Ministry of Health of the Russian Federation
Volgograd State Medical University

Department of Pharmaceutical and Toxicological Chemistry

GENERAL PHARMACEUTICAL CHEMISTRY

Quality control of medicines in pharmacies. Intrachemist's control.

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Discipline

GENERAL PHARMACEUTICAL CHEMISTRY

LESSON №10 Quality control of medicines in pharmacies.	Quality control of medicines in pharmacies. Intrachemist's control. Types of intrachemist's control.

QUESTIONS FOR THE LESSON

1. A set of measures to monitor the quality of medicines in the pharmacy.
2. Types of intrachemist's control.
3. The acceptance control.
4. The written control.
5. The polling (oral) control.
6. The organoleptic control.
7. The physical control.
8. The chemical control.
   - Obligatory qualitative analysis
   - Selective qualitative analysis
   - Obligatory full chemical analysis
9. The control over realisation.

QUALITY CONTROL OF MEDICINES IN PHARMACIES.

All production activities of a pharmacy are aimed at ensuring the high quality manufacture of medicines for the public and for Health-care facilities.

Quality control of medicines in a pharmacy setting involves a range of activities, which include:

- ✓ compliance with sanitary norms and rules, sanitary-hygienic and anti-epidemic regimes, asepsis rules for preparing medicines, pharmaceutical order in accordance with the current regulatory and methodological documents and orders;
- ✓ ensuring the terms and conditions of storage of medicines in the pharmacy in accordance with the physical and chemical properties and requirements of the State Pharmacopoeia, current orders and instructions;
- ✓ a thorough review of prescriptions received by the pharmacy and the requirements of medical institutions in order to verify the correctness of

their prescribing, the compatibility of the drugs that make up the medicines; compliance of the prescribed doses with the age of the patient;

- ✓ compliance with the technology for preparing medicines in accordance with the requirements of the State Pharmacopoeia, current orders and instructions.

In the Russian Federation, intrachemist's control is carried out in accordance with the **Order of Ministry of Health of the Russian Federation dated October 26, 2015 No. 751n "On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activities"**

The order regulates the manufacture and quality control of drugs manufactured in a pharmacy. Quality control of drugs manufactured in pharmacies should be carried out by a pharmacist-analyst accredited for this type of pharmaceutical activity. The specialist must own all types of intra-pharmacy control. The implementation of certain types of intrachemist's control is carried out by a pharmacist-technologist.

TYPES OF INTRACHEMIST'S CONTROL

There are 7 kinds of the intrachemist's control.

- ✓ The acceptance control;
- ✓ The written control;
- ✓ The polling (oral) control;
- ✓ The organoleptic control;
- ✓ The physical control;
- ✓ The chemical control;
- ✓ The control over realisation.

Types of intrachemist's control can be divided on: **obligatory** - each preparation made in conditions of a drugstore is exposed to the control, **selective forms** - are carried out depending on different factors (age of the* patient, the medicinal form, structure of a preparation).

All manufactured medicines are subject to obligatory the written control, the organoleptic control and the control over realisation.

The results of organoleptic, physical and chemical control of manufactured medicinal products, including in-pharmacy preparations and prepackages, concentrated solutions, trituration, ethyl alcohol are recorded in **the journal of the results of organoleptic, physical and chemical control of**

medicinal products manufactured by prescriptions, requirements and in-pharmacy preparations, concentrated solutions, trituration, ethyl alcohol and prepackages of medicinal products.

The following information shall be entered in this journal:

- ✓ date of control and number in order;
- ✓ number of the prescription, requirements, name of the medical organisation issuing them (if any);
- ✓ series number of an industrially produced medicinal product;
- ✓ composition of the medicinal product: substance or ion to be determined (to be specified in case of physical or chemical control of prescription dosage forms)
- ✓ results of physical, organoleptic, qualitative control (each on a scale: positive or negative), chemical control (qualitative and quantitative determination);
- ✓ full name of the person who has prepared, packaged the medicinal product;
- ✓ signature of the person who has checked the medicinal product manufactured;
- ✓ Conclusion on the results of the written control: satisfactory or unsatisfactory.

The journal recording the results of organoleptic, physical and chemical control of medicinal products manufactured in accordance with prescriptions, requirements and intra-pharmacy preparation, concentrated solutions, trituration, ethyl alcohol and packaging of medicinal products must be numbered, laced and signed by the head of the pharmacy (individual entrepreneur) and stamped (if applicable).

THE ACCEPTANCE CONTROL

The acceptance control is organised in order to prevent the receipt by a pharmacy or an individual entrepreneur of substandard medicinal substances used for manufacturing medicinal products, as well as substandard packaging materials.

All incoming medicines (irrespective of their source) are subject to acceptance control.

Acceptance control consists of checking incoming medicinal substances and medicinal products for compliance with the requirements on the indicators:

- ✓ "Description",

- ✓ "Packaging",
- ✓ "Labelling",
- ✓ as well as checking the correctness of accompanying documents, including documents confirming the quality of medicinal products (medicinal substances).

The "***Description***" control includes an inspection of

- external appearance,
- aggregate state,
- colour,
- smell of the medicinal product.

If there are doubts about the quality of medicinal substances, samples are sent to an accredited testing laboratory (centre) for additional testing. Such medicinal products marked "Denied for acceptance control" are stored in the quarantine area of the storage facility isolated from other medicinal products.

When checking the indicator "***Packaging***" special attention is paid to its integrity and compliance with the physical and chemical properties of medicinal products.

When controlling for "***Labelling***" indicator, compliance of the labelling of primary and secondary packaging of the medicinal product (substance) with the requirements of the quality control document, availability of the leaflet-insert in the national language in the package (or separately in the package for all quantities of finished medicinal products) is checked.

WRITTEN CONTROL

When a medicinal product is manufactured as well as intra-pharmacy preparations, a written control passport must be completed, stating

- ✓ date of manufacture of the medicinal product;
- ✓ prescription number or requirement number;
- ✓ name of a medical organisation, name of a department (if any); series number, quantity in a series - for medicinal products in the form of inter-pharmaceutical preparations;
- ✓ names of the medicinal substances taken and their quantities, the degree of homeopathic dilutions or homeopathic substances taken, the number of doses, signatures of persons who have prepared, packed and checked the medicinal product.

The written control passport must be completed immediately after the manufacture of the medicinal product, indicating the medicinal products in Latin, in accordance with the sequence of technological operations.

Written control passports are stored for two months from the date of manufacture of medicinal products.

- In the manufacture of powders, suppositories, the total mass, quantity and mass of individual doses shall be indicated.
- The total suppository weight, concentration and volume (or weight) of the isotonic substance added to eye drops, solutions for injection and infusion must be indicated not only on the written control passport but also on the reverse side of the prescription for the medicinal product.
- In the case of concentrated solutions, the composition, concentration and volume taken shall be indicated on the written control passport.
- All calculations for manufacturing a medicinal product are made prior to the manufacture of the medicinal product and are recorded on the written control passport.
- If the medicinal product contains narcotic drugs, psychotropic, poisonous and potent substances and other medicinal substances subject to quantity control, their quantity is indicated on the reverse side of the prescription.
- Where medicinal products are manufactured and dispensed by the same person, the written control passport shall be completed during the manufacture of the medicinal product.
- The manufactured medicinal products, prescription and requirement for which the medicinal products have been manufactured, the completed written control passport shall be submitted for inspection to the pharmacist performing control functions for the manufacture and dispensing of medicinal products.
- Control consists in verifying that the records in the written control passport correspond to the prescription or requirement and that the calculations made are correct.
- If the pharmacist-analyst has performed a full chemical control of the quality of the manufactured medicinal product, the number of the chemical analysis and the signature of the pharmacist-analyst shall be affixed on the certificate of written control.

POLLING CONTROL

Polling is carried out randomly and is carried out after a pharmacist has prepared no more than five dosage forms.

During the Polling control, the supervising pharmacist names the first ingredient of the medicinal product and, in the case of compounded medicinal products, also the quantity of the medicinal substance. The pharmacist who prepared the medicinal product then lists all other medicinal substances used and their quantities. If concentrated solutions are used, the pharmacist also lists their composition and concentration.

ORGANOLEPTIC CONTROL

Organoleptic control is a mandatory type of control and consists in checking the medicinal product according to

- ✓ appearance,
- ✓ smell,
- ✓ homogeneity of mixing,
- ✓ the absence of mechanical inclusions in liquid dosage forms.

The taste is checked selectively in dosage forms intended for children.

The homogeneity of powders, homeopathic triturations, oils, syrups, ointments, suppositories is checked selectively by each pharmacist during the working day, taking into account all types of manufactured dosage forms.

PHYSICAL CONTROL

Physical control consists in checking the total mass or volume of the medicinal product, the number and mass of individual doses (at least three doses) included in the medicinal product, the number of granules in one gram of homeopathic granules, the disintegration of homeopathic granules.

As part of the physical control, the quality of the closure of the manufactured medicinal product is also checked.

Medicinal products manufactured in accordance with prescriptions, requirements shall be subject to physical control selectively during the working day, taking into account all types of manufactured dosage forms, but not less than 3% of their quantity for the day.

Medicinal products manufactured in the form of intra-pharmacy are subject to physical control in an amount of at least three packages of each series (including prepackaging of industrial products and homeopathic medicinal products).

Physical control is obligatory for medicines intended for use in children under 1 year of age, containing narcotic drugs, psychotropic and potent substances, medicines requiring sterilisation, suppositories.

CHEMICAL CONTROL

Chemical control consists in assessing the quality of manufacture of medicinal products according to indicators:

- qualitative analysis: identification of medicinal products;
- quantitative analysis: quantification of drugs.

For chemical control, a special workplace shall be equipped with the necessary equipment, instruments and reagents, quality control documents and reference literature.

Qualitative analysis is obligatory:

- Purified water and water for injection daily from each bottle, for the absence of chlorides, sulphates and calcium salts. Water intended for manufacturing sterile solutions must also be tested for the absence of reducing agents, ammonium salts and carbon dioxide;
- all medicines and concentrated solutions from storage rooms to the drug manufacturing facilities;
- medicinal products arriving at a pharmacy in case of doubt as to their quality;
- concentrated solutions, liquid pharmaceuticals in burettes in the drug manufacturing premises when they are filled;
- prepackaged drugs of industrial production;
- Homeopathic medicinal products as intra-pharmacy. The quality of the medicinal product is assessed by the excipients.

During chemical control of purified water and water for injection, the purified water and water for injection must be recorded in ***journal of registration of results of control of purified water and water for injection:***

- ✓ date of receipt (distillation) of water;
- ✓ date of water control
- ✓ number of chemical analysis performed;
- ✓ number of bottle or burette from which water was taken for analysis
- ✓ The results of the control for the absence of impurities;
- ✓ pH of the water;
- ✓ Conclusion of the water analysis (satisfactory / unsatisfactory);
- ✓ Signature of the person who carried out the analysis.

The journal of registration of results of control of purified water and water for injection must be numbered, laced and stamped with the signature of the head of the organisation and the seal of the superior organisation.

Qualitative analysis should be carried out selectively on medicinal products of various dosage forms manufactured by a pharmacist during the working day, but not less than 10% of the total number of medicinal products manufactured by each pharmacist, except for homeopathic ones.

When carrying out chemical control of the identity of medicinal products in burettes and jars, the following information shall be obligatorily recorded in the journal of the results of control of medicinal products for authenticity:

- ✓ date of filling the burette, jars;
- ✓ serial number of chemical analysis;
- ✓ name of the medicinal product;
- ✓ drug series number or analysis number of the drug manufacturer;
- ✓ number of the jar to be filled in;
- ✓ substance (ion) to be determined;
- ✓ results of the control on a scale of "plus" or "minus";
- ✓ signatures of persons who have completed and verified the completion.

The journal of the results of control of medicinal products for authenticity must be numbered, laced and signed by the head of the pharmacy (individual entrepreneur) and stamped (if there is a seal).

Qualitative and quantitative analysis (full chemical control) is obligatory:

- ➢ all solutions for injections and infusions.
- ➢ sterile solutions for external use (ophthalmic solutions for irrigations, solutions for treating burns and open wounds, for intravaginal injection and other sterile solutions);
- ➢ Eye drops and unguents containing narcotic drugs, psychotropic, potent substances.
- ➢ All dosage forms intended for the treatment of infants and children up to 1 year of age;
- ➢ solutions of atropine sulphate and hydrochloric acid (for internal use), silver nitrate solutions;
- ➢ all concentrated solutions, trituration;

- intra-pharmaceutical preparations of each series;
- stabilisers used in the manufacture of solutions for injections and infusions, buffer solutions used in the manufacture of eye drops;
- concentration of ethyl alcohol in dilution, as well as in case of doubts as to the quality of ethyl alcohol upon its receipt by a pharmacy, to an individual entrepreneur;
- injectable homeopathic solutions;
- dosage forms prepared in accordance with prescriptions and requirements, in the number of at least three dosage forms when working in one shift, taking into account the different types of dosage forms.

CONTROL OVER REALIZATION

All manufactured medicinal products are subject to Control over realization, within the framework of which compliance is checked:

- ✓ the packaging of the medicinal product to the physico-chemical properties of the medicinal products included therein;
- ✓ the doses of narcotic drugs, psychotropic substances or potent substances specified in the prescription or claim - in relation to the patient's age
- ✓ details of the prescription, the requirement to the information specified on the packaging of the manufactured medication
- ✓ labelling of a medicinal product in accordance with the requirements set out in regulatory documentation.

If one of the above mentioned discrepancies is detected, the manufactured medicinal product shall not be dispensed.