Methodical Instruction N. 10
for the 2d year students’ self – preparation work
(at class and at home)

<table>
<thead>
<tr>
<th>The subject under the study</th>
<th>Hygiene and Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module No.</td>
<td>1</td>
</tr>
<tr>
<td>Topic</td>
<td>Method of food poisoning case investigation</td>
</tr>
<tr>
<td>Year study</td>
<td>2</td>
</tr>
<tr>
<td>Faculty</td>
<td>Stomatological</td>
</tr>
</tbody>
</table>

1. The topic basis:
All cases of food poisonings are exposed to the obligatory account and research with the purpose of establishment the reasons of their occurrence, and realization of preventive measures for liquidation their consequences. For this purpose it is necessary to know rules and order of filling of the documentation at detection cases of food poisonings.

2. The aims of the training course:
A=1. 1) To have general knowledge of the topic studied;
A=2. 2) To understand, to remember and to use the knowledge received;
A=2. 3) To learn hygienic requirements to content of dust;
A=3. 4) To form the professional experience by reviewing, training and authorizing it.

3. Materials for the before – class work and self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:
To know
Preclinical disciplines - the notion of food poisonings and their classification;
- sanitary-hygienic characteristic of food poisonings of microbic, nonmicrobic and non-identified ethiology and their prevention.
To be able to
- investigate the cases of food poisoning of different nature;
- perform the act of food poisoning investigation.

3.2 The contents of the topic:

Text:
Food poisonings are non-contagious, are more often the sharp and mass diseases, caused by the use of substandard food, containing microorganisms or toxins of a various origin.

CLASSIFICATION FOOD POISONINGS:

FOOD POISONINGS MICROBE AETIOLOGY.
1. Toxicoinfections are caused by hit in an organism food, containing the alive microorganisms making in organism toxins. Specific activators are salmonellas, potentially pathogenic microbes such as intestinal stick (E. Coli), Proteus, etc.
2. Bacterial toxicoses (the old name - food intoxications) arise at hit in organism
products, containing bacterial toxins. Representatives are staphylococcal toxicosis, botulism.

3. Mixed aetiology diseases when in food are both alive microbes and bacterial toxins - for example, salmonellas + staphylococcal toxin.

**TOXICOINFECTIONS.**

**Product sources:** meat products, especially forcemeat, eggs, fish, lactic products.

**Conditions when products become dangerous for Toxicoirfections:**

1) The reasons of hit activators in products:
   a) Using ill and tired animals, wrong cutting animal carcass,
   b) Wrong storage and transportation products, processing of crude and ready products on one board, one knife etc.,
   c) Non-observance by the personnel food objects rules of personal hygiene, absence regular physical examinations of the personnel, attraction to work casual people,

2) The reasons of duplication and preservation activators in products:
   a) Wrong storage - non-observance temperature and terms of realisation,
   b) Insufficient thermal processing

**Clinic of Toxicoinfections.** There are 5 clinical forms:

1) Gastroenteritic form, 2) Typhoid form, 3) Choleric form, 4) Dysentery form, 5) Grippe form.

**The main causes of Toxicoinfections**

**Sources of infectivity of food products**

1. Sick animal
2. Polluted water
3. Polluted utensils
4. Polluted equipment
5. Polluted apparatus
6. Polluted transport
7. Polluted rooms of food department
8. Infected food products
9. Carriers of bacilli: -man, cast, dogs, poultry
10. Carriers of microbes - flies, etc.
11. Non-observance of the rules of personal hygiene

**Disturbances of technological processes in food cooking**

1. Insufficient thermal treatment of food products (meat, fish and so on).
2. Insufficient sterilisation of tinned food.
3. Insufficient pasteurisation.
4. A small quantity of preservative (antiseptics, sugar, vinegar, salt and others).

**Disturbances of sanitary and hygienic conditions of storing and realisation of food products**

1. Delay in realisation of ready food storing.
2. Storing of ready food.
3. Under high temperature conditions.
4. Storing of boiled food in thick layers.

**Prevention of Toxicoinfections.**

Elimination the reasons of hit and duplication activators of Toxicoinfections in products (see higher).

**BACTERIAL TOXICOSES**

Group of food poisonings microbe aetiology caused by the microbe toxins, which have collected in products.

1) Staphylococcal toxicosis.
The reason is golden staphylococcus it is capable to produce exotoxin in feed. Products are as sources: dairy products, creams, pies, cakes, dairy, fish and meat products.

Conditions of hit staphylococcus and forming by it toxin in products:

a) Staphylococcal diseases of the personnel of eating establishments -quinsy, pustular diseases of a skin of hands,
b) Wrong storage - at room temperature, non-observance terms of realisation.

Clinic: gastroenteritis at high temperature, diarrhoea seldom, in heavy cases - infringement cardiac system, dehydration of organism.

Prevention: physical examinations the personnel correct storage products, it is especial for cakes and pies in a hot season.

2) BOTULISM

The reason is formation in food product exotoxin of botulinum stick - Clostridium botulinum. Features of the activator:

a) Spore-making - spores maintain boiling 4-5 hours, (in the vegetative form - only 15 minutes), maintain action preservatives - salts, vinegar, sugar long time,
b) Obligate anaerobe microbe - develops without access of oxygen (canned food),
c) Under certain conditions (+ 10 - + 30° C without oxygen) is formed the strongest neurotropic exotoxin - a fatal doze for person 35 micrograms.

Products are as sources: earlier in Germany in 19 century - cooked and blood sausages ("sausage poison"), dry-cured and cold smoked fish, now it is especial frequently - canned food (mushroom, vegetable domestic preparation - it is difficult to destroy spores in domestic conditions), sometimes - dry-cured and smoked meat, a canned meat.

Clinic of botulism.

Toxin amazes central nervous system - in oblong brain-nucleus skull-brain nerves. Are amazed more often:
- Nucleus of nerve oculomotorius - squint, ptosis, anisocoria, frustration of accommodation,
- Nucleus of an optic nerve - fog, "grid" before eyes,
- Nucleus of glossopharyngeal and hypoglossal nerve - infringements of speech up to aphonia, infringements of swallowing,
- Nucleus of facial nerve - disappearance tonus of mimic and chewing muscles,
- Nucleus of vagus nerve - increase pulse at the normal or lowered temperature, defecation is normal or propensity to locks (as against other microbe food poisonings!).

Then are spasms, pains in muscles, defeat vessel, respiratory centres of central nervous system - death. The mortality at not treatment botulism is up to 70 %, at treatment - up to 30 %.

Treatment of botulism.

This is introduction of antibotulinic serum or antitoxin (doze at once 15000 IU, repetition in doze 5000 IU in 5 hours). At the use suspicious product preventive doze is 2000 IU.

Prevention of botulism.

Strict observance temperature technology preparation canned food, dry-cured fishes, and meat. Domestic conservation - in small banks at long time of boiling, storage canned food at temperature less than 10 degrees.

FOOD POISONINGS NOT MICROBE AETIOLOGY.

1. Poisonings with poisonous mushrooms.

Between many mushrooms, which people can collect in forests, some kinds are very poisonous and can give heavy intoxication.

Poisoning by Amanita phalloides.

Contains amanitotoxin and ammonitohemolysin. Block all kinds of metabolism, first of all carbohydrate and water. Sharp gastroenteritis is cholera-like diarrhoea - dehydration of
organism - infringements of central nervous system and cardiac system (sharp falling the blood pressure). Hemolysis of erythrocytes is displayed pallor of skin and sharp hepatic insufficiency - jaundice of skin. Death is from collapse.

**Poisoning by fly agaric (Amanita muscaria).** Atypical appearance - sometimes mask under edible mushrooms. It contains muscarine what causes changes of nervous system. There are in clinic: gastroenteritis, perspiration, tearing and salivation, expansion of pupils. Defeat central nervous system as alcoholic poisoning. Death is from paralysis of the respiratory centre.

**Prevention poisonings by poisonous mushrooms.**
1) Acquaintance of the population to poisonous mushrooms by sanitary-educational work: lectures, conversations, and posters use mass media (radio, TV).
2) The control at the sale places (in the markets) - sale mushrooms must be only under the sanction of the sanitary medical assistant.

2. **Poisonings by poisonous wild growing plants** are most typical at children's age. Reason is usage of plants with m-cholinolytics such as *atropine*, *scopolamine* - *belladonna, and dope*. On background of gastroenteritis - expansion of pupils (belladonna - the beautiful woman), spasm of accommodation (infringement of sight on close distance), dryness and reddening skin and mucous, hoarse voice, lock. At poisoning dope human is arisen hallucinations and oppression central nervous system (CNS). After recovery human may have the remote effects on CNS such as amnesia etc.

**Prevention poisonings by poisonous plants.**
1) Destruction it at territory of children's pre-school establishments.
2) Control children in parks. Sanitary educational work with tutors.

3. **Poisonings with products sometimes or in part poisonous.**

**Solanine in potato.** It is in growing and become green potatoes. It has irritating and haemolytic action. Gastroenteritis may be easy and average degree of weight.

**Phasin in string beans.** Its toxin gives irritation and hemagglutination action. Destruction toxin may be at long thermal processing. In case of this food poisoning gastroenteritis are easy and average degree of weight.

**Amygdalin in stone fruits.** Most of all are in bitter almonds, in stones of apricots, peaches, cherries etc. In an organism breaks up with allocation prussic acid - blockade of fabric breath. In heavy cases it may be loss of consciousness, short wind, plentiful vomiting, diarrhoea, spasms, death in 2-9 hours from paralysis of the respiratory centre.

4. **Poisonings by heavy metals.** The reasons are:
   a) From utensils (the zinc buckets, copper utensils, glaze on pottery),
   b) From the ground polluted with heavy metal lead (about highways)

**Zinc and copper (cuprum).** Basically act from utensils at storage in it sour products. Not heavy gastroenteritis - in intestines are formed albuminates of copper and zinc - are not soaked up in organism - ulcerating, irritating action at intestines.

**Lead.** It does from utensils (glaze) and ground. Poisonings are usually chronic. Clinic is lead triad: lead enccephalopathy and polyneuritis, lead pains, lead border on gums. In blood - basophilic granularity in erythrocytes, reticulocytosis, increase contents of lead in blood and urine (more than 0,04 mg /l).

Prevention: a) hygienic standardisation heavy metals in products and the control observance maximum permissible concentration, b) prevention transition metals from container, utensils.

5. **Food poisonings by agrochemicals.**

5.1 **Food poisonings by pesticides.**
Pesticides are chemical means for protection plants from wreckers, illnesses and weeds.
Without application of them is loss 50% of crop. Their accumulation in products is sometimes possible above maximum permissible concentration and development poisonings.

The reasons accumulation pesticides in products:

a) Application the non-authorised preparations (very proof or toxic),
b) Excess the established norms of the charge or frequency rate of processing,
c) Non-observance term of expectation - time between last processing of plants and harvesting.

The clinic poisonings depends on group of pesticides - chlorine-organic, phosphorus-organic, carbamates, etc. They blockade enzymes such as cytochrome oxidase, cholinesterase).

5.2 Food poisonings by fertilisers.

Fertilisers - substances for increase productivity plants. Nitric fertilisers are most of all applied. Thus can collect in plants nitrates (salts of HNO$_3$) - in organism they are restored in nitrites (salts of HNO$_3$), connect with haemoglobin and make methemoglobin in blood (methemoglobinemia) and absence transport of oxygen in blood - in organism there is hypoxia. Are especially dangerous to children of first 3 months.

At high levels of nitrates in products can arise problem nitrozo-combinations (NS) - has cancerigenic effects.

6. Food poisonings by food additives.

More than 5000 chemical substances are now use as food additives – dyes, aromatics, emulgents, preservatives, flutters etc. Poisonings occur at application the non-authorised additives or excess their permissible amount.

Mycotoxicoses.

The food poisonings caused by toxins microscopic mould mushrooms on bakeries (grain, flour) at storage in crude conditions.

Ergotism. It is at hit in organism grain with ergot. Toxins are ergotoxine, ergotamine, and ergometrine. They cause spasm smooth, then they cause another muscles.

In clinic distinguish 3 forms:

a) Convulsive, b) Gangrenous, c) Mixed - combination of 1 and 2 forms.

Ergotism it is especially dangerous for pregnant - spasm of smooth muscles of uterus - abortions, premature birth.

Fusariotoxicosis. This is a poisoning with "drunk bread". Microscopic mould mushroom kind Fusarium graminearum. In clinic - gastroenteritis + defeat CNS as alcohol intoxication.

Alimentary toxic aleukia. Up to 1944 year it is "septic quinsy": microscopic mould mushroom sort Fusarium - develops in the grain, which has wintered under snow. Deep infringements of blood forming, leuko- and trombocytopenia. The main attribute is aleukia (in 1-2 weeks) sharp decreases leukocytes, increases lymphocytes. It is heavy necrotic quinsy and sepsis. Mortality is 50-80%.

Aflotoxicoses. Microscopic mould mushroom Sort Aspergillis. On peanut and peanut flour, on grain, corn, nuts, rice at storage in damp conditions at the increased temperature. Cause heavy defeat of liver and have cancerigenic effect on liver - initial cancer of liver (earlier they are basically in Africa and Asia). Now they are often in Crimea and on South Ukraine (in conditions hot climate).

FOOD POISONINGS NOT INVESTIGATED AETHIOLOGY

Urov illness (Kashin - Beck illness). Now it is established, that it is hyperpolymicroelementosis (many strontium, manganese and fluorine in ground, water and feed). Endemic disease is registrated near the river Urova in Eastern Siberia and some other territories on the Earth. In clinic it is deformation skeleton during growth, heavy exchange infringements.

Gaffen illness. Gaffen gulf in Holland. It is at use fish from some reservoirs in some
periods. The official diagnosis is alimentary paroxysmal -toxic myoglobinuria. Attacks of sharp muscular pains + sharp renal insufficiency in view of Myoglobinaemia. It is necessary hemodialysis.

**Poisoning with meat of female quail.** Sometimes it is gastroenteritis different degree of weight. The reason is not established.

**TACTICS OF THE DOCTOR AT SUSPICION ABOUT FOOD POISONING**

1. Statement the preliminary diagnosis on the basis:
   a) Gathering the food anamnesis at the victim or relatives,
   b) Clinic with characteristic symptoms
2. Rendering emergency medical service under vital indications -cardiacs, respiratory analeptics, etc.
3. Confirmation the diagnosis: gathering and sending in laboratory SES (department Hygiene of feed) with "Accompanying direction on laboratory investigating” the rests of food, washing waters of stomach, emetic weights, faeces, blood, urine.
4. Desintoxication therapy: washing stomach, plentiful drink, antibiotics, and droppers. At botulism it is necessary antibotulinic serum, antitoxin.
5. Prevention spreading flashes of food poisoning - "Emergency notice on food poisoning" - doctor send to SES and inform SES by the phone. After reception of the emergency notice doctors SES within 24 hours will carry out investigation of food poisoning - sanitary inspection public eating establishment, honey.
6. At the appropriate indications it is necessary hospitalisation patient in infectious department of hospital by first aid.

3.5. Self-control material:

A. **Questions to be answered:**
   1. Tactics of the doctor at detection of a food poisoning.
   2. Rules of selection food tests for the laboratory analysis.
   3. Rules of registration the documentation in case of detection of a food poisoning (name of the documents, order and terms of their registration).
   5. Scheme of investigation of a food poisoning.

B. **Test tasks to be done:**

1. What document does the doctor send at detection of a food poisoning for SES?
   A. A history of illness.
   B. A hospital sheet (Information).
   C. The statistical coupon.
   D. The emergency notice on a food poisoning.
   E. An accompanying direction for the laboratory analysis.

2. **What preventive measures of food poisoning by poisonous mushrooms you know?**
   A. Destruction it at territory of children's pre-school establishments.
   B. Sanitary-educational work.
   C. Hygienic standardisation.
   D. Prevention of transition from container, utensils.
   E. Control in forests.

3. During what term after poisoning the investigation of a food poisoning should be carried out?
   A. 7 days
   B. 24 hours
C. 12 hours  
D. 10 days  
E. 72 hours  

4. What is reason of botulism?  
A. Formation of endotoxin in food product.  
B. Formation of endotoxin in human organism.  
C. Formation of exotoxin in human organism.  
D. Formation of endotoxin in blood.  
E. Formation of exotoxin in food product.  

5. What are symptoms’ characteristic for botulism?  
A. Dehydration of organism.  
B. Gastroenteritis at high temperature, diarrhea.  
C. Increase pulse at the normal or lowered temperature, defecation is normal or propensity to locks.  
D. Infringement cardiac system, dehydration of organism.  
E. Hallucinations and oppression central nervous system.  

6. In a children’s preschool establishment, menu includes such dishes: milk porridge, macaroni with boiled meat, cucumber salad, kissel, rye bread. Which of the listed dishes must be removed from menu?  
A. Macaroni with boiled meat  
B. Rye bread  
C. Milk porridge  
D. Cucumber salad  
E. Kissel  

7. A girl was admitted to a hospital. During examination it is revealed: the body temperature is 36.0°C, the skin and mucous membranes are pale, the girl is adynamic. The pupils are dilated, response to light is decreased, the voice is hoarse, the mucous membrane of the mouth is dry, during swallowing water moves through the nose, and there was no defecation within two days. Before this she ate porridge, fried eggs, boiled sausage, home-made canned cucumbers, and fried potatoes. Which disease is the most probable?  
A. Dyskinetic constipation  
B. Salmonellosis  
C. Infectious encephalopathy  
D. Botulism  
E. Staphylococcus intoxication  

8. During irregular storage germinated potatoes have bitter taste. What poisonous substance contained in such potatoes can cause food poisoning?  
A. Gelvelic acid  
B. Muscarin  
C. Solanin  
D. Phasin  
E. Muscaridin  

9. A sickness in a children’s establishment began suddenly in 2-3 hours after eating cottage cheese made of sour milk. All victims had numerous vomiting, pains in the abdomen, watery feces, pale coverlets, in some children – insignificant increase of body temperature (to 37.3°C). Clinical manifestations passed during a day. What is the most probable diagnosis?  
A. Acute intestinal infection  
B. Staphylococcus toxicosis
C. Mycotoxicosis
D. Poisoning with salts of heavy metals
E. Food toxicoinfection

10. What is danger of using ground-nuts flour in nutrition under conditions of hot climate?
A. It can be source of erysipelas.
B. It can be source of trichinellosis.
C. It can be source of aphylatoxin.
D. It can be source of cholera.
E. It can be source of haemeralopia.

Situational tasks
1. On August 30 last year, for 21 hours, residents of one of the villages (a total of 91 people) complained of fever (38 °C and above), headache, epigastric pain, nausea, vomiting, diarrhea. All the victims were at the wedding, which began at 11:00. The dish was prepared in the evening. Due to the fact that there were only 2 refrigerators, meat, gammon, cutlets were in the kitchen in the cellar. It was hot outside, the temperature during the day was 25-29 °C. In the rest of the product, vomiting and fecal masses were found the culture of Salmonella enteritidis. Identify and prove the possible cause of food poisoning, identify products that can cause food poisoning. List the preventive measures required in this case.

2. During investigation of a food poisoning, which reason became a river fish a catfish (was caught, is salted within 5 days, then go in food), is revealed botulotoxin E. What measures should carry out the doctor in this case.

3. Among the pupils of a children's house the case of a mass food poisoning is revealed. The reason the use in food cakes with a cream stored on kitchen with infringement of a temperature mode has served. Name a method most effective and real in preventive maintenance staphylococcus toxicosis?

4. Self-preparation at class.

THE APPENDIX 1

THE PLAN of REALIZATION of PREVENTIVE MEASURES
(In the given case of food poisoning)
1. Realization of sanitary - educational work (to specify the forms).
2. Necessity of sanitary inspection of food object.
3. Necessity of inspection of the personnel of food object.
4. Necessity of withdrawal of products or closing of food object.
5. Measure on prevention of similar poisonings in home conditions.
6. Other measures.
The signature of the student _______________________

THE APPENDIX 2

THE CHEME of the ANALYSIS of SYMPTOMS of DISEASE (FOOD POISONING)
1. Name ill person ________________________________
2. Date, time of a beginning of disease, date of hospitalization
3. Basic symptoms: a nausea (+ -), vomiting, dyarrea, pain in the field of a stomach, temperature of a body (OC), headache, general (common) weakness, symptoms at eyes, omission century, expansion of pupils, dryness in a mouth, change of a vote, spasm, cyanosis, muscular pains, pain in joints, gripe phenomenon, blood in excrement, pulse, arterial pressure, Changes ofCNS.
The revealed symptoms are designated "plus" or "minus" is familiar, temperature in about °C, is underlined weight of disease (easy, average, heavy) It is necessary to specify:
4. The name of manufacture or establishment, where the collection of tests, their address is made
5. Specification of sanitary - epidemic inspection:
   - Date of a food poisoning;
   - Term of occurrence of symptoms of disease after acceptance of suspicious meal;
   - Description of the clinical phenomena at ill;
   - Number of the injureds;
   - Number hospitalized person;
   - Presence of cases with fatal outcome;
   - Preliminary diagnosis.
6. At presence of tests of several products it is necessary to specify, which of them is suspected as the reason of a food poisoning.
7. Purpose of research:
   - Establishment of the diagnosis;
   - Last visiting of children's establishment, school, hospitalization;
8. Place of hospitalization. 9- If a poisoning - to specify, where there was a poisoning, than has poisoned.
10. Primary antyepidemic measure.
11. Date and time of the primary signal system about disease (telephone, telegraph) in SES. The surname of the person, which has transferred the message. Who has accepted the message.
12. Date and time of sending of the notice. The signature of the person, which has sent the notice.
13. Date and time of reception of the notice SES, registration number in a magazine. The signature of the person, which has received the notice.

THE APPENDIX 3.

SCHEME of drawing up the act of investigation of a food poisoning

1. Name of doctor, date of drawing up of the act of investigation.
2. Description of a beginning of disease
3. Clinical condition of the patient
4. Statement of the preliminary diagnosis
5. To specify amount of the persons using a suspicious product
6. To .specify number ill person
7. To list a material sent for the laboratory analysis
8. To specify a place of the use of food, product.
9. To determine time past after reception of suspicious food
10. To determine, with what particularly product could become the reason of food poisoning
11. To make interrogation of the injureds with the purpose of revealing infringement organoleptic properties of food
12. To specify a suspected product or place and date of its manufacture
13. To make the brief description sanitary state of object of manufacture or reception of food
14. To specify the name withdrawn product
15. To specify results of laboratory research of a product
16. To make the proved conclusion in case food poisoning

The main causes of food toxicoinfections

| Sources of infectioning of food products | Disturbances of technological processes in food cooking | Disturbances of sanitary and hygienic conditions of storing and realization of |
1. Sick animal
2. Polluted water
3. Polluted utensils
4. Polluted equipment
5. Polluted apparatus
6. Polluted transport
7. Polluted rooms of food department
8. Infected food products
9. Carriers of bacilli: -man, cast, dogs, poultry
10. Carriers of microbes - flies, etc.
11. Non-observance of the rules of personal hygiene

1. Insufficient thermal treatment of food products (meat, fish and so on)
2. Insufficient sterilization of tinned food
3. Insufficient pasteurization
4. A small quantity of preservative (antiseptics, sugar, vinegar, salt and others)

<table>
<thead>
<tr>
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<tbody>
<tr>
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<tr>
<td>2. Storing of ready food</td>
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<td>3. Under high temperature conditions</td>
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<td>5. Storing of ready food under in-sanitary conditions</td>
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5. Self-preparation work at home.
1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic.

6. The subject of the research work.
1. The main sanitary-hygienic requirements to food department.

Literature recommended
- Main Sources:
- Additional ones:

Information Resources:
1. www.umsa.edu.ua
2. www.dovkil-zdorov.kiev.ua
3. www.who.int/topics/hygiene