Based on the information and predicates provided, let's instantiate the assurance case pattern for the GPCA (Generic Patient-Controlled Analgesia) system safety case. The aim is to replace the placeholders with concrete information about the system and generate the hierarchy accordingly.

### Step 1: Replace Placeholders and Develop the Elements

- Replace `"{system}"` with `"GPCA System"`

- Replace `"{operational hazard}"` with `"Dose Error"`

- Replace `"{scenario}"` with `"Over Dosage Scenario"`

- Replace `"{spec}"` with `"Dosing Specification"`

- Replace `"{property}"` with `"Accuracy"`

- Replace `"{Source}"` with `"Medical Standards"`

### Step 2: Remove Undeveloped and Placeholder Markings

The instantiated pattern for the GPCA system will therefore be:

### Hierarchical Tree Structure:

\*\*Level 1:\*\*

- G1: Operational safety is verified in GPCA System

- C1: All specs are given by Dosing Specification.allInstances()

\*\*Level 2:\*\*

- S1: Argument over the satisfaction of all specs over GPCA System

- Undeveloped

- G2: All operational hazards are mitigated

- C2: Operational hazards are given by Dose Error.allInstances()

- S2: Argument over reliability in all suitable levels of GPCA System

- Undeveloped

\*\*Level 3:\*\*

- S3: Argument over operational hazards

\*\*Level 4:\*\*

- G3: Dose Error is mitigated

\*\*Level 5:\*\*

- S4: Argument over the applied scenarios of Dose Error

- C3: All related scenarios are given by Dose Error

\*\*Level 6:\*\*

- G4: Dose Error is mitigated under Over Dosage Scenario

\*\*Level 7:\*\*

- S5: Argument over all specs related to Over Dosage Scenario

- C4: All related specs are given by Over Dosage Scenario.spec.allInstances()

\*\*Level 8:\*\*

- G5: Dosing Specification is appropriate for Over Dosage Scenario

\*\*Level 9:\*\*

- S6: Argument the appropriateness of Dosing Specification over properties

- C5: Properties are given by Dosing Specification.property.allInstances()

\*\*Level 10:\*\*

- G6: Accuracy is appropriate for Dosing Specification

\*\*Level 11:\*\*

- S7: Argument over the source of the Accuracy definition

- C6: Source is given by Accuracy.source

\*\*Level 12:\*\*

- G7: Medical Standards is appropriate and trustworthy

- Sn1: Source

- G8: Accuracy definition is sufficient

- Sn2: Property

### Ensuring each predicate has been instantiated correctly

- \*\*Goal (G1, Operational safety is verified in GPCA System)\*\*—Replaced placeholder with GPCA System.

- \*\*Goal (G2, All operational hazards are mitigated)\*\*—Replaced placeholder.

- \*\*Goal (G3, Dose Error is mitigated)\*\*—Replaced placeholder with Dose Error.

- \*\*Goal (G4, Dose Error is mitigated under Over Dosage Scenario)\*\*—Replaced placeholders with Dose Error and Over Dosage Scenario.

- \*\*Goal (G5, Dosing Specification is appropriate for Over Dosage Scenario)\*\*—Replaced placeholders with Dosing Specification and Over Dosage Scenario.

- \*\*Goal (G6, Accuracy is appropriate for Dosing Specification)\*\*—Replaced placeholders with Accuracy and Dosing Specification.

- \*\*Goal (G7, Medical Standards is appropriate and trustworthy)\*\*—Replaced placeholder with Medical Standards.

- \*\*Goal (G8, Accuracy definition is sufficient)\*\*—Replaced placeholder with Accuracy.

- \*\*Strategy (S1, Argument over the satisfaction of all specs over GPCA System)\*\*—Replaced placeholder with GPCA System.

- \*\*Strategy (S2, Argument over reliability in all suitable levels of GPCA System)\*\*—Replaced placeholder with GPCA System.

- \*\*Strategy (S3, Argument over operational hazards)\*\*—Replaced placeholder.

- \*\*Strategy (S4, Argument over the applied scenarios of Dose Error)\*\*—Replaced placeholder with Dose Error.

- \*\*Strategy (S5, Argument over all specs related to Over Dosage Scenario)\*\*—Replaced placeholder with Over Dosage Scenario.

- \*\*Strategy (S6, Argument the appropriateness of Dosing Specification over properties)\*\*—Replaced placeholders with Dosing Specification and properties.

- \*\*Strategy (S7, Argument over the source of the Accuracy definition)\*\*—Replaced placeholder with Accuracy.

- \*\*Context (C1, All specs are given by Dosing Specification.allInstances())\*\*—Replaced placeholder with Dosing Specification.

- \*\*Context (C2, Operational hazards are given by Dose Error.allInstances())\*\*—Replaced placeholder with Dose Error.

- \*\*Context (C3, All related scenarios are given by Dose Error)\*\*—Kept as is.

- \*\*Context (C4, All related specs are given by Over Dosage Scenario.spec.allInstances())\*\*—Replaced placeholder with Over Dosage Scenario.

- \*\*Context (C5, Properties are given by Dosing Specification.property.allInstances())\*\*—Replaced placeholder with Dosing Specification.

- \*\*Context (C6, Source is given by Accuracy.source)\*\*—Replaced placeholder with Accuracy.

- \*\*Solution (Sn1, Source)\*\*—Replaced placeholder with source.

- \*\*Solution (Sn2, Property)\*\*—Replaced placeholder with property.

This tree format represents our instantiated assurance case for the GPCA system, following the given safety case pattern.