

Information systems in pharmacy practice

What about is the lecture?

three main topics, which will be discussed:

- 1) Pharmacy information management systems
- 2) Information systems like information references for your pharmacy practice
- 3) SPC, PIL

Pharmacy Information systems

Complex computer systems - maintenance of the pharmacy.

Traditional pharmacy systems are focused on handling with prescription and on the inventory management.

New generation of these are pharmacy information management systems, where there can be followed patient medication profiles, new generation is able to cooperate with other systems and databases - like real time transmission knowledge of medicinal products from expert resources, alerts and warnings.

Pharmacy Information systems

- could be incorporated in the whole complex hospital management system.
- server plus station
- Thanks this is ensured:
 - Real-time sharing information for all users of this system

How to find the right or well designed System for your pharmacy?

There are mentioned some requirements:

- system availability
- possibility of improving - in accordance to new legislation requests
- recovery from failure / reliability
- response time

How to find the right or well designed System for your pharmacy?

This systems have to fulfill this functions:

- **Controlling of inventory and supplying management**
- **Storage, Security –**
- **Dispensing -**
- **Compounding - financial information for billing and charging,**
- **Other Administration – Reports**
- **Monitoring**

Where there is the eventual application of such software in the pharmacy?

- In the PC at the place of dispensing (and in the office)
- In some countries are used Automated dispensing cabinet or Packaging systems
- In the laboratory in the device called "Robotic IV automation devices"

some examples of Pharmacy information management systems

International. examples

- Best Rx (Best Computer Systems)
- Compusolve
- FSI Pharmacy Management System (Foundation Systems)
- HBS Pharmacy Software (Health Business Systems)
- IPS Workflow (Suite RX)
- Liberty (HCC)
- NRx (QS/1)
- OPUS-ISM
- PC1 (PDX)
- Pharmacy Management System (Cerner/Etreby)
- Pharmacy-RX (McKesson)
- Pharmaserv (McKesson)
- PioneerRX (NewTech Systems)
- Prime Rx (Micro Merchant Systems)
- ...

Czech republic

- In the Czech republic:
- Mediox
- Lekis
- PenWin
- Los Maxima
- In the Slovak republic:
- Nautilus Pharmacy

Automated dispensing cabinet



Automated dispensing cabinet

- input of information and proceeding:

Automated dispensing cabinet

- the end of the chain - final automated dispensing

- Because this tools (automated dispensing cabinets) are useful tool for Medication Control, their are all the time discussed topics of many journals and conferences:

Automated dispensing cabinet - packaging systems

- Another, but similar tool are packaging systems:

Automated dispensing cabinet - packaging systems

- in the end, the medication package for the patient is customized, and patient obtain all needed information on the back or front side of the package.

Automated dispensing cabinet - packaging systems

Robotic IV automation devices

- These robots automatically prepare hazardous intravenous (IV) solutions.
- E.g. company [Health Robotics](#) is a supplier of life-critical intra-venous medication preparation, compounding - called CytoCare Robot (and dispensing robots, software automation solutions.):

Barcode and pharmacy practice

Why is the coding through barcode important for pharmacy practice?

- A barcode is an optical machine-readable representation of data
- Originally barcodes systematically represented data by varying the widths and spacings of parallel lines, and may be called as linear or one-dimensional (1D).
- Afterwards they evolved into other different shapes - like rectangles, dots .. - in two dimensions (2D).
- Optical scanners called barcode readers.
- Nowadays, scanners and interpretive software became available on devices including smartphones, tablets..

Which codes are used?

- •[EAN-8](#), [EAN-13](#) (European Article Numbering)
- •UPC (Universal Product Code)

Barcode and pharmacy practice

- 2D - FMD

Barcode and pharmacy practice

- Another use of barcodes in the pharmacy is:
- „Batch code“ – printed in the pharmacy, at this moment is not the "batch" used in the meaning "products prepared in one manufacturing cycle".
- At this point of use all the barcode include information about deliver date, supplier, expiration, pharmacy retail price and co-payment.

Barcode and pharmacy practice

QR code

- Initially developed, patented and owned by [Toyota](#)
- Can encode text, music, images, URLs, emails...
- Quick Response Code
- How to read QR codes - e.g. with application downloaded in mobiles, tablets..

Information for pharmacy practice

Another question for pharmacist, who are taken in the concept of 7 star pharmacist as Information Manager - Where to search valid and up-to-date information?

We need to search:

- News about medicinal products, treatment, diseases
- Clinical trials
- Product announcements
- Guidelines, regulations

Information overload

- Which leads to information overload.

Information

- When searching for information on a topic, it is important to understand the value of the sources.
- **Primary sources** - original ideas, events, and empirical
-
- **Secondary sources** analyze, review, or summarize information in primary resources or other secondary resources.
- **Tertiary sources** provide overviews of topics by synthesizing information gathered from other resources. Tertiary resources often provide data in a convenient form or provide information with context by which to interpret it.

Source criticism in medicine

- "evidence based medicine" (EBM).

Information about medicinal product

- The most detailed information about medicinal products are called Summary of Product Characteristics - abbreviation (SPC or SMPC)

SPC

QUALITATIVE AND QUANTITATIVE COMPOSITION

PHARMACEUTICAL FORM

Therapeutic indications

Posology and method of administration

Contraindications

Special warnings and precautions for use

Interaction with other medicinal products and other forms of interaction

Fertility, pregnancy and lactation

Effects on ability to drive and use machines

Undesirable effects

SPC

- PHARMACOLOGICAL PROPERTIES (Pharmacodynamic and Pharmacokinetic properties, Preclinical safety data)
- PHARMACEUTICAL PARTICULARS (List of excipients, Incompatibilities, Shelf life, Special precautions for storage, Nature and contents of container, Special precautions for disposal of a used medicinal product or waste materials derived from such medicinal product and other handling of the product)

PIL

Patient information leaflet: provides information on using the medicine safely.

„User’s information about the product written by the manufacturing pharmaceutical company“

- (Package leaflet for veterinarian products)
- All medicinal product with marketing authorisation have to include in the package such a leaflet
- Official bodies - like in Europe - EMA - creates guidelines that must be followed when the patient information leaflet is written.

EMA’s guideline:

- Language: simple words, short sentences, medical terms translate into language which patient can understand
- Style: “active style”
- Type size, font, paper
- Headings - eg "What is it and what it is used for?"

PIL

The content:

- What is it and what it is used for
- What you need to know before you take or use it
- Warnings and precautions
- Children
- Other medicines and the product
- The product with food, drink, and, alcohol
- Pregnancy and breast-feeding and fertility
- Driving and using machines
- How to take or use it children and adolescents
- If you take or use more than you should
- If you forget to take or use it
- If you stop taking or using it
- Possible side effects
- How to store
- Contents of the pack and other information

PIL

Notes:

- *Combined package leaflet for different strengths or different drug forms – allowed by National authorities*
- *Package insert - in the U.S.*
- *requirements for patient package inserts – FDA*

Micromedex

Thomson Reuters Micromedex is the most reliable, trusted name in evidence-based clinical reference

Best benefits:

- reliable content
- user-friendly enhancements

Unfortunately the access is not for free:

Who is it for?

- Clinicians
- Physicians
- Pharmacists...
- •

Micromedex

- What is the content of Micromedex?
- Information related to medicinal products, treatment, patient education, toxicity

How does it work?

- Provides a wide range of databases

Micromedex

- AltCareDex®
 - AltMedDex® System:
 - Clinical Checklist™
 - ClinicalPoints® System
 - DISEASEDEX® System: (General Medicine, Emergency Medicine)
 - DRUGDEX® System
 - DRUG-REAX® System
 - HAZARDTEXT®
 - IDENTIDEX® System
 - IV INDEX® System - IV Compatibility
 - POISINDEX® 2.0
 - REPRORISK® System:
- and many others..

Micromedex

Diseasedex Emergency Medicine

- Comprehensive source of urgent and acute care information
- Treatment
- Diagnosis

-

Diseasedex General Medicine

- Evidence-based, current disease information
- Diagnosis
- Treatment
- Complication
- Prognosis
- Follow-up
- Prevention, screening
- Advising the patient

Micromedex

Drugdex system

Detailed drug information:

- Dosage
- Pharmacokinetics
- Interaction
- Adverse side effects
- Contraindication
- Comparative drug efficiency
- Indications, therapeutic uses
- Generic names

Micromedex

Drug-reax system

- Drug interactions
- Drug – drug
- Drug – food
- Drug – disease
- Drug – alternative medicine
- Drug – ethanol
- Drug – tobacco
- Drug – laboratory
- Drug – pregnancy
- Drug – lactation

Hazardtext Hazard Managements

- Chemical safety in the workplace
- Identification, synonyms, clinical effects
- Range of toxicity, minimum/maximum lethal exposure
- Workplace, environmental standards, labels, shipping, handling storage
- Fire hazard, explosion hazard, reactivity hazard, ...
- Protection

Micromedex

Identidex System

- Tablet and Capsule Identification
- Imprint code
- Color
- Dosage form
- Active ingredients
- Manufacturer

Poisindex

- Identify ingredients for commercial, pharmaceutical, biological substances
- Information on range toxicity, treatment protocols for exposures involving the substance

- Micromedex - Interactions checker:
- Severity of Interaction, information about the documentation of the interaction

Lexicomp

- similar to Micromedex
- „Lexicomp is an industry-leading provider of drug information and clinical content for the healthcare industry. We provide the tools necessary to help improve patient safety, ensure compliance, and elevate the quality of care patients receive. “
- This system is helping healthcare professionals make safer and faster decisions with easy to use clinical information, advanced technology, and superior customer service.
- It works like On-line system, Mobile Apps.

Lexicomp

Clinical modules:

- Drug and herbal interaction analysis (Lexi-Interact™)
- Identification of solid, oral drugs (Lexi-Drug ID™)
- Comprehensive medical calculations (Lexi-CALC™)
- King Guide to Parenteral Admixtures (Lexi-I.V. Compatibility™)*
- Patient education module: Printable patient leaflets providing drug, disease, condition and procedure information for your patients
- Medical Internet search portal (Web Search)
- Assessment, diagnosis, and treatment of poisonings and drug overdoses (Lexi-Tox™)

...

Web pages

As credible web pages which you can access for free - these are usually web pages of official National authorities or International companies or supervisors:

- FDA
- European centre for Disease Control
- Centers for Disease Control and Prevention
- Mayo Clinic (“Mayo Clinic is a nonprofit worldwide leader in medical care, research and education for people from all walks of life.”)
- EMA
- SIDC

AISLP

- Note: Czech Information system resembling Micromedex is called **AISLP**
- The content:
- Information about human, with marketing authorisation in the Czech republic
- Information based on documents of state institutions, manufacturers, web portals
- Update 4 times per year
- Can be linked to other pharmacy management systems