

WORLD HEALTH ORGANIZATION

IDE No. 3  
English Only  
(First Draft)

**INTERNATIONAL DENTAL EPIDEMIOLOGICAL  
METHODS SERIES**

MANUAL No. 3

Dental Health Evaluation  
Level A Survey

GENEVA  
1967

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## 1.0 INTRODUCTION

### 1.1 Purpose of Type A Descriptive Dental Health Survey

The procedures in this manual are designed to provide an over-all assessment of the prevalence of the major dental diseases in a population with a minimum expenditure of time and money. The degree of precision is sufficient for geographic pathology, public health program planning, and program evaluation. The observations are selected so as to have clinical meaning and yet require a minimum of diagnostic knowledge on the part of the examiners. To facilitate work in the field, the instrumentation requirements have been reduced to an expendable tongue blade and a small ruler eliminating the need to transport sterilization equipment into remote regions.

It is hoped that by reducing costs and by simplification of procedures, public health workers will be encouraged to gather some data in interesting situations even where the difficulty of conducting more detailed surveys makes it impossible. Obviously some data is better than none and any documentation of unusual findings will stimulate further study. More important perhaps, is to facilitate collection of the statistical data needed for public health program direction at a level of precision adequate to the purpose without drawing needlessly from funds needed for preventive or treatment services.

### 1.2 Relation to Internationally Recognized Indices

In order to capitalize on the widespread understanding of such indices



the DMF for dental caries, the PI for periodontal disease and the Oral Hygiene Index, these recording criteria have been retained in the simplified system. However, instead of recording in detail the status of all teeth or regions of the mouth, only the most severe level to which the disease has advanced anywhere in the mouth is recorded. Thus, if periodontal disease has advanced to the degree that the subject has one or more periodontal pockets he is classified as being in that disease severity group. This provides direct information that the subject is in need of treatment for periodontal pockets, and the relative numbers of the population in the various severity categories may be used to estimate over-all treatment needs (see section 9.3). The relation between the disease condition of the population and treatment need is thus expressed in terms of individual persons similarly to statistics for other ICD rubrics such as tumors, congenital conditions, infections, etc.

### 1.3 Relation to Type B Indices

It is felt that the type A survey will be quite adequate for many practical public health purposes, because classification of the population according to the severity level manifested for specific diseases fills the statistical need for program planning and evaluation. However, it is anticipated that an effort will be made to translate the classification data into reasonable estimates of the type B indices, see section 9.3. For example, some estimate of the average DMF tooth score would be useful to provide continuity with more detailed previous surveys. The

reverse process of translating type B indices, which take the form of general averages, into relative frequencies of the population with disease at specified levels of severity (i.e. into type A data) is not practical with the present level of knowledge.

When more precision is required, e.g. the evaluation of some partial caries control agent, the direct full oral examinations necessary for calculation of individual caries increments, or total experience may be needed. The full methods are described in manuals 4, 5 and 6, and the user must use his judgment as to when the need for more precision justifies increased cost of data collection. Appendix A of this manual gives a description of mark sensed cards for extending the type A surveys by recording DMF and PI scores.

#### 1.4 Type A Surveys as International Standard

It is recognized that in many cases where funds are available or special research aims require them, the more precise type B or even type C indices may be used in national or regional surveys. In these cases, it is urged that the type A observations also always be compiled. Often this may not require extra examination time but only the small clerical task of filling in the forms. As an illustration, if a nation were to conduct a national survey of dental caries using full radiographs, the data would be excellent for internal purposes but comparison with surveys in other parts of the world where radiographs were not used would be impossible. Inclusion of the type A observations in the above situations would provide a degree of comparability at virtually no extra cost to the more detailed survey.

## 2.0 GENERAL PROCEDURES

### 2.1 The Recording Forms

Figures 1a to 1d show different versions of the recording form suitable for the IBM mark sensed system, the Remington Rand optically-scanned system, the electronic page scanner, and a padded form from which conventional Holerith cards may be punched by a machine operator. All recording cards lead to the same results and the choice is only dependent on the type of equipment available locally. All forms are suitable for processing by the computer programs given in Appendix A which may be easily modified to run on a variety of electronic computers.

### 2.2 Examination Conditions and Instrumentation

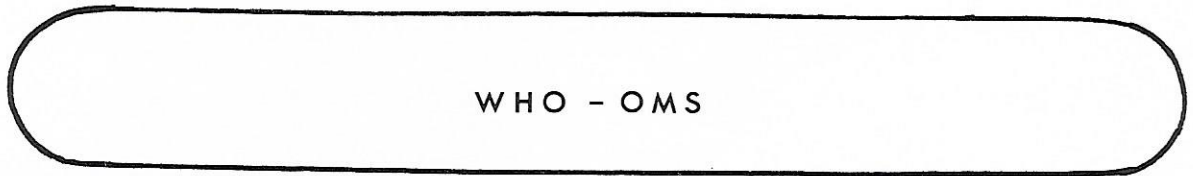
2.2.1 Lighting: It is important that the examinations be conducted under suitable lighting conditions. Illumination of the mouth by open skylight (but not direct sunshine) available close by a window, or lighting comparable to that given by a two-cell flashlight or electric torch is considered adequate. The type A survey is expected to be usable under field conditions where electric power for high powered examination lights is not available.

2.2.2 Tongue Blade and Ruler: Disposable tongue blades (see figure 2) are all the instruments specified for the type A survey. The blade is to be used generally as a cheek or lip retractor. The millimeter ruler is suitable for the horizontal

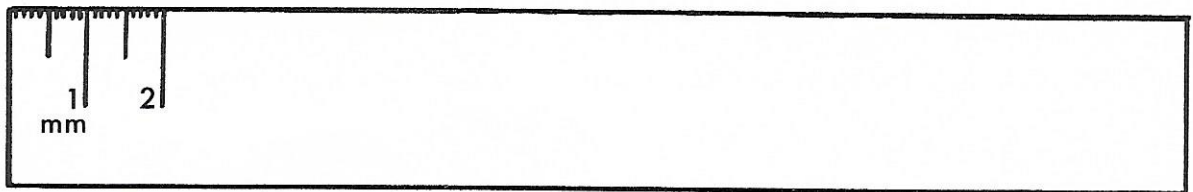


**PLEASE NOTE**

**Figures 1b, 1c, & 1d are not included  
in this first draft.**



TONGUE BLADE



PLASTIC RULER

Figure 2: Disposable tongue blade and plastic ruler which are the only instruments required for the type A survey.

incisor position measurements and may be used easily without being contaminated by saliva; however, if this occurs the plastic may be washed with soap and water. The tongue blades should be rejected after each patient and never re-used. If care is taken, the examiner's hands need not contact the patient's mouth--eliminating the time required for washing between subjects.

2.2.3 Patient Position: Because of the brief examination time required, it is suggested that the patient sit on a stool or box facing the examiner and the source of light which is coming from behind the examiner. Head rests are not considered essential and the time required to seat a patient and adjust the head rest adds to the time required for the examination. Seating the patient has the effect of steadying him and bringing his face to a more constant position in front of the examiner. The examiner is free, however, to work under whatever conditions he finds most comfortable.

2.2.4 Examination Time: It has been found that a trained and experienced examiner working with a trained recording clerk can perform the examination of a reasonably cooperative patient in about one and a half minutes. While this would indicate that something in the order of 30 cases can be seen in an hour, it is suggested that for full recording of side one, 25 cases be the maximum per hour and a short rest be taken from the task at the end of each hour to avoid errors associated with fatigue.

### 2.3 Personnel Required and Duties

Under ideal conditions, three individuals should be used: (1) the examiner,

(2) the examiner's recording clerk, and (3) the organizing clerk. Organization of the examination session is described in figure 3. The duties of the examiner and recording clerk are obvious but some suggestions may be helpful regarding the third member of the team.

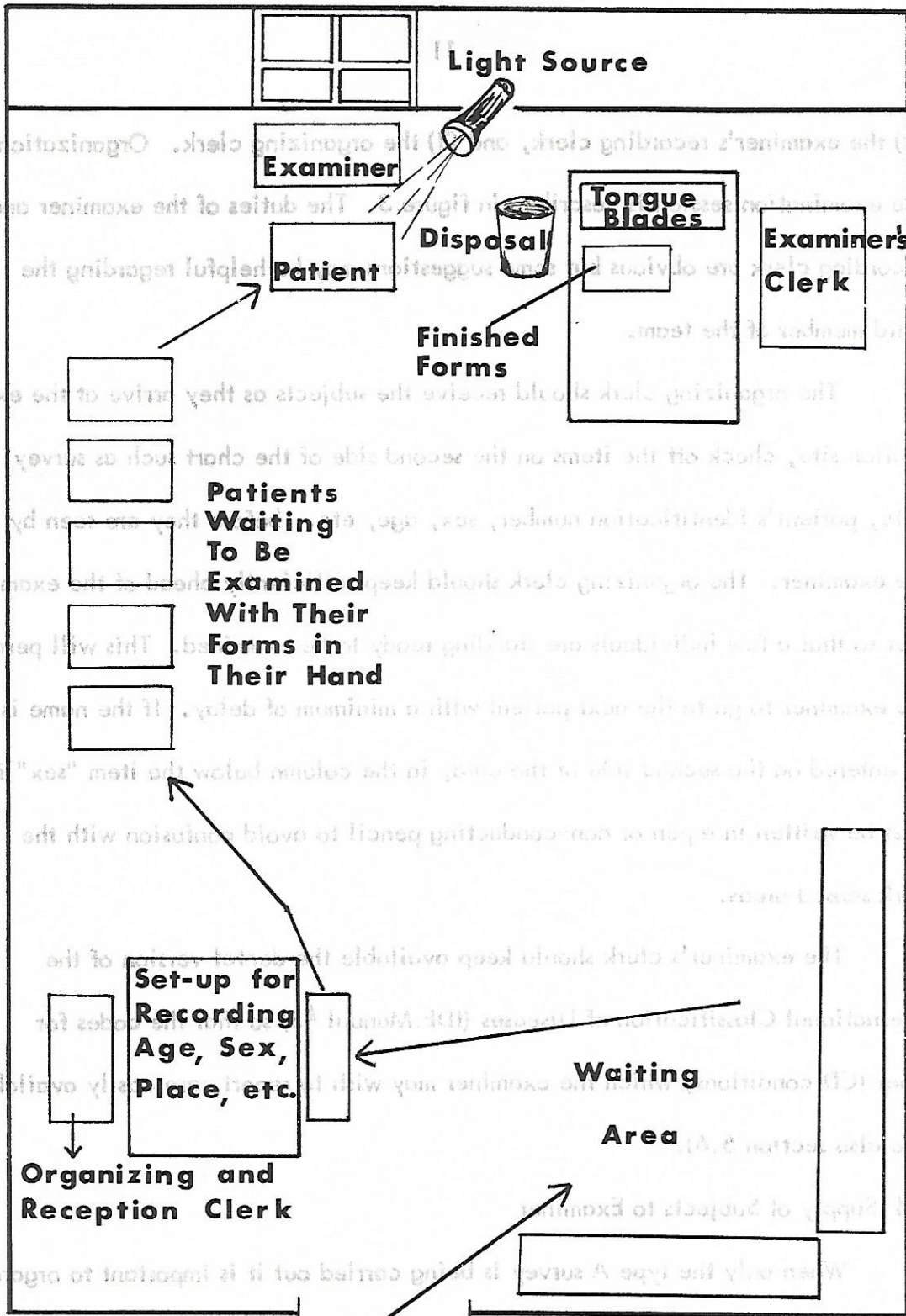
The organizing clerk should receive the subjects as they arrive at the examination site, check off the items on the second side of the chart such as survey date, patient's identification number, sex, age, etc., before they are seen by the examiner. The organizing clerk should keep sufficiently ahead of the examiner so that a few individuals are standing ready to be examined. This will permit the examiner to go to the next patient with a minimum of delay. If the name is to be entered on the second side of the card, in the column below the item "sex" it must be written in a pen or non-conducting pencil to avoid confusion with the mark sensed areas.

The examiner's clerk should keep available the dental version of the International Classification of Diseases (IDE Manual #2) so that the codes for other ICD conditions, which the examiner may wish to report, are easily available (see also section 5.6).

#### 2.4 Supply of Subjects to Examiner

When only the type A survey is being carried out it is important to organize so that sufficient subjects are on hand to keep the examiner occupied and yet avoid an unnecessarily long waiting period for the persons being examined. It





**Figure 3: Organization of examination stand.**

may be a useful guide to have persons arrive ten to fifteen minutes prior to being examined and to keep at least half a dozen individuals, for whom side two of the chart has been completed, available for the examiner. The subjects should hold their recording forms to give to the examiner to avoid having to check each time if the right card is being used.

When the type A survey is merely included for standardizing purposes along with more detailed type B or C level surveys, or when the type A survey is being used in conjunction with surveys principally conducted for other purposes such as nutrition, or medical purposes, the short type A examination must be worked in according to convenience.

#### 2.5 Authority to Conduct Examinations

The right of the individual to refuse to be examined must be respected in all health surveys. For children in many countries the authority to carry out health examinations is vested in local school or public health officers who may delegate their right to dental health workers. Such authority must be formally obtained before survey work can proceed.

For adults, cooperation must be solicited by informing them of the importance of the work and perhaps giving them some benefit by advising them regarding their oral health status. Individuals will agree rather easily to the quick inspection on which the type A survey is based whereas they may refuse examinations involving considerable instrumentation, see Manual #1, Part II, section 4.8.

An indication of the number of non-responses or refusals to be examined should be given on the Source of Data form, see figure 4, and section 4.4.

## 2.6 Care of Forms

If the special forms shown in figures 1a to 1d are used, care must be taken to avoid bending or creasing which would prevent their acceptance by the machines. Marks must only be placed in the marking zones. In all three types of forms, marks outside the designated areas will result in improper punching of the cards and erroneous findings. Care should be used to keep punch cards dry and under pressure in the boxes supplied. No special care is needed with the padded form shown in figure 1d but when planning to use this form the cost of punching cards must be considered.

SOURCE OF DATA RECORD, WHO FORM DH2  
TYPE A Dental Health Survey

1. Name and Address of Survey Administrator .....
2. Name of Organization Sponsoring the Survey .....
3. Dates When Survey Was Carried Out:  
Year 19.... Month ..... to Year 19.... Month .....
4. Brief Description of Population Surveyed  
 .....  
 Geographic area      Sub-division or selection      Ages included .....
- Remarks:  
  
  
  
  
  
  
  
  
  
 .....  
 Estimate true size of population sampled relevant to ages examined.
5. Sampling Method (or description how subjects were contacted)
6. Recording Form Used .....
7. Comments on Cost, Time, or Difficulties in Surveying this Population.  
 Total cost .....; Transportation .....; Salaries & living .....
- Total examining time .....; Actual examining time .....
- Transportation time .....
- Comments:

Figure 4: Form for documenting source of data in a Type A survey.

Figure 4 continued-

8. Examiners Used:

<u>Name</u>	<u>Training or Degrees</u>	<u>Data Collected by Examiner</u>
-------------	----------------------------	-----------------------------------

9. Other ICD Conditions Kept Under Surveillance:

<u>ICD Number</u>	<u>Description of Criteria Used for Recognition</u>
-------------------	---

10. Use of Assignable Code Fields:

	<u>Characteristic</u>	<u>Coding Used</u>
A		
B		
C		
D		
E		
F		
G		
H		
I		

11. Other Data Collected in Connection With This Survey, e.g. Type B data, nutrition, etc.

12. Important Findings and Recommendations:

### 3.0 INSTRUCTION OF PERSONNEL

#### 3.1 Examiners

Examiners must become familiar with the description of recording items given in sections 5 to 8, then, whenever possible, some actual examinations should be done under the supervision of an experienced person who can explain any difficulties. Very little difficulty will be encountered by trained dentists. Auxiliaries and para-medical personnel who may be called upon to conduct examinations in remote areas where consultation with an experienced examiner is impossible, are urged to attempt as much of the survey as they can, because fair information will be more valuable than none and many of the recordings such as tooth counts are highly objective and simple to carry out. Pilot tests have indicated that once they have been properly instructed, auxiliaries can carry out the examinations with excellent results and perhaps more objectivity than dentists.

If several new examiners are being trained at one time it will increase interest if all can examine the same patients, then discuss items of disagreement until a clear understanding of the requirements is obtained. Where possible in national surveys actual calibration should be carried out and periodic checking of examiners through re-examination of some subjects will increase the standardization of the examinations. Additional information on examiner bias may be found in Manual #1, section II, 4.7. If the enlargement of the recording form in Appendix B is set up where it can be easily seen, it will serve to remind a new examiner of the items required.

### 3.2 The Recording Clerk

To the extent possible, the recording clerk should also be familiarized with sections 5 to 8 so that he can quickly record the findings dictated to him by the examiner. In training recording clerks, findings may be dictated from past recorded cases calling out the items as would be done if the patient was present. After only a little practice, clerks will easily keep up with the examiner's oral instructions. A clerk who is familiar with the proceeding may often aid a new examiner by reminding him if an item has been missed or by requesting a very unusual item to be checked. Instruction should include actual marking of the zones on the cards to ensure that the proper amount of pressure and darkening-in is understood.

### 3.3 Other Assistants

The other important assistant is the organizing clerk. This person must understand the details of sampling at the site where the work is being carried out (see section 4) in order to be clear that the correct individuals are being seen. Often this work may be aided by or be done by a local official.

If recording of other than age and sex is to be attempted on the second side of the form, this clerk must understand the basis for coding the individual characteristics. If the information as to occupation, education, religion, etc., cannot be obtained beforehand from records, the clerk should be prepared to ask for the information with politeness and discretion bearing in mind that the subject may not be forced to give out any information of a personal type.

#### 4.0 SAMPLING CONSIDERATIONS (See Manual #1, Section II, 3)

##### 4.1 Definition of Target Population

Statistics have only little value unless it is clear as to the time, place, and characteristics of the population they are meant to describe. Very frequently in epidemiology the population may be described as the persons living in a circumscribed geographic area. The area may be definable as a political unit, a municipality, a section of a country, and sometimes by physical boundaries, for example, those persons living in a valley or a river basin.

The population whose dental health is to be described may be further delineated by confinement to certain ages, occupations, economic status. Often this is done in order to explore the effect of certain living conditions on health or because certain groups such as those in military or government service are easier to approach.

The primary thing in planning a survey is to write down clearly what group will be described by the resultant figures. For type A surveys the best thing may be to describe the geographic area followed by a description of ages selected and any exclusions that are necessary.

##### 4.2 Sampling Frame

The sampling frame is the scheme for getting access to the population. It is clearest to think of the frame as a complete list from which all individuals or a random sample may be selected for examination. Obviously if the list whether



imaginary or real would exclude some individuals in the population, the sample drawn from the list would not be completely descriptive of the target population. The simple but common situation of sampling children in schools from the classroom name lists is illustrated in figure 5. More detailed information on the use and development of sampling frames is given in section 3.5, Part II of Manual #1.

Whenever a statistician experienced in sampling is available, he should be consulted; however, it is stressed that with type A surveys, field workers in remote geographic regions which have never been surveyed should be encouraged to collect some data which will indicate the oral health conditions even though the sampling is not ideal. The important thing is to fully document how the individuals were located on the data source form, figure 4, see section 4.4.

#### 4.3 Sample Size

The type A survey is not designed or required to pin point the prevalence of dental disease. The purpose of the survey is to appraise the relative importance of the major dental diseases in a population and to make clinically meaningful comparisons possible. The basic tabulation is of classification data expressed easily as percentages, see section 9.1. Table 1, which is reprinted from Manual #1, gives the 95 per cent confidence limits of percentages according to the size of the random sample on which they are based. The confidence range is wider for values near 50 per cent than for those approaching zero or 100 per cent. A sample of 100 gives a confidence range for the above percentages of from  $\pm 10$  per cent to  $\pm 2$  per cent. More than doubling the sample narrows the confidence

School 1, Room 1		School 1, Room 2		School 2, Room 1	
Name	Age	Name	Age	Name	Age
1 Black, J.	11	1 Andrews, T.	9	1 Allan, T.	6
2 Burns, S	11	2 Anderson, J.	9	2 Cannon, S.	7
*3 Doe, R.	10	3 Blue, S.	9	3 Elder, S.	7
4 Dunn, A.	12	*4 Cambell, M.	10	4 Finlay, T.	8
5 Grant, F.	9	5 Duncan, T.	9	*5 Harrison, S.	8
6 Green, J.	13	6 -		6 Jackson, B.	6
7 Jones, B.	14	7 -		7 -	
8 -		8 -		8 -	
*9 -		.		9 -	
10 -		.		.	
.		.		.	
.		.		.	
.		.		.	
30 -		.		.	
31 -		.		27 -	
32 Roper, P.	13	20 -		28 Lawson, Z.	7
*33 Ross, T.	12	21 Little, B.	11	*29 Tinker, B.	7
34 Smith, A.	12	*22 Thompson, J.	9	30 White, M.	7
35 White, J.	12	23 Williams, B.	9	31 Young, T.	7

Figure 5. Sampling children's names from classroom lists. In conducting surveys in schools it is very convenient to draw a systematic sample of children from classroom lists. In the above illustration, the sampling ratio is set at 6 so that every sixth child is examined. Note that starting on the first sheet of names from a random start (in this case 3) every sixth name is marked and the sequence is continued from class to class and school to school throughout the entire survey. If a child is absent, the name following the one marked may be taken, failing this, the one preceding and so on. If it was decided only to examine children with odd ages (i.e. 5, 7, 9 etc.) the marked names with even numbers would be ignored and the sample would be reduced by half. The most important thing in sampling is to select the children by some predetermined scheme as above; in no case should the teacher be asked to select "typical" children or any children rejected because they are not thought to be representative.

TABLE I  
95% CONFIDENCE INTERVALS FOR PERCENTAGES BASED ON VARIOUS SIZED SAMPLES

Observed %	Number of Children Examined					Observed %	Number of Children Examined				
	25	50	100	250	500		25	50	100	250	500
0.0	0 - 14	0 - 7	0 - 4	0 - 1	0 - 1	26.0	15 - 41	18 - 36	20 - 32	21 - 31	
1.0			0 - 5	0 - 4	0 - 2	27.0		19 - 37	21 - 33	22 - 32	
2.0		0 - 11	0 - 7	1 - 5	0 - 4	28.0	12 - 49	19 - 38	22 - 34	23 - 33	
3.0			1 - 8	1 - 6	1 - 5	29.0		20 - 39	23 - 35	24 - 34	
4.0	0 - 20	0 - 14	1 - 10	2 - 7	2 - 6	30.0		21 - 40	24 - 36	25 - 35	
5.0			2 - 11	3 - 9	3 - 7	31.0		22 - 41	25 - 37	26 - 36	
6.0		1 - 17	2 - 12	3 - 10	3 - 9	32.0	15 - 54	23 - 42	26 - 38	27 - 37	
7.0			3 - 14	4 - 11	4 - 9	33.0		24 - 43	27 - 39	28 - 38	
8.0	1 - 26	2 - 19	4 - 15	5 - 12	5 - 11	34.0		25 - 44	28 - 40	29 - 39	
9.0		3 - 22	5 - 16	6 - 13	6 - 12	35.0		26 - 45	29 - 41	30 - 40	
10.0			6 - 18	7 - 14	7 - 13	36.0	18 - 58	27 - 46	30 - 42	31 - 41	
11.0		3 - 31	7 - 19	8 - 15	8 - 14	37.0		28 - 47	31 - 43	32 - 42	
12.0			8 - 20	9 - 16	9 - 15	38.0		29 - 48	32 - 44	33 - 43	
13.0			9 - 21	10 - 17	10 - 17	39.0		30 - 49	33 - 45	34 - 44	
14.0		6 - 27	10 - 22	11 - 18	11 - 18	40.0	22 - 61	31 - 50	34 - 46	35 - 45	
15.0			11 - 24	12 - 19	12 - 19	41.0		32 - 51	35 - 47	36 - 46	
16.0	5 - 36	7 - 29	12 - 25	13 - 20	13 - 20	42.0		33 - 52	36 - 48	37 - 47	
17.0			13 - 26	14 - 21	14 - 21	43.0		34 - 53	37 - 49	38 - 48	
18.0		9 - 31	14 - 27	15 - 22	15 - 22	44.0	24 - 65	35 - 54	38 - 50	39 - 49	
19.0			15 - 28	16 - 23	16 - 23	45.0		36 - 55	39 - 51	40 - 51	
20.0	7 - 41	10 - 34	16 - 29	17 - 24	17 - 24	46.0		37 - 56	40 - 52	41 - 52	
21.0			17 - 30	18 - 25	18 - 26	47.0		38 - 57	41 - 53	42 - 53	
22.0		12 - 36	18 - 31	19 - 26	19 - 27	48.0	28 - 69	39 - 58	42 - 54	43 - 54	
23.0			19 - 32	20 - 27	20 - 28	49.0		40 - 59	43 - 55	44 - 55	
24.0	9 - 45	13 - 38	20 - 33	21 - 28	21 - 29	50.0		41 - 60	44 - 56	45 - 56	
25.0			21 - 35	22 - 31	22 - 30			42 - 61	45 - 57	46 - 57	

\* If observed percentage exceeds 50, read the value (100 - the observed percentage) and subtract each limit from 100.  
 Source: n = 25, D. Mainland; n = 50, 100, 250, G.W. Snedecor;  
 n = 500, calculated from normal curve approximation.

limits on a percentage of 50 per cent to  $\pm 6$  per cent, and negligible additional precision is gained by using a sample of 500. Thus, it is suggested that in general public health work a practical sample size on which to base specific percentages (e.g. age specific estimates) is in the order of 200.

4.3.1 For geographic pathology (mapping) a five level scale is satisfactory and may be expressed in terms of the percentages of the population observed to have a given characteristic or level of disease severity as follows.

1. Very low - the condition is absent or observed in less than 10 per cent of the population.
2. Low - the condition is observable in from 10 to 32 per cent of the population.
3. Medium - the condition is observed in from 33 to 66 per cent of the population.
4. High - the condition is observed in from 67 to 90 per cent of the population.
5. Very high - the condition is observed in over 90 per cent of the population.

Naturally because of the random sampling variation attached to any estimate, one can not be certain that a finding for example of 11 per cent is not really representative of a population value of 9 per cent. Thus, there can not be certain assignment of survey results to any specific one of the five levels given above unless sample sizes are in the order of hundreds of thousands. Figure 6

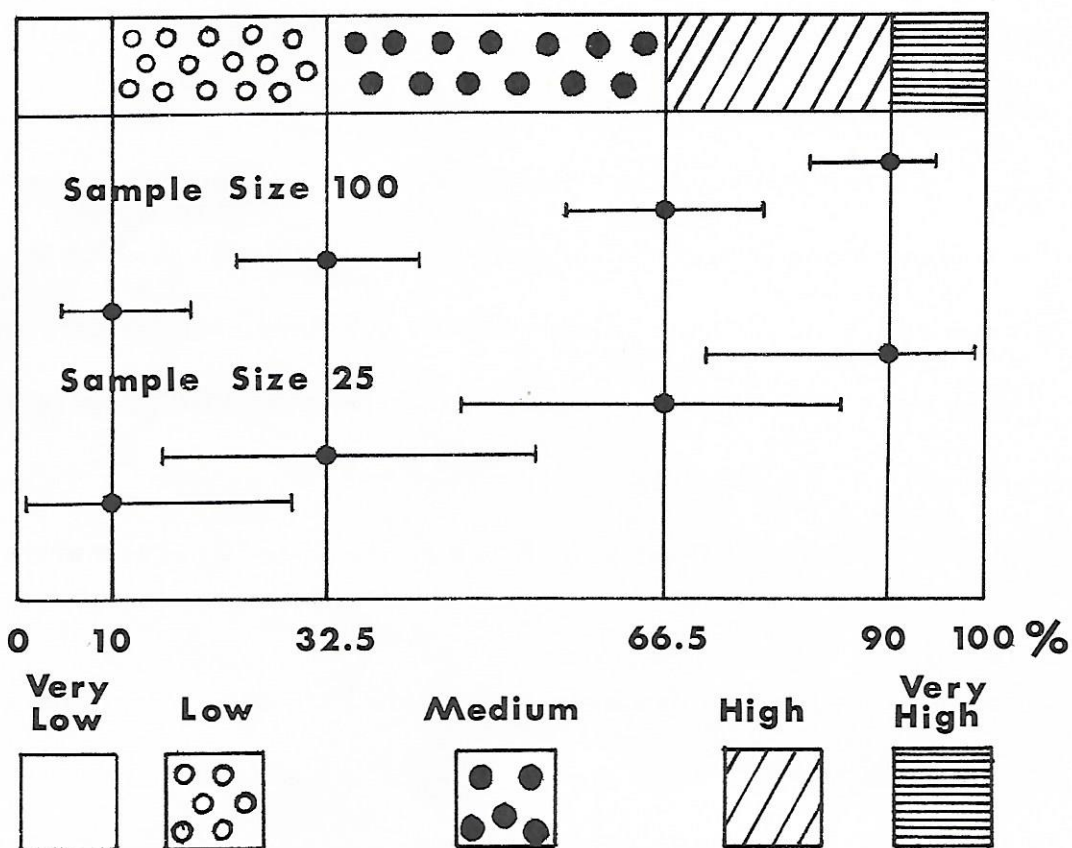


Figure 6: Discrimination between levels of disease categories used in geographic pathology. Note that with samples as small as twenty-five the upper confidence limits for an observed 10 percent does not enter the medium area, nor does the range for 32.5 percent involve the very low area. Thus samples from 25 to 100 make it possible to distinguish between percentages not in adjacent levels.

shows that even with samples under 100, percentages not falling in adjacent levels may be considered significantly different and this is satisfactory for mapping purposes.

#### 4.4 Recording the Source of Data

Figure 4 shows an appropriate form for recording all relevant details about the origin of the data. This is very important in reporting survey results because the data are only of value if it is very clear exactly which population or division of a population is described by the tables. Details as to the qualification and training of the examiners, and any difficulties in carrying out the prescribed examination should be noted. The identity of codes assigned to regions or subdivisions, see section 7.3, and of assigned codes, see section 5.7, should be carefully recorded on the source of data form.

If the data is based on a sample drawn from a known population, the size of the population should be given because this may be needed when results from various other surveys are combined.

As the plan for the survey progresses it is a good idea to make a note of any important decisions or actions taken so that they will not be forgotten in writing up the report.

## 5.0 EXAMINATION AND RECORDING OF DENTAL DISEASES AND CONDITIONS

### 5.1 Dental Caries (ICD-521)

Record separately for deciduous and permanent dentitions only the most severe lesion type observed. Check levels in order from bottom to top of column.

- (1) First check to see if there are cavities or fillings between the six lower anterior teeth, figure 7(a); if one or more is present mark the bottom zone and end the examination.
- (2) If no lower anterior cavities or fillings are observed, look at the labial surfaces of the upper and lower anterior teeth, figure 7(b). If one or more carious lesions are seen, mark the zone called labial and end the examination.
- (3) If no cavities or fillings are seen in the first two regions, check the spaces between the upper six anterior teeth, figure 7(c). If one or more lesions are seen, mark the appropriate zone and end the examination.
- (4) If there is still no caries observable, look for caries that has originated between the posterior teeth, figure 8. If one or more lesions are found, mark the zone and end the examination.
- (5) If no caries was seen in the previous four regions, check the fissures and pits, figure 9, for obvious caries or fillings and mark the zone two, labelled pit or fissure, then end the examination.
- (6) If no caries or fillings are seen, mark the first zone.

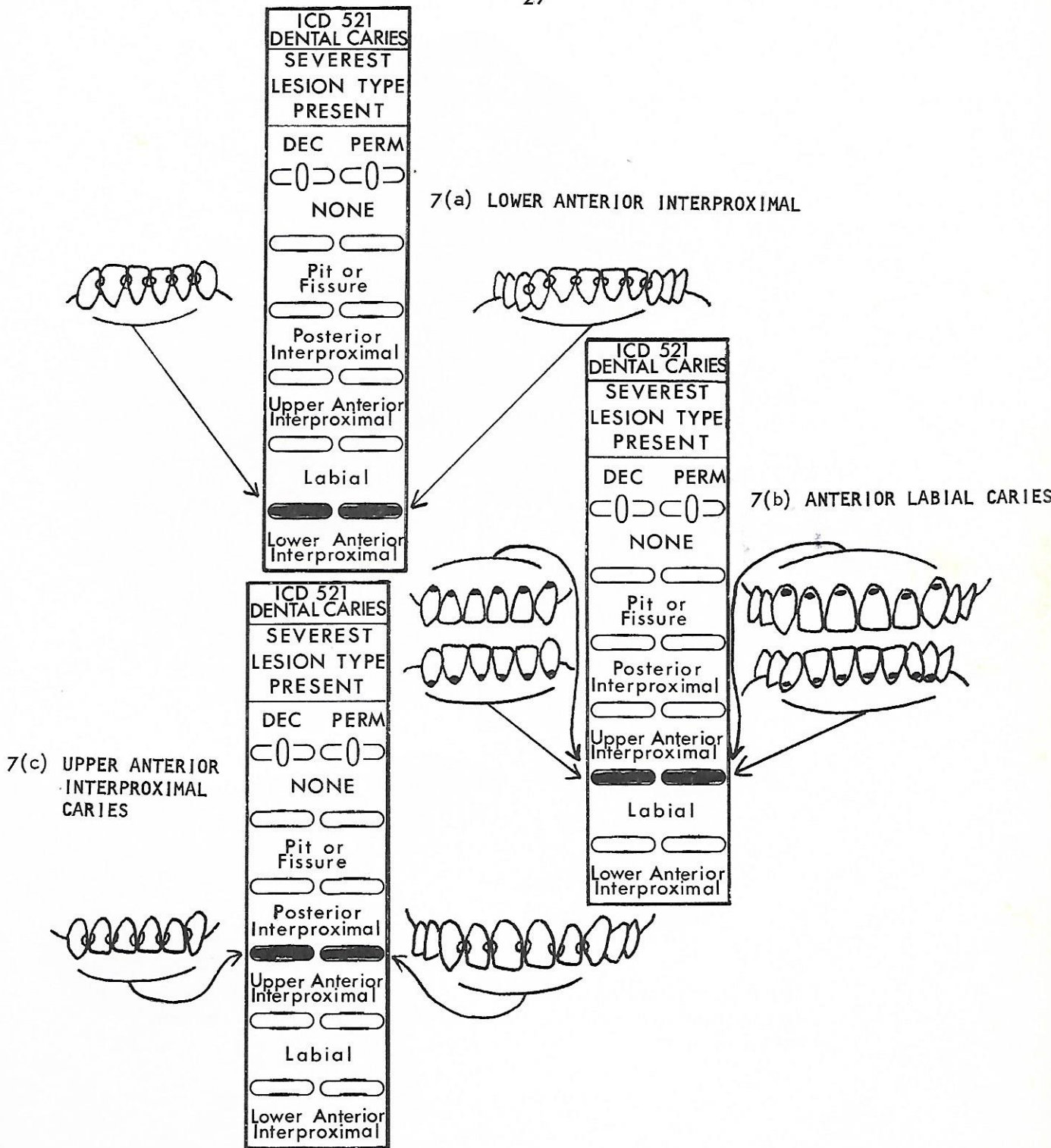


Figure 7: Location and marking zones for indicating the presence of caries on anterior teeth. The presence of one or more lesions in the areas indicated starting with the lower anterior interproximals ends the examination. Only the zone for the most severe lesion type should be marked.



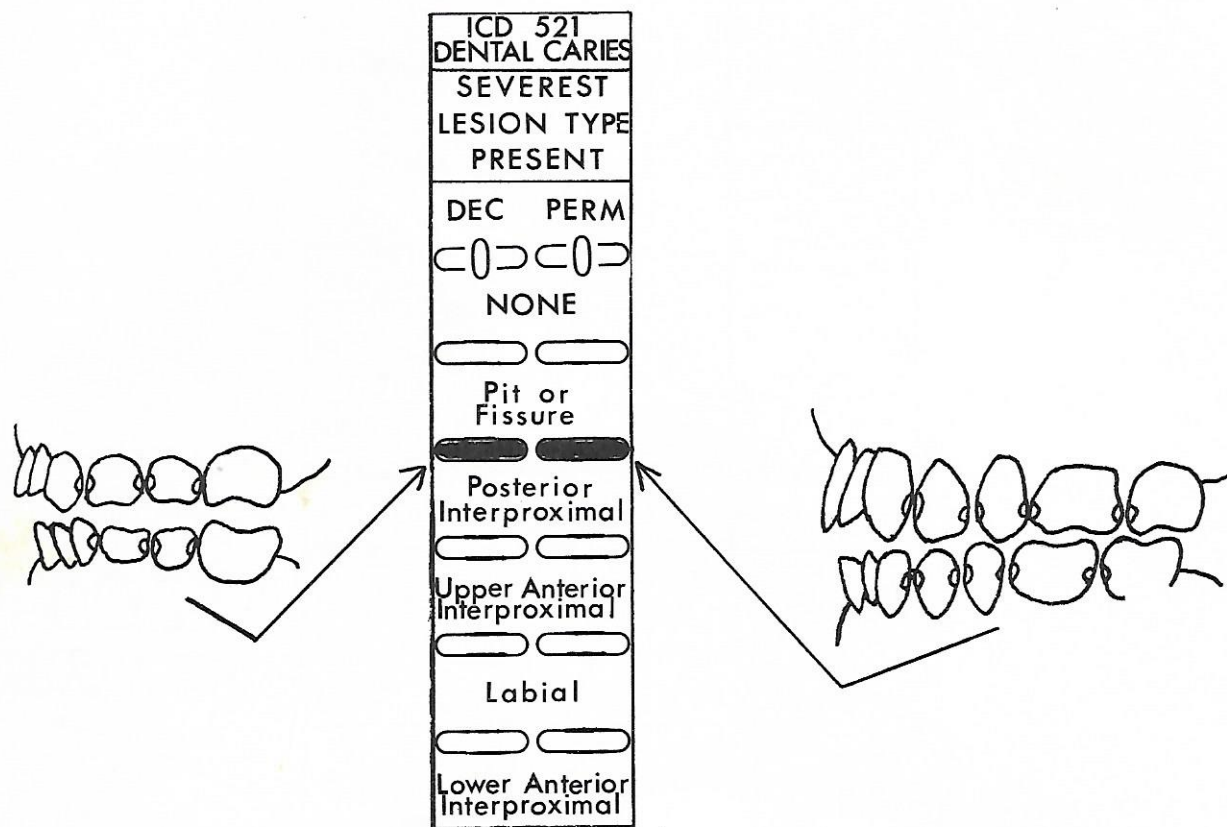


Figure 8: Locations for posterior interproximal caries and appropriate marking zone on deciduous and permanent teeth.

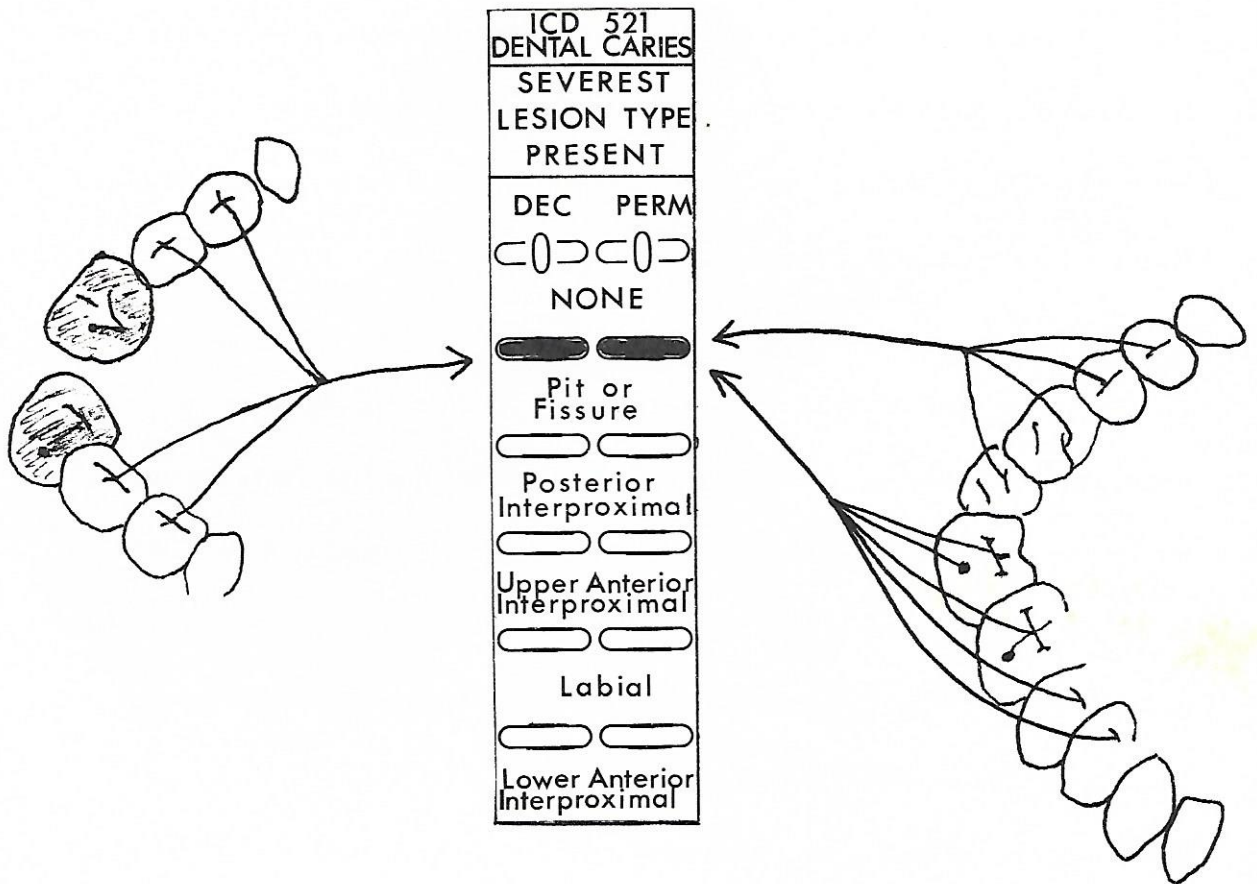


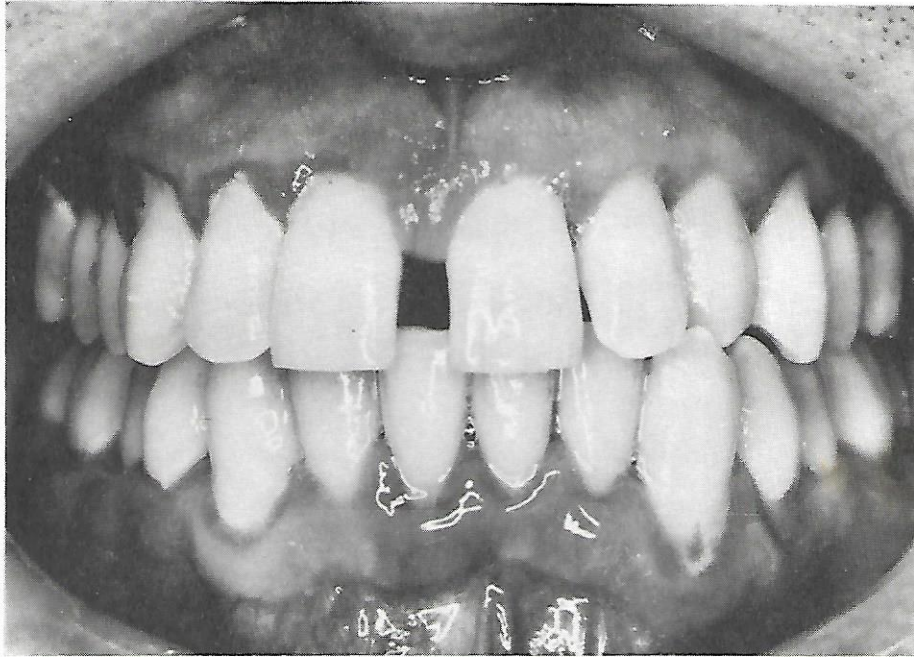
Figure 9: Locations of pits and fissures on deciduous and permanent posterior teeth and the appropriate marking zones to record the presence of one or more lesions.

If one or more teeth are missing, the observations may still be made from the status of the remaining teeth. If one or two posterior teeth show evidence of having been extracted and none of the remaining teeth are carious, report pit or fissure caries by marking zone two.

#### 5.2 Periodontal Disease (ICD-523.1, 523.4)

Record only the most severe periodontal condition found on one or more tooth units. Examine for presence of the most severe condition first, moving to the less severe until a recordable condition is observed. The definitions of the levels are basically that of the PI (Russell USPH Index). Pockets associated with partially erupted third molars which are not etiologically the same as general periodontal disease should be ignored.

- (1) Using tongue blade, check for advanced destruction with loss of masticatory function which may be observed in terms of looseness, drifting or tilting, or depressibility of the tooth in its socket. If one tooth or more is found to be in this category, mark the zone labelled "loose" and end the examination.
- (2) If there are no loose teeth, check to see if there is the type of inflammation associated with pocket formation in one or more positions in the mouth, see figure 10. The epithelial attachment will be broken and there will be a pocket (not merely a deepened gingival crevice due to swelling in the free gingiva). There may be redness on the attached gingiva outlining the pocket form. At this level the tooth will not be loose. If a lesion of this



ICD 523.1 523.4
Perio- dental
PI

None

Mild Ging.

Severe

Pocket

Loose

Figure 10: Illustrations of type of inflammation observable in association with pockets and characteristic appearance of drifting and loose teeth caused by severe periodontal disease.

type is seen, mark the card and end the examination.

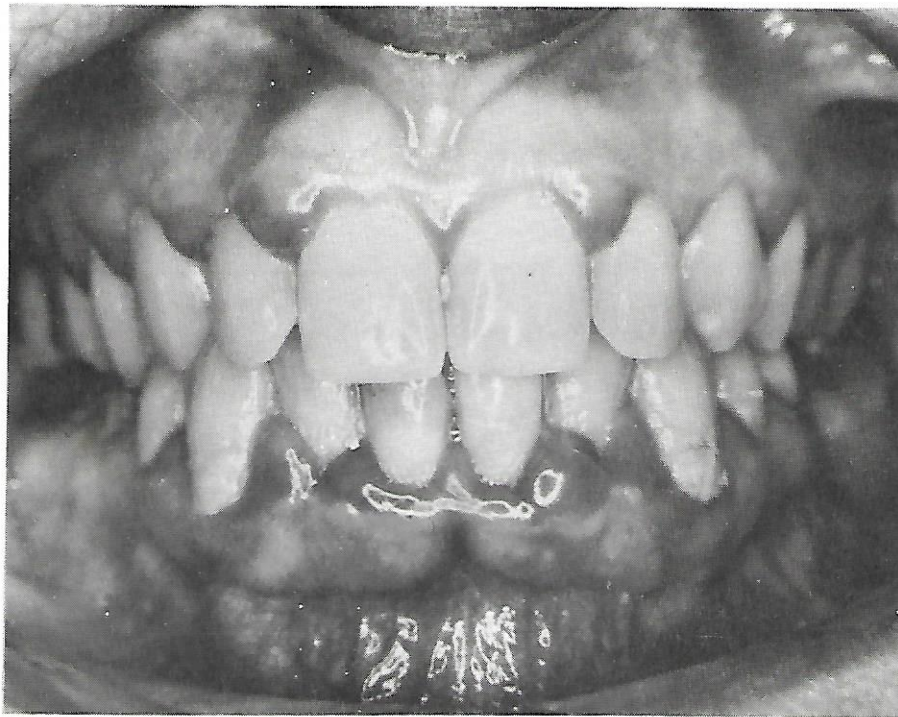
- (3) If no pockets are seen, check to see if there is obvious gingivitis manifested by inflammation completely surrounding a tooth but with no apparent break in the epithelial attachment. The inflammation may be evidenced by redness, bleeding, swelling that makes the tissue surface lose its pebbled appearance, see figure 11. If obvious gingivitis is seen, mark the card and end the examination.
- (4) If there is only mild gingivitis indicated by an overt inflammation in the free gingiva but the area does not circumscribe the tooth, mark the presence of mild gingivitis. If there are no signs as above of periodontal disease, check none on the card. When in doubt, mark the lower degree of severity.

### 5.3 Oral Hygiene (ICD-523.6 Soft Debris)

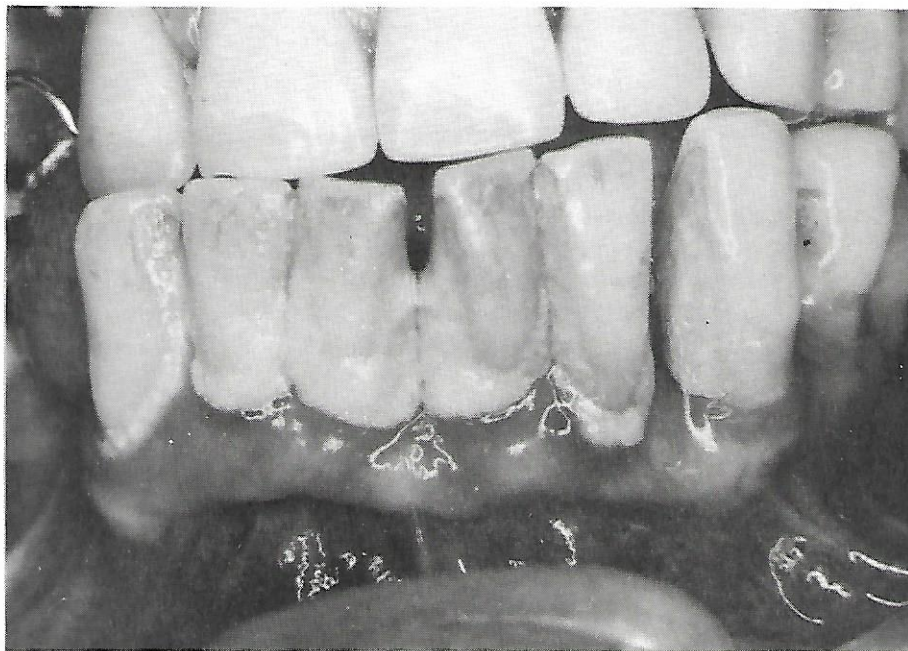
Oral debris is detected by observation using the tongue depressor to hold back the cheek and observing the lingual and buccal, or labial surfaces of the teeth. Note the highest level that the debris is found on the worst teeth and score for the mouth the highest level found on that tooth. The criteria are after Green and Vermillion, see figure 12.

### 5.4 Dental Calculus (ICD-523.6 Solid Accretion)

Examine teeth for severity of calculus deposition, see figure 12. The condition of the worst tooth is used as the score for the mouth.

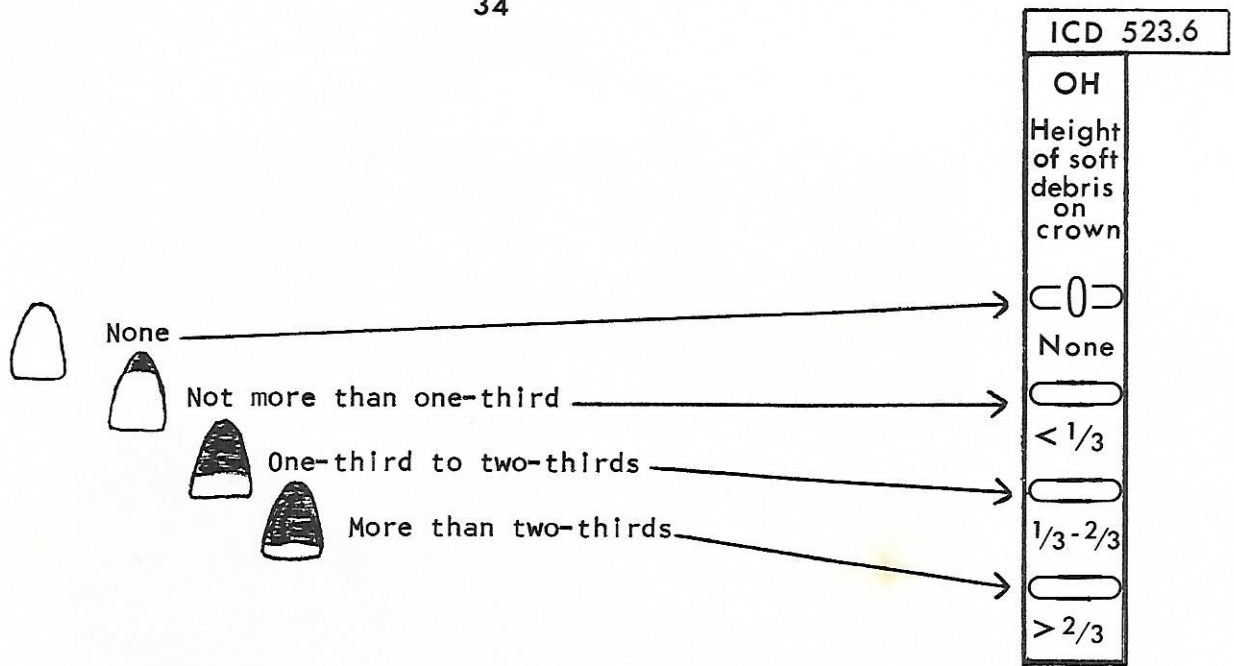


ICD 523.1 523.4 Periodo- dental
PI
None
Mild Ging.
Severe
Pocket
Loose

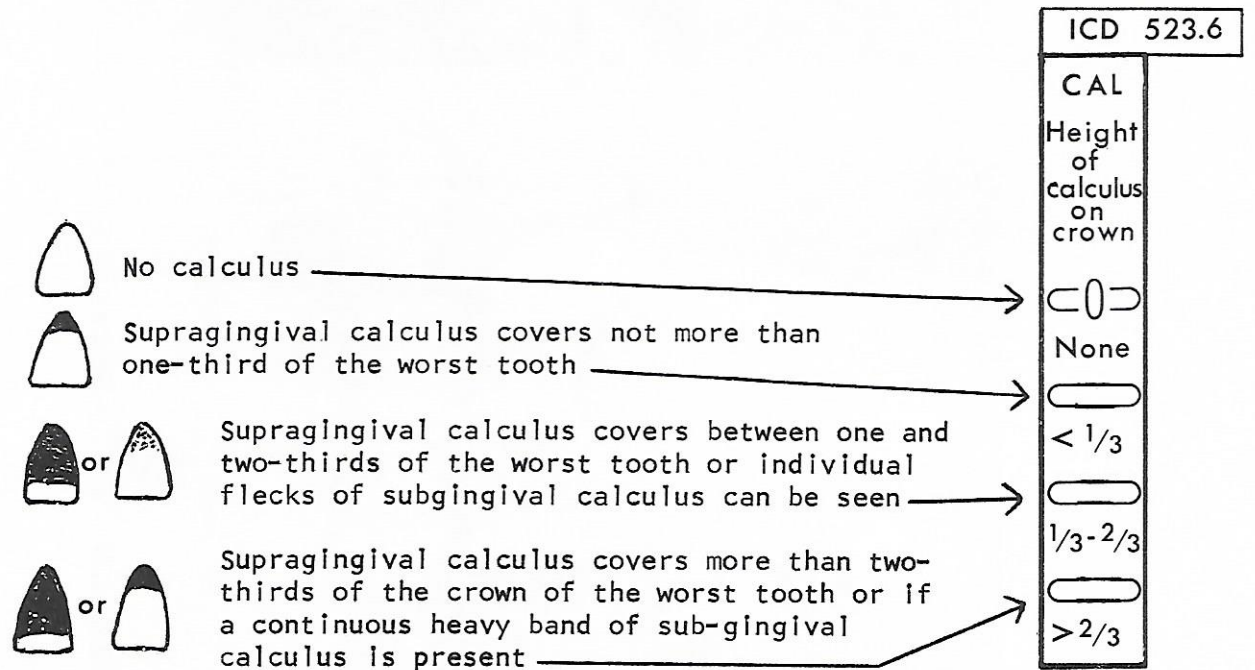


OH Height of soft debris on crown
none
< 1/3
1/3 - 2/3
> 2/3

Figure 11: Illustrations of severe gingivitis and soft debris.



A. Criteria for scoring levels of soft debris.



B. Criteria for scoring quantity of calculus.

Figure 12: Examination criteria for scoring amount of hard or soft debris on one or more teeth. Only the most severe condition is recorded.

### 5.5 Occlusion Status (ICD-524.2, 524.3)

- (1) **Horizontal Incisor Relationship.** The maxillary incisors may protrude beyond the lower incisors in the horizontal direction (overjet) or vice versa (underjet). With the posterior teeth closed together place the millimeter ruler horizontally at the mid line against the surface of the less protrusive arch and measure the amount of protrusion to the outside tip in millimeters, see figure 13. If the central incisors are not in similar anterior position, take an average position.
- (2) **Vertical Incisor Relationship.** Excluding cases where the incisors are not close to being completely erupted, have the posterior teeth closed and observe whether the central incisors overlap on the vertical direction (overbite) or if they are still spaced (openbite). Note the amount of overbite according to the horizontal position of the incisor tip of the most prominent arch. Judge the amount of openbite if present in millimeters, see figure 14.
- (3) **Buccolingual Buccal Segment Relation (Posterior Crossbite).** The posterior arch segments may be out of normal alignment, see figure 15. Disregarding single tooth malposition (see 6.5.5) or malposition where every other tooth is in different direction, count and mark the number of teeth (1,2.....8) involved in a posterior arch crossbite either to the buccal or to the lingual. Do not count both upper and lower teeth; count only the teeth in the arch which are malformed and exclude third molars from the count.
- (4) **Anteroposterior Buccal Segment Relation (Distocclusion, Neutrocclusion, or**



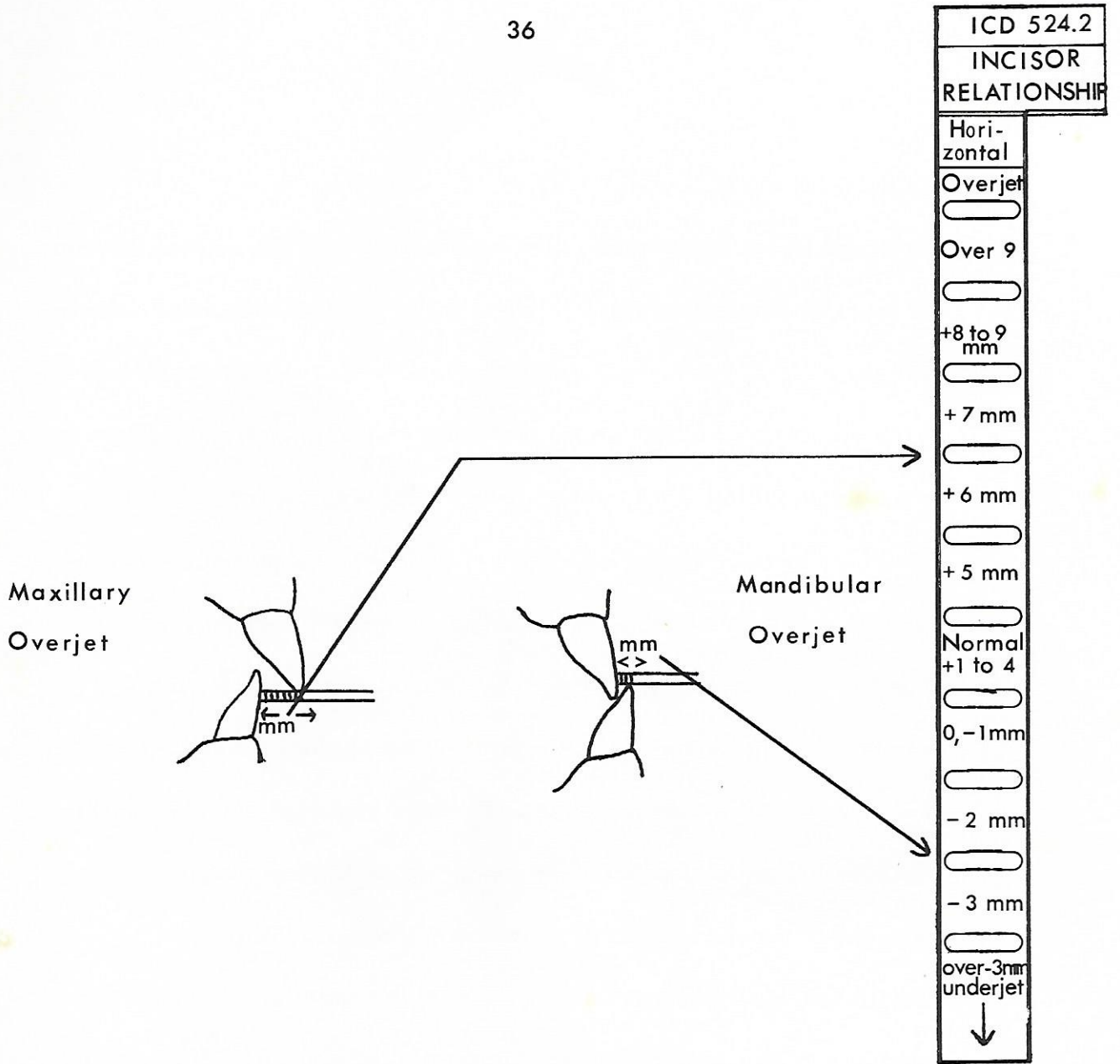


Figure 13: Measurement of overjet.

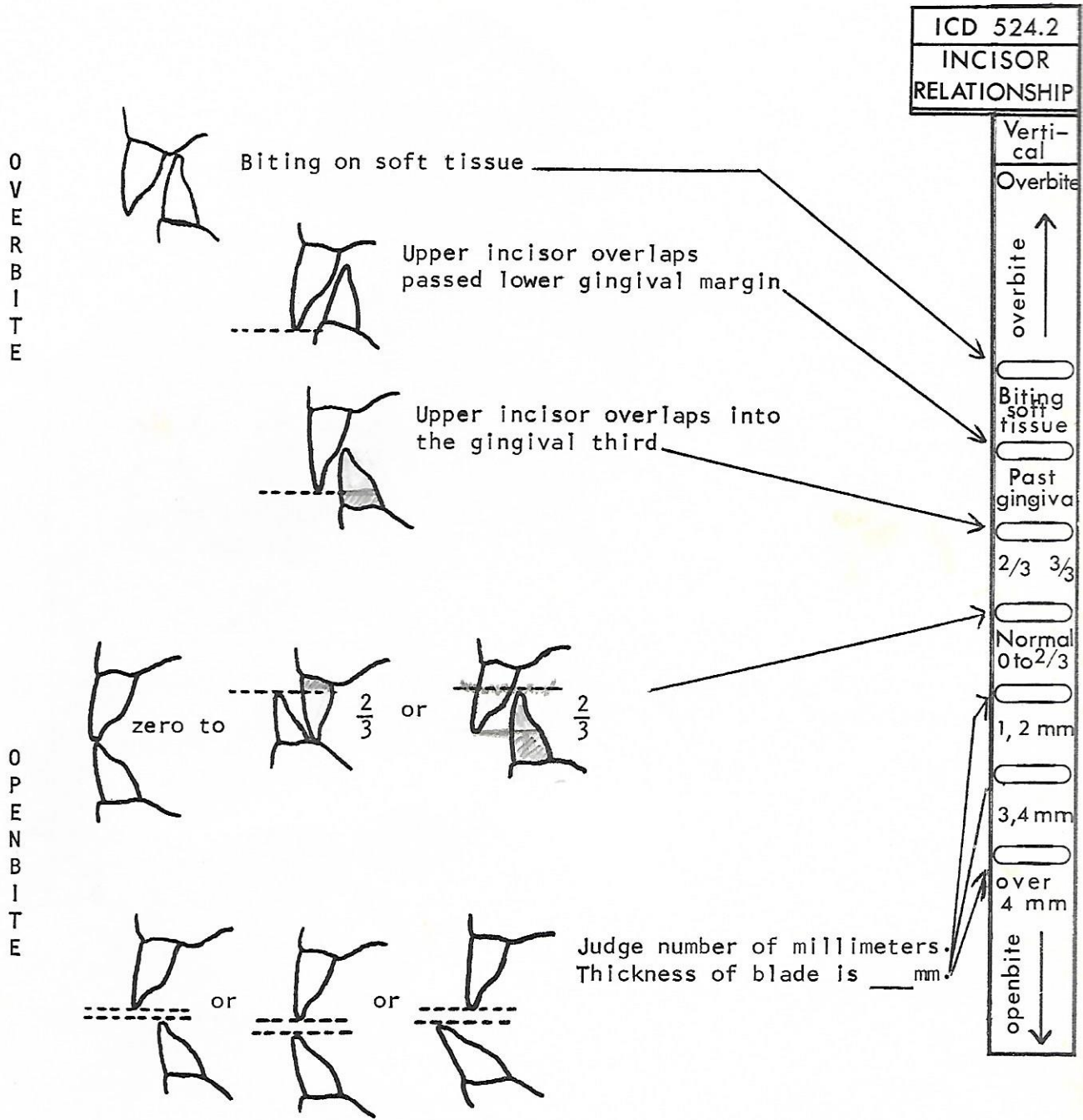
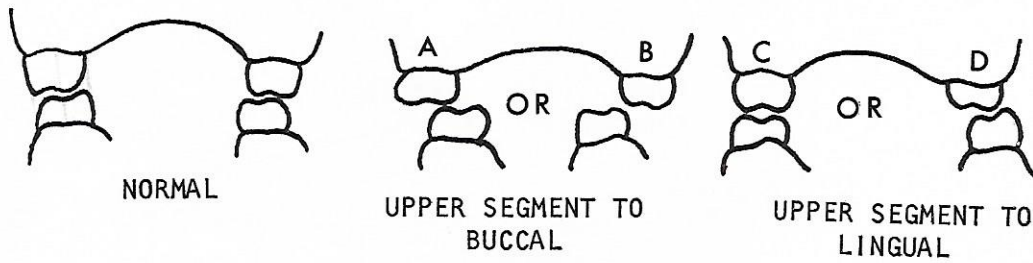


Figure 14: Examination procedures for recording overbite and openbite.

I.C.D. 524.2	
No of teeth in Posterior crossbite	
Normal	C D
1	C 1 D
2	C 2 D
3	C 3 D
4	C 4 D
5	C 5 D
6	C 6 D
7	C 7 D
8	C 8 D



Count 1 for any maxillary teeth in position A, B, C or D relative to the opposing mandibular tooth

Figure 15: Explanation of meaning of posterior crossbite. The number of maxillary teeth either lingual or buccal to the opposing lower teeth should be recorded. Third molars are excluded.

Mesioocclusion). Paying particular attention to the relation of the upper and lower first permanent molars and if present the deciduous second molars, describe the anteroposterior position of the lower teeth to the upper teeth. For each side of the mouth observe the degree of deviation from neutroocclusion in terms of cusp units of the first molar. If the displacement on a side is such that the lower tooth cusp fits into the upper groove to the posterior of its normal position, the score is 2 for distocclusion. If the lower tooth cusp fits into the groove to the anterior of the normal position, score 2 for mesioocclusion. For displacement in either posterior or anterior direction such that the cusps do not fit into grooves but are roughly half way or cusp to cusp, score 1 for distocclusion or 1 for mesioocclusion. Add the scores for each side and mark the appropriate answer, see figure 15. In case of doubt, mutilation or extraction of molars, use best judgment. In case there is mesioocclusion on one side and distocclusion on the other, call the same as the worst side, see figure 16.

- (5) Anterior Tooth Displacement (ICD-524.3) Record the amount of displacement or rotation of upper and lower anterior teeth after the method of Van Kirk and Pennell(1959). A total score is obtained by summing up the scores for the anterior teeth assigning a value of one for minor irregularity and two for major malposition, see figure 17.

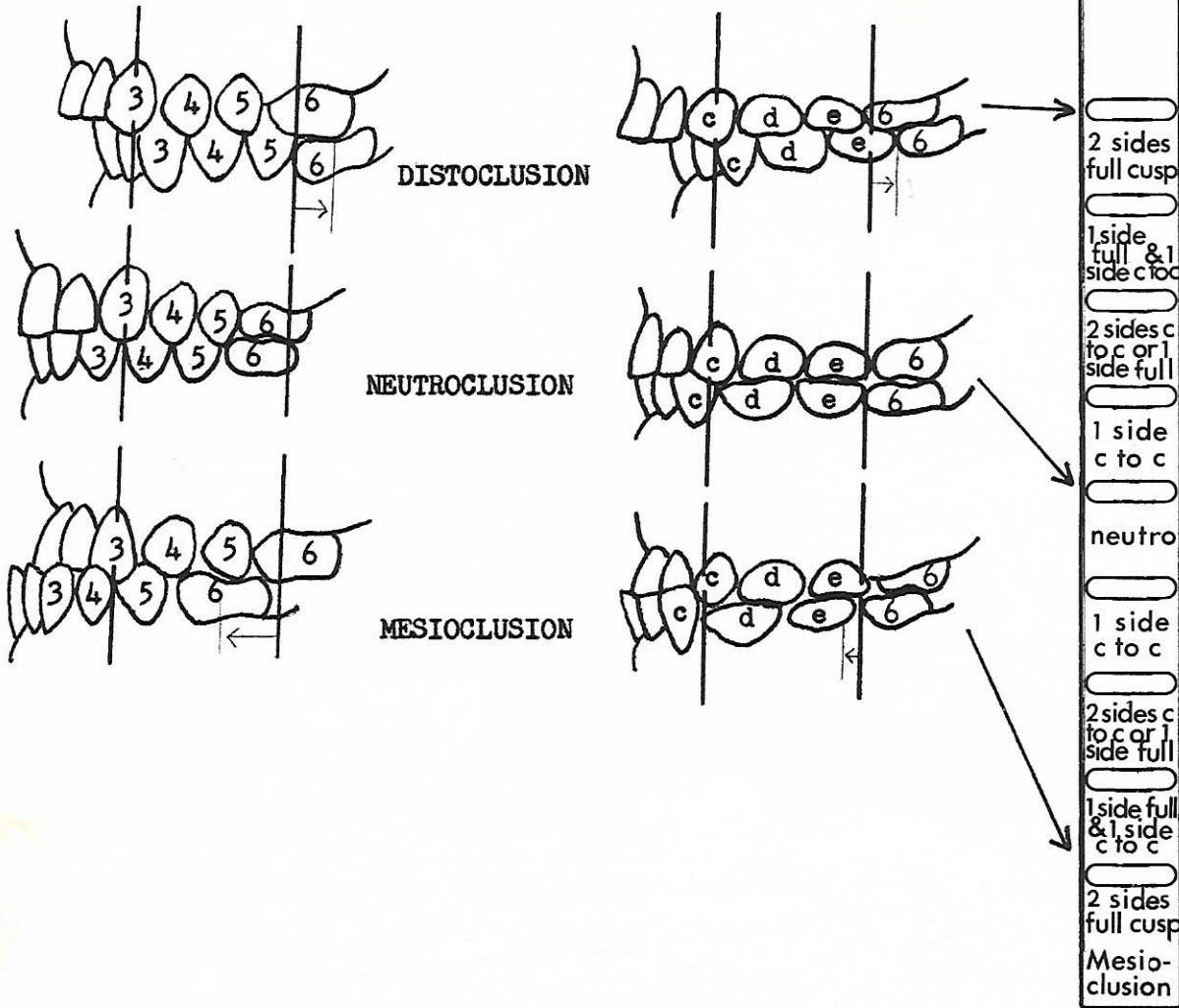
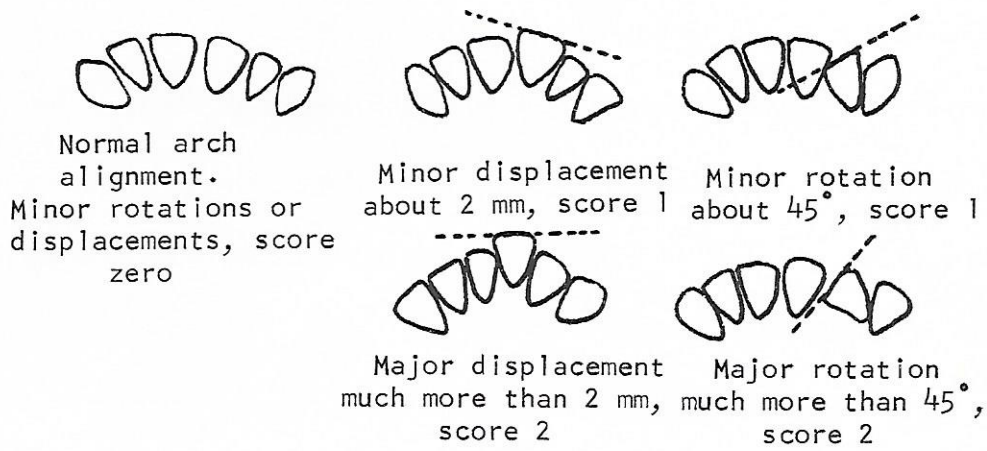


Figure 16: Illustration of buccal segment relations in permanent and mixed dentitions when determining the antero-posterior buccal segment relations. The illustrations depict full cusp displacement and cusp to cusp relation would be recognized as definite shifts but to a lesser degree.



524.3

Anterior tooth displacement score

0

NONE

1

2

3

4

5

6

7

8

9

OR MORE

Mark score on card as

Number of minor rotations or displacements	+	2 times the number of major rotations or displacements or sum of scores	=	Total
--	---	---	---	-------



Figure 17: Explanation of the scoring of tooth displacement.

### 5.6 Other Defects as Defined in International Classification of Diseases

An allowance of three fields has been made on the front of the card, see figure 18, to record the presence of other oral conditions or diseases of clinical or public health interest. This may be because the conditions are common enough in the surveyed population that their presence needs to be called to the attention of public health or professional authorities, or because the condition is particularly serious to the patient and requires urgent treatment. In the latter case the patient's name should be written on the survey form. Using the three open fields the type A survey form may be a useful way to record statistics of diagnosed conditions in institutions, see Manual #2.

The procedure is as follows. When a condition of interest is noted, its ICD rubric should be looked up in the alphabetic listing of Dental Diseases in Manual #2. The main three numbers should be recorded starting from the left with the right hand column marked zero or reserved for the fourth digit when the alphabetic listing so designates. A very short listing of other ICD dental conditions of primary interest is given in Table II. ICD numbers are marked as shown in figure 18.

### 5.7 Assignable Codes

On side two of the form, eight blank fields, A to H, and one delegated to congenital defects may be used for specific conditions which the survey planners wish to have observed for every individual. Thus, for example, if

OTHER ICD CONDITIONS													
Mark in the appropriate code													
X	X	X	.	X	X	X	.	X	X	X	.	X	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 18: Method of recording International Classification of Diseases rubrics. In the left field is the three digit number for disorders of tooth development and eruption (520); in the middle field is the four digit code for abrasion (521.2).





Vincent's infection (ICD-070) was considered very important to the survey, it could be arranged that the single column field B would be used for recording the presence or absence or the degree of this disease. Columns A and B, or A, B and C may be used together for recording 2 and 3 digit measurements such as weight and height, or as codes to 99 and 999 respectively. When special assignable codes are used, they should be fully described on the Source of Data form, figure 4 as this information is needed in the data processing.

## 6.0 RECORDING TREATMENT STATUS

### 6.1 Number of Teeth Present

Count and record the number of upper and lower teeth separately. In order to avoid too much confusion, when roots only remain or the crowns of the teeth are badly destroyed by dental caries, record as present those teeth for which about two-thirds of the crown is still present. Excluding the possibilities of extensive and complicated restorative procedures available in a few countries, this will describe the teeth that are either intact or capable of being restored by the usual plastic restorative materials (e.g. cements or amalgams). Teeth with two-thirds of crowns intact but with exposed pulps and apparent or suspected apical abscesses that should be extracted are also to be counted as present.

For counts up to ten and for over fourteen the range in which the count falls is sufficient for recording.

### 6.2 Need for Carious Teeth to be Restored

Observing the arbitrary rule that teeth for which crowns are still about two-thirds intact, give the approximate number which require restoration by marking the appropriate range.

If the individual person has never and does not now need any restorations because there is no sign of caries attack (neither cavities, fillings, or obviously extracted teeth) indicate by marking the appropriate zone at the top of the column. If the subject has been attacked by decay but there are now no teeth requiring

restoration either because all required restorations have been completed, or because the teeth are too badly destroyed to be restored, indicate that the need for restorations has been completed by marking the second zone.

### 6.3 Need for Tooth Extraction

Give the approximate number of teeth needing extraction by marking the appropriate range or marking the last zone if all that remain require removal. The teeth indicated for extraction for the purpose of the type A survey will be the following:

- (a) those for which the crowns have been reduced to less than one-third by dental caries,
- (b) those having obvious periapical abscesses as evidenced by wide open pulp chambers, or apical fistulae,
- (c) those which, under the definitions of periodontal disease (section 5.2), are either no longer able to function due to looseness or which have gross periodontal pockets.

If the subject has never needed extractions, or if some extractions have been done and no further extractions are now needed, mark the zones "never needed" or "now complete," respectively.

### 6.4 Appliances Present in the Mouth

Indicate the type or combination of types of appliances observable in the mouth. Single shell crowns or inlays not supporting bridgework are to be regarded

as restored teeth and not as appliances. A description of the appliances or combinations for recording is given below, mark only one zone.

- (a) If none are present mark zone "none".
- (b) Any appliance designed to correct malaligned teeth, or retain teeth in position after treatment will be recorded as an orthodontic appliance, mark "ortho".
- (c) Partial dentures, removeable or fixed bridges in mouths not having a full denture, mark "partial or bridge".
- (d) Partial dentures, removeable or fixed bridges in mouths which also have a full denture, mark "partial or bridge plus dent."
- (e) A single upper full denture without other appliance, mark "upper dent."
- (f) A single lower full denture without other appliance, mark "lower dent."
- (g) Two full dentures, mark "U + L Dent."

## 7.0 RECORDING TIME AND PLACE OF SURVEY

It is mandatory to enter the year, month, and place. Where more than one examiner is used, the examiner's identity may be recorded. The recording of characteristics such as occupation, religion, etc. and other characteristics using the assignable codes is optional, depending on the purpose of the survey.

### 7.1 Survey Year

Mark the calendar year in which the examination is being carried out. If the survey extends through the end of December into a new year, so indicate on later forms of the same survey.

### 7.2 Survey Month

Mark the monthly period in which the examination is carried out. Combination of items 7.1 and 7.2 will make clear the order in which the individuals were examined when the survey extends into a new calendar year.

### 7.3 Identification Numbers

The six fields assigned are sufficient to give a separate identification number to every subject examined. The distinguishing number is sometimes important to replace a lost or damaged card from a reserve listing and in order to collate cards for the same individual when other information such as type B indices are also being recorded. The six columns are divided into groups so that all individuals from any of ten large regions, or of one hundred regional subdivisions (1,000 subdivisions if needed) can be quickly selected by a sorting

machine or computer. A sample size of up to 999 is available for each subdivision.

7.3.1 Regions and Subregions: The identity of the regions, and subdivisions should be recorded on the Source of Data form, figure 4.

The method of using the region and subregion columns will be such that the numbers will fit in with the sampling scheme followed, see Manual #1, Part II, section 3.6. The region column may be used to designate main geographic areas such as provinces, or counties, and the subregions assigned to municipalities, etc. If it is necessary to identify the examination stand or locality in a multiphase sampling plan, assignable fields may be used for this purpose.

7.3.2 Case Number: Case numbers may begin with number one in each subregion in that the subregion will provide the additional digits to distinguish the individual case. Digits should be right side justified, thus, 1 is marked 001, and 17 as 017.

#### 7.4 Examiner Number

Although it is assumed that after examiners have been trained (section 3), and that where examiner bias may be critical they have been assigned proper proportions of the work (see Manual #1, Part II, section 4.7.1), the need may arise to trace the examiner involved. An example might be where an unexpected difference in observations is found and one would like to check to see if it is explainable in terms of examiner bias. It may often occur that examiner numbers correlate with regions, or subregions. In this situation it is sufficient to record the fact on the Source of Data form, figure 4.

### 7.5 Length of Residence

Indicate if subject has been a resident since birth or the age bracket in years. This information may be vital in judging the effectiveness of fluoridation, and other public health programs in terms of that part of the population which has been exposed to the program over known time limits.



## 8.0 RECORDING CHARACTERISTICS OF THE INDIVIDUAL

Knowledge of the individual's characteristics such as sex, age, education and economic status, etc., are useful for two purposes. First, they may be useful to determine how much bias there may be in the sample or group examined. For example, if the sample is supposed to be proportional (see Manual #1, Part II, section 3.6) the age and sex distribution of the sample should be similar to that of the population it is to represent and this may be checked. Second, comparisons of disease prevalence according to individual characteristics are a main source of hypothesis (see Manual #1, Part II, section 5.4.3). Where possible, the characteristics should be filled in from records before the dental examination by the clerk, see section 2.3.

### 8.1 Age

Age should be recorded as the age at the last birthday, i.e. the present age. For type A surveys it is suggested that children of only selected ages be surveyed and the odd ages 3, 5, 7, etc., are recommended. This is because dental diseases change in prevalence rapidly with age and more accurate data is obtained by taking selected ages than by grouping ages. Taking the odd ages instead of all ages also halves the amount of tabulation and computation. The ages for survey in type A surveys are seen in the standard report form, shown in Appendix D.

For children below nine years it may be difficult to obtain the correct age

unless it can be taken from school records or by asking a parent. Asking the child his age should only be resorted to when the other means are impossible. Age is recorded by using the left column for the tens and the right for the units. In undeveloped countries it may occasionally be necessary to make a judgment of age based on the stage of tooth eruption, wear, etc.

### 8.2 Sex

Mark the sex as provided for on the chart. It will often be impossible to tell from the name of the individual on a list which is the correct sex, and hence, this may need to be recorded at the time of examination.

### 8.3 Community Size where Resident

Dental disease prevalence and dental treatment levels are known to differ according to the community size where the individual resides. This is because there are important differences in such things as availability of foods, and use, and also of dental services between large cities and, for example, rural or farm residents. The community size should be easily known in advance according to the place where the examination is being performed. The size grouping suggested is:

over 100,000 population..... Metro(politan)

5,000 to 99,999 population...city

1,000 to 4,999 population....town or village

under 1,000 population..... rural

#### 8.4 Occupation

Some idea of the occupation of the individual, or of the bread-winner for the household can be useful for two reasons. First, it may reflect something about the way of living standard within the specific country and secondly, some occupations may entail greater risk of contracting disease. The major groups of the International Classification of Occupations (ISCO) are given in Table III. It will be seen that the occupations give a rough idea of the educational level in one direction and in the reverse direction some information on the physical activity of the subjects. The upper part of the scale also tends to be inside workers while the lower is outside workers. All these may be related to disease susceptibility and differences observed may suggest hypothesis to be pursued in type B surveys (see Manual #1, section 5.4.3).

Detailed study of the relation of occupation, per se, to oral disease is needed but this comes at the level of the type B survey (see Manuals 2, 4, 5, and 6). When detailed study is done it is necessary to know the exact occupation and the exact circumstances including length of time in the work, materials contacted, etc. At the type A survey level it is suggested that epidemiologists and public health workers be watchful for occupational influences and attempt to document their existence so that more detailed study may be planned.

#### 8.5 Religion

An indication of the religion is useful to infer cultural habits which have

TABLE III  
 MAJOR GROUPINGS OF THE INTERNATIONAL STANDARD CLASSIFICATION OF LABOUR

	ISCO OCCUPATION
Professional, technical and related technicians	Prof.
Administrative and managerial workers	Admin.
Clerical workers	Clerk
Sales workers	Sales
Service workers	Serv.
Agricultural, Animal husbandry, Forestry workers, Fishermen and Hunters	Agr.
Production and related workers	Prod.
Transport equipment operators	Tran.
Labourers	Lab.
Workers not classified by occupation, e.g. unemployed (blank col.)	Other

bearing on food usage, hygiene, social conditions, etc. The major groupings which may be useful are: Buddhism, Christian, Hebrew, Hindu, Moslem, none (atheist), unknown.

#### 8.6 Ethnic Group or Race

Anthropologically speaking, the definition of the racial group is extremely complicated and may involve blood groupings, hair, language, anthropometrics, geography, etc. The thought in mind when including a classification in type A surveys is to suggest the broad cultural background. The headings in Table IV are only loosely definable but will give some guidance when surveying populations of mixed origin.

Within specific circumscribed populations it will often be desirable to use an assignable code field to define relevant subgroupings. For example, a survey of the British Isles may usefully give sub-ethnic groupings as English, Scotch, Irish and Welsh. Definitions of usage of assignable code fields must be given on the Source of Data form, figure 4.

TABLE IV  
 MAIN ETHNIC GROUPINGS RECOMMENDED FOR TYPE A SURVEYS

		RACE OR ETHNIC
		N. Eu.
Caucasian	(Northern European	Med.
	(Mediterranean	Hind.
	(Hindu	Mong.
Mongoloid	(Mongolian	Mal.
	(Malaysian	A. Ind.
	(American Indian	Negro
Negroid	(Negro	Mela.
	(Melanesian	Poly.
Polynesian		Other
Australasian, Pigmy, Bushman, others		

## 9.0 TABULATION AND ARRAY OF DATA

### 9.1 Standard Reporting Format

The standard output format from the computer program used to process type A survey data is given in Appendix D. It is not intended in any sense to restrict other analysis and suggestions are made for further compilations in section 10.

The standard output gives indices at two levels of reliability. The most reliable are those which may be called primary or direct tabulations of the recordings and only these should be used as the basis for combining surveys or testing differences between surveys (sections 10.1 and 10.2). The second type of indices are derived or inferred from the primary tabulations, e.g. estimates of DMFT or PI, average teeth needing restoration or extraction, etc. These estimates are based on the best formulae currently available but further research when data becomes available may offer further useful improvements. The derived indices are provided as a convenience so that the type A surveys may be related at least approximately to other types of surveys.

On the standard report sheet indices are arranged in groups that estimate the disease prevalence, the treatment need, and the level of treatment received.

### 9.2 Primary or Directly Tabulated Indices

9.2.1 Population Distribution by Class of Caries Lesion: The hierarchy of lesions was taken from Reid and Grainger (1954). These items are percentages based on

the class sub-totals out of the entire sample examined. They are based on part of the entire sample even though some are edentulous and not classifiable because it cannot be assumed for older ages that the teeth were lost early from caries or late from periodontal disease.

The system of arraying percentages of individuals in the various severity levels somewhat understates the differences between populations because it is recognized that, as there is a shift toward caries on the more resistant areas, the numbers of cavities in the lower levels, i.e. the pits and fissures, posterior interproximal, etc., increase on the average approaching complete affectation of all available surfaces of the specific type. Nevertheless, the class of lesion attacked at a given age may be for some purposes more useful than the lesion count which is influenced by predisposing factors such as tooth morphology.

For ages 3, 5 and 7, the tabulated data are for deciduous teeth only. Above this age the tabulations are for the permanent teeth.

The inference of the severity scale is that individuals appearing in the higher severity levels would also have the type of lesions present in all lower classes. Consequently, the cumulative sub-totals starting from the severest class downward represent the true totals of the population having each class of lesion, see Table V.

9.2.2 Population Distribution by Class of Periodontal Lesion: The hierarchy of lesions represents progressive development of periodontal disease (WHO Technical



TABLE V  
 NATURE OF RECORDINGS OF CARIES, PERIODONTAL  
 DISEASE AND ORAL HYGIENE

Recorded Severity Level of Caries	Frequency of Subjects at Level		Observed Mean Total DMFT	Cumulative Percentages
	No.	%		
(0) None	20	12.5	0	-
(1) Occlusal	74	46.2	3.36	88.6
(2) Posterior interproximal	42	26.3	3.79	41.4
(3) Upper anterior interproximal	14	8.8	6.79	15.1
(4) Labial	2	1.3	11.50	6.3
(5) Lower anterior interproximal	8	5.0	16.63	5.0
Total	160	100.1	3.67	

Report Series 207). The percentages in each class are based on the entire population examined. Thus, at ages where edentulous persons exist the percentages do not add up to 100 per cent. This is done because it is literally true, and the epidemiologist must decide whether adjustments of these rates are needed. For example, in the older ages it might be assumed that many persons who are edentulous should be included in the sub-totals for pockets or non-functionally loose teeth and would have been so grouped if extraction services had not been available. It can only be through knowledge of the population surveyed that the validity of such an assumption can be judged and as a first tabulation the individuals should be grouped as observed.

If it is required to know the real percentages of the population with various levels of lesions, a cumulative table similar to that for dental caries (Table V) should be constructed.

As with dental caries, when there are large numbers of the population in the more severe classes, it must be assumed that the average number of lesions also increases. Hence, the tabulations tend to understate a population disease difference.

9.2.3 Population Distribution by Levels of Soft Debris Accumulation: This tabulation is quite obvious in meaning, but a suggestion is made that when using this data for standardization purposes, a simple dichotomy combining the two higher and two lower classes may provide a useful simplification. In this case,

persons in the higher class are termed as having "poor hygiene" and in the lower as "good or satisfactory".

9.2.4 Population Distribution by Levels of Calculus Accumulation: The meaning of the classification is quite clear and, as with soft debris, a useful dichotomy by combining the two lower and two higher levels may often be useful. In this case, the worst group is termed "heavy calculus" and the lower groups "none or little". When larger numbers of the population are at the higher levels it is probable the average condition is also more severe within each lower level.

9.2.5 Population Distribution by Occlusion Characteristics: The standard report gives more coarsely grouped distributions of the scales recorded. The groupings are selected to have clinical relevance but if the epidemiologist desires the full classification can be compiled.

The distributions of measurements are themselves of interest epidemiologically and, being the primary observations, should be used as the basis for statistical comparisons. As an example, a difference in average overjet according to ethnic group such as mongoloid versus caucasian is useful epidemiologically. Nevertheless, under the section on derived indices, a summarization called the Treatment Priority Index (TPI) is provided, see section 9.3.2.

9.2.6 Tabulation of Other ICD Items Reported: The standard report produces a simple count of the numbers of each type of case reported. Percentages are not calculated because there may be uncertainty as to the true population base.

9.2.7 Counts of Upper and Lower Teeth Present: A distribution of cases coarsely grouped according to losses of clinical interest is produced in the standard tabulation. An average estimate is computed using mid-points of the recording ranges.

The average number of teeth present is the "dental mortality" index. Particularly at the older ages, it reveals the over-all impact of the dental diseases, the public health treatment, and the preventive measures as they affect the population. Loss of teeth up to about the thirtieth year is primarily due to lack or failure of treatment for dental caries. Past this age periodontal disease is the principal cause of tooth loss. At the older ages (65 and over) the final results of the public health measures in a country are observable in terms of the numbers of teeth remaining.

Inferences as to need for dentures are made by subtracting from the count of teeth present the number of extractions needed, then arbitrarily stating that all those with less than eight teeth per arch need a denture in that arch.

9.2.8 Need for Restoration of Carious Teeth: A coarsely grouped distribution of the population according to need for conservative dentistry and an average computed from mid-points of the recording ranges is given. In addition, the percentage of the population that have never needed restorations plus those whose need is completely satisfied, and who need no extractions, is given. This gives a good measure of the status of conservative dentistry in the population and is

referred to as "persons having no dental caries defects".

9.2.9 Need for Tooth Extraction: A coarsely grouped distribution of the need for tooth extraction is given in the standard report. The groupings represent: (1) need for up to four extractions which would easily be done in one clinical session, and (2) need for more extractions which would likely require two or more appointments. The average number of extractions needed is also reported.

As stated in section 9.2.8, the need for extractions is used to adjust the number of teeth present when inferring need for dentures.

9.2.10 Frequency of Observed Appliances: The full distribution of the population wearing appliances is reported. The hierarchy roughly suggests degrees of sophistication in prosthetic dentistry in the population and may be used as reported or in relation to other indices such as the caries or periodontal disease prevalence. When the treatment in a population consists only of extractions and dentures beginning at early ages, there is need for dental public health education as to the value of conservative treatment. Estimates of need for partial dentures, bridges, and orthodontic appliances are not attempted in the standard computer report.

9.2.11 Prevalence of Congenital Defects: The population distribution for the various defects is given. For several classes treatment may be considered mandatory. For example, in many developed countries, congenitally missing incisors make mandatory the need either for orthodontic treatment to arrange the anterior teeth or for prosthesis. The major congenital defects such as harelip or cleft

palate are obvious treatment situations.

9.2.12 Assignable Codes: If examination for other diseases, e.g. Vincent's infection, has been decided on in a particular survey using one of the assignable code fields, the computer will print out the distributions in the standard report. But special instructions must be given the computer for this to be done and hence, how these codes have been used must be clearly specified in the Source of Data form, figure 4.

9.2.13 Individual Characteristics: The distribution of the population according to the individual characteristics such as age, sex, length of residence, examiners, etc., is given. The purpose is to throw light on the need for separate reports according to variations in these characteristics. As an example, if it is suspected that dental disease differs in certain strata, complete sub-reports may be produced for those individuals in the stratum of interest. The technical data processing procedures are explained in Appendix D.

9.2.14 No Dental Defects: A distribution of the population having no need for caries treatment, periodontal treatment, malocclusion, and oral hygiene is given as an over-all index of the level of cases in the population.

9.3 Derived Indices (see section 1.3)

9.3.1 Caries, Periodontal Disease, Oral Hygiene, and Calculus: The nature of the recordings in the type A survey is such that individuals classified at a higher level may be assumed to have all types of lower severity conditions and hence,

on the average, higher average scores. This is shown in Table V for children age nine in a survey from Nova Scotia, Canada (King, 1967). The cumulative percentages represent the true proportions of the population having specified types of lesions.

There is a rather close linear relationship between crude scores, 0 to 5, and the DMFT scores, suggesting that a simple regression equation could be calculated to estimate the average DMFT from the average scores. A better estimate is possible if recognition is given to the fact that as there is a shift to greater numbers of subjects in the more severe categories, the true average scores for individuals in the lower categories increases. Some preliminary study was done using thirteen small sets of data representing counties (sample sizes 29 to 75) at four age levels in the Nova Scotia survey. Figure 19 shows results that are very encouraging. No final solution to estimates of DMF, PI, etc., can be made until data is available from other surveys. Some preliminary discussion of the computing problem is given in Appendix C and it is expected in later additions that the equations may be ready for inclusion. Even at present it will be noticed that the type A survey may be translated to DMFT scores using Knutson's curve, see figure 20.

9.3.2 Malocclusion or Orthodontic Conditions: One means of summarizing the malocclusion observations is provided by the Treatment Priority Index (Grainger, 1967) which assigns each individual a position in a scale from 0 to 10 having the

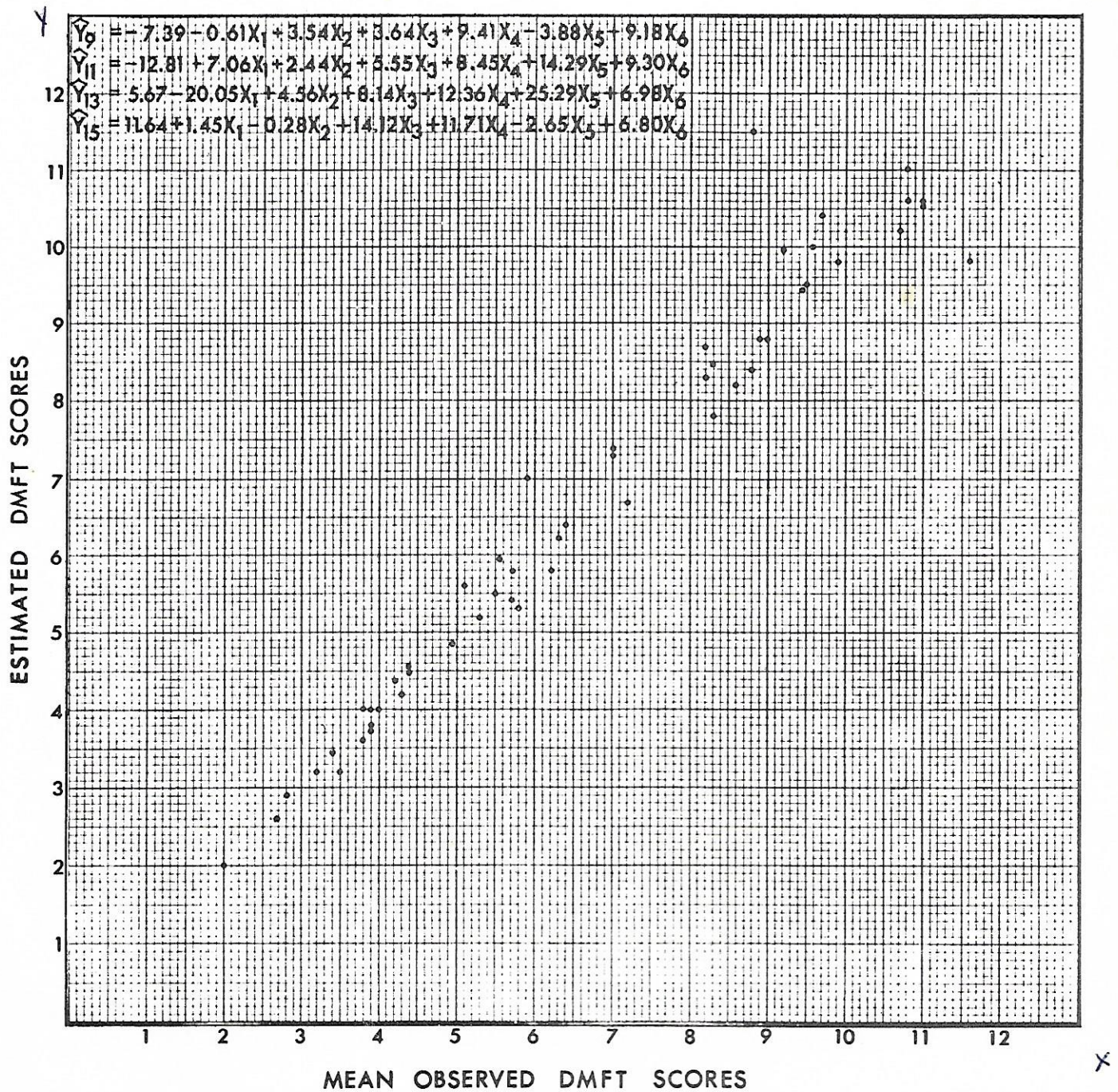
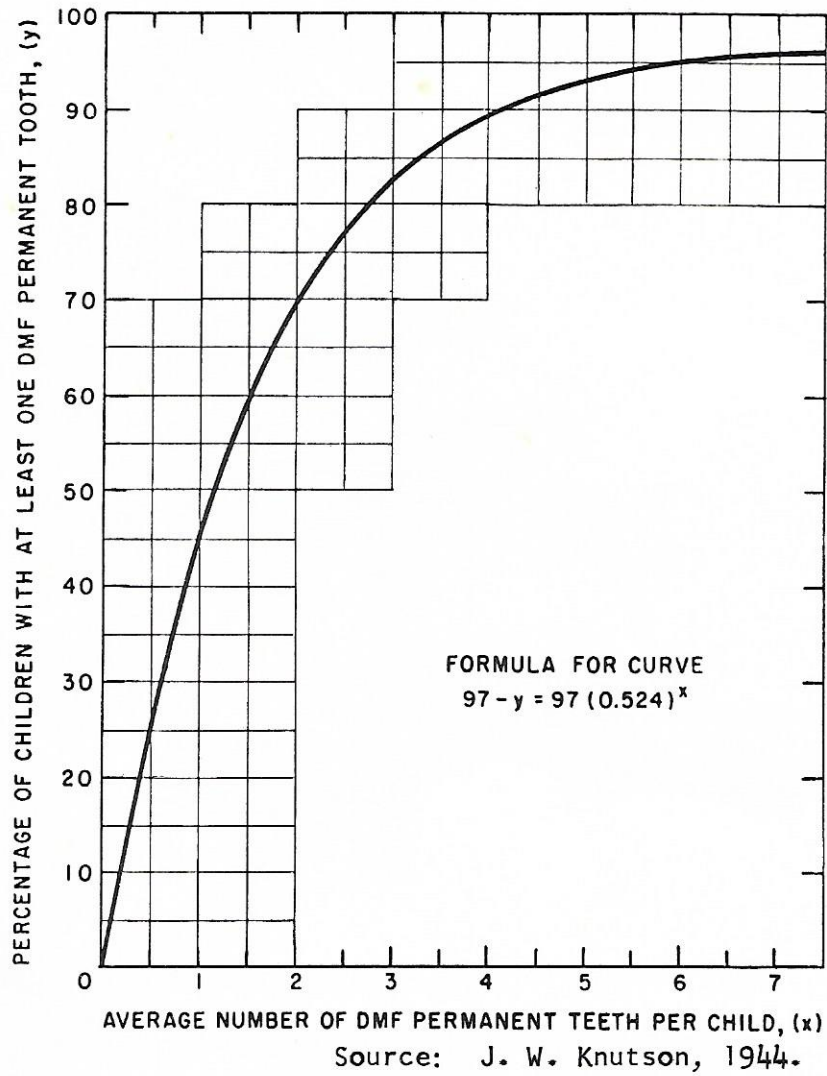


Figure 19: An experimental attempt to relate caries severity recordings for small samples of children ages 9, 11, 13 and 15 years in thirteen districts of Nova Scotia, Canada to DMFT averages. The relationship is linear and suggests that satisfactory equations will be derived when more data becomes available. In the equation the X values represent the number at a specific severity level while the Y indicates the sum of the DMFT scores. Therefore, the estimated DMFT score is the sum of the DMFT scores divided by the sample size.





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Figure 20: Relation of dental caries prevalence to DMF count.

meaning below:

- .0 classically perfect occlusion
- 1-3 observable but minor defects
- 4-5 clearly definable defect but need for treatment marginal
- 6-8 marked defect, treatment highly desirable
- 9-10 very severely handicapping defect - treatment mandatory

An abridged distribution is given as part of the standard output from the computer program in Appendix D.

The TPI may be used for an initial screening of cases as well as for epidemiological purposes. It may be found that cases in the range 4 to 7 should be reviewed by a consultant to refine the decision that treatment is or is not needed but cases in the lower or higher scale positions are quite reliably assessed.

9.3.3 Estimated Need for Dentures: The total number of subjects whose dentitions have degenerated to the state where they require full denture service (including those persons wearing dentures regardless of their serviceability) may be inferred as the sum of the following categories:

- (a) maxillary edentulous persons
- (b) mandibular edentulous persons
- (c) completely edentulous persons
- (d) persons having less than 8 maxillary teeth or requiring extractions which will leave less than this number
- (e) persons having less than 8 mandibular teeth or requiring extractions which will leave less than this number
- (f) persons who are classifiable as both (d) and (e) above.

## 10.0 CONSOLIDATION AND REPORTING OF TYPE A SURVEY RESULTS

General instructions for reporting surveys for publication as manuscripts in scientific journals or as monographs are given in Manual #1, Part II, section 7. The purpose of this present section is to specify how type A survey results should be preserved and reported when supplying the data to a National Headquarters or a WHO regional office. For the latter purpose, all the standard tabulations, source of data information, and if desired, comments and recommendations should be transmitted. On the other hand, in formal publication, probably only a selection of the data most relevant to the purpose of the article would be included.

### 10.1 Reporting Survey Results to Consolidating Agency

The standard inclusions when transmitting survey results to a higher agency such as a regional epidemiological center are as follows.

- (a) Data source records. These should be completed as described in section 4.4 and figure 4. They are necessary in order that the consolidating agency may have knowledge of the sampling or any special tabulations.
- (b) Standard type A report. Either a copy of the computer output, Appendix D, a photostatic copy, or a typed copy of the standard primary tabulations and of the inferred indices should be included.
- (c) Standard data summary. A copy of the output from computer program, Appendix D, giving the crude totals, should be printed for inclusion. This output simplifies the work of the central agency when combining or comparing survey results.

- (d) Comments and recommendations which aid in the interpretation of the data or which emphasize important findings should be included. As examples, the reporter may wish to make clear that an unusual finding such as very high prevalence of a particular disease, or low availability of treatment has been verified and recommend that interested agencies be informed. The reporter may wish to tell of some interesting relationship between disease and local factors, that raise the need for study in more depth, by methods of Manuals 4, 5 and 6.
- (e) Comments on problems of conducting survey in region involved, cooperation of local officials, attitude of population, transportation problems, over-all cost estimates, etc.

#### 10.2 Secular Array of Findings

On a three or five year basis national agencies should consider consolidation of type A survey findings in order to reveal changes in disease level, or treatment provision. Such findings are useful in evaluating the success of the National Dental Health Program and also for planning future needs of health personnel, clinical facilities, etc.

The form for consolidating the data on a time basis is exactly the same as the standard report form but a separate page is used for each specific age or age grouping. On these pages instead of the columns representing age groups, they represent chronologic time intervals.

In reporting on sections of the secular statistical records, graphical presentation should be used liberally. Many examples of methods of illustrating findings are given in Manual #1.

## 11.0 ANALYSIS OF SURVEY RESULTS

A few comments on the commonest analytical processes likely to be applied to type A survey data are needed. These are: (1) combining results of surveys for sub-regions into over-all region estimates, (2) comparing results from two or more surveys either separated geographically or by time in the same region, and (3) interrelationships among specific recordings of the same survey. General remarks follow below and particulars of data processing using the computer programs are given in Appendix D. The discussion concerns only manipulation of primary tabulations as derived indices would be recalculated from the combined primary tabulations.

### 11.1 Combining Results from Two or More Surveys

The method of combining depends on the sampling method used in the various sub-sets. A good example is calculation of national estimates given figures from several provinces or states. If the same sampling ratio had been used in all the sub-regions, the data may be combined by pooling the raw data cards and recalculating one estimate. If the raw data are not available so that the work must be done from tabulations or if a different sampling ratio was used in some provinces then weighted averages of all percentages must be calculated for each cell. The method is given in Manual #1, Table XXI, but is illustrated in Table VI in terms of type A survey data. The weights would be proportional to the size of the population each sub-set represents and this should be available

TABLE VI  
 COMBINING RESULTS BASED ON EQUAL AND UNEQUAL  
 SAMPLING RATIOS

Sub-Region Population Size Relative Size (w)	#A 10,000 .167	#B 20,000 .333	#C 30,000 .500	Combined 60,000 1.000				
	Calculus Observations: unequal sampling ratio							
	n	%	n	%	n	%		
none	72	7.23	206	19.51	414	45.30	30.35*	
< 1/3	312	31.33	463	43.84	217	23.74	31.70*	
1/3 - 2/3	446	44.78	306	28.98	196	21.44	27.85*	
> 2/3	166	16.67	81	7.67	87	9.52	10.10*	
Total Sample	996	100.00	1056	100.00	914	100.00	100.00	
	Calculus Observations: equal sampling ratio, 1/10							
	n	%	n	%	n	%	n	%
none	72	7.23	412	19.51	1242	45.30	1726	29.50
< 1/3	312	31.33	926	43.84	651	23.74	1889	32.29
1/3 - 2/3	446	44.78	612	28.98	588	21.44	1646	28.14
> 2/3	166	16.67	162	7.67	261	9.52	589	10.07
Total Sample	996	100.00	2112	100.00	2742	100.00	5850	100.00

\* Combined values are  $\sum (w_A \%_A + w_B \%_B + w_C \%_C)$

Note that the two estimates differ very slightly in practice because the samples differed slightly from the required 1 in 10. For practical purposes both are of equal value.

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from the Data Source Form, figure 4.

### 11.2 Comparing Results From Two or More Surveys

The method suggested for comparing the classification data arising from two or more type A surveys follows the method of Table XXXII in Manual #1. A comparison is made in terms of  $r \times c$  tables at each age or age group level and these results are combined if homogeneous using the chi-square addition theorem. An illustration using type A survey data is seen in Table VII.

### 11.3 Interrelationships Among Recordings

Studies of the interrelationships among the recorded items is not the main purpose of the type A survey. If tables of all the twenty-five recordable items were to be generated at even one age-specific level, three-hundred tables would result. If the relationships were to be tested at all age-specific levels and combined, the number is increased into thousands. Obviously such complete investigation must remain part of analytical epidemiology or research.

Nevertheless, there is some need for consideration of interrelationships in type A surveys to provide for comparison of average disease prevalence according to characteristics of individuals, and to make possible some standardized comparisons. One example would be the prevalence of periodontal disease among individuals with equal oral hygiene status. Another common situation might be to check survey results by examiner to observe variations in recording level or other bias. In these two cases, the simplest tabulation procedure is



TABLE VII

COMPARISON OF SOFT DEBRIS OBSERVATIONS FOR THREE  
GROUPS ON AGE SPECIFIC LEVEL AND METHOD OF  
COMBINING RESULTS USING ADDITIVE CHI-SQUARE

Age Group	Classification	Group #A	Group #B	Group #C	Total	$\chi^2$	d.f	P
7 years	0	o (e) 47 (84.1)	o (e) 190 (129.4)	o (e) 117 (176.2)	354			
	< 1/3	53 (46.6)	78 (124.6)	210 (167.7)	341			
	1/3 - 2/3	17 (21.5)	43 (57.4)	97 (78.1)	157			
	> 2/3	5 (5.5)	15 (14.6)	20 (19.9)	40			
	Total	122	326	444	892			
9 years	0	o (e) 62 (66.7)	o (e) 127 (105.3)	o (e) 141 (156.0)	330			
	< 1/3	89 (71.4)	92 (109.4)	162 (162.2)	343			
	1/3 - 2/3	21 (31.6)	48 (48.5)	83 (71.9)	152			
	> 2/3	12 (12.3)	15 (18.8)	32 (21.2)	59			
	Total	184	282	418	884			
11 years	0	o (e) 50 (71.1)	o (e) 112 (75.5)	o (e) 109 (124.4)	271			
	< 1/3	110 (99.7)	85 (105.9)	185 (174.4)	380			
	1/3 - 2/3	41 (35.7)	21 (37.9)	74 (62.4)	136			
	> 2/3	23 (17.6)	20 (18.7)	24 (30.7)	67			
	Total	224	238	392	854			
Combined $\chi^2$ and Probability						173.036	18	<.001

o: observed counts

e: expected values are the product of the relevant row and column totals divided by the grand total  
 $\chi^2 = \sum (o-e)^2/e$  for all cells

d.f: degrees of freedom equal number of rows less one times number of columns less one

to produce separate standard reports using separate sub-decks of cards for each level of oral hygiene, or examiner.

In addition to exploring average trends, interrelationships are more clearly revealed using bivariate and multivariate methods, see *Manual #1*, section 2.2.7. Such studies demand special compilations from the survey cards and the epidemiologist should work out appropriate procedures on consultation with a statistician.

## 12.0 REFERENCES

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## APPENDIX A

### RECORDING AND DATA PROCESSING OF DMFT AND PI SCORES

Figures A1 and A2 show forms on which full DMF tooth scores and PI scores may be recorded. The forms have been provided partly as an aid in experimental studies to determine how the type A survey findings may be used to estimate the type B indices; and partly for use in situations where the greater precision from full recording may be required. The identification sections of the cards match the format on the type A card and comparable items are punched in the same columns (see Appendix C) to facilitate data processing.

The recording instructions are self explanatory. The status of each tooth is marked in the column assigned, using the first side of the card for maxillary teeth and the second side for the mandibular teeth. The recording criteria are similar to those described in Manuals #4 and #5. For periodontal disease the recording instructions applicable to each tooth are given in section 5.2.

SURVEY DATE		IDENTIFICATION NUMBERS						AGE IN YEARS LAST BIRTHDAY	SEX	UPPER ARCH														
		REGION	SUB-REGION COMMUNITY OR INSTITUTION	CASE NUMBER			EXAMINER NUMBER			AGE WHEN STARTING RESIDENCE	RIGHT	LEFT												
YEAR	MONTH									7	6	5	4	3	2	1	1	2	3	4	5	6	7	
1966	JAN	0	0	0	0	0	0	0	0															
	FEB	1	1	1	1	1	1	1	1															
1967	MAR	2	2	2	2	2	2	2	2															
	APR																							
1968	MAY	3	3	3	3	3	3	3	3															
	JUNE																							
1969	JULY	4	4	4	4	4	4	4	4															
	AUG																							
1970	SEPT	5	5	5	5	5	5	5	5															
	OCT																							
1971	NOV	6	6	6	6	6	6	6	6															
	DEC																							
1972		7	7	7	7	7	7	7	7															
1973		8	8	8	8	8	8	8	8															
1974		9	9	9	9	9	9	9	9															
1975																								

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WORLD HEALTH ORGANIZATION TYPE B SURVEY DMF TOOTH INDEX FORM

FRONT

COMMUNITY SIZE	ISCO OCCUPATION	RELIGION	RACE OR ETHNIC	ASSIGNABLE CODE									LOWER ARCH													
				A	B	C	D	E	F	G	H	I	RIGHT	LEFT												
	PROF	BUHD	N EU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RURAL	ADMIN	CHRIS	MED.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TOWN OR VILLAGE	CLERK	HEB	HIND.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CITY	SALES	HINDU	MONG	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
METRO	SERV	MOSL	MAL.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	AGR	OTHER	A. IND	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	PROD.	ATH.	NEGRO	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	TRAN.		MELA.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	LAB.		POLY.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	OTHER		OTHER																							

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WORLD HEALTH ORGANIZATION TYPE B SURVEY DMF TOOTH INDEX FORM

BACK

Figure A1: Type B Survey recording form to be used for DMF tooth scores. If the DMFT score is to be integrated with the Type A data on form 1A, the identification numbers should be identical for recordings of the same individual. Use of all other columns is as described in sections 7 and 8.

SURVEY DATE	IDENTIFICATION NUMBERS						EXAMINER NUMBER	AGE WHEN STARTING RESIDENCE	AGE IN YEARS LAST BIRTHDAY	SEX	UPPER ARCH														
	YEAR	MONTH	REGION	SUB-REGION COMMUNITY OR INSTITUTION	CASE NUMBER						RIGHT	7	6	5	4	3	2	1	1	2	3	4	5	LEFT	6
1966	JAN	0	0	0	0	0	0	0	0	0															
	FEB	1	1	1	1	1	1	BIRTH	1	1	MALE														
1967	MAR	2	2	2	2	2	2	1-4 YEARS	2	2	FEMALE														
	APR							5-9 YEARS																	
1968	MAY	3	3	3	3	3	3	10-14 YEARS	3	3															
	JUNE							15-19 YEARS																	
1969	JULY	4	4	4	4	4	4	20-29 YEARS	4	4															
	AUG							30-39 YEARS																	
1970	SEPT	5	5	5	5	5	5	40-49 YEARS	5	5															
	OCT							50-59 YEARS																	
1971	NOV	6	6	6	6	6	6	60+	6	6															
	DEC																								
1972		7	7	7	7	7	7		7	7															
1973		8	8	8	8	8	8		8	8															
1974		9	9	9	9	9	9		9	9															
1975																									

**INSTRUCTIONS**

- MARK APPROPRIATE ZONE WITH GRAPHITE PENCIL.
  - INDICATED
  - NOT INDICATED
- MARK ONLY ONE ZONE IN EACH COLUMN.
- UNMARKED COLUMNS ARE TAKEN AS UNREPORTED.

PDC 4255 WORLD HEALTH ORGANIZATION TYPE B SURVEY PERIODONTAL (PI. RUSSELL) INDEX FORM

FRONT

COMMUNITY SIZE	ISCO OCCUPATION	RELIGION	RACE OR ETHNIC	ASSIGNABLE CODES									LOWER ARCH														
				A	B	C	D	E	F	G	H	I	RIGHT	7	6	5	4	3	2	1	1	2	3	4	5	LEFT	6
	PROF.	BUHD	N. EU.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RURAL	ADMIN	CHRIS	MED.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TOWN OR VILLAGE	CLERK	HEB.	HIND.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CITY	SALES	HINDU	MONG.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
METRO	SERV.	MOSL.	MAL.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	AGR.	OTHER	A. IND.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	PROD.	ATH.	NEGRO.	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	TRAN.		MELA.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	LAB.		POLY.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	OTHER		OTHER																								

PDC 4256 WORLD HEALTH ORGANIZATION TYPE B SURVEY PERIODONTAL (PI. RUSSELL) INDEX FORM

BACK

Figure A2: Type B Survey recording form to be used for periodontal index scores. If both Type A and Type B forms are used, the identification numbers should be identical for each individual. Instructions for use of other columns are given in sections 7 and 8.

*Material digitalizado em abril de 2019 sob  
responsabilidade do CECOL/USP a partir do acervo do  
Prof. Dr. Alfredo Reis Viegas, da Faculdade de Saúde Pública (FSP)  
da Universidade de São Paulo (USP).*



**Centro Colaborador do Ministério da  
Saúde em Vigilância da Saúde Bucal  
CECOL/USP**