Preventing Medication Errors in Community Pharmacy
Donald Sullivan, RPh, PhD

Live Activity Handout
2 slides per page
Preventing Medication Errors in Community Pharmacy

ACTIVITY DESCRIPTION
This program will provide tools and techniques for community pharmacists to reduce medication errors in their pharmacies. It will discuss how root cause analysis and failure mode and effects analysis can help prevent future medication errors and improve patient safety. The program will also provide insight into how technology and electronic prescribing can cause medication errors and what community pharmacists can do to help prevent these types of errors. This program meets the requirement for Florida Medication Errors Credit.

TARGET AUDIENCE
The target audience for this activity is pharmacists, pharmacy technicians, and nurses in hospital, community, and retail pharmacy settings.

LEARNING OBJECTIVES
After completing this activity, the pharmacist will be able to:

- Describe how root cause analysis and failure mode and effect analysis can help prevent errors in community pharmacy.
- Describe how automation, e-prescribing, and other technology can affect medication errors in community pharmacy.
- Describe common medication error prevention tips and tools.
- Review examples of how medication error reduction techniques can improve patient safety in community pharmacy.

After completing this activity, the pharmacy technicians will be able to:

- Describe how root cause analysis and failure mode and effect analysis can help prevent errors in community pharmacy.
- Describe how automation, e-prescribing, and other technology can affect medication errors in community pharmacy.
- Describe common medication error prevention tips and tools.
- Review examples of how medication error reduction techniques can improve patient safety in community pharmacy.

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Preventing Medication Errors in Community Pharmacy

Faculty: Donald Sullivan, R.Ph, Ph.D.

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Learning OBJECTIVES
Describe how root cause analysis and failure mode and effect analysis can help prevent errors in community pharmacy
Describe how automation, e-prescribing, and other technology can affect medication errors in community pharmacy
Describe common medication error prevention tips and tools
Review examples of how medication error reduction techniques can improve patient safety in community pharmacy

Activity INSTRUCTION
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Faculty Disclosure
Dr. Sullivan has no actual or potential conflicts of interest in relation to this activity.

Activity ACCREDITATION
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Medication Errors During Your Career

If you fill 300 prescriptions per day:
• 1,500 per week
• 6,000 per month
• 66,000 per year (4 weeks vacation)
• 1.98 million during the course of a 30 year career in pharmacy

What do you think your chances are of making a medication error?
Organizational Culture & Med Errors

- Health care organizations must promote a non-threatening attitude toward medication errors and stress open communication. This significantly improves the chances of success of root cause analysis.

- Medication error reduction requires a total commitment from the organization. It is everyone’s responsibility.

Root Cause Analysis

- When a medication error does occur, the organization and/or health care professional should conduct a root cause analysis.
- This type of analysis is done after a medication error has occurred.
- In root cause analysis, the focus should be on the processes, procedures, and systems in the medication use process to determine why an error occurred.
Root Cause Analysis

• When conducting a root cause analysis, the individuals involved should be very thorough in examining the process that preceded the error.
• It should also include special causes as well as common causes regarding the error in question.

Root Cause Analysis

When beginning a root cause analysis, the focus should be on finding answers to the following questions:
• What happened (in detail)?
• Why did it happen?
• What occurred just before the error?
• At which step(s) did the medication use process breakdown or did a failure occur?
• What processes or systems underlie the cause of the error?
Root Cause Analysis

- What possible strategies can be implemented to help ensure the error does not occur again?
- Have there been any other “near-misses” or other medication errors that closely resemble this one?
- What kind of evaluation and/or assessment plan will be implemented to monitor the outcomes of any error prevention technique or process change that is implemented?

Root Cause Analysis

- Once the “root cause” of the error has been determined, an action plan, follow-up, measurement strategy, evaluation, and assessment plan must be implemented to prevent future medication errors of this type.
- Even though root cause analysis is done after an error occurs, healthcare organizations should take a proactive approach to reducing errors and focus a large amount of time and resources on the prevention of medication errors.
Failure Mode and Effects Analysis

• Failure Mode and Effects Analysis (FMEA) is one way to accomplish this and should be considered as part of a comprehensive risk-reduction strategy regarding medication safety.

• The primary goal of FMEA is to systematically identify areas of potential failure in the medication use process at your institution.

FMEA in 5 Steps

1. Create a detailed diagram of the process and tasks when dispensing medications
2. Identify how and where systems and processes may fail
3. For each point in the process, what is the likelihood of an error & its consequences
FMEA in 5 Steps

4. Consider the severity of the patient outcome and then identify a countermeasure that might eliminate or prevent the error before it reaches the patient.

5. Develop action plans to prevent the error and then evaluate its effectiveness

Case - Tramadol

• It might be mixed up with the drug trazodone
• Tramadol and trazodone are both available in the same strengths: 50mg and 100mg
• They may be stored close together on the same shelf
• Both sound alike when called in orally
• Generic packaging/labeling for the two may be very similar
• This process should be done with other prescription drugs that could be mixed-up
Case – Sivextro® vs Zyvox®

• The drug is used for similar medical conditions as Zyvox.
• Is this medication more effective than Zyvox® (linezolid)?
• The literature suggests that Sivextro® may cause less GI problems, serotonergic effects and bone marrow suppression than Zyvox®.
• Is this true? Are these differences clinically significant to the patient?
• Does the physician know that Sivextro® does not require monitoring like Zyvox®?

Case – Sivextro vs Zyvox

• Will physicians and prescribers realize that Sivextro® is usually dosed once daily for 6 days and Zyvox® (which is similar) is usually dosed twice daily for 10-14 days?

• Do prescribers understand that a course of therapy with Sivextro® is very expensive (around $2,000) but may be cheaper than Zyvox®?
IT and Medication Errors

• IT systems should improve access to pieces of information, organize them and create links between them.
• Pharmacists and prescribers often know relevant drug information, but forget to consider it at the time of prescribing and dispensing.
• IT systems can be an excellent tool at bridging the “knowledge-action” gap by providing this information at the time a decision is made.

IT and Medication Errors

• The role of IT systems often focuses on preventing errors of commission (wrong drug, wrong strength, wrong directions, etc.) However, IT systems should also focus on errors of omission (forgetting to prescribe or recommend a drug that would benefit the patient).
• Example: In a pilot study, the implementation of a “smart” electronic summary significantly improved prescribing rate of ACEs and ARBs in heart failure patients with left ventricular dysfunction.

IT Implementation

The negative attitudes towards complete IT integration within a pharmacy workflow system needs to be addressed before implementation. These are:

• Lack of large controlled studies on clinical outcomes. Most are small pilot studies with limited clinical outcome measurements, home-grown or “piecemeal” type systems, “projected” outcomes as results, and data based on “best-case” scenarios
• Negative attitudes regarding the impact on patient safety or clinical patient care
• Attitude that these systems will create more work for the pharmacist and are complex to use
• Previous experience of poor implementation of other IT systems
• Fear of the disruption of workflow and loss of jobs

IT Implementation

• The implementation process of an integrated IT system is the key to its ultimate success. Understanding how it will be incorporated into workflow processes at the pharmacy and how pharmacists actually use it in the routine care of patients should be the primary concern. This should include continuous quality improvement and evaluation of the system. It is an ongoing commitment, not a one-time endeavor.
• Let’s discuss computerized physician order entry (CPOE) and its effect on medication errors in the pharmacy
Benefits of CPOE

• Averting problems with: handwriting, similar drug name, specification errors, and drug interactions
• Integration with electronic medical records
• Clinical decision support systems (CDSS)
• ADE reporting systems
• Faster order transmission to the pharmacy
• Economic savings and high ROI
• More accurate coding, which increases reimbursements and potentially decrease prescriber liability insurance

Benefits of CPOE

• Helps prescribers stay up to date on formulary changes and insurance coverage issues
• Alerts prescribers of the most appropriate treatment options based on evidence based medicine, current clinical guidelines and best practices
• Facilitates data exchange between health care providers
Benefits of CPOE

• Maintains up-to-date, accurate and unbiased drug databases for drug therapy selection
• Provides prescribers with computer screen alerts and prompts to be careful of look-alike drugs and dosages that exceed clinical guidelines
• Provides prescribers with patient specific allergy and drug interaction alerts to help avoid potential adverse drug reactions

Benefits of CPOE

• Flags pre-existing conditions that would preclude the use of certain therapeutic options
• Expedites refill requests from both patients and pharmacists.
• However, when technology is implemented on a system with medication error problems, it only compounds the type and amount of those errors.
There is no doubt that electronic prescribing can be very beneficial in preventing many types of medication errors. However, this new technology will only breed a new generation of medication errors that pharmacists and practitioners must become aware. Some of these include:

- If a prescriber misspells the patient’s name, the system may bring up the wrong patient. This can result in the prescriber ordering a prescription for the wrong patient.
- A physician may forget to close one patient’s record on the system before e-prescribing medications for the next patient. This could result in the first patient receiving prescriptions intended for the second patient.
Patient Safety – Electronic Prescribing

• Physicians may design their own “short-cuts” and enter them into the system to speed-up e-prescribing. For example: When prescribing amoxicillin 875mg, the physician only has to enter “Amox” and the system automatically brings up amoxicillin 875mg. Errors occur when the physician types Amox... and the system brings up the 875mg strength when actually the physician wanted the 500mg strength.

Patient Safety – Electronic Prescribing

• Physicians design their own “short-codes” for medication directions to speed-up prescribing. For example: The physician creates a short-code in the system called “CTID”. Whenever this is typed into the system, the directions for the medication are automatically inserted such as “Take one capsule by mouth three times a day”. Errors can occur when the wrong short-codes are chosen or misspelled.
Patient Safety – Electronic Prescribing

• Physicians setting “defaults” within the system. For example: A physician knows that 90% of his patients started on an ACE inhibitor are given lisinopril 10mg, QD. This is set in the system as the default and automatically comes up on the prescribing screen. An error occurs when a patient is supposed to get a different strength of lisinopril.

Patient Safety – Electronic Prescribing

• Like some pharmacists, prescribers turn-off some safety features of the system, such as drug interaction alerts or they get in the habit of just “entering” past them because many are clinically insignificant. This is sometimes referred to as “work-arounds”.

• A physician may inadvertently order laboratory tests instead of medications when options on the screen look like drug names.
Patient Safety – Electronic Prescribing

• The system is not kept properly updated with new clinical information such as when new clinical guidelines are introduced, new ADRs are discovered, and new drugs become available.

• Individual prescribers can access the system’s programming and can create overrides within the system. For example: A prescriber gets into the system and can override maximum dosage alert messages or delete them altogether.

Patient Safety – Electronic Prescribing

• Prescriber fatigue
• Prescriber’s giving others access to the system
• Prescribing is the last thing they do in an electronic medical record
• Duplicate prescriptions are sent because an error was made and the prescription was resent.
• Duplication due to fax machine defaults
• Unapproved electronic prescribing
Patient Safety – Electronic Prescribing

- Missing or mismatched quantities – a prescriber selects a quantity of “1” for a 10-mL insulin vial
- Mismatch between dosage form and drug – a physician selects cefdinir suspension as the drug but enters “10” thinking it was tablets

Medication Error Prevention

Communication of Medication Changes Upon Transition of Care

- New medications
- Discontinued medications
- Adjusted medications
- Unchanged medications to be continued
- Medications held at the hospital
- Non-formulary/Formulary adjustment
- New medications started on discharge
- Additional comments
Medication Error Prevention

Teach-Back Method to Patients
• Why are you taking each of the medications prescribed to you?
• What are the positive effects of taking each medication?
• What adverse effects may occur with each medication you use?
• Where should you store your medications at home?
• When are your medications due to be refilled?
• How long should you be taking these medications?

Medication Error Prevention

• The use of symbols in the prescribing and dispensing of medication has no place in therapy.
• Many health care professionals like to use symbols as short-cuts or work-arounds to “speed-up” the mundane task of prescribing medications.
• The use of symbols can lead to all kinds of medication errors and misinterpretations.
Medication Error Prevention

• Pharmacists should never use symbols on oral prescriptions from physicians and should encourage physicians to do the same on written prescriptions.

• Symbols can be especially hard to read when orders or prescriptions are sent via fax machines with poor resolution or print quality and from carbon copies of hospital orders.

Medication Error Prevention
Do Not Use Short Cuts

• the symbols for greater than (“>”) or less than (“<”) which could be mistaken for the number “7” or letter “L”.

• apothecary units.

• the “@” symbol which could be mistaken for the number “2”.

• “µg” for micrograms. Mistaken for “mg”.

• “H.S” or “h.s.” for half strength or bedtime. These two abbreviations are confused with each other frequently.
Medication Error Prevention
Do Not Use Short Cuts

• “S.C. or S.Q.” for subcutaneously. Mistaken for “sublingual” or “5 every”.
• “d/c” for discontinue or discharge. This abbreviation is frequently misinterpreted.
• “c.c.” for cubic centimeters. The more appropriate substitution for c.c. is to use “mL” or write out “milliliters”.
• “/” is used to separate doses or strengths. It is often mistaken for the number “1”.
• “UD” for use as directed. Mistaken for “unit dose”.

Medication Error Prevention
Do Not Use Short Cuts

• “+” is used for “plus” or “and”. Mistaken for the number “4”.
• “q6PM” is used for nightly at 6PM. Mistaken for every 6 hours.
• “ss” is used for one-half or sliding scale for insulin. Mistaken for “55”.

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Medication Error Prevention
Do Not Use Short Cuts

• “U” should not be used for “units”. It is often misread as “0”, “cc” or “4”.
• “IU” should not be used for “International unit(s)”. It is often misread as IV (intravenous) or “10”.
• “qd, or QD” should not be used for “every day” or “daily”. It is often misread as four times daily (QID).
• “qod, or QOD” should not be used for “every other day”. It is often mistaken for daily (QD) or four times daily (QID).

Medication Error Prevention

• The inappropriate use of decimals is one of the most common sources of medication errors. This source of error also has the potential for the most harm. There are two basic rules that health care professionals need to follow regarding the use of decimals.

1) Never Use a Trailing Zero
2) Always Use a Leading Zero
Medication Error Prevention

• What is a trailing zero? This is a zero that is added after a decimal point. For example: A physician writes a prescription for hydromorphone 1.0mg. There is no reason to add a zero after the decimal point or even have a decimal point. The drug should be written hydromorphone 1mg.

• When written as 1.0mg, it could be misread 10mg since the decimal point is often hard to see. The habit of using trailing zeros can often lead to 10-fold increases in dosing because the decimal point can be missed. In the example above, missing the decimal point could cause a fatal dose of hydromorphone to be prescribed to a patient.

Medication Error Prevention

• A leading zero should be used in front of any decimal point. For example: When writing a prescription for lorazepam one-half milligram, the physician should write it lorazepam 0.5mg. If the physician writes a prescription for lorazepam as .5mg, it is very likely the decimal point will be missed and the patient could be given 5mg of lorazepam.

• A leading zero alerts health care professionals that there is a decimal point there in the medication order or prescription. By not using a leading zero, a 10-fold dosing error can occur as well.
Medication Error Prevention

• If a nurse calling in an order prescription cannot read the strength, drug, directions or dose on a prescription from a physician, never use what is on the patient’s medication profile to clarify these issues.

• It is bad clinical practice for a nurse to say, “I cannot read what the strength is on this prescription from the physician, just give them the same strength as last time.” Always make the nurse confirm the information in question with the physician.

Medication Error Prevention

• Teach everyone in the pharmacy to not be afraid to speak-up. Many times a potential medication error is caught by a pharmacy technician, cashier, delivery person, pharmacy intern, etc. and that person is afraid to question the authority of the nurse, pharmacist or physician.

• Even pharmacists are sometimes afraid to question the judgment of a physician or specialist. Any health care professional who truly has the patient’s best interest in mind will not be offended if a potential error is brought to their attention.
Medication Error Prevention

- Create a culture where medication error prevention is everyone’s responsibility and encourage all employees to speak-up when something does not look correct.

- Patient safety should be everyone’s priority and egos should be left out of the equation.

Medication Error Prevention

- Make sure your drug reference sources are up to date
- Never completely disable a computer alert system
- Edit your system of drug interaction alerts to eliminate ones that are not clinically significant
- Many systems will allow a print-out of bypassed alerts that should be reviewed
Medication Error Prevention

• Patients not being properly taught how to use dosing cups, droppers, and measuring spoons. They need to be educated by the pharmacist on how to measure the correct volume of liquid in these measuring devices, so patients do not overdose or under-dose the medication.

• Complete the entire process for each prescription (counting, checking, labeling, verifying) before moving on to the next one.

Medication Error Prevention

• If you are interrupted while verifying a prescription, start the entire verification process over.

• Interruptions when pharmacists are entering prescriptions into the computer and/or verifying prescriptions will absolutely not be tolerated. Train technicians and interns to never interrupt a pharmacist while he/she is in the process of the final verification before dispensing.
At Risk Behaviors

• There are three classifications of behavior that can be involved in a medication error. The first type is human error. In this type of error, a health care professional did something other than what was intended.

• For example, a pharmacist placed simvastatin 10mg instead of 20mg in a prescription vial.

At Risk Behaviors

• The second type is reckless behavior. In this type of behavior, the pharmacist is intentionally taking a risk but does not necessarily want to harm the patient.

• A good example of this is when a pharmacist is so busy, he/she does not check to make sure the technician placed the correct medication in the patient’s bottle. He/she just assumes the technician placed the correct medication in the bottle.
At Risk Behaviors

• The third is at-risk behavior. These behaviors can become a normal part of everyday life. They become so common place at the work site that the perception of their risk fades over time.

• Why does this risk fade? Because these risky behaviors have not caused a problem so far, but beneath the surface a problem or medication error is just waiting for the right opportunity to surface.

At Risk Behaviors

• One example of an at-risk behavior is a pharmacist who always overrides all drug interaction alerts from a pharmacy’s computer system. The pharmacist believes that 99% are false-alarms and feels he/she can rely on their own knowledge of drug-drug interactions. This is an at-risk behavior. Identifying and discouraging at-risk behaviors is the primary weapon in preventing this behavior.
At Risk Behaviors

Listed below are some at-risk behaviors that should be addressed and corrected by health care organizations.

• Rushed communication with a coworker working the next shift. This can lead to information being left-out or miscommunicated.

• Failure to address an issue with a prescriber when the pharmacist feels that the drug is being inappropriately prescribed, dosed, or used. The idea of “just because the prescriber wrote it, my job is to fill it” can lead to serious medication errors.

• Not reading the stock medication bottle label 3 times before counting it and dispensing it.

• Answering the phone and taking care of walk-up customers at the same time the pharmacist is checking several prescriptions.

• Having every patient “sign-away” their option to be counseled by a pharmacist because it saves the pharmacist time and aids his/her ability to keep “caught-up”.

At Risk Behaviors

• Not checking the patient’s profile for allergies or other drug interactions because the drug being dispensed is a “safe” or “low-risk” drug.

• Leaving the keys in the safe that stores schedule II medications to speed up the dispensing process of these medications. (By doing this, the technicians do not have to always ask for the keys.)

At Risk Behaviors

• Using “homemade” abbreviations (such as “Q46” for “every 4-6 hours” or “pp” for “as needed for pain”) when taking oral prescriptions from a prescriber to increase speed and save time. This leads to confusion if another pharmacist needs to read and interpret this prescription at a later date.
At Risk Behaviors

• Allowing technicians to counsel patients on simple things like: number of refills, storage in the refrigerator, and use of the medication.

• Not regularly verifying important information with the customer to update their patient profile with new information such as new chronic diseases, new allergies, herbal product use, other medications they may be getting filled at other pharmacies, commonly used OTCs, etc.

At Risk Behaviors

• These are just a few examples of at-risk behaviors of pharmacists. If you find yourself guilty of any of these behaviors, don’t let them continue. Just because they have not led to an error yet, does not mean one may not occur in the future. Again, medication error prevention is everyone’s responsibility and the reduction of at-risk behaviors will help reduce these errors in the future.
There is no doubt that fax machines have made life easier for health care professionals. Faxing prescriptions to the pharmacy can help get the appropriate care to the patient quicker. However, fax machines can be a significant source of medication errors if they are not used properly.

1) Always make sure your fax machine has adequate ink or toner. Medication errors can occur very easily if the print on the fax is faded or contains streaks from lack of toner/ink.

2) Many fax machines will pick up the security features on prescription paper. For example: A physician faxes a prescription to the pharmacy for atorvastatin 10mg. When the prescription is removed from the fax machine by the pharmacy, the words “void” are printed all over it. This is a security feature of the paper prescriptions coming through on the fax.
   • This type of security feature on prescription paper is to prevent patients from photocopying prescriptions from physicians. However, the fax machine does not know this and will pick it up. This may make it hard for the pharmacist to read the prescription.
Fax Machines and Errors

3) Faxed prescriptions work well if the paper they are written on is free of lines. Physicians who write orders or patient instructions on notebook or “lined” paper make it hard for the person receiving the fax to read it clearly.

4) Advise physicians to write prescriptions in the center of the piece of paper when faxing it to a pharmacy. This will ensure that all the information on the prescription is transmitted by the fax machine. In addition, physicians should avoid writing near the edge of the paper. Again, to ensure that all of the information on the prescription is transmitted by the fax machine.
Fax Machines and Errors

5) Papers sent through a fax machine should be clear of any debris, paper particles, tears in the paper, dust, hole punchers, stickers, post-it notes, etc. This will make sure the information can be easily read and interpreted.

Fax Machines and Errors

6) Regular maintenance and cleaning should be conducted on all fax machines. Dust and paper particles can cause distortions that can lead to medication errors. Make sure the platen (roller in the fax machine) or the glass surface in the scanner are regularly cleaned and replaced as needed. Scratches on these surfaces will come across as distortions on the fax machine.
Fax Machines and Errors

7) If there is “phone noise” (black marks or streaks on the paper printed from the fax machine) the pharmacist should be very careful it does not interfere with the interpretation of the medication order on the fax.

Bottom line: If something is not clear or illegible on a fax, take the extra time and orally verify the prescription or medication order with the physician.

References

References


References

Exam Questions:

1) Failure mode and effects analysis (FMEA) is conducted after a medication error occurs?
   a) true
   b) false

2) Which of the following abbreviations should not be used?
   a) “qod” for every other day
   b) “@” because it may be confused with the number 2
   c) “U” for units
   d) a and b should not be used
   e) a, b, and c should not be used

3) Which of the following are incorrectly written and could lead to a medication error?
   a) “alprazolam .5mg”
   b) “amoxicillin 250.0mg
   c) “Lantus® insulin 25 units daily”
   d) a and b
   e) b and c

4) Pharmacies should create a culture where medication error prevention is everyone’s responsibility and encourage all employees to speak-up when something does not look correct.
   a) true
   b) false
5) Which of the following are errors that e-prescribing systems have the potential to cause?

a) Errors when e-prescribing systems are not kept up-to-date.
b) Errors when physicians use short-codes for medication directions.
c) Errors when the prescriber forgets to close one patient’s record on the system before e-prescribing for the next patient.
d) b and c
e) a, b, and c

6) Which of the following can cause a medication error when prescriptions are faxed to the pharmacy?

a) Fax machines can pick up the security features on prescription paper and can make them hard to read.
b) Physicians who write orders or patient instructions on notebook or “lined” paper make it hard for the person receiving the fax to read it clearly.
c) Prescriptions sent through a fax machine that contain any debris, paper particles, tears in the paper, dust, hole punchers, stickers, post-it notes, etc. can make the prescription hard to read.
d) a and b
e) a, b, and c

7) Which of the following can prevent medication errors?

a) Make sure your drug reference sources are up to date.
b) Completely disable your computer alert system for drug interactions.
c) Print-out bypassed alerts and review them.
d) a and b
e) a, and c

8) It is bad clinical practice for a nurse to say, “I cannot read what the strength is on this prescription from the physician, just give them the same strength as last time.” Always make the nurse confirm the information in question with the physician.

a) true
b) false

9) Which of the following is considered an “at risk” behavior?
a) A pharmacist placed lisinopril 10mg instead of 20mg in a prescription vial.
b) A pharmacist is so busy, he does not check to make sure the technician placed the correct medication in the patient’s bottle. He just assumes the technician placed the correct medication in the bottle.
c) A pharmacist who always overrides all drug interaction alerts from a pharmacy’s computer system. She believes that 99% are false-alarms and feels she can rely on her own knowledge of drug-drug interactions.
d) a and b
e) a, b, and c

10) The negative attitudes toward complete IT integration within a pharmacy workflow system needs to be addressed before implementation.

a) true
b) false