SPARTANS WILL.

IPPSR Legislative Staff Training: *Understanding the Implications of COVID on Supply Chains*

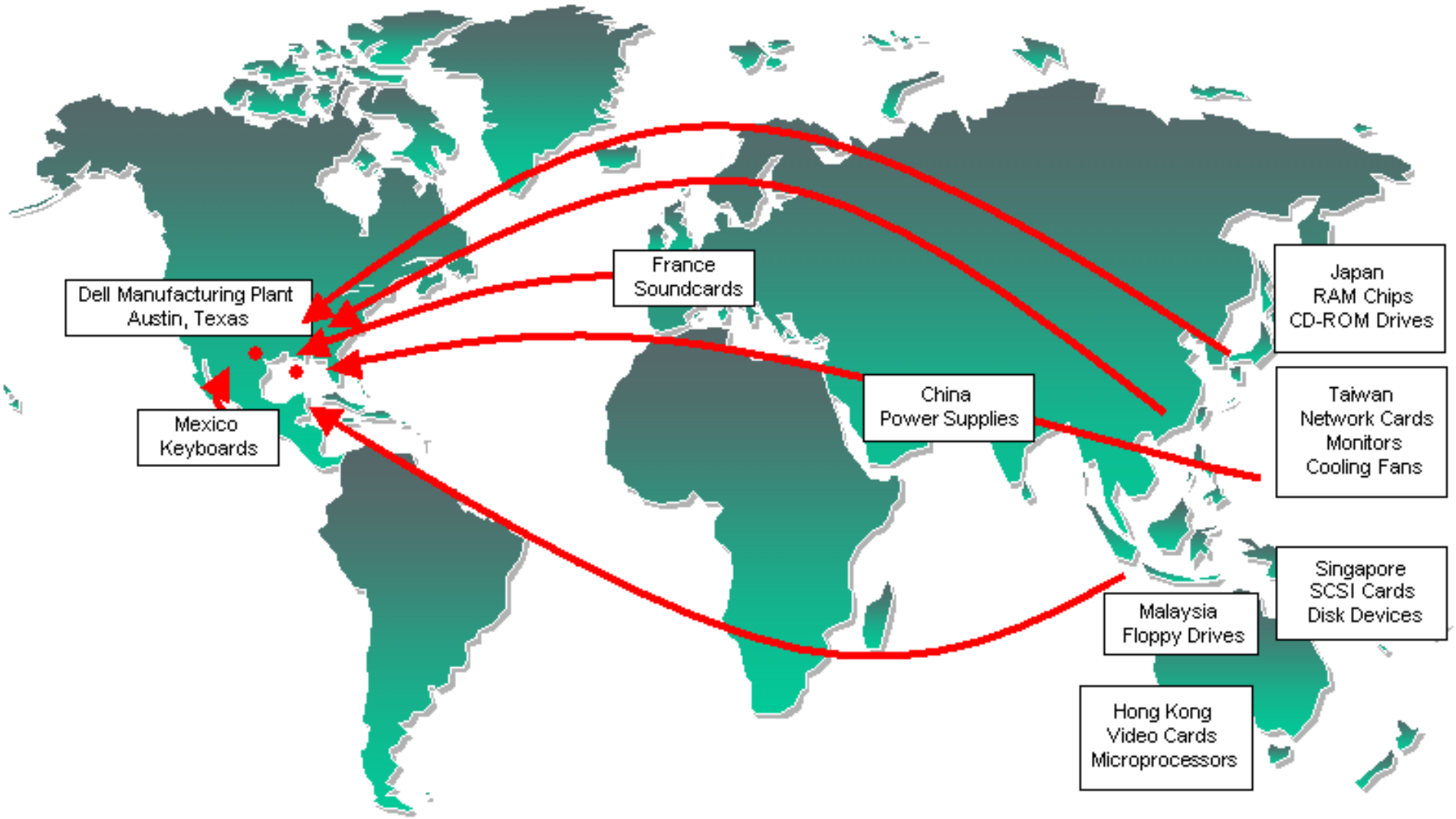
Panelists

- **Dr. Vedat Verter,** John H. McConnell Endowed Chair & Chairperson, Department of Supply Chain Management
- **Dr. Brent Ross,** Associate Chairperson, Department of Agricultural, Food, and Resource Economics
- **Dr. Judy Whipple,** Bowersox-Thull Endowed Professor, Department of Supply Chain Management

Agenda

- Understanding the Supply Chain
- The Impact of COVID-19 Pandemic
- Industry examples – agri-food & pharma
- Where do we go from here?

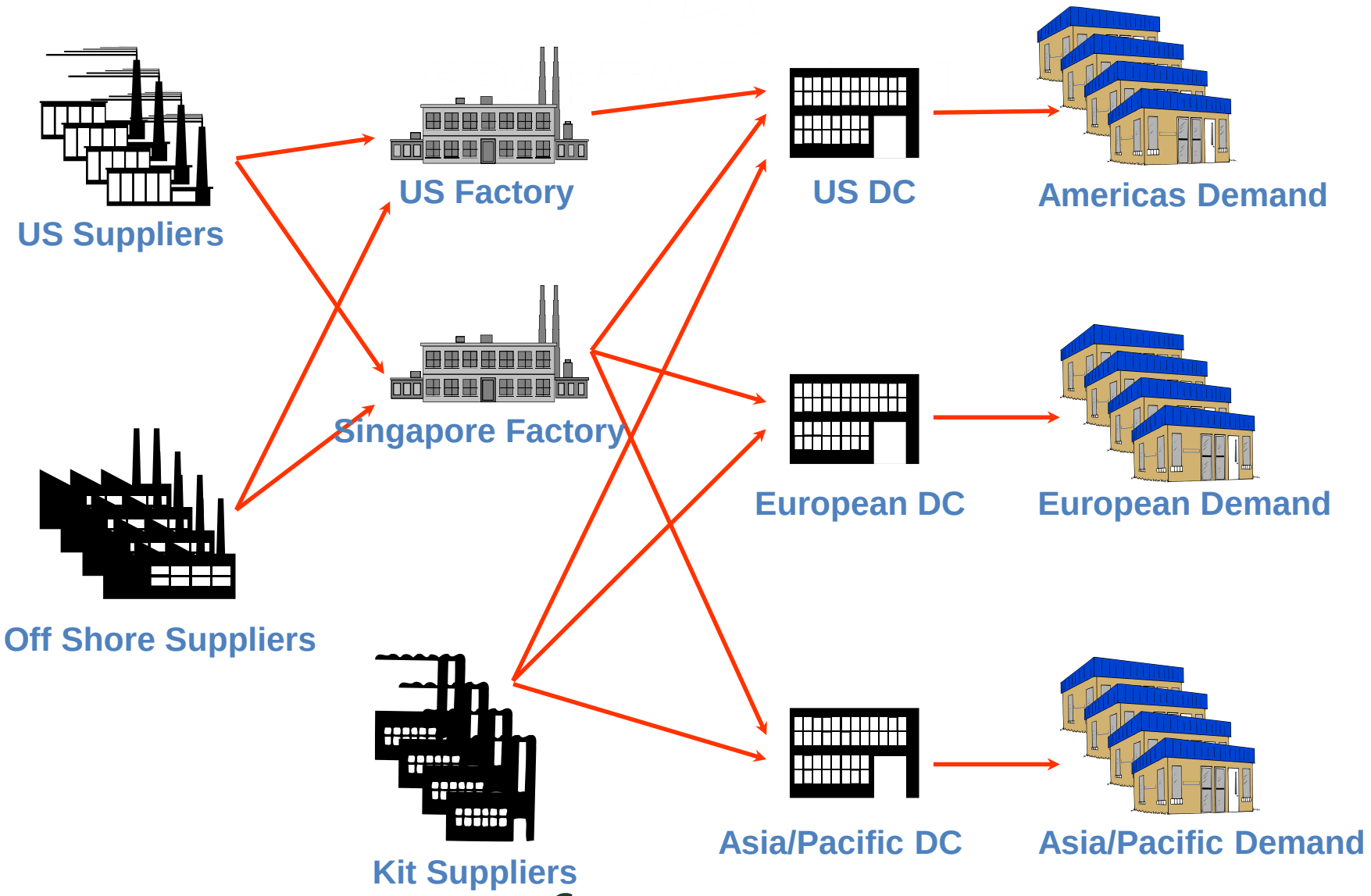
Dell's Global Supply Chain



Supply Chain Management

- Matching supply and demand to make products available when and where they are demanded
- Synchronize flows through the supply chain

Supply Chain Model



Primary Supply Chain Participants

- Raw material providers
- Processors/Suppliers
- Transportation/Warehouse Providers
- Manufacturers
- Wholesalers/Distributors
- Retailers

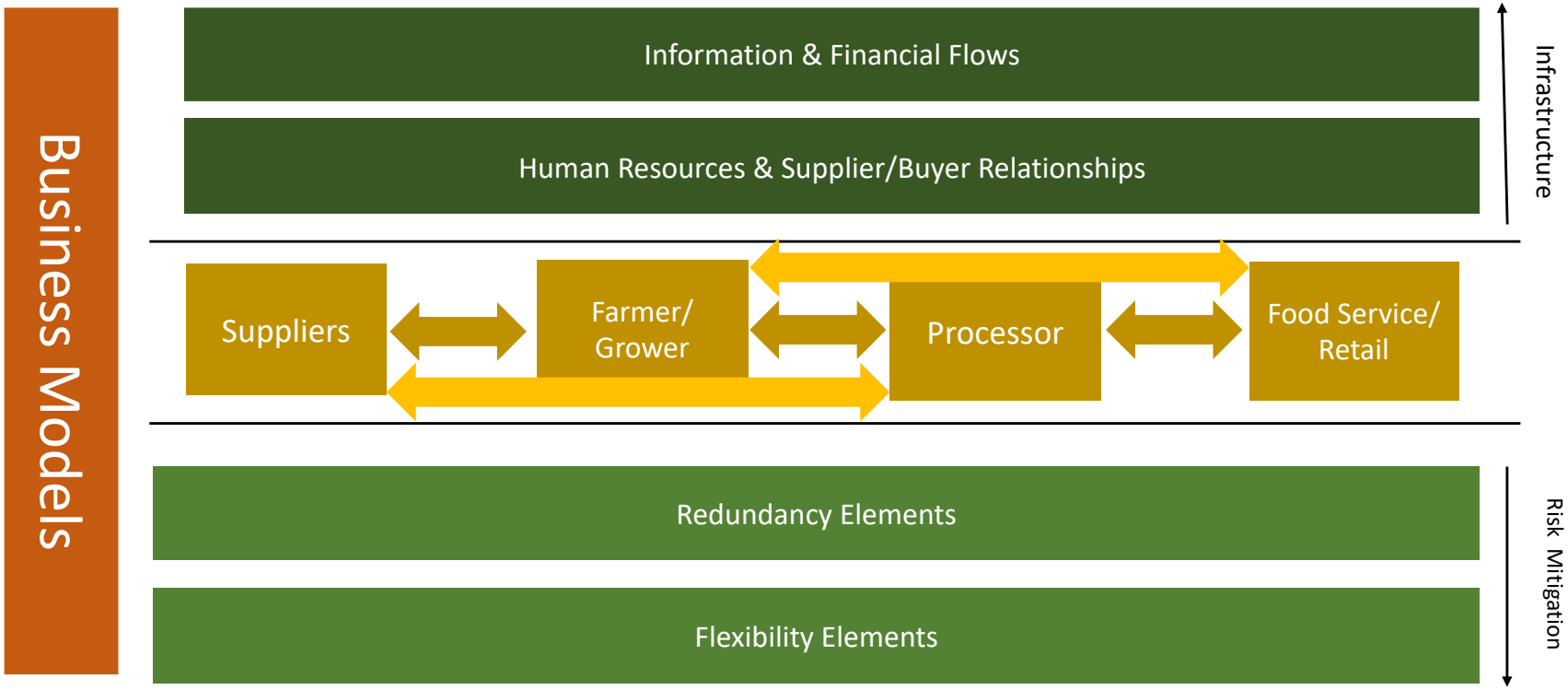
What are the Prevailing Challenges Associated with COVID-19?

- Sudden and unprecedented peak in global demand for essential products
- Inventory shortages
- Capacity constraints
- Congestion in the health system

How Did We Get Here?

- Global dispersion of supply base
- Supply chain complexity
- Lack of visibility
- Lead-times and interdependencies

Model of Agri-Food Supply Chains



"One size does not fit all"

SCs vary from commodity-to-commodity and business model-to-business model

Some Specific Attributes that Affect Supply Chain Design in the Agri-Food System

- Nature
  - Biological lags between production decisions and consumption (>1yr)
  - Location (e.g. weather/climate, agronomic conditions)
- Labor Intensity
- Product Perishability and Storability
- Standards and Regulations (e.g. food safety)
- Consumer Demand (e.g. product specifications, willingness-to-pay)

Implications of COVID-19 on Agri-Food Supply Chains: *A Tale of Two Industries*

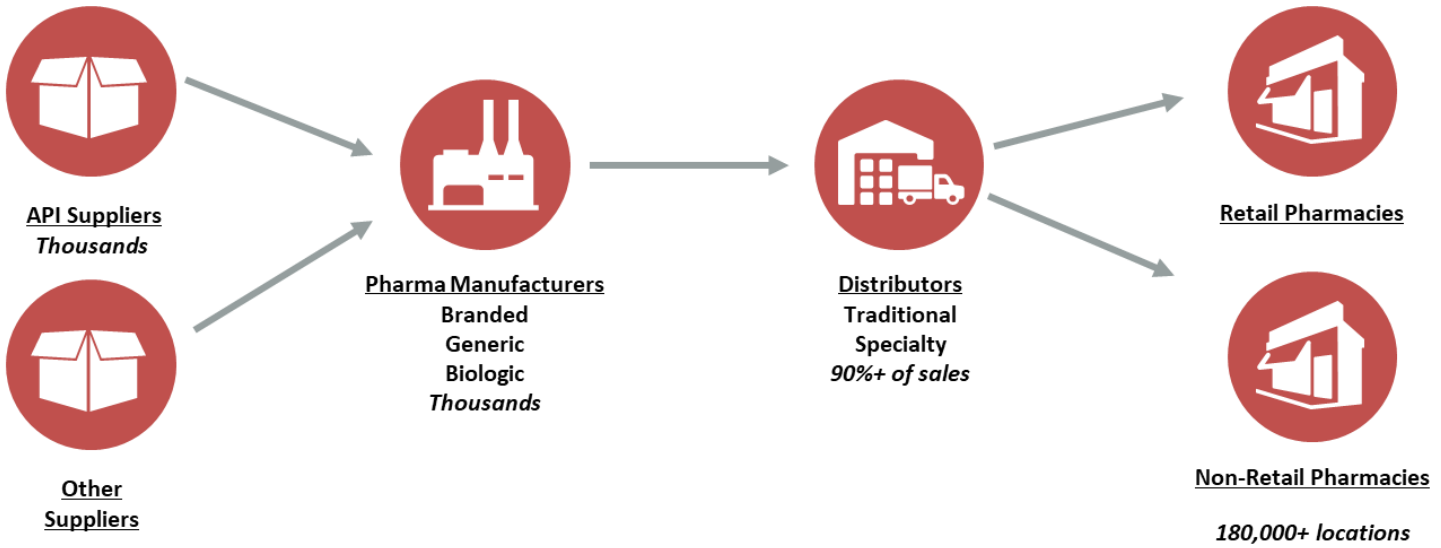
U.S. Meat Industry

- Consolidated processing capacity
  - Specialized
- Labor intensity
  - On-farm – Low (Outdoor)
  - Processing – High (Indoor)
- Foodservice vs. Retail Markets
  - Demand Inflexibility

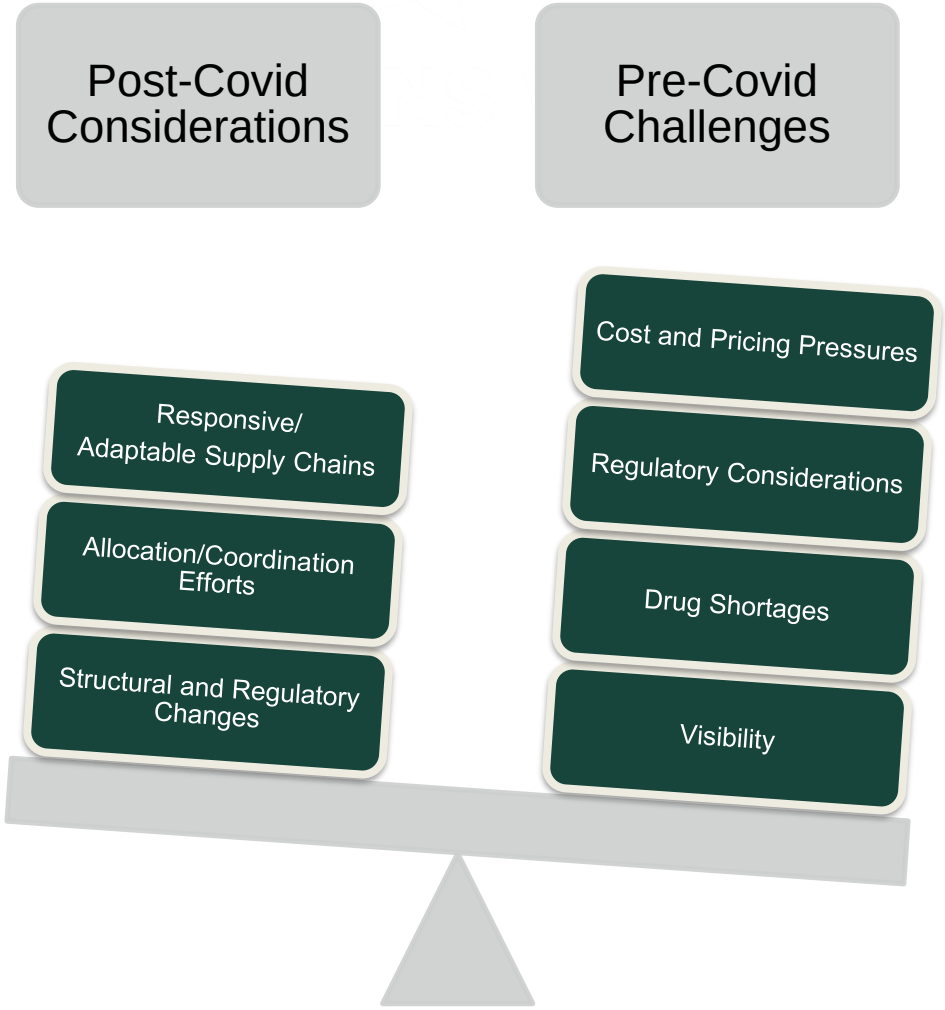
U.S. Blueberry Industry

- Minimal Processing
  - Fresh Product
- Labor Intensity
  - Harvest – High (Outdoor)
  - Processing – Low (Indoor)
- Retail Market

The Pharmaceutical Supply Chain



* Sources Available


Post-Covid Considerations
Pre-Covid Challenges
Responsive/ Adaptable Supply Chains
Allocation/Coordination Efforts
Structural and Regulatory Changes
Cost and Pricing Pressures
Regulatory Considerations
Drug Shortages
Visibility

Where Do We Go From Here?

- Develop cross-industry collaboration (e.g., automotive, consumer products)
- Understand the importance of labor and trade-offs with technology
- Develop new products and/or substitutes
- Balance between costs and risks
- Establish public/private partnerships

Questions?