

Measurement of Whole-Body Mass Composition

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Overview of PEA POD ADP System

- **What is it?**
 - A non-invasive diagnostic device to measure infant body composition.
- **What does it do?**
 - Provides accurate fat and fat-free mass data for neonatal growth monitoring via Air Displacement Plethysmography (ADP).
- **Why is it important?**
 - Supports nutritional management in preterm and medically complex infants.



Technology Description

- **Components:**

- Transparent, biocompatible infant chamber
- Volume perturbation unit
- High-precision pressure transducers
- Integrated digital scale
- Proprietary software

- **Function:**

Uses air displacement plethysmography to measure body volume and calculate body density.

How the Pea Pod Works

- **Mechanism:**

- Body mass and body volume are measured (both performed within the unit).
- Once body density ($\text{Density} = \text{Mass}/\text{Volume}$) is determined, the PEA POD uses known densitometric equations to calculate percent Fat and Fat-Free Mass.

- **Key Features:**

- Rapid (7 minutes¹)
- Precise (coefficient of variation <2%)
- Safe for fragile infants

1. https://www.cosmed.com/hires/Pea_Pod_Brochure_EN_C03838-02-93_A4_print.pdf

Procedural Steps

- Undress infant and place fitted hair cap to reduce air pockets.
- Weigh infant using integrated scale.
- Place infant in PEA POD chamber and seal door.
- Perform 2-minute body volume measurement.
- Software computes body composition (fat mass, fat-free mass, % body fat).
- Remove infant and clean device.

Clinical Settings

- **Inpatient:**

- Primarily in NICUs (95% of use).
- For preterm or medically complex infants.

- **Outpatient:**

- Pediatric clinics or research settings (5% of use).
- For follow-up or healthy infant assessments.

Clinical Indications

- **Conditions:**

- Intrauterine growth restriction
- Neonatal malnutrition
- Early obesity risk

- **Population:**

- 10% of U.S. infants (380,000) born preterm annually.
- 15% (570,000) low birth weight.

- **Benefit:** Guides nutritional interventions to optimize growth.

Comparison to Current Methods

- **Current Methods:**

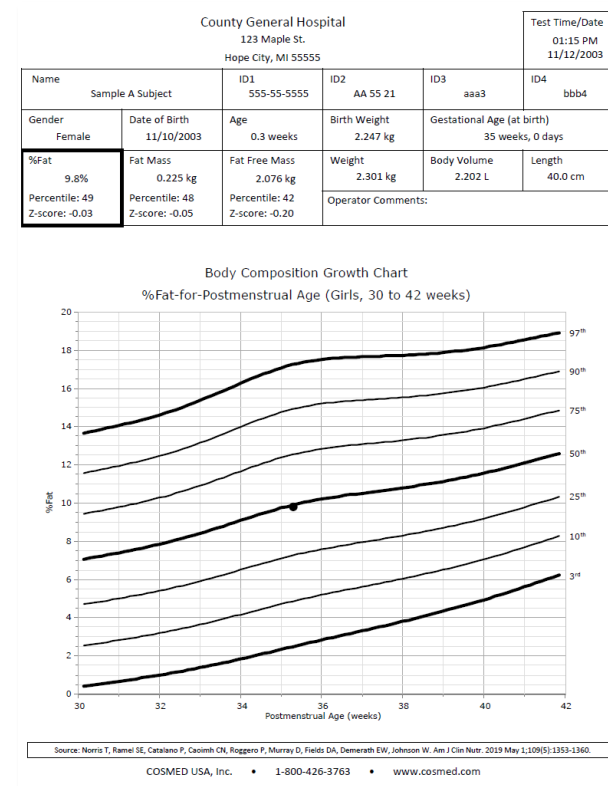
- Anthropometric measurements (skinfold, length, weight)
- Bioimpedance (BIA)
- Dual-Energy X-ray Absorptiometry (DEXA)

- **Limitations:** Less accurate, operator-dependent, radiation exposure, difficult to perform because it requires no infant movement.

- **PEA POD Advantage:** Non-invasive, precise, radiation-free.

Documentation in Clinical Records

- **Where Documented:**
 - Inpatient: NICU progress notes
 - Outpatient: Clinical notes
- **Details Recorded:**
 - Test Time/Date
 - Date of Birth
 - Birth Weight (optional)
 - Length
 - Weight
 - Body composition results (fat mass, fat-free mass, % body fat)
 - Percentiles and z-scores for fat mass, fat-free mass, % body fat
 - Ability to add clinical interpretation



Naming Conventions

- Air Displacement Plethysmography
- PEA POD Body Composition Analysis
- Infant ADP
- Non-Invasive Body Composition Measurement
- Infant Body Fat Assessment

Device Usage

- **Single Device:** Only one PEA POD used per procedure.
- **Non-Permanent:** Diagnostic tool, not an implant.
- **No Removal/Revision:** Not applicable as it's non-invasive.
- **Body Part:** Measures whole-body composition (fat and fat-free mass).
- **No Specific Sites:** Does not target vessels, vertebrae, or other localized areas.
- **Standalone Procedure:** Not performed with other interventions.

Adverse Events

- **No safety issues reported in over 20 years of utilization**
 - Potential for transient discomfort or brief crying during positioning.