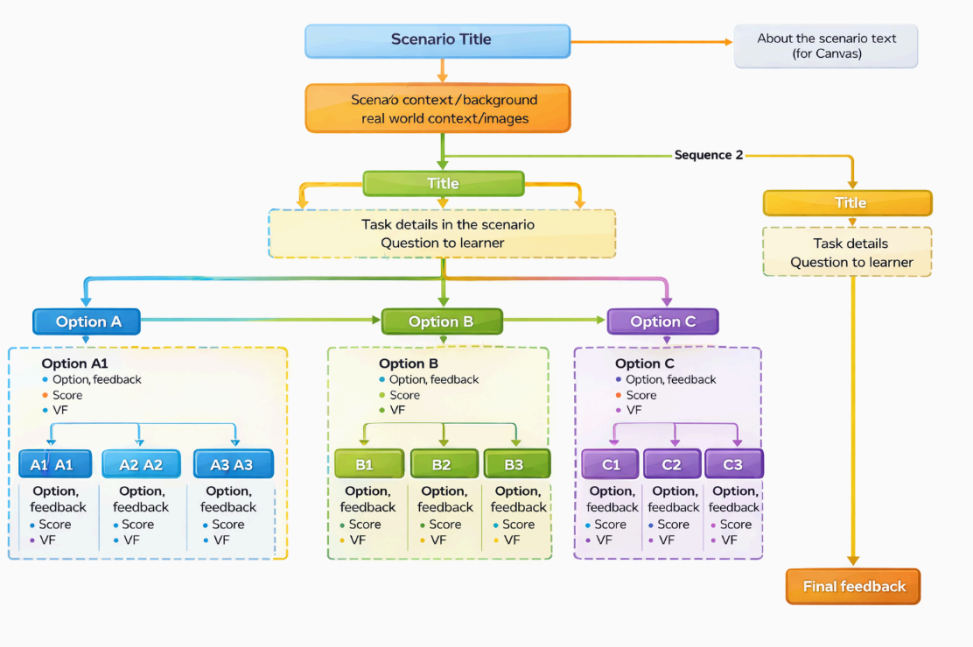
Component Title	Inspect a Hospital Medical Gas Line and Make It Patient-Ready
Component Type	Linear branching scenario
Subject Matter & Subject Task	Medical Gas Pipeline Systems (MGPS)
Subject focus (General, Clinical, Infrastructure)	Infrastructure
Performance domain (Skills, Knowledge, Risk Management)	Skills
Topic Focus	Securing and inspecting medical gas line fittings
Regulatory Standard	NFPA 99 – Health Care Facilities Code
Source Content	NFPA 99: Health Care Facilities Code HTM 02-01 Medical Gas Pipeline Systems
Keywords	Inspect, secure, medical gas, oxygen line, fittings, branch connection, pressure integrity
Component Description	This is a real-world scenario that focuses on the critical aspects of inspecting, securing, and validating medical gas pipeline connections in a hospital environment. By the end of the exercise, the system should be verified as safe, compliant, and ready for patient use.
Component Type	Branching scenario
Component Time	15 minutes

Link title	Activity Instructions
On-Screen Text	Step into realistic challenges where your decisions directly affect patient safety. You'll be asked to assess situations, apply technical standards, and choose actions that align with healthcare regulations and best practices. **What You'll Do** ● Face real-world scenarios grounded in NFPA 99 requirements and hospital safety protocols. ● Apply inspection and securing techniques accurately and responsibly in ways that reflect good judgment, situational awareness, and regulatory compliance. Refer to NFPA 99 sections on medical gas pipeline inspection to reinforce your knowledge. ● Make informed decisions and see how your actions impact patient safety, compliance outcomes, and facility readiness. ● Replay and reflect to see how different choices affect outcomes technically, operationally, and in terms of patient risk.

	How It Works Each decision point includes **three response options**: ● **Fully correct** – Demonstrates sound judgment and technical accuracy. *(2 points)* ● **Partially correct** – Shows effort, but with room for improvement. *(1 point)* ● **Incorrect** – Fails to meet expectations or misapplies concepts. *(0 points)* You can revisit and replay each scenario as many times as you'd like to improve your score or test different strategies. *Note: This activity does not have audio.*
Note to developer	The information on this screen is for the Global 'Activity Instructions' button.
Content source	N/A
Additional content (Y/N)	Y

Screen#	Introduction
Component Title	Inspect a Hospital Medical Gas Line and Make It Patient-Ready
Screen type	Text and image
Estimated duration	1 minute
Image description/source	
Alt Text	Technician inspecting hospital medical gas piping

Text <Text in gray does not change.>	You're about to step into the role of a hospital facilities technician assigned to a critical task: inspecting and securing medical gas pipeline connections in a patient care area. The ward is scheduled to reopen shortly, and it's your responsibility to ensure the system is safe for clinical use. **Your mission** Work through a series of tasks that require accurate execution of NFPA-compliant inspection and securing procedures. The decisions you make will directly impact patient safety and regulatory compliance. **Think like a healthcare infrastructure professional!** ● Anchor connections correctly: Start at the correct junction, use approved securing methods, and verify fittings are properly seated. ● Inspect with safety in mind: What "looks tight" may still leak under pressure. Compliance is non-negotiable. ● Respect the system: Medical gas lines directly support patient life. Improper handling can cause pressure loss or contamination. ● Decide with foresight: Consider how today's inspection holds up during continuous clinical use.
Note to developer	The activity will follow the following structure: 
Content source	N/A

<table>
<tr>
<td>Performance Feedback (Score)</td>
<td>For every question there are three options that will earn different scores:
● Correct - 2
● Partially correct - 1
● Incorrect – 0

The score will add up in real time to show the student how they are performing.

Maximum possible score: 12
Least possible score: 0</td>
</tr>
<tr>
<td>Visual Feedback Indicator (VF)</td>
<td>The numeric score will be accompanied by a graphic/visual feedback indicator. For this exercise, we will use two graphics:
● A local indicator that will track the student’s performance for every question answered – Task efficiency
● A global indicator that will demonstrate the degree of aircraft readiness – Aircraft readiness

Local indicator

Labelled as ‘Task efficiency’, there will be one local indicator for each of the 3 tasks.

This will be a half-circle gauge that moves from red to green:
● Critical Fault (0–49%)
● Compromised Flight Readiness (50–79%)
● Flight-Ready (80–100%)

How it will work:
● The needle will start at 0.
● The meter will have markings in percentages:
o 0, 50, 75, 100
● The percentage will be calculated as the student attempts each question in the task and will add cumulatively.
o Eg: Task 1
▪ Q1: Correct answer = 2/2 = 100%
▪ Q2: Incorrect answer = (2+0)/4 = 50%
o Task 2
▪ Q1: Correct answer = 2/2 = 100%
▪ Q2: Partially correct answer (2+1)/4 = 75%
o Task 3
▪ Q1: Partially correct answer = 1/2 = 50%
▪ Q2: Partially correct answer = (1+1)/4 = 50%
● Every decision will move the needle according to the percentage achieved.</td>
</tr>
</table>

Adobe Stock image : 476970176

Global indicator:

Labelled as 'Patient readiness', there will be one bar across the scenario that will track the cumulative performance percentage over the 3 tasks.

- Since there are 3 tasks, with a maximum possible score of 12, the numeric score will add up across the 3 tasks. The subsequent percentage will be reflected on the bar as the person progresses from question to question.
- Here the percentage will be calculated on a total of 12.
    - Eg: Task 1
        - Q1: Correct answer = 2/12 = 16.5%
        - Q2: Incorrect answer = (2+0)/12 = 16.5%
    - Task 2
        - Q1: Correct answer = (2+0+2)/12 = 33%
        - Q2: Partially correct answer (2+0+2+1)/12 = 41.5%

Adobe Stock Image: 516870295

The bar will have 3 colors with corresponding numeric ranges and the provided text:

- Critical Fault (0–49%)
- Compromised Flight Readiness (50–79%)
- Flight-Ready (80–100%)
- On the bar, we only need numeric markers in multiples of 10
    - Starting point: 0, 10, 20, 30...until Final point (100)

<IP title> **Scenario: Lacing and Tying Wire Bundles**

<Intro: to be added within the scenario>

You’re a junior hospital facilities technician working in a busy healthcare environment. Your supervisor assigns you to inspect and secure medical gas lines in a patient care area as part of routine safety checks. The ward is due to reopen in a few hours. You’ll need to assess the installation and carry out three specific tasks, ensuring compliance with healthcare safety standards.

<Provide the Begin scenario button>

<Task Title 1> **Task 1: Perform single-cord lacing on a primary wire bundle.**

<Task/Decision 1> You're about to begin securing a primary medical gas line near a patient headwall. What step will you take first?

*Choose the correct option and select **Submit**.*

<Add image>

Option A	Feedback	Score	Option B	Feedback	Score	Option C	Feedback	Score
Begin at the narrowest section of the gas line using a standard	**Incorrect.** Starting at the narrowest section can cause uneven pressure	Score: 0 VF: Local VF: : 0/2	Start at the main supply connection of the gas line	**Correct.** Healthcare facility standards require securing medical gas lines	Score: 2 VF: Local VF: : 2/2	Apply a temporary restraint near the main connection and	**Partially correct.** Although you should begin near the main	Score: 1 Local VF: 1/2 Global VF: 1/12

tightening clamp.	during operation. Healthcare safety guidelines specify starting at the primary connection point to maintain pressure stability and alignment. Additionally, a standard clamp is not approved as an initial securing method for medical gas systems.	Global VF: 0/12	using an approved locking fastener.	to begin at the primary supply connection using approved locking fasteners. This provides a secure anchor and maintains pressure integrity throughout the system.	Global VF: 2/12	continue securing with standard clamps.	supply connection, temporary restraints are used only for short-term positioning, not permanent securing. Using them in this context would not provide the required stability or compliance. Standard clamps are also not approved for this task.	
<Decision 2>			<Decision 2>			<Decision 2>		
Having secured the line at an incorrect narrow section, you continue fastening. How frequently should approved fasteners be placed?			**Once you've begun securing with an approved locking fastener, how should you complete the securing process?**			**While using a temporary restraint for permanent securing, what issue might arise?**		
Option A1:			**Option B1:**			**Option C1:**		
They should be placed only at the start	**Incorrect.** Fasteners are required at regular	Score: +0 Local VF: 0/4	Continue using temporary restraints and	**Incorrect.** Temporary restraints are not used for	Score: +0 Local VF: 2/4	The restraint may not maintain pressure	**Correct.** Temporary restraints are not designed	Score: +2 Local VF: 3/4

and end of the line.	intervals along the line and at all junction points to ensure stability during pressure changes and operation. Limiting them to only the ends is insufficient and non-compliant.	Global VF: 0/12	leave excess material for adjustment.	permanent medical gas installations, and leaving excess material can interfere with nearby equipment. Healthcare standards require clean termination with no loose components.	Global VF: 2/12	stability over time.	to withstand continuous pressure or vibration. When used incorrectly, they can compromise system integrity and patient safety.	Global VF: 3/12
Option A2:			**Option B2:**			**Option C2:**		
They should be placed only at junction points.	**Partially correct.** Junction points do require fasteners, but healthcare guidelines also require placement at regular intervals along the entire line to maintain	Score: +1 Local VF: 1/4 Global VF: 1/12	Finish with a standard clamp and trim excess material.	**Correct.** While trimming excess material is required, standard clamps are not the prescribed final securing method for medical gas lines.	Score: +2 Local VF: 3/4 Global VF: 3/12	The securing will become tighter and more reliable.	**Incorrect.** Using an improper securing method does not increase reliability. It introduces risk and may fail safety inspection.	Score: +0 Local VF: 1/4 Global VF: 1/12

	stability and organization.							
Option A3:			**Option B3:**			**Option C3:**		
They should be placed at regular intervals and at each junction point.	**Correct.** This is the healthcare-recommended method. Placing fasteners consistently and at every junction ensures the line is securely installed and compliant.	Score: +2 Local VF: 2/4 Global VF: 2/12	Finish with an approved locking fastener and verify pressure integrity.	**Correct.** This completion method aligns with healthcare safety standards. Verification ensures the system is secure and ready for clinical use.	Score: +2 Local VF: 4/4 Global VF: 4/12	It allows the securing process to adjust more easily.	**Partially correct.** While temporary methods may allow adjustment, they are not approved for permanent installations and are not recommended.	Score: +1 Local VF: 2/4 Global VF: 2/12

<Task Title 2> **Task 2: Secure a medical gas line between two fixed support points**

<Task/Decision 2> During scheduled facility maintenance, you're tasked with securing a medical gas line that runs along a hospital corridor ceiling between two fixed support points. The distance between these supports exceeds recommended spacing limits. You must apply a securing method that ensures the line is compliant and protected from movement, vibration, or pressure-related stress.

What material should you use to secure the medical gas line between the supports, and how should it be applied?

Option A	Feedback	Score	Option B	Feedback	Score	Option C	Feedback	Score
Use approved metal pipe clamps and secure the line using manufacturer-recommended spacing.	**Correct.** Healthcare facility standards allow the use of approved pipe clamps and require them to be installed at defined intervals to ensure stability and compliance under operational conditions.	Score: 2 VF: Local VF: 2/2 Global VF: (Task 1 score) +2 /12	**Use temporary plastic ties wrapped multiple times without locking mechanisms.**	**Partially correct.** While temporary restraints may hold the line initially, healthcare standards specify that permanent installations must use approved securing hardware. Temporary ties are not the default or	Score: 1 Local VF: 1/2 Global VF: (Task 1 score) +1 /12	**Use color-coded temporary tags to hold the line in position.**	**Incorrect.** Color-coded tags are intended for identification and temporary marking only. Leaving them in place can lead to loosening and non-compliance during operation.	Score: 0 Local VF: 0/2 Global VF: (Task 1 score) + 0 /12

				preferred method.				
<Decision 2>			<Decision 2>			<Decision 2>		
Once the line is secured, what should you do with any excess securing material?			**What must be done if temporary restraints were used during installation?**			**Why are temporary tags unsuitable for permanent medical gas line securing?**		
Option A1:			**Option B1:**			**Option C1:**		
Leave excess material accessible for inspection and future adjustment.	**Incorrect.** Leaving excess material poses a snagging and safety risk. Healthcare guidelines require clean finishes with no loose components.	Score: +0 Local VF: 2/4 Global VF: (Task 1 score) +2 /12	Replace temporary restraints with approved hardware before system release.	**Correct.** Temporary restraints must be removed and replaced with approved permanent securing methods prior to system activation.	Score: +2 Local VF: 3/4 Global VF: (Task 1 score) +3 /12	They are weaker than permanent securing hardware.	**Partially correct.** Strength is not the only concern. Temporary tags are not rated for continuous use or pressure-related environments.	Score: +1 VF: Local VF: 1/4 Global VF: (Task 1 score) + 1 /12
Option A2:			**Option B2:**			**Option C2:**		
Trim or remove excess material to ensure a clean installation.	**Correct.** Removing excess securing material prevents interference and supports compliance with healthca	Score: +2 Local VF: 4/4 Global VF: (Task 1 score) + 4 /12	Leave temporary restraints in place if they appear stable.	**Incorrect.** Visual stability is not sufficient. Temporary restraints must not remain in service	Score: +0 Local VF: 1/4 Global VF: (Task 1 score) +1 /12	They are designed for temporary use and may loosen over time.	**Correct.** Temporary tags and ties are meant to be removed. Leaving them in place compromises	Score: +2 Local VF: 2/4 Global VF: (Task 1 score) + 2 /12

	re installation standards.			installations.			long-term safety and compliance.	
Option A3:			**Option B3:**			**Option C3:**		
Seal excess material with tape to prevent movement.	**Partially correct.** Sealing is unnecessary when approved hardware is installed correctly. Proper fastening alone is sufficient.	Score: +1 Local VF: 3/4 Global VF: (Task 1 score) + 3 /12	Over-tighten restraints to ensure they do not loosen.	**Partially correct.** Excessive tightening can damage lines or fittings. Proper torque and spacing—not force—ensure compliance.	Score: +1 Local VF: 2/4 Global VF: (Task 1 score) +2 /12	They are harder to track during inspections.	**Incorrect.** Visibility is not the issue. The primary concern is that they are not approved for permanent securing.	Score: +0 Local VF: 0/4 Global VF: (Task 1 score) + 0 /12

<Task Title 3> **Task 3: Secure a branch connection from a main medical gas line**

<Task/Decision 3> You are working above a patient room where a branch line connects from a main medical gas pipeline to a wall outlet. Your task is to secure the branch line according to healthcare-approved procedures. Proper branch securing is critical to prevent stress on fittings, leaks, or inspection failures.

How should you begin securing the branch line from the main medical gas pipeline?

Option A	Feedback	Score	Option B	Feedback	Score	Option C	Feedback	Score
Begin securing on the branch line, using any nearby fastener on the main line as an anchor.	**Incorrect.** Securing must begin with a new fastener placed just past the branch-off point on the main line. Reusing an existing fastener can result in looseness and non-compliance.	Score: 0 Local VF: 0/2 Global VF: (Task 1 score + Task 2 score) + 0 / 12	Start with a new fastener on the main line just past the branch point, then secure along the branch.	**Correct.** Healthcare facility standards recommend beginning with a new securing point placed just after the branch connection, then continuing with evenly spaced fasteners along the branch line.	Score: 2 Local VF: 2/2 Global VF: (Task 1 score + Task 2 score) + 2 / 12	Secure both the main and branch lines together using a single fastening method.	**Partially correct.** While proximity securing may appear stable, combining lines does not meet separation and movement requirements for branch connections.	Score: 1 Local VF: 1/2 Global VF: (Task 1 score + Task 2 score) + 1 / 12
<Decision 2>			<Decision 2>			<Decision 2>		

You've incorrectly reused an old fastener. As you continue, how should securing points be spaced?			**You're securing a branch line with heavier hardware. How should you complete the securing process?**			**Why is it problematic to secure both the main and branch lines together?**		
Option A1:			**Option B1:**			**Option C1:**		
Use irregular spacing based on line diameter.	**Incorrect.** Healthcare standards require regular spacing of securing points to ensure uniform support, safety, and ease of inspection, regardless of line size.	Score: +0 Local VF: 0/4 Global VF: (Task 1 score + Task 2 score) + 0 / 12	Finish with oversized hardware and leave excess clearance.	**Incorrect.** Oversized hardware can cause vibration and stress. Excess clearance violates installation guidelines.	Score: +0 Local VF: 2/4 Global VF: (Task 1 score + Task 2 score) + 2 / 12	It restricts independent movement during pressure changes.	**Correct.** Each line must accommodate movement independently. Securing them together can stress fittings and cause leaks.	Score: +2 Local VF: 3/4 Global VF: (Task 1 score + Task 2 score) + 3 / 12
Option A2:			**Option B2:**			**Option C2:**		
Place securing points closer near the branch and farther apart afterward.	**Partially correct.** Extra support near branch points is useful, but spacing must remain consistent throughout.	Score: +1 Local VF: 1/4 Global VF: (Task 1 score + Task 2 score) + 1 / 12	Finish with approved hardware and verify line stability.	**Correct.** Completing the branch securing with approved hardware and verification meets healthcare complia	Score: +2 Local VF: 4/4 Global VF: (Task 1 score + Task 2 score) + 4 / 12	It improves appearance but is not compliant.	**Partially correct.** Appearance is secondary. The primary concern is mechanical stress and safety.	Score: +1 Local VF: 2/4 Global VF: (Task 1 score + Task 2 score) + 2 / 12

				nce require ments.				
Option A3:			**Option B3:**			**Option C3:**		
Space securing points evenly to the end of the branch.	**Correct.** Even spacing ensures proper support and inspecti on complia nce.	Score: +2 Local VF: 2/4 Global VF: (Task 1 score + Task 2 score) + 2 / 12	Finish with approve d hardwar e and apply addition al covering s.	**Partially correct.** Hardwar e is required , but addition al covering s are unneces sary unless specifica lly mandat ed.	Score: +1 Local VF: 3/4 Global VF: (Task 1 score + Task 2 score) + 3 / 12	It increase s system pressure at the branch.	**Incorrec t.** Securing method s do not affect pressure . They impact mechani cal integrity and safety.	Score: +0 Local VF: 1/4 Global VF: (Task 1 score + Task 2 score) + 1 / 12

<Final text at the end of the scenario>

Screen#	
Screen title	Scenario insights
Screen type	Text and image

Image description/source	

Notes to developer

This is the final screen of the scenario. This will have:

1. A score based on learner's performance
2. The visual feedback graphic
3. Common text independent of score
4. Feedback based on score category (10 – 49%; 50 – 79%; 80 – 100%). This feedback is conditional on the score

Congratulations! You have completed the scenario. Your score is: <<*Score*>>.

If score is 10 – 49%: < This attempt shows significant gaps in your understanding of healthcare safety standards for securing and inspecting medical gas pipeline systems. You've missed several core concepts, such as correct securing methods, proper starting and ending points, and essential patient safety considerations.

At this stage, your knowledge does not yet meet the required technical standards. If attempted in a live hospital environment, these errors could lead to system instability, gas leaks, or failure to meet compliance and inspection requirements.

To improve:

- Revisit healthcare facility guidelines related to medical gas pipeline installation and inspection, reviewing each step carefully.
- Study visual references or demonstrations, if available, to better understand approved securing and spacing techniques.
- Seek guided practice and feedback from a qualified facilities engineer or supervisor to rebuild your understanding from the ground up.

Don't be discouraged—this is an opportunity to close the gaps and develop the skills required to support safe patient care.

>

If score is 50 – 79%: < You're on the right track, but there are key areas that need attention. Your responses show a partial understanding of proper medical gas line securing and inspection procedures, but also reveal gaps in areas like material selection, spacing consistency, or completion methods.

In real-world terms, this level of knowledge might result in installations that appear acceptable but fail under operational pressure or inspection. Inconsistent application of healthcare safety standards can lead to rework, safety risks, or delays in clinical readiness.

To build on this foundation:

- Revisit medical gas pipeline standards and facility procedures related to permanent versus temporary securing methods.
- Focus especially on correct spacing, approved hardware usage, and branch connection requirements.
- Work with a mentor or supervisor to review each step in context, discussing why each detail matters for patient safety.

You have potential. Refine the details, and you'll be ready for hands-on practice.
>

If score is 80 – 100%: < Excellent work. Your decisions throughout this scenario demonstrate a strong understanding of healthcare-compliant practices for securing and inspecting medical gas pipeline systems.
You've shown a confident and accurate grasp of approved materials, securing methods, spacing requirements, and safety standards expected in regulated healthcare environments.
In real-world terms, this means you are ready to move from theory to supervised practice and should be able to apply these techniques in active healthcare facilities. Your choices reflect not only technical accuracy, but also professional responsibility and patient safety awareness.
To take your skills further:

- Practice these securing and inspection techniques in controlled facility walkthroughs or simulated installations.
- Review facility diagrams and standard layouts for medical gas systems to strengthen visual recognition skills.
- Assist in inspection or verification activities to deepen your understanding of compliance and quality checks.

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Screen#	
Screen title	Summary insights
Screen type	Text and Image
Storyline template/Canvas template	NA
Estimated duration	1 Minute
Image description/source	

	
Alt Text	Stylized bar chart with an upward arrow indicating progress, growth, or improved performance metrics.
Text <Under key takeaways, add the text in context to the learning.>	You've just completed a facilities safety scenario focused on securing and inspecting medical gas pipeline systems. The decisions you made didn't just affect the installation — they shaped the overall safety, reliability, and readiness of a patient care environment. **Key takeaways:** ● Correct outcomes often depend on context — the best choice is one that holds up under operational pressure, inspection, and real-world use. ● Precision matters. Overlooking small details like spacing, hardware choice, or finishing steps can lead to larger safety issues. ● Standards exist not to slow you down, but to ensure every action supports patient safety and system reliability. ● Even routine infrastructure tasks are part of a larger care ecosystem. Your attention to quality directly supports clinical outcomes. **Here are some values to carry forward:** ● Consistency in applying healthcare safety standards ● Curiosity about the purpose behind each procedure ● Responsibility for outcomes, both visible and unseen ● A mindset of safety, thoroughness, and professional pride
Content source	N/A
Additional content (Y/N)	Y