Frequently Asked Questions

What are the requirements for license renewal?

Licenses Expire	Contact Hours Required
October 31, yearly	14 (All hours are allowed through home-study)

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Cost of Courses		
Course Title	**Contact Hours**	**Price**
Best Nursing Practice: Care of Patients Prescribed Opioids for the Treatment of Pain	3	$19.00
Hepatitis: Recognition and Management	4	$19.00
Hooked: Drug Abuse in America	3	$19.00
Patient Safety: Implementation of National Safety Standards for Nurses	4	$19.00
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Are you approved by ANCC?

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Always check your state's board website to determine the number of hours required for renewal, and the amount that may be completed through home-study. Also, make sure that you notify the board of any changes of address. It is important that your most current address is on file.

Kentucky Board of Nursing Contact Information
Kentucky Board of Nursing 312 Whittington Pky, Suite 300 Louisville, KY 40222 Phone: (502) 429-3300 or (800) 305-2042 | Fax: (502) 429-3311 Website: http://www.kbn.ky.gov/

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CE for Kentucky Nursing Professionals

Chapter 1: Best Nursing Practices: Care of Patients Prescribed Opioids for the Treatment of Pain

3 Contact Hours

Release Date: 2/22/2016 **Expiration Date: 2/22/2019**

Audience

The audience for this course is any registered or advanced practice nurse responsible for prescribing or managing patients who may be prescribed opioids for the treatment of pain.

Purpose statement

Historically, prescribers limited the use of opioids for pain management solely to patients with acute or cancer-related pain. However, recent studies indicate that many types of pain are undertreated. To potentially bridge this therapy gap, the use of opioids for the treatment of nonterminal pain is on the upswing. This course covers the changes in opioid use as well as provides details for the assessment and care of those taking opioids for non-cancer pain.

Learning objectives

- Describe six pain-related components of an initial patient evaluation.
- Describe two tools for patient risk assessment.
- Describe three advantages of creating written patient/provider opioid agreements.
- Explain the value of function-based treatment goals over pain-relief goals.
- Describe four key steps to take prior to initiating treatment with an opioid pain medication.
- Explain why special care must be taken with extended-release/long-acting (ER/LA) opioid formulations.
- Explain two reasons that methadone must be used with particular caution.
- Describe two ways to potentially address unpleasant or intolerable opioid side effects.
- Explain three potential benefits of using prescription drug monitoring programs (PDMPs).

How to receive credit

- Read the entire course online or in print which requires a 3-hour commitment of time.
- Depending on your state requirements you will asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- Provide required personal information and payment information.
- Complete the mandatory Self-Assessment and Course Evaluation.
- Print your Certificate of Completion.

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Faculty

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Bradley Gillespie, PharmD, trained as a clinical pharmacist, has practiced in an industrial setting for the past 20+ years. His initial role was a Clinical Pharmacology and Biopharmaceutics reviewer at FDA, followed by 15 years of leading Early Development programs in the pharma/biotech/ nutritional industries. Currently, he supports efforts at the National Institutes of Health to develop therapeutics for rare and neglected disease. In addition to his industrial focus, he remains a registered pharmacist and operates a medical writing business, with a focus on developing health professional continuing education programs.

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Disclosures

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Introduction

Historically, prescribers limited the use of opioids for pain management solely to patients with acute or cancer-related pain. However, recent studies indicate that many types of pain are undertreated. To potentially bridge this therapy gap, the use of opioids for the treatment of nonterminal pain is on the upswing [1]. This shift does not come without controversy as considerable debate continues regarding the appropriate use of these potent, and potentially addictive medications [2]. This increase in opioid prescriptions is staggering: in 1991, approximately 76 million opioid prescriptions were written in the United States; but by 2013, this figure jumped to nearly 207 million. The United States (U.S.) is the world's largest consumer of these medications, cornering nearly 100% of the global hydrocodone demand, and 81% of the demand for oxycodone [3].

Of the estimated 24.6 million U.S. citizens (i.e., 9.4% of the population 12 and older), suffering from substance abuse, approximately 1.9 million people abuse or are dependent on prescription opioid drugs. Addiction occurs in every state, county, and socio-economic or ethnic groups [4]. Possibly relating to this surge in the use of prescription narcotics, each day 44 people in the U.S. will die of a prescription opioid overdose [5].

Opioids, far more than any other medications, are highly correlated with risks of abuse, misuse, and diversion from intended use. In an attempt to counter these growing adverse events, both the pharmaceutical industry and the government have taken steps to address this public health issue. In 2005 the U.S. Food and Drug Administration (FDA) developed three guidance documents that outlined risk management approaches for drug products. The four cornerstones of the approaches included:

1. Characterization of each drug product's risk/benefit profile;
2. Development and implementation of each drug product's usage guidelines to optimize benefits while minimizing risks;
3. Evaluations of items (1) and (2) coupled with a reassessment of the risk/benefit relationship; and
4. Active adjustments, as needed, to the established risk management tools to optimize the risk/benefit profile. These guidelines were codified into law in 2007 with the passage of the fda amendments act. The law officially established the requirements for risk evaluation and mitigation strategies (rems) for all drugs with potential safety issues. While the rems are required training for prescribers and pharmacists, they should also be included in the training requirements of nurses involved in the care of patients receiving opioid medications [6].

In 2012, FDA published a REMS specific to the use of extended-release and long-acting opioids. This document encourages prescribers to consider the following prior to ordering opioids for their patients:

- **Educate**: Complete a REMS-compliant educational program geared to your discipline.
- **Counsel patients**: Ensure that the risks, safe use, secure storage and disposal of the medications are understood every time these drugs are prescribed.
- **Medication guides**: Ensure that every patient is provided and understands a comprehensive medication guide with each prescription refill [7].

In addition to REMS, a variety of risk management strategies are used by governments, healthcare organizations, and pharmaceutical companies to minimize prescription opioid risk, and most importantly, their potential for abuse, addiction, and diversion [6].

This continuing education program is designed to characterize the best practices for the use of prescription opioid medications intended for treating chronic pain, within the constraints emphasized by the FDA. It will also characterize other strategies to combat the misuse of prescription medications. This program will provide nurses with a solid foundation for responsible opioid use and include vigilant monitoring designed to identify misuse.

Critical terminology

Chronic pain lasts longer than six months. Such pain can range in intensity from mild to excruciating, and can occur episodically or continuously. Such discomfort can be inconvenient to incapacitating. Chronic pain can affect patients physically and emotionally.

The most common sources of chronic pain include headaches, joint pain, injury-associated pain, and backaches. Chronic conditions can lead to generalized muscle or nerve pain [8].

Pain disorders, exclusive of cancer or end of life pain, are often referred to collectively as chronic non-cancer pain (CNCP).

Although many clinicians may quickly turn to opioids for the treatment of CNCP, it is critical to recognize that opioids are only one

weapon in the pain management toolbox. In fact, not all patients are good candidates for opioid medications, either due to the nature of their condition, their comorbidities, or their potential for medication abuse. However, if used properly, opioids can be a very useful component in pain management. Clinicians need to carefully balance the potential benefits against the significant risks associated with opioid use and potential abuse.

Critical concepts

Nurses whose patients suffer from CNCP must be keenly aware of the need to balance pain relief with the many risks associated with the use of opioid analgesics. One term used to describe this intricate balancing act is pharmacovigilance (PV). Pharmacovigilance is defined by the World Health Organization (WHO) as the science and activities related to the detection, assessment, understanding, and prevention of adverse effects or other drug-related problems [9].

Pharmacovigilance need not be complex or burdensome, but rather be based on a commonsense approach not unlike those used for most any other category of medication. The concern with opioids is their potential danger coupled with their high demand by recreational drug users and criminal organizations. Optimal CNCP therapy requires establishment of a middle ground between appropriate pain relief and prevention of abuse and diversion, considered in light of unrelieved pain. In addition to the many comorbidities to consider, clinicians must also be especially vigilant for concomitant usage with other medications or products such as alcohol or sedatives which cause respiratory depression.

In 2016, the Centers for Disease Control (CDC) issued a draft guidance describing the appropriate use of opioid pain medications. A number of elements were explored and a few common themes are presented below:

- Need for a thorough physical examination including pain, past medical history, and family/social histories.
- Possible urine drug toxicology testing if abuse is suspected.
- Consideration of alternative treatment options prior to the prescription of opioids.
- Initial dosage levels at the lowest effective dose.
- Implementation of pain treatment agreements.
- Comprehensive monitoring and documentation of pain and treatment progress, i.e., the higher the dose, the greater the level of vigilance.
- Implementation of safe and effective methods for opioid discontinuation (e.g., dose tapering or medication-assisted treatment, as required) [10].

The continuing education program is designed to detail how to implement these general guidelines in a realistic approach in line with the time and budgetary constraints that govern contemporary nursing practice. Important considerations will be reinforced using realistic case studies to best illustrate key concepts.

Nursing consideration: There is a large, unmet need for the safe and effective use of opioid analgesics. As such, the employment of prescription opioids is widespread and likely increasing. At the frontline in patient contact and communication opportunities, nurses are in an ideal position to ensure appropriate narcotic usage.

Appropriate prescription opioid use; Step 1: Assessing patients for opioid therapy

In order to effectively determine the appropriateness of an opioid medication for the treatment of CNCP, it is critical that both the patient's condition and their potential for misusing or abusing the medication are fully characterized. Specifically, it is critical that healthcare professionals complete a comprehensive physical, medical, and social history and include an assessment of substance abuse and consideration of any special population requirements. A thorough pain assessment must also be conducted which includes the patient's chief complaint and a history of the present illness. Diligent nurses will look beyond the specific complaint and holistically evaluate the broader mental, cultural, and socioeconomic contexts in which the chief complaint is embedded.

Nurses are uniquely qualified to contribute to this critical evaluation. Prior to a physical examination, typically nurses will obtain a thorough medical history, with a focus on the chief complaint. A good medical history assessment is a test of both the nurses' knowledge and communication skills. The specific questions to be asked will depend on the specifics of the patient, but nonetheless, general frameworks exist to cover most eventualities. In addition to asking the most appropriate questions, organizing the findings is critical. Finally, depending on the mental state and reliability of the patient, a collateral history from a friend, relative or caregiver may be required [11].

A comprehensive evaluation of a patient in pain usually requires moving beyond the typical list of questions asked during a general history. It may be possible to gather this information before an in-person visit by using paper or online questionnaires. In most cases where pain is the chief complaint, it is appropriate to begin a conversation by asking about the pain, but then it is usually best to review the broader context and impact of that pain.

When conducting an initial evaluation, clinicians should be alert for signs that a patient is minimizing his or her pain. This may result from a variety of psychological or emotional factors. For example, some patients may worry that they will be labeled as a "complainer" if they mention pain, or that their health care provider will suspect that they are addicted if they ask about opioid pain medications. Other patients may underreport pain because they fear that pain medications will dull their cognitive abilities, lead to addiction, or produce undesirable side effects. Clinicians should be empathic, supportive and honest, neither promising too much nor removing all hope, when evaluating a patient in chronic pain.

It is critical to gain as much information as possible about the specific complaint of pain. The SOCRATES acronym is a useful tool to remember key points to be collected when taking a pain history. Its use is illustrated by asking the following questions when assessing a complaint of pain:

- Site: Where exactly is the pain?
- Onset: When did it start? Was it constant/intermittent? Was it gradual/sudden?
- Character: What is the pain like, e.g., sharp, burning, tight?
- Radiation: Does the pain radiate/move anywhere?
- Associations: Is there anything else associated with the pain, e.g., sweating, vomiting?
- Time course: Does it follow any time pattern? How long does it last?
- Exacerbating/relieving factors: Does anything make it better or worse?
- Severity: How severe is the pain (consider using the 1-10 scale) [12]?

These questions must be asked and the responses evaluated in light of the philosophy offered by Goodwin and Bajwa, "Pain is what the patient says it is." It should never be inferred that pain is "all in a patient's head." Psychological factors may be important in a patient's experience of pain, and the importance of such factors should be taken seriously and incorporated into the overall treatment plan [12].

Psychosocial evaluation

Pain affects every aspect of a patient's life. Therefore, it is vital to evaluate the ways pain may be impacting, or may be affected by, psychosocial elements of a patient's life. Clinicians must be alert for signs of depression or anxiety, which are very common in patients suffering from chronic

pain. Be particularly alert for suicidal thoughts, since the risk of suicide is roughly doubled for patients with chronic pain. Due to the potential for misuse and abuse, medical histories collected in preparation for opioid prescribing must also include a complete psychosocial history evaluation. Key points that must be covered include:

- Childhood history including sexual, physical abuse, and abandonment issues.
- Educational history.
- Family history including disability and addictions.
- Marital history as well as any other significant adulthood events.
- Legal history, including both criminal and civil litigation.
- Employment and military history.
- Psychological dysfunction.
- Current interpersonal relationships, support, and living situation [13].

Some freely-accessible instruments for gathering a psychosocial history are available [see, for example, the Depression Anxiety & Positive Outlook Scale (http://www.dapos.org) or the Patient Health Questionnaire PHQ Screeners (http://www.phqscreeners. com)]. Referral to a mental-health professional is warranted if the clinician's judgment suggests that the patient has active psychological issues beyond his or her expertise. Clinicians should also probe for ways in which pain may be affecting the patient's family system, work, or social activities. Pain can seriously erode these spheres of life, and evaluating these challenges and addressing them during treatment (for instance by referral to a vocational counselor or social worker) is just as important as treating the more immediate medical issues that may be contributing to chronic pain.

Evaluating patients for risk of opioid dependence or abuse

Whenever a clinician considers treating pain with a controlled substance, the risk of misuse or diversion is always a possibility, no matter how remote, and must be assessed. Exactly whom to suspect, and when to be proactive in investigating risk factors is an area of great debate as there are no convincing data available that support a strategy of focusing on any one specific population parameter or setting. As a result, clinicians must be vigilant with all patients.

In patients treated with opioids for chronic pain, addiction is rare in the absence of a prior self- or family history of alcohol or drug abuse. With this in mind, investigators have attempted to validate instruments to objectively separate potential opioid abusers from patients who are at low risk. One example is the Screening Instrument for Substance Abuse Potential (SISAP), which was designed to identify individuals with a possible substance abuse history based on the National Alcohol and Drug Use Survey. A total of five questions were obtained from the survey that identified with a history of drug and/or alcohol abuse. This instrument was shown to correctly identify 91% of substance abusers with a very low rate of false negatives. It is hypothesized that the use of such tools could improve pain management by guiding appropriate opioid use to include the more vigorous monitoring of patients at greatest risk of abuse [14].

SISAP was one of the original screening tools developed to formally assess a patient's risk of developing an opioid abuse problem. Subsequently, a number of tools have been developed and validated. Many of these instruments are appropriate for routine clinical use. A key ease of use attribute is that they are relatively brief and can be easily implemented. In Table 1, potential tools are listed. In order to be listed, they must have relatively good content and be at least partially validated for assessing patient risk for opioid misuse or abuse. It is critical to note that although these tools may be helpful adjuncts to clinical judgement, no single tool has been widely endorsed or thoroughly validated.

Table 1. Tools for opioid patient risk assessments

Tool	Use	Who administers?	Length	Access
Current Opioid Misuse Measure (COMM)	Monitor for misuse by patients currently on long-term opioid therapy.	Patient self-reports.	17 items	http://www.inflexxion.com/COMM/
Diagnosis, Intractability, Risk, Efficacy (DIRE)	Screen for risk of opioid addiction.	Clinician.	7 items	Belgrade, M.J., et al (2006) *J Pain*. 7:671-681
Opioid Risk Tool (ORT)	Screen for risk of opioid addiction.	Clinician, or patient self-reports.	5 yes/no questions	http://www.opioidrisk.com/node/887
Screener and Opioid Assessment for Patients with Pain, Version 1 and Revised (SOAPP, and SOAPP-R)	Screen for risk of opioid addiction.	Patient self-reports.	24 items	http://www.inflexxion.com/SOAPP/

Some studies have also shown that younger age, and the presence of psychiatric conditions are also associated with aberrant drug-related behaviors. In evaluating patients with chronic pain for risk of addiction or signs that they may be abusing a controlled substance, it may be helpful to consider the sets of characteristics listed in Table 2 [15].

Table 2. Characteristics of chronic pain patients versus addicted patients

Chronic pain patient	Addicted patient
Medication use is well-controlled.	Medication use is out of control.
Medication use improves quality of life.	Medication use impairs quality of life.
Wants to decrease medication use if adverse events develop.	Medication use continues or increases despite the incidence of adverse events.
Is concerned about the physical problem being treated with the drug.	Is unaware or in denial about any problems that develop as a result of drug treatment.
Follows the practitioner-patient agreement for the use of the opioid.	Does not follow the opioid agreement.
May have leftover medication.	Does not have left over medication.
	Loses prescriptions.
	Always has a story about why more drug is required.

Physical examination

The physical examination conducted as part of the initial patient screening contains all of the elements common to contemporary practice, with a few areas that should be emphasized due the unique nature of opioid prescriptions. Themes to be evaluated include:

- A rigorous evaluation of the patient's nervous system.
- An assessment of allodynia (pain from stimulation that would not normally evoke pain, such as light touch).
- Hyperalgesia (amplified pain response to stimulation that would normally evoke only mild pain).
- Pain insensitivity, also known as congenital analgesia, is one or more rare conditions in which a person cannot feel (and has never felt) physical pain.
- A sensory examination that could include response to light touch, light pressure, pinpricks, cold, or vibrations [16].

It may be useful to employ a visual analog scale (VAS) to characterize the level of pain experienced by the patient. An example (Figure 1) is provided below, with a range between zero (no pain) and ten (worst pain imaginable) in centimeters (cm) [17]:

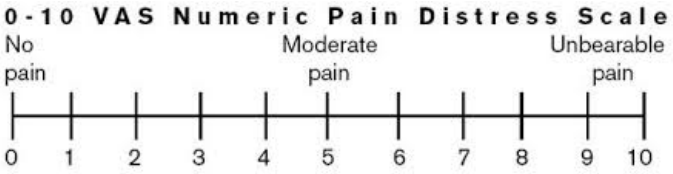

Figure 1. Visual Analog Scale of Pain.

In the case of pain assessment in children, it may be useful to employ an age-appropriate instrument, such as that provided in Figure 2 [18]:

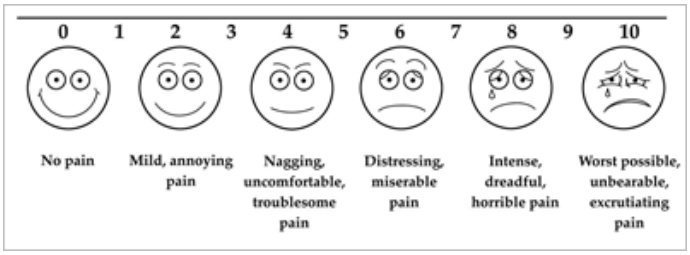

Figure 2. Age-appropriate pain assessment.

The process is the same for whichever VAS assessment tool is employed. A pain VAS is usually self-completed by the patient. He or she (s/he) is asked to draw a line perpendicular to the VAS line best representing their pain intensity. By measuring the distance between the "no pain" reference point and the patient's mark in millimeters (mm), a pain score ranging from 0-100 is derived. The higher the score, the greater the perception of pain magnitude. The general recommendations based on pain VAS scores in postsurgical patients are as follows: 0 - 4 mm, no pain; 5 - 44mm, mild pain; 45 - 74mm, moderate pain; and 75 - 100mm, severe pain [19].

Nursing consideration: Determining each patients' candidacy for appropriate opioid usage requires extensive effort from the entire healthcare team. Nonetheless, the important bond present between nurses and their patients leaves them well-positioned to actively contribute to the process.

An ideal approach to summarizing the role of proactive nursing is to illustrate key concepts in relevant case studies. The case presented below covers the highlights of an initial presentation and assessment of a patient as a candidate for opioid pain control.

Opioid therapy case study: Initial presentation and assessment

Matt Davidson, age 69 years, is a retired, male high school physical education teacher. He has come to his primary care physician for his annual physical. He has a history of hypertension, osteoarthritis, and prostate cancer, for which he was treated two years ago with a combination of external beam radiation and chemotherapy. His PSA is now near zero, and he has no signs of disease, although he continues to be troubled by mild urinary incontinence and erectile dysfunction. On this visit, Mr. Davidson complains of joint pain, as well as a burning, tingling pain in his hands and feet, and asks if anything can be done for it.

A full evaluation of the patient's pain leads to a dual diagnosis of osteoarthritis and peripheral neuropathy secondary to chemotherapy. Specific questions from the nurse can be used to optimize Mr. Davidson's treatment plan.

Appropriate assessment questions and responses:

Q. Please rate your current pain levels on a scale of 1-10. Also describe any side effects that could be related to the current treatment.
A. He rates his pain as a 7 or 8 on the ten-point scale. Additionally, he describes the occurrence of heartburn.

Q. What are your current medications for pain?
A. Ibuprofen: 800-1200 mg, daily.

Q. How is your pain affecting your life? Is it preventing you from engaging in any of your normal activities?
A. He reports disturbed sleep, which he says makes him more irritable during the day. He also says he no longer plays tennis, that walking has begun to hurt, and it is becoming difficult to use the computer keyboard.

This information is used to create a treatment plan with the functional goals of: reducing night time awakenings to no more than once per night; walking daily at least one mile without pain; and using the computer without pain. A return to tennis is left as a possible goal if less strenuous goals are achieved first. An extended-release oxycodone product is prescribed, as well as a prophylactic laxative (to counter the known opioid side effect of constipation). The patient is given printed information about the safe use, storage, and disposal of opioid medications.

Written agreements; Step 2: Written documentation of all aspects of a patient's care

Professional documentation of treatment

Written documentation of all aspects of a patient's care, including assessments, informed consent, treatment plans, and provider/patient agreements are a vital part of opioid prescription "best practices." Such documentation provides a transparent and enduring record of a clinician's rationale for a particular treatment, provides a basis for ongoing monitoring, and, if needed, modifications of a treatment plan. Clinicians must decide for themselves how thoroughly, and how frequently, their documentation of a patient's treatment should be. Regardless of the approach, records should have documentation of patient pain and function using objective measures. Further, there are a number of items that should be considered for documentation.

Key components include:

- Histories demonstrating consistent improvements in pain and function offer a solid rationale for increases in opiate doses.
- All histories of substance abuse must be recorded including past treatment successes and failures.
- Documentation of collaboration with a substance abuse professional is required for any patients with ongoing substance abuse issues that are receiving opiates.
- All prescriptions, especially psycho-active drugs, and drugs with the potential for abuse must be documented.
- The medical necessity of drugs like benzodiazepine, or carisoprodol, etc. must be clearly recorded.
- It is critical to include the morphine equivalent dose (MED) in the permanent patient records.

- Every prescription written must include the dose, and the number dispensed must be charted.
- Prescriptions should be written with the objective of avoiding the necessity to refill prescriptions outside a clinic visit.
- Notes should have documentation of screening for depression, e.g. "In the past month have you felt overwhelmed?"
- All side effects must be documented, especially in patients receiving high dose narcotics.
- Documented histories of constipation, worsening sleep apnea, impairment of operation of equipment or vehicles.
- Complete documentation of red flags, e.g. early refills, self-dose escalation, "lost scripts," missed, appointments, signs of substance abuse, violated past care agreements.
- Documentation of urine toxicology screens.

Prior to issuing any opioid medications, treatment expectations should be clearly outlined in a treatment plan (frequency of visits, who can prescribe, etc.). Furthermore, the consequences of violating the treatment plan need to be prospectively determined. Best practice elements for pain treatment agreements include:

- Medications will not be refilled early.
- Refills require a clinic visit, by appointment.
- No urgent requests, i.e., appointments for refills must be requested at least two days in advance.
- Lost or stolen prescriptions or medications cannot be refilled.
- Failure to follow these policies may result in discontinuation of pain medications.
- Regularly scheduled urine toxicology screens should occur often, e.g., at the first visit, then at random intervals 2-3 times/year or more if the patient has a history of substance abuse) [20].

Patient-provider agreement

Provider/patient agreements have many potential advantages including:

- Allowing treatment to start on a note of mutual respect and partnership.
- Enhancing transparency.
- Engaging patients in a collaborative education and decision making process.
- Helping to set functional goals and clarifying the clinician's and patient's roles and responsibilities in attaining these goals.
- Documenting acceptance of treatment risks and benefits.
- Documenting informed consent.
- Helping avoid misunderstandings that may occur over long treatment time periods.
- Providing a foundation for subsequent decisions about changes in medications or termination of treatment.

To be effective, the specifics of treatment must be clearly characterized and explained using a specific approach tailored to the individual patient and their family or caregiver. This may require the provision of agreements in multiple languages. All agreements should be written at the sixth- to seventh grade education level, or lower. Translators may need to be provided for speakers of other languages to ensure patient understanding and effective informed consent. A patient who does not fully understand the potential risks and benefits of a treatment cannot be truly "informed" as required by the legal and ethical guidelines for medical practice. Time must be allowed for patients to ask questions, and for prescribers to ensure patients understand what they are being told. It is critical to ensure that none of language used could be interpreted as coercive. Thus, agreements should avoid:

- Putting all burden on the patient rather than sharing it between patient and clinician.
- Framing the agreement in terms of punishments for possible future crimes or difficulties.
- Using language that is stigmatizing, dominating, or pejorative.
- Using coercion in any way.
- Imposing limitations for the clinician's convenience without clear and substantial benefit for the patient.
- Insisting on behaviors unrelated to actual use of medications.
- Using the term "fired" to describe termination of treatment.
- Threatening abandonment or suggesting that patients will not have continued access to non-opioid pain relieving treatments if opioids are terminated.

Patient-provider agreements are in wide usage, and come highly recommended for long-term opioid therapy. Although the literature does not demonstrate the quantitative efficacy of such agreements, the 2012 FDA blueprint for opioid prescriber education suggests the adoption of a patient-provider agreement in such situations [21]. A number of samples of patient-provider agreements are available in the public domain including the following, issued by the National Institute on Drug Abuse: https://www.drugabuse.gov/sites/default/files/files/SamplePatientAgreementForms.pdf.

Although the term "agreement" is generally perceived as being more patient-friendly than the word "contract," clinicians should understand, that from a legal standpoint, any written or oral agreement between a prescriber and a patient may be considered a binding "contract." Clinicians should ensure that the terms in any agreement are understood by the patient, and are acceptable, attainable, and consistent with high quality practice.

Some, or all, of the tasks related to documentation may be efficiently managed by properly trained nursing personnel.

Nursing consideration: In addition to collecting a plethora of patient-specific data, thorough and comprehensive documentation is key to treatment success. A nurse's close patient relationship places them in an ideal position to make this key contribution to safe and effective use of opioids in all types of patients.

Informed consent; Step 3: Ensuring that each patient is fully apprised of the risks and benefits of opioid therapy for the treatment of pain

Informed consent is a fundamental part of planning for any treatment, but it is critically important in long-term opioid therapy, given the potential risks of such therapy. At its best, consent also fortifies the clinician/patient relationship.

Fortunately, the great majority of patients who are prescribed opioids experience limited and reversible adverse events and rarely develop addiction. Nonetheless, a subset of all populations will encounter significant difficulties including protracted adverse events, misuse, abuse and addiction. All of these issues may result in morbidity and/or mortality. Informed consent is an important consideration prior to prescribing opioids [22].

The American Medical Association (AMA) has taken a firm position and states that proper informed consent is a crucial communication tool between the patient and the prescriber. The AMA guidelines suggest that the minimum essential elements of informed consent include:

- The patient's full diagnosis.
- The nature and purpose of the proposed opioid treatment plan.
- A complete listing of the potential risks and benefits of the therapy.
- All available alternative treatments including their risks and benefits.
- Risks and benefits of not receiving treatment.

A current example of an informed consent to be discussed with the patient, and signed prior to the issuance of any opioids can be found at http://www.painmed.org/files/consent-for-chronic-opioid-therapy.pdf.

Nursing consideration: While the prescriber has the ultimate responsibility for obtaining informed consent, the process of fully explaining all elements of the informed consent often fall to the nurse. As such, it is critical that nurses involved in providing opioid informed consent are well versed on the pros and cons of pain therapy.

Treatment plans; Step 4: Development of a patient-specific safe and efficacious treatment roadmap

As soon as a patient has been determined suitable for opioid therapy and informed consent is obtained, a comprehensive, written plan must be developed specific for the individual patient. In order to quantify the success of the program, a concise statement of goals must be included in the plan. Typically, a chronic pain patient will be asked to rate his or her pain on a scale of one to ten as described in the physical examination portion above. But this subjective approach may be flawed; every patient has different pain thresholds. One person's seven could be interpreted as a three by another. At the same time, even with a significant quantitative easing of pain, if the patient is still confined to his or her bed by their pain, this may not be a clinical success [23].

A more realistic approach may employ a function-based strategy. Using this method, efficacy is not measured as a patient's progress in achieving pain relief, but rather by his or her ability to objectively achieve better functions. Potential post-therapeutic goals could include the ability to go to work, walking, enhanced sleeping, or simply improved social interactions. Possible functional scales could include one or two activities with minimal impact, e.g., non-grossly affect work enjoyment, and largely jeopardized undertakings, e.g., pain-free walking, with intermediate steps interspersed [23]. As with the pain scales, functional scales would be rated on a scale of one to ten, with one being the least affected and ten as the most affected.

Function-based goals offer two key advantages for managing opioid use in patients with chronic pain:

- Prescribing decisions (or decisions to terminate treatment) are based on outcomes that can be objectively demonstrated to both clinician and patient (and, possibly, to the patient's family).
- Individual differences in pain tolerance become secondary to the setting and monitoring of treatment goals since subjectively perceived levels of pain are not the primary focus in determining functionality.

Such assessment can be a valuable tool in identifying an opioid-addicted patient. The basis of this characterization is that addiction often leads to decreased function, counter to what one would expect in the case of appropriate opioid use.

If such a function-based approach can be used, progress can be documented independently of subjective swings in reported pain. Of course, it is critical to note that progress may not be measured in days. Rather, gains may be incremental and occur over the course of months or years, and some patients who begin showing solid progress may plateau. In these cases, re-assessment should be considered. It may be beneficial to begin with more easily achievable goals, to be replaced with more difficult goals after initial successes. This approach can be much more motivating than a plan resulting in early treatment failure. Some potential examples of functional goals are illustrated in Table 3 [24].

Table 3. Evidence and functional goals

Functional goal	Evidence
Begin physical therapy.	Letter from physical therapist.
Sleeping in bed instead of a lounge chair.	Reported by family member or friend*.
Participation in a pain support group.	Letter from the group leader.
Increased daily living activities.	Reported by family member or friend*.
Ability to walk around the block.	Self-report, pedometer readings, or written log.
Increased social activities.	Reported by family member or friend*.
Return to work.	Pay stubs or letter from employer.
Daily exercise.	Reported by family member or friend*.
**When another person is involved, explicit permission from the patient is required, and should be documented in writing whenever possible.*	

It must be explicitly clear in the patient-provider agreement that obtaining evidence of these functional goals is the sole responsibility of the patient. If for whatever reason the patient is unable to achieve or document progress, as outlined in the treatment plan, an adjustment may be indicated.

While the assessment of treatment goals is highlighted by setting functional goals, there are a number of other "nuts and bolts" to consider when developing an effective treatment plan. First, the treatment plan must be an effective collaboration between the patient and his or her clinician. In addition to the goals being realistic and measurable, they must be effectively tailored to be meaningful to the individual. For example, the discussion could begin with a simple question, "What do you hope to achieve through treatment?"

Like with most patient/provider documents, patients should be reminded of the potential risks and benefits of therapy, even after obtainment of informed consent. The realities of tolerance and physical dependence cannot be overly emphasized. A key component is also a description of how treatment might be terminated. It is critical to discuss the conditions that could lead to discontinuation of therapy. Opioids are not curative, and have no standard duration of treatment. Termination may be required for many reasons, including:

- Healing or resolution of a specific pathology underlying the pain.
- The experience of intolerable side effects.
- Lack of adequate response to a medication in terms of either pain relief or functional improvement.
- Evidence of non-medical or inappropriate use of the medication(s).

If inappropriate use of a prescription medication is discovered, treatment usually must be suspended, although provisions should be in place for the continuation of some kind of pain treatment and/or referral to other professionals or members of a pain management team. Some clinicians may be willing and able to continue a regimen of opioid therapy even after the discovery of aberrant behavior, if conducted with intensified monitoring, patient counseling, and careful documentation. This heightened level of vigilance and risk management may exceed the abilities and resources of the average

prescriber. In such cases, referral to a provider with specialized skills or experience in dealing with high-risk patients may be prudent.

Nursing consideration: Development of a solid treatment plan can be time consuming as the success and utility of such a plan requires a significant investment in patient contact time. Without the intimacy that can be established in such a relationship, a meaningful and realistic plan will be difficult or even impossible to develop. The typical nurse-patient relationship is ideal for this sort of communication.

Case study: Treatment hits a roadblock

Mr. Davidson returns for a follow-up after two weeks. He reports that his arthritis pain has become only slightly better, and that he is still experiencing the burning/tingling pain in his hands and feet. He has not achieved any of his functional goals. Upon questioning, he reveals that he has not been taking the opioid medication as frequently as prescribed because he "doesn't want to become an addict."

Appropriate assessment and action: The common patient fear of addiction should be allayed with careful, compassionate education that explains the differences between addiction and tolerance and communicates the key idea that proper use of an opioid may improve functioning and quality of life. The prescription for the extended release/long acting opioid is continued, and a prescription for a 10mg extended-release gabapentin is added.

Which opioid; Step 5: Which is the optimum therapeutic for your patient?

In 1682 Sydenham said, "Among the remedies which it has pleased Almighty God to give to man to relieve his sufferings, none is so universal and so efficacious as opium." This is still true hundreds of years later. Opioids, as a class, comprise many specific agents available in a wide range of formulations. A given patient might be appropriate for extended release/long acting (ER/LA) therapy only, short-acting only, or a combination of an ER/LA opioid with a short-acting opioid for breakthrough pain [25].

Short-acting oral opioids typically have a rapid effect (15-30 minutes), but may take longer to achieve peak efficacy due to the time required to pass the blood brain barrier. Generally speaking, elimination half-lives average three to four hours, offering a relatively narrow duration of action. As a result, they are best used for acute, intermittent or breakthrough pain (pain occurring against a background of constant pain). Fentanyl may be the fastest acting opioid of all. Combination products couple an opioid with a non-opioid analgesic, usually for use in patients with moderate pain [25].

Single-agent immediate release products are made using a variety of opioids such as codeine, morphine, hydromorphone and oxymorphone. Combination products typically combine a nonsteroidal anti-inflammatory drug and an opioid. Examples of the narcotics employed include codeine or hydrocodone combined with either aspirin, or more commonly, acetaminophen [26]. In 2014, the FDA made a recommendation that prescribers discontinue the use of combination products containing more than 325mg of acetaminophen per dosage unit. This decision is based on data suggesting that the increased risks of liver damage associated with larger doses of acetaminophen are not outweighed by any initial efficacy benefits [27].

ER/LA opioid formulations are purposely engineered to control the release of drug in such a way as to provide relatively consistent and prolonged drug levels in the blood. The resultant lower maximum and higher minimum concentrations should provide more effective pain relief. The onset of action is typically slower than that of immediate release products (perhaps 30-90 minutes), but offer a much longer duration of action (4 to 72 hours). These potent products are typically reserved for patients suffering from constant pain [28].

Prescribers should educate themselves regarding the general characteristics, toxicities, and drug interactions common to opioid products. Respiratory depression is the most serious adverse effect of opioids; it can be immediately life threatening. The risk of respiratory depression or respiratory arrest is higher in patients with an upper respiratory infection, asthma or other respiratory problems. Constipation is the most common long-term side effect but can often be managed with laxatives or stool softeners. Drug-drug interaction profiles are product specific. As such, the knowledge of particular opioid-drug interactions allows for the safer administration of opioid analgesics. In general, central nervous system depressants (sedatives, hypnotics, tranquilizers, tricyclic antidepressants, and alcohol) can have a potentiating effect on opiate-derived sedation and respiratory depression. Methadone can be an effective opioid, but it must be prescribed carefully and with a full knowledge of its highly variable pharmacokinetics and pharmacodynamics. Due to their enhanced duration of action, prescribers of ER/LA opioids must be even more mindful of these considerations. For detailed information on current ER/LA opioid analgesics, see the FDA Risk Evaluation and Mitigation Strategy (REMS) for Extended-Release and Long-Acting Opioids [29].

Nursing consideration: Although nurses are not responsible for ultimate prescribing conditions, a solid familiarization of product selection considerations will allow the nurse to collect much of the information needed to guide proper product choices as well as providing optimum side effect monitoring.

Initiating therapy, Step 6: How to best begin treatment

Prior to beginning treatment in patients with opioids, after a complete patient-specific assessment, it must be confirmed that they are responsible candidates for treatment via proper documentation of past therapy and a solid treatment plan. Components of a comprehensive treatment plan are discussed in detail in Step 3, above. Initial treatment should be conducted as a trial to determine if the proposed regimen can safely and efficaciously treat your patient. Such a trial could range in duration from a few days to several months [30]. A decision to continue opioid therapy after an appropriate trial should be based on careful review of the trial outcomes including:

- Progress toward meeting therapeutic goals.
- Changes in functional status.
- Presence and nature of opioid-related adverse effects.
- Changes in the underlying pain condition.
- Changes in medical or psychiatric comorbidities.
- Degree of opioid tolerance in the patient.
- Identification of altered or aberrant behaviors, misuse, or diversion.

It may not always be possible to safely prescribe after a single office visit, requiring repeat visits. It is also critical to always consider consultations and/or referrals if the patient appears to be beyond the scope of your practice or comfort level [30].

Nursing consideration: In addition to a nurse's critical role in selecting appropriate patients, and proper opioid therapeutic choices, nurses are in an optimum position to monitor safety and efficacy, especially immediately after the initiation of therapy.

Dose titration; Step 7: Getting to the right dose for the right patient

Patients who are opioid-naïve or have modest previous opioid exposure should be started at a low dose of a short-acting opioid and titrated slowly upward to decrease the risk of opioid-related adverse effects. If it is unclear if a patient has recently been using opioids (either prescribed or non-prescribed), the clinician should assume that the patient is opioid-naïve (i.e., not tolerant) and proceed as if opioid-naïve.

While some clinicians may initiate treatment with immediate release opioids, others will begin with an ER/LA product. Analgesic efficacy can be established after approximately 24 hours for immediate release opioids or in two to three days when ER/LA products are used. All opioids used during a 24-hour time period should be totaled to obtain the total daily dose (TDD). The TDD can be divided by the dosing interval to obtain a new dose level. The "end of dose" pain should also be considered. If full pain relief is obtained, but unreasonable adverse events have developed, the dose should be reduced to find a level that can be tolerated. Doses should not be adjusted more frequently than every 24 hours. If patients are stabilized on immediate release opioids, the use of an equivalent ER/LA product can be considered when appropriate. Such decisions can only be made after an assessment for opioid tolerance is established. While a slower titration strategy may be appropriate in older, frail patients, a more aggressive titration could be in order in cases of severe pain [31].

It is critical to note that although low-dose, short-acting opioids may offer the greatest safety for initiating opioid therapy, clinicians must recognize that short-acting opioids are not intrinsically safer than other formulations, and must stress to their patients the importance of strict adherence to prescribed doses/administration.

In a variety of clinical settings, nurses play an important role in pain assessment and opioid dose titration. Nursing knowledge surveys have revealed that information deficits may contribute to an under-treatment of pain. It is thought that in some cases, nurses are more influenced by patient behavior than the patient's self-report of pain. Survey results revealed a tendency of nurses' personal opinions to influence opioid dosing rather than recorded assessments [32]. Based on these findings, it is clear that nurses should maximize their understanding of opioid use to best serve their patients.

Nursing consideration: Dose titration is highly subjective and requires close monitoring and individualization. Since nurses often have the greatest level of patient contact, as in other parts of the opioid use process, they are ideally placed to optimize dose titration.

Abuse-deterrent formulations; Step 8: Keeping your patient safe

The previously cited abuse of prescription drugs has spurred the development of novel drug formulations designed for resistance to various methods of tampering and misuse. Current technologies intend to make the product not active unless taken as directed. For example, one class of deterrent formulation includes an opioid antagonist within the dosage form. If the dosage is crushed, the antagonist is released, rendering the opioid inactive. Thus, if such an ER/LA product was ground and inhaled, it would remain inactive in the respiratory tract. Another method is to use an inactive pro-drug formulation that is not activated unless subjected to gastric conditions. Another strategy is to change the physical structure of the dosage making it difficult or impossible to liquefy or concentrate the opioid.

Abuse-deterrent opioid formulations, of course, do not prevent users from simply consuming too much of a medication.

Development of any of these approaches is proving to be elusive and are mainly untested in the general population [33].

Case study: Progress
At the next scheduled follow-up visit, Mr. Davidson reports reduced pain and improved functioning. He says his pain is now 3-4 on a 10-point scale. He can now walk his dog twice daily, and is using the computer without pain. He says his sleep has improved as well. Mr. Davidson asks for a higher dose of the opioid "to see if I can get the pain down to zero."

Appropriate assessment and action: Although seemingly reasonable, it is explained to Mr. Davidson that, in fact, "zero pain" is an unrealistic goal for anyone, and that increasing the dose to achieve that goal would likely incur a range of side effects that would erode his overall quality of life.

Periodic review and monitoring; Step 9: Maintaining a good thing

If a trial of an opioid medication is deemed successful and opioid therapy is continued, periodic review and monitoring should be performed for the duration of treatment. Ensuring adherence to the prescribed treatment can be quite difficult, yet is crucial to good outcomes. Opioid therapy is often complex and complicated by legal, social, pharmacologic, and psychologic factors. Unless these issues can be overcome, safe and effective therapy may be impossible to achieve. Improved use surveillance and drug monitoring is key [34].

All patients receiving opioid therapy need to be assessed regularly. Routine monitoring is imperative, since risks and benefits rarely remain stable. Additionally, changing circumstances may trigger earlier assessment. The tests performed, questions asked, and evaluations made should be tailored to the patient as guided by clinical judgment. At a minimum, monitoring should include a documentation of pain intensity and level of function, progress towards the achievement of goals, adherence to therapy, and presence of adverse events. Clinicians must be vigilant towards the detection of aberrant drug-related behaviors, substance abuse, and any psychological changes. Elements of opioid therapy review and monitoring are not largely different than the tools used during initial assessment [35].

Patients with chronic pain receiving a steady dose of an opioid medication may experience episodes of pain that "breakthrough" the analgesic effects of the steady-state drug level. Close monitoring of breakthrough episodes is key to helping patients reduce pain and facilitate functioning.

By definition, breakthrough pain is a transient increase in pain of moderate to severe intensity occurring in the background of persistent pain that has been controlled. It is critical to distinguish true breakthrough pain from uncontrolled persistent pain. Breakthrough pain is episodic, with no persistent pain between flare-ups. Breakthrough pain must also be distinguished from end-of-dose failure, which can often be managed by increasing the frequency of the medication. Authentic breakthrough pain typically presents 1-4 times per day, but a patient could go days between episodes, then experience a day with eight attacks [36].

Patient pain diaries can be useful to help track breakthrough episodes and spot correlations between the episodes and variables in the patient's life. If specific triggers are identified, this may provide opportunities for changes that will reduce the prevalence of breakthrough episodes without need to increase reliance on medication. Non-opioid methods of dealing with breakthrough pain (e.g., cold or warmth, massage, yoga, acupuncture, meditation, or electrical stimulation) could be considered prior to any increases in opioid medication. As with the management of the underlying chronic

pain condition, clinicians should use an agreed-upon set of functional goals as a way to monitor, and if necessary, adjust, the use of as-needed opioid medications for breakthrough pain.

Patients who have previously engaged in aberrant drug-related behaviors or are otherwise at high risk of abuse should be required to submit to periodic urine drug screens to confirm adherence to the treatment plan. Drug testing must be conducted in a consensual manner as a part of the treatment plan with the understanding that it is key to patient success. Benefits of testing include:

- Serving as a deterrent to inappropriate use.
- Providing objective evidence of abstinence from drugs of abuse.
- Monitoring response to treatment.
- Assisting with a diagnosis.
- Helping patients allay concerns by family members, employers, or law-enforcement.
- Demonstrating to regulatory authorities a clinician's dedication to monitoring "best practices."

In the context of family practice settings, unobserved urine collection is usually an acceptable procedure for drug testing. Clinicians, however, should be aware of the many ways in which urine specimens can be adulterated. Clinicians charged with interpreting test results should be familiar with the metabolites associated with each opioid that may be detected in urine, since the appearance of a metabolite can be misleading. A patient prescribed codeine, for example, may test positive for morphine because morphine is a metabolite of codeine. Similar misunderstandings may occur for patients prescribed hydrocodone who appear positive for hydromorphone or oxycodone and oxymorphone (see Table 4).

While quarterly or twice yearly assessments may be adequate for most patients, high-risk patients must undergo more frequent or intense monitoring. For the highest risk patients, weekly checks may be indicated. Regardless of frequency, regular, consistent checks are critical to success [35].

As part of routine practice, clinicians who prescribe opioids should perform medication reconciliation at each patient visit. The American Medical Association defines "medication reconciliation" as "…making sense of a patient's medications and resolving conflicts between different sources of information to minimize harm and maximize therapeutic effects [37]."

Although clinical patient care is a solid approach to monitoring appropriate opioid use, prescribers should also take advantage of prescription drug monitoring programs (PDMP) when available. A PDMP is a statewide electronic database designed to collect data on substances dispensed. Information contained in the database can be distributed to individuals who are authorized to receive it for the purposes of their profession. A PDMP offers a variety of benefits including:

- Support access to legitimate medical use of controlled substances.
- Identify and deter or prevent drug abuse and diversion.
- Facilitate and encourage the identification of, intervention with, and treatment of persons addicted to prescription drugs.
- Inform public health initiatives through outlining of use and abuse trends.
- Educate individuals about PDMPs and the use, abuse and diversion of and addiction to opioids.

Case study: A caution light

After 3 weeks, a message has been received stating that a young woman has called requesting an early refill of Mr. Davidson's opioid "because he's suffering."

Appropriate assessment and action: This message rightly raises suspicions. The clinician first accesses her state's Prescription Drug Monitoring Program to see if Mr. Davidson might be acquiring prescriptions from another provider. He is not, and nothing appears unusual. The prescriber then calls Mr. Davidson directly. Mr. Davidson confirms that he did ask his granddaughter to call for the prescription because he was having increased pain after playing tennis for an hour. Mr. Davidson is advised to temporarily use an OTC NSAID (ibuprofen, not more than 600 mg, three times per day) and is asked to return for an in-person visit within a week. At that visit, a range of non-pharmacological strategies are reviewed to provide additional pain relief (i.e. post-exercise cold/warm treatments; exercises to improve flexibility; massage; and the use of an elbow brace to be used for tennis).

What to watch for; Step 10: Opioid side effects

Many patients treated with an opioid will experience side effects, the most common of which are constipation (very common) and nausea. Unfortunately, these side effects are challenging to manage, and tolerance to these frequently do not develop. In some cases, these may be so adverse as to warrant opioid discontinuation, contributing to inadequate analgesia. Proactive treatment for constipation is typically indicated. Other common side effects include sedation, dizziness, vomiting, physical dependence, tolerance, and respiratory depression. Less frequently observed side effects of opioid use are delayed gastric emptying, hyperalgesia (increased sensitivity to pain), immunologic and/or hormonal dysfunction, muscle rigidity and myoclonus (spasmodic jerky contractions of groups of muscles) [38]. Unlike constipation and nausea, tolerance to many side effects can occur, becoming less troublesome over time.

A variety of approaches are being explored in an attempt to mitigate these troubling side effects. Some patients can benefit from changing the opioid or the route of administration used. Proper screening, education, and pre-emptive treatment will minimize bad outcomes and enhance efficacy in many cases.

Opioids and pregnancy

A prominent team of obstetric researchers determined that maternal opioid treatment in the early phases of pregnancy was associated with a variety of birth effects that are important contributors to infant morbidity and mortality. It is critical to consider the background rate of such maladies. For example, it was found that the prevalence of hypoplastic left heart syndrome was about 2.5 times higher in women taking opioids compared to those that were not. It is also important to consider that the incidence in mothers with opioid therapy was only 5.8 out of 10,000 women compared to a baseline event rate of 2.4 out of 10,000 women. Since neither event rate is relatively high (less than 0.06% chance in women taking opioids), it is critical that clinicians weigh potential benefits versus risks on an individual patient basis [39].

If opioids are used in pregnant women, opioid withdrawal issues are to be expected in the infant if the mother becomes opioid dependent.

Driving and work safety

Prior to the onset of any therapy, patients need to advised that cognitive impairment may occur. This must be included in their informed consent. Patients can expect a variety of changes in cognitive function including:

- Somnolence.
- Fatigue.
- Dizziness.
- Decreased ability to concentrate.
- Slowed motor performance.
- Slowed reflexes.
- Impaired coordination.

Any of these can impact a patient's ability to drive or work safely, with increased incidence at the initiation of therapy. Some recent studies suggest that driving ability may be less impaired in patients dependent on chronic opioid treatment. Nonetheless, impairment should be assumed in patients receiving opioids and should be considered when determining what a patient can safely accomplish [40].

Clinicians should be aware that certain professions (i.e., school bus drivers and pilots) may be subject to restrictions in the use of opioid medications. Clinicians should check with their state medical society or the Federation of State Medical Boards to obtain up-to-date information in this regard.

Screening for endocrine function

While it has become evident that estrogen plays a role in the female pain experience, less attention has been paid to the role of testosterone in either sex. Opioid therapy is associated with changes in testosterone levels. Since testosterone plays critical roles in both males and females, it is important that clinicians be aware of potential endocrine change issues as well as possible hormone replacement strategies. A recent publication detailed a survey showing that sex hormone determinations are rarely carried out in pain treatment centers [41].

Both male and female patients on long-term opioid therapy are at risk for hypogonadism, thus the endocrine function of all patients should be assessed at the start of long-term opioid therapy and at least annually thereafter. The symptoms of hypogonadism in both genders may include fatigue, mood changes, decreased libido, loss of muscle mass, and osteoporosis. Although there are insufficient data to recommend routine endocrine screening of asymptomatic patients, current guidelines recommend such testing for patients exhibiting any of the aforementioned signs and symptoms.

Nursing consideration: Like most every aspect of opioid therapy, clinical monitoring is highly subjective, and benefits from the formation of a close and trusting bond between the patient and nurse. All communications must be direct, honest, and caring. Since nurses often have the greatest level of patient contact, they should ideally optimize this beneficial contact.

Opioid rotation; Step 11: Best balance to optimize treatment

"Opioid rotation" means switching from one opioid to another in order to better balance analgesia and side effects. Rotation may be needed because of a lack of efficacy (often related to tolerance), bothersome or unacceptable side effects, increased dosing that exceeds the recommended limits of the current opioid (e.g., dose limitations of co-compounded acetaminophen), or an inability to absorb the medication in its present form (e.g., if there is a change in the patient's ability to swallow, switch to a formulation that can be absorbed by a different route, such as transdermal). The initial step is to select a new drug at a starting dose designed to minimize risks while retaining the level of efficacy obtained with the former drug product. Relevant estimates of analgesic interchangeability have been outlined using "equianalgesic dose tables," which have been modified only slightly in the past several decades [42]. A good example of such a table generated by Stanford University School of Medicine can be found at https://palliative.stanford.edu/opioid-conversion/equivalency-table/.

Because of the large number of variables involved in how any opioid will affect any given patient, opioid rotation must be approached cautiously, particularly when converting from an immediate-release formulation to an ER/LA product. As a result, an equivalent dose table must be used carefully as a high degree of variation has been found across the various charts and online calculator tools, potentially accounting for some overdoses and fatalities. The optimal dose for a specific patient must be determined by careful titration and appropriate monitoring. In some cases, because of the potential risk of harm while rotating from one chronic opioid regimen to another, it may be wise to initially use lower doses of an ER/LA opioid than what might be suggested by equianalgesic charts and at the same time, temporarily liberalizing, as needed, the use of a short-acting opioid. This would then be followed by gradual titration of the LA opioid to the point where the as-needed short-acting opioid is incrementally reduced, until no longer necessary.

Non-adherence patients; Step 11: How to manage non-compliant patients

Patients who begin to exhibit aberrant drug-related behaviors or nonadherence to a prescription should be monitored more strictly than compliant patients. It is critical to not rush to judgement, though, and move methodically as you assess the situation. The management of chronic pain can be difficult. Putting a patient on the defensive can adversely impact their treatment, but an important distinction must be drawn between addiction and pseudo-addiction. Chronic pain sufferers seeking increased dosages of opioids may not be addicted (marked by loss of control, compulsion, etc.), and the pseudo-addicted may demonstrate concerning behavior, such as demands on clinicians, procurement of opioids from more than one prescriber, or hoarding medications. If non-adherence is suspected, clinicians should rely on extra close observation, testing, and the inclusion of other healthcare professionals including psychiatrists or drug addiction specialists. Finally, a reliance on the prospective treatment plan will ensure that therapy is following the agreed upon course [43].

Possible reasons to keep in mind during assessment for nonadherence include:

- Inadequate pain relief.
- Misunderstanding of the prescription specifics.
- Misunderstandings related to lack of fluency with English.
- Attempts to "stretch" a medication in order to save money.
- Cultural or familial pressure not to take a medication.
- Stigma about taking a pain medication.
- Overmedication and fears about addiction.
- Misunderstanding of a prescription by a caregiver who has taken responsibility for daily apportioning of medications.
- Confusion between two medications that look very similar to each other.

Nursing consideration: When it comes to managing patient non-adherence to opioid therapy, solid relationship building is key to success. A proper investigation and assessment of the situation may be time consuming and frustrating. Due to the many demands placed on prescribers, they may be unable to adequately conduct this task. Nurses may find themselves in an ideal space to work with the patients to fully characterize any issues with their treatment, and provide productive advice to the ultimate prescriber.

Case study: Stable improvement

After a slight dose adjustment of the gabapentin, Mr. Davidson reports continued functional progress and acceptable levels of pain. He has increased his level of physical activity and reports that his mood and general health is better as a result. He says he would like to try to taper down his use of the opioid.

Appropriate assessment and action: This is a treatment success; the health care team should be gratified. In this case, Mr. Davidson is given clear and specific instructions for how to taper his dosage of opioids to the lowest effective dosage level.

Treatment termination; Step 12: Safely halting opioid therapy

Reasons for the discontinuation of an opioid analgesic can include: the healing of or recovery from an injury, medical procedure, or condition; intolerable side effects; lack of response; or discovery of misuse of medications. Regardless of the reason, termination should be accomplished so as to minimize unpleasant or dangerous withdrawal symptoms by tapering the opioid medication slowly, or by carefully changing to a new formulation.

Tapering, or detoxifying patients after chronic opioid use is complex and needs to be monitored in order to minimize withdrawal symptoms. Sadly, very little clinical guidance is available to guide proper tapering strategies. In some cases, it may be beneficial to consult with an addiction specialist for help when designing an approach to treatment discontinuation [44].

In general, a slower taper will produce fewer unpleasant symptoms of withdrawal. As an alternative to termination, a clinician may choose to continue opioid treatment with intensified monitoring, counseling, and careful documentation if it is deemed in the best interest of the patient. This requires deliberate consideration and a well-documented risk management plan that addresses the greater resources necessary for opioid continuation following evidence of misuse. If termination of the provider/patient relationship is deemed necessary, clinicians must ensure that the patient is transferred to the care of another provider, and see that the patient has adequate medications to avoid unnecessary risk from uncontrolled or potentially dangerous withdrawal. Practitioners can be held accountable for patient abandonment if medical care is discontinued without justification or adequate provision for subsequent care.

Methadone; Step 13: High potential + elevated risks = controversy

Methadone, a synthetic opioid, was originally used as an analgesic in the 1940s. Beginning in the 1960s, methadone was re-purposed as a maintenance drug for use in the treatment of opioid addiction. Currently, it is employed for both indications. While specialized training and DEA registration is required for the treatment of addiction, it can be prescribed for pain by any provider authorized to prescribe Schedule II controlled substances. Over the past few decades, methadone sales have risen sharply, largely for use outside of the narcotic treatment arena. Coupled with the increase in the use of methadone for pain, questions of its safety have also been on the rise. Although methadone accounts for less than five percent of opioid prescriptions, it has been linked to one-third of opioid-related deaths [45].

There is a disconnect between the half-life of methadone in the blood and the duration of analgesia that it provides. While its plasma half-life ranges from 8 to 60 hours, the duration of methadone analgesia is 6 to 12 hours. In practice, pain relief may end long before the drug is eliminated from the body, leading to re-dosing, and potentially dangerous systemic accumulations. Furthermore, methadone is metabolized by several different enzyme systems, subjecting it to multiple potential drug-drug interactions. Due to both of these liabilities, prescribers must exercise great caution when utilizing methadone [46].

Methadone's long duration of action, coupled with its low price is likely contributing to the upsurge in its use for the treatment of chronic pain. In addition to the complications described previously, the use of methadone is complicated by its interaction with cigarette smoking (which increases the rate of its metabolism), and alcohol (which can augment its toxicity in addition to also increasing the rate of its metabolism).

While methadone is not commonly employed as a first-line opioid, it could be beneficial in opioid-naïve patients. Due to its slow onset and long duration of effect, it may help avoid some of the reward behaviors common to fast-acting opioids. The APS/AAPM guidelines recommend a starting dose in most opioid-naive patients of 2.5 mg every eight hours, with dose increases occurring no more frequently than weekly. It is nearly impossible to determine an equivalent dose of methadone based on morphine dosing. Although a 10mg dose of methadone is an approximate analgesic to 15mg of morphine, the required methadone dose will decrease over time. Therefore, the lowest possible dose titration should be followed in opioid-tolerant patients. Most available narcotic equivalence tables are based on single doses. Due to its potential accumulation, relying on these charts for chronic methadone dosing can result in a substantial overdose that may not become apparent for several days [47].

Nursing considerations: Because the risk of overdose is particularly acute with methadone, patients should be educated about these risks and counseled to use methadone exactly as prescribed. They should also be warned about the dangers of co-administering other respiratory depressants.

In 2006, the FDA issued an alert warning that methadone can cause serious cardiac conduction disturbances, including QT-interval prolongation and Torsades de Pointes, a potentially fatal ventricular arrhythmia. It appears that methadone-related corrected QT (QTc) interval prolongation and cardiac arrhythmias can occur at any dose, but are more likely at higher doses, or with concomitant use of drugs that interact with methadone or that themselves prolong QTc. Although uncommon, the cardiac arrhythmias that can be induced by methadone are potentially lethal if not detected. The cardiac health of patients who are candidates for methadone should be assessed, with particular attention paid to any history of heart disease or arrhythmias. An initial ECG may be advisable prior to starting methadone, particularly if a patient has a specific cardiac disease, or cardiac risk factors, or is taking agents that may interact with methadone [48].

Clearly, there are liabilities associated with the use of methadone. At the same time, it has potentially favorable attributes as an analgesic. Appropriate use of methadone in patients with chronic pain demands a clear characterization of the patient followed by a thorough risk-benefit assessment.

Safe storage and disposal of opioid medications; Step 14: Proper opioid logistics

It is well established that many abusers of prescription drugs obtain them from family and friends. Therefore, appropriate medication and disposal is an effective strategy in preventing potential abuse. Prior to receiving opioids, patients should be informed of these facts and provided key steps for safely maintaining their medications including information regarding take-back programs for un-needed medications [49].

If possible, opioid pain medications should be stored in a locked cabinet or other secure storage unit. Storage areas should be cool, dry, and out of direct sunlight. Remind patients not to store medications in their car, to keep medications in the original containers, and to avoid storing medications in the refrigerator or freezer unless specifically directed to do so by a healthcare provider or pharmacist.

A variety of approaches are available for home disposal of unused medications. Examples include mixing the drugs with unappealing substances, such as coffee grounds or used cat litter. Such mixes should be sealed in plastic bags prior to placing them in the garbage. It is critical that pills should not be crushed, and never flushed down a drain or toilet. Additional details can be found on the Massachusetts Medical Society website [50].

Many communities sponsor take-back days for un-used medications. The U.S. Drug Enforcement Agency (DEA) regularly sponsors such programs. Details on upcoming events can be found on their website [51].

Nursing consideration: In addition to limiting the quantity of opioid medications administered, nurses can play a critical role in preventing their misuse by keeping patients aware of the proper methods and resources available for medication storage and disposal.

Managing an overdose; Step 15: Keys to keeping your patient alive

An opioid overdose is a potentially lethal condition resulting from some combination of prescribing practice, failure to appreciate patient risks of medication misuse, drug administration errors, or simply abuse. In addition to the commonly known issue of respiratory depression, overdose can also have life-threatening toxic effects on multiple organ systems. It is key to recognize that the duration of action varies between products. As such, overdose treatment must reflect these differences [52].

It is critical to note that respiratory depression typically takes some time to develop. As a result, there will be early warning signs of overdose including:

- Intoxicated behavior – confusion, slurred speech, stumbling.
- Feeling dizzy or faint.
- Acting drowsy or groggy.
- Unusual snoring, gasping, or snorting during sleep.
- Difficulty waking up from sleep or staying awake.

Patients and their caregivers should be counseled to immediately call 911 or an emergency service if they observe any of these warning signs. If a person has stopped breathing, artificial respiration/cardio-pulmonary resuscitation (CPR, including rescue breathing) should be begun immediately and continued until emergency help arrives.

Naloxone; Step 16: A pharmacologic approach to reversing opioid overdose

Naloxone is a pharmacologic antidote that can be used to treat opioid overdose. It acts by binding to opioid receptors with a greater affinity than an opioid, displacing the opioid, and making it inactive. Administered properly, naloxone can reverse all signs and symptoms of opioid intoxication, and it can be administered using a variety of dosage forms including parenteral, intra-nasal, or by pulmonary inhalation [53].

Intranasal naloxone is becoming more and more readily available on an over the counter (OTC) basis. As of October, 2015, OTC naloxone was legally available in 14 states, with many others considering legislation to allow this practice [53].

While discussing the suitability of naloxone for OTC use, the U.S. Food and Drug Administration grappled with a number of issues unique to this problem, e.g., the issue of self-selection. The current OTC paradigm states that a patient deciding to use an OTC drug would self-select to treat their symptoms, but the use of naloxone would be unique in that the patient choosing to administer the drug would not be the patient receiving it. Data were required to demonstrate that the individual administering naloxone can properly diagnose an opioid overdose and that such administration is appropriate [54].

If available, patients might be considered for naloxone OTC therapy if they:

- Receive prescriptions of more than 50mg of morphine equivalent/day.
- Are being rotated from one opioid to another when there may be incomplete cross-tolerance.
- Are opioid naïve and have been prescribed methadone or are rotated from another opioid to methadone.
- Are released after emergency medical care involving opioid intoxication or poisoning.
- Have a suspected history of substance abuse, dependence, or nonmedical opioid use.
- Have known or suspected concurrent heavy alcohol use.
- Have a respiratory infection or illness.
- May have difficulty accessing emergency medical services.

Patient education; Step 17: What do you need to teach your patient?

Thorough patient education about the safe use, storage, and disposal of opioid medications is an essential part of opioid prescribing "best practices." This education can be partially integrated into standard patient/provider agreements or informed consent documents. As with other patient-directed materials, education must be provided in a language and at a reading level (typically 6th-7th grade) appropriate for a clinician's patient population.

Safe use of opioid medications means that patients carefully follow clinician instructions, including special directions about timing of doses, and whether to administer the medication with food or without. Clinicians should be mindful of any patient physical limitations (e.g., poor eyesight) that could interfere with the accurate and timely administration of prescribed opioids.

Key educational topics include:

- Read the prescription container label each time to check dosage.
- Never use medicines after expiration date.
- Never share medicines with others.
- Do not take a pain medicine with alcohol or other sedatives.
- Do not take a pain medicine to promote sleep.
- Never break, chew, or crush medicines, particularly ER/LA opioid medications.
- For transdermal products, external heat, fever, and exertion can increase absorption, leading to a potentially fatal overdose.
- Transdermal products with metal foil backings are not safe for use in MRI scanners.
- Do not use transdermal products if they are broken or torn.

Generalities of opioid safe use as well as a comprehensive listing of opioid ER/LA product-specific information can be found in the August 2015 FDA Blueprint for Prescriber Education for Extended-Release and Long-Acting Opioid Analgesics [55].

Conclusions: Tying it all together

This educational program has summarized "best practices" for the responsible use of opioid pain medications for chronic non-cancer pain, with an emphasis on nursing roles. Clinicians face the competing demands of relieving pain while minimizing potential harm to both patients and society. The steps and procedures described in this program provide a structure by which clinicians can achieve these twin goals without incurring undue burdens of time or energy.

Pharmacovigilance simply means that prescribers apply basic principles of prudent medicine to the needs of patients in pain. And, because the evidence base for current guidelines remains sub-optimal, clinicians retain a great deal of latitude in deciding how that vigilance is best deployed on a day-today basis. The treatment of pain is a dynamic and evolving field, and clinicians should periodically refresh their knowledge through reading, attending seminars/courses, or by taking additional CME courses.

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BEST NURSING PRACTICES: CARE OF PATIENTS PRESCRIBED OPIOIDS FOR THE TREATMENT OF PAIN

Self Evaluation Exercises

Select the best answer for each question and check your answers at the bottom of the page.
You do not need to submit this self-evaluation exercise with your participant sheet.

1. In 2012, FDA published a REMS specific to the use of extended-release and long-acting opioids. This document encourages prescribers to consider which of the following prior to ordering opioids for their patients:
   a. Educate: Complete a REMS-compliant educational program geared to your discipline.
   b. Plan an exit strategy to ensure safe opioid termination prior to initiating dosing.
   c. Make sure that all caregivers have provided informed consent.
   d. Ensure that all patients receiving opioids have reached the age of majority.
2. Prior to initiation of opioid therapy, clinical professionals need to complete which of the following assessments?
   a. A comprehensive clinical laboratory workup.
   b. Cardiac evaluation.
   c. Intelligence testing.
   d. A thorough pain assessment.
3. A nurse trained to characterize and identify an opioid addicted patient might note which of the following regarding the addicted patient?
   a. Their medication use clearly improves the patient's quality of life.
   b. If adverse events are observed, the patient wants to increase medication use.
   c. The patient is greatly concerned about the physical problem being treated.
   d. The patient is aware of problems that could develop as a result of drug treatment.
4. "Best practices" for pain treatment contracts contain which of the following elements?
   a. Medications are to be refilled at the patient's discretion.
   b. All urine toxicology screens will be prospectively scheduled.
   c. Lost or stolen opioid prescriptions must be re-written with 48 hours.
   d. Refills require a clinic visit by appointment.
5. Function-based goals offer key advantages for managing opioid use in patients with chronic pain. Examples of such advantages include which of the following?
   a. Functional goals are purely subjective.
   b. Perceived levels of pain are the sole focus in determining functionality.
   c. Prescribing decisions are based on outcomes that can be objectively demonstrated to both clinician and patient.
   d. The attainment of function-based goals is totally independent of states of addiction.
6. Short-acting opioids are most appropriate and commonly used for which of the following conditions?
   a. Cancer pain.
   b. Breakthrough pain.
   c. Neuropathic pain.
   d. Terminal pain.
7. Of the following tools, which one can help patients identify triggers of breakthrough pain?
   a. Paper or electronic pain diary.
   b. Pill box organizers.
   c. Portable EEG monitors.
   d. Automated systems for sending patients reminders to take their medications.
8. A Prescription Drug Monitoring Program (PDMP) is a statewide electronic database designed to collect data on substances dispensed. Information contained within the database can be distributed to individuals who are authorized to receive it for the purposes of their profession. A PDMP offers a variety of benefits including which of the following:
   a. Individual pharmacy brand versus generic dispensing patterns.
   b. Restriction of access to legitimate medical use of controlled substances.
   c. Ability to identify and deter or prevent drug abuse and diversion.
   d. Provide Pharmacy Benefit Managers with critical opioid prescribing patterns.
9. If non-adherence to proper opioid therapy is suspected, clinicians should rely on extra close observation, testing, and the inclusion of other healthcare professionals including psychiatrists or drug addiction specialists. Possible issues to keep in mind during assessment for nonadherence include:
   a. Adequate pain relief.
   b. Complete understanding of the specifics of the opioid prescription and treatment plan.
   c. Pride in taking a pain medication.
   d. Cultural or familial pressure to not take a medication.
10. When providing education to your patients receiving opioid medications, it is important to stress that it can be particularly unsafe to combine opioids with which of the following other medicines?
    a. Stimulant medications.
    b. SSRI antidepressants.
    c. Benzodiazepines or barbiturates.
    d. Anti-hypertensive medications.

Answers:	1.A 2.D 3.B 4.D 5.C 6.B 7.A 8.C 9.D 10.C

Chapter 2: Hepatitis: Recognition and Management

4 Contact Hours

Release Date: 4/15/2015 **Expiration Date: 4/15/2018**

Audience

The target audience for this education program is nurses who want to improve their knowledge of the various forms of hepatitis and enhance their ability to provide safe and effective nursing care for patients suffering from the disease.

Purpose statement

This course presents the various types of hepatitis as well as the pathophysiology, assessment, and care of each.

Learning objectives

- Describe the anatomy and physiology of the liver.
- Describe the different forms of viral hepatitis.
- Discuss the incidence and prevalence of the different forms of viral hepatitis.
- Discuss the pathophysiology of hepatitis.
- Explain the stages of viral hepatitis as they relate to clinical manifestations.
- Describe the process of diagnosing viral hepatitis.
- Explain treatment strategies for viral hepatitis.
- Discuss important nursing considerations when caring for patients infected by hepatitis.
- Describe the pathology of nonviral hepatitis.
- Discuss the treatment of nonviral hepatitis.

How to receive credit

- Read the entire course online or in print which requires a 4 hour commitment of time.
- Depending on your state requirements you will asked to complete either:
  - An affirmation that you have completed the educational activity
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- Provide required personal information and payment information.
- Complete the mandatory Self-Assessment and Course Evaluation.
- Print your Certificate of Completion.

Accreditations and approvals

Elite is accredited as a provider of continuing education by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

In addition to states that accept ANCC, Elite is an approved provider of continuing education in nursing by: Alabama, Provider #ABNP1418 (valid through April 30, 2017); California Board of Registered Nursing, Provider #CEP15022; District of Columbia Board of Nursing, Provider # 50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; and Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2017).

Faculty

Adrianne E. Avillion, D.Ed., RN
Adrianne E. Avillion, D.Ed., RN, is an accomplished nurse educator and published health care education author. Dr. Avillion earned her doctoral degree in Adult Education and her MS from Penn State University, along with a BSN from Bloomsburg University. Dr. Avillion has served in various nursing roles over her career in both leadership roles and as a bedside clinical nurse. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development. She currently owns and is the CEO of Strategic Nursing Professional Development, a business that specializes in continuing education for health care professionals and consulting services in nursing professional development.

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Introduction

Hepatitis is a rather common systemic disease characterized by inflammation of the liver due to viruses, drugs, and toxins[1,2] . Hepatitis causes hepatic cell destruction, necrosis, and autolysis (destruction of cells by their own enzymes)[1].

The most common viral forms of hepatitis are hepatitis A, B, and C (HAV, HBV, HCV). Newer strains of hepatitis virus, d, E, F (now declared not an actual hepatic virus), and G have been identified in the last 10 years[2].

Nonviral hepatitis is classified as toxic, drug-induced (idiosyncratic), or autoimmune[7].

Hepatitis varies in its severity and prognosis. Its effects range from mild and self-limiting to severe and even fatal.[3] Regardless of the cause of the disease, nurses must have detailed knowledge of the anatomy and physiology of the liver, as well as the pathophysiology of the disease.

Anatomy and physiology of the liver

The liver is the second largest (after the skin) organ in the human body. Wedge- or prism-shaped, it is the body's largest gland, weighing on average about 3 pounds, or 1,500 grams. The liver, which is highly vascular, is pinkish-brown in color, enclosed in a fibrous capsule, and located under the diaphragm in the right upper quadrant of the abdomen[4,5].

The liver is anchored to the lesser curvature of the stomach by the lesser omentum, which is a fold of peritoneum that covers most of the liver. The hepatic artery, hepatic portal vein, common bile duct, and hepatic veins pass through the lesser omentum[4,5].

Liver percussion

Percussing and measuring the liver helps estimate its size. Hepatomegaly (enlargement of the liver) can be indicative of hepatitis and other liver diseases[6].

Percussion and measurement of the liver is accomplished by[6]:

- First, identify the upper border of liver dullness. Begin in an area of lung resonance in the midclavicular line. Percuss downward to the point where liver dullness is heard. Mark the area where dullness is first heard with a pen.
- Then, beginning to percuss at the right midclavicular line at a level below the umbilicus, percuss upward toward the liver. Mark the spot where the sound changes from tympany to dullness.
- Measure the vertical span between the two marked areas with a ruler. The normal liver span in an adult ranges from 2 ½ to 4 ¾ inches (6.5 to 12 cm).

Gross anatomy

The liver has four lobes[4]:

- Left lobe.
- Right lobe.
- Caudate lobe (located behind the right lobe).
- Quadrate lobe (located behind the left lobe).

From an anatomical perspective, the liver is divided into a larger right lobe and a smaller left lobe by the falciform ligament that is, however, no use in the surgical setting. From a surgical perspective, the liver is divided into right and left lobes of almost equal size by Cantlie's line, which is a major fissure running from the gallbladder fossa in front to the inferior vena cava (IVC) fossa behind[5].

The right and left lobes are divided into two sections. The right hepatic vein (RHV) divides the right lobe into anterior and posterior sections. The left hepatic vein (LHV) divides the left lobe into medial and quadrate sections. The quadrate section is sometimes referred to as the quadrate lobe[4,5].

Anatomical note! The posterior section of the right lobe and the caudate lobe (located behind the right lobe) are not seen on a fontal view of the liver[5].

Circulation

The functional unit of the liver is the lobule. The lobule consists of a plate of hepatic cells (hepatocytes) that encircle a central vein and branch outward. Sinusoids (irregularly shaped blood vessels) are the capillary system of the liver. The sinusoids are lined by reticuloendothelial macrophages called Kupffer cells. These cells remove bacteria and toxins that have entered the blood through the intestinal capillaries[4].

The sinusoids carry oxygen-rich blood from the hepatic artery and nutrient rich blood from the portal vein. Unoxygenated blood is transported through the central vein and flows through hepatic veins to the IVC[4].

The liver is extremely important to the achievement and maintenance of the body's homeostasis. Functions of the liver include[4]:

- Playing a major role in the metabolism of carbohydrates.
- Detoxifying various toxins in the plasma.
- Synthesizing plasma proteins, nonessential amino acids, and vitamin A.
- Storing essential nutrients such as iron and vitamins K, D, and B12.
- Removing ammonia from body fluids.
- Converting ammonia to urea for excretion in the urine.
- Helping regulate blood glucose levels.
- Secreting bile.

The gallbladder

It is not possible to discuss the functions of bile without reviewing gallbladder functioning. The gallbladder, a pear-shaped organ, is joined to the ventral surface of the liver by the cystic duct and is covered with visceral peritoneum[4,5].

The gallbladder is responsible for the storage and concentration of bile. It is also responsible for releasing bile into the common bile duct for transport to the duodenum in response to contraction and relaxation of the sphincter of Oddi, the smooth muscle that surrounds the ends of the

common bile duct and the pancreatic duct. The sphincter of Oddi relaxes during a meal to allow bile and pancreatic juices to flow into the intestine[4,5].

Function of bile

Bile is responsible for emulsifying fat and promoting intestinal absorption of fatty acids, cholesterol, and other lipids. The liver recycles about 80% of bile salts into alkaline bile and combines them with the bile pigments bilverdin and bilirubin (the waste products of red blood cell breakdown) and cholesterol. This alkaline bile is continuously secreted by the liver[4].

Bile alert! Certain factors may increase the production of bile. These are vagus nerve stimulation, release of the hormone secretin, increased blood flow in the liver, and the presence of fat in the intestine [4].

FORMS OF VIRAL HEPATITIS

Viral hepatitis is a serious problem throughout the world. Its greatest prevalence is in Africa, South America, Eastern European countries, and Asian countries (with the exclusion of Japan)[2].

The three major viruses that affect the liver are hepatitis A (HAV), B (HBV), and C (HCV). They vary according to mode of transmission, pathophysiology, and prognosis[2].

Newer strains of hepatitis virus have been identified within the last decade. These forms are less common and not as well known as the major three hepatitis viruses[2].

Hepatitis A

Stacey is a 25-year-old art historian who works at a museum in a major metropolitan area. She returned home 3 weeks ago from a business trip to South America. Stacey is not feeling well. She complains of tiring easily, loss of appetite, headache, and sensitivity to bright light. When she notices that her urine has become especially dark and that her stools are clay-colored, she becomes alarmed and makes an appointment with her family physician.

When Stacey's physician learns of her recent travel to South American, she asks Stacey if she ate any fresh fruit or vegetables from the open markets she visited. When Stacey confirms that she had indeed eaten a lot of fresh fruit (without washing it), her physician suspects a diagnosis of hepatitis. Furthermore, the physician suspects hepatitis A based on the incubation period and the fact that one mode of transmission is the fecal-oral route. Stacey has most likely consumed contaminated food.

Hepatitis A, a highly contagious disease, is caused by infection with the hepatitis A virus (HAV). Hepatitis A, also known as infectious or short-incubation hepatitis, has an acute onset and most often affects children and young adults. Hepatitis A is usually a mild disease with a generally good prognosis. It is self-limiting and does not cause chronic infection or chronic liver disease[7,8].

Hepatitis A has an incubation period of 15 to 45 days. It is transmitted primarily by the fecal-oral route by either person-to-person contact or by consuming food or water that is contaminated. The disease is rarely transmitted via the blood-borne (needle or injection) route[8].

Hepatitis A alert! HAV infection is usually caused by eating contaminated food, milk, or water. Many outbreaks of the disease can be traced to ingestion of seafood from polluted water[7].

There are about 150,000 new cases of Hepatitis A in the United States annually and 10 million new cases reported throughout the world every year. The disease causes about 100 deaths annually in the United States[2].

Nearly 50% of all reported hepatitis A cases in the United States have no specific risk factor(s) identified. Among adults who do have identified risk factors, the majority of cases occur in men who have sex with other men, persons who use illegal drugs, and persons who travel internationally[8].

Hepatitis A alert! Because HAV that is transmitted during sexual activity usually occurs because of fecal-oral contact, measures usually used to prevent transmission of other sexually transmitted diseases (STDs), such as using condoms, do not prevent the transmission of HAV. Good personal hygiene has not been shown to be successful in preventing transmission of the virus[8].

The most effective way to prevent HAV transmission is vaccination. Persons who should be routinely vaccinated with hepatitis A vaccine are[10]:

- All children between their first and second birthdays (12 through 23 months of age).
- Any persons 1 year of age and older traveling to, or who work in, countries with significant prevalence of hepatitis A (e.g., Central or South America).
- Children and adolescents up to 18 years of age who live in places where routine vaccination has been implemented because of high incidence.
- Men who have sex with men.
- People who use street drugs.
- People who have chronic liver disease.
- People who are being treated with clotting factor concentrates.
- People who work with HAV-infected primates.
- People who work with HAV in research laboratories.
- Members of households who plan to adopt or take care of a newly arriving child from a country where hepatitis A is common.

There are other people who might benefit from the hepatitis A vaccine, including[10]:

- Anyone who is 1 year old or older and wants protection from HAV infection.
- Unvaccinated children or adolescents in areas where outbreaks of hepatitis A are occurring.
- Unvaccinated people who have been exposed to HAV.

Hepatitis A vaccine alert! Hepatitis A vaccine is not licensed for children younger than 1 year of age.[10]

People who should not receive the hepatitis A vaccine or who should wait to receive it include[10]:

- Anyone who has ever had a severe allergic reaction to a previous dose of the vaccine should not get another dose.
- Anyone who has had a severe allergy to any components of the vaccine.

Hepatitis A vaccine alert! Because hepatitis A vaccine is a killed or inactivated vaccine, the risk to a pregnant women or her unborn baby is thought to be very low. However, she should not receive the vaccine without consulting with her physician[10].

The risks associated with receiving the hepatitis A vaccine include[10]:

- Soreness at the injection site.
- Headache.
- Loss of appetite.
- Fatigue.

Hepatitis B

James and his friends are celebrating his 21st birthday. On a dare, James decides to get a tattoo. They visit a tattoo parlor, and James gets a small tattoo on his left arm. About 3 months later, James complains of feeling ill. He has little or no appetite, nausea and vomiting, and stomach pain. As these symptoms begin to dissipate, James notices that his skin and the whites of his eyes are becoming yellow. Alarmed, James visits the campus health clinic at the university he attends. After obtaining a history and physical, the physician orders a blood test to detect antibodies to hepatitis B. The results confirm a diagnosis of hepatitis B, most likely contracted from non-sterile tools at the tattoo parlor.

Hepatitis B is caused by infection with the hepatitis B virus (HBV). The disease can be severe and prognosis worsens with age and debility. Hepatitis B sometimes progresses to chronicity. Babies and young children are more likely to develop chronic hepatitis B infection[7]. Chronically infected people may not feel ill or have symptoms. However, they can still spread the disease to others even though they do not look or feel ill[11].

Hepatitis B has an incubation period of 30 to 180 days. It affects people of all ages and has an insidious onset. Initial symptoms are vague and are often mistaken for the flu[7,9].

Once thought to be transmitted only by the direct exchange of contaminated blood, it is now known that the disease can be transmitted by contact with other bodily fluids[7].

Hepatitis B alert! Nurses, physicians, laboratory technicians, and dentists are frequently exposed to HBV, often as a result of wearing defective gloves[7].

Examples of how HBV is transmitted include[7,9]:

- Sexual contact (especially if condoms are not used).
- Sharing needles when injecting drugs.
- Getting a tattoo or piercing with tools that have not been sterilized.
- Sharing personal items like razors or toothbrushes.

Hepatitis B alert! Infection can also result from contact with a contaminated object, where the virus can live for up to seven 7 days[11].

HBV can also be transmitted from mother to baby during delivery. It is now recommended that all pregnant women be tested for HBV infection[7].

In most cases, hepatitis B is a self-limiting disease. Supportive care includes rest, eating a healthy diet, drinking plenty of water, and avoiding alcohol and drugs[9].

About 140,000 new cases of hepatitis B are diagnosed in the United States annually. About 300,000 people in the world are chronically infected by HBV. There are 1,000 deaths annually in the United States from HBV-related liver cancer[2].

The best way to prevent infection with HBV is to be vaccinated against the disease. Routine hepatitis B vaccination was recommended for some adults and children in the United States beginning in 1982, and for all children in 1991[11].

Hepatitis B vaccine alert! Since 1990, new hepatitis B infections among children and adolescents have decreased by more than 95%, and by 75% in other age groups[11].

Babies usually receive three doses of the HBV vaccine[11]:

- Dose 1: At birth.
- Dose 2: 1-2 months of age.
- Dose 3: 6-18 months of age.

Hepatitis B vaccine alert! Some babies might receive four doses of the vaccine (e.g., if they are receiving a combination vaccine that contains HBV vaccine, such as TWINRIX, which protects against hepatitis A and hepatitis B)[9,11].

Anyone up to the age of 18 who did not receive the vaccine when they were younger should also be vaccinated[11].

The Centers for Disease Control and Prevention (CDC) recommends that all adults who have not been vaccinated when they were younger and who are at risk be vaccinated. This group includes[11]:

- Sexual partners of persons infected with HBV.
- Men who have sex with men.
- People with multiple sex partners.
- People who inject street drugs.
- People who have chronic hepatic or kidney disease.
- People under the age of 60 who have diabetes.
- People who have jobs that expose them to human blood or other body fluids.
- Household contacts of people infected with HBV.
- Residents and staff in institutions for the developmentally disabled.
- People receiving kidney dialysis.
- People who travel to areas where hepatitis B is common.
- People infected with HIV.

Others who may be encouraged by their physicians to receive the hepatitis B vaccine include adults 60 and older with diabetes and anyone else who wants protection against hepatitis B infection[11].

Pregnant women who are at risk or who want protection may also be vaccinated[11].

Hepatitis B vaccine alert! Adults should receive three doses of the vaccine, with the second dose administered 4 weeks after the first dose, and the third dose 5 months after the second[11].

Persons who should not receive the hepatitis B vaccine include[11]: Persons who have a life-threatening allergy to yeast or any other component of the HBV vaccine.

Persons who have had a life-threatening reaction to a previous dose of hepatitis B vaccine.

Persons who are moderately or severely ill when a dose of vaccine is scheduled should wait until they recover before receiving the vaccine.

Hepatitis B vaccine alert! Persons may be asked to wait 28 days before donating blood after getting a hepatitis B vaccine. The rationale for this wait is that the blood screening test could mistake vaccine in the bloodstream for HBV infection[11].

Side effects are usually mild and severe problems are very rare. The most commonly reported side effects are soreness at the injection site and a temperature of 99.9°F[11].

Hepatitis C

Danielle is a professor of nursing at a major urban university. She is chairperson of the department and has had a distinguished career. Danielle is especially aware of the importance of living life to the fullest. In 1990, she was in a serious automobile accident and nearly died from her injuries. Because of those injuries, Danielle underwent a series of surgeries and required several blood transfusions. As a result of those transfusions, Danielle developed what was diagnosed as a mild case of hepatitis about 5 months later. As the years passed, and knowledge of hepatitis became more sophisticated, Danielle was eventually diagnosed with chronic hepatitis C.

Hepatitis C, caused by the hepatitis C virus (HCV), is responsible for about 20% of all cases of viral hepatitis. The majority of cases of HCV infection are due to injectable drug use[7].

Hepatitis C can be acute or chronic. The acute form of the disease is generally self-limiting, but becomes chronic in 10% to 50% of cases. The disease can progress over many years, worsening with age and debility. Eventually, HCV chronic infection may lead to cirrhosis, hepatocellular cancer, and the need for a liver transplant. Patients become susceptible to complications beyond the hepatic system, such as autoimmune thyroiditis, vasculitis, and glomerulonephritis[3,7].

Hepatitis C alert! Most people do not know that they are infected with HCV until some liver damage has already occurred. It is common for people to have hepatitis C for 15 years or more before it is diagnosed[13].

Many people infected with HCV find out that they are infected by accident when their blood is being tested prior to a blood donation or during a routine physical examination. When HCV infection is detected, a liver biopsy may be performed to determine if the virus has scarred the patient's liver[13].

Hepatitis C has an incubation period of 15 to 160 days with an insidious onset. Usually transmitted via the blood-borne, parenteral route, HCV infection is more common in adults[7].

Persons at increased risk for hepatitis C include[13]:

- Current IV drug users.
- Past IV drug users.
- Those who received blood donations, blood products, or organs. This was a common means of transmission, but is now rare in the United States since blood screening became available in 1992.
- People who received a blood product for clotting problems made before 1987.
- Persons receiving hemodialysis or persons who spent many years on dialysis for kidney failure.
- People who received tattoos or body-piercings with non-sterile instruments.
- People with known exposure to the HCV, such as health care workers who have been injured by needlesticks or those who received blood or organs from a donor who tested positive for HCV.
- Persons who are HIV-infected.
- Children born to mothers infected with HCV.

Those who are less commonly at risk are persons who have sexual contact with others infected with HCV and those who share personal care items such as razors or toothbrushes and may have contact with the blood of an infected person[12].

Hepatitis C alert! The risk of contracting HCV infection through sexual contact is very small. This risk increases, however, if someone has multiple sexual partners[13].

About 35,000 new cases of HCV infection are diagnosed annually in the United States, and there are 3.2 million people in the United States who are chronically infected. The disease causes about 9,000 deaths in the United States annually[2].

The CDC recommends that the following persons should discuss being tested for HCV infection with their health care providers[12]:

- Persons born from 1945 to 1965.
- Persons who are current or former IV drug users, even if they injected drugs only once or were IV drug users many years ago.
- Persons who were treated for a blood clotting problem prior to 1987.
- Persons who received a blood transfusion or organ transplant before July 1992.
- Persons who are on long-term hemodialysis.
- Persons who have abnormal liver tests.
- Persons who have liver disease.
- Persons who work in health care or public safety and were exposed to blood through a needlestick or other sharp-object injury.
- Persons who are infected with HIV.

Hepatitis C alert! Testing for HCV infection is not part of routine prenatal care. However, if a pregnant woman has risk factors for HCV infection she should speak to her health care provider about being tested[12].

To date, there is no vaccine approved for hepatitis C, although promising research is being conducted[12].

Hepatitis D

Hepatitis D, or delta hepatitis, is caused by a defective virus (hepatitis D virus or HDV) that causes serious liver disease. The virus is an RNA virus that is structurally unrelated to HAV, HBV, or HCV[14]. However, HDV can only cause infection in the presence of HBV[3]. HDV requires HBV to replicate and only occurs in people who are infected with HBV[14]. Thus, hepatitis D cannot outlast a hepatitis B infection[7].

About 1% of patients infected with HDV develop fulminant hepatitis, which is a frequently fatal form of hepatitis that causes rapid deterioration of the patient's condition with hepatic encephalopathy, hepatic necrosis, renal failure, and coma. Death may occur within 2 weeks[7,14]. The only treatment option for patients with fulminant liver failure may be liver transplantation[3]. Hepatitis D is uncommon in the United States[7].

Hepatitis D alert! Hepatitis D is responsible for about half of all cases of fulminant hepatits[7].

About 15 million people worldwide are infected with hepatitis D. The disease is more common in adults than in children and has an incubation period of 14 to 64 days[7,14]. HDV is transmitted through percutaneous or mucosal contact with infectious blood. It can be acquired either as a co-infection with HBV or as a super-infection in persons with HBV infection[14].

To date, there is no vaccine available for hepatitis D. However, the disease can be prevented in people who are not already HBV-infected through the hepatitis B vaccination[14].

Hepatitis E

Hepatitis E is a serious hepatic disease caused by the hepatitis E virus (HEV) that usually causes an acute infection. It does not cause a chronic infection[15]. Transmission is enteric, due to ingestion of fecal matter, even in extremely small amounts[7,15]. The virus is constantly shed in feces, making detection difficult[7]. The disease is rare in the United States, having a less than 2% prevalence[7]. Outbreaks are usually associated with contaminated water supply in countries with poor sanitation[15]. It is usually found in developing countries near the Equator such Africa, Asia, or Central America. Incidence is highest in people aged 15 to 40[7].

Hepatitis E has an incubation period of 14 to 60 days. It can be a highly virulent disease, progressing to fulminant hepatitis and liver failure, especially in pregnant women. To date, there is no vaccine for hepatitis E[15].

Hepatitis E alert! Hepatitis E was formerly grouped with hepatitis C under the name of non-A, non-B hepatitis[7].

Hepatitis F

Within the past decade, it was believed that a virus isolated from rare blood samples was able to cause hepatitis. This virus was designated as hepatitis F virus. However, further investigation has failed to confirm the existence of this virus. Therefore, to date, there is no known hepatitis F virus[16].

Hepatitis G

The discovery of HAV and HBV led investigators to believe that additional hepatotropic viruses existed. Hepatic viruses C, D, and E. were identified, but research shows that hepatotropic viruses may still be evolving[17].

Hepatitis G virus (HGV) was discovered by researchers who were studying patients who seemed to have acute non-A, non-E infection. Since clinical hepatitis seemed to develop when the virus was present, it was believed that this was a unique virus. Succeeding studies failed to confirm HGV as a hepatotropic virus, however. Since it could not be proven that HGV specifically led to a hepatotropic liver infection, the term "hepatitis G virus" may not be correct and its use has diminished. The accepted term is now GBV-C, a member of the GBV group[17].

GBV-C is found throughout the world, with an estimated 3% of the human population currently infected. About 1% to 4% of worldwide blood donors are carriers of the virus at the time they donate blood[17].

There is some controversy over whether or not GBV-C causes hepatitis. Many research studies have failed to show decisive evidence that infection with the virus leads to clinical hepatitis. However, acute hepatitis and fulminant hepatitis have been described in patients who acquired the virus during transfusion. In general, the incubation period after transfusion is about 14 to 20 days, and if hepatitis develops, it is usually mild[17].

GBV-C alert! Patients infected with GBV-C seem to be an increased risk for non-Hodgkin lymphyoma[17].

To date, the link between GBV-C and development of clinical hepatitis remains doubtful. Research continues regarding this virus and other viruses that impact liver status[17].

PATHOPHYSIOLOGY

Although the causative virus may be different, changes to the liver are usually similar in each type of viral hepatitis. However, the seriousness of the disease and the degree of liver cell injury and necrosis vary[18].

Since the liver plays a critical role in metabolizing hormones and drugs, maintaining homeostasis, removing toxins from the body, and storing essential nutrients, disruption of its functioning can lead to a wide array of pathophysiological changes[3,18]. For example, there might be malabsorption of fat and fat-soluble vitamins, impaired lipoprotein synthesis, deficiency of vitamins stored in the liver, and decreased levels of serum albumin and various other plasma proteins, which can lead to edema[3].

Other manifestations of liver damage include[3,19]:

- Elevated serum bilirubin levels, leading to jaundice.
- Elevated serum cortisol levels, possibly causing Cushing syndrome.
- Evidence of decreased drug metabolism, such as failure of medications to reach or maintain therapeutic levels.
- Evidence of hyperaldosteronism, such as hypokalemia and retention of sodium.
- Signs of hypoglycemia because of impairments in glycogenolysis and gluconeogenesis.
- Signs of abnormalities in glucose tolerance because of impaired uptake and glucose release by the liver.
- Changes in serum cholesterol levels.
- Elevations in serum ammonia levels.
- Bleeding tendencies.
- Increased risk for infection.

Clinical manifestations: Stages of viral hepatitis

Signs and symptoms are similar for various types of viral hepatitis and typically progress in three stages: prodromal, clinical jaundice, and recovery[7,18].

Prodromal stage

Signs and symptoms of the prodromal stage (also referred to as the preicteric stage) are likely due to circulating immune complexes. Patients usually complain of tiring easily, fatigue, loss of energy, generalized malaise, and anorexia (often accompanied by mild weight loss)[7,18].

Other symptoms during this stage include[7,18]:

- Headache.
- Weakness.
- Depression.
- Arthralgia (joint pain).
- Myalgia (muscle pain).
- Nausea and vomiting.

Patients may also experience photophobia (sensitivity to light) and changes in their senses of taste and smell, which contribute to anorexia and weight loss[7,18].

Patients' temperatures may increase to 100°F to 102°F (37.8°C to 38.9°C). There may be right upper quadrant tenderness and, 1 to 5 days before the onset of the clinical jaundice stage, dark-colored urine and clay-colored stools[7,18].

Prodromal stage alert! The infection is highly transmissible during the prodromal stage[18].

Note that many of the signs and symptoms occurring during the prodromal stage mimic those of the flu or other minor viral illnesses. In many cases, signs and symptoms are so mild that medical care is not sought[7,18].

Clinical jaundice stage
The clinical jaundice stage, also called the icteric stage, begins 1 to 2 weeks after the prodromal stage. This is the phase of "actual" illness[18].

If the patient progresses to the icteric stage, he/she may have pruritus (itching), abdominal pain or tenderness, and indigestion[18]. Early in this stage, patients may complain of anorexia, which may later subside with a return of appetite[7].

Inspection of the mucous membranes, skin, and sclera may show jaundice, which can last for 1 to 2 weeks[7]. Inspection may also show skin rashes, urticaria (hives), and erythematous patches, especially if infected by HBV or HCV[7].

Clinical jaundice stage alert! Jaundice indicates that the liver is not able to remove bilirubin from the blood. However, the presence of jaundice does not indicate the severity of the disease. Hepatitis can also occur without jaundice. This is referred to as anicteric hepatitis[7,18].

Findings upon palpation include right upper quadrant tenderness, an enlarged, tender liver, and, in some patients, splenomegaly and cervical adenopathy[7].

Recovery stage
The recovery or posticteric stage begins with the resolution of jaundice and lasts from 2 to 6 weeks in uncomplicated cases of viral hepatitis. However, in some cases recovery can take up to 12 weeks or longer, especially in patients with hepatitis B, C, or E[7,18].

Summary of important points of disease staging
Since mild forms of the disease may go unrecognized, it is important that nurses and other health care professionals be aware of the different aspects of hepatitis viruses. When performing initial assessment, it is important to determine:

- If the patient has traveled to geographic regions where specific types of viral hepatitis are common.
- If the patient took part in any behaviors that put him/her at risk. For example, eating foods or drinking water in geographic regions where hepatitis occurs; injecting street drugs; having multiple sexual partners; or receiving medical treatment in geographic areas where hepatitis is prevalent.
- If the patient is a man who has sex with other men.
- If the patient is a recipient of blood, blood products, or transplanted organs. Although screening has been in place in the United States for many years, there are cases of chronic hepatitis that have not been diagnosed until years after the procedure.
- If the patient's occupation (e.g., health care professionals) puts him/her at risk for acquiring hepatitis.
- If the patient has sustained an injury with a possibly contaminated sharp object (e.g., a needlestick injury).
- The length of time between possible causative event and appearance of symptoms.

Physical assessment findings such as enlarged liver, fever, or jaundice should be correlated to the length of time between the possible causative event and the appearance of symptoms.

Staging alert! It is important that nurses and other health care professionals know the differences in incubation periods and modes of transmission of the various hepatitis viruses to determine the causative virus and possible prognosis.

Diagnosis

Diagnosis begins with a thorough history and physical. Based on these findings, further diagnostic testing may be implemented to confirm a diagnosis of viral hepatitis and to identify the causative agent.

Hepatitis profile
A hepatitis profile identifies antibodies that are specific to the virus causing the disease. This type of testing is routine for patients with suspected viral hepatitis[7]:

- Hepatitis A: Detection of antibodies to hepatitis A confirms diagnosis[7].
- Hepatitis B: The diagnosis is confirmed if hepatitis B IgM (immunoglobulin) antibodies or HBsAg are present[7].
- Hepatitis C: Diagnosis is confirmed by the presence of hepatitis C antibodies, which are usually detectable 4 to 10 weeks after exposure. Hepatitis C serum RNA can be detected 2 to 3 weeks after exposure[7].
- Hepatitis D: The diagnosis is confirmed with detection of intrahepatic delta antigens or immunoglobulin antidelta antigens in acute disease or, in chronic disease, the detection of IgM and IgG (immunoglobulin G)[7].
- Hepatitis E: Diagnosis is confirmed with detection of hepatitis E antigens[7].
- Hepatitis G: Diagnosis can be made in the presence of GBV-C RNA. Most patients will develop detectable anti-E2 antibody after clearance of the virus.

Liver function studies
Depending on the physician and clinical manifestations, additional findings from liver function studies may be needed to support the diagnosis[7].

Serum aspartate aminotransferase (AST)
Aspartate aminotransferase (AST), formerly known as serum glutamic oxaloacetic transaminase (SGOT), is used to evaluate patients with suspected hepatocellular diseases[7,20]. This particular enzyme is found in high concentrations within highly metabolic tissue, such as the heart muscle, liver cells, skeletal muscle cells, and, to a smaller degree, in the kidneys, pancreas, and red blood cells (RBCs). When the cells of these organs and tissues are injured or otherwise affected by disease, the cells decompose (undergo lysis). AST is released and picked up by the blood, and the serum level of AST rises[20].

The degree of elevation is directly related to the number of cells affected by disease or injury. The degree of elevation depends on the amount of time that the blood is drawn after the injury. Serum AST levels become elevated 8 hours after cell injury, peak at 24 to 36 hours, and return to normal levels in 3 to 7 days. In patients with acute hepatitis, AST levels can rise to 20 times the normal value. Normal AST values in adults range from 0 to 35 units/L[20].

AST alert! If the cellular injury is chronic, as in the case of chronic hepatitis, AST levels will be persistently elevated[7,20].

Certain factors may interfere with AST results, these include[20]:

- Pregnancy may cause decreased AST levels.
- Exercise may elevate AST levels.
- Levels are falsely decreased in severe, long-standing hepatic disease.
- Certain drugs, such as Coumarin-type anticoagulants, digitalis preparations, erythromycin, oral contraceptives, opiates, salicylates, cholinergic agents, antihypertensives, and verapamil, may increase AST levels.

Serum AST levels are frequently compared with alanine aminotransferase (ALT) levels. The AST/ALT ratio is typically greater than 1 in patients with alcoholic cirrhosis, liver congestion, and metastatic tumor of the liver. A ratio of less than 1 may be noted in patients who have acute hepatitis, viral hepatitis, or infectious mononucleosis. The ratio of AST/ALT is less accurate if AST levels are greater than 10 times normal value[20].

Serum alanine aminotransferase (ALT)
Serum alanine aminotransferase (ALT), formerly known as serum glutamic-pyruvic transaminase (SGPT), is used to identify hepatocellular

diseases of the liver and to monitor improvement or worsening of such diseases. Normal ALT levels in adults and children range from 4 to 36 international units/L at 37°C[20].

ALT is found predominantly in the liver where it is released into the bloodstream in the event of injury or disease that affects the liver parenchyma. ALT is very specific for hepatocellular disease. In viral hepatitis, the ALT/AST ratio is less than 1[20].

Several factors may cause an increase in ALT levels, these include[20]:

- Receiving previous intramuscular (IM) may increase ALT levels.
- Certain drugs may increase ALT levels such as acetaminophen, ampicillin, codeine, phenytoin, salicylates, tetracyclines, and verapamil.

Serum alkaline phosphatase

Serum alkaline phosphatase (ALP) is found in a variety of body tissues, but the highest concentrations are found in the liver, biliary tract, epithelium, and bone. ALP is important in the detection of liver and bone disorders. Within the liver, ALP is found in Kupffer cells, which line the biliary collecting system. ALP is excreted into the bile. Normal findings in adults are 30 to 120 units/L.20 ALP levels are slightly elevated with viral hepatitis[7].

ALP alert! Isoenzymes of ALP are also used to differentiate between liver and bone disease by evaluating results from a heat stability test and electrophoreses. The isoenzyme of liver origin (ALP1) is heat-stable, while the isoenzyme of bone origin (ALP2) is inactivated by heat[20].

Factors that can interfere with ALP results include[20]:

- Recent ingestion of a meal can increase ALP levels.
- Drugs that can increase ALP levels include albumin made from placental tissue, antibiotics, fluorides, indomethacin, nicotinic acid, phenothiazine, tetracycline, and verapamil.
- Drugs that can decrease levels include cyanides, fluorides, oxalates, and zinc salts.

ALP alert! Young children can have increased ALP levels because their bones are still growing. Such increases are greater during growth spurts, which occur at different ages in males and females[20].

Serum bilirubin levels

Serum bilirubin is used to evaluate liver function. Normal adult values are[20]:

- Total bilirubin: 0.3-1.0 mg/dL.
- Indirect bilirubin: 0.2-0.8 mg/dL.
- Direct bilirubin: 0.1-0.3 mg/dL.

Jaundice (discoloration of the body's tissues) occurs in the presence of abnormally high blood levels of bilirubin. Jaundice is observable when the total serum bilirubin exceeds 2.5 mg/dL[20].

In viral hepatitis, serum bilirubin levels are elevated. Levels may continue to be elevated late in the disease, especially in those patients who have a severe form of the disease[7].

Other tests used to diagnose viral hepatitis

Prothrombin time

Prothrombin time (PT) is used to evaluate the extrinsic system and common pathway in the clotting mechanism. Clotting factors I, II, V, VII, IX, and X are produced in the liver. Synthesis of these factors will not occur in the presence of severe hepatocellular dysfunction, and serum concentration of these factors will be decerased[20]. Thus, PT can be prolonged[7].

PT alert! A PT that is prolonged more than 3seconds longer than normal indicates severe liver damage[7].

White blood cell count

The primary function of white blood cells (WBCs) is to fight infection and react against foreign bodies or tissues[20]. In viral hepatitis, transient neutropenia (abnormally low count of neutrophils, a type of WBC that helps combat infections, especially those caused by bacteria and fungi) and lymphopenia (a reduced number of lymphocytes in the blood) followed by lymphocytosis (an increase in lymphocytes in the blood) occurs[7].

Liver biopsy

A liver biopsy is performed if there is suspicion of chronic hepatitis. A liver biopsy is performed for acute viral hepatitis only if the diagnosis is questionable[7].

A liver biopsy takes about 15 minutes. A local anesthetic is administered to reduce discomfort during the needle insertion and biopsy[20].

A liver biopsy may be performed by what is called a "blind" stick, or "directed" by using computed tomography (CT) or magnetic resonance imaging (MRI) scan, ultrasound, or laparoscopy. Directed biopsy is used if there is a specific area of the liver that is suspicious and from which tissue must be obtained. The "blind" stick is used if there is diffuse involvement of the liver[20].

Summary of clinical presentation and diagnosis

The clinical presentation, causative agents, and diagnosis of viral hepatitis are quite detailed. Before proceeding to a discussion of treatment and nursing interventions for viral hepatitis, it is appropriate to summarize and review a number of important points. This will be done in a clinical scenario format.

David and his friends are part of a group doing missionary work in Central America. They depend on local markets for much of their food, and especially enjoy the fresh fruits and vegetables that are sold at lower prices. About 4 weeks after returning home, David and his friends develop flu-like symptoms accompanied by changes in their senses of taste and smell. As these symptoms begin to subside, they notice that their urine has become rather dark in color and that their stools are clay-colored.

What type of viral hepatitis is most likely impacting David and his friends? Justify your choice.

The correct answer is HAV. With an incubation period of 15 to 45 days, symptoms onset of 28 days (4 weeks) fits within that period. Signs and symptoms are consistent with hepatitis A. As far as exposure to the virus, David and his friends were living in a geographic region where HAV infection is common. Since HAV is transmitted during the fecal-oral route, the fact that they ate fruits and vegetables from local markets suggests that at least some of the food they ate was contaminated with HAV.

It is important to remember that HAV is also transmitted during sexual contact, especially oral-anal contact. This places men who have sex with men at risk for HAV infection.

What is the best way to prevent HAV infection?

The best way to prevent HAV infection is by vaccination. The vaccine is approved for anyone who is 1 year old and older.

Shelley is a college freshman. She is thrilled to be away from what she perceives as domineering parents. They especially worry about Shelley's health, since she has a number of severe allergies, including a history of severe allergic reactions to medications or vaccines that contain yeast. Shelley recently started dating a man who she describes as "the love of my life." During their first sexual experience, her boyfriend does not wear a condom even though Shelley asks him to. He becomes upset and says planning to bring condoms ruins the spontaneity of the moment. Not wanting to offend him, Shelley begins taking oral contraceptives. She is

sure that there is no danger of STDs since she "knows" he is faithful to her. However, Shelley has not counted on the transmission of hepatitis.

About 3 months after Shelley and her boyfriend begin a sexual relationship, she develops symptoms that she attributes to a minor viral infection. However, as time goes on, Shelley does not seem to fully recover. About 2 weeks after her initial symptoms appeared, Shelley notices that her sclera (whites of her eyes) have a yellow tinge and she complains of severe itching (pruritus) of her skin. Shelley goes to the campus health center, where she is diagnosed with HBV infection. The nurse practitioner prepares to explain the effects of the disease, how it is transmitted, treatment measures, and prevention strategies.

What specific information should the nurse practitioner provide? Several important issues come to mind in Shelley's case. Although there is an effective vaccine for HBV infection, Shelley, unfortunately, is among those who should not receive the vaccine. Contraindications to the vaccine include experiencing a life-threatening allergy to yeast or any other component of the HBV vaccine. Shelley has had such reaction in the past. Therefore, she is not able to receive a HBV vaccine. Shelley needs to understand that this might put her at special risk for development of the disease and why she cannot take the HBV vaccine.

Shelley also needs to understand how HBV is transmitted. Information should include:

- The virus is shed in all body fluids.
- The virus is blood-borne and can be transmitted during parenteral (needle) and sexual contact and/or by coming into contact with contaminated body fluids of other people.
- The virus can be transmitted from a mother to her baby during delivery.

The nurse practitioner would provide easily understood examples of transmission. Simply saying that the virus is blood-borne is inadequate. Specific examples might include:

- Sexual contact, especially if condoms are not used. Remember that Shelley's boyfriend disliked using condoms.
- Sharing needles when using IV drugs.
- Getting a tattoo or piercings with tools that have not been sterilized.
- Sharing personal items that have come into contact with infected body fluids such as razors or toothbrushes.

It is important that the nurse practitioner and other health care professionals who may provide care to Shelley remain objective and supportive. This is especially true when discussing modes of transmission. If health care professionals display disgust, disapproval, or amusement regarding patient behaviors, patients may not follow directions regarding disease management.

Since Shelley is not able to be vaccinated, teaching her how to avoid contact with contaminated fluids is very important. Strategies such as using condoms during sexual activity and not sharing personal items (e.g., razors) are important. If Shelley, or other persons, is determined to get tattoos or piercing, they should go only to persons licensed to perform such procedures. They should also ask how instruments are cleaned before getting piercings or tattoos.

If patients continue using IV drugs, they should be told never to share needles. They should also be referred to drug counseling in an effort to stop using drugs.

Treatment measures, which will be covered in detail later in this education program, include administration of antiviral medication and supportive measures such as rest, adequate fluid intake, and antiemetics for nausea and vomiting.

Tim is a 45-year-old successful businessman. He owns several fast food restaurants and earns an excellent income. He is married, and he and his wife are the proud parents of three children, ages 8, 5, and 3. Tim and his wife are active in their community and church and have the reputation of being willing to help anyone in trouble. They are very much admired in their community. In fact, Tim has been approached to run for mayor. During his latest physical exam, blood work indicated that Tim has been infected with the HCV virus. Tim is shocked and cannot imagine how he was infected. His physician takes a careful patient history, and Tim reluctantly admits that 15 years ago, when he was a young executive, he used IV drugs at a party hosted by his boss. "But it was just once! I quit that firm soon after and swore I'd never do drugs again! And I haven't! What will I tell my wife? She doesn't know I ever did drugs."

What can be done to help Tim deal with this diagnosis? What important information must be relayed to Tim about dealing with HCV infection?

Remember that 10% to 50% of cases of HCV infection become chronic. It is common for people to have hepatitis C for 15 years or more before being diagnosed. And, even though he used injectable drugs only once, it only takes one event to contract HCV infection. Unfortunately, by the time of diagnosis, liver damage has already occurred. These facts need to be explained in a supportive, non-judgmental manner. Time should also be reassured that there are antiviral medications that can treat HCV infection. (These will be discussed later in this education program). Tim may need to have a liver biopsy to identify any areas of scarring in his liver.

Tim's wife and children should be screened for HCV infection. Tim's health care provider may wish to help Tim tell his wife about the diagnosis and be immediately available to answer questions and provide emotional support.

Precautions to safeguard not only Tim's health, but that of his wife and children, need to be taken. Steps should be taken to help members of Tim's household avoid coming into contact with Tim's blood. For example, objects such as razors, which may have Tim's blood on them, should be properly disposed of after use and not used by other members of the household. Tim should eat a healthy diet and avoid alcohol.

Another issue to be dealt with is the prominence of Tim's public life. Given his prominence in the community, he may have concerns about the diagnosis begin made public, despite current privacy laws. He may also have concerns about his past drug use becoming public. Tim's health care providers should assure Tim that any information pertaining to his diagnosis will be kept strictly confidential. Unfortunately, it is impossible to guarantee that no one else will learn about the disease. Someone may overhear Tim talking about HCV infection and "spread the news." Unfortunately, it is all too common for confidential information to go public, especially if the information concerns a public person.

Tim may want to think about how to deal with a breach of confidentiality before it happens. He may even consider relaying the information himself rather than have it come out while he is campaigning for mayor. Whatever Tim chooses to do, his health care providers should be supportive of his decision and work to optimize Tim's state of health and wellbeing.

Amanda is a graduate student pursuing her MSN degree. As part of her advanced clinical work, she is preparing a lecture on viral hepatitis for a nursing undergraduate class. Most of the students are familiar with HAV, HBV, and HCV. However, their knowledge of other causative hepatitis viruses is scant. What are some important pieces of information Amanda should relay about these other hepatitis viruses?

The lesser known viruses need to be thoroughly described. Amanda should cover each of these viruses in a logical manner.

Hepatitis D: Also known as delta hepatitis, hepatitis D is caused by a defective virus (HDV) and can cause serious liver disease. However, HDV can only cause infection in the presence of HBV, which it needs to replicate and cause disease. Therefore, the disease can be prevented in people who are not already infected with HBV by receiving the hepatitis B vaccine. HDV infection can cause serious disease, even leading to fulminant hepatitis, which can be fatal. The only treatment option for patients who have fulminant liver failure may be liver transplantation.

Hepatitis E: HEV causes a serious, acute infection. The disease, which is rare in the United States, is transmitted via the fecal-oral route. HDV is shed constantly in feces, making detection difficult. Outbreaks are usually

found in developing countries located near the Equator and are associated with contaminated water supplies in countries with poor sanitation. Hepatitis E can be virulent, progressing to fulminant hepatitis and liver failure, especially in pregnant women. Hepatitis E was formerly grouped with hepatitis C under the name of non-A, non-B hepatitis.

Hepatitis G: Hepatitis G was once thought to be a unique virus that caused hepatitis. However, further research failed to confirm HGV as a hepatotropic virus. Since it cannot be verified that HGV specifically led to hepatotropic liver infection, the term hepatitis G is no longer thought to be accurate. Instead, the accepted term is now GBV-C, a member of the GBV group. GBV-C is found throughout the world, with an estimated 3% of the human population currently infected.

A patient presents with severe pruritus, abdominal pain, and indigestion. He also has erythematous patches over his skin. What stage of hepatitis do these signs and symptoms suggest?

These signs and symptoms are consistent with the clinical jaundice or icteric stage. Remember that there are three stages of viral hepatitis:

- Prodromal stage: Also called the preicteric stage, the prodromal stage can mimic a minor viral infection or the flu. Patients complain of fatigue, lack of energy, malaise, weight loss, headache, arthralgia, myalgia, photophobia, nausea and vomiting.
- Clinical jaundice stage: Also called the icteric stage, presenting signs and symptoms of this stage include pruritus, abdominal pain or tenderness, and indigestion. Jaundice may become evident as well as skin rashes, urticaria, and erythematous patches.
- Recovery stage: The recovery, or posticteric, stage begins with resolution of jaundice and lasts from 2 to 6 weeks in uncomplicated cases of viral hepatitis. In patients infected with HBV, HCV, or HEV, recovery can take 12 weeks or longer.

Leslie is a professional development specialist who is conducting orientation for a group of newly licensed nurses. Part of the orientation consists of classes dealing with hepatitis, since the medical center where the nurses work employs a group of researchers who specialize in the various forms of hepatitis. What should Leslie include in her explanation of the diagnostic process for viral hepatitis?

The most logical starting point when discussing diagnosis is to explain that the detection of antibodies specific to the causative virus confirms diagnosis. However, additional studies may be necessary to support the diagnosis. Leslie explains these various studies and asks learners to match the correct lab test to its description.

_____ is found predominantly in the liver where it is released into the bloodstream in the event of injury or disease that affects the liver parenchyma. It is very specific for hepatocellular disease but may be increased in patients receiving IM injections.

- The correct answer is ALT, or serum alanine aminotransferase.

_____ is found in Kupffer cells, which line the biliary collecting system. It is excreted into bile. It is found in a variety of body tissues, with the highest concentrations in the liver, biliary tract, epithelium, and bone.

- The correct answer is ALP, or serum alkaline phosphatase.

Normal values for _____ are 0.3-1.0 mg/dL.

- The correct answer is serum bilirubin levels.

_____ is found in high concentrations within highly metabolic tissue such as the heart muscle, liver cells, and skeletal muscle cells. When cells of these organs and tissues are injured or affected by disease and the cells undergo lysis, this enzyme is released and picked up by the blood, and the serum level rises.

- The correct answer is AST, or serum aspartate aminotransferase.

A patient who is taking oral contraceptives and being evaluated for liver disease may have increased levels of _____.

- The answer is AST. Several factors may interfere with AST results. Drugs such as erythromycin, digitalis, opiates, and oral contraceptives may increase AST levels.

TREATMENT OF VIRAL HEPATITIS

With the exception of hepatitis B and hepatitis C, no specific drug therapy has yet been developed[7]. Goals of treatment for viral hepatitis include[3]:

- Identifying and treating underlying causes (e.g., specific causative virus).
- Alleviating signs and symptoms.
- Preventing complications.
- Providing psychosocial support.
- Providing appropriate patient and family education.

Hospitalization is required only if patients experience severe signs and symptoms or complications. Hospitalization may be needed if patients experience persistent vomiting and are unable to maintain adequate fluid intake. In such cases, parenteral nutrition may be necessary[7].

Hepatitis A

Fortunately, HAV infection is usually self-limiting and the prognosis is good[7]. Most patients return to their optimum level of health within 2 months. Once infected, patients develop immunity to hepatitis A[3].

Since there is no specific treatment for HAV infection, treatment consists primarily of supportive care[3,7]. Supportive measures include[3,7]:

- Rest.
- Ingestion of small, frequent, high-calorie, high protein meals. Note that protein intake should be decreased if signs or symptoms of pre-coma (lethargy, confusion, altered mental status) develop.
- Adequate fluid intake.

Large meals are usually better tolerated in the morning. This is because patients generally experience later in the day. To provide relief for patients experiencing nausea and vomiting, antiemetics may be administered 30 minutes before meals[7].

Treatment alert! Avoid administering phenothiazines for nausea and vomiting since these drugs have a cholestatic (suppression of bile flow) effect[7].

If patients experience severe pruritus, cholestyramine (Prevalite) may be administered[7].

Treatment alert! These supportive measures are implemented in other forms of viral hepatitis as well[3,7].

It is possible to prevent infection with HAV by receiving hepatitis A vaccine (Havrix, Vaqua)[3,7,21].

Havrix is administered to provide active immunization against HAV. It is given with immune globulin to prevent hepatitis A in persons who have been exposed to the virus or travel to areas where the virus is endemic[21].

There is also a Food and Drug Administration (FDA)-approved combination vaccine to protect against HAV and HBV infection. The vaccine is called TWINRIX (hepatitis A & hepatitis B recombinant vaccine) and is a bivalent vaccine containing components used in producing Havrix® (hepatitis A vaccine) and Engerix-B® (hepatitis B vaccine recombinant). TWINRIX is available in vials and prefilled syringes and is manufactured without preservatives[22].

TWINRIX is administered via IM injection in the deltoid region. The standard dosing schedule consists of three doses (1 mL each) given IM. Typically, the second dose is given 1 month after the first dose, and the third dose is given 6 months after the first dose[23].

TWINRIX is indicated for active immunization of people 18 years of age and older against disease caused by HAV and infection by all known subtypes of HBV. Since hepatitis D does not occur in the absence of infection with HBV, it is expected that hepatitis D will also be prevented by vaccination with TWINRIX[24].

Immunization is recommended for all persons 18 years of age and older who are susceptible to or at risk of exposure to HAV and HBV[24]. Such individuals include (but are not limited to)[24]:

- People who are traveling to areas where HAV and HBV are prevalent.
- People with chronic liver disease such as chronic hepatitis C, autoimmune hepatitis, and primary biliary cirrhosis.
- People whose occupations put them at risk for exposure, such as laboratory workers who handle HAV and HBV, police and others who provide first-aid or medical assistance, workers who come into contact with feces or sewage, health care personnel who provide first-aid or emergency medical assistance, personnel who work in daycare centers and correctional facilities, persons who work at hemodialysis units, and military personnel.
- Men who have sex with men.
- Residents of drug and alcohol treatment facilities.
- People who live in areas where HAV and HBV are prevalent.
- Patients who often receive blood products.
- People who use IV illicit drugs.
- Household and close contacts of patients with acute or relapsing hepatitis and/or patients with acute or chronic hepatitis B.

TWINRIX is contraindicated in persons who are allergic to any component of the vaccine, including yeast and neomycin[24].

Hepatitis B

If hepatitis B is diagnosed as acute, meaning it is self-limiting without complications, treatment beyond supportive measures may not be necessary. However, if chronic hepatitis B is diagnosed, treatment with antiviral medications is initiated[3,7,25].

Note that guidelines for medication administration in this and other sections of this education program can change quickly based on research and clinical trials. The information provided in this education program is based on the best available resources, but is designed to serve as a resource only, not as prescription guidelines. Additionally, the list of side effects, warnings, and interactions are not all-inclusive.

- **Adefovir (Hepsera)**: Adefovir is an antiviral medication available in tablet form that is prescribed for adults and children aged 12 and older for the treatment of chronic hepatitis B infection. The typical dose is 10 mg orally once a day. The ideal length of treatment has yet to be established. Side effects include fever, headache, nausea, vomiting, pruritus, rash, abdominal pain, dyspepsia, weakness, and hepatomegaly. Serious side effects that have been reported include renal failure, renal insufficiency, hepatic failure, and lactic acidosis. Ibuprofen may interact with adefovir by increasing the drug's bioavailability. Adefovir may increase the risk of nephrotoxicity with drugs that are nephrotoxic, such as nonsteroidal anti-inflammatory drugs (NSAIDs). The drug should be used with caution in patients with renal dysfunction and in elderly patients. Several black box warnings are associated with adefovir[21]. These are[21]:
  - Due to increased risk of nephrotoxicity, monitor renal function, especially in patients with renal dysfunction or those who are taking nephrotoxic drugs.
  - Patients may develop lactic acidosis and severe hepatomegaly with steatosis (infiltration of liver cells with fat). This is especially likely in women, obese patients, and those taking antiretroviral drugs. Hepatic function must be monitored.
  - Discontinuing adefovir may severely worsen hepatitis.
  - Adefovir may promote resistance to antiretroviral drugs in chronic hepatitis B patients with unrecognized or untreated HIV infection.
- **Entecavir (Baraclude)**: Entecavir is available as an oral solution (0.05 mg/mL) and in tablet form (0.5 mg, 1 mg). The drug is used to treat chronic HBV infection in patients 16 years of age and older who have active viral replication and either persistently increased aminotransferase levels or histologically active disease. Entecavir is prescribed for adults and adolescents 16 years of age and older who have had no previous nucleoside treatment. The usual dose is 0.5 mg orally once daily at least 2 hours before or after a meal. For adults and adolescents aged 16 years of age and older who have a history of viremia and are taking lamivudine or have resistance mutations, or patients with decompensated liver disease, the usual dosage is 1 mg orally once a day at least 2 hours before or after a meal[21].

  Common side effects include dizziness, fatigue, headache, diarrhea, dyspepsia, nausea, glycosuria, hematuria, hepatomegaly, and lactic acidosis. Entecavir interacts with cyclosporine and tacrolimus and may further decrease renal function. Drugs that reduce renal function or compete for active tubular secretion may increase the level of either drug. Renal function must be monitored carefully. Food delays absorption, so the drug must be taken on an empty stomach[21].

  The drug has several black box warnings. These include[21]:
  - Entecavir should not be used in patients who are co-infected with HIV and HBV and are not receiving highly active antiretroviral therapy.
  - The drug should be used with caution in patients with renal impairment.
  - The drug should be used with caution in patients who have had a liver transplant.
  - Entecavir may lead to life-threatening lactic acidosis and severe hepatomegaly with steatosis (infiltration of liver cells with fat).
  - HIV infection may significantly worsen after therapy with entecavir is stopped. Liver function should be monitored for several months after drug therapy is stopped.

  The drug should be used with caution in pregnant women only if benefits to the woman outweigh risks. It is not known if the drug appears in breast milk so the drug should not be used by breastfeeding women. Dosage should be decreased in elderly patients because of age-related decease in renal function[21].

- **Lamivudine (Epivir-HBV)**: Lamivudine is prescribed as an antiretroviral agent for the treatment of chronic hepatitis B with evidence of HBV replication and active liver inflammation. Epivir-HBV is available as an oral solution (10 mg/mL) and in tablet format (100 mg tablets). Typical dosage for adults is 100 mg Epivir-HBV orally once a day. Children ages 2 to 17 years of age receive 3 mg/kg daily. The optimum duration of treatment has yet to be determined. Safety and effectiveness of treatment beyond 1 year has not been determined. The drug may be given without regard to food. Side effects associated with lamivudine include dizziness, fever, headache, fatigue, insomnia, depressive disorders, anorexia, diarrhea, nausea, vomiting, abdominal pain, pancreatitis, neutropenia, cough, anemia, rash, chills, lactic acidosis, arthralgia, myalgia, and thrombocytopenia. If used in conjunction with sulfamethoxazole-trimethoprim, lamivudine level may be increased. Patients should be monitored for toxicity. Lamivudine may increase ALT and bilirubin levels and may decrease hemoglobin levels and neutrophils and platelet counts[21]. Black box warnings for this drug include, but are not limited to[21]:
  - Cases of lactic acidosis and severe hepatomegaly with steatosis have been reported. Some have been fatal.
  - The drug should be used cautiously, if at all, in children with a history of pancreatitis or who have risk factors for the development of pancreatitis.
  - Hepatitis B may recur when the drug is stopped.

- The optimum length of treatment has not been determined. Safety and effectiveness of Epivir-HBV use for more than 1 year has not been established.
- Patients should be tested for HIV infection before starting treatment and during therapy because the form and dose of lamivudine in Epivir-HBV are not appropriate for patients who are infected with both HBV and HIV.

- **Telbivudine (Tyzeka)**: Telbivudine is an antiviral medication used to treat chronic hepatitis B in adults and children 16 years of age and older. The medication is available in tablet form (600 mg). The usual dosage is 600 mg by mouth daily. Telbivudine may be given without regard for food. Common side effects include dizziness, insomnia, fatigue, headache, pyrexia, abdominal pain, diarrhea, dyspepsia, nausea, myalgia, arthralgia, back pain, cough, pruritus, and rash. Drugs associated with myopathy (muscular disease in which muscle fibers do not function, leading to muscle weakness) can interact with telbivudine and increase the risk of myopathy. Drugs that alter renal function, if used in conjunction with telbivudine, can increase the risk of nephrotoxicity. Use in conjunction with interferons can lead to an increased risk for and severity of peripheral neuropathy. Telbivudine may cause increases in CK, ALT, AST, lipase, creatinine, and lactate levels. The drug may decrease neutrophils and platelet counts[21].

  Black box warnings associated with telbivudine include[21]:
  - Patients may develop lactic acidosis and severe hepatomegaly with steatosis during treatment.
  - Discontinuing telbivudine may cause hepatitis B to worsen.
- **Interferon alfa-2b (recombinant)**: Interferon is available in solution and powder forms for injection. This antiviral drug is used to treat hairy-cell leukemia and AIDS-related Kaposi sarcoma as well as chronic hepatitis B and chronic hepatitis C. To treat chronic hepatitis B, adults are given 30 to 35 million IU IM or subcutaneously weekly, given as 5 million IU daily or 10 million IU 3 times weekly for 16 weeks. Children aged 1 to 17 years of age receive 3 million IU/m2 subcutaneously 3 times a week for the first week. The dose is then increased to 6 million IU/m2 subcutaneously (SC)3 times a week (maximum dose is 10 million IU 3 times weekly) for a total of 16 to 24 weeks. Common side effects include amnesia, anxiety, depression, dizziness, suicidal ideation, agitation, confusion, hypertension, palpitations, abdominal pain, anorexia, diarrhea, dyspepsia, nausea, vomiting, constipation, hemorrhoids, hypothyroidism, cough, bronchitis, and dyspnea. Life-threatening side effects that have been reported include anemia, granulocytopenia, leukopenia, thrombocytopenia, lymphocytosis, and neutropenia[21]. Black box warnings include[21]:
  - Alpha interferon may lead to or exacerbate fatal or life-threatening neuropsychiatric, autoimmune, ischemic, and infectious disorders.
  - Using alpha interferon in conjunction with ribavirin may lead to fetal deaths or birth defects.
  - Using interferon in conjunction with ribavirin may aggravate cardiac disease and cause hemolytic anemia.
- **Peginterferon alfa-2a (Pegasys)**: This antiviral medication is available in single-dose vials and prefilled syringes for injection. The drug is used to treat chronic hepatitis B in patients who have compensated liver disease and evidence of viral replication and liver inflammation. Dosage in adults is 180 mcg SC in the abdomen or thigh once a week or once weekly for 48 weeks. Side effects include depression, dizziness, fatigue, insomnia, memory impairment, abdominal pain, anorexia, diarrhea, nausea, vomiting, arthralgia, myalgia, back pain, pruritus, and dry skin. Potentially life-threatening side effects include neutropenia, thrombocytopenia, and lymphopenia. There are several potential drug interactions. For example, methadone levels may increase if taken in conjunction with peginterferon alfa-2a. If used in conjunction with ribavirin, there may be an additive increase in hematologic toxicity. Peginterferon alfa-2a may increase triglyceride and ALT levels. The drug may decrease hemoglobin and hematocrit levels and may increase or decrease thyroid function test values. Black box warnings include advising caution when administering this drug to patients also taking ribavirin. Ribavirin may cause birth defects or fetal death. Alpha interferons can lead to or exacerbate fatal or life-threatening neuropsychiatric autoimmune, ischemic, and infectious disorders. Male and female patients and their sexual partners should be extremely careful to avoid pregnancy during treatment during and for 6 months after treatment is discontinued[21].

  The best way to treat hepatitis B is to prevent it. In addition to the TWINIX vaccine (described in the previous section about hepatitis A treatment) that is a combination vaccine used to prevent both hepatitis A and hepatitis B, there are two commercial HBV vaccines approved in the United States. These are Recombivax HB and Engerix-B[3].

  These vaccines are used to immunize against infection from all known subtypes of HBV, primary pre-exposure prophylaxis against HBV, and post-exposure prophylaxis when given with hepatitis B immune globulin (HBIG)[21].
- **Engerix-B**: Adults 20 years of age and older initially receive 20 mcg IM, then a second dose of 20 mcg IM after 30 days. A third dose of 20 mcg IM is given 6 months after the first dose. Adolescents aged 11 to 19 years of age initially receive 10 mcg IM (pediatric and adolescent form), and a second dose of 10 mcg IM 30 days later. A third dose of 10 mcg IM is given 6 months after the first dose. Neonates and children up to 10 years of age receive 10 mcg IM initially, a second dose of 10 mcg IM 30 days later, and a third dose of 10 mcg IM 6 months after the first dose[21].
- **Recombivax HB**: Adults aged 20 years of age and older receive 10 mcg initially IM, a second dose of 10 mcg IM after 30 days, and a third dose of 10 mcg IM 6 months after the first dose. Infants, children, and adolescents aged 19 or younger receive 5 mcg IM, a second dose of 5 mcg IM after 30 days, and a third dose of 5 mcg IM 6 months after the first dose.

Vaccine alert! Vaccination is required for all children. Infants should receive their first dose of HBV vaccine shortly after birth[3].

Hepatitis C

In addition to supportive measures (as described in the hepatitis A treatment section), antiviral treatment may be prescribed. It is important to note that antiviral medications can cause significant side effects including depression and other mental health symptoms. Patients should be monitored for adverse mental health effects[3].

The decision to initiate antiviral treatment depends on several factors including[3]:
- Viral load.
- Degree of liver fibrosis.
- Patients' willingness and ability to adhere to treatment regimen.

Treatment alert! Emotional counseling should be part of all treatment regimens[3].

Antiviral drugs currently in use as part of the treatment regimen for hepatitis C include peginterferon in combination with ribavirin and boceprevir or telaprevir for patients with genotype 1[3].
- **Peginterferon alfa-2a**: This drug, also used in the treatment of hepatitis B as previously described, is used to treat chronic hepatitis

C regardless of genotype in HIV-infected patients who have not previously been treated with interferon[21].

- **Peginterferon alfa-2b**: This antiviral medication is administered via subcutaneous injection to treat chronic hepatitis C in patients with compensated liver disease not previously treated with interferon alfa[21].
- **Ribavirin**: Ribavirin is an antiviral available as capsules, oral solutions, tablets, and powder to be reconstituted for inhalation. Ribavirin is used to treat chronic hepatitis in patients with compensated liver disease who have not been treated with interferon alfa or who have relapsed following interferon alfa therapy. The drug is also used to treat chronic hepatitis C regardless of genotype in HIV-infected patients who have not previously been treated with interferon[21].

Ribavirin alert! Black box warning for this drug emphasizes that ribavirin alone is not effective for treatment of chronic hepatitis C[3,21].

Side effects associated with ribavirin include fatigue, anxiety, depression, dizziness, headache, anorexia, nausea, vomiting, anemia, alopecia, pruritus, rash, and flu-like illness. Potentially life-threatening side effects include apnea, bronchospasm, bradycardia, cardiac arrest, pulmonary edema, and pneumothorax. Ribavirin can interact with lamivudine, stavudine, and zidovudine causing a decrease in antiretroviral activity. Drugs such as acetaminophen, magnesium-containing antacids, antacids that contain aluminum or simethicone, aspirin, or cimetidine may alter ribavirin levels. Using ribavirin with didanosine may increase toxicity and they should not be used together. Ribavirin may increase ALT, AST, bilirubin, and reticulocyte count. It may decrease hemoglobin level, WBC, and platelet counts[21].

In addition to warning that ribavirin alone is not effective treatment for hepatitis C, additional black box warnings include[21]:

- Aerosol form is not indicated for use in adults.
- Ribavirin may cause hemolytic anemia and worsen cardiac disease. The drug is contraindicated for use in patients who have a history of significant or unstable cardiac disease.
- Use of ribavirin is contraindicated in patients who are hypersensitive to the drug and in patients who have sickle cell anemia or thalassemia (blood disorders) major.
- Ribavirin is contraindicated for use in pregnant women and in men whose sexual partners are pregnant or may become pregnant within 6 months.
- Aerosolized ribavirin has been associated with abrupt deterioration of respiratory function in infants.
- The drug should be used with caution in elderly patients and persons with hepatic or renal insufficiency.
- Ribavirin may precipitate in ventilators, causing equipment to malfunction. This can lead to serious consequences.

Boceprevir (Victrelis): Available as 200 mg capsules, boceprevir is used to treat chronic hepatitis C genotype 1 infection in combination with ribavirin and peginterferon alfa in those patients who have compensated liver disease. Boceprevir is also used to treat chronic hepatitis C genotype 1 infection in combination with ribavirin and peginterferon alfa in those patients without cirrhosis who were not previously treated or who failed or partially responded to previous therapy with interferon and ribavirin[21].

For adults 18 years of age and older, treatment is initiated with 4 weeks of peginterferon alfa and ribavirin therapy. Then, boceprevir 800 mg is administered orally 3 times a day (every 7 to 9 hours). The drug should be given with a meal or light snack. Capsules must be refrigerated until dispensed from the pharmacy[21].

Side effects include dizziness, fatigue, insomnia, nausea, dry mouth, diarrhea, vomiting, anemia, arthralgia, alopecia, dry skin, rash, and chills. Potentially life-threatening side effects include neutropenia and thromobocytopenia[21].

Boceprevir interacts with a multitude of drugs. Prior to initiating therapy a careful medication history must be obtained and the prescriber must be constantly aware of any and all medications (prescription, over-the-counter [OTC], herbal supplements, vitamins, and minerals) that the patient takes or may want to take. Patient education must emphasize the importance of consulting with the prescribing health care provider before taking any type of medication or supplements.

Telaprevir (Incivek): Telaprevir comes in 375 mg tablets and is prescribed to treat chronic hepatitis C in patients genotype 1[21]:

- With compensated liver disease, including cirrhosis, who are treatment-naïve (who have never used HIV drugs) and have had prior relapse with HCV-RNA undetectable at weeks 4 and 12.
- With compensated liver disease including cirrhosis who have previously been partial and null responders.

Telaprevir should be given within 30 minutes of food with 20 g fat content to increase drug absorption. Side effects include fatigue, nausea, vomiting, hemorrhoids, anorectal discomfort, pruritus, diarrhea, anemia, leukopenia, neutropenia, and thrombocytopenia. Potentially life-threatening side effects include Stevens-Johnson syndrome and toxic epidermal necrolysis[21].

Telaprevir interacts with a multitude of drugs. Prior to initiating therapy a careful medication history must be obtained and the prescriber must be constantly aware of any and all medications (prescription, OTC, herbal supplements, vitamins, and minerals) that the patient takes or may want to take. Patient education must emphasize the importance of consulting with the prescribing health care provider before taking any medications or supplements.

Black box warnings include[21]:

- Telaprevir can cause fatal and nonfatal skin reactions.
- Telaprevir, peginterferon alfa, and ribavirin should be discontinued immediately if a serious skin reaction develops.
- Patients must be told to obtain urgent medical care if they notice skin changes, rashes, or itching.

The various antihepatitis C drugs weaken HCV at different points in its lifecycle. Thus, combination therapy (treatment with 2 or 3 drugs simultaneously) increases treatment effectiveness. Recent clinical trials show that a number of new antiviral drugs are quite effective against HCV infection[26].

Simeprevir (Olysio) is an antiviral medication used in combination with peginterferon alfa and ribavirin or with sofosbuvir to treat chronic hepatitis C infection[27]. If taken with ribavirin, it is important to remember that ribavirin can cause birth defects or fetal death. Therefore, if using ribavirin, women should not become pregnant. Men should not take ribavirin if their sexual partner is pregnant since unborn babies can be harmed if a man fathers a child while taking the drug. It is recommended that at least two effective forms of birth control should be used while either sexual partner is taking ribavirin and for 6 months after the drug is stopped[27].

Simeprevir should be taken with food. The capsule should be swallowed whole and not crushed, chewed, broken, or opened. Persons taking the drug should avoid exposure to sunlight or tanning beds, especially during the first 4 weeks of treatment. When outdoors, patients should wear hats, sunglasses, protective clothing, and use a sunscreen SPF 30 or higher[27].

St. John's Wort should not be taken when taking simeprevir. Other drugs that may adversely interact with simeprevir include antibiotics, antifungals, antihypertensives, HIV/AIDS medications, seizure medications, and statins used to manage elevated cholesterol[27].

Serious side effects include severe skin rash, mouth sores, eye redness, and shortness of breath. If these occur, patients should seek immediate medical attention. Common, less severe side effects include mild itching or rash, nausea, or muscle pain[27].

Sofosbuvir (Sovaldi) is another antiviral medication used to treat chronic hepatitis C. This drug must be given in combination with other antiviral

medications and should not be used alone. If taken with ribavirin, precautions to avoid pregnancy should be taken as previously described[28].

Prior to taking sofosbuvir, it is important for the patients' health care providers to know if the patients have any liver problems other than hepatitis, if they have had liver transplants, renal disease, or HIV infection. The drug may be taken without regard to food. Immediate medical help should be obtained if patients develop pale skin, respiratory distress, rapid heart rate, difficulty concentrating, fever, swollen gums, painful mouth sores, cold or flu symptoms, and/or cough. Common, less serious side effects include fatigue, headache, mild itching, nausea, insomnia[28].

On October 10, 2014, the FDA approved Harvoni (ledipasvir and sofosbuvir), the first combination pill to treat chronic hepatitis C genotype 1 infection. It is also the first approved medication regimen that does not require administration with interferon or ribavirin. Sofosbuvir is a previously approved drug. Ledipasvir is a new drug[29].

The most commonly reported side effects associated with Harvoni are fatigue and headache[29].

Hepatitis D

Treatment with antiviral medications has produced positive outcomes in some patients but clinical studies show that long-term response to such therapy is poor. Since HDV cannot exist without HBV infection, hepatitis B vaccine should prevent development of hepatitis D[3].

Hepatitis E

Fortunately, hepatitis E is self-limiting. Therefore, only supportive interventions are necessary to facilitate recovery[3].

Hepatitis G

Currently, there is no definitive treatment for hepatitis G beyond supportive measures[17].

Additional nursing considerations

There are a number of nursing considerations that merit additional emphasis. Since viral hepatitis can interfere with the liver's metabolic and synthesis tasks, nurses must monitor all patient body systems in addition to interventions specific to the care of patients with viral hepatitis[3]:

- Since damage to liver cells can lead to portal hypertension, nurses must be alert to the possibility of cardiac arrhythmias. Careful auscultation of heart sounds is essential so abnormal heart sounds can be identified promptly. Peripheral pulses and capillary refill time must also be monitored[3] .
- Respiratory status should be carefully monitored since abdominal pain and ascites may interfere with the ability to take deep breaths[3].
- Teach patients and families to be alert to signs of bleeding, both overt and covert. They should monitor urine for unusual darkness or obvious bleeding. Changes in color and consistency of feces, such as darkened, tarry stools or obvious bleeding should be reported to their health care providers immediately. Remember that darkened urine may also be due to the presence of bilirubin if the liver is unable to remove bilirubin from the bloodstream[3,7].
- Assess for, and/or tell patients to report, muscle (myalgia) and/or joint (arthralgia) pain[3,7].
- During office visits, a thorough abdominal assessment should be performed. Size and location of the liver, assessment of bowel sounds, and pain upon palpation or at rest should be evaluated. Teach patients to report anorexia, nausea, vomiting, and/or diarrhea[3,7].
- Teach patients and families to monitor the skin, mucous membranes, and sclera for jaundice.
- Teach patients and families to provide meticulous skin care and to examine the skin for any evidence of skin breakdown, rashes, etc.
- Intake and output should be monitored. Patients should weigh themselves or be weighed daily to monitor for signs of fluid retention (e.g., unusual weight gain or edema) and/or weight loss as a result of anorexia, nausea, vomiting, and diarrhea[3,7].
- Medications used to treat hepatitis have a number of side effects, including having an adverse impact on the renal system. Therefore, it is important to monitor renal function[3].
- Neurologic status must be carefully monitored. Teach patients and families to monitor levels of consciousness and changes in mental status[3].
- Hepatitis, especially chronic hepatitis, can be a devastating diagnosis. Patients and families need emotional support and referrals to psychosocial counseling as appropriate. Monitor patients for signs and symptoms of depression and suicidal ideation. Prompt referral for mental health intervention is essential for those patients who are depressed, especially those who exhibit suicidal ideation[3,7].
- Teach patients and families about enteric precautions if patients have been diagnosed with hepatitis A or E, both of which are transmitted by the fecal-oral route. Emphasize the importance of meticulous hand-washing, especially before and after preparing food and after using the bathroom[3,7].
- Patients should be taught to incorporate rest periods throughout their day[7].
- Encourage a healthy diet. Small, frequent meals may be better tolerated than 3 large meals. Facilitate fluid intake of at least 4 quarts (4 liters) every day. Patients who are anorectic should be encouraged to drink fruit juices[7].
- Patients and families need meticulous education regarding their medication regimens. This includes how and when to take medications, potential side effects and what to do if they occur, and the importance of adhering to the medication schedule exactly as it was prescribed. Patients and families must be taught to tell their prescribing health care providers about any and all medications they are taking including prescriptions, OTCs, vitamins, herbal preparations, minerals, and any other supplements. They must also be taught not to add any of these substances to their regimens without first talking to their health care providers[3,7].
- Patients also need counseling about lifestyle behaviors. This counseling must be conducted in an objective, supportive manner. Teach patients not to share any personal items that may carry blood, even minute traces of blood. These items include razors, toothbrushes, bandages, bloody tissues, and needles used to inject drugs. Explain to patients that they will not be allowed to donate blood or blood products[3].
- Since hepatitis can be transmitted between partners during sexual activity, it is important to discuss safe sex practices. Infected patients should tell their partners about their infection and the risk of transmitting the disease. All sexual partners should be told to be tested for the disease. A new latex condom should be used every in every instance of sexual activity. Patients must comprehend that condoms may reduce, not eliminate, the risk of disease transmission[3,7,25].

Cynthia has been on an extended course of amoxicillin and NSAIDs for a serious infection. She is now experiencing anorexia, nausea, vomiting, dark urine, and yellowing of the sclera of the eyes. Cynthia is diagnosed with drug-induced, or toxic, hepatitis.

Steven is 28-years-old. He has just been fired from his job as a chemist because of ongoing tardiness and absenteeism. Both of his parents drank alcohol excessively, as did their friends. Steven also drinks large quantities of alcohol and has done so since he was a teenager. Despite the concerns of his close friends, Steven continues to drink, even though it cost him his job. Recently Steven was diagnosed with alcoholic hepatitis.

Darlene has a family history of autoimmune disease. Darlene is currently being evaluated for autoimmune hepatitis, also known as lupoid hepatitis.

Nonviral hepatitis is a nonviral inflammation of the liver classified as toxic, alcoholic, or autoimmune[30].

Toxic hepatitis

Toxic hepatitis is inflammation of the liver caused by chemicals, drugs (prescription and OTC) and nutritional supplements.[30] It is estimated that 25% to 50% of all cases of hepatitis, and even hepatic failure, may be caused by the adverse effects of drugs[32]. Drug-induced (idiosyncratic) hepatitis may be due to a hypersensitivity reaction specific to the affected person. Drugs that may cause this type of hepatitis include, but are not limited to, niacin, sulfonamides, phenothiazines, amoxicillin, methotrexate, NSAIDs, and vitamin A[7].

In susceptible persons, symptoms of hepatic problems may occur at any time during or after exposure to these drugs but most often become evident after 2 to 5 weeks of therapy[7].

Drug-induced hepatitis alert! Not all adverse reactions to drugs are toxic. For example, hormonal contraceptives may interfere with liver function and cause jaundice without leading to necrosis, fatty infiltration of liver cells, or hypersensitivity[7].

There are several risk factors for drug-induced liver injury:[32]

- Race: Afro-Caribbean and Hispanics may be more susceptible to this type of toxicity.
- Age: Elderly patients are at increased risk for liver injury.
- Gender: Hepatic drug reactions are more common in females.
- Alcoholics: Alcoholics are more susceptible to drug toxicity.
- Chronic liver disease: Persons with preexisting liver diseases may be more susceptible to drug toxicity.
- Genetic factors: Genetic factors may cause abnormal reactions to drugs.
- Patients with AIDS: Persons with AIDS and those who are malnourished may be more susceptible to drug reactions.

In addition to drug-induced injury, chemicals and other substances that are toxic to the liver can cause toxic hepatitis. These include carbon tetrachloride, acetaminophen, trichloroethylene, poisonous mushrooms, and vinyl chloride. Liver damage generally occurs within 24 to 48 hours after exposure depending on the amount or degree of exposure. Alcohol, anoxia, and preexisting liver disease can increase the toxic effects of these agents[7,31].

Signs and symptoms of toxic hepatitis are jaundice, abdominal pain, nausea and vomiting, weight loss, anorexia, fatigue, dark-colored urine, pruritus, and rash. Diagnosis is made by assessing liver function studies, WBC counts, and eosinophil counts. A liver biopsy may be needed to confirm diagnosis. Patient history may show exposure to toxic substances[7,30].

Treatment consists of stopping exposure to the toxic substances, antidotes to medication (if available), and supportive measures. In cases of severe liver damage, a liver transplant may be needed. Patients should also be told to avoid alcohol, exposure to liver toxins, and limit the amount of medications (including OTC, vitamins, supplements, and herbal preparations) they take[7,30].

Alcoholic hepatitis

Alcoholic hepatitis refers to liver inflammation caused by drinking alcohol. Alcoholic hepatitis is most likely to develop in people who drink large amounts of alcohol over a period of many years. However, not all persons who are heavy drinkers develop alcoholic hepatitis – the disease can develop in people who drink only moderately.33 About 35% of alcoholics develop hepatitis, and about 33% of people with alcoholic hepatitis die within 6 months of noticing symptoms[30].

Alcoholic hepatitis alert! Persons diagnosed with alcoholic hepatitis must stop drinking alcohol! If people with alcoholic hepatitis continue to drink alcohol they have a high risk of serious liver damage and death[7,33]!

Persons who are at higher risk for the development of alcoholic hepatitis include[30]:

- Those who drink excessive amounts of alcohol.
- Those who drink excessive amounts of alcohol and are malnourished.
- People who are obese.
- People who are binge drinkers.
- Women.
- People who are Hispanic or black.
- People who have another type of hepatitis (especially hepatitis C).
- People who drink beer or spirits as opposed to wine.

Alcoholic hepatitis alert! Genetic factors may play a part in the development of alcoholic hepatitis. Mutations in certain genes that affect alcohol metabolism may increase the risk of alcoholic liver disease and cancers linked to alcohol use. Exact genetic associations have not been identified[33].

Signs and symptoms of alcoholic hepatitis include[7,30,33]:

- Jaundice.
- Anorexia.
- Nausea and vomiting.
- Abdominal pain and tenderness.
- Weight loss.
- Malnourishment.
- Confusion.
- Changes in behavior.
- Hepatic and/or renal failure.
- Ascites (retention of large amounts of fluid in the abdominal cavity).

Additional complications of alcoholic hepatitis include[33]:

- Portal hypertension. Blood from the intestines, spleen, and pancreas enter the liver through the large portal vein. If scar tissue slows normal liver circulation, blood backs up and causes increased pressure within the portal vein.
- Varices. When circulation through the portal vein is blocked, blood may back up into other blood vessels in the esophagus and stomach. Since the walls of these blood vessels are thin, they may bleed if filled with excessive amounts of blood. Significant amounts of

bleeding in the upper stomach or esophagus is life-threatening and requires immediate emergency intervention.
- Hepatic encephalopathy. Hepatic damage interferes with the liver's ability to remove toxins from the body. A build-up of toxins can cause brain damage, leading to changes in behavior, personality, and mental status.
- Cirrhosis. Liver damage and inflammation can, over time, cause cirrhosis (irreversible scarring of the liver). This can lead to liver failure.

Diagnosis is based on findings from liver function tests and liver imaging studies[30].

A diagnosis of alcoholic hepatitis requires complete cessation of alcohol intake. It is the only way to prevent the disease from worsening. In some cases, liver damage may be reversed. In fact, many people who stop drinking experience significant improvement in symptoms in just a few months. Patients should be referred to support groups such as Alcoholics Anonymous, outpatient treatment programs, or residential inpatient hospitalization[33].

People who consume large amounts of alcohol are often malnourished. A dietary consult is often made to help patients assess their current diets and plan a diet that is nutrient-rich. Some patients may have difficulty eating enough to ingest adequate amounts of vitamins and nutrients. In such cases, parenteral and/or tube-feeding may be prescribed[33].

Corticosteroids may be prescribed to reduce liver inflammation. These types of drugs have some short-term benefits. However, steroids have many significant side effects and are not recommended for people who have renal failure, gastrointestinal bleeding, or infections. An estimated 40% of people do not respond to corticosteroids[33].

For those patients who have severe liver damage associated with alcoholic hepatitis, liver transplant is the only hope for survival. However, there is reluctance to perform liver transplants on patients with alcoholic hepatitis because of the concern that patients will resume drinking after surgery. Alcoholic hepatitis is considered a contraindication for liver transplantation in most transplant centers in the United States[33].

Some alternative medicine treatments are thought to help liver inflammation. However, such alternative supplements should not be used without the knowledge and consent of the patient's health care provider.

The leaves and seeds of the milk thistle plant are believed to control liver inflammation. Milk thistle may cause diarrhea and nausea and may interfere with the effectiveness of prescription medications. To date, clinical research studies have not shown a benefit for people with alcoholic liver disease who take milk thistle supplements[33].

S-Adenosyl methionine (SAMe) is a supplement that some people believe reduces inflammation of the liver and helps the liver repair itself. Some evidence suggests that some people who develop liver disease have a deficiency of SAMe, which is made naturally in the body. However, there is not adequate scientific evidence to recommend the use of SAMe for alcohol-induced liver disease[33].

Autoimmune hepatitis

Autoimmune hepatitis, also known as lupoid hepatitis, occurs when the patients' immune systems attack their own livers. This leads to inflammation, scarring (cirrhosis), liver cancer, and liver failure[7,30]. Research suggests that a genetic factor may predispose some people to autoimmune disease[7]. Other factors that increase the risk for the development of autoimmune hepatitis include[7,30]:
- Being female. About 70% of those with autoimmune hepatitis are women, most of whom are between 15 and 40 years of age.
- Having other autoimmune diseases. People with other autoimmune diseases such as rheumatoid arthritis or ulcerative colitis are at higher risk.
- Medications. Some antibiotics and medications used to treat elevated cholesterol levels may increase the risk for autoimmune hepatitis.
- After having an infection. Autoimmune hepatitis may occur following a viral or bacterial infection.
- Having a family history of the disease. Genetic factors may increase disease risk.

Patients may not have any signs or symptoms of autoimmune hepatitis. When they do occur, signs and symptoms of autoimmune hepatitis include jaundice, abdominal pain, enlarged liver, nausea and vomiting, amenorrhea, joint pain, anorexia, pruritus and rash, appearance of abnormal blood vessels on the skin, and dark-colored urine[30].

Diagnosis is based on history, liver function tests, and, possibly, a tissue sample obtained during a liver biopsy[30].

Treatment focuses on stopping the immune system from attacking the patient's liver. Corticosteroids may be prescribed to reduce liver inflammation. In conjunction with corticosteroids, an immunosuppressant called azathioprine (Imuran) may be prescribed[30].

Azathioprine is available as a powder for injection and in 25 mg, 50 mg, 75 mg, and 100 mg tablets. It is used as an immunosuppressant for a variety of conditions including immunosuppression in kidney transplantation, severe refractory rheumatoid arthritis, multiple sclerosis, psoriasis, idiopathic thrombocytopenic purpura, and lupus nephritis. The drug should be given after meals to minimize adverse gastrointestinal effects[21].

Side effects associated with azathioprine include fever, nausea, vomiting, diarrhea, abdominal pain, arthralgia, myalgia, rash, alopecia, infections, anemia, arthralgia, myalgia, and anorexia. Potentially life-threatening side effects include pancreatitis, leukopenia, thrombocytopenia, hepatotoxicity, and increased risk of neoplasia. The drug has the potential to interact adversely with many drugs, so it should be prescribed and patients monitored by health care providers who have significant knowledge of azathioprine[21].

Azathioprine may increase alkaline phosphatase, ALT, AST, and bilirubin levels. It may decrease hemoglobin and uric acid levels as well as platelet, RBC, and WBC counts[21].

Use of the drug is contraindicated in pregnant women and used with caution in patients with hepatic or renal dysfunction. Black box warnings associated with azathioprine include[21]:
- Chronic immunosuppression with this drug increases the risk of neoplasia.
- Patients must be warned of the risk of malignancy.
- Patients should be instructed to avoid pregnancy during therapy and for 4 months after therapy has been discontinued.

Azathioprine alert! Caution must be taken to avoid confusing azathioprine with look-alike and/or sound-alike drugs. For example, azathioprine should not be confused with Azulfidine. Imuran should not be confused with Inderal[21].

In summary, there are a number of factors that can lead to nonviral hepatitis. After diagnosis, patients and their families need emotional support and careful patient/family education to adhere to treatment regimens. Some of this education includes referring patients to appropriate counseling and support groups. This is especially true as patients and families deal with forms of hepatitis that are life-threatening or require cessation of alcohol use.

Patients affected by alcoholic hepatitis must stop drinking to survive. Persons addicted to alcohol need to be referred to appropriate support groups and may need outpatient or inpatient hospitalization.

Some patients may need liver transplantation to survive. However, in patients with alcoholic hepatitis, most transplant centers in the United States cite alcoholic hepatitis as a contraindication for transplantation. This adds to the stress of patients dealing with this form of hepatitis.

Nurses and other health care professionals must provide objective, supportive care regardless of the cause of the patient's hepatitis. They must examine their own feelings and beliefs (such as disapproval of persons who use illegal drugs or who are alcoholics) and assess whether such feelings and beliefs compromise their ability to provide the best nursing care. Nurses and their health care colleagues must work to deal with their own feelings and beliefs so they provide the best possible care and support to patients dealing with hepatitis.

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HEPATITIS: RECOGNITION AND MANAGEMENT

Self Evaluation Exercises

Select the best answer for each question and check your answers at the bottom of the page.
You do not need to submit this self-evaluation exercise with your participant sheet.

1. The functional unit of the liver is the:
   a. Sinusoid.
   b. Lobule.
   c. Caudate.
   d. Gallbladder.

2. It is common for people to have hepatitis _____for 15 years or more before it is diagnosed.
   a. D.
   b. A.
   c. B.
   d. C.

3. Hepatitis E is a highly virulent disease, progressing to fulminant hepatitis and liver failure, especially in:
   a. Children.
   b. The elderly.
   c. Pregnant women.
   d. Men.

4. Pathological changes in the liver:
   a. Vary according to the causative virus.
   b. Do not affect absorption of fat-soluble vitamins
   c. Increase the amount of vitamins stored in the liver.
   d. Decrease levels of serum albumin, which can lead to edema.

5. Which of the following statements concerning diagnosis of hepatitis is accurate?
   a. AST levels decrease in chronic hepatitis.
   b. IM injections may increase ALT levels.
   c. Young children can have decreased ALP levels.
   d. In viral hepatitis, serum bilirubin levels are decreased.

6. Which of the following interventions is appropriate to prevent HAV?
   a. Administering phenothiazines for nausea and vomiting.
   b. Ingestion of low-calorie, low-protein meals.
   c. Administering Havrix.
   d. Encouraging exercise at frequent intervals.

7. The first combination pill to treat chronic hepatitis C, genotype 1 infection is:
   a. Harvoni.
   b. Simeprevir.
   c. Telaprevir.
   d. Boceprevir.

8. Nursing considerations to remember when taking care of patients with hepatitis include:
   a. Teach patients about enteric precautions if they have been diagnosed with hepatitis C.
   b. Monitor patients for depression and suicidal ideation.
   c. Limit fluid intake to reduce fluid retention.
   d. Explain that latex condoms should eliminate the risk of disease transmission.

9. Toxic hepatitis:
   a. Is estimated to cause 25% to 50% of all cases of hepatitis.
   b. Is caused by hormonal contraceptives that interfere with liver function and generally lead to fatty infiltration of liver cells.
   c. Is the result of alcohol intake.
   d. Is also known as lupoid hepatitis.

10. Risk factors that increase the risk for the development of autoimmune hepatitis include:
    a. Being male.
    b. Having cancer.
    c. Having rheumatoid arthritis.
    d. Taking antidepressants.

Answers:	1.B 2.D 3.C 4.D 5.B 6.C 7.A 8.B 9.A 10.C

Chapter 3: Hooked: Drug Abuse In America

3 Contact Hours

Release Date: 2/1/2016 **Expiration Date: 2/1/2019**

Audience

The target audience for this education program is all nurses who are responsible for the assessment and care of individuals at risk for drug use and abuse.

Purpose statement

Drug abuse in America is an epidemic. Health care providers are uniquely qualified to identify and intervene to break the cycle of abuse. This course provides overview information of illicit substances and prescription use abuse. Knowledge of these substances provides a framework for identification and care.

Learning objectives

- State the severity of drug abuse in the United States.
- Describe at least three elements of the national drug control strategy.
- Differentiate between club and prescription drug abuse.
- List five club drugs as well as their associated street names.
- List the three most frequently abused prescription drug types as well as examples of each type.
- List three new emerging drugs of abuse.
- Describe priorities for nursing assessment and care when dealing with patient who has abused drugs.

How to receive credit

- Read the entire course online or in print which requires a 3-hour commitment of time.
- Depending on your state requirements you will asked to complete either:
  - An affirmation that you have completed the educational activity
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- Provide required personal information and payment information.
- Complete the mandatory Self-Assessment and Course Evaluation.
- Print your Certificate of Completion.

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Dr. Thompson has had a long and diverse nursing career. She earned her baccalaureate degree in nursing from Case Western Reserve University, her master's in nursing from The Ohio State University, and her doctorate in Public Health, Injury Epidemiology, from the University of Texas, Houston. As an epidemiologist, she has studied many societal epidemics such as drug abuse and populations at risk. She has taught both undergraduate and graduate nursing at The Ohio State University and the University of Texas, Houston, and is currently an adjunct faculty for Simmons College, Boston. Dr. Thompson was the director of clinical research for Orlando's Florida Hospital System and helped to champion standards of practice based on evidence. She has been a long-time writer and has served on the nursing editorial team of Elsevier publishing.

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Disclosures

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Introduction

Every day, nurses see people who have drug problems; clearly, drug abuse problems have not gone away despite individual and federal efforts to curb them. This course will offer facts that may help in understanding their problems, as well as providing strategies to deal with them.

Overdose drug deaths

Deaths from drug use can be divided into two categories: Prescription drugs and illicit or "street" drugs. The statistics tell the story. In 2014 (the latest year for which data are available), 43,225 people died of drug-induced causes. This number was up from 2004 by 21,161 individuals and represents a 100% increase. Of the number of 2014 deaths from drug use, 25,760 were from prescription drugs and 17,465 were from illicit drugs. While both numbers are unacceptable, prescription drug deaths outweigh illicit drug deaths in the United States[1]. The trends of drug abuse and drug-related deaths are a national public health problem. The trends are staggering; there is a drug-induced death in the U.S. every 15 minutes.

The cost to society[3]

Children
Annual averages for 2009 to 2012 indicated that more than 8.3 million children under 18 - or almost one in eight (11.9 percent) - lived with at least one parent who was dependent upon alcohol or an illicit drug within the past year. Of these, about 2.1 million children lived with a parent who was dependent upon or abused illicit drugs. Almost 7.3 million lived with a parent who was dependent upon or abused alcohol.

School performance
Significantly fewer school-aged children who are current marijuana users report an average grade of "A" (12.5 percent), compared to those who are not current marijuana users (30.5 percent report an average grade of "A").

College-age students who use non-medical prescription stimulant medications typically have lower grade point averages and are more likely to be heavy drinkers and users of other illicit drugs . They are also more likely to meet diagnostic criteria for dependence upon alcohol and marijuana, skip class more frequently, and spend less time studying.

Economic costs

According to the last available estimate, the economic cost of drug abuse in the U.S. was estimated at $143 billion in 2010[4]. This value represents both the use of resources to address health and crime consequences, as well as the loss of potential productivity from disability, premature death, and withdrawal from the legitimate workforce.

Addiction and treatment need
In 2010, 23.5 million persons ages 12 and older needed treatment for an illicit drug or alcohol-use problem (9.3 percent of individuals in that age group). And of these, 7.1 million needed treatment for illicit drug problems, with or without alcohol. Of the 23.5 million persons needing substance use treatment, 2.6 million received treatment at a specialty facility in the past year. Of the 7.1 million needing drug treatment, 1.5 million received specialty treatment.

Acute health effects
In 2009, there were nearly 2.1 million drug-related ED visits nationwide. Of these, almost 27% were prescription drugs, 21% were illicit drugs, and 15% were alcohol with drugs[5].

The 2015 agenda to control drug abuse in America is focused on two target areas: First, is to confront the prescription drug misuse problem. The second is to tackle the heroin epidemic[6].

The National Drug Control Strategy reflects a comprehensive approach to reducing drug use and its consequences. Endorsing a balance of prevention, treatment, and law enforcement, the strategy calls for a 15 percent reduction in the rate of youth drug use over five years, and similar reductions in chronic drug use and drug-related consequences such as deaths and drugged driving. Below are some brief highlights of the strategy which harnesses the collaborative strength of local, state, tribal and federal agencies, community-based organizations, and other nongovernmental partners.

Administration's strategy focuses on:

- Developing a community-oriented national prevention system focused on young people.
- Collaborating with states to help communities implement evidence-based prevention initiatives.
- Providing sound information about the dangers of drug use to young people, their parents and other caring adults through the National Youth Anti-Drug Media Campaign within workplaces, schools, faith communities and civic organizations.
- Supporting mentoring initiatives, especially among youth at greater risk for initiating drug use.
- Expanding research about drugs used by youth, including inhalants, pain killers, "study drugs" (such as Ritalin), and steroids.
- Fostering collaboration between public health and safety organizations to prevent drug use.
- Curtailing drugged driving by encouraging states to establish and enforce laws that impose penalties for the presence of any illicit drug while driving, and by launching a national effort to educate the public about the serious public health and safety threats posed by drugged driving.

Seek early intervention opportunities in health care: Studies indicate that most health care spending related to substance abuse goes to the avoidable, catastrophic consequences of addiction, rather than to its treatment. The health care system can avert enormous human and economic cost if care providers consistently screen and intervene with early-stage substance abuse before it becomes acutely life-threatening. Therefore, administration's strategy focuses on:

- Increasing screening and early intervention for substance use in all health care settings.
- Increasing health care providers' knowledge of screening and brief intervention techniques through medical schools and continuing education programs.
- Curbing prescription drug abuse by expanding prescription drug monitoring programs, encouraging community prescription take-back initiatives, informing the public of the risks of prescription drug abuse and overdose, as well as recommending disposal methods to remove unused medications from the home, and working with physicians to achieve consensus standards on opiate painkiller prescribing.
- Expansion of reimbursement for screening and brief interventions in primary care.

Integrate treatment for substance use disorders into health care and expand support for recovery: For millions of Americans, substance use progresses to a point where brief interventions are not sufficient to promote recovery. Addiction treatment can be a critical – even lifesaving – resource in such situations, but only if it is readily available and is of a high quality. Making recovery possible is, therefore, key to effective drug control. The strategy focuses on:

- Expanding addiction treatment in community health centers and within the Indian Health Service.
- Supporting the development of new medications to treat addiction and the implementation of medication-assisted treatment protocols.
- Improving the quality and evidence base of substance abuse treatment, including family-based treatment.
- Fostering the expansion of community-based recovery support programs, including recovery schools, peer-led programs, mutual-help groups, and recovery support centers.

Break the cycle of drug use, crime, delinquency and incarceration: Drug use is often interwoven with criminal and delinquent behavior that disrupts family, neighborhood and community life in fundamental and long-lasting ways. The criminal justice system plays an important role in reducing drug use and its consequences. The strategy focuses on:

- Supporting law enforcement's efforts to reduce drug availability, and to educate the public about the dangers and legal consequences of drug trafficking and drug abuse.
- Encouraging partnerships and collaboration between law enforcement and community organizations to increase cooperation and understanding, and to reduce open-air drug markets and gang activity.
- Promoting and supporting alternatives to incarceration such as drug- and problem-solving courts.
- Reducing drug use by those under criminal justice supervision through drug testing with certain, swift, but modest sanctions in probation and parole systems.
- Mandating treatment and court monitoring for chronic drug-using offenders who disproportionately burden the health care and criminal justice systems.
- Supporting post-incarceration reentry efforts by assisting in job placement, facilitating access to drug-free housing, and developing adult reentry programs.
- Developing and disseminating more effective models of addressing substance use disorders among youth in the juvenile justice system.

Disrupt domestic drug trafficking and production: Drug-trafficking organizations move large quantities of illicit drugs into the United States and distribute these drugs throughout the nation. These same groups, at times working through street and prison gangs, employ criminal networks that return the illicit proceeds of the drug trade (along with an array of weapons) across our borders. This trade imposes enormous negative consequences for the safety, health and security of our citizens. The resources of the United States must be marshaled to disrupt the organizations that conduct this trade. The strategy focuses on:

- Maximizing federal support for law enforcement drug task forces.
- Assisting tribal authorities in combating trafficking on tribal lands.
- Implementing the Southwest Border Counternarcotics Strategy - the administration's border plan, that requires United States agencies to take specific actions to address the serious border drug threat.
- Interdicting the southbound flow of currency and weapons.
- Disrupting counterintelligence operations of drug-trafficking organizations to improve interdiction and to protect the safety of United States personnel.
- Countering domestic methamphetamine production and reducing retail diversion of pseudoephedrine used in clandestine labs, both large and small, to produce methamphetamine.
- Eliminating high-potency indoor grow labs and marijuana cultivation on public lands.
- Disrupting the criminal distribution of prescription medications for non-medicinal purposes.

Strengthen international partnerships: The United States is one of the world's most lucrative markets for illegal drugs. It is in our interest to work collaboratively with international partners to reduce the global drug trade, because such actions protect the health and safety of our citizens. The United States also shares responsibility with drug-producing and transit nations for the existence of this dangerous,

destabilizing, and violent criminal enterprise. Shared responsibility for the origin of a problem implies shared responsibility to solve it. Therefore, the strategy focuses on:

- Conducting joint counterdrug law enforcement operations with international partners to cause major disruptions in the flow of drugs, money, and chemicals.
- Intensifying counterdrug engagement internationally, particularly in the Western Hemisphere, including thorough training and technical assistance to help our international partners build stronger judicial, civic, and health institutions.
- Promoting alternative livelihoods for coca and opium farmers to reduce drug production.
- Improving our understanding of the vulnerabilities of drug-trafficking organizations by pooling the knowledge of our intelligence and law enforcement agencies.
- Targeting the illicit finances of drug-trafficking organizations by engaging the international community in major anti-money-laundering initiatives.
- Expanding support for international prevention and treatment initiatives in partnerships with the United Nations and the Organization of American States.
- Increasing medication-assisted treatment for drug addiction through the President's Emergency Plan for AIDS Relief - the largest effort in history to treat a single disease.

Improve information systems for analysis, assessment, and local management: Science should help inform policy and rigorously evaluate its effects. This can be possible only with near real-time information on drug use patterns, associated problems, and the results of previously implemented policies. To achieve better management information, the strategy focuses on:

- Enhancing current data systems that identify the number of drug users, drug-related offenders, drug-related emergency room admissions and other key public health and public safety indices.
- Assessing the availability, price, and purity of illicit drugs on the street so it is known when our programs have had a measurable impact on drug markets.
- Developing and implementing community-based data systems focused on drug use and drug-related problem indicators.

The National Drug Control Strategy relies on a comprehensive approach, informed by experience and evidence, to reduce drug use and its consequences within the United States. The strategy is a collaborative effort by dozens of departments, agencies, members of Congress and the American people. Its implementation is a shared responsibility guided by the Office of National Drug Control Policy and its interagency partners.

SUBSTANCE & DRUG TYPES

Drug addiction is a chronic disease that causes compulsive drug-seeking and use, despite harmful consequences to the drug addict and to those around them [7]. Although it is true that for most people the initial decision to take drugs is voluntary, over time the changes in the brain caused by repeated drug use can affect the individual's self control and ability to make sound decisions.

The two major drug categories discussed in this monograph are: street drugs (also called club drugs), and prescription drugs.

CLUB DRUGS

Overview

Club drugs are a pharmacologically heterogeneous group of psychoactive compounds that tend to be abused by teens and young adults at nightclubs, bars, raves or trance scenes. Heroin, bath salts, cocaine, LSD, PCP, MDMA (ecstasy), marijuana, salvia, spice, mushrooms, and methamphetamine are some of the drugs in this group. These drugs are dangerous because there is no way of knowing how strong the drug actually is, or what exactly is in the drug.

Heroin

Heroin (diacetylmorphine) is derived from the morphine alkaloid found in opium, and is roughly 2 to 3 times more potent[8]. Heroin is classified as a Schedule I drug under the Controlled Substance Act of 1970, and as such has no acceptable use. The use of heroin has doubled since 2005 in the United States. According to the 2011 Survey on Drug Use and Health by the U.S. Substance Abuse and Mental Health Administration, it is estimated that over 600,000 persons use heroin each year. Similarly, the estimated number of new heroin users increased from 109,000 per year during 2002-2005 to 169,000 per year during 2009-2011 (U.S. Department of Health and Human Services. Substance Abuse and Mental Health Services Administration, Office of Applied Studies). Results from the 2011 National Survey on Drug Use and Health: Volume I. Summary of National Findings[9]. New users are often young adults 18 to 25 years of age. Heroin use has replaced other higher-priced, commonly abused opiates, and has become the drug of choice in the United States, its use increasing rapidly since 2010[10].

Heroin: Common street names	
Brown Sugar.	Dope.
China White.	H.
Junk.	Horse.
Skag.	Smack.
Skunk.	White Horse.

Heroin is a power or black sticky substance that may be injected, inhaled, or smoked. It is an opioid derived from the opium poppy flower. Once ingested, it is quickly metabolized to morphine and other metabolites that bind to opioid receptors in the brain. Following ingestion, there is a surge of euphoria (the rush) accompanied by a warm flushing of the skin, a dry mouth, and heavy extremities[11]. Following the initial euphoria, the user experiences alternating wakeful and drowsy periods.

Heroin: Clinical signs		
Short-term	Decreased mental functioning.	**Long-term**
Euphoria.	Respiratory depression.	Altered level of consciousness.
Flushing of skin.	Constricted (pin point) pupils.	Collapsed veins.
Dry mouth.	Nausea.	Hypotension.
Heavy extremities.	Bradycardia	Muscle spasms.
Itching.	Abscesses.	Seizure.
		Coma.
		Possible death.

Nursing considerations: Acute signs of a heroin overdose may include slow and shallow breathing, hypotension, muscle spasms, seizure, coma, and possible death.

Tolerance develops with regular heroin use, and the abuser must use more of the drug to get the same effect or substance intensity. As higher doses are used over time, physical dependency and addiction develops[12]. With physical dependence, the body adapts to the presence of the drug and withdrawal symptoms may occur within a few hours of non-use. There may be feelings of drug craving, restlessness, muscle and bone pain, insomnia, diarrhea and vomiting. There may also be cold flashes and shivering. Major withdrawal symptoms may peak between 48 and 72 hours after the last dose is stopped and may last up to one week. Sudden heroin withdrawal by heavy user individuals can result in death.

Beyond the immediate withdrawal symptoms of heroin, there may be long-term consequences. Ongoing heroin use can lead to collapsed veins, gastrointestinal problems, liver disease, kidney disease, brain damage, and needle contamination diseases such as HIV. Heroin use during pregnancy may cause a spontaneous abortion or lead to premature birth, low birth weight, birth defects, and commonly a heroin-addicted infant.

Treating heroin overdose

Methadone has been used for over a quarter century to treat heroin addiction. The use of this medication in opiate dependency is highly regulated within the United States, and may differ between states. Oral methadone is approved for opiate detoxification and maintenance only in approved and certified treatment programs; although certain emergency and inpatient care exceptions may exist[13].

A new and controversial medication to reverse the effects of heroin overdose has more recently been approved and has been released for sale for prescription use by the Federal Food and Drug Administration (FDA) in April 2014[14]. Naloxone comes in the form of a hand-held device, injection, or nasal spray, and is being hailed by government and health care leaders as a ground-breaking tool to address the epidemic of heroin overdoses across the nation. The states of New York and New Jersey are already mandating its use by first responders. After initial training of these first reponders, the drug was saving lives in its first weeks of use.

Naloxone is marketed under the name of Evzio, or Narcan[15]. A single dose of the drug (which acts as an antidote to heroin) has been successful in reviving overdose victims from death due to respiratory failure and lack of blood pressure. Naloxone works by reversing the suppressive effects of heroin on the opioid receptors that signal respiration, to bring back consciousness and normal breathing. The drug is not new and has been used by emergency medical personnel on the streets and in hospitals for over 40 years in an injectable form.

The release of the drug is controversial. Some experts believe it will give addicts a false sense of confidence that they can continue to use as much heroin as they want, and that the drug will save them from death by overdose. Many also object on the grounds that it will increase insurance costs. Proponents of the drug do not believe addicts will intentionally take enough of the drug to overdose just because naloxone is available, and they feel the FDA has addressed a life-threatening public health crisis that has reached epidemic proportions.

Naloxone works like an Epipen, which counteracts anaphylactic shock. It can be injected into the muscle or subcutaneously. New Jersey has approved the use of naloxone for law enforcement officers. “We think greater availability of immediate treatments like naloxone are important as New Jersey confronts this crisis in heroin and opioid overdoses,” said Aline Holmes, a registered nurse and Senior Vice-President of Clinical Affairs at the New Jersey Hospital Association[16]. In May 2013, New Jersey signed the Overdose Protection Act, which gives legal immunity to anyone using the drug to save a life.

The state of New York has also approved the use of the drug by all law enforcement agents. Seventeen other states have followed suit, with some states allowing prescriptions to family and friends of the addict. Naloxone comes in a nasal spray or in an injectable form, and can be used by anyone without advanced training in an emergency situation. Although additional training is advisable, its use is suggested after calling 911 and checking for breathing.

One drawback of naloxone is that if the heroin is adulterated with fentanyl, patients will need a larger dose over a longer period of time to combat the longer-acting drug combinations. This may cause the patient to sink back into respiratory distress. Patients will also require emergency medical care and/or hospitalization, despite receiving the drug and being revived.

The Centers for Disease Control report local and state health departments fund naloxone and provide it to hospitals and community-based clinics free of charge[17]. San Francisco’s Drug Overdose Prevention and Education Project and Massachusetts’ Overdose Education and Naloxone Distribution Program are examples of two community-based programs using the drug[18].

Bath salts

Bath salts are one of the newest fads to hit the street. They consist of a synthetic powder that is sold legally online and in drug paraphernalia shops. Bath salts contain man-made stimulants called cathinones, which are similar to amphetamines. Because these substances are stimulants, they increase dopamine levels in the brain and create a sensation of euphoria. The substance comes as a powder, but may be snorted, injected, smoked, ingested orally or even rectally. The substance is inexpensive and is easy to acquire[19].

Bath salts: Common street names	
Ivory Wave.	Zoom.
Purple Wave.	Bloom.
Red Dome.	Cloud Nine.
Blue Silk.	Ocean Snow.
Vanilla Sky.	Lunar Wave.
White Lightening.	Scarface.
Plant Food.	Hurricane Charlie.

Once consumed, it may take up to ninety minutes to feel its full effect. Therefore, there is a tendency for consuming more than intended to get a certain result. This can lead to possible overdoses and deaths.

Bath salts abuse: Clinical signs		
Tachycardia.	Vessel constriction.	Seizures.
Chest pain.	Kidney failure.	Severe panic attackPsychosis.
Hypertension.	Muscle spasm.	Paranoia.
Hyperthermia.	Tremors.	Insomnia.
Irritability.	Agitation.	Violent behavior.

Nursing considerations: Care of patients with an overdose of bath salts may require admission, use of intravenous sedatives, antipsychotics, and/or restraints, or other measures to protect the patient and health care team.

Cocaine

Pure cocaine was first used in the 1880s as an anesthetic in eye, nose, and throat surgeries, as well as for its ability to constrict blood vessels and limit bleeding. However, many of its therapeutic applications are now obsolete because of the development of safer drugs[20].

The National Survey on Drug Use and Health (NSDUH) estimates that in 2010 there were 1.5 million cocaine users age 12 or older - roughly 0.6 percent of the U.S. population[21]. According to the NSDUH, 2 out of every 1000 (0.2 percent) children ages 12 to 17 were current users of cocaine. For young adults ages 18 to 25, the current use of cocaine was estimated at 1.5 percent, or 1.5 out of every 100 young adults.

Cocaine is made from the coca plant and is the most potent stimulant of natural origin It can be snorted, smoked or injected. When snorted, cocaine powder is inhaled through the nose where it is absorbed into the bloodstream through the nasal tissues. When injected, the user uses a needle to release the drug directly into the bloodstream. Smoking involves inhaling cocaine vapor (or smoke) into the lungs where absorption into the bloodstream is as rapid as it is by injection. All of these methods of administration pose great risks to the user[22].

Crack is cocaine base that has not been neutralized by an acid to make the hydrochloride salt. This form of cocaine comes in a rock crystal that is heated to produce vapors that are smoked. The term "crack" refers to the crackling sound produced by the rock as it is heated[23].

Cocaine: Common street names	
Blow.	Crack.
Bump.	Flake.
C. Candy.	Rock snow.
Charlie.	Toot.
Coke.	

Cocaine is highly addictive. It triggers the brain to release dopamine and creates a euphoric feeling - a "high" – that is intense, but short-lived. This leads individuals to keep using the drug over and over. The duration of cocaine's immediate euphoric effects depends upon the route of administration. The faster the absorption, the higher the intensity. Also, the faster the absorption, the shorter the duration of action. The high from snorting is relatively slow in its onset, and may last 15 to 30 minutes; the high from smoking may last 5 to 10 minutes[24] .

Cocaine abuse: Clinical signs		
Short-term -	Restlessness.	**Long-term -**
Narrowed blood vessels.	Malnourishment.	Sense of loss of smell.
Tachycardia.	Cardiac dysrhythmias.	Nosebleeds.
Hypertension.	Stroke.	Problems swallowing.
Hyperthermia.	Loss of smell.	Hoarseness.
Gastric pain/nausea.	Seizure.	Poor nutrition.
Loss of appetite.	Coma.	Weight loss.
Panic attack.	Sudden death.	Infection and death of bowel tissue (due to decreased blood flow).

Evidence-based practice: The full extent of cocaine's effect on an unborn or newborn child is not fully known. Studies have shown that infants born to women who use cocaine during pregnancy may be delivered prematurely, have low birth rates, and may be shorter in length. Women who abuse cocaine may have other addictive habits, such as nicotine and alcohol use. The amount of prenatal care, exposure to sexually transmitted diseases, and socioeconomic factors may also affect infant outcomes. Research is finding that exposure to cocaine in utero may also lead to deficits in cognitive abilities, information processing, and the ability to complete tasks in childhood[25] .

Evidence-based practice: Evidence suggests that users who smoke or inject cocaine may be at an even greater risk of causing harm to themselves than those who snort the substance. For example, cocaine smokers also suffer from acute respiratory problems such as cough, shortness of breath and severe chest pains with lung trauma and bleeding[26] .

A tolerance to the cocaine high may be developed. Many addicts report that they fail to achieve as much pleasure as they did from their first cocaine exposure. Some users will increase their dose in an attempt to intensify and prolong the euphoria. This can also increase the risk of adverse psychological or physiological effects[27].

Hallucinogens: LSD

Hallucinogenic substances are characterized by their ability to cause changes in a person's perception of reality. Persons using hallucinogenic drugs often report seeing images, hearing sounds, and feeling sensations that seem real but do not exist[1]. In the past, plants and fungi that contained hallucinogenic substances were abused. Currently, these hallucinogenic substances are produced synthetically to provide a higher potency[28].

LSD (lysergic acid diethylamide) is one of the major drugs in the hallucinogen class. While the substance was discovered in 1938, it became popular in the 1960s and is still commonly used today. The substance is manufactured from lysergic acid, which is found in ergot - a fungus that grows on rye and other grains[29].

LSD: Common street names (Sold under more than 80 street names)	
Acid.	Microdot.
Blotter.	Yellow Sunshine.
Blue Heaven.	Sugar Cubes.
CID.	Trips.
Doses.	Tabs.
Dots.	Window Panes.
Hits.	Purple Dragon.

LSD is produced in crystalline form. It is then mixed with excipients, or is diluted as a liquid for production in ingestible forms. It is odorless, colorless, and has a slightly bitter taste. LSD is sold in tablet form (usually small tablets known as Microdots), on Sugar Cubes or in thin squares of gelatin (commonly referred to as Window Panes). Most

commonly, however, it is sold as blotter paper (sheets of absorbent paper soaked in or impregnated with LSD, covered with colorful designs or artwork, and perforated into one-quarter inch square, individual dosage units)[30].

The effects of LSD are unpredictable. Usually, the first effects of the drug are felt 30 to 90 minutes after taking it. A wide variety of physical and behavioral effects may result[31].

LSD abuse: Clinical signs		
Short term - Rapid mood swings from one emotion to another. Distortion of ability to think rationally. Visual hallucinations. Hypertension. Tachycardia. Dry mouth. Insomnia.	Dizziness. Insomnia. Dilated pupils. Hyperthermia. Sweating. Nausea. Loss of appetite. Tremors. Perception of hearing colors and seeing sounds. Increased blood sugar.	**Long term –** Frightening flashbacks. Ongoing visual disturbances. Disorganized thinking. Panic feeling. Paranoia. Mood swings. Fear of insanity and death.

LSD produces tolerance, so some who use the drug repeatedly must take progressively higher doses to achieve the state of intoxication that they had previously achieved. This is an extremely dangerous practice given the unpredictability of the drug.

Hallucinogens: PCP

PCP (phencyclidine) was developed in the 1950s as an intravenous anesthetic. Its use in humans was discontinued in 1965, however, because patients often became agitated, delusional, and irrational as they recovered from its anesthetic effects. PCP is now being illegally manufactured in laboratories. In its pure form, it is a white crystalline powder that is readily soluble in water or alcohol. It has a distinctive, bitter chemical taste. PCP can be easily mixed with dyes and turns up on the illicit drug market in a variety of tablets, capsules and colored powders. It can be snorted, smoked or ingested. For smoking, PCP is often applied to a leafy material such as mint, parsley, oregano, or marijuana[32].

Psilocybin is obtained from certain mushrooms found in South America, Mexico and the U.S.; although the substance can also be produced synthetically. Mushrooms containing psilocybin are available fresh or dried and have long, narrow stems topped by caps, with dark gills on the underside. These mushrooms are usually ingested orally, but can also be brewed in a tea or added to food to mask the bitter flavor. Once ingested, psilocybin is broken down in the user's body to produce psilocyn, another hallucinogenic substance[33].

Although it is a white crystalline powder in its pure form, on the illicit drug market it can contain a number of contaminants. This causes the color to range from a light to darker brown, and its consistency can range from a powdery substance to a gummy mass. It is available in a variety of tablets, capsules, and colored powders, which are either taken orally or by insufflation ("snorted"). The liquid form of PCP is actually PCP base dissolved most often in ether - a highly flammable solvent. When smoked, PCP is typically sprayed onto leafy material such as mint, parsley, oregano, or marijuana. PCP may also be injected.[34]

PCP: Common street names	
Angel dust. Boat.	Tic tac. Zoom.

The effects of PCP use are unpredictable. Effects can be felt within minutes of ingestion and can last for many hours. When taken in a moderate amount, PCP causes the user to feel distracted, distant, and estranged from their surroundings; as the dosage is increased, the individual's behavior may escalate to hostility, and even psychosis.

PCP abuse: Clinical signs		
Short term – low dose: Delusions. Hallucinations. Paranoia. Problems thinking. Distracted. Anxiety. Tachypnea. Hypertension (early). Tachycardia. Exaggerated gait. Auditory hallucinations. Image distortion. Severe mood swings. Slurred speech. Blank stare.	Numbness in hands and feet. Hypoventilation. **Short term – high dose:** Rapid and involuntary eye movement. Acute anxiety. Hypotension (late). Tachypnea. Nausea. Vomiting. Blurred vision. Drooling. Loss of balance. Violence. Suicidal thoughts.	Impending doom. Seizure. Coma. Death.

MDMA (ecstasy or molly)

MDNA was first used in the 1970s - not as a recreational drug; rather, it was an aid in psychotherapy. In 1985, the Drug Enforcement Administration labeled MDNA as a Schedule I substance, or a drug with a high abuse potential and no recognized medical use[35].

MDMA is a synthetic psychoactive drug that has similarities to both the stimulant amphetamine and the hallucinogen mescaline. It produces feelings of increased energy, euphoria, emotional warmth and empathy toward others. It also produces distortions in sensory and time perception. MDMA was initially popular among white adolescents and young adults in nightclub scenes or at "raves" (long dance parties), but the drug now affects a broader range of users and ethnicities[36].

MDMA: Common street names	
Ecstasy. Molly. Adam. Clarity.	Eve. Lover's speed. Uppers.

MDMA is taken orally, usually as a capsule or tablet. The popular term molly (slang for "molecular") refers to the pure crystalline powder form of MDMA that is usually sold in capsules. The drug's effects last approximately 3 to 6 hours; it is not uncommon for users to take a second dose of the drug as the effects of the first dose begin to fade. It is commonly taken in combination with other drugs. For example, some urban gay and bisexual men report using MDMA as part of a multiple-drug experience that includes cocaine, GHB, methamphetamine, ketamine, and the erectile-dysfunction drug sildenafil (Viagra)[37].

MDNA impacts the brain by creating a surge of serotonin and depleting the brain of its important chemical balance. This results in negative effects with additional drug cravings[38].

MDNA abuse: Clinical signs		
Initial – Lowered inhibition. Increased energy. Euphoria. Emotional warmth. Empathy toward others. Anxiety.	**Short-term -** Distortion in sensory and time perception. Depression. Sleep problems. Drug cravings. Tachycardia. Hypertension. Hyperthermia. Sleep disturbances. Nausea. Blurred vision. High dose may lead to death.	**Long-term -** Memory deficits. Long lasting confusion. Problem with attention. Impulsiveness. Aggression. Increased anxiety. Loss of appetite. Less interest in sex.

Longer term, MDNA can have many of the same physical effects as other stimulants like cocaine and amphetamines.

Marijuana

Marijuana is a green, brown, or gray mixture of dried, shredded leaves, stems, seeds and flowers of the hemp plant (Cannabis sativa). Cannabis is a term that refers to marijuana and other drugs made from the same plant. Other forms of cannabis include sinsemilla, hashish and hash oil. All forms of cannabis are mind-altering (psychoactive) drugs.

The main active chemical in marijuana is THC (delta-9-tetrahydrocannabinol). Short-term effects of marijuana use include problems with memory and learning, distorted perception, difficulty in thinking and problem solving, loss of coordination, increased heart rate and anxiety.

Marijuana is usually smoked as a cigarette (called a joint), or in a pipe or bong. Marijuana has also appeared in blunts, which are cigars that have been emptied of tobacco and refilled with marijuana, sometimes in combination with another drug, such as crack. It can also be mixed into foods or used to brew a tea[39].

Although legalized in some states, Cannabis remains the most commonly-used illegal drug in the United States. In 2012, there were 18.9 million Americans age 12 and over who reported using marijuana in the past month, an increase from 14.4 million (5.8 percent) in 2007. The drug is usually smoked but it can also be eaten. The smoke irritates the lungs and contains more cancer-causing chemicals than tobacco smoke. Common effects of marijuana use include pleasure, relaxation, and impaired coordination and memory[40]. Marijuana is often the first illegal drug people use and is associated with an increased risk of progressing to more powerful and dangerous drugs, such as cocaine and heroin. The risk for progressing to cocaine is 104 times higher if marijuana has been smoked at least once, than if there has never been marijuana use.

In recent decades, marijuana growers have been genetically altering their plants to increase the percentage of delta-9-tetrahydrocannabinol (THC), the main active ingredient in marijuana. The average potency of marijuana has more than doubled since 1998[41].

The use of marijuana can produce adverse physical, mental, emotional and behavioral effects. It can impair short-term memory and judgment and distort perception. Because marijuana affects brain systems that are still maturing through young adulthood, its use by teens may have a negative effect on their development[42]. Studies have additionally shown an association between chronic marijuana use and increased rates of anxiety, depression, suicidal thoughts and schizophrenia[43].

Contrary to popular belief, marijuana can be addictive. Marijuana addiction is also linked to a withdrawal syndrome similar to that of nicotine withdrawal, which can make it difficult to quit. People trying to quit report irritability, sleeping difficulties, craving and anxiety.

Marijuana: Common street names	
Grass. Chronic. Pot. Weed. Homegrown. Hydro. Shake. Gangster. Hash. Hemp.	Bud. Dope. Ganja. Herb joint. Mary Jane. Kind bud. Sinsemilla. Skunk. Boom. Reefer.

Marijuana abuse: Clinical signs		
Initial – Enhanced sensory perception. Euphoria.	**Short term –** Drowsiness/relaxation. Slowed reaction time. Problems with balance and coordination. Tachycardia. Increased appetite. Problems with learning. Problems with memory.	**Long term -** Mental health problems. Chronic cough. Frequent respiratory infections.

Youth who report heavy use beginning in adolescence may lose IQ points. Babies of mothers who use marijuana may have problems with attention, memory, and problem solving[44].

Methamphetamine

Methamphetamine is a highly addictive central nervous system stimulant that can be injected, snorted, smoked or ingested orally. Methamphetamine users feel a short, yet intense "rush" when the drug is initially administered. The immediate effects of methamphetamine include increased activity and decreased appetite. The drug has limited medical uses for the treatment of narcolepsy, attention deficit disorders, and obesity[45].

Most amphetamines that are distributed to the black market are produced in clandestine laboratories. Methamphetamine laboratories are, by far, the most frequently encountered clandestine laboratories in the United States. The ease of clandestine synthesis, combined with tremendous profits, has resulted in significant availability of illicit methamphetamine. Large amounts of methamphetamine are also illicitly smuggled into the United States from Mexico[46].

Methamphetamines: Common street names	
Crystal meth.	Speed.
Meth.	Go fast.
Fire.	Crystal.
Bikers' coffee.	Glass.
Crank.	Stove top.
Chickenfeed.	Trash.
Ice.	Yellow ban.

Methamphetamine is a powerful stimulant that increases alertness, decreases appetite, and gives the individual a sense of euphoria or pleasure. Withdrawal can lead to depression.

Methamphetamines: Clinical signs		
Short term -	Tachycardia.	**Long term -**
Increased alertness.	Anxiety.	Confusion.
Increased physical activity.	Insomnia.	Delusions.
Decreased appetite.	Irregular heart rate.	Weight loss.
Tachypnea.		Severe dental problems (meth mouth).
Mood disturbances.		Psychotic signs.
Hallucinations.		Violent behavior. Paranoia.
		Delusions (such as sensation of bugs crawling under skin).

Pregnant women using methamphetamines may have premature delivery and/or separation of the placenta from the uterus. Babies born to these mothers are often born with low birth weight, lethargy, and heart and/or brain problems[47].

PRESCRIPTION DRUGS

Overview

The non-medical use or abuse of prescription drugs is the fastest-growing drug problem. It is estimated by Johns Hopkins Center for Injury Research and Policy that fifty Americans die each day from a prescription drug overdose. Of these deaths, it is estimated that 18 are women. According to the report by the Trust for America's Health (TFAH), prescription drug abuse has quickly become a top public health concern, as prescription drug-related deaths now outnumber those from heroin and cocaine combined. Drug overdose deaths now exceed motor vehicle-related deaths in 29 states and Washington, D.C.

Misuse and abuse of prescription painkillers alone costs the country an estimated $53.4 billion a year in lost productivity, medical costs, and criminal justice costs. The report also notes that, currently, only one in 10 Americans with a substance abuse disorder receives treatment. According to the Centers for Disease Control and Prevention (CDC), sales of prescription painkillers per capita have quadrupled nationally since 1999, and the number of fatal poisonings due to prescription painkillers has also quadrupled. Enough prescription painkillers were prescribed in 2010 to medicate every American adult continually for a month[48].

Women are at a particular risk for prescription drug overdose. According to the CDC, more than 5 times as many women died from prescription pain killer overdoses in 2010 as in 1999. Nearly 48,000 women died of prescription painkiller overdose between 1999 and 2010. Deaths from prescription painkiller overdoses among women have increased more than 400 percent since 1999, compared to 265 percent in men. For every woman who dies of a prescription pain killer overdose, 30 visit the emergency department for painkiller misuse or abuse.

Prescription drugs account for the second most commonly abused category of drugs, behind marijuana and ahead of cocaine, heroin, methamphetamine and other drugs. Opiate overdoses (once almost always due to heroin use) are now increasingly due to the abuse of prescription painkillers. Prescription drug abuse poses a unique challenge because of the need to balance prevention, education, and enforcement, with the need for legitimate access to controlled substance prescription drugs.

The extent of prescription drug misuse can only be estimated. 2014 data from the National Institute on Drug Abuse reports that about 16 million people in the United States abuse prescription medications. In general, men abuse prescription drugs more than women. The exception to this is among children ages 12 to 17. In this age group, females abuse prescription medications more than males. An estimated 20 percent of high school students admit to taking a prescription drug without a doctor's prescription. Prescription drug abuse is at its highest during the teens and 20s; although rates are now increasing among those in their 50s[49].

According to the National Institute on Drug Abuse's (NIDA) research report Prescription Drugs: Abuse and Addiction, there are three classes of prescription drugs that are most commonly abused: Opioids or pain killers, central nervous system depressants or tranquillizers, and stimulants[50]. The problem most often with prescription drug abuse is that the individual does not just take one substance. As dependency increases, more pills or substances are needed to create the same effect. Then, when more does not work to create the desired sensation, the individual may begin mixing substances and adding alcohol or other illegal substances.

Opioids

Many Americans benefit from the appropriate use of prescription painkillers; but, when abused, they can be as addictive and as dangerous as illegal drugs. Pain is a complex topic, and adequate control of pain may enhance the quality of life for people who suffer from chronic pain. Short-term opioid use under a provider's cautious supervision rarely leads to addiction or dependence. However, when used long-term, opioids may lead to drug abuse and physical dependence and/or addiction.

Opioids [51]				
Generic name	**Brand names**	**Street names**	**Common forms**	**Common ways taken**
Codeine	Various names.	Captain Cody, Cody, Lean, Schoolboy, Sizzurp, Purple Drank *With glutethimide:* Doors & Fours, Loads, Pancakes and Syrup.	Tablet, capsule, liquid.	Injected, swallowed (often mixed with soda and flavorings).
Fentanyl	Actiq, Duragesic, Sublimaze.	Apache, China Girl, China White, Dance Fever, Friend, Goodfella, Jackpot, Murder 8, Tango and Cash, TNT.	Lozenge, sublingual Tablet, film, buccal tablet.	Injected, smoked, snorted.
Hydrocodone or Dihydrocodeinone	Lorcet, Lortab, Norco, Vicodin.	Vike, Watson-387.	Capsule, liquid, tablet.	Swallowed, snorted, injected.
Hydromorphone	Diladid, Exalgo.	D, Dillies, Footballs, Juice, Smack.	Liquid, suppository.	Injected, rectal.
Meperidine	Demerol.	Demmies, Pain Killer.	Tablet, liquid.	Swallowed, snorted, injected.
Methadone	Dolophine, Methadose.	Amidone, Fizzies *With MDMA*: Chocolate Chip Cookies.	Tablet, dispersible tablet, liquid.	Swallowed, injected.
Morphine	Duramorph, Roxanol.	M, Miss Emma, Monkey, White Stuff.	Tablet, liquid, capsule, suppository.	Injected, swallowed, smoked.
Oxycodone	OxyContin, Percodan, Percocet, OxyFast, Roxicodone.	O.C., Oxycet, Oxycotton, Oxy, Hillbilly Heroin, Percs.	Capsule, liquid, tablet.	Swallowed, snorted, injected.
Oxymorphone	Opana.	Biscuits, Blue Heaven, Blues, Mrs. O, O Bomb, Octagons, Stop Signs.	Tablet.	Swallowed, snorted, injected.

Opioids can be life threatening in an overdose. The threat is enhanced when the opioids are taken with alcohol or with central nervous system depressants. Because the drugs have a slight delay in the feelings the individual is wanting, additional substances may often be taken with the hopes of enhancing the feelings of euphoria. If the dosage and mixture of systems is significant, the individual may slip into a drug overdose situation with central nervous system depression and other life threatening signs.

Clinical signs of abuse or overdose		
Short term - Feelings of euphoria. Pain relief. Drowsiness. Nausea. Constipation.	**Longer term or high dose -** Respiratory depression. Central nervous system depression.	Loss of consciousness. Cardiac dysrhythmias. Death.

Nursing consideration: Older adults are at a higher risk for unintentional misuse or abuse because many have multiple prescriptions. This increases the risk of drug-to-drug interactions. Also, many older adults are treated with opioids for chronic pain. Careful monitoring is critical.

Nursing considerations: Individuals trying to suddenly withdraw from chronic opioid drug use should be carefully monitored for restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with shivering, and leg movements[52].

Benzodiazepines and barbiturates: Central nervous system depressants

Benzodiazepines depress the central nervous system (CNS). Millions in the United States use benzodiazepines to treat anxiety and sleep disorders, including insomnia.

Barbiturates are commonly used for anesthesia, and are prescribed to treat seizures and occasional insomnia or anxiety.

Central nervous system depressants[53]				
Generic name	**Brand names**	**Street names**	**Common forms**	**Common ways taken**
Benzodiazepines				
Alprazolam	Xanax	Candy, Downers, Sleeping Pills, Tranks.	Pill, capsule, liquid.	Swallowed, injected.
Chlorodiazepoxide	Limbitrol			
Diazepam	Valium			
Lorazepam	Ativan			
Triazolam	Halcion			
Barbiturates				
Pentobarbital	Nembutal	Barbs, Phennies, Red Birds, Reds, Tooies, Yellow Jackets, Yellows.	Pill, capsule, liquid.	Swallowed, injected.
Phenobarbital	Luminal			
Sleep medications				
Eszopiclone	Lunesta	Forget-me Pill, Mexican Valium, R2, Roche, Roofies, Roofinol, Rope, Rophies.	Pill, capsule, liquid.	Swallowed, injected.
Zalepion	Sonata			
Zolpidem	Ambien			

Taking CNS depressants for a few days to a few weeks may help to calm nerves or enhance sleep. After a while, however, larger doses may be needed to get the same calm or sleepy feeling. Like opioids, the individual may overdose if the substances are taken in large amounts and mixed with opioids, other substances and/or alcohol.

Clinical signs of abuse or overdose		
Short term - Decreased alertness. Seizure.	Respiratory depression. Decreased heart rate.	**Long term -**

Patients addicted to barbiturates or benzodiazepines should not attempt to stop taking the drugs on their own. Withdrawal from these drugs can be problematic and in the case of certain CNS depressants, are potentially life-threatening. Patients addicted to these medications should undergo medically supervised detoxification because the treatment dose must be gradually tapered off. Inpatient or outpatient counseling can help the individual during this process. Cognitive-behavioral therapy has also successfully been used to help individuals adapt to the removal from benzodiazepine use[54].

Stimulants

The uses of stimulants have often been used for weight loss. Other substances, such as methylphenidate, are used therapeutically for attention deficit disorders and narcolepsy.

Stimulants impact the body with a fast jumpstart, causing a great increase in alertness, energy and attention to detail[55].

Stimulants [56]				
Generic name	**Brand names**	**Street names**	**Common forms**	**Common ways taken**
Amphetamine	Adderall, Benzedrine.	Bennies, Black Beauties, Crosses, Hearts, LA Turnaround, Speed, Truck Drivers, Uppers.	Tablet, capsule.	Swallowed, snorted, smoked, injected.
Methylphenidate	Concerta, Daytrana, Methylin, Ritalin.	IF, MPH, R-ball, Skippy, The Smart Drug, Vitamin R.	Liquid, tablet, chewable tablet, capsule.	Swallowed, snorted, smoked, injected, chewed.

Clinical signs of abuse or overdose		
Short term - Increased alertness. Energy. Increased body temperature. Increased blood sugar. Tachycardia.	Hypertension. Constriction of blood vessels. Irregular heartbeat.	**Long term – high doses** Anger. Seizure. Cardiovascular system failure. Psychosis. Paranoia.

Treatment of an addiction to prescription stimulants is based on behavioral therapies used in treating cocaine and methamphetamine addiction. At this time, there are no medications that are FDA-approved for treating stimulant addiction[57].

EMERGING SUBSTANCES OF ABUSE

New drug and drug use trends often occur without notice. The National Drug Early Warning System (NDEWS) watches and publishes trends as soon as they are identified[58].

The following substances are considered new drug abuse threats. If these are identified in your community, they should be reported to local, state, and national authorities.

Emerging drug abuse substances [59]	
Fentanyl	There is a recent surge in overdose deaths related to fentanyl, an opioid 30 to 50 times more potent than heroin. There have been some reported cases when the individual thought they were taking heroin; when in fact the substance was fentanyl. An overdose of fentanyl can be reversed with naloxone (Narcan) (July 2015).
Synthetic Cannabinoids (No More Mr. Nice Guy)	Synthetic cannabinoids are chemically related to THC, the active ingredient in marijuana. It is sometimes called "synthetic marijuana" or "legal marijuana," but the effects can be considerably more powerful and more dangerous than marijuana. Users can experience anxiety and agitation, nausea and vomiting, high blood pressure, shaking and seizures, hallucinations and paranoia, and they may act violently (May 2015).
Flakka (alpha-PVP)	Alpha-PVP is chemically similar to other synthetic cathinone drugs popularly called "bath salts." It takes the form of a white or pink, foul-smelling crystal that can be eaten, snorted, injected, or vaporized in an e-cigarette or similar device. Vaporizing, which administers the drug very quickly into the bloodstream, may make it particularly easy to overdose. Like other drugs of this type, alpha-PVP can cause a condition called "excited delirium" that involves hyper stimulation, paranoia, and hallucinations and can lead to violent aggression and self-injury. The drug has been linked to deaths by suicide, as well as heart attack. It can also dangerously raise body temperature and lead to kidney damage or kidney failure (April 2015).
New Synthetic Cannabinoids – Cloud 9, Relax, Crown, or Mojo, Spice, K2, Scooby Snax	New designer synthetic pot. Despite the similarity on the molecular level to marijuana, these drugs are much more dangerous than marijuana and have resulted in very serious health consequences that include overdose and aggressive or suicidal behavior in users. "Cloud 9," "Relax," or "Crown," is sold as a liquid in eyedropper bottles, and is often used with vaporizing devices: e-cigarettes or "hookah pens." Use of these drugs can cause hallucinations, aggressive behavior, racing heartbeat, drowsiness, and vomiting. Mojo, Spice, K2, and Scooby Snax can each cause severe agitation, anxiety, and paranoia; raised heartbeat and blood pressure; nausea and vomiting; muscle spasms, seizures, and tremors; intense hallucinations and psychotic episodes, including suicidal fixations and other harmful thoughts (November 2014).
Caffeine Powder	Bulk bags of pure caffeine powder are readily available online. These products may be attractive to young people looking for added caffeine stimulation, or for help losing weight. But they are extremely dangerous: Just a teaspoon of pure caffeine powder is equivalent to about 25 cups of coffee—a lethal amount. In addition to death, severe caffeine overdose can cause fast and erratic heartbeat, seizures, vomiting, diarrhea, and disorientation—symptoms that are much more extreme than those from drinking too much coffee or tea, or consuming too many sodas or energy drinks (July 2014).
e-Cigarettes	E-cigarettes are increasingly popular battery-operated devices marketed as a safer alternative to smoking conventional cigarettes. They produce a flavored nicotine aerosol that looks and feels like tobacco smoke, but without the tar or other chemicals produced by burning tobacco leaves. However, while e-cigarettes do not produce tobacco smoke, it is still unclear how safe they are. They still deliver nicotine, which is a highly addictive drug. Also, vapor from some e-cigarette products has been found to contain known carcinogens and toxic chemicals (November 2013).
N-bomb	"N-bomb" refers to any of three closely related synthetic hallucinogens: 25I-NBOMe, 25C-NBOMe, and 25B-NBOMe. They are being sold as legal substitutes for LSD or mescaline. Also called "legal acid," "smiles," or "25I," they are generally found as powders, liquids, soaked into blotter paper (like LSD) or laced within something edible. These chemicals act on serotonin receptors in the brain, like other hallucinogens, but they are considerably more powerful - even more powerful than LSD. Extremely small amounts can cause seizures, heart attack or arrested breathing, and death (September 2013).
"Syrup," "Purple Drank," "Sizzurp" Lean"	Refers to drinking prescription-strength cough syrup containing codeine and promethazine, mixed with soda or alcohol. Codeine and other opioids present a high risk of fatal overdose due to their effect of depressing the central nervous system, which can slow or stop the heart and lungs. Mixing with alcohol greatly increases this risk (May 2013).

DRUG ABUSE NURSING ASSESSMENT AND CARE

The nursing assessment related to drug abuse may take one of two paths:
Path 1 focuses on identification, screening, and possible prevention.
Path 2 focuses on the individual who may seek health care after having consumed one or more substances. This may include either the intentional or unintentional consumption of a substance or medication.
The assessment and care depends completely on the path and situation.

Path one – identification and screening

The "CAGE" assessment is a standardized screening tool that helps to identify individuals at risk for substance or drug abuse. This simple four question-screening tool is a reliable method to identify individuals at risk. If any question is answered "yes," the individual should be considered at risk.

The CAGE questionnaire [60]:

- Have you ever felt you ought to **C**ut down on your drug use (or drinking)?
- Have people **A**nnoyed you by criticizing your drug use (or drinking)?
- Have you ever felt bad or **G**uilty about your drug use (or drinking)?
- Have you ever used drugs (or had a drink) first thing in the morning (**E**ye opener) to steady your nerves to get the day started (or get rid of a hangover)?

Path two - brief assessment, identification, and care

Health care providers are often surprised to have an individual suddenly appear who is having an acute drug-related crisis. Regardless of whether the substance is an illegal street drug or a prescription medication, the initial assessment and care is the same. As the health care provider, it is important to gather as much information as possible, keep the patient and staff safe, and provide intervention and supportive care, to ensure that the patient receives the help necessary to deal with the drug problem.

Initial observation and history

- Who brought the individual in for care?
- What is the story that is being shared? Time sequence of substance or drug ingestion?
- Were designer drugs involved? Get as many details as possible.
- Were substances or drugs mixed?
- Do they have any of the substance, drug, or evidence of the substance? Get sample if possible.
- Is the patient awake/alert? Has reduced consciousness? Is the individual acting out or violent?
- Overall observation of person, place, and time?

It is vitally important to determine what substance or substances may have been consumed. The individual often may have taken more than one substance type or mixed the substances with alcohol. If street drugs were consumed, they might have been tainted with unknown chemicals that may create a totally unanticipated patient response.

Brief assessment

- Conscious?
- A-B-C assessment?
- Vital signs? Stable or unstable?
- Track marks or skin lesions?
- Ensure safety for individual, family, and staff.

Laboratory tests

Secure toxicology and other tests as indicated.

Toxicology and other laboratory tests are critical to understand the substance, the amount in the individual's system, as well as impact to other vital body systems. While not all substances can be immediately identified, it is helpful to understand how long a substance remains in the individual's system.

Clinical care

- Safety for patient, family, and staff is the first priority.
- Provide supportive care, as indicated.
- Notify law enforcement or safety officers as appropriate.
- Where appropriate, help to ensure that individual has help needed long-term.

Resources and education

While providing education during an acute care situation may not be appropriate, it is important to know the resources available in the local community to help those who have addiction or abuse problems. Nationally, the Substance Abuse and Mental Health Services Administration (SAMHSA) provides a treatment location service that offers behavioral health help in the individual's local community. The agency national helpline is 1-800-662-HELP. The agency's primary website is http://www.samhsa.gov/find-help. From this location, there is the capability to enter a local address, city or zip code to find local or state help. This site identified 212 treatment locations in West Virginia.

During an encounter where drug abuse is identified and the individual is ready for help, the most important part the health provider can play is to ensure that multidisciplinary team is involved and that the individual has a concrete plan and a next step for evaluation and care. It is not helpful to simply provide a pamphlet, a phone number, or list a website.

KEY RECOMMENDATION

Andrea Gielen, ScD, Director of the Johns Hopkins Center for Injury Research and Policy states, "We must use the best lessons we know from other public health and injury prevention success stories to work in partnership with clinical care, law enforcement, the business community, community-based organizations, and other partners to work together to curb this crisis." Toward this end, it is recommended that each health care professional:

- Educates the public to understand the risks of prescription drug use to avoid misuse in the first place;
- Ensures responsible prescribing practices, including increasing education of healthcare providers and prescribers to better understand how medications can be misused and to identify patients in need of treatment;
- Increases understanding about safe storage of medication and proper disposal of unused medications, such as through "take back" programs;
- Makes sure patients do receive the pain and other medications they need, and that patients have access to safe and effective drugs;
- Improves, modernizes and fully-funds Prescription Drug Monitoring Programs, so that they are real-time, interstate and incorporated into Electronic Health Records, to quickly identify patients in need of treatment and connect them with appropriate care, and also to identify "doctor shoppers" and problem prescribers;
- Makes rescue medications more widely available by increasing access for at-risk individuals to naloxone and provides immunity for individuals and others seeking help. Expands access to and availability of effective treatment options as a key component of any strategy to combat prescription drug abuse[61].

Drug abuse in America is a public health problem of proportion. It is the responsibility of each health care professional to know the facts, know the laws, understand screening, provide the best care, and take an active role in preventing, reporting, and caring for individuals who need help kicking the problem.

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HOOKED: DRUG ABUSE IN AMERICA

Self Evaluation Exercises

Select the best answer for each question and check your answers at the bottom of the page.
You do not need to submit this self-evaluation exercise with your participant sheet.

1. There is a drug-related death in the United States every:
   a. Day.
   b. Hour.
   c. 15 minutes.
   d. 5 minutes.

2. Bath salts consist of a synthetic powder that is sold legally online.
   a. True.
   b. False.

3. According to the National Survey on Drug Use and Health, in 2010 it was estimated that there were ____ cocaine users age 12 years or older.
   a. 10,000.
   b. 50,000.
   c. 1 million.
   d. 1.5 million.

4. Methadone has been used for over 25 years to treat heroin addiction or overdose. Most recently, a newly approved medication has been approved to treat heroin overdose rescue medication. This drug that can be life saving is:
   a. Epinephrine.
   b. Cortisone.
   c. Naloxone.
   d. High dose Benadryl.

5. What street substance is most likely to cause the following clinical signs that include rapid mood swings, distortion of ability to think rationally, and visual hallucinations?
   a. Heroin.
   b. LSD.
   c. MDNA.
   d. Methamphetamine.

6. In 2012, there were ____ Americans 12 years and older who reported using marijuana in the past month.
   a. 9.3 million.
   b. 12.7 million.
   c. 18.9 million.
   d. 26.2 million.

7. Xanax is a type of:
   a. Sleeping medication.
   b. Benzodiazepine.
   c. Barbiturate.
   d. Opioid.

8. Caffeine powder is an emerging new substance that is openly sold online. This product is attractive to young people wanting an inexpensive stimulant. If the caffeine power is pure, as little as ___ may be a lethal dose.
   a. 1 teaspoon.
   b. 1 tablespoon.
   c. ¼ cup.
   d. 1/3 cup.

9. If a patient screens positive on the "CAGE" Questionnaire, it is most important that the nurse:
   a. Contacts law enforcement.
   b. Provides the patient with local phone numbers and pamphlets.
   c. Notify the appropriate support team and ensure the patient is connected for continued care.
   d. Admit the patient to the hospital until further assessments and interventions can be established.

10. Older adults may be at higher risk for drug abuse because:
    a. Their diminished eyesight may result in taking the incorrect medication.
    b. If they take multiple medications, there may be increased drug-to-drug interactions leading to adverse effects.
    c. Increased use of opioids for chronic pain.
    d. Mental confusion with aging.

Answers:	1.C 2.A 3.D 4.C 5.B 6.C 7.B 8.A 9.C 1.B

Chapter 4: Patient Safety: Implementation of National Safety Standards for Nurses

4 Contact Hours

Release Date: 2/15/2016 **Expiration Date: 2/15/2019**

Audience

National patient safety standards are a core competency for nursing practice. This course is for all nurses who are responsible for providing patient care.

Purpose statement

Safety comes first in patient care and in health care environments. This course presents the latest National Patient Safety goals as well as strategies for nursing.

Learning objectives

- Implement patient care designed to achieve National Patient Safety Goals.
- Describe how to prevent "never-ever" events.
- Explain how to reduce the occurrence of non-reimbursable hospital-acquired conditions.

How to receive credit

- Read the entire course online or in print which requires a 4-hour commitment of time.
- Depending on your state requirements you will asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- Provide required personal information and payment information.
- Complete the mandatory Self-Assessment and Course Evaluation.
- Print your Certificate of Completion.

Accreditations and approvals

Elite is accredited as a provider of continuing education by the American Nurses Credentialing Center's Commission on Accreditation.

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Faculty

Adrianne E. Avillion, D.Ed., RN

Dr. Avillion is an accomplished nurse educator and published healthcare education author. Dr. Avillion earned her doctoral degree in Adult Education and her M. S. from Penn State University, along with a BSN from Bloomsburg University. Adrianne has served in various nursing roles over her career in both leadership roles and as a bedside clinical nurse. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development. She currently owns and is the CEO of Strategic Nursing Professional Development, a business that specializes in continuing education for healthcare professionals and consulting services in nursing professional development. Additionally, she writes on safety issues in her role as editor and writer of a newsletter for The National Association of Physicians Nurses as well as incorporates safety education as part of continuing education tutorials for various continuing education companies

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Introduction

Safety first! There is not a practicing healthcare professional who would not agree that "safety first" is (or should be) the guiding principle of patient care services. Given that, why are medical errors the third leading cause of death in the United States? Why, according to recent research, do nearly 440,000 Americans die annually from preventable hospital errors [1]?

> ***EBP alert!*** Research shows that an alarming number of healthcare consumers die from preventable medical errors. It is imperative that nurses and their healthcare colleagues comprehend safety mandates and safety research findings and then implement the recommendations into all aspects of their practice [1,2].

Clearly, it is essential for all healthcare providers to improve the safety of the environment in which patient care is delivered. Accrediting bodies and national organizations such as The Joint Commission and the Institute of Medicine have conducted research, published reports, and issued mandates regarding safety measures that should, and must, be implemented. But, how much is the average healthcare professional aware of such research and the rationale behind mandates and recommendations?

The purpose of this educational program is to discuss three critical topics related to essential safety standards:

- National Patient Safety Goals.
- "Never ever events."
- Centers for Medicare and Medicaid Services conditions that are not reimbursable if not present upon admission.

The educational program will also explain how nurses can implement the recommendations and mandates of these standards to improve patient safety as well as the quality and appropriateness of their practice.

National Patient Safety Goals

It is a typically hectic evening at one of the Hazelmoor Community Hospital medical units. A notice has been shared and posted that concerns the latest National Patient Safety Goals. Nurses are requested to familiarize themselves with these goals and how the hospital plans to achieve them. The nurses know that they must "eventually" make time to review this information, but that time is not tonight as it is just too busy, and patient care comes first. Nor is there time the next evening. Nor the next. Time goes by, and as one nurse puts it, "Our patients come first. We can't stop to read a bunch of stuff when we should be taking care of patients. That's why safety is compromised. All of this paper work and theory! The people that write these things should try being out here actually taking care of patients. Then maybe they'd see what it's like in the real world!"

Does the preceding situation sound familiar? Have you heard colleagues make similar statements? Have you made such comments yourself? You are not alone. Many healthcare professionals do not have a clear understanding of the National Patient Safety Goals, or how achieving these goals will improve patient care. It is not enough to distribute facts about these goals and what should be done to achieve them. Leaders of healthcare organizations have an obligation to explain how these goals were identified, how each organization developed a plan for achieving these goals, and most importantly, how the goal achievement will improve patient care.

History of the National Patient Safety Goals

The National Patient Safety Goals (NPSGs) are a set of standards which address the highest-priority patient safety issues that The Joint Commission promotes and utilizes to implement major changes in patient safety [3]. The NPSG program was established in 2002 and the first set of NPSGs was effective on January 1, 2003. The purpose of establishing such goals was to assist accredited organizations in addressing specific areas of concern regarding patient safety [4].

How are the NPSGs developed, and who develops them? According to The Joint Commission website, a panel of "widely recognized patient safety experts advise The Joint Commission on the development and updating of NPSGs" [4]. This panel is called the Patient Safety Advisory Group and is comprised of nurses, physicians, pharmacists, risk managers, clinical engineers, and other professionals who have hands-on experience in addressing patient safety issues in a wide variety of healthcare settings.

The Patient Safety Advisory Group works with staff from The Joint Commission to identify emerging patient safety issues, and advises The Joint Commission on how to address those issues in NPSGs, Sentinel Event Alerts, standards and survey processes, performance measures, educational materials, and/or in Center for Transforming Healthcare projects [4].

Large amounts of data are generated by the collaboration of The Joint Commission and the Patient Safety Advisory Group. How does The Joint Commission determine patient safety issue priorities for NPSGs when faced with so much information? Input is solicited from practitioners, provider organizations, purchasers, consumer groups, and other stakeholders. Based on this input, The Joint Commission identifies priority patient safety issues, and how to best address them. The Joint Commission also determines if an NPSG is applicable to a specific accreditation program. If so, the goal is adapted to be program-specific [4].

Nursing consideration: Nurses may be concerned that the people who have input into the development of safety priorities lack current experience in patient care delivery. One way to alleviate these concerns, and to encourage staff nurses to become more involved in implementing NPSG recommendations is to encourage them to become more involved with The Joint Commission Perhaps they may even become a member of the Patient Safety Advisory Group or become active in another Joint Commission process. For more information about the Patient Safety Advisory Group, contact the Executive Vice-President and Chief Medical Officer of The Joint Commission at +1 (630) 792-5350, or access The Joint Commission website for more information (http://www.jointcommission.org).

NPSGs alert! What exactly are the responsibilities of the Patient Safety Advisory Group? As stated directly on the website, the group [5]:

- Annually recommends program-specific NPSGs for adoption by The Joint Commission Board of Commissions.
- Reviews draft patient safety recommendations for potential publication in The Joint Commission's periodic Sentinel Event Alert advisory, and advises Joint Commission staff as to the evidence for, and face validity of these recommendations as well as their practically and cost of implementation.
- Recommends potential future topics for Sentinel Event Alert.
- Assesses and facilitates learning initiatives about sentinel events, Sentinel Event Alerts, and the National Patient Safety Goals, including the implementation and effectiveness of the National Patient Safety Goals. Learning initiatives include: on-line tools such as Frequently Asked Questions and PowerPoint presentation;, tool kits to facilitate implementation of the National Patient Safety Goals; and education seminars and workshops.

Current national safety goal priorities

Samantha is a registered nurse who was recently appointed as a member of her hospital's Safety Advisory Council. She is preparing to attend her first meeting. The focus of the meeting will be a review of the newly published National Patient Safety Goals (NPSGs). Samantha is a bit uneasy about this focus as her role as a staff nurse has been to implement actions mandated by the hospital to comply with the goals. Now she is going to be in a position to help design actions that she and her colleagues must implement. This is a major responsibility, and Samantha is both excited and apprehensive about her new accountability as a leader.

Samantha and other stakeholders must not only follow organizational mandates in regards to compliance with NPSGs, but must become active participants in the decision-making process of how these goals can be achieved. Since their establishment in 2002, the NPSGs have evolved to become one of the most important methods of promoting and enforcing major safety changes in healthcare organizations. Recent changes, in addition to existing goals, have concentrated on preventing hospital-acquired infections and medication errors, promoting surgical safety, ensuring correct patient identification, enhancing communication between staff, and identifying patients at risk for suicide. The most recent 2016 goal is to reduce the harm associated with clinical alarm systems [3].

Before discussing the implications of the newest goal related to the safety of hospital alarm systems, we must review the other goals highlighted in the 2016 NSPGs. Each goal was developed to evaluate the safety and the quality of care provided for patients in the different care arenas which include hospitals, home-care, ambulatory care, behavioral health, critical-access hospitals, laboratories, long-term care, nursing-care centers, and office-based surgery. To access information about each 2016 NPSGs, go to this website link: http://www.jointcommission.org/standards_information/npsgs.aspx. For the purpose of this educational program, we will focus on the hospital, ambulatory care, and home-care goals.

2016 Hospital National Patient Safety Goals

The following summaries are based on information taken from The Joint Commission web site's easy-to-read version of the goals [6]. The easy-to-read version is intended for the general public as well. For the exact language of the goals, access: http://www.jointcommission.org.

Identify patients correctly.

- Use at least two ways to identify patients. For example, use the patient's name and date of birth. This will make sure that each patient gets the correct medications and treatments.
- Make sure that the correct patient gets the correct blood when receiving a blood transfusion.

Nursing consideration: Nurses must always be sure to identify patients in at least two ways prior to administering medications and blood products. Nurses may be tempted to ignore this simple safety mandate, especially if they know the patient well. But, ignoring the mandate even once makes it easier to ignore it again, and then again. Nurses also serve as role models for colleagues bound by the same mandate. Nurses must always use at least two methods to identify each patient [6].

Improve staff communication.

- Get important test results to the right staff person on time.

Nursing consideration: Communication is essential to reduce errors. Research shows that appropriate communication enhances patient safety [7]. Research shows that poor communication can contribute to medical errors while good communication can help to reduce their occurrence [7]. However, improving staff communication is not limited to just getting test results to the right person in a timely manner. Communication involves sharing information as a team about the patient's status and progress toward desired outcomes.

Use medicines safely.

- Before a procedure, label medicines that are not labeled, for example, medicines in syringes, cups and basins. Do this in the area where medicines and supplies are set up.
- Take extra care with patients who take medications to thin their blood.
- Record and pass along correct information about a patient's medicines. Find out what medicines the patient is taking. Compare those medicines to new medicines given to the patient. Make sure the patient knows which medicines to take when they are at home. Tell the patient it is important to bring their up-to-date list of medicines every time they visit a doctor.

Nursing consideration: In addition to complying with the preceding directives, nurses must ensure medication lists are reconciled each time a patient is transferred from or accepted from another healthcare facility or patient care area. Educate patients and families how to safely take their medications at home. Have them demonstrate safe self-medication practices. Do not ask them simple yes and no questions such as "Do you know what side effects your medication can cause?" Instead, ask them "Tell me what side effects your medicine can cause and what you should do if these happen." Be sure to assess their knowledge in a practical way.

Use alarms safely.

- Make improvements to ensure that alarms on medical equipment are heard and responded to on time.

This is a major addition to the 2016 NPSGs. It will be discussed in detail later in this program.

Prevent infection.

- Use the hand cleaning guidelines from the Centers for Disease Control and Prevention (CDC) or the World Health Organization (WHO). Set goals for improving hand cleaning, and use these goals to improve hand cleaning.
- Use proven guidelines to prevent infections that are difficult to treat.
- Use proven guidelines to prevent blood infection from central lines.
- Use proven guidelines to prevent infection after surgery.
- Use proven guidelines to prevent infections of the urinary tract that are caused by catheters.

EBP alert! Research shows that proper hand washing is the most effective way to prevent the spread of infections in hospitals [8]. Nurses have an obligation to share research findings that show that this and other infection control interventions really do help to prevent infection. Adults are more likely to apply knowledge in the work setting if they have evidence that specific interventions actually "work."

Identify patient safety risks.

- Find out which patients are likely to try to commit suicide.

Nursing consideration: The prevalence of mental illness makes it almost a certainty that nurses, no matter where they practice, will care for persons who are currently experiencing a mental illness. It is estimated that 25 percent of all adults in the United States will develop at least one mental illness during their lifetime [9]. Nurses must be aware of the signs and symptoms as well as information from the patient's personal and family history that indicate a patient is at risk for suicidal behavior.

Prevent mistakes in surgery.

- Make sure that the correct surgery is conducted on the correct patient, and at the correct location on the patient's body.
- Mark the correct place on the patient's body where the surgery is to be done.
- Pause before the surgery to make sure that a mistake is not being made.

Nursing consideration: It is essential that nurses be alert to the possibility of any potential errors in the surgical setting and act swiftly to prevent their occurrence.

2016 Home Care National Patient Safety Goals

This summary is taken directly from The Joint Commission's easy-to-read version [10].

Identify patients correctly.

- Use at least two ways to identify patients. For example, use the patient's name and date of birth. This ensures that each patient gets the correct medicine and treatment.

Use medicines safely.

- Record and pass along correct information about a patient's medicines. Find out what medicines the patient is taking. Compare those medicines to new medicines given to the patient. Make sure the patient knows which medicines to take when they are at home. Tell the patient it is important to bring their up-to-date list of medicines every time they visit a doctor.

Nursing consideration: Nurses should have patients or families demonstrate safe self-medication. It is not enough to simply give them information about their medications and ask "yes" or "no" questions such as, "Do you understand how to take your medicine?" Instead have them explain what side effects might occur and what to do about them, or have them actually demonstrate how to administer a specific medication.

Prevent infection.

- Use the hand cleaning guidelines from the Centers for Disease Control and Prevention (CDC) or the World Health Organization (WHO). Set goals for improving hand cleaning. Use these goals to improve hand washing.

Nursing consideration: Nurses must teach patients and friends appropriate hand washing techniques. This includes when and how to implement the techniques.

Prevent patients from falling.

- Find out which patients are most likely to fall. For example, is the patient taking any medicines that might make them weak, dizzy or sleepy? Take action to prevent falls for these patients.

Nursing consideration: Nurses must also be alert to other safety hazards or issues in the patient home that contribute to falls such as scatter rugs, highly polished floors, wet surfaces and mobility difficulties.

Identify patient safety risks.

- Find out if there are any risks for patients who receive oxygen. For example, are there fireplaces in the patient's home?

Nursing consideration: Nurses must teach patients and families how to avoid hazards associated with oxygen therapy. Increasing the awareness of contraindications when a family member is on oxygen therapy, such as smoking, must be communicated to persons visiting the home where oxygen is in use.

2016 Ambulatory Care National Patient Safety Goals

The following summary is taken from The Joint Commission's easy-to-read version [11].

The 2016 goals for Ambulatory care are similar to those of hospitals and include:

- Identify patients correctly.
- Use medicines safely.
- Prevent infection(s).
- Prevention of mistakes in surgery.

Ben is an experienced cardiovascular care nurse. He is working on the "step-down" cardiac care unit, and has been one of the leaders on the unit for many years. A new nursing employee is touring the unit with the nursing director as part of her hospital orientation. She comments, "Isn't anyone worried about all of the alarms going off? Nobody seems to be concerned." Ben explains that, "Most alarms are actually false. You get to know what is 'real' and what isn't. For instance, we have one man whose alarm goes off all the time because he's a really restless sleeper." At that moment the code for cardiac arrest is heard coming from the room of the man who is a "restless" sleeper. His cardiac monitor alarm had been going off for several minutes. Unfortunately, the alarm had been ignored and now the patient is in cardiac arrest.

Alarm fatigue occurs when the daily number of alarm signals, such as bells, beeps, and tones from medical devices (especially physiological devices), overwhelms healthcare personnel with information. This can actually desensitize healthcare personnel to the alarms themselves. Nurses and other healthcare professionals may turn alarm volumes down in an effort to control noise levels. Turning down the volume may create an unsafe environment for the patient. After a period of time, clinicians may not respond to alarms simply because the alarms have become part of the "normal" background noise of a unit, and no longer trigger concern [12].

EBP alert! Research shows that 80 to 99 percent of alarms generated by devices such as ventilators, blood pressure monitors, and electrocardiograms are false and/or do not actually need any clinical intervention [13]. Clinicians are becoming desensitized to the sounds of alarms, and experiencing alarm fatigue. Nurses and other healthcare professionals must work with each other to make eliminating alarm fatigue a priority. This can be accomplished by avoiding unnecessary monitoring, and educating clinicians to the full potential of devices.

The extent to which alarm fatigue has adversely affected patients is not precisely known. The United States Food and Drug Administration's Manufacturer and User Facility Device Experience Database listed 566 alarm-related deaths between January 2005 and June 2010. This number is believed to under-represent the actual cases [12]. From 2009 to 2012, The Joint Commission reported 98 alarm-related events, 80 of which resulted in death, 13 resulted in permanent loss of function, and five resulted in unexpected additional care or extended stays. Since sentinel event reporting to The Joint Commission is voluntary, some experts believe that this number represents less than ten percent of such adverse occurrences [13].

Healthcare safety experts agree that alarm fatigue is becoming worse, and the consequences of this are perilous [4,12,13]. In June 2013, The Joint Commission approved a new NPSG on clinical alarm safety for hospitals and critical access hospitals. This goal was implemented in two phases. Phase one began on January 1, 2014 when hospitals were required to establish alarm safety as an organizational priority, and to identify the most important alarms to manage based on their internal situations. Phase two began on January 1, 2016 and hospitals are expected to develop and implement specific components of policies and procedures, and to educate staff in the organization of alarm system management [4].

The Joint Commission points out that "clinical alarm systems are intended to alert caregivers of potential patient problems, but if they are not properly managed, they can compromise patient safety" [14]. The Joint Commission also notes that the problem of alarm safety is multifaceted. Alarms may be difficult to detect. There may be numerous alarm signals that tend to desensitize staff and contribute to persons missing or even ignoring alarm sounds. Some staff members may even turn off alarms to decrease the amount of "noise" on a particular unit [14]. Desensitization to alarms may have serious or even fatal consequences for patients.

In addition to The Joint Commission, several organizations have compiled useful information about safely managing alarm systems. For example, the Advancement of Medical Instrumentation (AAMI) founded in 1967, is a nonprofit organization with a mission to develop, manage, and use safe and effective healthcare technology. On the organization's website, they are described as the primary source of national and international consensus standards for the medical device industry as well as a source of practical information, support, and guidance for healthcare technology and sterilization professionals [15]. More detailed information can be found at their website: http://www.aami.org/.

Another source of information is the ECRI Institute, an independent nonprofit organization whose mission is "to benefit patient care by promoting the highest standards of safety, quality, and cost-effectiveness in healthcare [2]." The institute accomplishes its mission through research, publishing, education, and consultation. ECRI's goal is to "be the world's most trusted, independent organization providing healthcare information, research, publishing, education, and consultation to organizations and individuals in healthcare" [2].

The ECRI Institute compiles an annual top ten list of patient safety concerns based on its review of patient safety event reports, research requests, and root-cause analyses submitted to the ECRI Institute PSO. This is one of the first patient safety organizations (PSOs) to be federally certified under the provisions of the Patient Safety and Quality Improvement Act (PSQIA). The ECRI Institute's report is not simply a list. It recommends that healthcare organizations use the list of patient safety concerns as a starting point for their patient safety discussions and for establishing their patient safety priorities [2]. The ECRI Institute also provides some free safety resources on its website: https://www.ecri.org/Pages/default.aspx.

Since the ECRI Institute began publishing its list of top health technology hazards in 2007, "alarm hazards have been at or near the top of the list[2]." Although the current Joint Commission emphasis is on alarm fatigue, the ECRI Institute is encouraging healthcare organizations to look beyond alarm fatigue, and investigate the incidence of alarms that do not activate when a patient is in distress. According to the senior project officer at the institute, alarm-related adverse events, whether due to missed alarms or unrecognized alarm conditions, can often be traced to alarm systems that were not configured appropriately. The ECRI Institute recommends that organizations examine their alarm configuration policies and procedures and ensure that they address the full range of factors that can lead to alarm hazards [2].

January 4, 2016: The Safety Council is meeting today, the first "regular" work day of the new year. Members of the council are reviewing their compliance with The Joint Commission's alarm safety goal. Compliance was to have been achieved on January 1, 2016. The Safety Council members are confident that the policies and procedures that have been in place since October 2015 adequately meet Joint Commission standards; however, they are not going to relax. Today, council members are going to review safety data, including adverse events reports, particularly those relating to alarm safety. They have also invited several staff nurses and therapists, who work daily on units that are sometimes bombarded by the constant "noise" of alarms, to attend the meeting. Members want to know how these healthcare professionals have been implementing policies and procedures, and what revision suggestions they may have to further enhance patient safety.

Nursing consideration: The preceding example of a fictional Safety Council demonstrates the importance of constantly reviewing actions undertaken to meet safety standards. It also emphasizes the importance of soliciting feedback from practitioners who work with these identified safety dilemmas every day.

Experts note, that in order to adequately address patient safety and clinical workflow, an overall plan must be developed to manage clinical interruptions. This plan must include [16]:

- Addressing alarms (e.g. physiological monitors).
- Responding to alerts (e.g. critical lab notification).
- Communicating with members of the healthcare team.

Nursing consideration: In order to effectively address the problem of alarm safety, nurses should also know what types of adverse events have occurred that are linked to problems with alarms.

What types of alarm-related adverse events have been reported? According to information from the U. S. Food and Drug Administration's Manufacturer and User Facility Device Experience database, falls, delays in treatment, ventilator use, and medication errors were causes of death or common injuries related to alarms [12]. Factors that contributed to these injuries or fatalities included [12]:

- Absent or inadequate alarm systems.
- Improper alarm settings.
- Alarm signals that were not audible in all areas.

Nursing consideration: Key recommendations from The Joint Commission and other safety experts regarding alarm safety include [12]:

- Establish a cross-disciplinary team to address the potential effect of alarm fatigue in all patient care areas.
- Create priorities for the adoption of alarm technology.
- Train clinical care teams on safe alarm management and response in high-risk areas and on the safe use of the devices.

Ronald Wyatt, MD, MHA, medical director of the division of healthcare improvement at The Joint Commission as of November 2015, suggests that healthcare organizations begin their alarm safety efforts by determining the baseline number of device alarms per day. They should then be able to answer the following questions [13]:

- How many alarms required a clinical intervention?
- How many alarms resulted in harm or death?
- What are the organization's current monitor alarm default parameters?
- How can we adjust alarms to indicate actionable alarms?

Nursing consideration: Nurses are all too well aware that many alarms do not actually indicate an actual patient problem or emergency. Some experts recommend that clinicians work with engineers and equipment manufacturers to customize the configuration of alarms and avoid the overlapping of redundant alarms. These changes must demonstrate a means for staff to quickly recognize alarms that need immediate attention. Additionally, some experts say that unnecessary patient monitoring results in excessive "nuisance alarms." Patients should be monitored only when it is clinically necessary. Alarms should be individualized for each patient to make the alarms most effective [13].

It is necessary for all healthcare organizations to have a documented and functional work plan to achieve the alarm National Patient Safety Goal [17], in addition to the specific requirements and explanations outlined in the 2016 Joint Commission National Patent Safety Goals [18]. The Joint Commission Sentinel Event Alert published on April 8, 2013 provides very helpful information to deal with the problem of alarms [19].

The Joint Commission Sentinel Event Alert of April 8, 2013 focuses on medical device alarm safety in hospitals. The Joint Commission's Sentinel Event database includes 98 alarm-related events (80 of which led to fatalities) reported from January 2009, to June 2012. The majority of events, 94 of 98, occurred in hospitals. The majority of the 94 events occurred in telemetry, intensive care, general medicine, and emergency department areas [19].

For the alarm-related events reported to The Joint Commission, major contributing factors included [19]:

- Absent or inadequate alarm system(s).
- Improper alarm settings.
- Alarm signals that were not audible in all areas.
- Alarm signals inappropriately turned off.

EBP alert! Research shows that the preceding factors have contributed to alarm-related problems. All nurses must be familiar with research findings related to this issue and be advocates for the reduction of alarm-related incidents [19].

Additional factors that contributed to alarm-related sentinel events have been identified by The Joint Commission. These include [19]:

- Alarm fatigue.
- Alarm settings that have not been customized to the individual patient or patient population.
- Inadequate staff training or education on the proper equipment use and functioning.
- Inadequate staffing to support or respond to alarm signals.
- Alarm conditions and settings that are not integrated with other medical devices.
- Equipment malfunction and failure.

EBP alert! Research shows that alarm fatigue is the most common contributing factor related to alarm-related sentinel events. Thus, all clinicians must take every possible action to resolve the problem of alarm fatigue [19].

So now we know the major factors that contribute to alarm-related adverse events. What do we do about them? The Joint Commission, the Association for the Advancement of Medical Instrumentation (AAMI), and ECRI Institute have compiled a number of recommendations for the reduction of patient harm related to alarm systems [2,19]:

- Organizational leadership must ensure that there is a process for safe alarm management and response in high-risk areas identified by the organization.
- Prepare an inventory of alarm-equipped medical devices used in high-risk areas and for high-risk clinical conditions. Identify the default alarm settings and the limits for such devices.
- Establish guidelines for alarm settings on alarm-equipped medical devices used in high-risk areas and for high-risk clinical conditions.

Alarm alert! When establishing such guidelines, include identification of situations when alarm signals are not clinically necessary [19].

- Establish guidelines for tailoring alarm settings, and limits for individual patients. These guidelines should address situations when limits can be modified to minimize alarm signals, and the extent to which alarms can be modified to minimize alarm signals.
- Inspect, check, and maintain alarm-equipped devices to provide accurate and appropriate alarm settings, proper operation, and detectability.

Alarm alert! The frequency of inspection, checking, and maintenance activities should be based on established criteria such as manufacturers' recommendations and risk levels [19].

- All members of the clinical care team should receive education and training on the organization's process for safe alarm management and response in high-risk areas, and on the safe use of the alarmed medical devices on which they rely.
- To help in the reduction of nuisance alarm signals, it is recommended that single-use sensors be changed according to manufacturer's recommendations, unless contraindicated.
- Assess the acoustics in the patient environments to determine if critical alarm signals are audible.
- Organizational leadership must re-establish priorities for the adoption of alarm technology. Note that the priority-setting process

should drive technology adoption rather than allowing technology to drive priority-setting.
- Establish a cross (interdisciplinary) team that includes representation from clinicians, clinical engineering, information technology, and risk management to address alarm safety and the potential impact of alarm fatigue in all patient care areas.
- Share information about alarm-related incidents with appropriate organizations such as The Joint Commission, the Food and Drug Administration, AAMI, and the ECRI Institute.

Nursing consideration: All staff nurses should be encouraged to contribute input to the development of safe alarm management. They must also be encouraged to seek membership on appropriate councils that address patient safety and quality.

Never ever events

What does the term "never ever event" mean? First introduced in 2001 by Ken Kizer, MD, former CEO of the National Quality Forum (NQF), the term "never ever event" is used to describe especially shocking medical errors (such as wrong-site surgery) that should never occur. The list of "never ever events" has grown over time to include adverse events that are unambiguous (clearly identifiable and measurable), serious (resulting in death or significant disability), and usually preventable [21].

The current list, revised in 2011, consists of 29 events, grouped into seven categories [21]:
- Surgical events.
- Product or device events.
- Patient protection events.
- Care management events.
- Environmental events.
- Radiologic events.
- Criminal events.

The "never ever" sentinel events most often reported to The Joint Commission are [21]:
- Wrong-site surgery (13.5 percent).
- Suicide (12 percent).
- Op/post-op complications (11 percent).
- Delay in treatment (8.3 percent).
- Medication error (8.2 percent).
- Patient fall (6.3 percent).

Surgical events

Carolyn is a young nurse who is about to begin her "dream job" as a surgical nurse in a prestigious operating theater at a major metropolitan medical center. She has had three years of experience as a staff nurse on a large post-operative surgical unit, and has recently completed her operating room orientation. Today she and her colleagues are dealing with a heavy caseload of outpatient surgeries. The next patient is scheduled to have a partial mastectomy of the right breast. Dr. Marlene Mason, the surgeon scheduled to perform the operation, has a reputation of being a bully and verbally abusive to the nurses working with her. One of Carolyn's colleagues whispers a warning to her, "Be alert today. This is Mason's fourth case today and she's in a horrible mood. One of her patients went downhill during surgery this morning and died soon after the surgery was completed." Dr. Mason enters the operating room and immediately begins complaining about the way the nurses have set up the room. She spots Carolyn and groans, "Don't tell me I have to deal with some new kid that doesn't know what she's doing. I need competent help in here! OK let's get this over with. It's a simple partial mastectomy of the left breast so even you should be able to deal with it." Carolyn is horrified and explains that the procedure is to be performed on the right, not the left, breast. The surgeon becomes agitated and accuses Carolyn of insubordination and orders her from the room. "Get out! Don't you think I know what I'm doing? It's the left breast!" She shoves Carolyn towards the exit as Carolyn's supervisor arrives. The supervisor clarifies that the surgery is to be performed on the right breast and tells the operating room team to take a time out until this situation is under control.

The preceding example is an example of a "never ever event" that is on the verge of occurring. Unfortunately, healthcare professionals are not strangers to circumstances that are out of control. The response to such circumstances is to ALWAYS act in the best interest of the patient. "Carolyn" acts appropriately in the best interest of the patient to avoid the tragic occurrence of a "never ever event."

Surgical "never ever events" include [21]:
- Surgery or other invasive procedure performed on the wrong body part.
- Surgery or other invasive procedure performed on the wrong patient.
- Wrong surgical or another invasive procedure performed on a patient.
- Unintended retention of a foreign object in a patient after a surgery or another procedure.
- Intra-operative or immediate postoperative/post-procedure death in an American Society of Anesthesiologists Class I patient.

Nursing consideration: All nurses, not just those who work in the surgical suite, must be aware of surgical "never ever events." All nurses contribute, to some extent, to the prevention of surgical "never ever events."

Fortunately, wrong-site, wrong-procedure, and wrong-patient surgery (WSPE) events are relatively rare. Research suggests that such errors occur once out of every 112,000 surgical procedures. To put this in perspective of individual hospitals, this statistic means that an individual hospital would only experience one such error every five to ten years. However, this estimate is based on procedures performed in the operating room. If procedures performed in other settings (such as ambulatory surgery centers) were included, the rate of such occurrences may be significantly higher [22].

The Joint Commission has developed a universal protocol for the prevention of WSPEs. The following is a summary of the critical factors of this protocol taken directly from the organization's website. For the complete protocol, access The Joint Commission website: https://www.jointcommission.org [23].

Conduct a pre-procedure verification process.
- Verify the correct procedure, for the correct patient, at the correct site.
- When possible, involve the patient in the verification process.
- Identify items that must be available for the procedure.
- Use a standardized list to verify the availability of items necessary for the procedure.
- Match the items that are to be available in the procedure area to the patient.

Mark the procedure site.
- For spinal procedures, mark the general spinal region on the skin. Special intraoperative imaging techniques may be used to locate and mark the exact vertebral level.
- Mark the site before the procedure is performed.
- If possible, involve the patient in the site marking process.
- The site is to be marked by a licensed independent practitioner who is ultimately accountable for the procedure and will be present when the procedure is performed.
- In limited circumstances, site marking may be delegated to some medical residents, physician assistants, or advanced practice registered nurses.

- Ultimately, the licensed independent practitioner is accountable for the procedure, even when delegating site marking.
- The mark must be unambiguous and used consistently throughout the organization.
- The mark is to be made at or near the procedure site.
- The mark should be sufficiently permanent to be visible after skin preparation and draping.
- Adhesive markers are not the sole means of marking the site.
- For patients who refuse site marking or when it is technically or anatomically impossible or impractical to mark the site, use your organization's written, alternative process to ensure that the correct site is operated on.

Perform a time-out.
Note that the procedure is not to start until all questions or concerns are resolved! Recall that a time-out was called in the sample scenario at the beginning of this section in order to resolve the conflicts that were occurring.

- Conduct a time-out immediately before starting an invasive procedure or making an incision.
- A designated team member starts the time-out.
- The time-out is to be standardized.
- The time-out involves the immediate members of the procedure team including the individual performing the procedure, the anesthesia providers, the circulating nurse, the operating room technician, and other active participants who will be participating in the procedure from the beginning.
- During the time-out, the team members must agree, at a minimum, on the correct patient identity, correct site, and the correct procedure to be conducted.
- When the same patient has two or more procedures, if the person performing the procedure changes, another time-out needs to be performed before starting each new procedure.
- Document the completion of the time-out. The amount and type of documentation is to be determined by the organization.

Surgical event alert! As of October 1, 2015 there were 92 wrong-patient/wrong-site/wrong-procedure errors reported to The Joint Commission for the 2015 calendar year [25].

Author's note: The remainder of the National Quality Forum's Healthcare "never ever events" are summarized in the following sections [21]. Because of, in part, their scope and number, generalized suggestions for achievement are provided.

Product or device events

A senior year nursing student is providing patient care to a woman who is on mechanical ventilation following a severe car wreck. The student notices that the safety inspection tag on the ventilator expired a few weeks ago. She also notices that her patient has developed a low-grade fever. Could there be some type of contamination of the ventilator? The student reports her findings to the staff nurse responsible for the patient who tells her, "Oh, it's not the ventilator. Bio-engineering is so busy that sometimes they can't check every single piece of equipment on time. It's only a couple of weeks late." Unfortunately, the patient's condition deteriorates, and it is determined that the ventilator was harboring bacteria that led to the patient developing pneumonia.

The preceding scenario is an example of a "never ever" that should have been prevented. According to the National Quality Forum's Health Care "Never Events," product or device events include [21]:

- Patient death or serious injury associated with the use of contaminated drugs, devices, or biologics provided by the healthcare setting.
- Patient death or serious injury associated with the use of or function of a device in patient care, in which the device is used for functions other than as intended.
- Patient death or serious injury associated with intravascular air embolism that occurs while being cared for in a healthcare setting.

Nursing consideration: Some suggestions for preventing the preceding never ever events include [21,24]:

- Remain alert to any drugs, devices, or biologics that have expired expiration or inspection dates, and take immediate action to remove/replace/check such items as appropriate.
- Monitor all equipment for any evidence of malfunction, and take immediate action to replace/repair such equipment.
- Monitor connections between catheter connections to prevent air embolism.

Patient protection events

Mr. Burns is 92 years old and is being discharged from the hospital today following treatment for pneumonia. He has had trouble understanding his discharge instructions. He also displays problems with short-term memory and the ability to perform self-hygiene. Mr. Burns is a widower and his only child, a daughter, lives nearly 700 miles away. Should Mr. Burns be discharged to his home? What obligations do his caregivers have to protect his safety after discharge?

This scenario is a good example of a potential patient protection event. Discharging Mr. Burns without further assessment of his ability to function safely at home, or an assessment of his home environment and resources would be negligent. His caregivers have an obligation to ensure his safety. Current assessment indicates Mr. Burns may be unable to make decisions and live safely in his home environment. Patient protection events are among the "never ever events" identified by the National Quality Forum. These include [21]:

- Discharge or release of a patient/resident of any age, who is unable to make decisions, to anyone other than an authorized person.
- Patient death or serious disability associated with patient elopement (disappearance).
- Patient suicide, attempted suicide, or self-harm resulting in serious disability, while being cared for in a health care facility.

Nursing consideration: Nurses must work collaboratively with all members of the healthcare team to develop and implement policies and procedures to ensure that patient protection events do not occur. These policies and procedures should include [21,24]:

- Assessment of a patient's ability to make decisions, including his/her ability to return to a safe environment after discharge.
- Implementing safeguards to avoid patient elopement from the healthcare setting.
- Assessment of a patient's mental health, including assessment for suicidal ideation. Such assessment should be conducted on all patients.

Care management events

The administrative team and members of the quality/risk management council are meeting under emergency circumstances. A patient has died as the result of a serious medication error. Some members of the council want to fire the nurse who made the error and "blame" the

entire tragic adverse event on her. Other council members point out that the error was not just one person's fault, but a combination of events resulting from a flawed medication administration process.

A true organizational culture of safety does not play the "blame game." An error is seldom the "fault" of one person. Persons who are interested in improving patient safety should look to improve the processes and systems that are the foundation of any healthcare organization functions.

"Never ever" care management events include [21]:

- Patient death or serious injury associated with a medication error.
- Patient death or serious injury associated with unsafe administration of blood products.
- Maternal death or serious injury associated with labor or delivery in a low-risk pregnancy while being cared for in a healthcare setting.
- Death or serious injury of a neonate associated with labor or delivery in a low-risk pregnancy.
- Artificial insemination with the wrong donor sperm or wrong egg.
- Patient death or serious injury associated with a fall while being cared for in a healthcare setting.
- Any stage 3, stage 4, or unstageable pressure ulcers acquired after admission/presentation to a healthcare facility.
- Patient death or serious disability resulting from the irretrievable loss of an irreplaceable biological specimen.
- Patient death or serious injury resulting from failure to follow up or communicate laboratory, pathology, and/or radiology test results.

Nursing consideration: The preceding care management "never ever" issues are broad in scope and numerous in number, and affect many aspects of patient care. Preventing these events includes following policies and procedures, improving patient/family education, assessing the effectiveness of patient/family education, ensuring excellent communication and collaboration among healthcare team members, and participating in continuing education and training to keep knowledge and skills current [2,21,24,26].

Environment events

Environmental "never events" include [21]:

- Patient death or serious injury associated with an electric shock while being cared for in a facility, excluding events involving planned treatments such as electric counter-shock.
- Any incident in which a line designated for oxygen or other gas to be delivered to a patient contains the wrong gas or is contaminated by toxic substances.
- Patient death or serious injury associated with a burn incurred from any source while being cared for in a facility.
- Patient death or serious injury associated with the use of or lack of restraints or bedrails while being cared for in a facility.

Nursing consideration: Prevention of environmental events involves teamwork among clinical and non-clinical staff members. If equipment is malfunctioning, it should be immediately removed from service, and the appropriate department notified for repair and/or replacement. If a piece of equipment has outdated safety check documentation, the appropriate department must be notified for repair and/or replacement. The use of any type of restraining device must strictly adhere to legal mandates and organizational policies and procedures [2,21,24,26].

Radiologic events

The specific factor identified in the radiologic event category is the introduction of a metallic object into the MRI area associated with the death or serious injury of a patient or staff member [21]. It is imperative that anyone working with a patient undergoing an MRI be alert to the introduction of any metallic objects in the MRI area. A checklist must be completed to assure patient eligibility for this procedure.

Criminal events

Criminal "never ever events" include [21]:

- Any incidence of care ordered by or provided by someone impersonating a physician, nurse, pharmacist, or other licensed healthcare provider.
- Abduction of a patient/resident of any age.
- Death or significant injury of a patient or staff member resulting from a physical assault that occurs in or on the grounds of a healthcare setting.

The leadership of all healthcare organizations must have policies and procedures in place to ensure that all persons working in or having privileges to work in a facility have the appropriate licenses and credentials to fulfill the roles for which they have been hired. Appropriate security must be in place to prevent patient/resident abduction and/or physical assault. Policies and procedures must also address what to do in the event of acts of (or threatened acts of) violence so that patients, visitors, and staff members are kept as safe as possible. Education and training should be provided regarding how to deal with violence in work settings [2,21,24,26].

Additional safety concerns identified by the ECRI Institute

As mentioned earlier, the ECRI Institute compiles an annual list of the top ten safety concerns for healthcare organizations. In 2015, the number one identified concern was alarm hazards, which has been discussed in detail. But what are the remaining nine concerns? A summary of the ECRI Institute's additional nine concerns follows. It is likely that these concerns are of importance to most, if not all, healthcare organizations.

1. **Data integrity: Incorrect or missing data in EHRs and other health IT systems.**
   Information technology (IT) can help to improve communication, provide swift access to essential data, and reduce errors for all members of the healthcare team. However, in order for IT to improve safety, a system must be in place to ensure that data in the electronic healthcare records (EHRs) are accurately and appropriately transferred to the various IT systems within an organization.

   According to the ECRI report, examples of data integrity failures include [2]:
   - Appearance of one patient's data in another patient's record.
   - Missing data or delayed data delivery.
   - Clock synchronization errors between medical devices and systems.
   - Default values used by mistake.
   - Fields pre-populated with erroneous data.
   - Inconsistencies in patient information when both paper and EMR are used.
   - Outdated information copied and pasted into a new report.

Nursing consideration: Nurses and their colleagues must remember to evaluate any IT issues that may and can contribute to an adverse event. Data entry is only as accurate as the person who is entering the information. The configuration of the IT system must also be evaluated. How easy is it to have multiple patient records open on a user's screen at one time? What, if any, are the identification checks to make sure that data is entered for the correct patient? How easy is it to cut and paste information? How can "old" or no longer accurate information be deleted from the active portion of a patient's record? These are just some of the questions that arise when reviewing the role IT may play in errors. Nurses must be vigilant in assisting in the evaluation of the IT process in their organizations and in the effectiveness of EHRs.

2. **Managing patient violence.**

EBP alert! Research shows that workers in healthcare and social assistance settings are five times more likely to be victims of nonfatal assaults or violent acts than average workers in all other occupations [27]. This makes managing workplace violence imperative, and a top priority in the healthcare setting.

A current review of the literature indicates that violence occurs in all healthcare settings, not just in the emergency department (ED) [2]. The ECRI Institute lists "Managing Patient Violence" as number three in their 2015 list of top ten patient safety concerns. The report suggests the following actions to help manage/prevent patient violence [2]:

- Acknowledge that the problem of violence is occurring in all healthcare organizations/facilities and is not limited to specific areas such as the ED.
- Provide all staff with training and education in de-escalation strategies, behavioral health, and management strategies when physical violence is threatened or actually occurring.
- Hire adequate security staff.
- Develop and implement a facility-wide safety plan that considers all levels of risk, from a single acute episode, to an active shooter, to a threat that requires evacuation of the facility.

3. **Mix-up of IV lines leading to misadministration of drugs and solutions.**
The risk of IV line mix-ups is more likely in critical care areas where multiple lines are often in place. However, the risk exists in all healthcare settings where patients or residents (e.g. long-term care residents) may need several types of medication [2].

The ECRI Institute recommends the following actions to prevent IV infusion-line confusion [2]:

- Trace all lines back to their origin before making connections.
- Develop and implement a policy and procedure for positioning different lines on different sides of the patient.
- Label each infusion line with the name of the drug or solution being infused.
- Do not force connections. If force is required, it should probably not be connected.

Nursing consideration: Since nurses are those who administer drugs or solutions via IV lines, this safety concern is especially critical to their practice. Incorporating ECRI Institute recommendations into applicable policies and procedures should help to avoid IV line mix-ups.

4. **Care coordination events related to medication reconciliation.**
The ECRI Institute has identified medication reconciliation as its fifth top ten patient safety concerns [2]. The prevention of medication errors is an ongoing healthcare concern, and medication reconciliation is of utmost importance.

The Agency for Healthcare Research and Quality has identified the following recommendations for accurate medication reconciliation [28]:

- Develop a single medication list that is shared by all disciplines for documenting the patient's current medications.
- Clearly define roles and responsibilities for each discipline involved in the medication reconciliation process.
- Standardize the medication reconciliation process throughout the organization.
- Simplify the medication reconciliation process as much as possible by eliminating unnecessary redundancies.
- Make the right thing to do the "easiest" thing to do within the parameters of normal legal practice.
- Develop effective prompts or reminders for consistent behaviors as they pertain to the medication reconciliation process.
- Educate patients, families, or other caregivers on the medication reconciliation process.
- Ensure that the medication reconciliation process meets all pertinent legal and regulatory requirements.

Nursing consideration: Note that medication reconciliation can be problematic upon admission to acute care or outpatient facilities unless the patient and/or family have kept accurate records of the patient's medications. It should be a top nursing priority to educate patient and family about the necessity of keeping thorough and accurate medication records. This includes not only prescription medications, but over-the-counter medications, vitamins, minerals, herbal preparations, and any other supplements being taken.

5. **Failure to conduct independent double checks independently.**
Failure to conduct truly independent double checks can, and does lead to errors. The ECRI Institute recommends the following recommendations to make sure that independent double checks are completed [2]:

- The second patient care provider who is performing the double check needs to look at all facets of the process including patient identity, indication and appropriateness, drug or blood type, dose, programmed infusion rate, and route.
- The second provider should not receive conclusions from the first provider. For example, suppose the first provider says to the second provider, "I get a dose of 5,000 units of heparin. What do you calculate?" The second provider already has a "clue" about what he or she thinks the answer should be. The second provider should calculate the dosage without hearing what the first provider calculated.
- Obtain staff buy-in for the independent double check process. Risk management and research findings regarding errors linked to the failure to adhere to independent double checks should be shared with clinical staff.
- Investigate systems processes and issues. The organization should be prudent when determining which processes require independent double checks.

6. **Opioid-related events.**

EBP alert! The use and prescription of opiates has increased dramatically in recent years. So has opioid misuse and abuse. In fact, in 2011, the number of ED visits related to opioid misuse and abuse were over 420,000. This is double the number of visits recorded in 2004. Therefore, nurses and other patient care providers must be alert to the likelihood of encountering patients who may be misusing or abusing opioids [2].

The ECRI Institute identified two issues of major concern regarding opioid prescriptions and the potential for opioid-related events. First, there is a concern that prescribers are ordering the same amount of hydromorphone as they would morphine, even though hydromorphone is about seven to

seven and one half times as potent as morphine. This can lead to overdose and dangerous adverse effects [2].

The second issue is that prescribers sometimes do not differentiate between patients who are opioid-tolerant (defined as patients who have been taking an opioid of a threshold dosage for at least one week) from those who are described as opioid-naïve (meaning patients who have not been taking an opioid of a threshold dosage for at least one week). Failure of prescribers to consider these two issues of major concern can lead to serious, even fatal consequences [2].

Nursing consideration: Research shows that patients may share their opioid medications with family members or friends. Research also shows that family members and friends may "help themselves" to such medications without the patient's knowledge or consent. It is imperative that nurses educate patients and families regarding the dangers of opioid misuse [2].

In order to reduce/avoid opioid-related events the ECRI Institute recommends that [2]:

- Prescribers participate in continuing education regarding safe opioid prescribing and the potential dangers of failing to adhere to safe-prescribing standards.
- All healthcare professionals should participate in continuing education regarding safe opioid prescribing as well as recognition of opioid use, misuse, and abuse, and strategies to intervene.
- Patients and families must be educated about opioid safety including how to properly store and dispose of opioids.
- Healthcare organizations must monitor their adverse events for evidence of opioid-related events, and take steps to prevent their occurrence.

7. **Inadequate reprocessing of endoscopes and surgical instruments.**
Even though endoscopes and surgical instruments are extremely difficult to clean (requiring multiple steps to ensure cleanliness), healthcare organizations reprocess thousands of reusable surgical instruments and devices on a daily basis. Failure to thoroughly clean such devices may allow organisms to remain on the devices (i.e. "fomite"). Some organisms may not be affected by disinfection or even sterilization. Even if thorough cleaning is accomplished, organisms may grow if equipment is not thoroughly dried.2 In other words, reprocessing requires thorough cleaning, disinfection, sterilization (as appropriate), and drying.

   The Association for the Advancement of Medical Instrumentation (AAMI) suggests the following steps to improve the quality of medical device and surgical instrument reprocessing [29]:

   - Cleaning and disinfection/sterilization of reusable devices are separate but equally important actions that must be performed before each patient use according to manufacturer's written instructions for use of the device.
   - Follow the manufacturer's instructions for cleaning, disinfection, and/or sterilization of devices.
   - Create a multidisciplinary committee to review priorities and establish a plan for implementing them. Representatives should be sourced from the operating room, infection control, healthcare technology management endoscopy, risk management, quality improvement, safety, education, and materials management groups and teams.
   - Share "lessons learned" with other healthcare organizations and learn from other organizations as well.
   - Establish formal written procedures for reprocessing.
   - Know and implement the current standards, recommended practices, and manufacturer's written instructions for use.
   - Include central sterile processing in the act of purchasing decisions for medical devices.
   - Separate and standardize functions and locations. In other words, separate central service from reprocessing.
   - Train and educate staff regarding appropriate reprocessing.
   - Assess organizational compliance with standards and regulations. Examples of tools for assessment can be found at: https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance.

8. **Inadequate patient handoffs related to patient transport.**
Research shows that when a patient is transported within the healthcare facility to another clinical setting or between units within the facility, a risk for harm exists [2]. But transport does not pose the only danger as the change of shift report (also a form of "handoff"), if not performed correctly, also can endanger the patient [30].

   "Handoff" is defined as the process of transferring responsibility for patient care. "Sign-out" is the act of relaying information regarding the patient [30]. The risks involved with handoff and sign-out vary with the acuity of the patient. However, even so called "low-risk patients" are at risk if the processes of handoff and sign-out are not executed accurately.

   The Joint Commission requires that each patient handoff communication include a standardized interactive approach to promote safe transfers. The ECRI Institute's report on the 2015 top ten safety hazards identifies several recommendations to build a process that enhances safety and reduces risk during handoff and sign-out [2,30].

   - Include transport-related incidents (including handoff and sign-off information) as part of adverse event, and near-miss adverse event, reporting.
   - Identify units and areas that are most often involved in transport and safety hazards.
   - Establish criteria for determining the level of transport needed.
   - Ensure that the necessary equipment is available for transport and that responsibility has been assigned for maintenance of therapies, and troubleshooting of equipment problems during transport.
   - Determine the training, competency, and experience required of personnel performing the transport, and ensure that those personnel possess such training, competence, and experience.
   - Develop and implement tools, forms, and checklists that facilitate handoff communication among all team members.

9. **Medication errors related to pounds and kilograms.**
Errors involving mix-ups between pounds and kilograms often occur in emergency departments, but can occur in any setting, including the home. These kinds of errors generally involve pediatric patients, whose small bodies often react quite adversely, even fatally, to an inaccurate mediation dose [2,31].

   Pediatric drug doses are weight-based, and the recommended doses are administered in relation to weight in kilograms. However, in many healthcare settings, children are weighed in pounds, and medication measurements must then be converted to kilograms. This conversion can be inaccurately calculated, thus leading to medication errors [31].

   The Emergency Nurses Association's (ENA) position statement in support of weighing pediatric patients only in kilograms includes the following information [31].

   - Pediatric weights should be measured and documented in kilograms only.
   - Scales used to weigh pediatric patients should be configured to only record weights in kilograms.
   - Pediatric weights should be documented in a prominent place on the medical record.
   - Electronic medical records (EMR) should be standardized to allow only kilograms for pediatric weight entries.

- The actual weight of the pediatric patient should be considered to be part of the mandatory nursing assessment unless patients need resuscitation or emergent stabilization.
- For the pediatric patient needing resuscitation or emergent stabilization, there should be a standard method of estimating weight in kilograms.
- The pediatric patient's weight in kilograms must be included in an interdisciplinary or intradisciplinary patient handoff report.

Nursing consideration: Note that the weight in kilograms must be utilized as a function of all handoffs to facilitate safety, and decrease adverse effects related to handoffs and sign-outs.

The ECRI Institute offers these suggestions for reducing the risk of medication errors related to pounds and kilograms [2].

- Ensure that pediatric scales (calculated in kilograms) are readily available in all areas of the organization.
- Document and display weights only in kilograms in the electronic healthcare record (EHR).
- Integrate digital scales with the HER to eliminate or reduce the need for data entry.
- Use clinical decision support functions that compare recorded weights with expected weights.
- Purchase infusion pumps with dose error reduction components.
- Avoid storing any high-alert drugs or other medications that have the potential to cause patient harm if weight-based doses are miscalculated in clinical areas.

Hospital-acquired conditions

The phrase hospital-acquired condition (HAC) refers to conditions that patients acquire while receiving treatment for another condition in an acute care health setting [32]. On July 31, 2008, in the Inpatient Prospective Payment System (IPPS) Fiscal Year 2009 Final Rule, the Centers for Medicare and Medicaid Services (CMS) included ten categories of HACs that, if they occurred, were not reimbursable by Medicare [33].

These categories are, for most if not, all organizations, "never ever events" as well.

As of 2015, the list of categories has been expanded to 14 and include the following items [33]:

- Foreign object retained after surgery.
- Air embolism.
- Blood incompatibility.
- Stage III and IV pressure ulcers.
- Falls and trauma.
  - Fractures.
  - Dislocations.
  - Intracranial injuries.
  - Crushing injuries.
  - Burn(s).
  - Other injuries.
- Manifestations of poor glycemic control.
  - Diabetic ketoacidosis.
  - Non-ketotic hyperosmolar coma.
  - Hypoglycemic coma.
  - Secondary diabetes with ketoacidosis.
  - Secondary diabetes with hyperosmolarity.
- Catheter-associated urinary tract infection (CAUTI).
- Vascular catheter-associated infection.
- Surgical site infection, mediastinitis, following coronary artery bypass graft (CABG).
- Surgical site infection following bariatric surgery for obesity.
  - Laparoscopic gastric bypass.
  - Gastroenterostomy.
  - Laparoscopic gastric restrictive surgery.
- Surgical site infection following certain orthopedic procedures.
  - Spine.
  - Neck.
  - Shoulder.
  - Elbow.
- Surgical site infection following cardiac implantable electronic device (CIED).
- Deep vein thrombosis (DVT)/pulmonary embolism (PE) following certain orthopedic procedures.
  - Total knee replacement.
  - Hip replacement.
- Iatrogenic pneumothorax with venous catheterization.

Nursing consideration: Beginning in fiscal year 2015, the HAC reduction program mandated by the Affordable Care Act, requires the CMS to reduce hospital payments by one percent for hospitals that rank among the lowest-performing 25 percent in regards to HACs [32]. Thus, it is essential that all nurses be especially vigilant in preventing HACs. They must also appreciate where their organizations stand in regard to HAC performance.

It is important that nurses be familiar with policies and procedures established to prevent HACs in their organizations. This educational program provides information to support nurses in their efforts to reduce/prevent HAC occurrence.

Foreign object retained after surgery

The problem of surgical items accidentally left inside the body after surgery has existed since the beginning of the practice of surgery. The contemporary preferred term for this problem is Retrained Surgical Items (RSI) rather than retained foreign bodies, or objects, or URFOs [35].

Nursing consideration: Retained objects are usually detected immediately after the procedure by X-ray, during routine follow-up medical visits, or from the patient's reports of pain or other forms of discomfort [34]. However, RSIs can be discovered hours to years after the initial operation [35]. Therefore, nurses must remain alert to the possibility of RSI and always ask patients about any history of surgical procedures during nursing assessment.

The most frequent retained surgical items are [34]:

- Soft goods, such as sponges and towels.
- Small miscellaneous items, including un-retrieved device components or fragments (such as broken parts of instruments), stapler components, parts of laparoscopic trocars, guidewires, catheters, and pieces of drains.
- Nails and other sharps.
- Instruments, most commonly malleable retractors.

Research shows that the retention of surgical items has significant monetary implications. The Pennsylvania Authority estimated that the average total cost of care related to the retention of such items is about $166,000, which includes legal defense, indemnity payments, and surgical costs not reimbursed by the CMS. Other studies estimate that the medical and liability costs are $200,000 or more per incident [34].

What are the most common root causes of RSIs reported to The Joint Commission? These causes are [34]:

- Absence of policies and procedures.
- Failure to comply with existing policies and procedures.
- Problems with hierarchy and intimidation.
- Communication failure with the physicians.
- Failure of staff members to communicate important patient information.
- Inadequate or incomplete staff education.

In the October 17, 2013 Sentinel Event Alert [34], The Joint Commission recommended a number of strategies to reduce RSIs and improve safety. A summary of some of the most essential information follows. For the complete report, access this online pdf: http://www.jointcommission.org/assets/1/6/SEA_51_URFOs_10_17_13_FINAL.pdf.

Establish effective processes and procedures.
- Establish a reliable and standardized counting system.
- Develop and implement effective evidence-based, organization-wide standardized policies and procedures for the prevention of RSIs.

Establish an effective counting procedure.
The Joint Commission directly recommends that a counting procedure should [34]:
- Be performed audibly and visibly by two persons engaged in the process. The surgical team should verbally acknowledge verification of the count.
- Include counts of items added to the surgical field throughout the surgery or procedure.
- Include counts of soft goods, needles/sharps, instruments, and small miscellaneous items. The team should document un-retrieved device fragments.
- Verify that counts printed on prepackaged sponges and instrument sets are correct. Handle any discrepancies according to the organization's policy.
- Be performed before the procedure begins in order to establish a baseline count; before the closure of a cavity within a cavity; before wound closure begins; at skin closure or end of procedure; and at the time of permanent relief of either the scrub person or the circulating registered nurse.
- Be applicable in all settings where invasive procedures are performed.
- Be reviewed periodically and revised as appropriate.

Establish effective wound opening and closing procedures.
Wound opening and closing procedures should include:
- Inspection of instruments for signs of breakage before and after use.
- Adherence to the organization's established counting procedure.
- Methodical wound exploration.
- Empowerment of any member of the operative team to call a "closing time-out" prior to the initial closing count to allow for an uninterrupted count.

Perform intra-operative radiographs.

Intra-operative radiographs should be performed:
- When the surgical count is incorrect [34].
- When the operative procedure is determined by the surgical team to be at high risk for retained surgical items.

Nursing consideration: If the counts remain unreconciled after initial radiologic examination, the surgical team should consider additional imaging or further wound exploration.

Effective communication.
Effective communication is essential. The Joint Commission recommends that an organization should institute team briefings and debriefings as a standard part of the surgical procedure. This allows any team member to express concerns regarding patient safety. Additionally, the surgeon should verbally verify the results of the counting procedure.

Appropriate documentation.
Document the results of counts of surgical items, instruments, or items intentionally left inside a patient (such as needle or device fragments deemed safer to remain than remove), and actions taken if count discrepancies occur.

Safe technology.
The Joint Commission suggests that organizations research the potential of using assistive technologies to supplement manual counting procedures and methodical wound exploration.

Air embolism

Intravascular air embolism is a preventable HAC that occurs when air enters the vascular system [36,37]. Air embolism is a serious, life-threatening event. It occurs when there is a direct connection between a source of air and the vascular system, and the pressure gradient allows the entry of this air into the bloodstream [37].

Common causes of air embolism include [36,38]:
- The entry of air through open intravenous (IV) and infusion systems. Examples include disconnection and open stop-cock.

EBP alert! Research shows that the amount of air that enters the vascular system is influenced by the patient's position, and the height of the vein in relation to the right side of the heart [36]. Thus, nurses must be aware of proper patient positioning at all times!

- Infusion lines that are not properly filled or completely vented.
- During parallel infusions where gravity and infusion pumps are connected together.
- Errors that occur during the performance of a pressure infusion.
- Air entering the intravascular system during surgical procedures that require the opening of the vascular system such as neurosurgical, vascular, gynecological, or orthopedic procedures.

The Pennsylvania Patient Safety Authority has published the following suggestions to prevent air embolism associated with central venous access devices (CVADs) [37].

During insertion [37]:
- Place the patient in Trendelenburg position with a downward tilt of 10 to 30 degrees during central line placement.
- Avoid CVAD insertion during patient inspiration. If the patient is able, ask him/her to hold his/her breath and perform a Valsalva maneuver.

After insertion [37]:
- Make sure that all catheters and connections are intact and secure.
- Occlude the catheter and/or the needle hub.
- Make sure that all self-sealing valves are functioning accurately.

Ensure proper care and maintenance of CVADs by [36,37,62,63]:
- Making sure that all lumens are capped and/or clamped.
- Using Luer-lock connections for needleless IV ports and self-sealing valves.
- Using infusion pumps with air-in-line sensors for all continuous infusions.
- Completely priming all infusion tubing, and expelling air from syringes before any injection or infusion.
- Using an air-eliminating filter on infusion tubing sets whenever necessary.
- Removing air from infusion bags when infusing fluids using inflatable pressure infusors.
- Fully priming contrast media injectors.
- Checking for air prior to each injection.
- Tracing lines and double-checking all connections.
- Taking all steps necessary to prevent misconnections.
- Inspecting the insertion site, catheter, and all connections regularly to assess for any breaks or openings that could allow air into the system.
- Ensuring the integrity of the central line dressing surrounding the insertion site.
- Using caution when moving or repositioning the patient to prevent pulling on the central line and compromising the integrity of the closed system.
- Teaching patients and/or families how to manage infusion therapy.

During removal of CVAD [37,62,63]:

- Place the patient in Trendelenburg position. If this is not possible the supine position may be used.
- Position the catheter exit site at a height that is lower than the height of the patient's heart.
- Cover the exit site with gauze. Apply gentle pressure while removing the catheter in a smooth, slow, and constant motion.
- Ask the patient to hold his/her breath and perform a Valsalva maneuver as the last portion of the catheter is removed. If the patient is unable to do this remove the CVAD during patient expiration.
- Place pressure on the site until hemostasis occurs. A time frame of one to five minutes is recommended.
- Apply a sterile occlusive dressing that remains in place for at least 24 hours. Change the dressing every 24 hours until the exit site has healed.
- Tell the patient to remain lying flat for 30 minutes after removal of the catheter.

Nursing consideration: For the latest information on central line devices and other infusion issues access:

- *The Infusion Nurses Society* at http://www.ins1.org/i4a/pages/index.cfm?pageid=1
- *The Association for Vascular Access* at http://www.avainfo.org/website/article.asp?id=280986

Blood incompatibility

It is 3PM, and the end of a particularly stressful eight-hour shift. Blood arrives from the blood bank for two patients: Mr. Robert Morino (who is Type A positive), and Mr. Roger Moran (who is Type A negative). Sandy, the RN responsible for the nursing care of both Mr. Morino and Mr. Moran is feeling stressed and anxious. It is snowing, and she wants to leave on time in order to be home before her young children arrive from their after-school activities. Without instituting the independent double check per hospital policy, Sandy begins administering the A positive blood to Mr. Moran, who quickly begins to have an adverse blood incompatibility reaction.

The preceding scenario is truly a disaster that was waiting to happen. What are some things that contributed to this adverse event?

- Sandy is anxious and stressed and not focused on her work.
- Sandy failed to institute the independent double check required by hospital policy.
- The two patients had similar first and last names.
- The two patients had similar (yet different!) blood types.

Blood incompatibility is preventable. What can nurses do to make sure that it does not occur? Let's start by reviewing what happens during an incompatibility reaction.

There are four types of blood [39,40,41]:

- Type A (red blood cells (RBCs) have A-antigen proteins attached to them).
- Type B (RBCs have B-antigen proteins attached to them).
- Type AB (RBCs have both A-antigen and B-antigen proteins attached to them).
- Type O (RBCs have neither A- nor B-antigens).

Blood is also classified by rhesus (Rh) factor. This is a specific RBC antigen in the blood. If this antigen is present, the blood type is Rh positive (e.g. such as in the case of Mr. Morino, who is A +). Absence of the antigen is classified as Rh negative.

Most occurrences of blood incompatibility are due to human error. During an incompatibility reaction, the patient's immune system reacts against the "wrong" blood. The patient's immune system produces antibodies against any blood antigens not present in his/her own blood. Such a reaction can have serious, even fatal, consequences [39,40,41].

EBP alert! Research shows that the most serious transfusion complications occur within the first 15 minutes before, and the 15 minutes after initiation of each unit of blood. Thus, nurses must be particularly alert for reactions during these time periods [42].

Here are some suggestions for nurses to implement in order to avoid blood incompatibility reactions [39,42,43]:

- Facilitate the establishment of an interdisciplinary transfusion committee. This committee should include a transfusion safety officer.
- Ensure that policies and procedures relating to blood transfusion are reviewed and updated on an ongoing basis.
- Review the prescriber blood product ordering process.
- Review the patient's consent for blood product transfusion and make sure that the right for refusal appears on the consent.
- Ensure that there is a process for monitoring, tracking, and trending all blood samples for type and cross, type and hold, wrong blood in tube, mislabeled tubes, and issued blood components from the blood bank.
- Transfuse the patient within 30 minutes of blood product pick-up from the blood bank.
- Always confirm the identity of the patient using two identifiers.
- Institute independent double check per hospital policy.
- Double check the blood type of patients and the blood packs before each transfusion.
- Double check that all information (full patient name, address, blood type, etc.) on the label of the blood product matches the patient's information. Note that this means that the nurse MUST know the patient's blood type and other relevant information.
- Double check the blood product's label for expiration dates.
- Implement a bar code patient identification system as appropriate.

Stage III and stage IV pressure ulcers

In addition to the physical and emotional toll on patients, stage III and stage IV pressure ulcers carry a significant monetary burden as well. It is estimated that the cost of one stage III or stage IV pressure ulcer may be between $5,000 and $50,000 [44].

How are stage III and stage IV pressure ulcers described? Here are their determining characteristics [45]:

- Category/stage III: Full thickness tissue loss, although subcutaneous fat may be seen. Bone, tendon, or muscles are not exposed. Sloughing may be present, but it does not obscure the depth of tissue loss. There may be undermining and tunneling.
  - The depth of this pressure ulcer depends on the anatomical location. For example, the bridge of the nose or the ear does not have (adipose) subcutaneous tissue and stage III ulcers in such locations can be shallow. However, in areas where there is significant adipose tissue, ulcers can be exceptionally deep. Bone and/or tendon are neither seen nor are directly palpable.
- Category/stage IV: Full thickness tissue loss where bone, tendon, and/or muscle are exposed. Sloughing or eschars may be present, often with undermining and tunneling.
  - The depth varies according to anatomical position. Ulcers may be shallow in areas that do not have (adipose) subcutaneous tissue (e.g. nose, ear). These types of pressure ulcers can extend into muscle and/or supporting structures such as fascia, tendon, or joint capsules, thus making osteomyelitis possible. Exposed bone or muscle is visible and/or directly palpable.

Which patients are at risk for the development of pressure ulcers? Here are some factors that increase such risk. These are divided into

three primary areas including mobility/activity, perfusion (including diabetes), and skin/pressure ulcer status [44,46].

- Advanced age: The elderly person's skin has less subcutaneous fat, which leads to decreased protection from pressure.
- Friction/ahear: Decreases the epidermal layer, reducing protection of the skin.
- Hypotension: Decreases the perfusion of local tissues, making skin more vulnerable to breakdown.
- Immobility: Lack of mobility can lead to sustained pressure on bony prominences.
- Length of stay in critical care units: The longer the length of stay is indicative of critical conditions associated with decreased mobility and/or position change, and increased shear force, all of which increase the risk for skin breakdown.
- Length of time on mechanical ventilation: Indicates inadequate oxygenation and the need to provide ventilation mechanically. Decreased oxygen levels means decreased oxygen to body tissues, including the skin.
- Moisture: Moisture (e.g. incontinence, sweat, failure to dry skin after bathing) contributes to skin breakdown, and in many cases, poor wound healing.
- Nutrition: Inadequate nutrition and decreased protein intake alters the proper state of the skin, contributing to skin breakdown.
- Pressure: The longer pressure is sustained, the more likely local tissue ischemia, edema, and tissue death occurs.
- Pressure scale risk scores: The higher the score on a pressure scale score, the greater the risk of pressure ulcer development.
- Vasoactive medications: Vasoactive medications, given to improve blood pressure, increase vasoconstriction, thus decreasing the perfusion of skin tissue.

Nursing measures to decrease the risk for pressure ulcer development include [44,46]:

- Performing skin assessment upon admission and at least once per shift thereafter. Skin inspection should be conducted more often on patients at high risk for pressure ulcer development. Document the results of all skin assessments.
- Identify patients at high risk for pressure ulcer development using a risk-identification scale.
- Incorporate results of skin assessment in change-of-shift reports and at any handoffs and sign-offs.
- Incorporate a schedule of turning and body repositioning, and document these actions.

EBP alert! Research shows that shearing forces can be reduced by keeping the head of the bed no higher than 30 degrees [44,46].

- Use appropriate positioning devices according to hospital policy and procedure.
- Keep skin warm and dry. Dry thoroughly after bathing. Remove skin secretions such as sweat and barrier creams. Use non-irritating, non-drying cleansing agents. Use moisturizers as appropriate. Keep bed sheets, clothing, etc., dry and wrinkle free.
- Take measures to avoid spasticity and contracture prevention.
- Ensure proper nutritional intake, especially protein.
- Promote mobility and self-position changes as appropriate.
- Remain alert to any skin changes (such as redness) that may suggest impending skin breakdown.

Falls and trauma

Patient falls with serious injury are among the top ten sentinel events reported to The Joint Commission Sentinel Even Database. Since 2009, The Joint Commission has received 465 reports of patient falls with injuries. About 65 percent of those falls caused fatalities [47].

The Joint Commission reports that from January 2009 to October 2014, the most common contributing factors contributing to reported falls included [47]:

- Communication failures.
- Deficiencies in the physical environment.
- Failure to adhere to protocols and safety practices.
- Inadequate assessment.
- Inadequate staff orientation, supervision, staffing levels, or skills.
- Lack of leadership.

EBP alert! Research shows that major factors to reduce falls and other adverse events are effective communication and interdisciplinary work [48]. Thus, nurses must work with their interdisciplinary colleagues to reduce/prevent falls.

Suggestions for fall prevention include the following nursing interventions [47,48]:

- Establish an interdisciplinary fall team with representatives from all disciplines.
- Develop and implement policies and procedures to enhance safety and prevent falls.
- Implement a fall risk screening assessment. Assess patients on admission, and periodically throughout hospitalization.
- Determine if patient medications may cause dizziness, coordination problems, or other issues that may contribute to falls.
- Initiate fall prevention interventions such as providing the patients with no-slip socks, teaching them about the use of (and supervising the use of) mobility assistive devices, and making sure that the call bell is within reach, and that patients know how to use it.
- Create a culture of safety in which systems and process issues are evaluated as the primary causes of adverse effects, and in which open communication is supported.
- Initiate rounds at least hourly to evaluate the safety of the patients and their environments.

Nursing consideration: If and when a fall does occur, a post-fall huddle should be conducted. This is done to evaluate: what risk factors for the fall existed: the circumstances surrounding the fall: and what measures should be taken to prevent future falls, including the review and revision of existing policies and procedures. Such a huddle is not conducted to cast blame, but to improve the culture of safety within the organization.

Manifestations of poor glycemic control

Nurses are essential to managing glycemic control for hospitalized patients. They perform and act on the results of blood glucose monitoring and medication administration. They also provide much of the patient/family education pertaining to glycemic management [49].

Research indicates that there are several factors that increase the risk of poor glycemic control in hospitalized patients. These include [49]:

- Insufficient nurse staffing.
- Nursing staff with excessive workloads.
- Lack of effective and timely communication.
- Teaching hospitals in which inexperienced resident physicians may be providing care for complex, critically ill patients.

EBP alert! Low nurse staffing undermines the culture of safety critical to the provision of safe and appropriate patient care. The organization's nurse leaders must evaluate staffing in terms of a culture of safety [49].

Suggestions for ensuring proper glycemic control include [49,50]:

- Establishing a system of interdisciplinary collaboration and open communication.
- Providing continuing education for nurses and physicians regarding glycemic control.
- Providing adequate patient/family education regarding glycemic control.
- Establishing policies and procedures that effectively guide glycemic control.
- Monitoring blood glucose levels according to hospital policies and procedures, and intervening appropriately.
- Establishing an adequate system of nurse staffing to ensure adequate patient coverage.
- Ensuring that equipment used for blood glucose monitoring is in good working order and that all nurses know how to use such equipment.

Catheter-associated urinary tract infections

Clara is a junior nursing student. She is taking care of a patient who has had an indwelling urinary catheter for three days. Clara is concerned about the possibility of infection, and asks the staff nurse responsible for the patient when it would be removed. The staff nurse is extremely busy and tells the student not to worry about a catheter when there are more urgent matters to attend to. Clara knows that hospital policy is that the catheter should be removed as soon as possible. She decides to talk to her instructor, and the resident physician when he sees the patient that morning. Are Clara's concerns valid? Are her actions appropriate?

The answer to both questions is "yes." Clara knows, as should all nurses, that hospital acquired catheter-associated urinary tract infections (CAUTIs) are a serious problem.

A catheter-associated urinary tract infection (CAUTI) is considered to be a preventable complication by the Centers for Medicare and Medicaid Services and thus no additional payment is provided to hospitals for costs associated with CAUTIs. Unfortunately, CAUTIs are still the most common nosocomial infection. They account for up to 40 percent of infections reported by acute care hospitals. Such infections increases hospital costs and is linked to an increase in morbidity and mortality [51].

EBP alert! Research shows that [52]:

- 70 to 80 percent of CAUTIs are due to the presence of an indwelling urethral catheter.
- 12 to 16 percent of adult hospitalized patients will have a urinary catheter at some time during hospitalization.
- When an indwelling urethral catheter remains in place the daily risk of acquiring bacteria in the urinary tract varies from three to seven percent.

Nurses must do everything possible to find alternatives to insertion of indwelling catheters., If such catheterizations cannot be avoided, removal of indwelling catheters must be performed as soon as possible.

Additional research findings show that [51]:

- The major risk factor for CAUTIs is prolonged catheterization.
- 25 percent of hospital in-patients, and up to 90 percent of patients in a critical care unit have a urinary catheter at some point during hospitalization. Unfortunately, such catheters are often inserted without an appropriate indication or remain in place after the need is no longer present.
- Most hospitals do not have effective strategies for preventing CAUTIs.

Experts recommend the following actions to prevent CAUTIs [51,52]:

- Establish policies and procedures which include: indications for indwelling urinary catheterization, insertion guidelines, and limitation of insertion to those patients who meet criteria for use.
- All healthcare team members must document the indication for indwelling catheter placement upon admission, and daily. If the patient is admitted with a CAUTI, this must also be documented.
- Be sure that only trained, competent personnel insert urinary catheters. Provide education and training as needed.
- Ensure that supplies and equipment necessary for aseptic catheterization technique are readily available.
- Review the necessity of continuing indwelling catheters on a daily basis. Such catheters should be removed as soon as possible.
- Implement infection control surveillance programs which include the: development of any CAUTIs; and the development of appropriate action plans to reduce/prevent CAUTI occurrence.

Nursing consideration: Nurses should ensure that indwelling catheters are properly secured to prevent movement and urethral traction. They must also ensure that a sterile, continuously closed drainage system is maintained [52].

Vascular catheter-associated infection

More than five million patients require central venous access every year, and infection is the main complication of intravascular catheters in patients who are critically ill [53]. Every year, an estimated 250,000 cases of central venous catheter-associated blood stream infections occur in the United States. The cost per infection is an estimated $34,508-$56,000 [54]. Nurses and their interdisciplinary colleagues must make every effort to prevent such infections.

The following interventions are important to the prevention of vascular catheter-associated infections:

Hand hygiene.

Proper hand hygiene is the most important infection control measure and the most effective way to prevent the transmission of healthcare associated infections [54,55].

Nursing consideration: Patients and families should be taught to observe if healthcare workers are washing their hands before and after providing patient care. They should be told to ask their healthcare providers to wash their hands if they have not done so.

The Centers for Disease Control and Prevention (CDC) and the Institute for Healthcare Improvement (IHI) both advocate that hand hygiene be performed "before and after palpating the catheter insertion site; before and after inserting, replacing, accessing, repairing or dressing a venous access device; before donning and after removing gloves; when hands are visibly soiled or contaminated; before and after invasive procedures; and after using the bathroom. Palpation of the insertion site should not be performed after the application of skin antiseptics, unless aseptic technique is maintained [54]."

Maximum sterile barrier precautions.

Maximum sterile barrier precautions must be taken when inserting the venous catheter. These precautions include not only the person inserting the catheter, but anyone assisting with the procedure, and the patient as well [53,54].

Skin antisepsis.

The IHI advocates the use of chlorhexidine skin antisepsis. The CDC prefers the use of a two percent chlorhexidine solution but a tincture of

iodine or 70 percent alcohol can be used [54]. Skin antisepsis should be performed at the time of insertion and with every dressing change [54,55].

Selection of catheter site.
The site of insertion is important to optimal outcomes. The use of the subclavian site is preferred to the jugular or femoral sites in adults to minimize infection risk [54,55].

Dressing change.
Dressings for insertion sites must be impermeable to water vapor. Use of sterile gauze, a sterile transparent, semipermeable dressing, or a chlorhexidine-impregnated sponge dressing that covers the catheter insertion site should be initiated. Topical antibiotic ointments or creams should not be applied to the insertion site because of the possibility of promoting fungal infections or pathogen resistance. Dressings are changed when they become wet, loose, or soiled.

CVAD dressing are generally changed weekly for a transparent semipermeable dressing, and every 48 hours for a gauze dressing [54].

Assessment and removal.
The catheter should be removed as soon as it is no longer indicated. The risk for infection increases with the length of time the device is left in place, and decreases when the catheter is removed [54].

EBP alert! The risk for infection has declined with the standardization of aseptic care and the requirement that insertion and maintenance of catheters be performed by experienced staff members. Education of staff in the insertion and maintenance of intravascular catheters is required, and staff competency must be periodically evaluated. Nurses must demonstrate competency in the care of patients with vascular catheters [54,55].

Surgical site infections

The prevention of surgical site infections is imperative. In the operating room setting, breaks in sterility, and a failure to follow established protocols for infection control put the patients at risk for surgical site infections [56].

Some strategies to prevent surgical site infections include the following interventions [56,57]:

- Healthcare providers must cleanse their hands and arms up to their elbows with an antiseptic agent just prior to surgery.
- Healthcare providers must cleanse their hands with soap and water or an alcohol-based hand cleanser before and after caring for each patient.
- If hair needs to be removed from the surgical site, an electric clipper must be used. A razor should NOT be used.
- Patients and families should be educated to not touch the surgical wound or dressings.
- Healthcare providers caring for patients after surgery should adhere to strict hand hygiene standards. They should also change dressings according established policies and procedures.

Nursing consideration: As stated earlier in this education program hand hygiene is the most effective way to prevent infections. Nurses must help to ensure that all colleagues and visitors adhere to hand hygiene protocol.

Deep vein thrombosis

Deep vein thrombosis (DVT) affects about 350,000 Americans every year [59]. In the hospital setting DVT is listed as a preventable HAC.

Nurses and other healthcare providers must first be aware of factors that place patients at higher risk for the development of DVT. These include [58]:

- Using birth control pills or hormone therapy.
- Having blood clotting disorders.
- Some malignancies.
- Increasing age.
- Being overweight or obese.
- Immobility.
- Personal or family history of DVT or pulmonary embolism.
- Pregnancy.
- Smoking.
- Having vein disease(s).

Strategies for the prevention of DVT include [58,59]:

- Administrating anticoagulant therapy as indicated.
- Promoting early movement and mobilization.
- Facilitating position change in patients who have difficulty moving themselves.
- Applying compression stockings or pneumatic compression devices as ordered and indicated.
- Teaching patients and families about the importance of early movement and position change.

Nursing consideration: Most of the interventions to prevent DVT are easily implemented. However, busy nurses and other healthcare professionals may forget to implement tasks as simple as position change or teaching patients the importance of early movement and position changes. They must remain alert to the possibility of DVT development and how to prevent it!

Iatrogenic pneumothorax with venous catheterization

A pneumothorax is a collapsed lung, and the result of air leaking into the space between the lungs and the chest wall. In most cases of pneumothorax, only a portion of the lung collapses [60].

Pneumothorax can be due to [60,61]:

- Chest injuries.
- Underlying lung diseases.
- Ruptured lung air blisters.
- Mechanical ventilation.
- Certain invasive procedures, such as venous catheterization.

Certain risk factors for pneumothorax include [60]:

- Age: Pneumothorax due to ruptured air blisters is most likely to occur in patients between 20 and 40 years of age.
- Gender: Men are more likely to have a pneumothorax than women.
- Genetics: Some types of pneumothorax seem to run in families.
- History of pneumothorax: A previous pneumothorax event predisposes an individual to experience another pneumothorax.
- Lung disease: Patients with underlying lung disease, particularly chronic obstructive pulmonary disease (COPD) are more likely to suffer a pneumothorax.
- Mechanical ventilation: Patients requiring mechanical ventilation are at higher risk for pneumothorax.
- Smoking: The risk increases with the number of cigarettes smoked as well as the length of time the patient has been smoking.

Iatrogenic pneumothorax (iatrogenic means something that is accidentally caused during medical treatment or procedure) has been identified as a preventable HAC. Thus, it is important to be able to identify appropriate steps to take to prevent such occurrence during venous catheterization. Such steps include [61]:

- Identifying patients at higher risk for pneumothorax during catheterization and being especially alert for problems.
- Ensuring the use of a standardized method of venous catheter insertion according to established policies and procedures.

- Ensuring that insertion is performed by physicians who have adequate experience in catheter insertion.
- Using ultrasound during catheterization to guide catheterization.
- Using ultrasound, chest radiography, and CT scanning for early recognition of pneumothorax.

Nursing consideration: In the event of a pneumothorax during the procedure, a standardized treatment algorithm for management of pneumothorax has been shown to improve outcomes and decrease the length of hospitalization. Nurses must work with the healthcare team to develop such an algorithm and be familiar with the interventions identified in the algorithm [61].

In summary

Nurses must be familiar with HACs identified as preventable by the CMS and by organizations that emphasize safety and appropriateness of care. There are currently (as of this writing) 14 categories of HACs identified by the CMS. However, there may be additional categories identified in the future. There may also be additions to other "never-ever events" and these will most likely be revisions and additions to The Joint Commission National Patient Safety Goals.

Nurses have a professional responsibility and moral obligation to keep themselves informed about current and future safety issues such as National Patient Safety Goals, "never-ever events," and CMS identified preventable HACs. Thanks to modern technology, nurses can access such information on relevant internet websites such as the CMS and The Joint Commission websites.

Nurses also have a professional obligation to become involved in how their employing organizations address safety issues. They should volunteer for committees and task forces and act as patient advocates at all times.

Nurses must support their organization's efforts to enhance safety and well-being of patients, visitors, and employees. In addition to adhering to safety mandates, they should help teach their colleagues how to establish and maintain a culture of safety. All employees are responsible for patient safety. Nurses are on the front-line of all safety initiatives and should act as leaders in the safety process.

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PATIENT SAFETY: IMPLEMENTATION OF NATIONAL SAFETY STANDARDS FOR NURSES

Self Evaluation Exercises

Select the best answer for each question and check your answers at the bottom of the page.
You do not need to submit this self-evaluation exercise with your answer sheet.

1. A nurse manager is explaining the importance of adhering to National Patient Safety Goals. In an effort to encourage adherence to hospital mandates regarding the goals, the manager:
   a. Explains that the Patient Safety Advisory Group consists of a group of physicians who are safety experts.
   b. Tells her staff that the National Patient Safety Goals are mandated and enforced by federal law.
   c. Encourages nurses to become more involved in working with The Joint Commission.
   d. Explains that the National Patient Safety Goals are a critical method developed by the federal government.

2. When considering the 2016 Home Care National Safety Goals the nurse realizes that:
   a. Two patient identifiers are not necessary in the home since the home care patient is the only patient in the home, and obviously identifiable.
   b. She must assess the home environment for safety hazards.
   c. Hand hygiene is important, but adherence to the CDC and WHO guidelines for hand cleaning are not necessary.
   d. She must personally inform all of the patient's friends and family members that they must not smoke in the home if oxygen is in use.

3. The Safety Council is establishing policies and procedures to reduce the threat of patient harm related to alarm systems. It is important that the council:
   a. Identify situations when alarm signals are not clinically necessary.
   b. Establish a system to increase frequency of inspection, checking, and maintenance activities based on hospital preferences.
   c. Mandate that all patients be monitored to some extent.
   d. Be composed primarily of members from the nursing department.

4. Which of the following actions is appropriate to prevent "never ever" surgical events?
   a. Marking of the surgical site by a certified nursing assistant before the patient goes to the operating room.
   b. Using adhesive markers as the sole means of marking the surgical site.
   c. Conducting a time-out immediately before making the incision.
   d. Cancelling the surgery if the patient refuses to have his/her surgical site marked.

5. Which of the following is a "never ever" care management event?
   a. Artificial insemination with the wrong donor sperm or wrong egg.
   b. Maternal death or serious injury associated with the labor or delivery of a high-risk pregnancy.
   c. Any stage II pressure ulcer acquired after admission to a healthcare facility.
   d. Patient death or serious injury associated with unsafe administration of intravenous fluids.

6. Which of these actions shows an accurately performed double check when blood product administration is required?
   a. The first nurse says to the second nurse "This blood is labeled Type-A positive. That's right isn't it?"
   b. The first nurse asks a nursing assistant to verify the patient's identity.
   c. The first nurse asks a blood bank technician to verify the blood type while commenting that, "This getting a second check is a waste of time."
   d. The first nurse asks the second nurse to double check the accuracy of all of his/her preparations to administer a blood product.

7. In order to avoid air embolism associated with CVADs:
   a. Ask the patient to take a deep breath during CVAD insertion.
   b. Avoid clamping CVAD lumens.
   c. Avoid applying pressure while removing the catheter.
   d. Place the patient in Trendelenburg position during catheter placement.

8. To decrease the risk of pressure ulcers the nurse should:
   a. Keep the head of the patient's bed elevated at 90 degrees.
   b. Perform skin assessment once a day.
   c. Use non-drying cleansing agents when bathing patients.
   d. Avoid using pressure ulcer risk identification scales.

9. The most effective way to prevent transfer of hospital acquired infections, including vascular catheter-associated infections, is:
   a. Skin antisepsis.
   b. Hand hygiene.
   c. Maximum sterile barrier precautions.
   d. Proper dressing changes.

10. Actions that should be taken to avoid hospital acquired conditions include:
    a. Having the surgical team document unretrieved device fragments.
    b. Asking a patient to take deep breaths during the insertion of a CVAD.
    c. Knowing that the most serious transfusion complications occur within the first hour before and after initiation of each unit of blood.
    d. Recognizing that the femoral site is the preferred site in adults for venous catheter insertion.

Answers:	1.C 2.B 3.A 4.C 5.A 6.D 7.D 8.C 9.B 10.A

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SELF-ASSESSMENT AND EVALUATION (Required)

Your feedback is vital for the planning and design of future educational activities and for continual process improvements. Thank you.

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1. Was the activity evidence-based, free of commercial bias or influence?
2. Was the author's expertise and knowledge of the subject evident in the content?
3. Did the content of this activity match my current (or potential) scope of practice?
4. Was the course well written, organized, and informative?
5. Was the presentation balanced and objective?
6. Did the activity support the stated learning objectives?
7. Do you plan to make changes to your practice as a result of this activity?
8. After completing the activity, are you more confident in your abilities?
9. The course information provided was: New, Review, or Both.
10. Will this activity have an impact on your knowledge, competence, performance and patient outcomes.

	Best Nursing Practices: Care of Patients Prescribed Opioids for the Treatment of Pain 3 Contact Hours			**Hepatitis: Recognition and Management 4 Contact Hours**			**Hooked: Drug Abuse in America 3 Contact Hours**			**Patient Safety: Implementation of National Safety Standards for Nurses 4 Contact Hours**		
	YES	NO		YES	NO		YES	NO		YES	NO	
1	❍	❍		❍	❍		❍	❍		❍	❍	
2	❍	❍		❍	❍		❍	❍		❍	❍	
3	❍	❍		❍	❍		❍	❍		❍	❍	
4	❍	❍		❍	❍		❍	❍		❍	❍	
5	❍	❍		❍	❍		❍	❍		❍	❍	
6	❍	❍		❍	❍		❍	❍		❍	❍	
7	❍	❍		❍	❍		❍	❍		❍	❍	
8	❍	❍		❍	❍		❍	❍		❍	❍	
	New	Review	Both	New	Review	Both	New	Review	Both	New	Review	Both
9	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
	Yes	No	No Change	Yes	No	No Change	Yes	No	No Change	Yes	No	No Change
10	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

Fill in the circle below numbers **0=Not likely at all, 5=Neutral and 10=Extremely likely**

How likely is it that you would recommend Elite ..... 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 ○

Best Practices: Care of Patients Prescribed Opioids for the Treatment of Pain: If you answered yes to question 7, how will you change your practice as a result of this activity and indicate any barriers you perceive in implementing these changes: _____

_____

Hepatitis: Recognition and Management: If you answered yes to question 7, how will you change your practice as a result of this activity and indicate any barriers you perceive in implementing these changes: _____

_____

Hooked: Drug Abuse in America: If you answered yes to question 7, how will you change your practice as a result of this activity and indicate any barriers you perceive in implementing these changes: _____

_____

Patient Safety: Implementation of National Safety Standards for Nurses: If you answered yes to question 7, how will you change your practice as a result of this activity and indicate any barriers you perceive in implementing these changes: _____

_____

Please describe any clinical situations that you find difficult to manage or resolve that you would like to see addressed in future continuing education:

_____

_____

List other topics that you would like to see provided: _____

_____

❑I agree to allow Elite to use my comments. If you answered yes, please provide your name and title as you would like them to appear.

_____