

CIC REVIEW 2023 EDUCATION AND RESEARCH

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Disclosures

UpToDate

CDC Epicenter Grant Funding



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Test Preparation

- 12 (8%) of 150 questions on the CIC exam cover education and research

References used to prepare this talk:

- APIC Online Text
 - Chapter 3: Education and Training
 - Chapter 5: Infection Prevention and Behavioral Modifications
 - Chapter 19: Qualitative Research Methods
 - Chapter 20: Research Study Design
- APIC Certification Study Guide, 6th Edition
 - Chapter 8
 - Practice exams 1-3



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Education – exam will evaluate knowledge of the following

1. Assess needs, develop goals and measurable objectives for preparing educational offerings
2. Prepare, present, coordinate, and/or disseminate educational content that is appropriate for the audience
3. Identify the differences between the concepts of knowledge, training, and competency
4. Provide immediate feedback, education, and/or training to healthcare workers when lapses in practice are observed
5. Facilitate education of patients, families, and others regarding prevention and control measures
6. Assess the effectiveness of education and learner outcomes (e.g., observation of practice, process measures)
7. Implement strategies that engage the patient, family, and others in activities aimed at preventing infection



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EDUCATION & TRAINING



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Education & Training: Key Concepts

- Goal of healthcare education and training = **improve job skills and competence**.
- Workplace training in healthcare is a response to emerging issues in the field and tends to be **problem-focused**.
- Learning retention **increases** when **immediate application follows instruction**.
- Workplace education is **business-driven** and tied to administrative and financial goals, productivity, and the need to benchmark against the best professional practices.
- **Needs assessments or performance improvement studies** identify deficiencies in knowledge, skills, or attitude and serve as the **basis** for educational program development.
- An educator should develop a **well-defined plan for each learning experience** that includes goals, objectives, and appropriate teaching methods.
- Education and training should be **linked to a facility's organizational vision, mission, and values**.



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What does success look like?

“Successful educational activities in healthcare should be informed by learning theories and the educational needs of the learner population, the institution, and the community as they relate to infection prevention. Infection preventionists should provide an appropriate climate for learning as well as demonstrate creativity and flexibility.”



Background

- Training HCP is more challenging than ever as a result of:
- ★ • Diverse workforce = diverse learning styles, **educational levels**, cultural norms, etc. signals need for varied approaches
 - Increase in part-time and temporary staff, contract labor, students, volunteers
 - Emerging threats create ongoing need for education

Major Goals in Teaching

- Leverage IPs unique position to directly impact HCP and staff learning
- Increase learners' competence in problem solving, critical thinking, managing existing situations
- Teaching can be oral, written; formal, informal
- Expand learner's creative abilities



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Principles of Adult Learning

Conditions of Adult Education	Principles of Teaching
The learners feel the need to learn.	<ul style="list-style-type: none"> • The IP exposes the learners to new possibilities for self-fulfillment. • The IP helps the learners clarify their own aspirations for improved performance. • The IP helps the learners diagnose the gaps between their present level of performance and their desired level.
The learning environment is characterized by physical comfort, mutual respect and trust, mutual helpfulness, freedom of expression, and acceptance of differences.	<ul style="list-style-type: none"> • The IP provides physical conditions that are comfortable (as to seating, temperature, ventilation, lighting, decorations) and conducive to interaction (circle or small groups at tables). • The IP accepts the learners as persons of worth and respect their feelings and ideas. • The IP builds relationships of mutual trust and helpfulness with and among the learners by encouraging cooperative activities and refraining from inducing judgmental attitudes or competitiveness.
The learners perceive the goals of the learning experience to be their goals.	<ul style="list-style-type: none"> • The IP exposes their own feelings and contributes their resources in the spirit of mutual inquiry.
The learners accept a share of the responsibility for planning and operating the learning experience.	<ul style="list-style-type: none"> • The IP involves the learners in a mutual process of formulating learning objectives in which the needs of the learners, of the IP, of the institution, of the subject matter, and of society are taken into account. • The IP shapes their thinking about the options available in designing learning experiences and the selection of methods and materials and involve the learners in deciding among these options jointly.




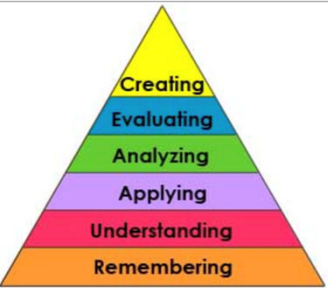
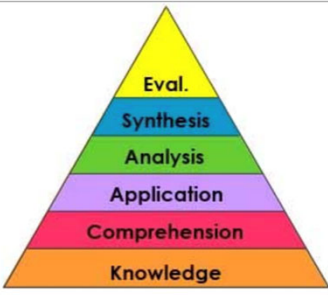
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Principles of Adult Learning

Conditions of Adult Education	Principles of Teaching
The learners participate actively in the learning process.	<ul style="list-style-type: none"> • The IP helps the learners organize themselves (teams, training projects, and so on) to share responsibility in the process of mutual inquiry. • The IP helps the learners exploit their own experiences as resources for learning through such techniques as group discussion, case method, and projects.
The learning process is related to and makes use of the experience of the learners.	<ul style="list-style-type: none"> • The IP gears the presentation of their own resources to the levels of experience of the learners. • The IP helps the learners to apply new knowledge to their personal experiences and thus makes the learned material more relevant and integrated.
The learners have a sense of progress toward their goals.	<ul style="list-style-type: none"> • The IP involves learners in developing mutually acceptable progress toward the learning objectives. • The IP helps the learners develop and apply procedures for self-evaluation according to these criteria.

Bloom's Taxonomy

- Benjamin Bloom 1956 – promote higher forms of thinking in education vs. memorization
- “Goals of the learning process” = **after being taught, learner should have new learning skills, knowledge, and/or attitudes**

			
	New Version	Old Version	
	Learning Behaviors	Goal of the Learning Process	
	Remembering: Can the learner recall or remember the information?	Define, duplicate, list, memorize, recall, repeat, reproduce state	
	Understanding: Can the learner explain ideas or concepts?	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase	
	Applying: Can the learner use the information in a new way?	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.	
	Analyzing: Can the learner distinguish between the different parts?	Appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.	
	Evaluating: Can the learner justify a stand or decision?	Appraise, argue, defend, judge, select, support, value, evaluate	
	Creating: Can the learner create new product or point of view?	Assemble, construct, create, design, develop, formulate, write.	

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Three types/domains of learning

1. Cognitive: mental skills (knowledge)
2. Affective: growth in feelings/emotional areas (attitude/self)
3. Psychomotor: manual or physical skills (skills)

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Cognitive Learning

Definition: Recall or recognition of knowledge involving the acquisition of new insights, new ways of thinking, problem-solving, and the development of intellectual abilities.

Examples:

1. *Recognize* the protective attire to be worn in caring for a patient on Contact Precautions.
2. *Evaluate* IPC policies specific to traffic control in the operating suite.



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Affective Learning

Definition: Learning new attitudes, values, beliefs, and way of being.

Examples:

Creating an environment which facilitates the learning experience and development of positive attitudes. Try to achieve a comfort level that reduces inhibition, promotes communication and creativity of thought.



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Psychomotor Learning

Definition: Learning new skills or new ways of acting or doing.

Examples:

- Demonstrating the appropriate techniques used to suction a tracheostomy.
- Demonstrating donning and doffing of PPE



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Behaviorism

- Approach to psychology, that combines elements of philosophy, methodology, and theory.
- Focuses on one particular view of learning: a change in external behavior a large amount of repetition of desired actions, the rewards of good habits, and the discouragement of bad habits.
- ★ **To sustain behavior following initial training, focus on repetition and reinforcement**



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Assessing behavioral change

★ The best way to assess behavioral change after a housewide HH education session is by:

Observing the behavior!

Example: By sending a trained anonymous observer to units to assess HCP and monitor compliance.



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★ General concepts drawn from learning and behavior theory

1. Include representatives of the target group into your planning. Not only does this promote ownership and responsibility, but it also can provide insight into what might be more effective educational strategy.
2. If the target group has a lot of cultural diversity, it will be important to secure planning input from groups not in the cultural mainstream of the target group.
3. Repetition of concepts over time and with various instructional or communication tools will enhance learning.
4. As much as possible, employ active learning strategies as opposed to just relying on passive, one-way dissemination of information.
5. Encouragement and recognition of mastery enhance learning. Learners need to know that they understand, are meeting expectations, and have strengthened their competency.
6. Multisensory learning is more effective. In developing instructional and communication strategies, try to use visual, auditory, and, as appropriate, the senses of taste, touch, and smell.



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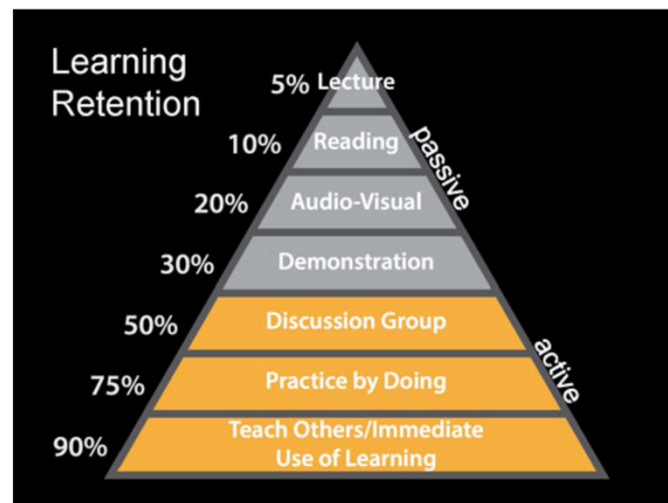
Active Learning

- Learners learn more and retain learning longer if they acquire it in an active manner vs. passive
- Involves learners in doing things and thinking about the things they are doing such as:
 - Quizzes
 - Games
 - Role playing
 - Small group problem solving
 - Case studies
 - Simulation



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See one, do one, teach one!



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Educational program development: Pearls

• Program Content

- Assessing educational needs of the learner population, the institution, and the community, as it relates to infection prevention, is the first step in effective program development
- Link knowledge/experience with content and use workplace examples to highlight points
- Include practice sessions as part of training exercises
- Preemptively plan reinforcement of training
- Ensure senior leader support to help with ongoing coaching needs

• HCP Competence

- Competency is a combination of knowledge, attitude, and skills that can be measured/evaluated
 - e.g., demonstrate standard and transmission-based precautions



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Educational program development

- Assessing Educational Needs – based on direct observation, internal incident reports, annual reviews, etc
- Goals and Objectives – must be clearly stated
- Learning Environment - optimize
- Common Classroom Settings – mix it up to fit content/approach
- Enhancing the Learning Experience



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Developing objectives: key concepts



Objectives describe each task or behavior the learner will be able to perform after completing the course, as well as the conditions under which each task/behavior will be performed. They should be:

- Must be specific
- Must be measurable
- Must be achievable
- Must be relevant to the material presented
- Must have a specific outcome



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Delivering educational content: common classroom designs to improve environment



- The **horseshoe shape** is an all-purpose setup. It allows face-to-face participant contact and provides a writing surface. The educator and training equipment are positioned for easy visibility. Participants can be positioned inside the "U" for group activity.
- **Team style** is achieved by arranging small tables and chairs around the room. It facilitates group activity and interaction. Some participants will have to turn their chairs around when the class reconvenes, but this is acceptable.
- **Conference table style** is best if the arrangement is circular or square; if it is rectangular, it creates a "person's table" effect and a sense of formality. The facilitator is placed at the head of the table in the power position.
- **Chevron or fishbone style**, a repeated V arrangement, creates less distance between participants and provides greater visibility of the educator. If the traditional classroom style is the only choice available, grouping the chairs in pairs promotes partnering. Provide enough space between rows to allow for the formation of quartets.
- **Stadium or auditorium style** is a limiting environment for active training. Participants can be paired for brief activities requiring a learning partner, although it may seem awkward to participants.



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Using learning style assessments to facilitate learning outcomes

Kolb learning style inventory places the learner into one of four learning styles:

1. **Accommodative**—prefers concrete experience and active experimentation
2. **Assimilative**—prefers abstract conceptualization and reflective observation
3. **Divergent**—prefers concrete experience and reflective observation
4. **Convergent**—prefers abstract conceptualization and active experimentation



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Using learning style assessments to facilitate learning outcomes (continued)

Dunn, Dunn, and Price Productivity Environmental Preference Survey (PEPS) is a self-diagnostic instrument and assesses four categories: Environmental—preference for light, noise, temperature, etc.

1. **Sociological**—preference for studying alone or in groups
2. **Physical**—visual, auditory, or kinesthetic
3. **Emotional**—responsibility, persistence, and motivation



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Using learning style assessments to facilitate learning outcomes (continued)

Vark inventory – an online assessment for auditory, visual, or kinesthetic preferences in learning



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Teaching styles - Grasha

Teaching Style	Characteristics
Expert	IPs use their vast knowledge base to inform learners and challenge them to be well prepared. This can be intimidating to the learner.
Formal Authority	This style puts the IP in control of the learner's knowledge acquisition. The IP is not concerned with learner-educator relationships, but rather focuses on the content to be delivered.
Demonstrator or Personal Model	The IP coaches, demonstrates, and encourages a more active learning style.
★ Facilitator	Learner-centered, active learning strategies are encouraged. The accountability for learning is placed on the learner.
Delegator	The IP role is that of a consultant and the learners are encouraged to direct the entire learning project.

- Mixed styles = improved learning outcomes
- Key Behaviors:
 - Eye contact
 - Positive facial expressions
 - Vocal tone



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Evaluation

Educational programs should be evaluated to ensure:

1. learner progress toward achieving program objectives
2. effectiveness of the educational process to foster learner learning
3. accomplishment of the mission of the institution to prepare HCP for optimal infection prevention and control activities

★ Can be formative/summative

- Formative = focuses on process, performed during planning session to get immediate feedback. Impacts current learners
- Summative = focuses on outcome, occurs after session completed. Impacts future learners

Examples include:

- Pre/post tests, Return demonstration, Direct observation (beware of Hawthorne effect), Exit questionnaires



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Innovative instructional models

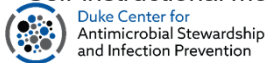
- Positive Deviance – “champions” in every group who problem-solve
- Creating Network Maps – enables clusters of HCP from different units to collaborate and eliminate barriers to infection prevention
- Distance Learning – ongoing education, training, collaboration, linking people across wide geographic areas



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Other instructional models

- ★ Lectures – ideal for presenting data when no collaboration/training needed (e.g. review accreditation survey results of IP program with managers)
 - Computer-based training – helps people complete training at their own pace
 - Games - interactive
 - Mass training delivery systems
 - Train the trainer – large numbers of staff need to be trained in short amounts of time
 - Role play/reenactment – can turn into training videos
- ★ Case studies - bridge the learning gap between theory and actual practice
 - Mentoring programs – peer-to-peer (HH)
- ★ Simulation – mock isolation room
 - Educational cart - portable means of displaying educational materials (e.g different types of resp protection)
 - Self-instructional modules – good for visual learners



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Just-in-time teaching

- JiTT uses feedback between classroom activities and work students do at home to prepare classroom. Provides context.
- Goal is to increase learning during classroom time, evaluate and fine tune learner needs, and motivate to modify and add to it and apply new knowledge.
- Example of when to use:
 - For new IP staff having trouble applying definitions
 - During environment of care rounds – correct front line provider behaviors in the moment

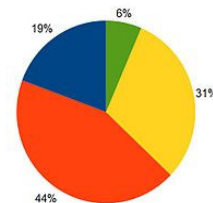


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Pie Chart



- Circular chart to display the mean score for each group.
- Best suited for visually and rapidly comparing one group to another.
- Example: Summarize the results of educational program provided to five different groups.



Hawthorne Effect



- Phenomenon whereby HCP improve or modify an aspect of behavior or skill in response to a change in their environment.
 - May yield a temporary and artificial high result.
 - Example: Worker aware they are being observed or monitored, rather than to nature of the change itself (e.g., hand hygiene observation).

Educational Resources



What are the most rigorous and reliable resources of clinical evidence to base educational programs?

- Standards issued by national or international authoritative sources
- Lesser but not the best resources include:
 - Best-practice guidelines from professional organizations
 - Consensus statements published by leading SMEs
 - Literature review of publications during the past 5 years.



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Education Summary: Key Concepts

1. Basic goal of HC education and training is to improve job skills and competence.
2. Healthcare is rapidly changing, and complex training must address literacy, diversity, cultural competency, cross-training, and technological advances.
3. Must be informed by learning theories and educational needs of learner population, institution, and community.



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INFECTION PREVENTION AND BEHAVIORAL MODIFICATIONS



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Key Concepts

- Programs to influence the human behavior aspect of infection prevention should reference relevant behavioral science theories
- Behavioral science theory applied in infection prevention can make practitioners more **efficient** and **effective** by helping them focus on factors likely to be important while avoiding investment of time and resources into factors unlikely to be important
- Current state of behavior theory application is not sufficient for the complexity of most behavioral challenges, including those in healthcare environments. Using behavior theory can improve success but not ensure total victory
- A focus on behavior change must be **supported** by organizational policies and procedures and environmental strategies to enhance the effect obtained by behavioral strategies implemented through infection prevention and control programming



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Challenges when implementing change

- Heifetz
- Technical
 - Those that can be solved by the knowledge of the experts (what)
- Adaptive
 - Requires new learning (how)



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Precede/Proceed

- ★ • Model where a target behavior (behavioral objective) may be changed by factors sorted into 3 categories: predisposing, enabling, reinforcing
 - **Predisposing:** factors that motivate people to change
 - Factual information, supportive attitudes and beliefs, personal values
 - **Enabling:** factors that capture the capacity to change
 - Necessary resources to change
 - **Reinforcing:** factors that determine if change will continue
 - Positive feedback



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Enabling Factors



Factors that allow the change process to occur:

Do they have necessary skills, capability, and necessary resources?

Managed by training and coaching for skill development or by helping obtain access to needed resources.

Examples: Is HH sanitizer or PPE readily accessible? Was the staff member trained how to correctly don/doff PPE?



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Examples of behavioral objectives relevant to IP Practice

Example 1: By the end of the next six months, 80% of the hospital's staff working in general patient areas will be following hand hygiene best practice all or almost all of the time.

Example 2: By the end of the next six months, 95% of the hospital's staff working in surgical suites will be following hand hygiene best practice all or almost all of the time.

Example 3: By the end of the next six months, 95% of the hospital's staff working in intensive care (ICU/CICU/NICU) units will be following hand hygiene best practice all or almost all of the time.

Example 4: By the end of the next six months, 75% of the managed care organization patients directed to take antibiotics will be taking their medications correctly and for the proper duration.

Example 5: By the end of the next six months, 90% of clinicians will use correct gloving techniques when at risk for exposure to patient bodily fluids all or almost all of the time.



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Key Behavioral Theories

- Cognitive
- ★ • Health belief model
- Social cognitive theory
- Transtheoretical model
- Diffusion theory
- Organizational development theory



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Cognitive



- Prescribes that the way to change health-associated behavior is to give people appropriate, factual information.
- Once they know, they will respond and change appropriately.
- No longer used – giving information has its place but isn't sufficient



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Health Belief Model

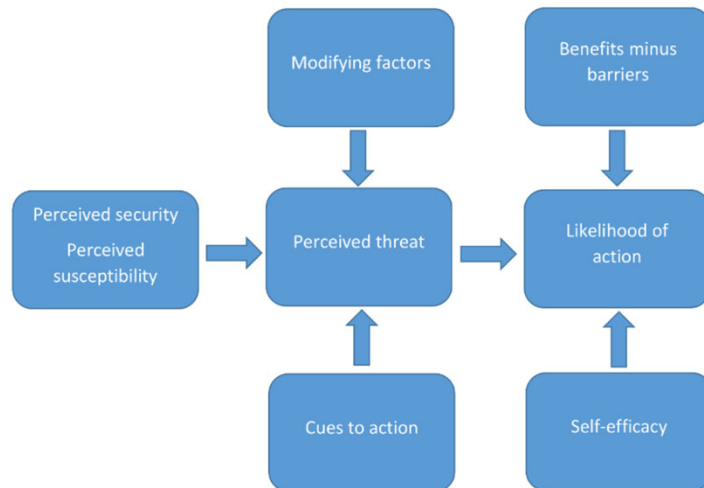
- Starts with the nature of beliefs in a target group regarding how serious a disease or health problem is and how likely they are to get the disease.
- Some gain must be perceived for behavior to change



Eg, role of HH in preventing pathogen transmission



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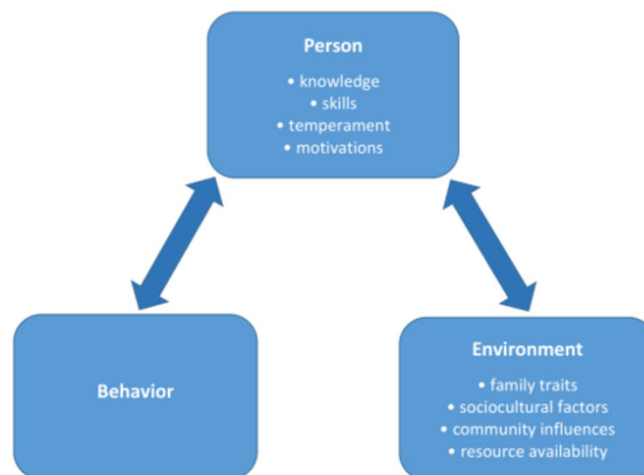
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Social Cognitive Theory

- Reciprocal determinism
- Factors are linked, not in a one-way cycle, but in a way where each influences the other
- Person's motivations, knowledge gaps, attitudes, and skill level must be addressed
- Environment must support change



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Transtheoretical Model

- Concept of readiness for change
- People can be categorized by different levels of change readiness is that the methods applied to different levels of readiness will not be the same
- Taylor Strategies based on stage of model*



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Positive Deviance

- Behavioral change approach that is based on the observation that in any community there exists individuals who have found uncommon practices and behaviors that enable them to achieve better results than their peers, despite the similarities of problems and available resources.



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Concepts from learning and behavioral theory

1. Include representatives of the target group into your planning. Not only does this promote ownership and responsibility, but it also can provide insight into what might be more effective educational strategy.
2. If the target group has a lot of cultural diversity, it will be important to secure planning input from groups not in the cultural mainstream of the target group.
3. Repetition of concepts over time and with various instructional or communication tools will enhance learning.
4. As much as possible, employ active learning strategies as opposed to just relying on passive, one-way dissemination of information.
5. Encouragement and recognition of mastery enhance learning. Learners need to know that they understand, are meeting expectations, and have strengthened their competency.
6. Multisensory learning is more effective. In developing instructional and communication strategies, try to use visual, auditory, and, as appropriate, the senses of taste, touch, and smell.



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Education Question 1

Adult learners are often motivated to learn by:

- 1) The need for new skills
 - 2) Professional standard mandates
 - 3) Desire for promotion and increased salary
 - 4) Changing cultural expectations
- a. 2, 4
b. 1, 3
c. 3, 4
d. 1, 4

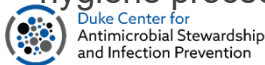


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Education Question 2

The healthcare facility has established a goal of improving infection prevention competency with hand hygiene among all staff. Which of the following education and training approaches should the IP recommend as a priority?

- a. Analysis of human factors that may present unrecognized obstacles for compliance
- b. Attending local/state health department educational programs on hand hygiene
- c. Implementation of a mentoring program based on peer-to-peer instruction and coaching
- d. Intensified disciplinary actions for employees who do not follow hand hygiene procedures



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Education Question 3

Which of the following should be used as a quality improvement measure for infection prevention education programs?

- a. The frequency of classes offered through the year
- b. The average number of attendees per class offered
- c. Summary of pre/post test scores for each class
- d. Analysis of program evaluation scores for all classes



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Education Question 4

The IP is asked to provide content for a hybrid education program. This model is most often based on:

- a. Attendance at a live event with assigned online follow-up activities
- b. Combination on online and independent for a specific topic
- c. Independent study with concurrent mentoring from a local expert
- d. Self-assessment of learning needs that is used to develop an instructional plan



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Education Question 5

Which of the following situations would be best for the IP to apply just-in-time learning principles?

- a. During a 30-minute orientation session for new employees
- b. With staff who repeatedly have problems applying infection definition
- c. In a medical staff meeting where surveillance priorities are being discussed
- d. For nurse managers evaluating monthly infection trend reports



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Education Question 6

A form of interactive training is often preferred among adult learners. However, in some situations a lecture may represent the best approach. In which of the following situations should the IP consider a lecture?

- a. When reviewing accreditation survey results for the infection prevention program with managers
- b. When addressing inaccurate data entry of reportable infections by a health data analyst
- c. After observing unsafe disposal of contaminated syringes in the ER
- d. When discovering employees with influenza-like symptoms providing patient care



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Education Question 7

Programs to build infection prevention competency have traditionally focused on a combination of skill and ability. Today, however, competency may include which of the following components?

- 1) Emotional intelligence
 - 2) Cultural diversity
 - 3) Communication Methods
 - 4) Effectiveness within a team
- a. 1, 2, 3
 - b. 2, 3, 4
 - c. 1, 3, 4
 - d. 1, 2, 4



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Education Question 8

The director has requested that the IP summarize the results of an education program to five different groups within the institution. The director specifically requests that the method used not only indicate the overall mean score for each group but also aid a simple comparative analysis for all who participated. The best data display technique to summarize these would be:

- a. A line list
- b. A pie chart
- c. A bar chart
- d. A spreadsheet



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Education Question 9

Many infection prevention programs address behavioral change. To achieve sustainable success following initial training, the IP must focus on which aspect of behavior?

- a. Avoidance of behavior change
- b. Repetition and reinforcement
- c. Need for approval and recognition
- d. Critical thinking and judgement



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Education Question 10

In which of the following infection prevention topics is the required educational content for employees most clearly described by a regulatory agency?

- a. Hand hygiene monitoring systems
- b. Environmental cleaning of hard surfaces
- c. Active surveillance for methicillin-resistant *Staphylococcus aureus* in hospitals
- d. Prevention employee exposure to bloodborne pathogens



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Education Question 11

An employee scored below the minimal acceptable level on the annual review of IP competencies. The employee has attempted to pass the written test three times and has now been referred to IP for additional help. What should the IP evaluate first?

- a. The employee's motivation to learn or review material
- b. The length of time the individual has been employed in health care
- c. The employee's anxiety regarding test taking
- d. The employee's literacy and reading ability



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Education Question 12

During an IP class, 1 person repeatedly interrupts, contradicts the instructor, makes negative comments. The most important thing the IP can do in this situation is:

- a. Request the individual be removed by security
- b. Insist that the individual remain silent
- c. Remain calm and assess the best way to intervene
- d. Dismiss the class and apologize to the instructor



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Education Question 12

The need to include employee education for IP is included in all of the following program components except:

- a. Facility IP risk assessment
- b. Facility IP program plan
- c. Annual facility budget and allocation of resources
- d. Facility 5-year strategic plan



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Education Question 13

The IP received feedback from course attendees that the didactic component is too lengthy and difficult. Which training component should the IP now reevaluate for its effectiveness?

- a. Lab-based simulation training
- b. Supervised clinical practice in patient care areas
- c. The classroom portions of the training program
- d. The testing requirements for course completion



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Education Question 14

Direct observation of performance by an individual of a specific skill may yield a temporary and artificial high result. This phenomenon is known as the:

- a. Hawthorne effect
- b. Measure of success
- c. Score of inflation risk
- d. Robertson's rule



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Education Question 15

The IP wants to ensure that the educational programs are based on the most rigorous and reliable sources of clinical evidence. Which of the following sources would best meet this need?

- a. Standards issued by national or international authoritative sources
- b. Best-practice guidelines from professional organizations
- c. Consensus statements published by leading subject matter experts
- d. Literature review of publications during the past 5 years



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Education Question 16

Direct observation of performance by an individual of a specific skill may yield a temporary and artificial high result. This phenomenon is known as the:

- a. Hawthorne effect
- b. Measure of success
- c. Score of inflation risk
- d. Robertson's rule



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Education Question 17

The process of evaluating learner response to an individual test questions in order to determine the quality and accuracy of those questions is known as:

- a. Validity testing
- b. Correlation
- c. Item analysis
- d. Risk adjustment



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Education Question 18

After holding a housewide education session on HH, the IP wants to evaluate how effective the sessions were in changing behavior. The most common way to assess HH behavior is:

- a. Post-test for participants to find out how much info they retained on HH
- b. Monitor job performance reviews for 1 year after the session to identify deficiencies related to HH
- c. Send an anonymous observer to the floors to assess HH compliance
- d. Conduct a survey to find out if participants have changed their HH behavior



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Education Question 19

Which of the following would be an **enabling factor** to increase HH compliance with staff in the ICU?

- a. Easy access to hand sanitizer, sinks, and soap
- b. Staff rewards for good HH
- c. Staff knowledge of contact transmission of infections
- d. Counseling for staff members who are observed not performing HH



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QUALITATIVE RESEARCH METHODS



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Key Concepts

- Qualitative inquiry is an approach to answering a question and may be synonymous with “research” when completed using a systematic process.
- Qualitative methods can be used to answer important exploratory questions, such as why and how. The results can assist in providing rich detail and meaning to specific phenomena important to infection prevention practice (explain vs. measure)
- High-level view of qualitative approaches, including narrative, phenomenology, grounded theory, and ethnography.
- Limitations = lack of generalizability



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Key Terms

- **Inductive approach to inquiry:** A method of inquiry that seeks to develop a new theory from the ground up based on findings from the process.
- **Deductive approach to inquiry:** A method of inquiry that tests existing theory from the top down.
- **Narrative:** A qualitative method that includes a complex account of an individual's experience in the context of their social or cultural environment
- **Phenomenology:** A qualitative method that is similar to narrative, but strives to remove individuality and discover the essence of a phenomenon
- **Grounded theory:** A qualitative method that is used to generate new theories, explanations, or concepts about a process or series of actions
- **Ethnography:** A qualitative method in which the goal is to understand the lives of individuals and the meanings of human behavior; linked specifically to cultural experiences



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	Quantitative methods	Qualitative methods
Key characteristics	Based on the scientific method Deductive approach Structured Theory testing	Based on philosophical assumptions Inductive approach Exploratory Theory generating
Design	Experimental or epidemiological	Holistic and contextual
Sampling	Gold standard is randomized sampling Generalizable to population	Usually purposive, non-randomized Not generalizable beyond study population
Measures or data	Objective Numeric Reliable Reproducible	Subjective Unique Differs over time, sample, and context
Biases	Random or systematic error possible and should be controlled through study design or statistical analyses	Investigators' personal history, philosophical assumptions, and cultures should be acknowledged and addressed in text
Analysis	Statistical hypothesis testing	Inductive content analyses for common themes
Interpretation	Generalizability is key	Individuality of experience is key

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Different Approaches to Qualitative Research

Approach	Description	Details	Examples for infection prevention
Narrative	Complex account of an individual's experience in the context of their social or cultural environment	A chronological accounting of event/series of events; Should include a description of the context in which the events took place	Biography to tell the story of the nurse in Dallas who contract Ebola with the aim of shedding light on key infection control concerns during that time, as well as lessons learned.
Phenomenology	Similar to narrative, but strives to remove individuality and discover the essence of a phenomenon	Collection of stories or perceptions from multiple individuals with the aim to reduce the details to identify a common theme; not meant to be a chronological accounting of events	Phenomenological description of surgical site infection among patients – more than describing a disease event, accentuating the fear, frustration, and insecurity of patients with this experience.
Grounded theory	Used to generate new theories, explanations, or concepts about a process or series of actions	Theory is developed in an iterative style as investigators collect more data; not designed to describe the process but explain it	Grounded theory exploration of the process of patient preparation for colon surgery to enhance the effectiveness of preoperative prevention practices
Ethnography	Goal is to understand the lives of individuals and the meanings of human behavior; linked specifically to cultural experiences	Collection of observations, interviews, field notes, and archival data to describe the everyday experience within specific cultures	Ethnographic study of hospital-specific cultural influences on hand hygiene and PPE use

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Using qualitative methods as an IP

- Identify primary aim, determine method to use, outline study in a proposal
- 3 key elements to achieving rigor: reliability, credibility, transferability
- Reliability – how well can another researcher follow decision trail of investigator?
- Credibility – spend time in the environment, build trust, data triangulation
- Transferability – will conclusions made hold true outside the study?



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Method	Qualitative approaches	Details
In-depth interviews	<ul style="list-style-type: none"> • Phenomenology • Narrative • Grounded Theory • Ethnography 	<ul style="list-style-type: none"> • Usually semi-structured with open-ended questions from an interview guide. • Should be completed in person, though phone or video chat are options as well. • Interviewers should allow participants to do most of the talking with little interference; prompt but do not rule the conversation • Practice to become a proficient interviewer prior to working with participants; try to place participants at ease with casual conversation and natural settings • Prepare to record the interviews for transcription and analysis, but also to take detailed notes if the participant is not comfortable being recorded
Group interview	<ul style="list-style-type: none"> • Phenomenology • Grounded Theory • Ethnography 	<ul style="list-style-type: none"> • May include focus groups, consensus panels, natural groups, or community interviews • Groups should generally include 6-10 people, though it is acceptable to have fewer than 6; any more than 10 could prevent all participants from having input. • Tend to require fewer resources than individual in-depth interviews and may provide comfort to individuals uncomfortable in an interview setting. • Not appropriate for sensitive subjects. • If participants do not know each other, consider "breaking the ice" prior to initiating discussion on research topic
Observation	<ul style="list-style-type: none"> • Phenomenology • Grounded Theory • Ethnography 	<ul style="list-style-type: none"> • Valuable because they allow data collection without direct interaction with study subjects or environment; permits study of everyday practices and routines • Can also be conducted as a participant in the environment • May be overt or covert, but researcher should minimize discomfort of participants under observation • Data should be recorded in field notes that include both descriptive and reflective details
Document and audiovisual material review	<ul style="list-style-type: none"> • Phenomenology • Ethnography • Grounded Theory • Narrative 	<ul style="list-style-type: none"> • May include any number of physical or digital media, including photographs, e-mails, memos, video recordings, internet websites, patient charts, policies, etc. • Provides a good source of data that is already "produced" • Can fill gaps or holes in the "big picture" that were not closed with interviews or observation; also can provide historical perspective that may be subject to recall bias by participants



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RESEARCH DESIGN

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Research – exam will evaluate knowledge of the following

1. Conduct a literature review
2. Critically appraise the literature (e.g., p-value, peer reviewed)
3. Facilitate incorporation of applicable research findings into practice
4. Identify opportunities for research related to performance improvement (e.g., effectiveness studies, product trials)

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Study Type	Other Names	Basic Design	Advantages	Disadvantages
Descriptive	Case report	Description of one or small number of cases by person, place, and time	★ Quick, easy; may be useful to formulate hypotheses and identify potentially important populations	No controls for comparison, and risk factors cannot be estimated
	Case series	Description of a defined number of cases by person, place, and time	Same as case report, except rates may be estimated	Same as case report
Analytical cross-sectional	Prevalence, correlational, or survey	Outcome and potential risk factors are assessed in a population group at one point in time	★ Quicker, easier, and cheaper than cohort studies; useful to describe extent exposures in a population; serial cross-sectional studies can investigate changes in prevalence	Incidence cannot be determined; temporal sequence of cause and effect for risk factors and outcome cannot be determined; risk of selection bias
Case-control	Case-referent, comparison	Population of individuals with and without the outcome are identified, then compared for exposures to one or more potential risk factors	★ Quicker, easier, and cheaper than cohort study, especially if outcome is rare or has long latency period; useful in studying multiple possible risk factors for an outcome; if outcome is rare, a smaller study size is needed than for a cohort study	Measures exposure rate, not exposure-specific incidence; risk exposure may be unavailable or difficult to assess, subject to recall bias or inaccuracy, or biased by knowledge of outcome; selection of proper controls may be difficult; temporal sequence of cause and effect for risk factors and outcome cannot be determined with certainty
Cohort	Prospective, longitudinal	Population of individuals with and without exposure to potential risk factors are identified and followed to compare the incidence of the outcome in each group	Exposure-specific incidence of outcome can be measured directly; usually less bias in patient selection and determining exposure information than in case-control study; useful in studying outcomes with short latency period and multiple possible outcomes from exposure to a potential risk factor; provides stronger evidence for a direct causal association than do cross-sectional or case-control studies	Longer, more expensive to conduct, especially if outcome has a long latency period following exposure; if outcome event is rare, a large study size is needed; outcome determination may be biased, and individuals may be lost to follow-up
Experimental clinical trials	Controlled trial, randomized clinical trial (RCT)	★ Investigator assigns interventions to an experimental (or treated) group and to a control (or placebo or standard care) group (randomized allocation is the best method); experimental and control groups should be treated similarly in all respects, except for the intervention, and are followed to compare the incidence of the outcome in each group	Randomization minimizes bias; double-blinding minimizes bias in determining outcomes; RCT provides better evidence for a direct causal association than do other study designs and is the best design to use to establish efficacy of treatment or intervention	More expensive, difficult to conduct; artificial; only a select subgroup of individuals are included, which limits generalization to other groups; randomization does not guarantee similar comparison groups; if historical controls are used, they are subject to selection bias, and findings must be interpreted with extreme caution

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Systematic review & Meta-analysis

- Used to identify, collect, analyze, and summarize empirical evidence related to a specific research question
- ★ • May include a **meta-analysis**, in which statistical methods are used to integrate the results of multiple and independent studies
- Systematic reviews not only describe what is currently known about a specific question but can also be used to determine what additional studies should be undertaken to address uncertainties

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★ Anatomy of a research paper

- Abstract - brief **summary** of the purposes of the study, and of its methods, main findings, and conclusions
- Introduction - presents the justification and purpose of the research in the context of the existing problem and its relationship to other current research. Research ? Is clearly stated.
- Methods - describes the study population, including inclusion criteria and methods used to determine sample size as well as methods used for data analysis
- Results - Data are presented in the text and summarized in tables and/or figures. Statistical analyses should include the appropriate measures of association, and summary measures (such as relative risk or odds ratio) and measures of precision (p values or confidence intervals) should be reported
- Discussion - interpretation of the major finding(s) of the study, a statement of study limitations, and suggestions for applications of the findings and future research



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Internal validity

- How well an experiment is done, especially whether it avoids systematic errors.
- High degree demonstrates strong evidence for causality
- In the methods section, describes what procedures were followed to minimize threats, the results section reports relevant data, and the discussion section assesses the influence of bias.



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Null hypothesis

- Hypothesis that there is no statistical significance between the two variables or two populations, any observed difference being due to sampling or experimental error.
- Usually, the hypothesis a researcher or experimenter will try to disprove or discredit.
- **The p value of (≥ 0.05) is the probability of obtaining the observed sample results (or a more extreme result) when the null hypothesis is actually true.**



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The alternative hypothesis

- An alternative hypothesis is one that states there is a statistically significant relationship between two variables.
- **If the p value is within the significant level (≤ 0.05), it suggests that the observed data is inconsistent with the assumption the null hypothesis is true, so the null hypothesis must be rejected and the alternative hypothesis accepted as true.**



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Delphi technique



The Delphi technique is a well-established approach to answering a research question through the identification of a consensus view across subject experts.

Completed before the research.



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Research Summary – Key Concepts

1. Critical evaluation of published research is necessary to assess usefulness and validity of research findings.
2. Incorporating evidence-based research findings into practice serves to improve safety, quality care, and outcomes of individuals, providers and organizations.



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Research question 1

All of the following are features of well-written research methods sections except:

- a. Time period of the study
- b. Clear criteria for defining cases and controls
- c. Questions the research will answer
- d. Methods of quality assurance



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Research Question 2

Which of the following questions should be asked when evaluating results from a research study?

- 1) Were the instruments valid for the study?
- 2) Is this a peer-reviewed research journal?
- 3) Was the sample representative of the intended population?
- 4) Do the conclusions prove the hypothesis?

- a. 1, 2, 3
- b. 2, 3, 4
- c. 1, 3, 4
- d. 1, 2, 4



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Research Question 3

An assessment of internal validity and the influence of bias can be found in which section of a research study?

- a. Introduction
- b. Results
- c. Discussion
- d. Methods



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Research Question 4

The abstract in a research study must include:

- a. A review of the literature
- b. A biographical profile of the principal investigator
- c. The intent or objective of the study
- d. Conflict of interest disclosures



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Research Question 5

Which of the following refers to the statistical technique that combines the results of a large number of studies?

- a. Linear regression analysis
- b. Inferential statistics
- c. Meta-analysis
- d. Axiomatic approach



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Research Question 6

The IP is reviewing a research study to assess the association between needless connectors (NC) change frequency and CLABSI rate. In a multivariate analysis, the CLABSI rate was significantly higher ($p=0.001$) among patients that had NC changed every 24 hours compared to patients changed at 96 hours. The IP knows that value this p value indicates more evidence in support of which of the following?

- a. The alternative hypothesis
- b. The quality of the analysis
- c. The null hypothesis
- d. The statistical hypothesis



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Additional questions: education & research

- Exam 1: 42, 61, 62, 85,89, 96, 120
- Exam 2: 27, 58, 69, 79, 92, 93, 102, 103, 111, 117, 118, 129
- Exam 3: 6, 41, 48, 66, 69, 97, 106, 118, 125, 130, 131



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