Based on the provided predicates and information from the pattern, we will instantiate the safety case for the Generic Patient-Controlled Analgesia (GPCA) system by removing placeholders, handling uninstantiated and undeveloped aspects, and addressing the multiplicity as specified. The scope will be narrowed to two operational hazards: "Overinfusion" and "Underinfusion."

### Instantiated Assurance Case for the GPCA System:

\*\*G1: Operational Safety of the GPCA System is Verified\*\*

- \*\*S1: Argument over the satisfaction of all specs over the GPCA system\*\* (Uninstantiated & undeveloped)

- \*\*C1: All specifications are provided as per the safety requirements\*\*

\*\*G2: All Operational Hazards of GPCA are Mitigated\*\*

- \*\*S3: Argument over Operational Hazards\*\*

- \*\*G3: Overinfusion is Mitigated\*\*

- \*\*S4: Argument Over the Applied Scenarios of Overinfusion\*\*

- \*\*G4: Overinfusion is Mitigated under Excessive Bolus\*\*

- \*\*S5: Argument Over All Specs Related to Excessive Bolus\*\*

- \*\*G5: 'Flow rate sensor equipped' Spec is Appropriate for Excessive Bolus\*\*

- \*\*S6: Argument the Appropriateness of 'Flow rate sensor equipped' over properties\*\*

- \*\*G6: 'Programmed rate too low' is Appropriate for 'Flow rate sensor equipped'\*\*

- \*\*S7: Argument Over the Source of the Programmed Rate Property\*\*

- \*\*G7: FDA Standard is Appropriate and Trustworthy for Programmed Rate\*\*

- \*\*Sn1: FDA standard document\*\*

- \*\*G8: 'Programmed Rate' Definition is Sufficient\*\*

- \*\*Sn2: Safety requirement documentation\*\*

- \*\*C3: All Related Scenarios Given by Overinfusion Scenarios\*\*

- \*\*C4: All Related Specs Given by Excessive Bolus.spec.allInstances()\*\*

- \*\*C5: Properties are Given by 'Flow Rate Sensor Equipped'.property.allInstances()\*\*

- \*\*C6: Source is Given by 'Programmed Rate'.source (Safety Doc References)\*\*

- \*\*C2: Operational Hazards are Given by GPCA Operational Hazards\*\*

### Hierarchical Tree Structure:

```

G1: Operational Safety of the GPCA System is Verified

- S1: Argument over the satisfaction of all specs over the GPCA system (Uninstantiated & undeveloped)

- C1: All specifications are provided as per the safety requirements

G2: All Operational Hazards of GPCA are Mitigated

- S3: Argument over Operational Hazards

- G3: Overinfusion is Mitigated

- S4: Argument Over the Applied Scenarios of Overinfusion

- G4: Overinfusion is Mitigated under Excessive Bolus

- S5: Argument Over All Specs Related to Excessive Bolus

- G5: 'Flow rate sensor equipped' Spec is Appropriate for Excessive Bolus

- S6: Argument the Appropriateness of 'Flow rate sensor equipped' over properties

- G6: 'Programmed rate too low' is Appropriate for 'Flow rate sensor equipped'

- S7: Argument Over the Source of the Programmed Rate Property

- G7: FDA Standard is Appropriate and Trustworthy for Programmed Rate

- Sn1: FDA standard document

- G8: 'Programmed Rate' Definition is Sufficient

- Sn2: Safety requirement documentation

- C3: All Related Scenarios Given by Overinfusion Scenarios

- C4: All Related Specs Given by Excessive Bolus.spec.allInstances()

- C5: Properties are Given by 'Flow Rate Sensor Equipped'.property.allInstances()

- C6: Source is Given by 'Programmed Rate'.source (Safety Doc References)

- C2: Operational Hazards are Given by GPCA Operational Hazards

```

This represents a fully structured GSN assurance case for GPCA focusing on the mitigation strategies for the hazard of overinfusion, specifically under the scenario of excessive bolus.