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EPIDEMIOLOGICAL SURVEYS IN DENTISTRY

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ЭПИДЕМИОЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ В СТОМАТОЛОГИИ

EPIDEMIOLOGICAL SURVEYS IN DENTISTRY

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TYPES OF EPIDEMIOLOGY

Epidemiology is the science that studies the relationship between different factors that determine the frequency and distribution of mass diseases in human society (PA Leus, «Communal Dentistry», 2000). This is one of medical science that studies the prevalence of disease in a given population, the factors causing it, defines the use of the data for the control problems associated with morbidity (Flemming, Scheutz, UK, 1997). Epidemiology is in close relation with other sciences: mathematics, sociology, ethics, and jurisprudence. There are two components in epidemiology: theoretical and practical. The main **objectives** of epidemiological studies are:

- to describe the real picture of the disease in human society;
- to identify disease risk factors;
- to determine the effect of preventive measures to reduce morbidity;
- to classify the characteristics of the disease and the reasons which caused them.

Planning preventive and curative dental care in any volume, including measures for primary prevention should be based on the situation analysis of epidemiological data, which requires reevaluation at least 1 time in 5 years. This applies equally to all countries, industrialized and developing, with a variety of health care systems. Data from epidemiological survey allow health authorities to set priorities and thus more efficient use of the available funds to meet the primary needs of the population in the supply of dental care and health.

Data from epidemiological studies allow:

- that produces equipment, materials and medicines.

Epidemiology studies the etiology of dental and oral disease spread among the population. It is divided into two types.

There are two major types of studies: observational and experimental studies.

1. An observational study (study without intentional intervention by the investigator):

- Descriptive.
- Analytical (the most known are cross-sectional, cohort and the study of «case-control»).

2. Experimental study — a comparative study with the deliberate intervention of one of the study groups.

Depending on the duration of the study are distinguished:

- Cross-sectional looks at a population at a single point in time. They can be descriptive and analytical.
- Longitudinal (long-term) studies provide surveillance of a particular group of people for a certain period of time. It can be analytical studies or experimental studies.

Analytical studies can be both cross-sectional and longitudinal.

Both major types of epidemiological studies — experimental and observational — examine causes, preventions, and treatments for diseases or outcomes. The difference lies in the actions of the investigator.

Descriptive epidemiology describes the distribution of disease. This is done through describing a condition by various characteristics of person (age or sex, for example), place (geographic location). Descriptive studies imply that the collection of data carried out without the presence of a specific hypothesis to be tested. In descriptive study scientist observes and only states the facts and signs, not taking any interventions in the event. As result of such study we can make conclusion: prevalence of caries in 12-years-old is 80 % and intensity (incidence (DMFT) is 2.5.

Sample survey (selective) is a form of descriptive cross-sectional study in which the sample is selected individuals from a particular population in order to use the observed symptoms in a sample for evaluation of the relevant characteristics of the population. In general, the sample can be used to assess any sign, but is usually estimated average value of several measurements, for example, age, presence of caries and so on. Then the portion of individuals in the population, with special features is calculated. If this feature is the presence of the disease, the size of this group is the prevalence of the disease.

Analytical studies imply that the data collection and analysis is being developed to address a specific issue. Epidemiological studies have examined the major risk factors and their relationship to disease. Usually there is the hypothesis of an association between the facts and phenomena, which is either confirmed or refuted by the study. In contrast from descriptive, analytical study, the researchers not only observes and states the facts and symptoms, but also analyzes them. As result of such study we can make conclusion: prevalence of caries in 12-years-old is 80 % and intensity is 2.5; children often eat sweet food, but use fluoridated water, fluoride toothpaste and brush their teeth twice a day.

Frequently analytical studies have the advantage over the experimental as potential etiological factors can not be determined in the experiment, perhaps for ethical reasons. For example, in the study of the effect of tobacco smoking on the development of oral mucosa cancer is not possible (illegal and unethical) accidentally expose individuals or society to different levels of potential carcinogens.

A *cross-sectional study* looks at a population at a single point of time. It examines the relationship between exposure and outcome prevalence in a defined population without regard to changes over time. Cross-sectional descriptive study presents a picture of society at a particular time. This is a scientific method of analysis, collected from two or more samples at the same time point. It is necessary to n such studies, follow-up for a certain group of people is not conducted.

The advantages of cross-sectional studies: they are fast, pretty easy and not expensive. However, they do not provide sufficient evidence of the relationship between risk factors and disease, since the relationship between risk factors and

disease at the time of the survey can be random. It is necessary to conduct long-term studies to confirm this relationship.

A *cohort study* typically examines multiple health effects of an exposure; subjects are defined according to their exposure levels and followed over time for outcome occurrence (Aschengrau & Seage, 2007, p. 137). Another term for a cohort study is a longitudinal study.

Cohort studies can be **prospective** or **retrospective**. Prospective studies recruit subjects based on exposure status and follow them to observe the health outcomes of the exposure. Retrospective studies begin after outcome occurrence has already taken place, but look back at effects of an exposure on an outcome and still classify subjects based on their exposure status.

In prospective cohort studies the intensity of the disease growth in the two cohorts is compared at the end of the observation period, and the relative risk (relative risk, RR) is calculated. If the relative risk is equal to one ($RR = 1$), the risk of disease in the presence of absence factor is the same. The relative risk of a larger or smaller 1 shows how many times the risk of disease is higher or lower in the cohort of persons who have a risk factor, compared with a cohort of individuals with no risk factors. Despite the fact that the cohort study requires time and financial resources, its advantage is the possibility of exploring the many outcomes of the disease and the degree of exposure to risk factors.

A *case-control study* typically examines multiple exposures in relation to an outcome; subjects are defined as cases and controls, and exposure histories are compared. In retrospective studies (for example, case-control studies) information is collected on the basis of event data from the past time.

In a study of «case-control» (case-control study, case-referent, cohort spelt backwards study), often called a retrospective study, a comparison of persons having an interest in the disease (the case) with those without the disease (controls) is conducted.

In each of the two groups persons are also distributed in accordance with the presence or absence of risk factors. Based on these data we calculate the probability of the disease in patients who have a risk factor, as compared with those who had no risk factors. This probability is defined as the odds ratio (OR).

The disadvantages of case-control studies are the complexity of the selection of the control group and the possibility of studying only one disease outcome in each study. However, case-control studies are relatively quickly, easily and cheaply organized and can be used to explore the many risk factors for the disease.

In an *experimental* study the scientist consciously intervenes in what is happening so that it will be possible to observe the effect of the intervention on the result. It is recurring long-term studies (longitudinal studies), carried out to evaluate the medical and / or cost-effectiveness of primary prevention of dental diseases (e. g., fluoridation) and different methods of treatment efforts (e. g., medical and economical efficiency of ceramic crowns, root canal sealer). An example of experimental study is clinical trials. There are three options for the design of clinical tri-

als: clinical study in the same group, clinical study in parallel-group, clinical study in the «cross-model».

Experimental studies are divided into randomized controlled trials (RCT) and non-randomized controlled studies.

Randomization is a process of random distribution of patients in the treatment group in order to eliminate any bias and the related evaluation of the likely displacement.

Randomized controlled studies have an important place in the hierarchy of evidence of practical recommendations:

- RCT;
- Isolated reports;
- Expert opinion.

Any investigation, regardless of how modern it is, requires preparation of the protocol, which describes a plan that includes goals, objectives and a detailed materials and methods. In drawing up the protocol is necessary to carefully consider all the details of the project, which in turn will help researchers to predict potential problems and errors that can occur during the course of the study. It will also facilitate the writing of the final report, as the report forms its basis.

Brief plan of epidemiological survey

1. Planning (what the settlements, what assess, personnel, time frames, budget).
2. The sample population for the examination:
 - age groups (key);
 - sample structure (city, rural areas, social, ethnic groups);
 - sample size (25–50 in one age group in one single point);
 - sampling method («systematic»).
3. Collection of epidemiological data:
 - general information;
 - dental status assessment;
 - identifying disease risk factors.
4. Data analysis

PROTOCOL OF EPIDEMIOLOGICAL SURVEY

The main components of the scientific research protocol are:

1. Setting purpose and objectives of the study (the designation of a scientific problem, a literature review of research field).
2. The sample of population for the examination: age groups, sample structure, the sample size, sampling method, number of subjects.
3. Selection of epidemiological survey methods (development of survey cards, questionnaires and so on. A detailed description of the methodology of the study. Compiling of necessary tools list, equipment and materials, budget).
4. Calibration of examiners, training of clerks. Schedule of survey.
5. Planning of statistical data analysis.

6. Evaluation of any ethical problems. Obtaining informed consent from the surveyed patients.

7. Collection of epidemiological data (organization of epidemiological survey).

8. Analysis of the data obtained. Writing a research report.

Depending on the type of planned epidemiological studies of various types and forms of organization may be used. You can carry out a cross-sectional study to obtain data on the prevalence and intensity of dental diseases. This type of research is also useful to identify the relationship of dental diseases with different socio-demographic factors, way of life in the framework of analytic epidemiology.

Planned epidemiological survey should have a specific purpose, so that all the data have been used with maximum efficiency. Also, in accordance with the purpose of the study, certain methods should be used.

METHODS OF EPIDEMIOLOGICAL SURVEY IN DENTISTRY

Methods of epidemiological survey in dentistry:

1. Total. It is maximally accurate, but total dental examination (the population of the country) is almost impossible due to the high labor intensity and cost.

2. Selective method (sample survey) of research is widely used in scientific research. The group (100–200 people or more) with certain specified parameters (the presence of somatic pathology, developmental disability who are in institutions, etc.) is picked.

It allows saving labor, money, time for the conducting, as well as carrying out the statistical processing of the observation materials.

It allows achieving a greater depth of detail and accuracy of the facts.

It usually used in cases where continuous monitoring is impractical to carry out because of too much work, unnecessarily stretched terms, attracting a significant number of additional skilled workers, etc.

It is used in cases where it is impossible to carry out continuous monitoring. Disadvantage: distribution of sample results to the general population is inevitable due to the error, which is called the margin of error. This error is generated as a consequence of the fact of incomplete coverage of all units in the population. However the practical application of the multiple sample observation and comparison of its results with the continuous examination of the same object shows that the main characteristics of the sample sufficiently reproduce the general characteristics corresponding statistical population.

3. Pathfinder method recommended by WHO; less time-consuming compared with the other and sufficiently informative.

It was proposed in 1962 by Dr. D. Barmes, scientists from Australia, who led Dental Department WHO in Geneva from 1970 to 1995. Through this method almost all countries have reliable information about the dental health of the population by determining the dental status of key groups in small amounts (25–50 people). In 2013, WHO issued guidance on dental examination (OHS-5) with computer data

processing program. Examination techniques are based on the latest achievements of dental diseases diagnostics. In addition to dental caries and periodontal diseases, dental examination includes an external examination of the head, face and neck, maxillo-facial joint, oral mucosa, non-carious defects and a number of other diseases and conditions of practical importance for the dental care planning. The computer program allows the processing of data for specific diseases, such as dental caries or AIDS manifestations. There is possibility of obtaining the necessary data by surveying a relatively small number of people of certain age groups.

Epidemiological population surveys should be conducted in the presence of a clear plan for future use of the results. This is especially important in the organization of large-scale epidemiological studies, for example, at the country level, which will require substantial financial costs.

In the past **total** or **selective** methods were often used in epidemiology. In Russia, starting in 1961 a large-scale population (hundreds of thousands) survey held, however, the incidence of caries population at the national level has not been studied until 1999, when prof. E. M. Kuzmina used the «pathfinder» method of WHO and held the first epidemiological survey of dental disease in the key age groups in all regions of the Russian Federation (E. M. Kuzmina, 1999). In Denmark, in computer files, you can find data of the dental status of every child of the country, but these studies cost about US \$ 100 per year per individual.

THE MAIN STAGES OF «PATHFINDER» METHOD (WHO)

The main stages of «pathfinder» method (WHO):

1. Setting purpose and objectives.

The purpose of epidemiological survey is to determine the prevalence and intensity of dental disease among different age groups (caries, periodontal disease, diseases of oral mucosa, non-carious lesions, and others) for evaluation the dental status of the population and dental care planning at all levels: from schools, businesses, the village to the district, city, region, country. In addition, the objectives of an epidemiological survey may be revealing and identifying of risk factors for dental diseases. If no data, it is necessary to carry out a pilot examination, which can help in the training of personnel and the organization of the main survey.

2. The sample of population for the examination:

- age groups (key);
- sample structure (city, rural areas, social, ethnic groups);
- sample size (at least 25–50 in age group in one single point);
- sampling method.

Age groups. Public health administrators and survey planners need to decide whether the survey will be carried out at local, regional or national level, the variables that will be examined in the survey and the age groups to be included.

The **most important key age groups** are **12-year-olds** and **35–44-year-old** adults. All key groups and health indicators are in table 1. It is minimum number of age groups. In 12-year olds is estimated intensity of caries, effectiveness of pre-

ventive measures, in the group 35–44 — the quality of dental care. Since 1981, the WHO publishes an annual booklet «levels in 12-year-olds».

Table 1

Key age groups by WHO

№	Age group	Criteria for evaluation
1.	6-year-olds	The percentage of healthy children (free of caries)
2.	12-year-old	The percentage of healthy children
3.	15-year-old	The number of healthy sextants «0» (CPI)
4.	18-year-old	Missing «M» of DMFT, the number of healthy sextants
5.	35–44-year-old	CPI, DMFT
6.	65–74 years	CPI, the percentage of the toothless population

In some countries, 5 years is the age at which children begin primary school. In countries where school entry is deferred to 6 or 7 years of age, these ages can be used, although the mean age should be reported with the results.

12 years. This age is especially important as it is generally the age at which children leave primary school. Therefore in many countries, it is the last age at which a reliable sample may be obtained easily through the school system.

15 years. In countries where it is difficult to obtain reliable samples from this age group, it is customary to examine individuals in two to three areas only, in the capital city or another large town and in one rural area.

35–44 years (mean = 40 years). Sampling adult subjects is often difficult. Samples can, however, be drawn from organized groups, such as office or factory workers. Care must be taken to avoid obvious selection bias, such as sampling patients at medical care facilities.

65–74 years (mean = 70 years). Obtaining of a sample and examining representative members of this age group is often not as difficult as for the younger age groups, as older people are more likely to be in or near their homes, in senior clubs, day centers or institutions in the day time. Nevertheless, care should be taken to sample adequately both housebound and active members of this age group.

Sample can be extended depending on the purposes of the study. WHO recommends that people under the age of 20 years are formed as a separate age group every year; from 20 to 34 years old grouping is carried out every 4-5 years (20–24 year-olds, 25–29 year-olds, 30–34 year-olds); from 35 years — every 10 years (35–44, 45–54, 55–64, 65–74 year-olds).

The sample size is defined by objectives of the study, the prevalence of the studied pathology, required accuracy of study, economic opportunities. In epidemiological studies of rare diseases it is needed to examine large groups, and sometimes the whole population (total method of epidemiological studies). A large-scale studies (hundreds of thousands) are conducted.

Pathfinder surveys can be either pilot or national-level systematic surveys, depending on the number and type of sampling sites to be included and the age groups included. A pilot survey is one that includes only the most important sub-

groups in the population and only one or two index ages, usually 12 year-olds and one other age group (for example, 35–44 year-olds).

A comprehensive systematic survey incorporates sufficient examination sites to cover all important subgroups of the population (i.e. groups with different disease levels or intervention needs), and at least three of the age groups or index ages recommended for examination by WHO. This survey design is suitable for collection of data for planning purposes and monitoring of oral health programs in all countries regardless of the level of disease, availability of resources or complexity of care.

The sample structure. Population subgroups should represent the whole population and all the external factors.

Selecting the population for epidemiological studies is made in view of:

- Climatic conditions;
- Socio-economic level;
- The presence of ethnic groups;
- Environmental factors (fluoride content in the water, chemicals, etc.).

The sampling is usually based on the administrative divisions of a country, i. e. the capital city, main urban centres, and small towns and rural areas. In countries where there are different geophysical areas, it is traditional to include at least one sampling site from each area type. If there are several distinct ethnic groups in the population with known or suspected differences in levels of oral disease, it may be necessary to include separate samples of each of these groups in the main subdivisions for the survey. Thus, maximum use should be made of available knowledge about variations between the different groups in order to limit the number of additional subsamples needed. Assistance of local health administrators can be very useful when making the final decision about which population subgroups are significant for the study and should be represented in the final sample. For a national pathfinder survey, between **10 and 15 sampling sites** are usually sufficient. If, however, there are many large urban centres in the country, it may be necessary to locate several additional sampling sites in at least two of these cities.

In each region should be examined the rural and urban populations. In large cities (more than 1 million inhabitants) it is recommended to examine the 2–3 groups in the various administrative districts. It is necessary to examine a few extra points in each city, since different areas may have different environmental conditions such as air pollution, the availability of water sources with uneven content of fluorine and others. If the district has a large number of newly arrived population (30–50 %), it is necessary to examine the local and visitors.

Sample size. Group size is determined by the required accuracy of the study, which is evaluated by statistical methods. In the study of the prevalence of dental caries and periodontal disease in one area the number of people of the same age group should be 50 (WHO recommendations for pathfinder research method if prevalence of these diseases is high). It is recommended that each group surveyed include the same number of male and female persons. Number of examined per-

sons can increase, what will enhance accuracy of the results of the survey. The number of examinees can be increased if the disease under study is rare.

Sampling method. The two major methods are probability and non-probability sampling, depending on whether there is a known probability of subjects to be selected for the survey. Depending on resources available and technical conditions, probability sampling can be executed in a number of ways including simple random sampling, systematic sampling, stratified cluster random sampling, probability proportional to size, as well as other variations. For the method of random sampling (for example, the survey every second or every third an individual from among the students and workers of the enterprise) lists are used. Where there is no opportunity to conduct probability sample size estimates, a non-probability sampling method is applied. The pathfinder survey method is a stratified cluster sampling technique that aims to include the most important population subgroups likely to have different disease levels.

There are several statistical texts that describe the available sampling techniques in detail, including determination of sample size, precision and power.

Number of subjects. In the pathfinder sampling method, the number of subjects to be examined in each index age group ranges from a minimum of 25 to 50 for each sampling site, depending on the expected prevalence and severity of oral disease. For example, a sample design for a national pathfinder survey for each index age or age group can be calculated as follows:

Urban: 4 sites in the capital city or metropolitan area ($4 \times 25 = 100$)

2 sites in each of 2 large towns ($2 \times 2 \times 25 = 100$)

Rural: 1 site in each of 4 villages in different regions ($4 \times 25 = 100$)

Total for one index age or age group: $12 \text{ sites} \times 25 \text{ subjects} = 300$

If this cluster distribution will be applied to four index ages in the population under study:

Total sample: $4 \times 300 = 1200$

Such a sample design permits identification of significant differences between urban and rural groups and, in most situations, between different socioeconomic groups in the capital city or other large towns. Areas where the disease prevalence is either much higher or much lower than the national average may also be identified from the results of such a survey. It is to be noted that a sample of 25 subjects is sufficient only in populations where dental caries and periodontal disease levels are estimated to be low or very low. In populations where the disease level is known to be high, e.g. the percentage of caries-free 12-year-olds is 20 % or lower, the standard size for each sample should be about 50 subjects and the total sample size should therefore increase to about 600 subjects for each age group. If the level of dental caries in the population is not known, it will be necessary to estimate the level of disease before starting a survey. A rapid and effective way of estimating the prevalence of dental caries in a population is by classifying a group of subjects as caries-free or not caries-free. It should be possible, for example, to examine 2 or 3 classes or year groups of 12-year-olds from different so-

cioeconomic levels, in two to three local, easily accessible schools where the widest possible differences in disease prevalence may be expected. If more than 50 % of the children in a class are caries-free, the caries prevalence is low, and if less than 20 % are caries-free, the prevalence is high. This estimation of prevalence may then be used as a guide to decide the standard sample size when completing the study protocol.

3. Selection of epidemiological survey methods.

The method is selected depending on the purpose of the study.

Techniques of epidemiological studies:

1. Dental examination (screening) using various indices (standardized, recommended and taken by WHO (appendix1)).
2. The survey population for the presence of risk factors (questionnaires, interviews, etc.). They can be used simultaneously.

Requirements for techniques of epidemiological studies:

- to be simple, easy to use, does not require a lot of time;
- to be accessible to all age groups;
- to be sufficiently accurate and informative;
- to be inexpensive.

4. Calibration of examiners, training of clerks. Schedule of survey.

After the allocation of the necessary funds for the purchase of tools (dental probes, mirrors and periodontal probes WHO), personnel salaries, travel expenses, the calibration of personnel is started. It should be a small group of experts for conducting an epidemiological study, and they should pass calibration.

Calibration objectives:

- Ensure uniform interpretation of the data.
- To minimize the variation in the estimates and judgments between individual doctors.
- Ensure a certain standard in the study.

When an epidemiological survey is undertaken by a team, it is essential that the participating examiners are trained to make consistent clinical judgements. When the survey will be conducted by a group of examiners, it is recommended that an experienced epidemiologist who is trained in accordance with the recommended methods for basic oral health surveys should be appointed to act as a validator for the survey team. The calibrator should examine at least 25 subjects who will also be examined by each member of the survey team. Assistance in training and calibration may be available from WHO. Training in the use of the criteria generally takes two days with a further two to three days required for calibration. Additional time may be needed depending on the number of examiners requiring training and the number of indices that will be used in a survey. An interval of at least a few days is desirable between training and calibration to allow the examiners time to assimilate their knowledge of the indices and to practise the procedures. It is essential that a group of examiners should be able to examine with reasonable consistency, using a common standard. In general, the consistency level

for most assessments should be in the range of 85–95 %. If the assessments made by certain examiners are consistently significantly different from the majority despite attempts to correct their performance, they should be excluded from the survey team. It should be made clear to all potential examiners before the examinations begin that the ability to make standardized assessments is not a measure of their clinical skill.

Duplicate examinations. Examiners may change the way they apply diagnostic criteria during the course of a series of assessments. To allow detection and correction of this tendency, it is advisable for each examiner to perform duplicate examinations on 5–10 % of the sample (no fewer than 25 subjects) in the actual survey. The most convenient age groups for duplicate examinations are likely to be the 12 and 15 years age groups because of ease of access.

If the survey includes adult age groups, duplicate examinations can be coordinated to be performed in these individuals. As far as possible, the examiner should not be able to identify the subjects who are re-examined, or know that a subject has been examined previously, since this information may affect the thoroughness or quality of the duplicate examination. The recorder, or perhaps a local school-teacher, should be requested to arrange for the re-examination of the subjects during the course of the survey. Duplicate examinations should be conducted at the start of the survey (i.e. immediately after calibration), about half-way through and at the end of the survey.

Recording clerk holds registration of examination data. He must first be instructed that he (she) could not only write the data correctly, but also to identify possible errors or omissions, accidentally made by researchers at the dictation of numbers of teeth or alphanumeric codes. Before the survey begins, the clerk should practise by recording the findings of a few preliminary examinations. When direct-entry computer systems are used, recording clerks should receive specific instructions and training in their use.

Organizing clerk. It is desirable to have an organizing clerk at each examination site to maintain a constant flow of subjects to the examiner(s) and to enter general descriptive information on the record forms. The organizing clerk should also check the finished records for accuracy and completeness, so that missing information may be obtained before the survey team moves to another location. This person should also be responsible for ensuring that the examiners have an adequate supply of sterile instruments.

The preparation of a schedule for data collection is an important aspect of survey planning. If this is not done, examining personnel may waste time waiting for subjects to arrive, or be otherwise unnecessarily delayed. Daily and weekly schedules can then be prepared. These should be made available to survey personnel, as well as to school and health authorities. The schedules should allow for some flexibility, so that unexpected delays do not cause major upsets in the survey timetable.

5. Planning of statistical data analysis.

Analysis of obtained features data for input into the computer and organizing computer files. Description of statistical methods of data processing is necessary.

6. Evaluation of any ethical problems.

that may arise during the study and obtain the necessary authorization by the Ethics Committee. Permission to examine population groups must be obtained from the relevant local, regional or national authority. If schoolchildren are to be examined, for example, the school authorities should be approached, the purpose of the survey explained and their approval obtained. It is necessary to obtain informed consent from the surveyed patients. In some instances, a written permission from parents will be required to be obtained before children can be examined.

7. Collection of epidemiological data (organization of epidemiological survey).

Instruments and supplies. The quantity and weight of instruments and supplies used in the survey should be kept to a minimum; however, sufficient numbers of instruments should be available to avoid the necessity to temporarily stop examinations while the used ones are being sterilized. The following instruments and supplies are required for each examiner:

- instruments for oral examination: plane mouth mirrors, metallic periodontal probes (CPI probes) and several pairs of tweezers;
- containers (one for used instruments and one for disinfecting or sterilizing instruments) and concentrated disinfection solution in sufficient quantity;
- rubber gloves;
- wash basin for either water and soap or disinfectant solution;
- cloth or paper hand towels;
- gauze.

Generally, a minimum of 30 mouth mirrors and 30 periodontal probes per examiner should be provided, as this will permit some instruments to be sterilized while the others are being used. Used instruments should be placed in disinfectant solution, then washed and drained well before sterilization. Use of disposable masks and gloves and wearing of protective glasses are also recommended.

The survey team must have disinfecting solutions available in sufficient quantity. In the absence of an autoclave, domestic pressure cookers or pots can be used for sterilizing instruments. Examinations may be conducted in a dental office or in the field. The lack of a suitable building or a dental office does not preclude a survey from being performed.

It is recommended that children and adults be examined in the same conditions and the same team of epidemiologists in order to ensure maximum comparability of the survey results.

The planner can estimate from a preliminary survey, or from previous experience, how much time, on average, each examination will take. As a guideline, a basic examination of a child usually takes about 10 minutes, while a complete examination of an adult may take between 15 and 20 minutes.

Examination is conducted in the dental chair, however, it is allowed to use different devices: high-backed chair, if a dental examination is carried out in a sitting position of the patient couch or if the patient lies (usually during the examination of children).

Lighting. The lighting should be as consistent as possible throughout the survey. If electricity is available at all locations, a lightweight portable examination light (in the blue-white colour spectrum) should be used. Inflammatory and structural changes of the oral tissues are more difficult to detect under normal artificial light (yellow-red in colour) than under natural or corrected artificial light. If electricity or battery-operated lights are not available at some survey sites, natural light should be used at all locations.

Assessment of oral health status. Standard forms are designed to facilitate computer processing of the observations. Each box is given an identification number (the small number in parentheses), which represents a location in a computer file. Recording codes are shown near the appropriate boxes. To minimize the number of errors, all entries must be clear and unambiguous.

The examination for dental caries should be conducted with a plane mouth mirror. The use of radiography for detection of approximal caries is not recommended because the equipment is impractical to utilize in most field situations. Likewise, the use of fibreoptics is not recommended. Although it is recognized that both these diagnostic aids reduce the underestimation of dental caries, logistical complications and frequent objections on the part of subjects to exposure to radiation outweigh any potential gains. Examiners should adopt a systematic approach to the assessment of the dentition status, bearing the following points in mind:

- The examination should proceed in an orderly manner from one tooth or tooth space to the adjacent tooth or tooth space.
- A tooth should be considered present in the mouth when any part of it is visible.
- If a permanent and primary tooth occupy the same tooth place, the status of the permanent tooth only should be recorded.

Sound crown. A crown is coded as sound if it shows no evidence of treated or untreated clinical caries. The stages of caries that precede cavitation, as well as other conditions similar to the early stages of caries, are excluded because they cannot be reliably identified in most field conditions in which epidemiological surveys are conducted. Thus, a crown with the following defects, in the absence of other positive criteria, should be coded as sound (fig. 1):

1. White or chalky spots; discolored or rough spots that are not soft to touch with a metal CPI probe.
2. Stained enamel pits or fissures that do not have visible cavitation or softening of the floor or walls detectable with CPI probe.
3. Dark, shiny, hard, pitted areas of enamel in a tooth showing signs of moderate to severe enamel fluorosis.

4. Lesions that, on the basis of their distribution or history, or on examination, appear to be due to abrasion.



Fig. 1. Sound teeth

Sound root. A root is recorded as sound when it is exposed and shows no evidence of treated or untreated clinical caries.

Cariou crown. Caries is recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, has (fig. 2):

- unmistakable cavity;
- undermined enamel;
- detectably softened floor or wall.



Fig. 2. Dental caries

A tooth with a temporary filling, or one which is sealed but also decayed, should also be included in this category. In cases where the crown has been destroyed by caries and only the root is left, the caries is judged to have originated in the crown and is therefore scored as crown caries only. The CPI probe should be used to confirm visual evidence of caries on the tooth surface(s). Where any doubt exists, caries should not be recorded as present.

Cariou root. Caries is recorded as present when a lesion feels soft or leathery on probing with the CPI probe. If the carious lesion on the root does not involve the crown, it should be recorded as root caries. For single carious lesions affecting both the crown and the root, the likely site of origin of the lesions should be recorded as the decayed site. When it is not possible to identify the site of origin, both the crown and the root should be coded as decayed. In general, root caries is not recorded for children, adolescents and adults.

Filled crown, with caries. A crown is considered filled, with decay, when it has one or more permanent restorations and one or more areas that are decayed. No distinction is made between primary and secondary caries and the same code is

used regardless of whether the carious lesions are in contact with the restoration(s).

Information on the Decayed, Missing and Filled Teeth Index can be derived directly from the data in Boxes 45–76 and 77–108 (Oral Health Assessment Form for Adults, 2013). The D component includes all teeth with codes 1 or 2. The M component comprises teeth coded 4 (missing due to caries) in subjects under 30 years of age, and teeth coded 4 or 5 (missing due to any other reason) in subjects 30 years and older. The F component includes teeth only with code 3. The basis for calculations is 32 teeth, i.e. all permanent teeth including wisdom teeth. Teeth coded 6 (fissure sealant) or 7 (fixed dental prosthesis/bridge abutment, special crown or veneer/implant) are not included in calculations of the index.

Assessment of other dental diseases is described in OHS-5.

Planning a survey on self-assessment of oral health and risk factors

The WHO STEPwise approach to Surveillance (STEPS) is a sequential process (fig. 3): it starts with the compilation of key information on risk factors and self-reported health using a questionnaire, and then moves on to simple physical measurements, followed by more complex measurements for biochemical analysis. The instruments may include core, expanded and optional data. STEPS emphasizes that fewer good-quality data are more valuable than large quantities of poor-quality data. By using the same standardized questions and protocols, countries can use the information produced by STEPS both for assessment of within-country trends as well for comparisons across countries. The approach encourages the collection of small amounts of useful information on a regular and continuing basis.

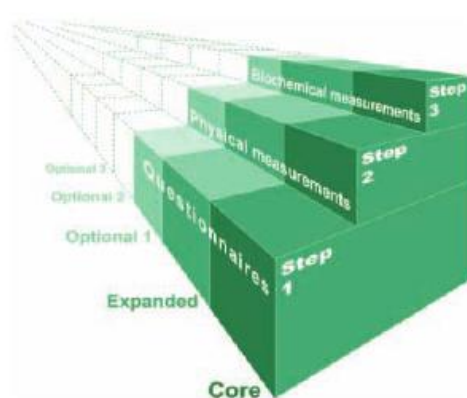


Fig. 3. Framework for the WHO STEPwise approach to chronic disease surveillance

STEPwise application of oral health principles has three steps:

Step 1: acquisition of information on self-assessment of oral conditions, oral health practices, measurements of diet, tobacco use and alcohol consumption, quality of life, and social position, all of which are based on standard WHO definitions. This may include data on general health factors that are of importance to oral health conditions, e.g. height, weight and waist circumference as indicators of

nutritional status, underweight or obesity, experience of diabetes and markers of HIV infection.

Step 2: the clinical data collected in Step 2 add to those obtained in Step 1. The implementation of Steps 1 and 2 has relevance to most countries.

Step 3: this comprises information obtained from biochemical analyses, e.g. collection of saliva to study its buffering capacity or for microbial assessment (e.g. *Streptococcus mutans*). However, WHO does not recommend advanced oral health measurements for countries with limited resources.

Oral health surveillance becomes possible when data on oral health status and risk factors are collected systematically and on a regular basis. Countries may choose to collect Step 1 or Step 2 data or both for planning and evaluation of oral health intervention.

Self-assessment of oral health and risks. Oral health information system. WHO recommends that countries should establish a complete oral health information system for monitoring and continued evaluation of national oral health programmes. The essential components of an oral health information system are depicted in fig. 4. Comprehensive information about oral health-care coverage, delivery of care, quality of care, and intermediate and ultimate outcomes of oral health intervention is important for ensuring an effective national oral health system. Population data on oral health status and prevalence of risk factors are relevant for surveillance of disease patterns and understanding trends over time; in addition, such information is instrumental for planning or adjustment of interventions by health authorities.

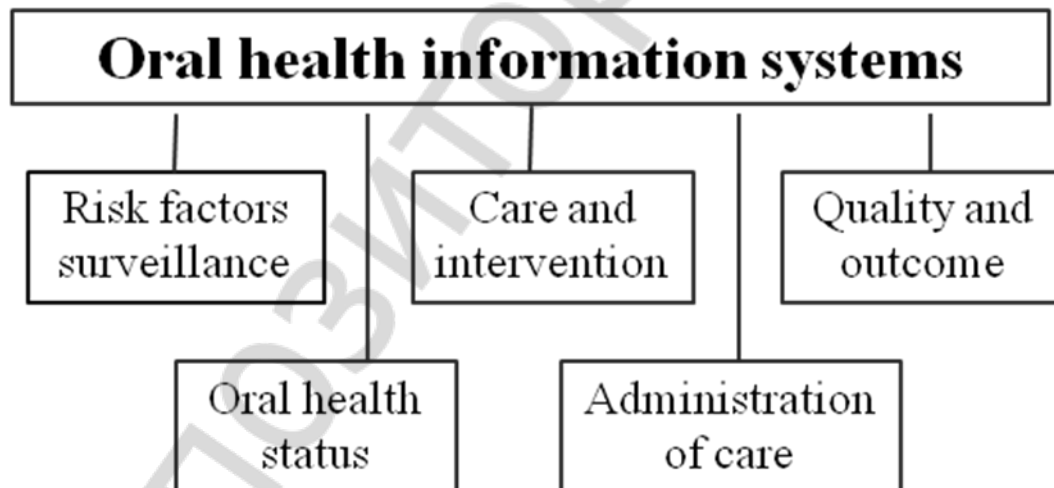


Fig. 4. Components of a comprehensive oral health information system

Systematic information on the prevalence of risk factors is important for planning community-oriented oral disease prevention and oral health promotion programmes. By merging clinical oral health data and risks factors data into a common database, the oral health effects of socio-behavioral factors could be estimated and relevant intervention strategies designed. Consequently, oral health programmes can be planned more effectively so that they meet the needs of

specific population groups. In addition to the above, information on self-assessed oral health is essential for identification of appropriate approaches in oral health promotion.

Self-assessment of oral health through the use of questionnaires. According to the STEPS approach (fig. 3), Step 1 represents collection of health data by means of questionnaires. When appropriately planned, questionnaires can be very useful in obtaining reliable information about health status and risks to health. Importantly, data collection is less time-consuming and less costly for the country. Participants filling out a questionnaire survey must be appropriately informed about the objectives of the study; each participant must be ensured anonymity and informed that the data will be used for statistical purposes only. Thus, informed consent must be obtained.

A practical health questionnaire should need only 15–20 minutes to complete. Compared with questionnaires for self-completion, interviewing yields somewhat higher response rates. However, compared with interviews, questionnaires for self-completion are practical, e.g. they can be posted to the respondent. Moreover, the external effect of an interviewer reading out the questions and answers is avoided and the respondent may have more time for giving correct answers to questions.

Oral health risk indicators within the frame of STEPS

WHO has proposed an operational model (fig. 5) for use by investigators or public health administrators when considering an appropriate intervention.

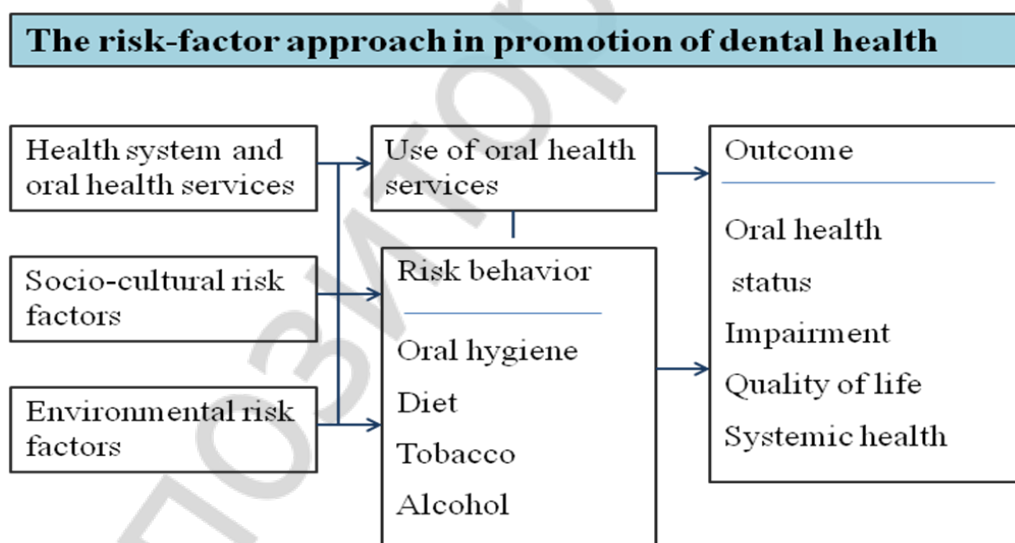


Fig. 5. Oral health risk factors relevant to planning and surveillance of oral health intervention programmes

This model aims to guide the gathering of data by focusing on socio-environmental determinants and modifiable risk factors of oral health such as diet/nutrition, tobacco use and excessive alcohol consumption. In addition, information is required about environmental exposure to fluoride, oral hygiene practices and use of available oral health services. Quality of life, oral health and system-

ic health are considered important outcomes of the specified distal and proximal factors. The model thereby provides a conceptual and practical basis for linking oral health to relevant chronic disease assessment.

WHO recommends the use of simplified structured questionnaires for collection of self-assessed data on oral health and risk factors in adults and in children or adolescents (appen. 2). Both questionnaires have been pilot-tested in a number of countries across the world. The simplified questionnaires include the core questions considered essential in national oral health surveillance, however, the questions and answers may be adapted to local or national settings. A country may wish to include additional questions and WHO can assist planners of a survey in their preparation of an expanded questionnaire to meet specific needs.

A questionnaire survey of risks to oral health (Step 1) can be carried out as a stand-alone activity or in combination with a clinical oral health survey (Step 2). In a combined survey, the data may provide an opportunity for assessing the health impact of risk factors; this is possible only when identical ID codes are allocated in the both surveys and the questionnaire is administered just before the clinical data are collected.

Depending on the background of the respondents, the questionnaires children and adults can be filled either by an interviewer or they can be self-completed. Interviewing requires appropriate field training of survey staff and a pilot study of 15–20 subjects should be carried out prior to the actual survey for ensuring face validity and reliability.

The WHO chronic disease surveillance programme (STEPS) incorporates a module on oral health of adults. However, the adult oral health questionnaire included in the standard version of STEPS does not focus on consumption of sugars, use of tobacco and alcohol, and education, as these items are already part of the general module. In addition, the main WHO STEPS questionnaire includes specific questions on general health and disease conditions which are relevant to oral health, e.g. diabetes, HIV/AIDS, nutrition status, and body mass index (BMI). WHO STEPS contains robust questions for measurement of diabetes from medical history or information about diagnosis, and Body Mass Index (BMI) defined as weight (kg) divided by the square of height (m) and the waist-hip ratio (WHR) defined as waist circumference (cm) divided by hip circumference (cm).

For planning and evaluation of school-based oral health programmes, a special oral health questionnaire is available from WHO. This questionnaire may be used for collection of oral health information from schoolteachers and covers oral health knowledge, attitudes and practices, sources of oral health information and teaching activities in classrooms.

Finally, separate WHO oral health questionnaires are available for people affected by HIV/AIDS, children with infections, and the role of schoolteachers. Such questionnaires may be relevant to carry out in conjunction with clinical examination of oral manifestations of HIV/AIDS.

Gathering general information

Fluoridated water is the main source of fluoride exposure, but fluoride may be present in food, drinks and other sources. Information should be gathered on sources of fluorides available to the survey population, including water, salt, milk and toothpastes, as well as on levels of usage of topical fluorides and other products likely to affect the development of dental caries. In certain situations it is important to know whether population groups have been or are exposed to fluoride and such information can be gathered at the time of the oral health survey. A sample of drinking water may be collected at each examination site and sent to a laboratory for analysis of fluoride content. Clean polyethylene bottles or tubes of approximately 30–50 ml capacity should be used for this purpose. They should be rinsed in distilled water prior to rinsing twice with the water to be sampled. The bottles should then be filled, closed firmly and clearly labelled with a permanent marker, giving the date of collection, location and source of the water. In many countries, it is possible to obtain fluoride analysis services through public health water supply departments.

8. Analysis of the data obtained. Writing a research report

Survey data are written in the standard form of the WHO or modified cards conforming to the objectives of the study and suitable for computer processing. Information is entered into a computer and processed statistically. The main characteristics of the data being analyzed: prevalence and intensity of diseases, risk factors.

FROM SURVEYS TO SURVEILLANCE

Surveillance provides on-going – continuous or periodic – collection, analysis and interpretation of population health data and the timely dissemination of such data to users. Properly conducted, surveillance ensures that decision-makers and public health administrators have the information they need to control disease now or plan strategies to prevent disease and adverse health events in the future. A systematic approach to data collection helps countries to observe and evaluate emerging disease patterns and trends (appendix 3). Operational indicators and targets are a prerequisite to policy formulation and surveillance.

In sum, the goal of data collection is to assist governments, health authorities and health professionals in formulating policies, specifying standards and developing programmes to prevent disease, and to measure the progress, impact and efficacy of efforts to control diseases that are already affecting their populations. The general WHO STEPwise manual is designed to produce national surveillance data on main chronic diseases, self-assessment of health and common risk factors. Such data create the basis for global health surveillance and inter-country comparisons. WHO recommends collection of global surveillance data that may inform about people's experience of poor quality of life in relation to their oral health, whether primary oral health care is available and accessible, and whether health systems respond to severe oral conditions.

This may be based on indicators such as:

- Relative reduction in the percentage of children aged 5, 6 and 12 years and adolescents aged 15 years who report poor quality of life due to pain, discomfort or problems with mouth/teeth.
- Relative increase in the percentage of children aged 5, 6 and 12 years and adolescents aged 15 years with access to primary oral health-care services.
- Relative reduction in the percentage of adults (35–44 and 65–74 years) who have poor quality of life due to pain, discomfort or problems with mouth/teeth.
- Relative increase in the percentage of adults (35–44 and 65–74 years) with access to primary oral health-care services.
- Relative increase in the percentage of people in high risk groups (e. g. tobacco, betel quid users, and excessive alcohol users) screened for oral cancer at least once.

In general, surveillance of oral health is neglected in modern public health. However, oral health surveillance can successfully be incorporated into national health surveillance schemes as measurement of just a few, crucial indicators could provide sufficient information for valuable assessment of the appropriateness of public oral health intervention. This manual advocates close adherence to standardized approaches to oral health surveys, as this will aid WHO in storing consistently comparable, essential data in the Global Oral Health Data Bank.

Who assistance

WHO attaches great importance to basic oral health surveys for planning, evaluation and surveillance of oral health programmes and, whenever possible, the Organization offers assistance directly or through one of its collaborating centres or consultants.

WHO may assist with survey planning, including advice on the sampling plan, estimates of sample size and the appropriate use of standard assessment forms. The aims of such assistance are to foster the use of uniform survey methods and to help investigators develop objectives and survey plans to meet their specific needs. Prior to seeking assistance from WHO, investigators might find it helpful to discuss the survey and the proposed survey plan with experienced colleagues in the national health or education sector so that factors of importance and interest are not neglected or overlooked.

Subject to prior agreement, WHO will assist, guide and facilitate use of a data entry programme in Epi Info or SPSS (Statistical Package for the Social Sciences) for analysis of data obtained through the procedures recommended in this manual, provided that the standardized format and coding have been used. The analysis may be carried out using a standard computer programme which will produce a standard set of tables. The summarized data will be systematically included in the WHO Global Oral Health Data Bank.

For investigators who do not have access to computer facilities, WHO may be able to arrange assistance, for example, through a WHO Collaborating Centre.

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Репозиторий БГМУ



World Health Organization
Oral Health Assessment Form for Adults, 2013

Annex 1

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World Health Organization

Oral Health Assessment Form for Adults, 2013

Loss of attachment Severity 0 = 0–3 mm 1 = 4–5 mm Cemento-enamel junction (CEJ) within black band 2 = 6–8 mm CEJ between upper limit of black band and 8.5 mm ring 3 = 9–11 mm CEJ between 8.5 mm and 11.5 mm ring 4 = 12 mm or more CEJ beyond 11.5 mm ring X = Excluded sextant 9 = Not recorded * Not recorded under 15 years of age		Index teeth 17/16 11 26/27 (173) <input type="text"/> <input type="text"/> <input type="text"/> (175) (176) <input type="text"/> <input type="text"/> <input type="text"/> (178) 47/46 31 36/37		Enamel fluorosis <input type="text"/> (179) Severity 0 = Normal 1 = Questionable 2 = Very mild 3 = Mild 4 = Moderate 5 = Severe 8 = Excluded (crown, restoration, "bracket") 9 = Not recorded (unerupted tooth)
Dental erosion Severity <input type="text"/> (180) 0 = No sign of erosion 1 = Enamel lesion 2 = Dentine lesion 3 = Pulp involvement Number of teeth affected (181) <input type="text"/> <input type="text"/> (182)		Dental trauma Status <input type="text"/> (183) 0 = No sign of injury 1 = Treated injury 2 = Enamel fracture only 3 = Enamel and dentine fracture 4 = Pulp involvement 5 = Missing tooth due to trauma 6 = Other damage 9 = Excluded tooth Number of teeth affected (184) <input type="text"/> <input type="text"/> (185)		
Oral mucosal lesions <input type="text"/> (186) <input type="text"/> (187) <input type="text"/> (188) Condition 0 = No abnormal condition 1 = Malignant tumour (oral cancer) 2 = Leukoplakia 3 = Lichen planus 4 = Ulceration (aphthous, herpetic, traumatic) 5 = Acute necrotizing ulcerative gingivitis (ANUG) 6 = Candidiasis 7 = Abscess 8 = Other condition (specify if possible) 9 = Not recorded		<input type="text"/> (189) <input type="text"/> (190) <input type="text"/> (191) Location 0 = Vermillion border 1 = Commissures 2 = Lips 3 = Sulci 4 = Buccal mucosa 5 = Floor of the mouth 6 = Tongue 7 = Hard and/or soft palate 8 = Alveolar ridges/gingiva 9 = Not recorded		
		Denture(s) Upper <input type="text"/> (192) Lower <input type="text"/> (193) Status 0 = No denture 1 = Partial denture 2 = Complete denture 9 = Not recorded		
Intervention urgency <input type="text"/> (194) 0 = No treatment needed 1 = Preventive or routine treatment needed 2 = Prompt treatment (including scaling) needed 3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin 4 = Referred for comprehensive evaluation or medical/dental treatment (systemic condition)				



Oral Health Questionnaire for Adults

Identification number	Sex		Location		
1. <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	Male <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-top: 5px;"></div>	Female <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-top: 5px;"></div>	Urban <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-top: 5px;"></div>	Periurban <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-top: 5px;"></div>	Rural <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-top: 5px;"></div>
1 4	1	2	1	2	3

2. How old are you today? _____
(Years)

3. How many natural teeth do you have?

No natural teeth ☐ 0

1–9 teeth ☐ 1

10–19 teeth ☐ 2

20 teeth or more ☐ 3

4. During the past 12 months, did your teeth or mouth cause any pain or discomfort?

Yes ☐ 1

No ☐ 2

Don't know ☐ 9

No answer ☐ 0

5. Do you have any removable dentures?

	Yes	No
	1	2
A partial denture?.....	<input type="checkbox"/>	<input type="checkbox"/>
A full upper denture?.....	<input type="checkbox"/>	<input type="checkbox"/>
A full lower denture?	<input type="checkbox"/>	<input type="checkbox"/>

6. How would you describe the state of your teeth and gums? Is it “excellent”, “very good”, “good”, “average”, “poor”, or “very poor”?

	Teeth	Gums
Excellent	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Very good.....	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Good	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Average	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Poor	<input type="checkbox"/> 5	<input type="checkbox"/> 5
Very poor	<input type="checkbox"/> 6	<input type="checkbox"/> 6
Don't know	<input type="checkbox"/> 9	<input type="checkbox"/> 9

7. How often do you clean your teeth? Never <input type="checkbox"/> 1 Once a month <input type="checkbox"/> 2 2–3 times a month..... <input type="checkbox"/> 3 Once a week..... <input type="checkbox"/> 4 2–6 times a week <input type="checkbox"/> 5 Once a day <input type="checkbox"/> 6 Twice or more a day..... <input type="checkbox"/> 7		
8. Do you use any of the following to clean your teeth? (Read each item)		
	Yes 1	No 2
Toothbrush.....	<input type="checkbox"/>	<input type="checkbox"/>
Wooden toothpicks.....	<input type="checkbox"/>	<input type="checkbox"/>
Plastic toothpicks?	<input type="checkbox"/>	<input type="checkbox"/>
Thread (dental floss)	<input type="checkbox"/>	<input type="checkbox"/>
Charcoal	<input type="checkbox"/>	<input type="checkbox"/>
Chewstick/miswak.....	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>
Please specify	<input type="checkbox"/>	<input type="checkbox"/>
9.		
	Yes	No
a) Do you use toothpaste to clean your teeth	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	Yes	No
b) Do you use a toothpaste that contains fluoride?	<input type="checkbox"/> 1	<input type="checkbox"/> 2
Don't know	<input type="checkbox"/> 9	
10. How long is it since you last saw a dentist? Less than 6 months <input type="checkbox"/> 1 6–12 months <input type="checkbox"/> 2 More than 1 year but less than 2 years..... <input type="checkbox"/> 3 2 years or more but less than 5 years <input type="checkbox"/> 4 5 years or more <input type="checkbox"/> 5 Never received dental care <input type="checkbox"/> 6		
11. What was the reason of your last visit to the dentist? Consultation/advise..... <input type="checkbox"/> 1 Pain or trouble with teeth, gums or mouth..... <input type="checkbox"/> 2 Treatment/ follow-up treatment <input type="checkbox"/> 3 Routine check-up/treatment <input type="checkbox"/> 4 Don't know/don't remember..... <input type="checkbox"/> 5		

12. Because of the state of your teeth or mouth, how often have you experienced any of the following problems during the past 12 months?

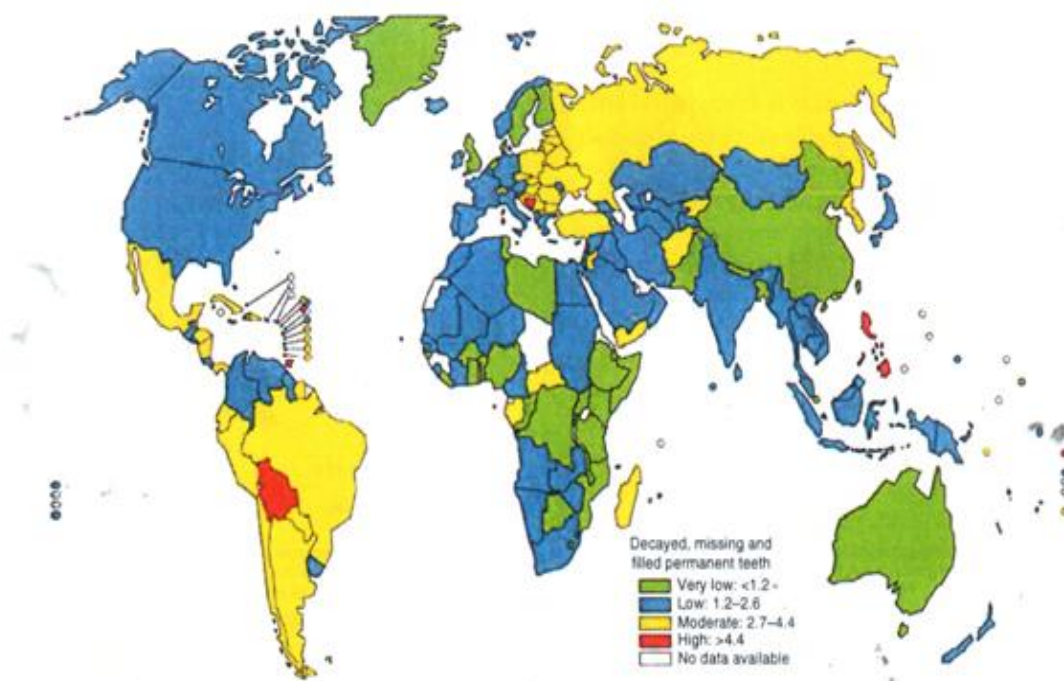
	Very often	Fairly often	Some- times	No	Don't know
	4	3	2	1	0
(a) Difficulty in biting foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Difficulty chewing foods.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Difficulty with speech/trouble pronouncing words.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Dry mouth.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Felt embarrassed due to appearance of teeth.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) Felt tense because of problems with teeth or mouth.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) Have avoided smiling because of teeth.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(h) Had sleep that is often interrupted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(i) Have taken days off work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(j) Difficulty doing usual activities..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(k) Felt less tolerant of spouse or people who are close to you.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(l) Have reduced participation in social activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. How often do you eat or drink any of the following foods, even in small quantities?

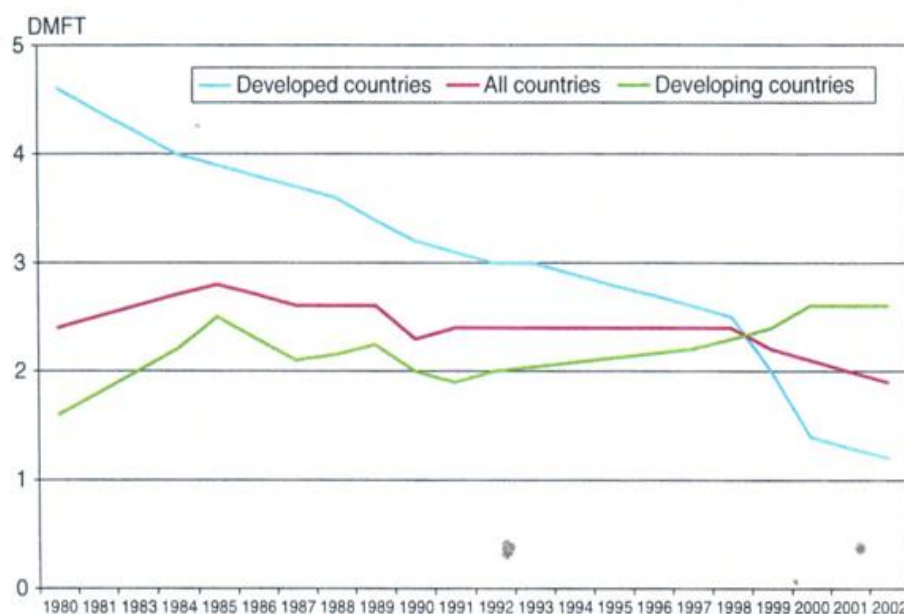
(Read each item)

	Several times a day	Every day	Several times a week	Once a week	Several times a month	Seldom /never
	6	5	4	3	2	1
Fresh fruit.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biscuits, cakes, cream cakes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweet pies, buns.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jam or honey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chewing gum containing sugar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweets/candy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

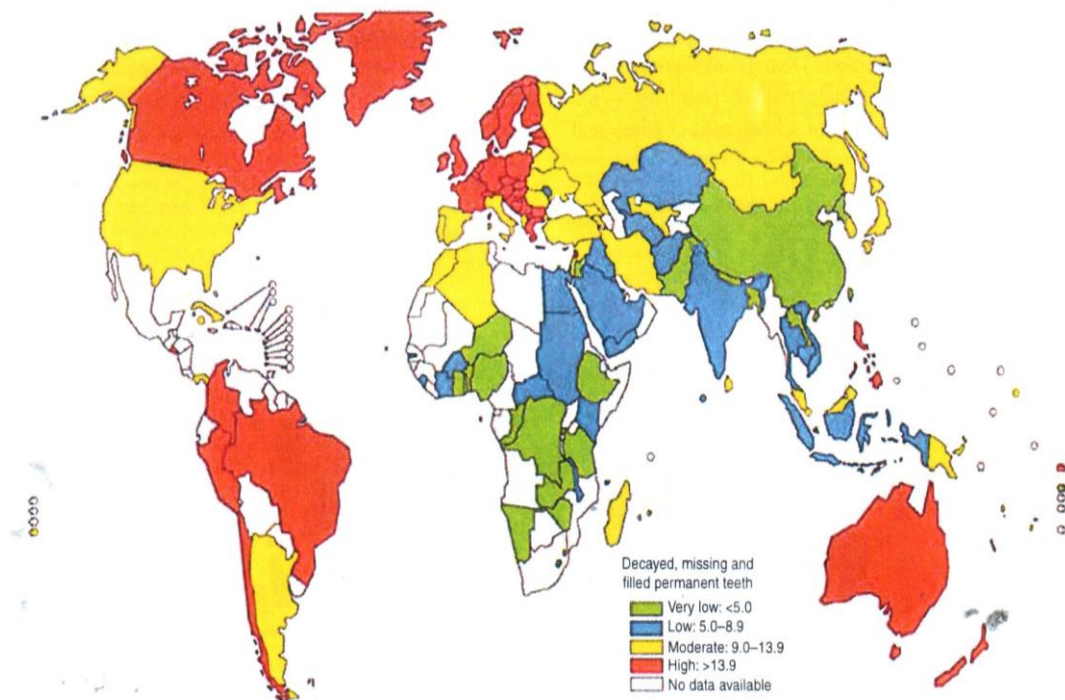
Lemonade, Coca Cola or other soft drinks.. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>						
Tea with sugar <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>						
Coffee with sugar..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>						
(Insert country-specific items)						
14. How often do you use any of the following types of tobacco? (Read each item)						
	Every day 6	Several times a week 5	Once a week 4	Several times a month 3	Seldom 2	Never 1
Cigarettes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cigars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A pipe.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chewing tobacco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use snuff.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please specify _____						
15. During the past 30 days, on the days you drank alcohol, how many drinks did you <i>usually drink per day</i>?						
Less than 1 drink.....	<input type="checkbox"/> 0					
1 drink.....	<input type="checkbox"/> 1					
2 drinks	<input type="checkbox"/> 2					
3 drinks	<input type="checkbox"/> 3					
4 drinks	<input type="checkbox"/> 4					
5 or more drinks	<input type="checkbox"/> 5					
Did not drink alcohol during the past 30 days.....	<input type="checkbox"/> 9					
16. What level of education have you completed?						
No formal schooling.....	<input type="checkbox"/> 1					
Less than primary school.....	<input type="checkbox"/> 2					
Primary school completed	<input type="checkbox"/> 3					
Secondary school completed.....	<input type="checkbox"/> 4					
High school completed.....	<input type="checkbox"/> 5					
College/university completed	<input type="checkbox"/> 6					
Postgraduate degree	<input type="checkbox"/> 7					
(Insert country-specific categories)						
<i>That completes our questionnaire</i> <i>Thank you very much for your cooperation!</i>						
Year <input type="text"/> <input type="text"/>	Month <input type="text"/> <input type="text"/>	Day <input type="text"/> <input type="text"/>	Interviewer <input type="text"/> <input type="text"/>	District <input type="text"/> <input type="text"/>	Country <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	



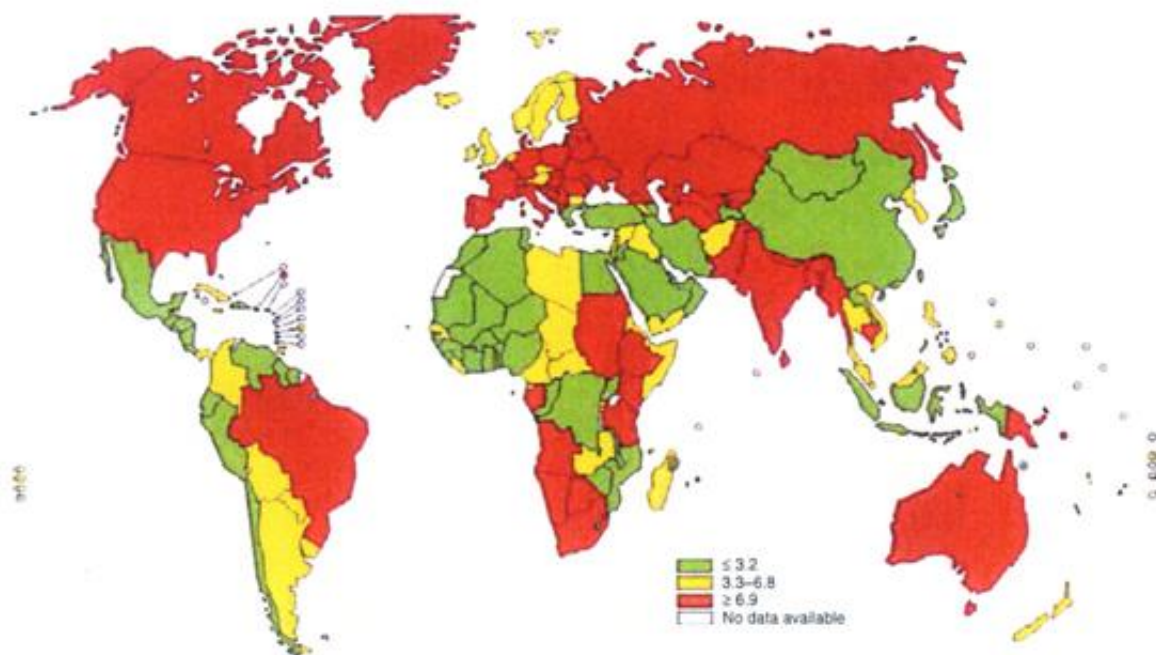
Dental caries levels of 12-year-old worldwide. Petersen P. E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31(Suppl 1): 3-24; WHO (2004) Global Oral Health Data Bank. Geneva, Switzerland, WHO



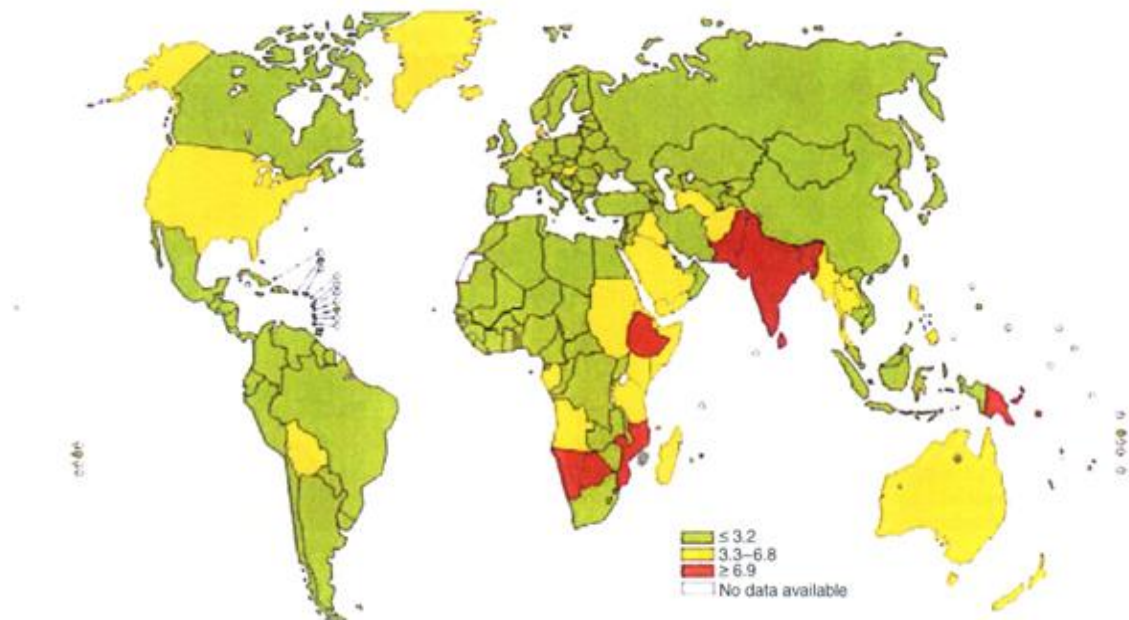
Changing levels of dental caries experience () among 12-year-olds in developed and developing countries. Petersen P.E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31(Suppl 1): 3-24; WHO (2004) Global Oral Health Data Bank. Geneva, Switzerland, WHO



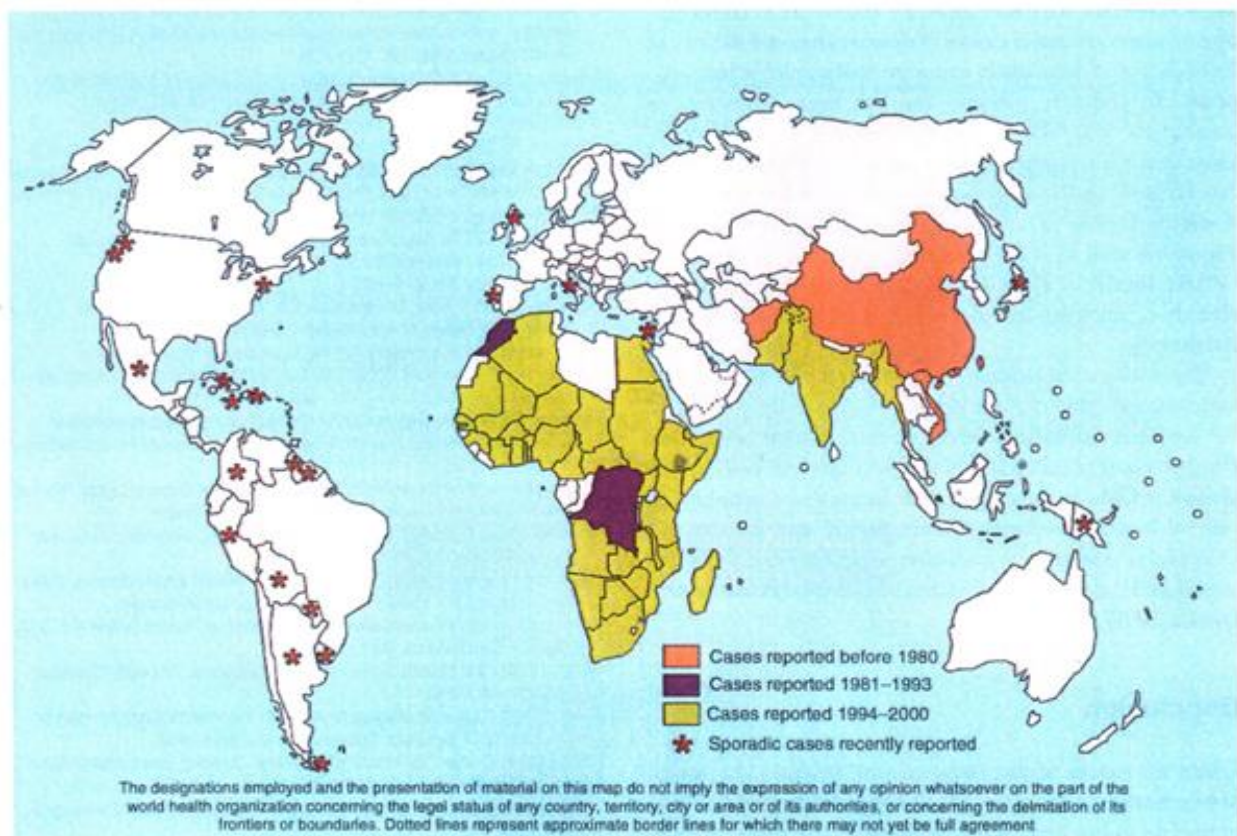
Dental caries levels () of 35-44-year-old worldwide. Petersen P. E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31 (Suppl 1): 3-24; WHO (2004) Global Oral Health Data Bank. Geneva, Switzerland, WHO



Incidence of oral cavity cancer among males (age-standardized rate (ASR) per 100 000 world population). Petersen P.E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31(Suppl 1): 3-24; WHO (2004) Global Oral Health Data Bank. Geneva, Switzerland, WHO



Incidence of oral cavity cancer among females (age-standardized rate (ASR) per 100 000 world population). Petersen P.E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31(Suppl 1): 3-24; WHO (2004) Global Oral Health Data Bank. Geneva, Switzerland, WHO



Cases of noma (cancrum oris) reported around the world. Petersen P.E. (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology 31 (Suppl 1): 3-24.

THE SAMPLE OF EPIDEMIOLOGICAL SURVEY PLAN

1. Setting purpose and objectives

Purpose: To conduct an epidemiological survey to evaluate the dental status of the inhabitants of the Republic of Belarus.

Objectives:

1. To study the prevalence and intensity of dental caries in the Republic of Belarus citizens.
2. To study the prevalence and intensity of periodontal disease in the Republic of Belarus citizens.

2. The sample of population for the examination:

To evaluate the dental status of the inhabitants of the Republic of Belarus is necessary to examine the population of key age groups (5–6 years, 12 years, 15, 18, 35–44, 65–74), according to WHO recommendations. Children of 5–6 years old will be examined in preschool institutions, children of 12, 15 years — in schools. Young people of 18 years – in higher educational institutions. People aged 35–44 at the workplace. Older adults 65–74 years — in nursing homes.

Research will be conducted in six regions of the Republic of Belarus: Brest, Grodno, Gomel, Mogilev, Vitebsk and in Minsk (2 points). Urban inhabitants will be examined in each region. In the Republic of Belarus 4 points of rural inhabitants (in different parts of country) will be examined.

The number of examinees in each age group in each locality will be 50 (equal quantity of males and females).

Systematic method of sampling will be used.

The following table shows the composition of the planned contingent for survey.

Point\age	5–6	12	15	18	35–44	65–74
Minsk (point 1)	50	50	50	50	50	50
Minsk (point 2)	50	50	50	50	50	50
Brest	50	50	50	50	50	50
Grodno	50	50	50	50	50	50
Gomel	50	50	50	50	50	50
Mogilev	50	50	50	50	50	50
Vitebsk	50	50	50	50	50	50
Village #1	50	50	50	50	50	50
Village #2	50	50	50	50	50	50
Village #3	50	50	50	50	50	50
Village #4	50	50	50	50	50	50
Total 3300						

3. Selection of epidemiological survey methods

Methods: 1. DMFT.

2. CPITN.

Special card, recommended by WHO, 2013 will be used.

4. Calibration of examiners, training of clerks. Schedule of survey

Budget epidemiological survey: instruments and materials (see below), travel expenses for 9 people for 14 days, remuneration of 9 people.

Carrying out calibration of examiners (3 teams). The consistency level for most assessments should be in the range of 85–95 %. Each team will consist of epidemiologist, recording and organizing clerk. Carrying out of recording clerk training.

Daily and weekly schedules should be prepared.

5. Planning of statistical data analysis

Description of statistical programs and methods of data processing is necessary.

6. Evaluation of any ethical problems

Permission to examine population groups must be obtained from the relevant local, regional or national authority. It is necessary obtain informed consent from the surveyed patients. A written permission from parents should be obtained before children can be examined.

7. Collection of epidemiological data (organization of epidemiological survey).

Examinations will be carried out by 3 teams of researchers.

The examination will require the following tools:

1. Dental mirror
2. Dental probe
3. Periodontal probe CPITN
4. Rubber gloves
5. Masks
6. Protective glasses
7. Survey cards
8. Disinfectants, gauze, paper hand towels, containers for instruments, basin, autoclave (domestic pressure cookers).

Each team needs 30 sets of instruments.

Examination will be carried out under the same conditions (position of examinees and lightning – artificial or day). Survey data will be entered in the standard form of the WHO. Results of an epidemiological survey may be submitted to the WHO Global Oral Health Data Bank (Geneva).

Survey on self-assessment of oral health and risk factors may be planned.

Self-assessment of oral health may be conducted through use of questionnaires, recommended by WHO.

Gathering common information.

8. Analysis of the data obtained. Writing a research report

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