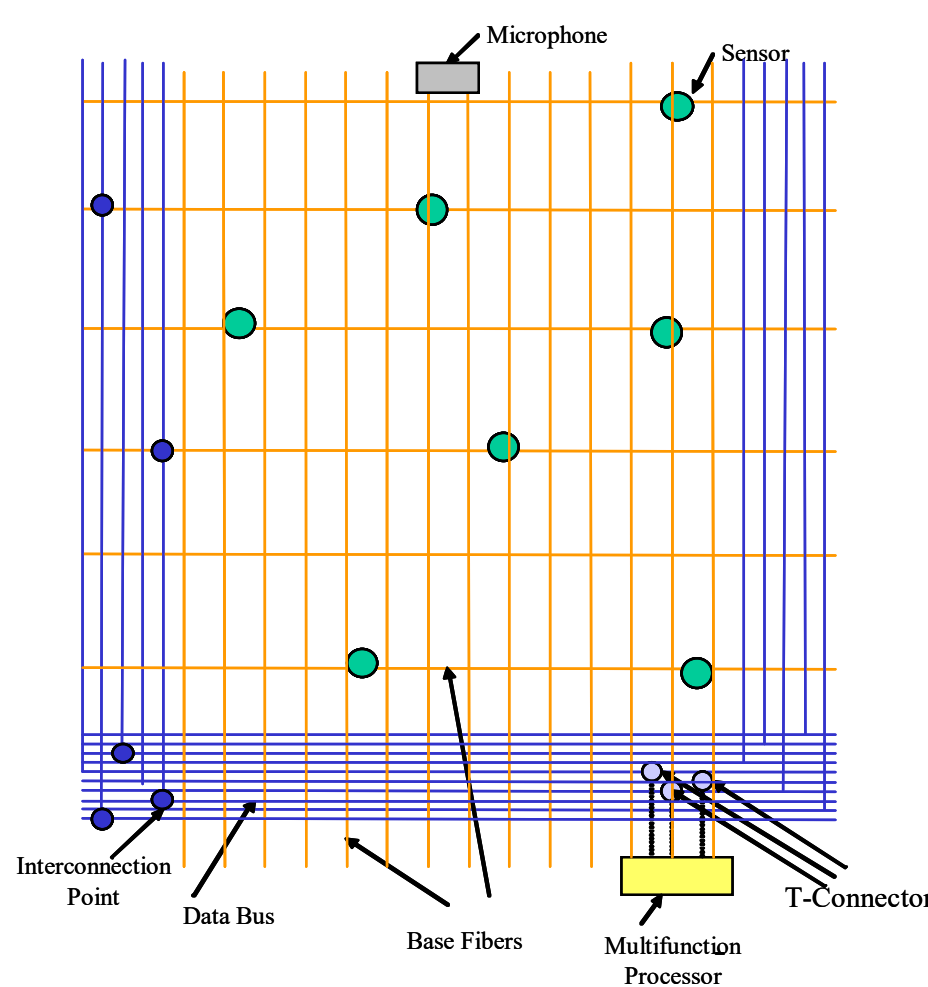
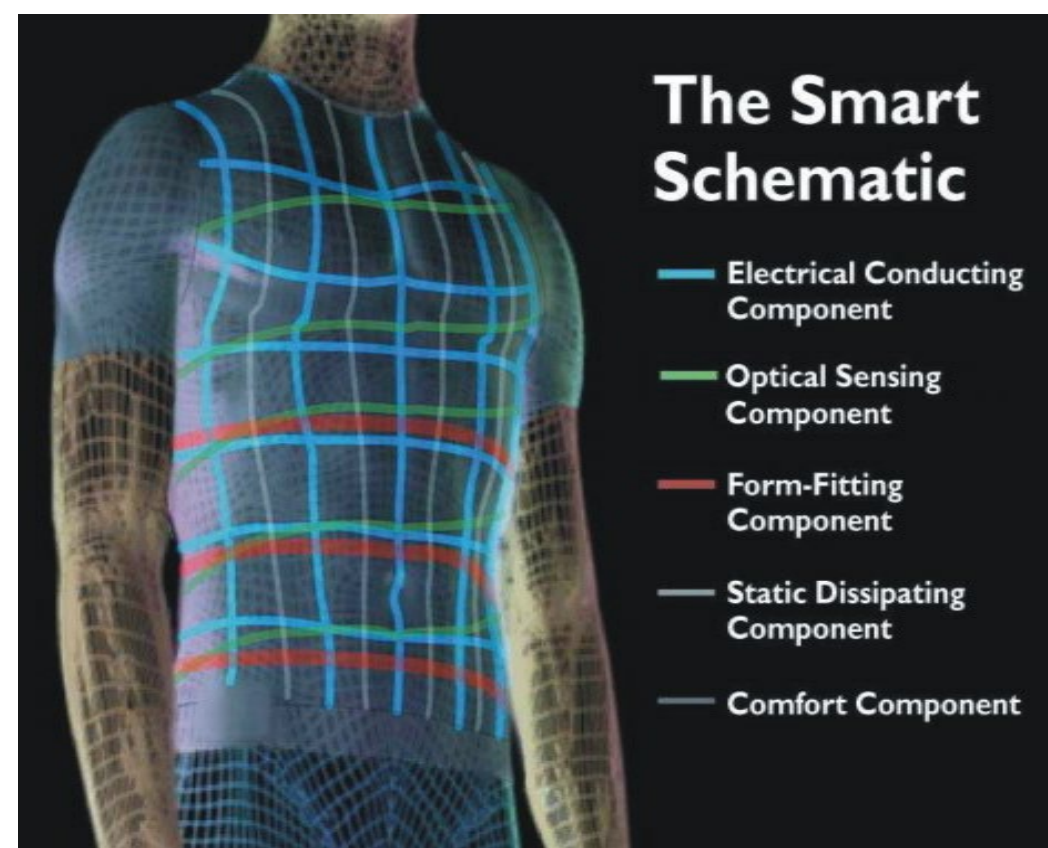


## The Wearable Motherboard (Smart Shirt)

A Convergence of Advanced Textile, Sensor and *Wireless* Technologies to Enhance the Quality of Life for Humans.



### Testing and Evaluation

- 12-Lead EKG/Heart Rate
- Respiration Rate
- Pulse Oximetry (SpO2)
- Body Temperature

### A Platform for Harnessing Ambient Intelligence

Research Began in 1996: Design and Develop the Next Generation Textile Structure for Combat Casualty Care

## Clothing is an *Information Infrastructure* that Also Protects and Makes You Look Good!

**Fabric *is* The Computer!**



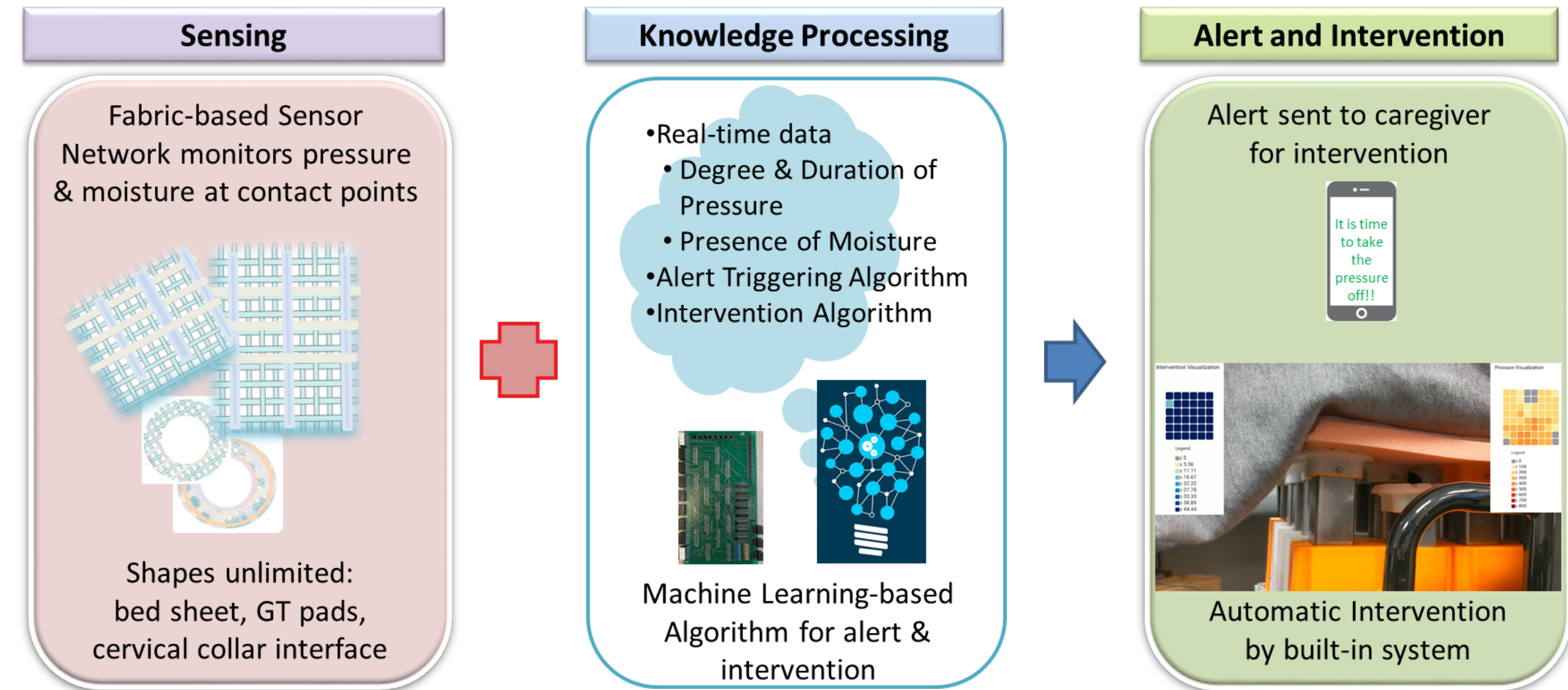
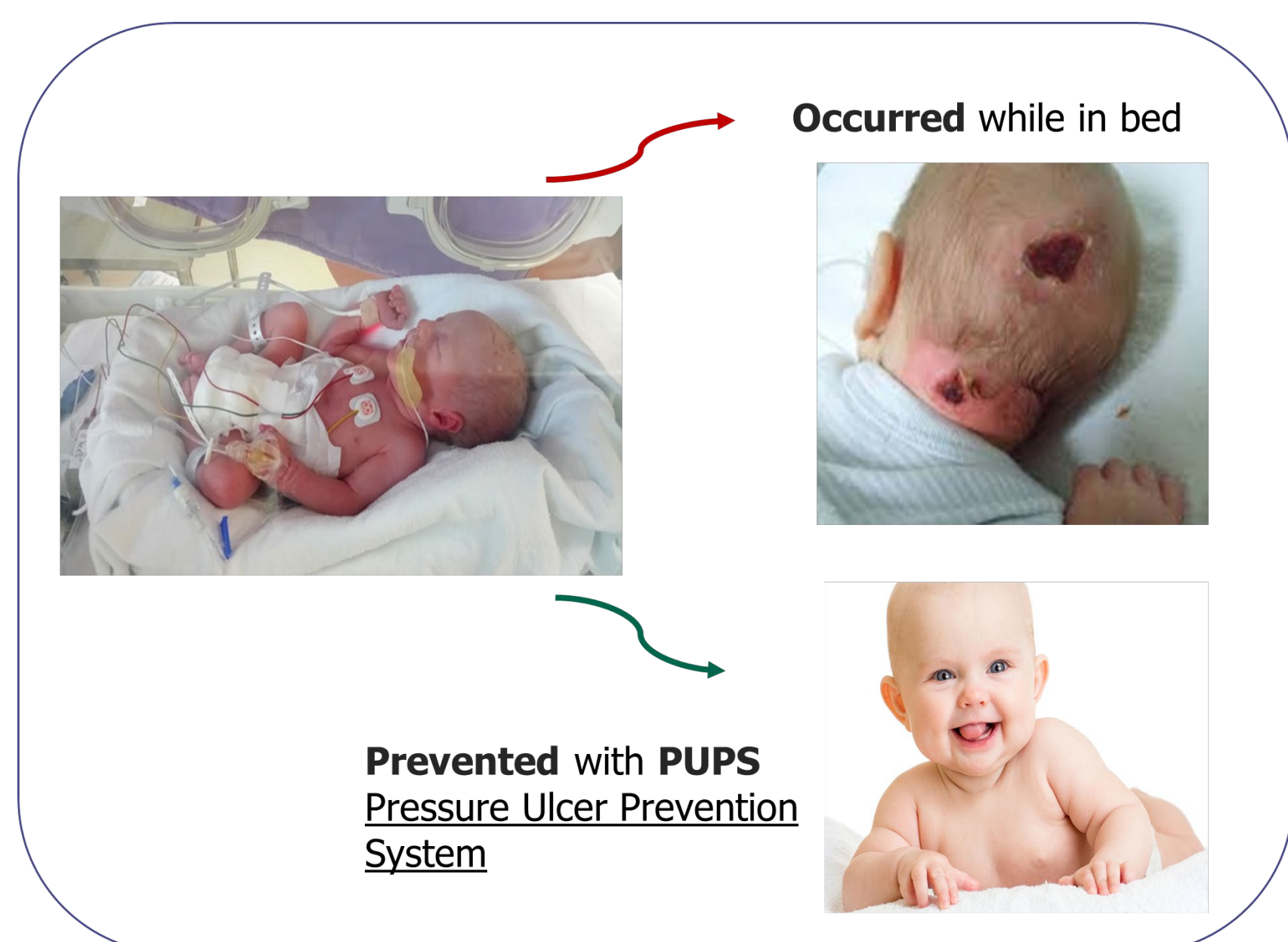
The First Smart Shirt is at the Smithsonian Museum in Washington, D.C.



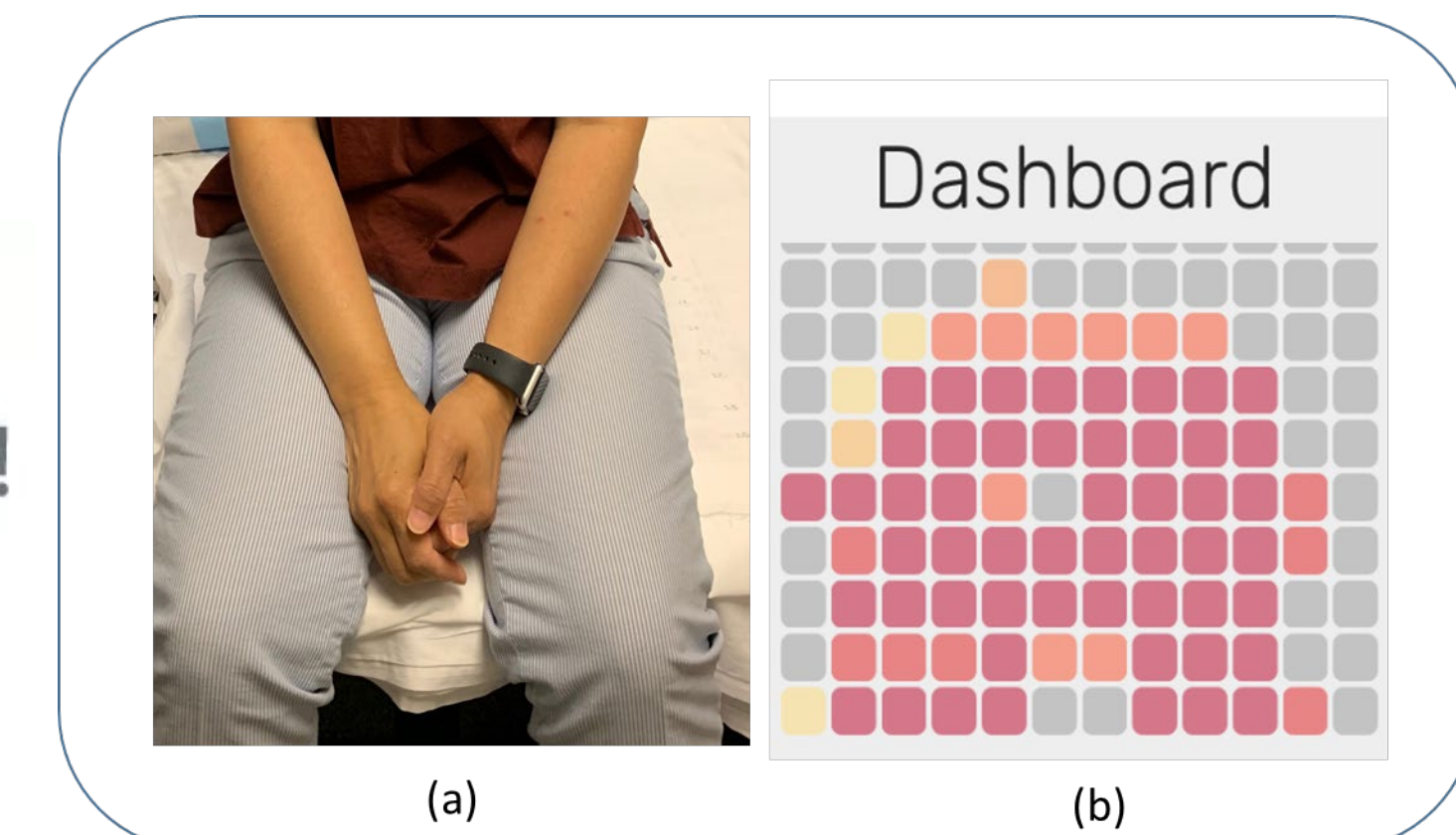
## The Scourge of Pressure Injuries

- Pressure Injury: High-Cost Adverse or NEVER Event Across the Healthcare Spectrum
- Patients affected: 2.5 million/year
- Cost: \$9.1 - \$11.6 billion/year
- Cost per PI: \$20,900 - \$151,700
- Deaths: ~60,000 patients/year

**Most Pressure Ulcers Occur Within TWO Days of Admission!!**

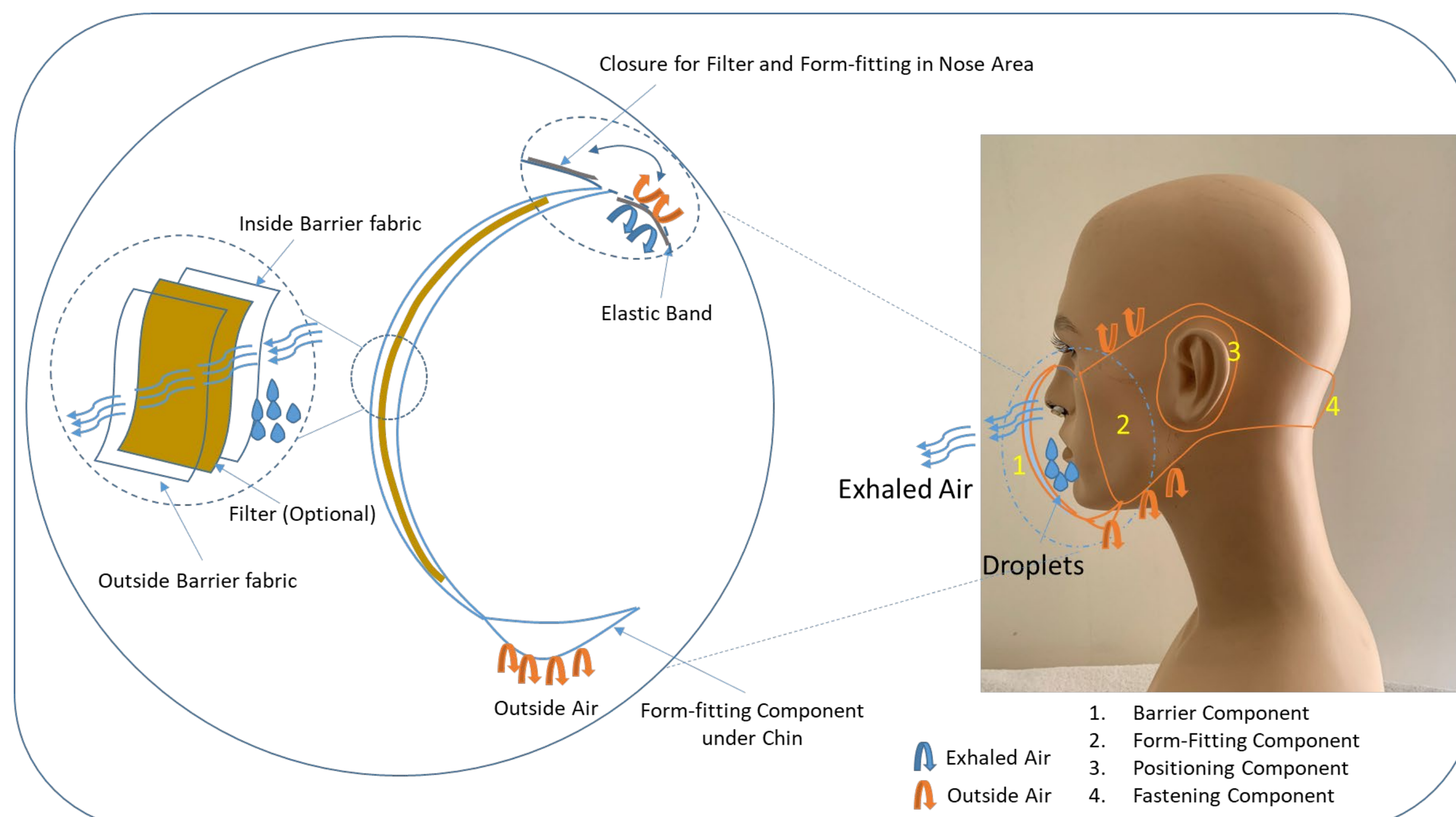


Let's take the pressure off!



(a) Individual Seated on a Fabric-based Sensor Network  
(b) Pressure Distribution Heat Map Displayed on the Smartphone

### Architecture of a Reusable Fabric Mask



## Grand Challenges in Respiratory Protection

- The Comfort – Protection Conundrum
- Need for Fit-Testing
- Absence of Real-time Fit Monitoring
- Lack of Reusability
- Shortages

**Significant Impact on Human Life!**

Technology + Innovation → Enhance Quality of Life

### Funding Sources

- Imlay Innovation Fund
- Neilsen Foundation
- CDC
- Kolon Term Professorship

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