

### 4 Phases of APAP Toxicity

**Phase 1**  
(1-24 hrs) - Commonly asymptomatic or  
- Non-specific (N/V)

**Phase 2**  
(24-48 hrs) - Labs show hepatotoxicity  
- Increase INR  
- Increase AST/ALT  
- Phase 1 symptoms subside

**Phase 3**  
(48-96 hrs) - Fulminant liver failure  
- Jaundice  
- Encephalopathy  
- Coagulopathy  
- hepa-to-renal syndrome

**Phase 4**  
(>96 hrs) - Pt either  
- Recovers  
- Dies  
- Receives liver transplant

### APAP Explanation of Chart on Pg 270

**NAPQI** APAP undergoes CYP2E1 (only with excessive doses) and produces NAPQI (toxic)  
N-acetyl-p-benzoquinone-imine

**Antidote** NAC (N-acetylcysteine)

**NAC** ↑ glutathione = ↑ GSH (glutathione-S-transferase)

**GSH** Converts NAPQI to **mercapturic acid** (excretes safely from the body)

**Rumack Matthew Nomogram** APAP blood levels are drawn and plotted on this

### APAP Toxicity Tx

#### N-Acetylcysteine

**Oral** - 140 mg/kg x 1 followed by  
- 70 mg/kg Q4H x 17 doses  
- Repeat dose if emesis occurs within 1 hr of administration

**IV** - 150 mg/kg IV x 60 mins followed by  
- 50 mg/kg IV x 4 hrs followed by  
- 100 mg/kg IV x 16 hrs

### Opioid Overdose Symptoms

- Slowed breathing (respiratory depression)

- Pinpoint pupils

- Altered mental status

- Unconsciousness (sedation)

- When in doubt give **naloxone**

### Opioid Toxicity Tx

#### Naloxone

**How it works** - If administered quickly, naloxone reverses depressant effects of opioids

**Naloxone AE:** - Little to none if no opioids were ingested

