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Development of Single Automated Nutrition Monitoring System in the Sakha Republic (Yakutia)

ABSTRACT

Taking into account the priorities of nutrition policy for the evaluation of actual nutrition following research samples were formed: pregnant women, nursing mothers, young children, pre-school and school age, various groups of the adult population. The results showed an irrational nature of the actual supply and inadequate eating behavior among different groups of the population of Yakutia and were the rationale for development of legal acts, policy documents, information, scientific, methodical and educational and training systems, including the development of creation of an automated system for nutrition monitoring of different groups of the population.

Keywords: monitoring of actual nutrition, automated system, information technology, single database

Influence of a complex of extreme climatic, socio-economic, environmental factors in the North is reflected in dynamic changes of adverse health status of different population groups. Climatic conditions and regional features have significant impact on the body's needs for nutrient and energy.

Poor nutrition of different groups of population of the Republic of Sakha and its proven relationship with deficient states and alimentary-dependent diseases, ill-defined policy priorities in the field of healthy nutrition of population in the Republic, poor quality assurance and food safety, as well as the lack of concrete measures to prevent the supply on the consumer market substandard and dangerous food products and their turnover on it showed the need for a well-functioning system of monitoring implementation, including the collection, storage, processing and dissemination of the data received.

In this connection, a group of scientists and programmers decided to form a team of developers to create a system for nutrition monitoring in the Republic favorable for optimizing the structure of nutrition and prevention of alimentary diseases.

The aim of monitoring is a distribution of a system for improving of nutrition to all social institutions (educational, health care, social development etc.), formation of a common data base to reflect objectively the condition of all catering system in the Republic and the dynamics of its development.

To achieve this purpose we had to create a unified methodology of monitoring; developed digital system of nutrition monitoring in the regions of Yakutia; conducted training seminars on introduction of monitoring; conducted regular consultations and methodical assistance and technical support of the regions of the Republic; made data collection and analyses on the implementation of measures to improve catering services; promoted internship sites. Therefore we created special web-portal.

Using digital system of management, given data are analyzed on further directions: health condition; characteristics of kitchen for their compliance with the requirements of sanitary rules and regulations, constructive

codes and regulations, as well as modern catering technologies; models of nutrition; characteristics of nutrition; availability of nutrition in accordance with the sanitary standards and regulations, catering organizers, pricing, cost, subsidies for catering from the budgets of all levels and extra-budgetary sources; system of electronic cashless payments (in the calculation of basic and supplementary nutrition); researching mass opinion on nutrition; promotion of a healthy diet, conducting control over quality and safety of products; implementation of regional and municipal programs on improving nutrition; training, retraining and skills development, work of internship sites, resource and other methodical and consulting centers for improving nutrition in institutions.

To estimate the actual nutrition the following methods are used: the balance method on the basis of a sample survey of household budgets; methods of retrospective nutrition playback - analysis of the frequency of food consumption and a 24-hour food recall; statistical techniques - menu-layout analysis. The research takes into account the diets of people living in environmentally disadvantaged areas. They should be drawn up and adjusted not only in line with the principles of sustainable, balanced diet, but also taking into account the increased demand in a number of nutrients that provide non-specific resistance and implementing mechanisms of nutritional adaptation to the impacts of priority pollutants facilities habitat in the area. For example, enrichment rations with a number of nutrients is important for nutritional regulation of metabolism of xenobiotics priority (lead and cadmium) direct anti-toxic effect (dietary fiber, calcium, iodine, zinc, vitamin C, group B, β -carotene). Also, the disruption of the structure of nutrition for pregnant women and nursing mothers requires the formation of a strategy to eliminate imbalances in the diet, development of a system for monitoring the level of provision of these groups with the main macro and micronutrients and implementation of appropriate preventive technologies correcting nutritional profile. Analysis of diets of workers employed in hazardous conditions of work, shows the need for the development of medical and preventive measures of alimentary-dependent diseases based on evidence-based approaches and modern technologies of catering and nutrition correction, as well as features of the toxic load of production, that is - the development and implementation of the system of nutritional prevention and diet therapy for operating companies in order to reduce general and occupational morbidity and mortality. To carry out a correct evaluation of the relationship with health food it's necessary to conduct organization and monitoring of actual diet and nutritional status on standardized procedures using common criteria and approaches, as well as to create conditions for inter-agency cooperation in the exchange and analysis of information. This trend can be seen in the future as part of socially-hygienic monitoring, as part of monitoring the quality, food safety and public health.

In recent years the policy of the President and the Government of the Republic of Sakha supports innovative biotech projects in the field of improvement life level of the population, especially among children and adolescents and youth. According to the Russian Law "On education" (Article 32, 51) the organizer of education is required to obtain the material conditions of the training process, including - the organization of nutrition of students in accordance with the Sanitary rules and regulations. According to them, on the basis of medical and hygienic regional assessment of actual nutrition and dietary habits among children and adolescents in educational institutions of the Republic of Sakha (Yakutia), there were developed unified diets - menu with the inclusion of food products from local raw materials. Calculation of power was held on an information system based on the decisions of line "1C: Planned nutrition", a unified menu is approved by the Office of Rospotrebnadzor for the Republic of Sakha (Yakutia), in August 2013, adopted by the Resolution of District administration of Yakutsk.

The line of "1C: Planned nutrition" consists of computer programs and information products for the collective management of nutritional department in educational institutions, health care, social protection (kindergartens, schools, hospitals, health centers, health camps), as well as in other cases, when the catering is

organized routinely, with the preparation of a typical menu that corresponds to norms of consumption (in natural product groups, indicators of nutritional value, value): "1C: Preschool Nutrition", "1C: School Nutrition", "1C: School Canteen", "1C: Planned Food Plant", "1C: Medicine. Dietary Nutrition", "Rezepturnik (version 3)" "Evaluation of Nutrition - Nutritest". These programs contain calculation, accounting products and nutritional calculations for industrial or small food suppliers to many nutrition units; electronic collections of recipes and sample menus. The format of presentation includes the entire set of technological and nutriologic information about dishes, foods menu. Complete information and software packages for viewing and downloading in a ration system designed for everyday calculations are available on distribution channels of the company "1C".

When publishing a new "Sanitary Rules" (thereafter SanPiN) and other official documents regulating the social catering, the developers make changes to the program. SanPiN-2409 adopted in 2008 on school nutrition contained new forms routing, sample menu, diet sheets analysis, journal of defective production. The program models have been added to output forms (reports themselves were in the program before). Adopted in 2010 SanPiN-2660 for pre-school contains the recommended form of a sample menu, routing, grading. Models of output forms have been added into the program, previously existing have been abandoned due to the wishes of users and the formal nature of the changes.

All the substantive requirements of SanPiN according to requirements of standard menu, recipes approval, the order of drawing up menus, control technology have been incorporated in the design of the program (before the adoption of SanPiN), therefore these provisions do not require software updates.

According to wishes of the users, not confirmed by official sources, there is currently being prepared a new edition of SanPiN on school nutrition. A new release is planned after the approval of the document.

Not only SanPiN, but other official documents of "Instruction on Budget Accounting" (approved by the Ministry of Finance), "Rules of service of catering" (approved by the Government of the Russian Federation) reflect the composition of the program. Typical forms of primary accounting documents are approved by the State Statistics Committee. Regional guidelines on nutrition are taken into account in approving the program of the state administration authority or supervision. Other requirements are implemented as a complement, as development and connection of new external reports and data processors are included in the delivery.

Updates of "1C" configuration are available to all users with a valid subscription to information and technological support: automatically on the site "1C"; through partners of the company "1C", providing services to information technology support; by user himself (rarely used).

To ensure nutritional calculations in the program, characteristics of nutritional value of foods, dishes and menu structure can be supplemented and modified. It's actually possible when you change the composition of nutrients in the form of new SanPiN. The database contains information on the nutrient composition of an expanded, even on unused at this time characteristics. The user can also add a nutrient and then enter values for it to all products.

There are some plans to develop. For example, a "Module "Nutrition" (for" Government Accountants)" - means free nutritional calculations for the accountants performing the work and practical nutritionist for the development, calculation and design of the menu. Work of storekeeper without reference to a desktop computer is supported by software "MobiSellAppa" for smart phones and tablets on Android, sharing via web services with "1C: School meals" and others.

Sharing with "1C: Accounting" by means of "Universal treatment upload / download" and exchange is planned to expand by including sharing plans. Transfer to the new version of the platform "1C: Enterprise" and "

Library of Standard subsystems" that will provide work in service mode technology "1C: Fresh" is being planned. The elaboration of "Monitoring of social nutrition," is started which is planned as a runner solution for regional governments or district level, providing them with operational information across the network subordinate kitchens, with the variable composition of controlled characteristics. In addition to "Bulletin board", the system is designed to detect anomalies (deviations from the normal) for the operational management decisions. For efficient data acquisition while minimizing labor costs there will be provided a mechanism to automatically obtain information on the system "1C: School Nutrition."

In the process of organizing the nutrition of children and adolescents in educational institutions and other social institutions, there are used a huge number of different documents. To improve staff efficiency, reduce the press on specialists and prevent errors, most documents can and should be conducted in electronic form. But the main condition for the proper documentation in electronic form is to standardize documentation in form and content.

Here is an incomplete list of documentation on nutrition of students and pupils, which is available and/or conducted in the nutrition unit, in the kitchen plant – providing feeding of a company (hereinafter – PFC), or in an educational institution, and the availability and/or maintaining of which is advised to conduct electronically: regulatory and guidance documents; technical documents for products of nutrition; standards (GOST) and specifications for purchased products; diets and menus – standard; Documentation on budgetary accounting, including menu-demand (Form OKUD 0,504,202) and cumulative list of product flow (form OKUD 0,504,037); Documents quantifying food, raw materials, and so on; information about the presence of the Documents confirming the quality and safety on the obtained (purchased) food products, materials, machinery, equipment, detergents and disinfectants; Documents in the system of production control and quality management of products (services), including the results of monitoring logs; Documents with information for consumers, including a daily menu.

It requires some explanation. First, about the possibility of conducting all the listed documents in electronic form in normative legal acts, as a rule, there are no permitting or prohibiting provisions. However, considering that the practice of electronic document has not yet been sufficiently disseminated, advocacy efforts are needed with representatives of the regulatory and supervisory authorities in the field for the possibility and expediency. Another question that is not resolved in the work of most kitchens - is to ensure qualified acceptance of the quality of incoming raw materials and finished products. The most important condition for this is the fact that those who are responsible for the acceptance of goods, should access information on existing quality requirements of all kinds of goods - in the form of a library of national standards and technical specifications for all types of products. Unfortunately, the manufacturers that produce the products according to technical specifications (TS) or standards organization (SO) are often reluctant to provide these documents to consumers of their products. Meanwhile, in the case of purchase of goods for the needs of the organized nutrition of social institutions, manufacturers are required to provide information on the quality of supplied products, this is requirement for such supplies. An alternative case is to place the TS (SO) on the official website of the manufacturer - the practice, unfortunately, has not yet received sufficient distribution.

Another important condition for electronic document management system of preschool and school nutrition is the ability to transfer data electronically. This is impossible without standardization of requirements for the format of documentation in electronic form. A common practice is to standardize a single file requirements for export and import and transfer of information (usually - a file of format XML). As a good example of such a format can be developed and used data format "Retsepturnik" which is used in the line of decisions "1C: Planned nutrition". It should be noted that the statement of requirements for the unified design of the menu, flow charts and other

documents are designed not only to make document management easier. It is also a necessary condition to guarantee the absence of errors, a common understanding of the requirements for menus and diet, the nomenclature of the products used. A very important condition for the proper conduct of the documents is unified indicating the name of food used in nutrition.

Analysis of the documents in the pre-school and school nutrition has shown that many problems are caused by lack of common terminology applied to the names of food products, when the same names are understood differently by different participants in the organization of supply.

Thus, there is an obvious need to introduce unified classification of food for nutrition of children and adolescents and the formation of a single product line, containing accurate and convenient names for practical use of them.

To solve this problem, the authors of the publication have created classification of food products, as well as they have compiled contributed unified product line (hereinafter - UPL) for the organization of nutrition in educational institutions, and other social institutions.

UPL is a systematized, replenished, convenient from a practical point of view, list of names of food products intended for the formation of diets of children and adolescents. This nomenclature conditionally awarded to each type of food: permanent full name, corresponding short trade sign, numerical sign (Code). The range allows identifying food product, to specify product names consistently in compiling menus and to develop technological charts for the products; it allows you to organize accounting products using the computer, which meets the requirements of the legislation on public procurement.

To specify brands and ordering information on manufacturers of food products included in the UPL, there was created "List of food for nutrition of children and adolescents", which is currently conducted under "Scientific and Research Institute of Baby Nutrition" using the developed by the participation of the authors of the publication information system for processing and storage of data on the food (computer program registration № 2010615918).

Therefore, standardization of regular, technical documentation and nutritional information in electronic form of the nutrition in social institutions in the Republic of Sakha (Yakutia) and the integration of used in this automated information systems with databases on food and nutrition, ensure compliance with all requirements of nutrition - as a hygienic, as economical.

A unified automated system for monitoring of nutrition, which will include all above mentioned parameters and characteristics, will make the work of the nutrition organizers more efficient, and give the best possible prospects of providing quality food safety for the health of the population.

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