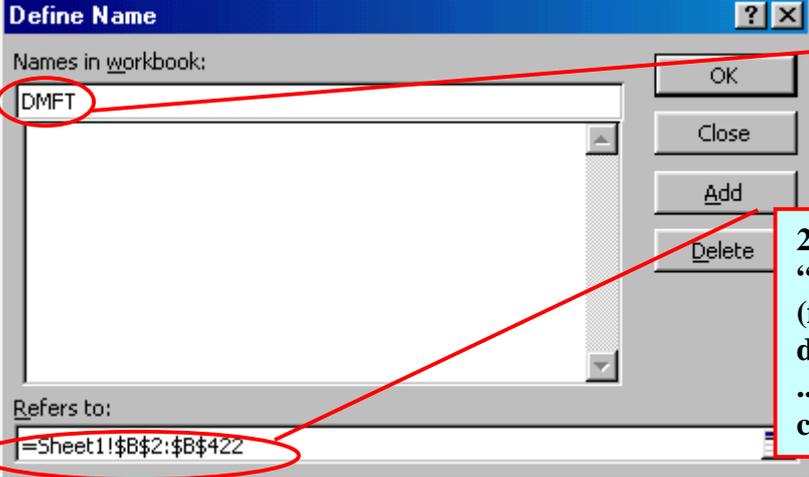
In the preceding section, you calculated the SiC Index with Excel® basic functions, **AVERAGE**, **equal (=) sign**, and **Sort**, following the principles of the SiC Index. Sometimes you may have too large data sets to drag cells readily.

With a formula we have developed combining with Excel® worksheet functions, you can calculate the SiC Index easily, for large data sets.

At first, name a range of the DMFT values “DMFT”. On the **Insert** menu, point to **Name**, and then click **Define**.



In the **Names in workbook** box, enter the name, “DMFT”. In the **Refers to** box, enter the **absolute references** of the range of the DMFT values including the sheet number.



1. Enter “DMFT”.

2. Enter “Sheet1!\$B\$2:\$B\$422.” (for the example with data in Column B, cells 2422), or drag over the corresponding cells.

Click one empty cell (for example D4). Then, enter the formula indicated below in **Formula Bar** (the box next to the '=' sign).

The screenshot shows the Microsoft Excel 2000 interface. The spreadsheet has columns labeled A through F and rows 1 through 8. Column A is labeled 'individual no.', B is 'DMFT', C is 'mean DMFT', and D is 'SiC'. Row 2 contains the values 1, 0, and 1.909738717. The Formula Bar is active, and a red circle highlights cell D4. Two callout boxes provide instructions: '1. Click one empty cell.' and '2. Enter the formula here.'

	A	B	C	D	E	F
1	individual no.	DMFT	mean DMFT	SiC		
2	1	0	1.909738717			
3	2	1				
4	3	0				
5	4	2				
6	5	0				
7	6	0				
8	7	0				

<Microsoft®Excel 2000 >

```
=(SUM(IF(DMFT>LARGE(DMFT,ROUND(COUNT(DMFT)/3,0)),DMFT,0))+LARGE(DMFT,ROUND(COUNT(DMFT)/3,0)) *(ROUND(COUNT(DMFT)/3,0)-COUNT(IF(DMFT>LARGE(DMFT,ROUND(COUNT(DMFT)/3,0)),COUNT(DMFT)))))/ROUND(COUNT(DMFT)/3,0)
```

<Microsoft®Excel 98 Macintosh Edition>

```
=(SUM(IF(DMFT>LARGE(DMFT;ROUND(COUNT(DMFT)/3;0));DMFT;0))+LARGE(DMFT;ROUND(COUNT(DMFT)/3;0)) *(ROUND(COUNT(DMFT)/3;0)-COUNT(IF(DMFT>LARGE(DMFT;ROUND(COUNT(DMFT)/3;0));COUNT(DMFT)))))/ROUND(COUNT(DMFT)/3;0)
```

Then press **“Control”+“Shift”+“Enter”** (Note! Not only **“Enter”**).

Congratulations! You have succeeded in calculation the SiC Index.

	A	B		
1	individual no.	DMFT	mean DMFT	SiC
2	1	0	1.909738717	4.614285714
3	2	1		
4	3	0		
5	4	2		
6	5	0		
7	6	0		
8	7	0		

Please observe: You should not confuse colon (,) and semicolon (;).

If you are a user of Microsoft®Excel 2000, you are supposed to use colon (,).

If you are a user of Microsoft®Excel 98 Macintosh Edition, you are supposed to use colon semicolon (;).

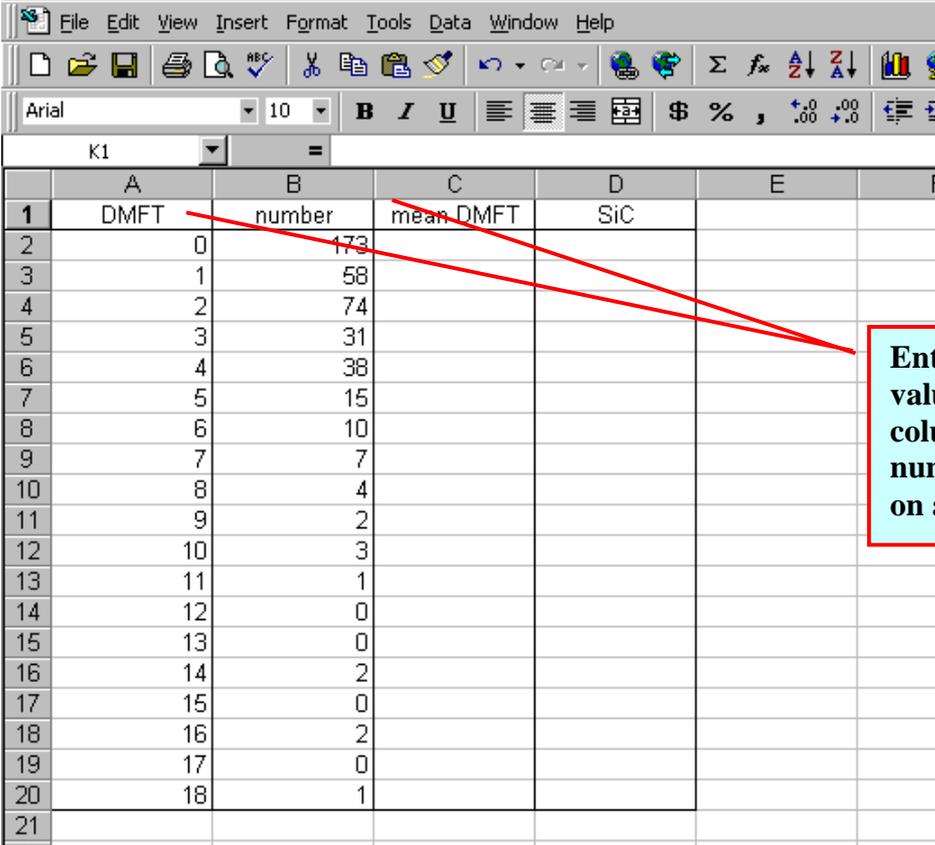
These rules possibly vary with different language versions of Excel.

For a set of data with breakdown of DMFT according to number of individuals

When a data are already grouped, such as “173 persons have 0 DMFT, 58 persons have 1 DMFT, 74 persons have 2 DMFT” and so on, the Mean DMFT can be calculated easily by a few basic functions in Excel®. As for the SiC Index, you can use a formula we have developed.

Entering the data

Enter DMFT indices in ascending order in each cell of one column (for example Column A) and the corresponding number of persons in another column (for example Column B).



	A	B	C	D	E	F
1	DMFT	number	mean DMFT	SiC		
2	0	173				
3	1	58				
4	2	74				
5	3	31				
6	4	38				
7	5	15				
8	6	10				
9	7	7				
10	8	4				
11	9	2				
12	10	3				
13	11	1				
14	12	0				
15	13	0				
16	14	2				
17	15	0				
18	16	2				
19	17	0				
20	18	1				
21						

Please observe: If you have the percentage distribution instead of person numbers, you can get them by multiplying each percentage by the total number and dividing the result by 100. If you do not know the total number, you can get the estimated SiC Index by putting the percentage data in the column for numbers and following this method.

Calculating the Mean DMFT

Click one empty cell (for example C2). Then click the *fx* sign called **Paste Function**.

	A	B	C	D
1	DMFT	number	mean DMFT	SiC
2	0	173		
3	1	58		
4	2	74		
5	3	31		
6	4	38		
7	5	15		
8	6	10		

Click **SUMPRODUCT** in the **Function name** box. Then click **OK** or press **ENTER**.

Paste Function

Function category: Most Recently Used

Function name:

- AVERAGE
- SUM
- SUMPRODUCT**
- COUNT
- ROUND
- PERCENTILE
- COUNTIF
- INT
- SUMIF
- IF

SUMPRODUCT(array1,array2,array3,...)

Multiplies corresponding numeric components in given ranges or arrays and returns the sum of those products.

OK Cancel

If 'SUMPRODUCT' is not shown to the right, click 'All' in the 'Function category' box. You will then see all the Excel function names in alphabetical order and can select 'SUMPRODUCT'.

You see the **SUMPRODUCT** box now. To enter the values, select all the cells in which the DMFT values are put, and the corresponding cells with numbers of persons (in the example, from A2 to A20 for **Array1**, from B2 to B20 for **Array2**).

The screenshot shows the Excel interface with the SUMPRODUCT dialog box open. The formula bar displays `=SUMPRODUCT(A2:A20,B2:B20)`. The dialog box contains the following information:

- Array1:** A2:A20 (with a red arrow pointing to the callout box)
- Array2:** B2:B20 (with a red arrow pointing to the callout box)
- Array3:** (empty)
- Formula result:** = 804

A callout box with a red border contains the text: "Select the cells from A2 to A20 for 'Array1', from B2 to B20 for 'Array2'."

Then divide them by the total number of persons and press **Enter**. Now you have got the Mean DMFT!

The screenshot shows the Excel spreadsheet after the calculation. The formula bar displays `=SUMPRODUCT(A2:A20,B2:B20)/421`. The cell C2 contains the value 1.909738717, which is circled in red. The spreadsheet data is as follows:

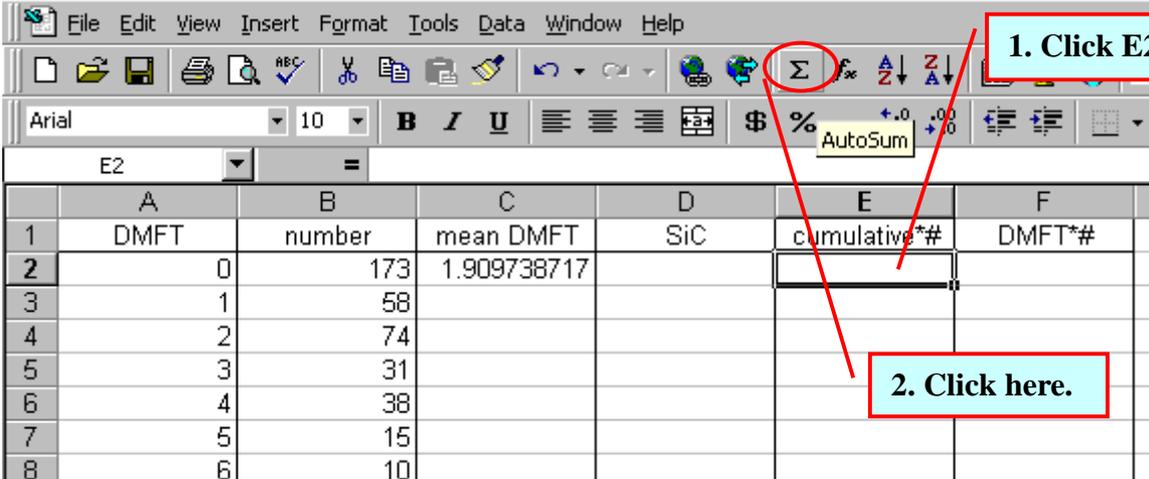
	A	B	C	D	E
1	DMFT	number	mean DMFT	SiC	
2	0	173	1.909738717		
3	1	58			
4	2	74			
5	3	31			
6	4	38			
7	5	15			
8	6	10			

*Note: Alternatively, you can use the **SUM** function to get the total number of persons. In this example, the expression would have been “=SUMPRODUCT(A2:A20,B2:B20)/SUM(B2:B20)”.*

Calculate the SiC Index

With a formula we have developed combining with Excel® worksheet functions, you can calculate the SiC Index easily.

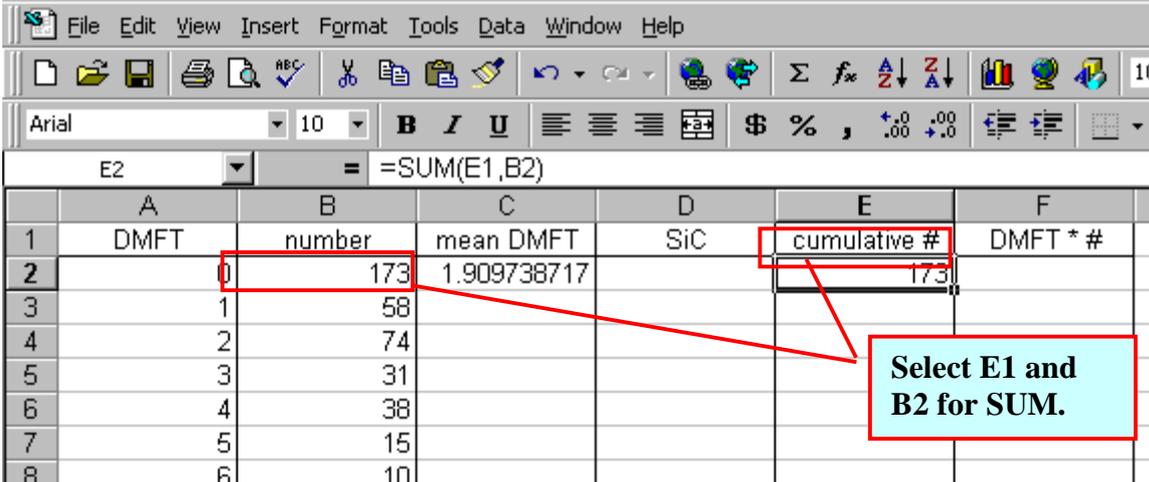
First, examine the cumulative numbers. Click the first cell of the column (E2 in the example) for the cumulative number and click the Σ sign called **Autosum**.



The screenshot shows the Excel interface with the Autosum button (Σ) circled in red. A red box labeled "1. Click E2." points to the Autosum button. Another red box labeled "2. Click here." points to cell E2 in the spreadsheet. The spreadsheet data is as follows:

	A	B	C	D	E	F
1	DMFT	number	mean DMFT	SiC	cumulative*#	DMFT*#
2		0	173	1.909738717		
3		1	58			
4		2	74			
5		3	31			
6		4	38			
7		5	15			
8		6	10			

Then enter the cell reference of the upper cell, colon (:), and the cell reference of the number corresponding to the lowest DMFT. (Generally, it is DMFT 0).



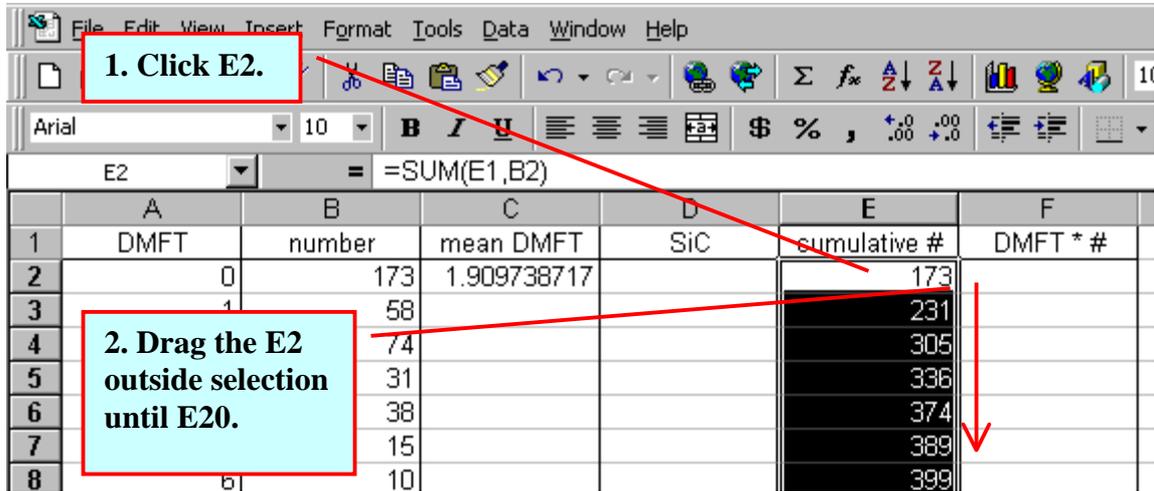
The screenshot shows the Excel interface with the formula bar displaying `=SUM(E1,B2)`. A red box labeled "Select E1 and B2 for SUM." points to cells E1 and B2 in the spreadsheet. The spreadsheet data is as follows:

	A	B	C	D	E	F
1	DMFT	number	mean DMFT	SiC	cumulative #	DMFT * #
2		0	173	1.909738717	173	
3		1	58			
4		2	74			
5		3	31			
6		4	38			
7		5	15			
8		6	10			

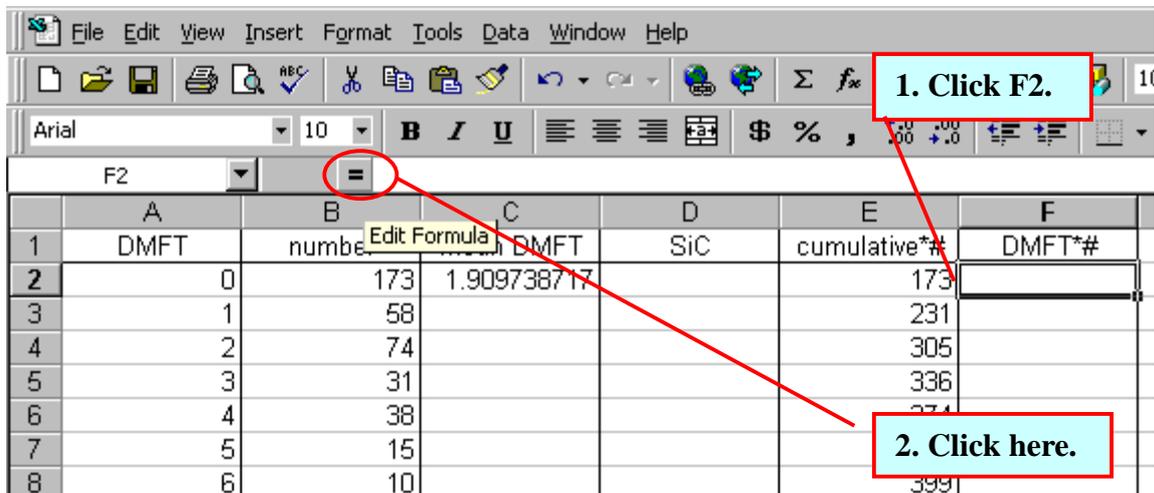
Please observe: There should be no number in the upper cell of cumulative numbers (E1 in the example, though you can put letters in the cell).

*Please observe: You should put colon (,) between cell references for the specific values of **SUM** now.*

Drag the **outside selection** of the first cell of the column for the cumulative number to fill the column with the cumulative numbers (from E2 to E20, in the example).



To examine the product of the DMFT index and the corresponding number of persons, click the first cell of the column for the product (F2 in the example). Then click the = sign called **Edit Formula**.



Multiply the lowest DMFT index by the corresponding number of persons (Cells A2 and B2 in the example).

3. Select A2 and B2 for the product. The formula will be A2*B2.

	A	B	C	D	E
	DMFT	number	mean DMFT	SiC	cumulative #
1					
2	0	173	1.909738717		
3	1	58			231
4	2	74			305
5	3	31			336
6	4	38			374
7	5	15			389
8	6	10			399

Drag the **outside selection** of the first cell of the products to fill the column with the products (from F2 to F20 in the example).

1. Drag the F2 outside selection until F20.

	A	B	C	D	E	F
	DMFT	number	mean DMFT	SiC	cumulative #	DMFT * #
1						
2	0	173	1.909738717		173	0
3	1	58			231	58
4	2	74			305	148
5	3	31			336	93
6	4	38			374	152
7	5	15			389	75
8	6	10			399	60

Name the range of the DMFT indices (in Column A) “DM”, the range of the cumulative numbers (in Column E) “CU”, and the range of the products of the DMFT and the percentage (in Column F) “PR”. Select the range, click the arrow sign to open the white box called **Name box**, and enter “DM”, “CU”, and “PR” respectively.

The screenshot shows an Excel spreadsheet with the following data:

	DMFT	number	mean DMFT	SiC	cumulative #	DMFT * #
1	DMFT					
2	0	173	1.909738717			
3	1	58				
4	2	74			305	148
5	3	31			336	93
6	4	38			374	152
7	5	15			389	75
8	6	10			399	60
9	7	7			406	49
10	8	4			410	32
11	9	2				
12	10	3			415	30
13	11	1			416	11
14	12	0			416	0
15	13	0			416	0
16	14	2			418	28
17	15	0			418	0
18	16	2			420	32
19	17	0			420	0
20	18	1			421	18

The Name Box in the top-left corner shows "DM" and a dropdown arrow. Three red callout boxes provide instructions:

1. Select the cells from A2 to A20.
2. Click here.
3. Enter the name.

Click one empty cell (for example D2). Then enter the formula indicated below in **Formula Bar** (the box next to = sign).

	A	B	Formula Bar	D	E	F
1	DMFT	number	mean DMFT	SiC	cumulative*#	DMFT*#
2	0	173	1.909738717		173	0
3	1	58				8
4	2	74				8
5	3	31				3
6	4	38			374	152
7	5	15			389	75
8	6	10			399	60

<Microsoft®Excel 2000 >

```
=(SUM(IF(CU>ROUND(SUM(NU)/3*2,0),PR,0))-
(LOOKUP(ROUND(SUM(NU)/3*2,0),CU,DM)+1)*(ROUND(SUM(NU)/3*2,0)-
LOOKUP(ROUND(SUM(NU)/3*2,0),CU)))/(SUM(NU)-ROUND(SUM(NU)/3*2,0))
```

<Microsoft®Excel 98 Macintosh Edition>

```
=(SUM(IF(CU>ROUND(SUM(NU)/3*2;0);PR;0))-
(LOOKUP(ROUND(SUM(NU)/3*2;0);CU;DM)+1)*(ROUND(SUM(NU)/3*2;0)-
LOOKUP(ROUND(SUM(NU)/3*2;0);CU)))/(SUM(NU)-ROUND(SUM(NU)/3*2;0))
```

Press **“Control”+“Shift”+“Enter”** (**Note! Not only “Enter”**).

Congratulations! You have succeeded in calculation the SiC Index.

The screenshot shows the Microsoft Excel 2000 interface. The formula bar displays the following array formula:

$$=({SUM(IF(CU>ROUND(SUM(NU)/3*2,0),PR,0)}-LOOKUP(ROUND(SUM(NU)SUM(NU)/3*2,0),CU)))/(SUM(NU)-ROUND(SUM(NU)/3*2,0))$$

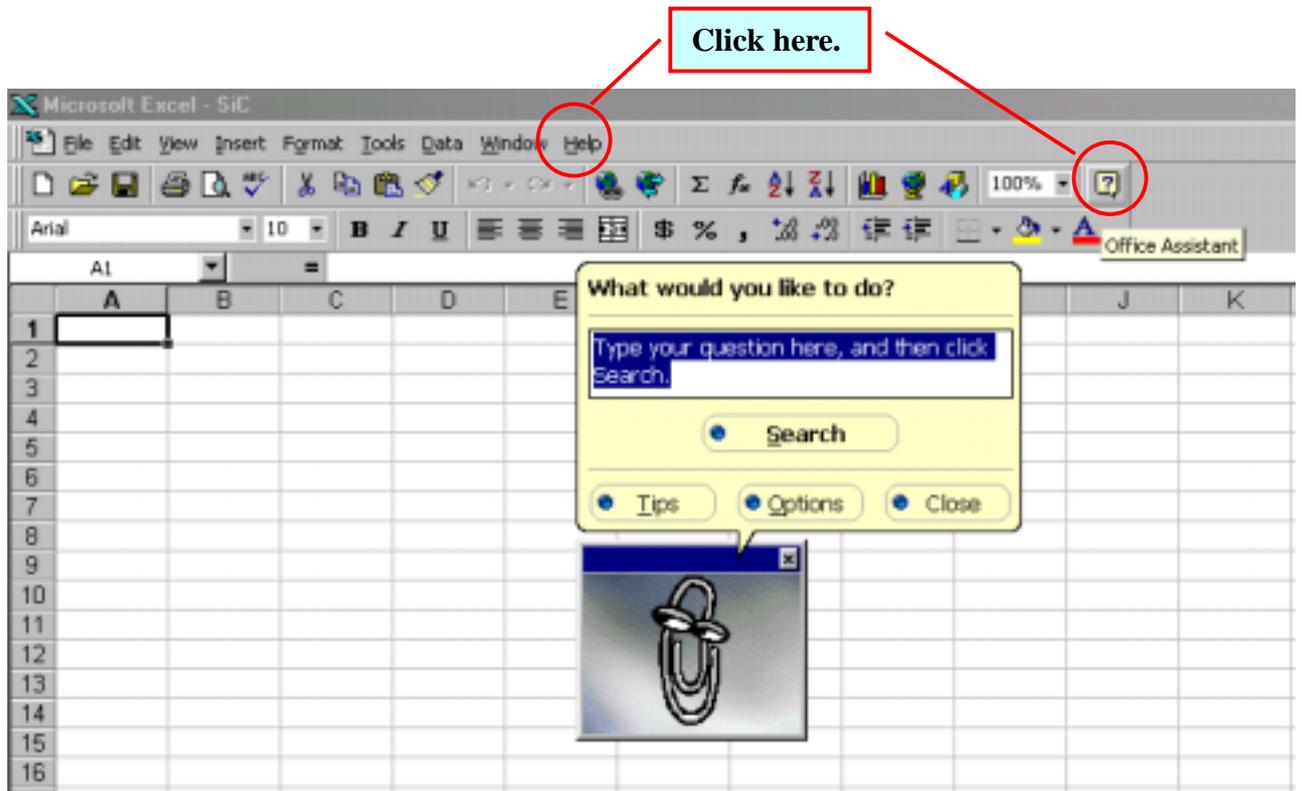
The spreadsheet data is as follows:

	A	B		SIC	cumulative #	DMFT * Formula Bar
1	DMFT	number	mean DMFT			
2	0	173	1.909738717	4.614285714	173	0
3	1	58			231	58
4	2	74			305	148
5	3	31			336	93
6	4	38			374	152
7	5	15			389	75
8	6	10			399	60

Please observe: You should not confuse colon (,) and semicolon (;). If you are a user of Microsoft®Excel 2000, you are supposed to use colon (,).

If you are a user of Microsoft®Excel 98 Macintosh Edition, you are supposed to use colon semicolon (;).

You may have some technical questions while you are calculating. Then you can click the ? sign called **Help** or **Office Assistance**.



- The End -