Introduction to Pharmacy Informatics and Automation

Course code: 0521516

Dr. Balakumar
Professor-Faculty of Pharmacy,
Philadelphia University-Jordan

Learning Outcomes

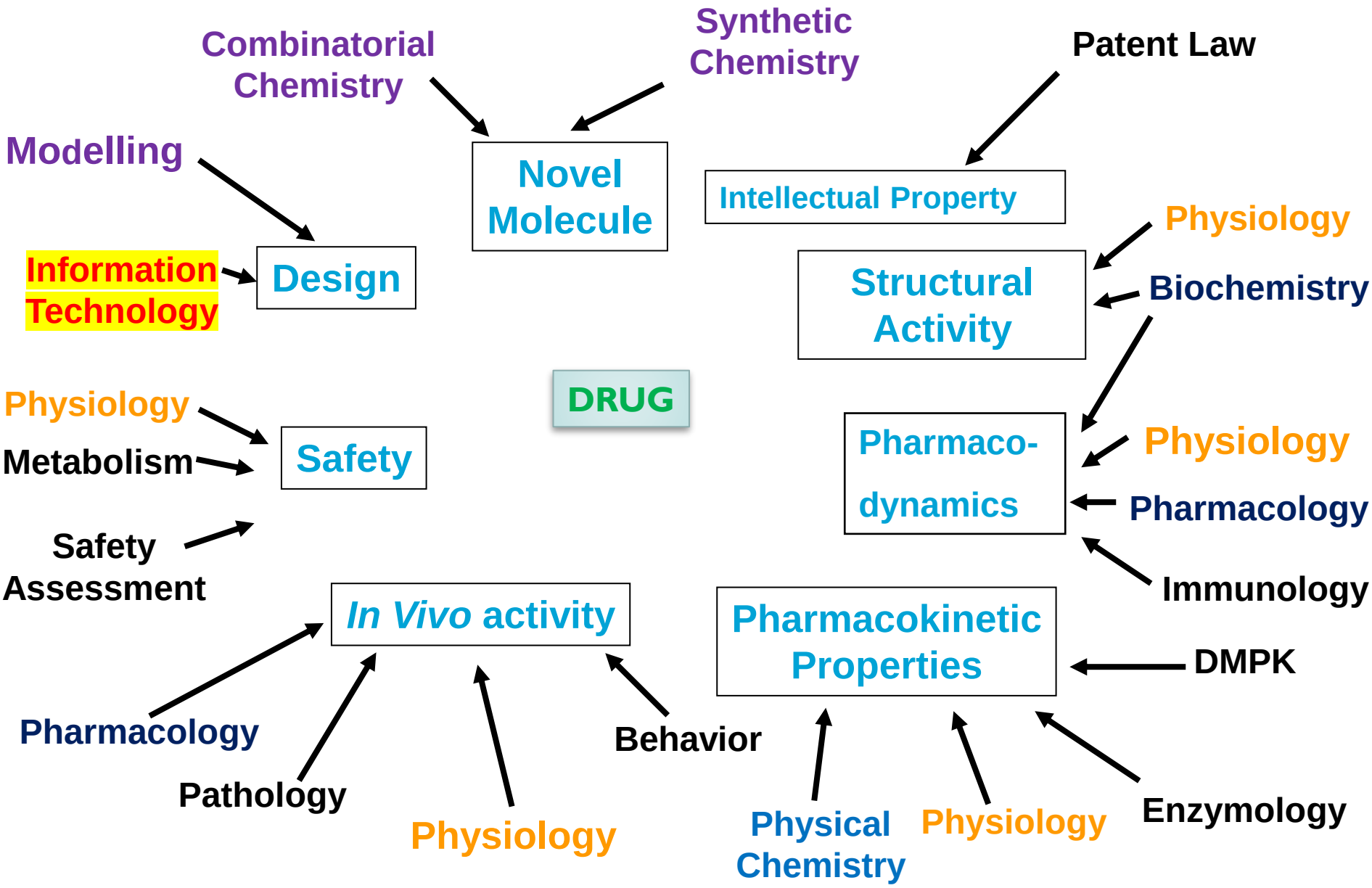
At the end of this lesson, students will be able to

- Outline the Pharmacy Informatics
- Outline the use of Information Technology in Pharmacy
- Explain information resources and databases
- Describe Pharmacy Automation
- Outline Advantages of Pharmacy Automation
- Outline Disadvantages of Pharmacy Automation

Pharmacy Informatics

- Drug discovery and development requires the integration of multiple scientific and technological disciplines.
- These include chemistry, biology, pharmacology, pharmaceutical technology and **information technology**.
- **Pharmacy** + **information technology** = Pharmacy informatics
- Pharmacy informatics, also known as Pharmaco-informatics, and related to the broader field of bioinformatics.
- Pharmacy informatics is a mixture of bioinformatics, chemoinformatics, and immunoinformatics to facilitate a faster process of drug discovery program.

Drug Discovery Process



Major steps involved in any drug discovery process

Target identification (to identify the potential biological target of the disease)

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Target validation (to make sure that the selected biological target is suitable and valid)

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Lead Identification (to identify suitable molecules bind to the validated target)

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Lead Modificiation (based on the properties, the identified lead can be modified to reduce toxicity, side effects, etc)

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Synthesis of compounds

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In-vitro evaluation by different biological assays (lab testing)

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In-vivo evaluation (testing new compounds using animal models for activity and toxicity)

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Clinical Trials (Phase-I: Drug evaluation involving human healthy volunteers
Phase-II: Drug evaluation involving small number of patients for testing activity, dosing and side effects)
Phase-III: Drug evaluation involving large number of on patients to test activity and toxicity at the long term side effects)
Phase-IV: Post marketing survey: Drug follow up after market release to report any new side effects and complications)

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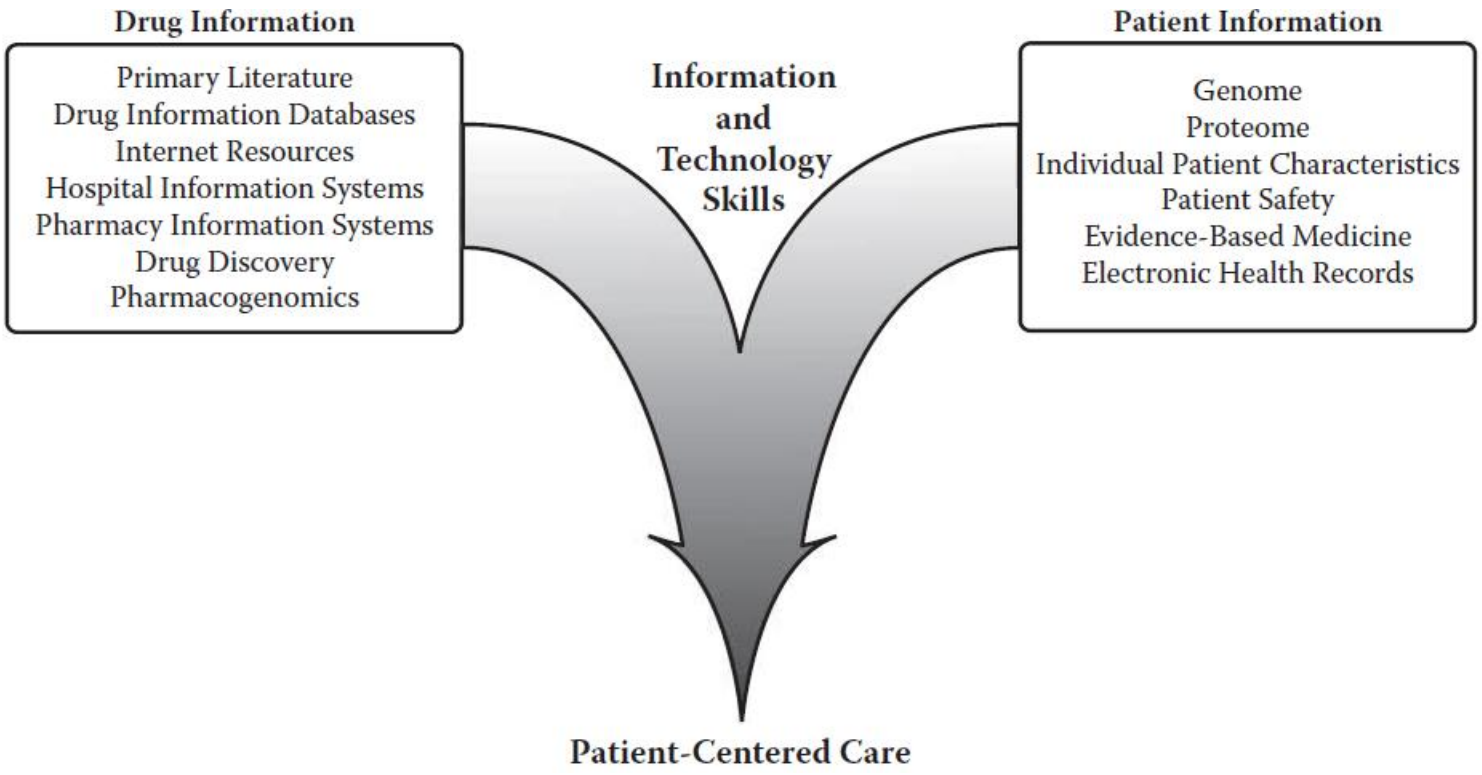
In-vitro evaluation by different biological assays (lab testing)

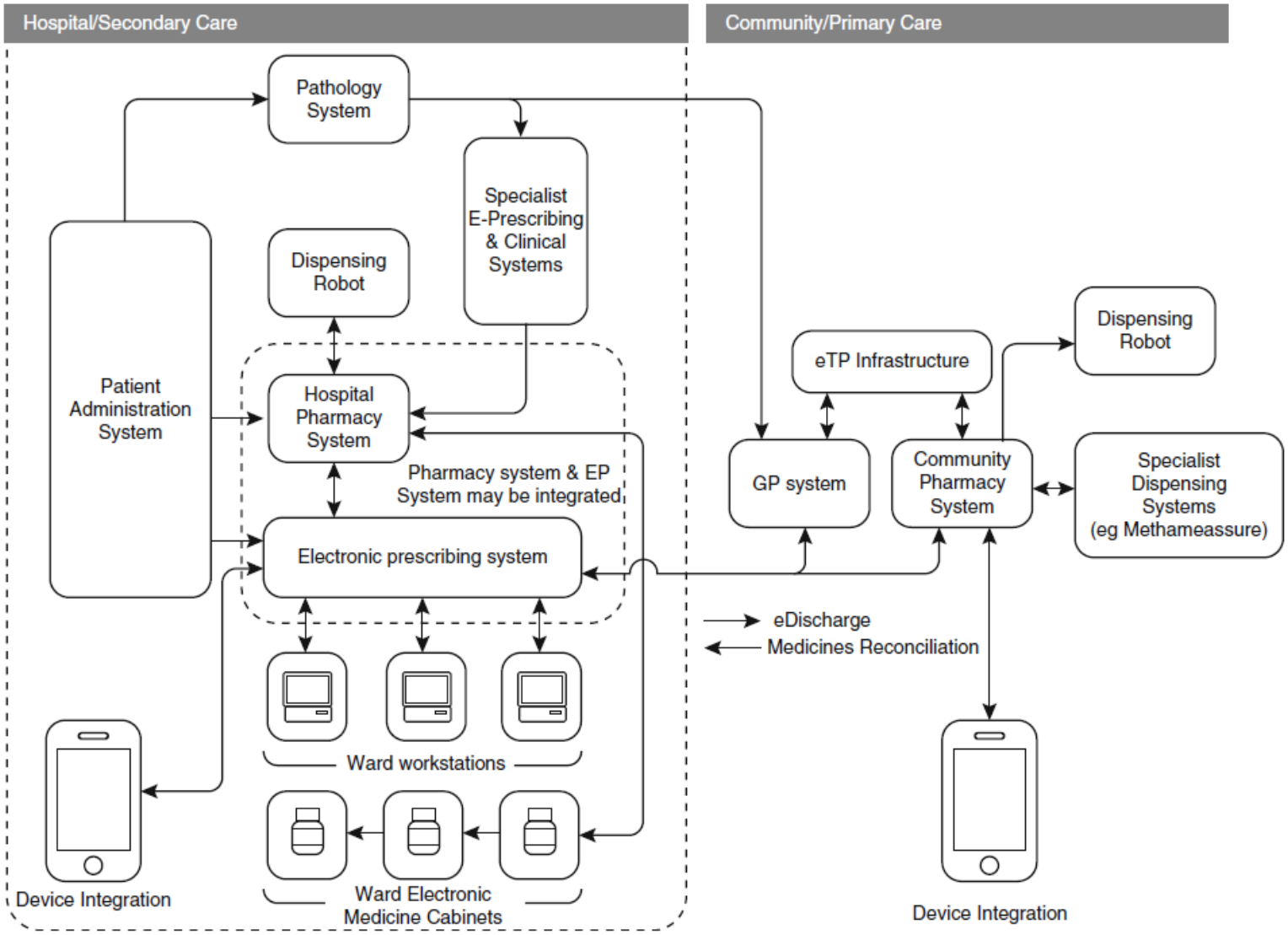
Pharmacy Informatics

- Pharmacy informatics is the scientific field that focuses on medication-related data and knowledge within the continuum of healthcare systems.
- Pharmacy informatics is the application of computers to storage, retrieval and analysis of drug and prescription information.
- Pharmacy informaticists work with pharmacy information management systems that help the pharmacist safe decisions about patient drug therapies, medical insurance records, drug interactions, as well as prescription and patient information

Patient-Centered care in Pharmacy Informatics



Information Technology and Pharmacy



Computer Applications Developed for Pharmacy

- Electronic health records (HER; within either GP or pharmacy systems), which enable the detailed recording of a patient's medication history, and provide decision support to the pharmacist.
- Pharmacy system functions for dispensing, labelling and stock control.
- Electronic prescribing /ordering and medicines management.
- Pharmacy automation to enable a seamless supply chain and facilitate medicines management on a hospital ward.

Computer Applications Developed for Pharmacy

- Hand-held devices containing pharmacokinetics (drug metabolism) calculators or medicines information for referential use in clinical settings.
- Pharmacy tracking software, for workload management.
- Pharmacy intervention logging and reporting tools.

https://ehs.com.jo/electronic-services/my-hakeem-mobile-application

Types of Information Resources

- Scientific information exists in a variety of sources: primary, secondary, and tertiary.
- Primary sources: conference proceedings, patents, dissertations, articles reporting the results of clinical trials, and other publications of original research.
- Secondary sources: textbook, Online indexes.
- Tertiary sources: conference meta-analyses, practice guidelines, review articles, textbooks, encyclopedias, and websites

Bibliographic Databases

A bibliographic database is an electronic index of literature that can include books, journals, magazines, etc.

When primary sources are needed, searchers often start with an

- Internet search engine (e.g., Google or ScienceDirect), which scans Web sites and other information on the Web for their search terms.

Examples: Google Scholar indexes journal articles in PubMed, the NLM's free Web interface to MEDLINE.

PubMed search provides more control over recall and precision than a Google Scholar search.

Guidelines for searching the literature

Guideline 1. Identify the Main Concepts

Guideline 2. Define Search Terms

Guideline 3. Use Boolean Logic (and, or terms)

Guideline 4. Use Limits and Qualifiers

Guideline 5. Use Multiple Sources

Guideline 6. Use Appropriate Drug Nomenclature

Guideline 7. Launch New Searches from Results

Bibliographic Databases for Pharmacy and Pharmaceutical Sciences

1. The Chemical Abstracts Service (CAS)
2. SciFinder Scholar (SFS)
3. Biological Abstracts (BIOSIS)
4. MEDLINE created by U.S. National Library of Medicine (NLM)
5. PubMed and PubChem
6. International Pharmaceutical Abstracts (IPA)
7. Citation searching
8. Website search engines

Pharmacy Automation

Pharmacy automation involves the electronic processes of handling and distributing medications.

Any pharmacy task may be involved, including counting small objects (e.g., tablets, capsules); measuring and mixing powders and liquids for compounding; tracking and updating customer information in databases (e.g., personally identifiable information (PII), medical history, drug interaction risk detection); and inventory management.

Types of Automation

1. Automated dispensing cabinet
2. Medical Robots
3. Remote dispensing
4. Measuring/counting robots for pills, capsules, and liquid medication
5. Inventory management systems
6. Patient calling systems
7. Patient record systems
8. Transcription machines
9. Packing Robots

Automatic Dispensing Cabinet

Advantages of Pharmacy Automation

Pharmacy automation has many different purposes, including improving efficiency, minimizing labor costs, improving accuracy, increasing speed, better space savings, better narcotics security, and improved inventory management.

Accuracy and speed:

RxSafe’s proprietary software verifies you have access to the right bottle.

When the bottle is returned to the system it’s weighed to ensure accurate counts, User mistakes are tracked, Slow moving inventory is flagged, No more overstocking or wasted inventory.

Advantages of Pharmacy Automation

Space savings:

- ✓ Store up to 5,400 stock bottles in 40 square feet of space.
- ✓ Gain more floor space to generate additional income.
- ✓ Avoid remodeling expense.
- ✓ Valuable space can be reclaimed, and used for consulting, vaccination, compounding, compliance packaging, counting technology.

Advantages of Pharmacy Automation

Narcotics security:

- ✓ Store stock bottles behind locked doors.
- ✓ Force workflow at one station without the added expense of other software or hardware.
- ✓ Our proprietary software ensures that you have access to the right bottle.
- ✓ When the bottle is returned to the system, it’s weighed to insure accurate counts.
- ✓ User mistakes are tracked and slow-moving inventory is flagged.
- ✓ No more overstocking or wasted inventory.

Advantages of Pharmacy Automation

Inventory management:

- ✓ Track your inventory in real time, so you know what and when to reorder.
- ✓ No disappearing inventory, No opening a second bottle.
- ✓ No waste due to expiration, Remote stock management is another standard feature of the RxSafe system.
- ✓ All pharmacy inventory is managed by the system whether it's inside or outside the RxSafe.
- ✓ No more headaches keeping track of inventory in different locations.

Pharmacy Automation Products

- ✓ **RapidPakRx**: Adherence Strip Packager for any Retail Pharmacy With Universal Cartridges & Built-in Vision Inspection.
- ✓ **BlistAssist**: Blister Card Packaging Assistant that Improves the Manual Process for any Retail Pharmacy.
- ✓ **Eyecon 9420**: Revolutionary Tabletop Automation: Prescription Validation, Counting and Filling System.
- ✓ **RxSafe 1800 w/ AWS**: Comprehensive, Automated Robotic Storage and Retrieval for Retail Pharmacies.
- ✓ **RxVault 1800 w/ AWS**: The Only Truly Automated Robotic Storage and Retrieval Solution for Narcotics and High Shrink Drugs.

Disadvantages of Pharmacy Automation

Cost:

- ✓ Automation and robots range from £50,000 to £500,000 and above.
- ✓ The installation and integration of such a system will also have their own costs.

Reliability:

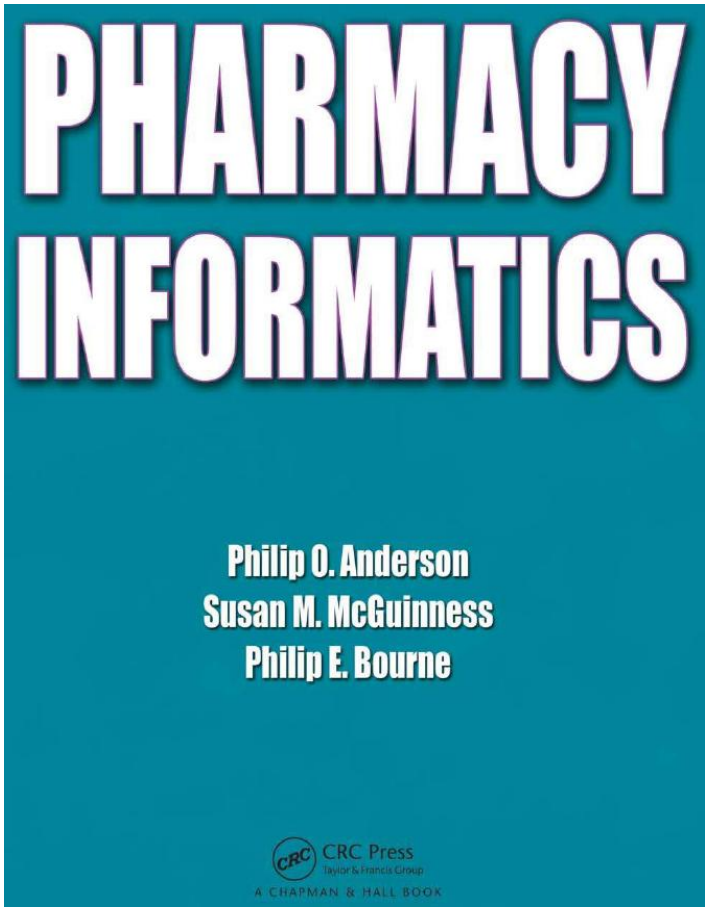
- ✓ Automation did not reduce all error types, especially prescription errors
- ✓ The money investment for an expensive machine and undergoing the disruption of its integration.

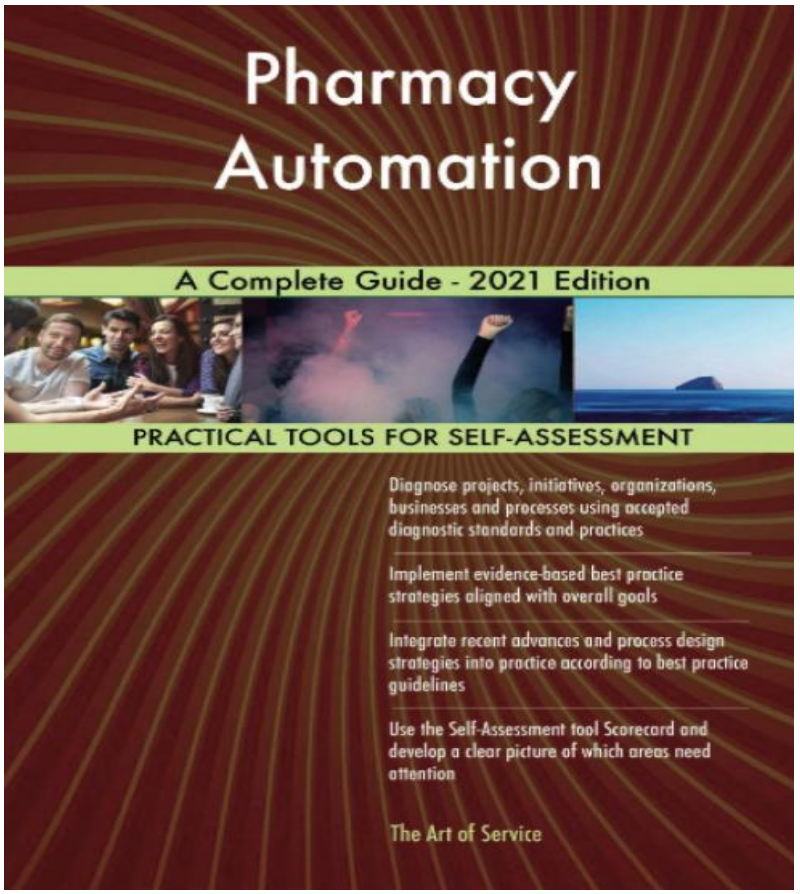
Disadvantages of Pharmacy Automation

Legislation:

- ✓ There are strict regulatory and compliance requirements for any pharmacy, especially those with NHS (National Health Services) contracts.
- ✓ These will differ depending on your area and business, but there will be limitations on which types of automation are permitted.

Books


PHARMACY
INFORMATICS
Philip O. Anderson
Susan M. McGuinness
Philip E. Bourne
CRC Press
Taylor & Francis Group
A CHAPMAN & HALL BOOK


Pharmacy
Automation
A Complete Guide - 2021 Edition
PRACTICAL TOOLS FOR SELF-ASSESSMENT
Diagnose projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices
Implement evidence-based best practice strategies aligned with overall goals
Integrate recent advances and process design strategies into practice according to best practice guidelines
Use the Self-Assessment tool Scorecard and develop a clear picture of which areas need attention
The Art of Service