

## Introduction

Discharge from the post anesthesia care unit (PACU)

- Early or inappropriate discharge leads to increased readmissions (Anderson 2011)
- Delayed discharge is a burden on patients (Brown 2008)
- An ontology-based decision support system can support discharge decision making

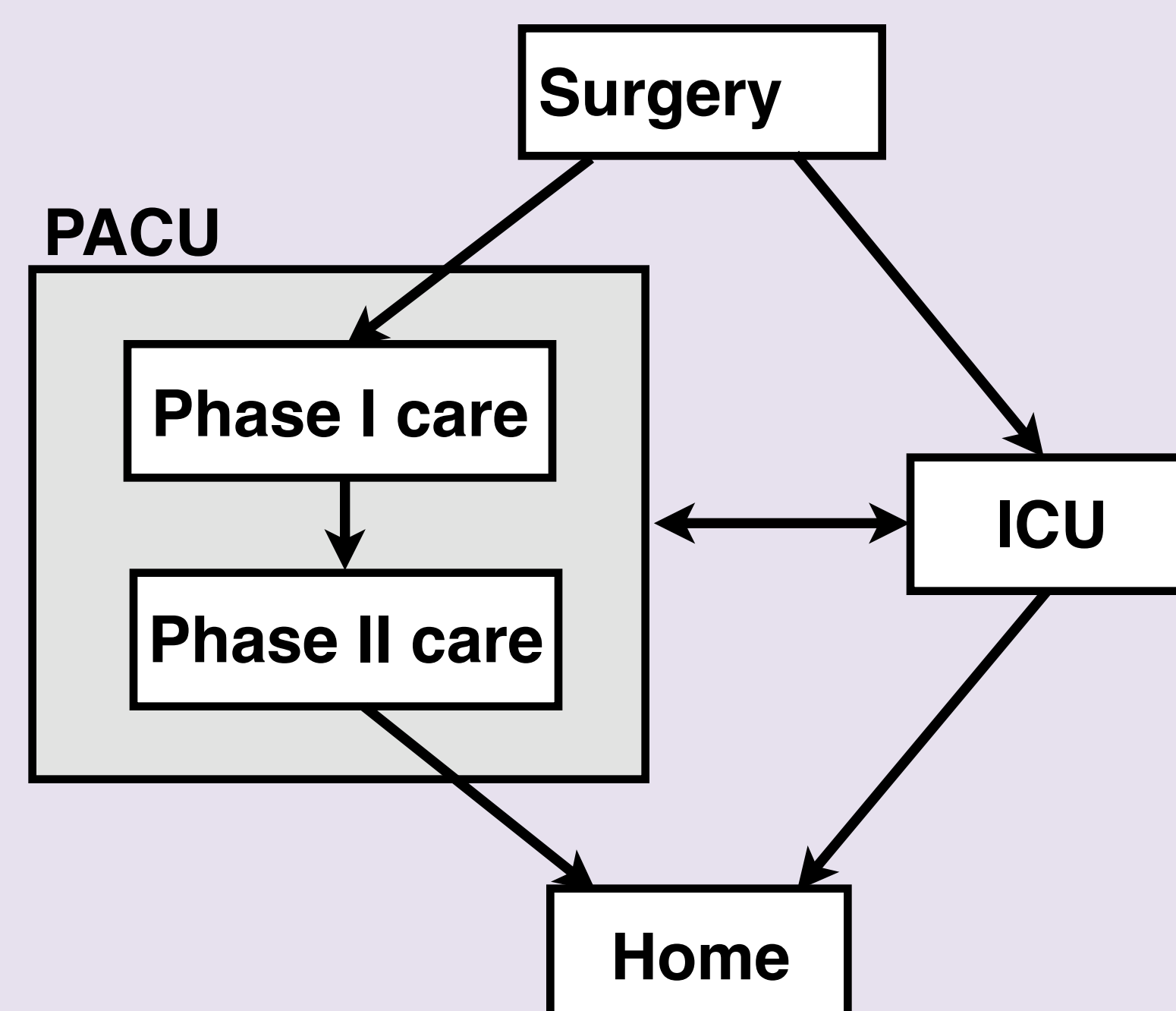


Fig. surgical discharge flow chart. Uncomplicated cases are discharged through the PACU, complicated cases through the intensive care unit (ICU).

Modified Aldrete Score (Aldrete 1995)

Each category scores between 0 to 2 points:

1. Consciousness
2. Respiration
3. Circulation (Blood pressure)
4. Circulation (Heart rate)
5. Oxygen Saturation
6. Activity & motion

Total Score must exceed 10 out of 12 for discharge

## Methods

### SWRL rules

Patient(?pt), hasSpO2(?pt, ?SpO2), greaterThan(?SpO2, 95) → hasAldreteScoreOxygen(?pt, 2)

### Data and object properties

Types	
AlertOrientedx4	?
Female	?
NormalBreathing	?
Patient	?
PHASE_I	?

### OWL classes

- PostOperativeCareGuidelines
  - CONFIRM\_AccompanyingAdultUponDischarge
  - CONFIRM\_DischargeInstructionsProvided
  - CONFIRM\_DischargeMedicationPrescriptions
  - CONFIRM\_DiscontinuationOfIVLock
  - CONFIRM\_PostopTelephoneCall
  - CONSIDER\_Catheterisation
  - CONSIDER\_HypotensionAssessment
  - CONSIDER\_OxygenTherapy
  - CONSIDER\_PainManagementMedication
  - CONSIDER\_ReassessmentWithinTwoHoursAfterInitialPostOpAss
  - CONSIDER\_Referral\_to\_CriticalCareSpecialist
  - DISCHARGE\_FROM\_PHASE\_I\_POSTANESTHETIC
  - DISCHARGE\_FROM\_PHASE\_I\_POSTANESTHETIC\_TO\_PHASE\_II
  - DISCHARGE\_FROM\_PHASE\_II\_POSTANESTHETIC\_TO\_HOME
  - REQUIRE\_ArmSlingApplication
  - REQUIRE\_CrutchesAndInstructions
  - REQUIRE\_EvaluationByAnesthesiologistBeforeDischarge
  - REQUIRE\_NotificationOfAnesthesiologistOfDischarge
  - REQUIRE\_NursingDocumentation
  - REQUIRE\_PhysicianOrderBeforeDischarge

## Results & Conclusions

- Generated more than 90 SWRL rules from discharge criteria (Phillips 2011, Stanford 2010)
- Created OWL classes for demographic information, medication, type of surgical procedure, symptoms, and for discharge criteria
- Inferred discharge classes
- Generated recommendations for physician actions

Example patient:

BP: 138/92  
HR: 64  
SpO2: 97%  
Pain: 3/10  
Rx: Oxygen

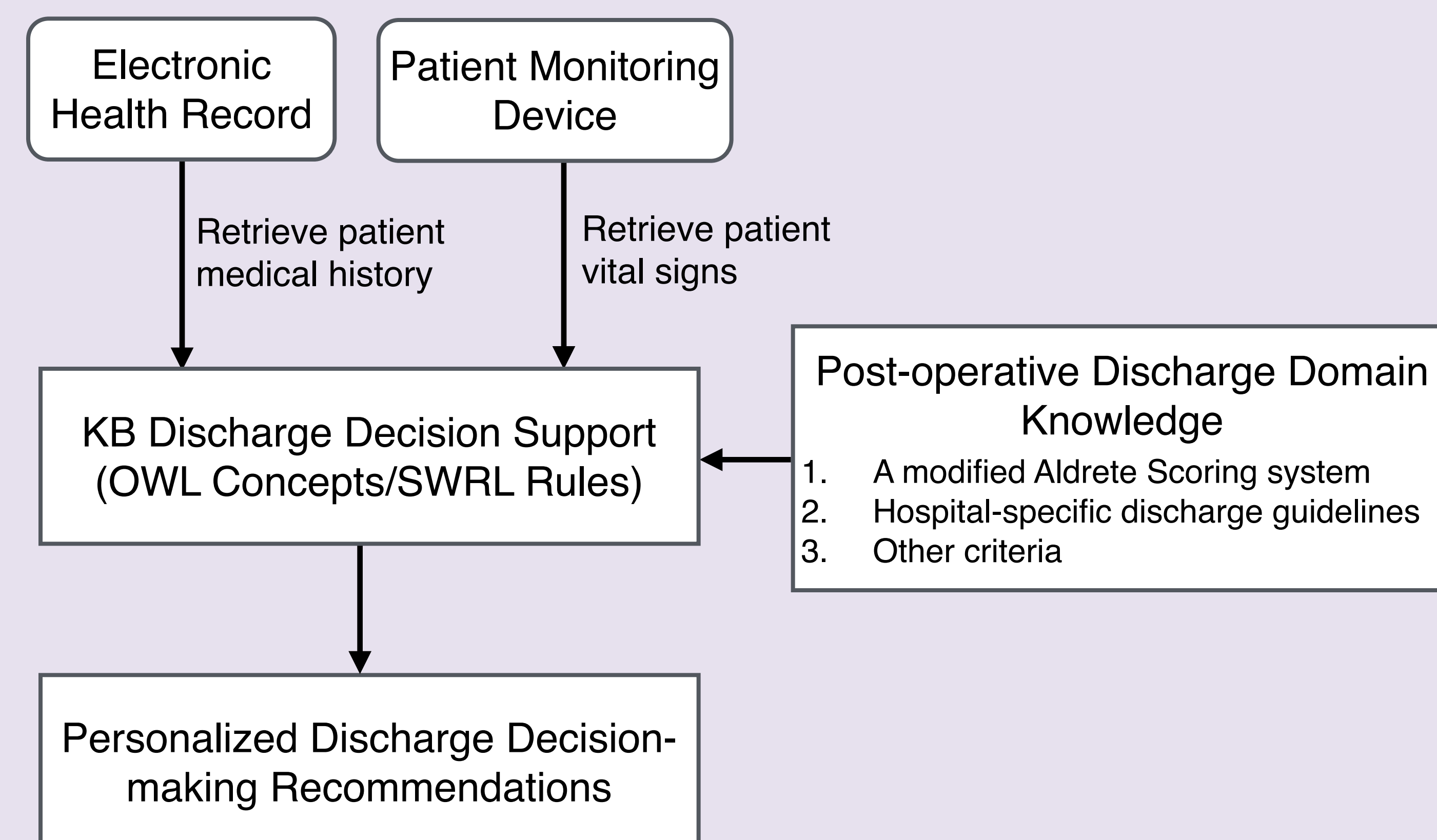
Time since surgery: 30 min

- CONFIRM\_AccompanyingAdultUponDischarge
- CONFIRM\_DischargeInstructionsProvided
- CONFIRM\_DischargeMedicationPrescriptions
- CONFIRM\_DiscontinuationOfIVLock
- CONFIRM\_PostopTelephoneCall
- DISCHARGE\_FROM\_PHASE\_II\_POSTANESTHETIC\_TO\_HOME
- REQUIRE\_CrutchesAndInstructions

Ontology-based decision support may:

- assist in discharge decision-making
- provide recommendations to physicians

## Future Work



- Integration with medical terminology ontologies, e.g. ICD-10, SNOMED-CT
- Information extraction from EHRs and in-room patient sensors
- Auto-generation of discharge summary notes for patients, caregivers and providers

## References & Acknowledgments

This work was supported by NLM training grant T15LM007442. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Health. Thank you to John Gennari for reviewing and offering suggestions to guide this work.

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