

# NAR Data Breakdowns 2007

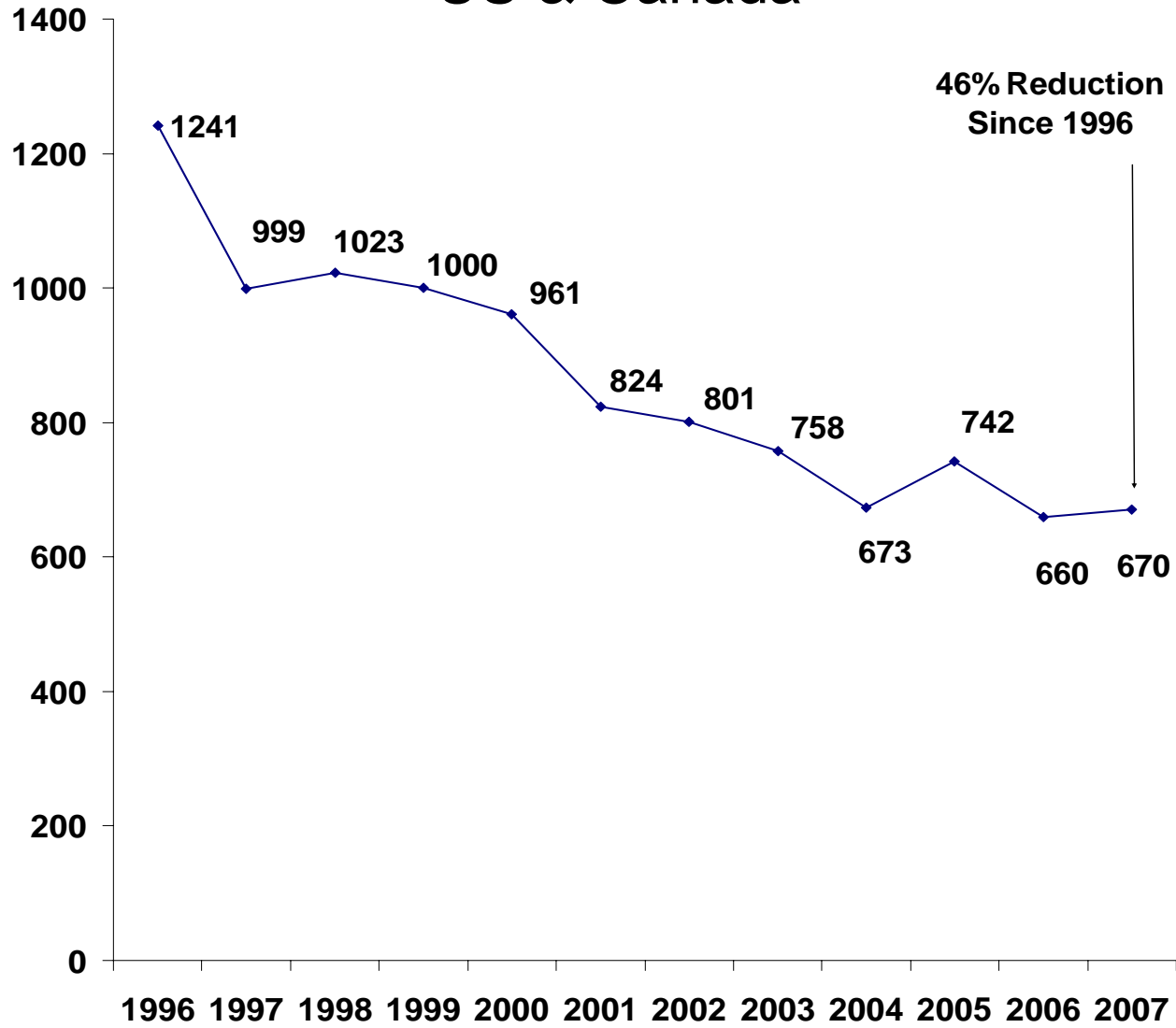
April 27, 2008

Source of data: AAR/BOE Database  
& Annual Hazmat Reports

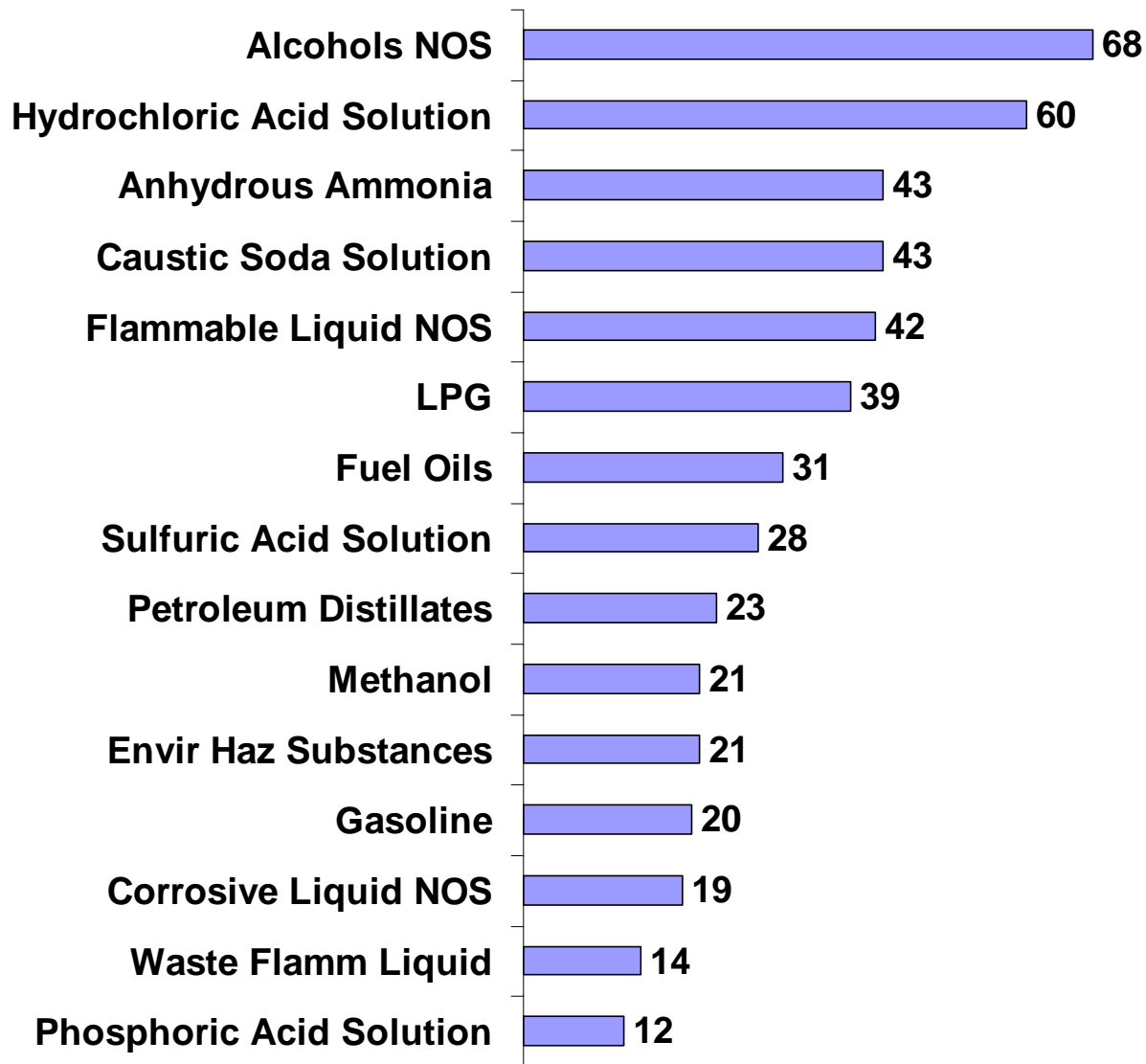
Todd Treichel  
ttreichel@aar.org

# NARs by Year

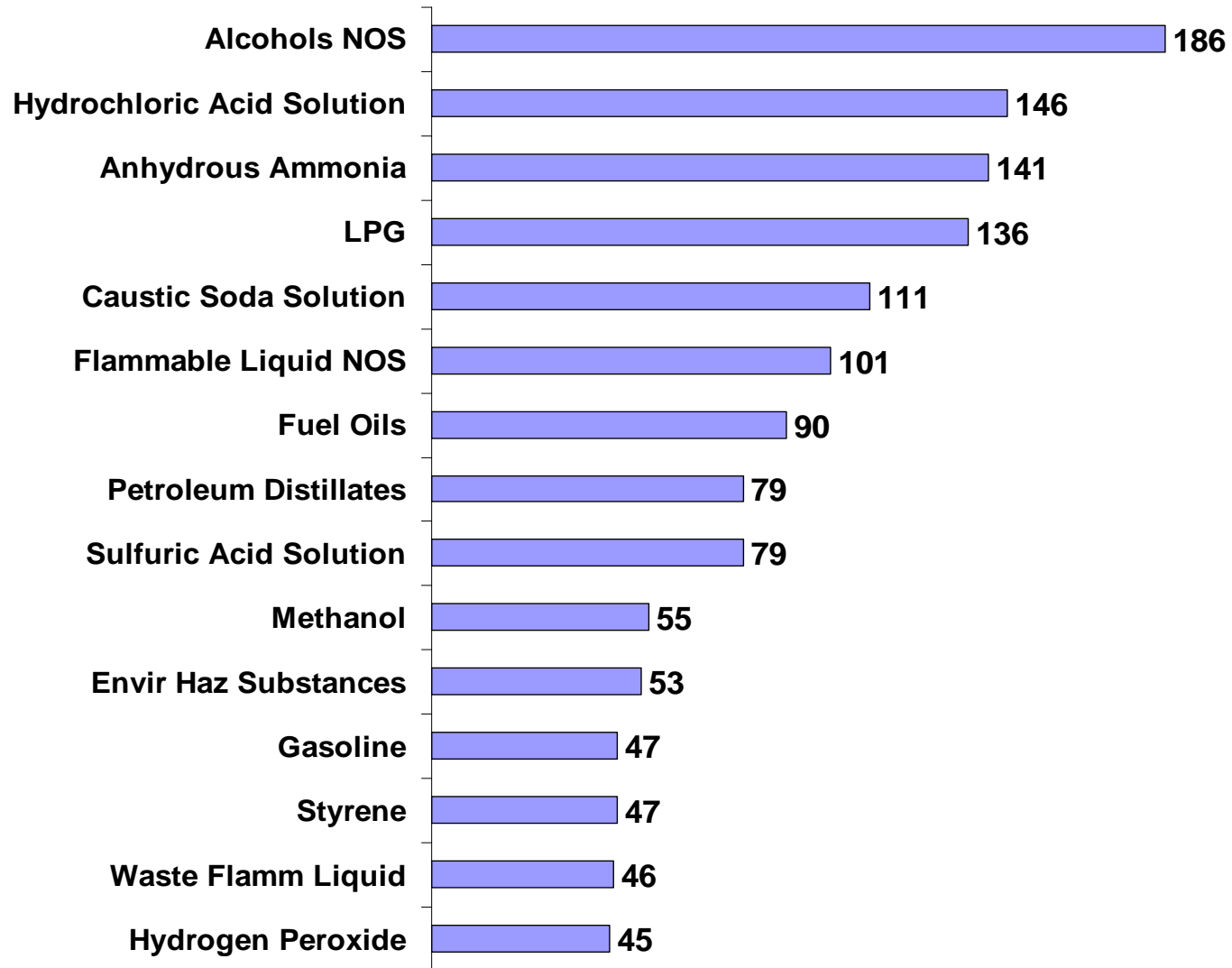
## US & Canada



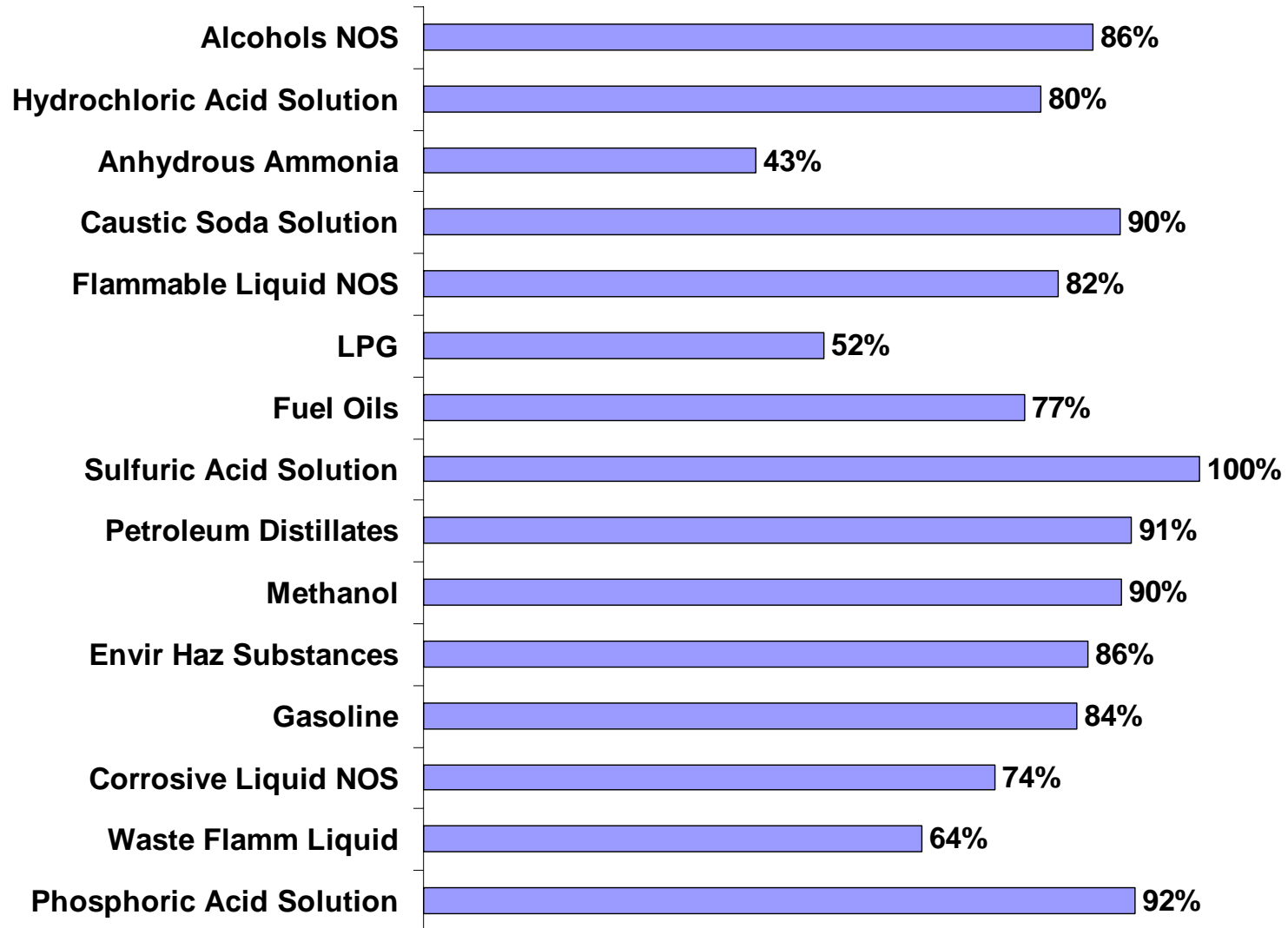
# Top Commodities for NARs 2007



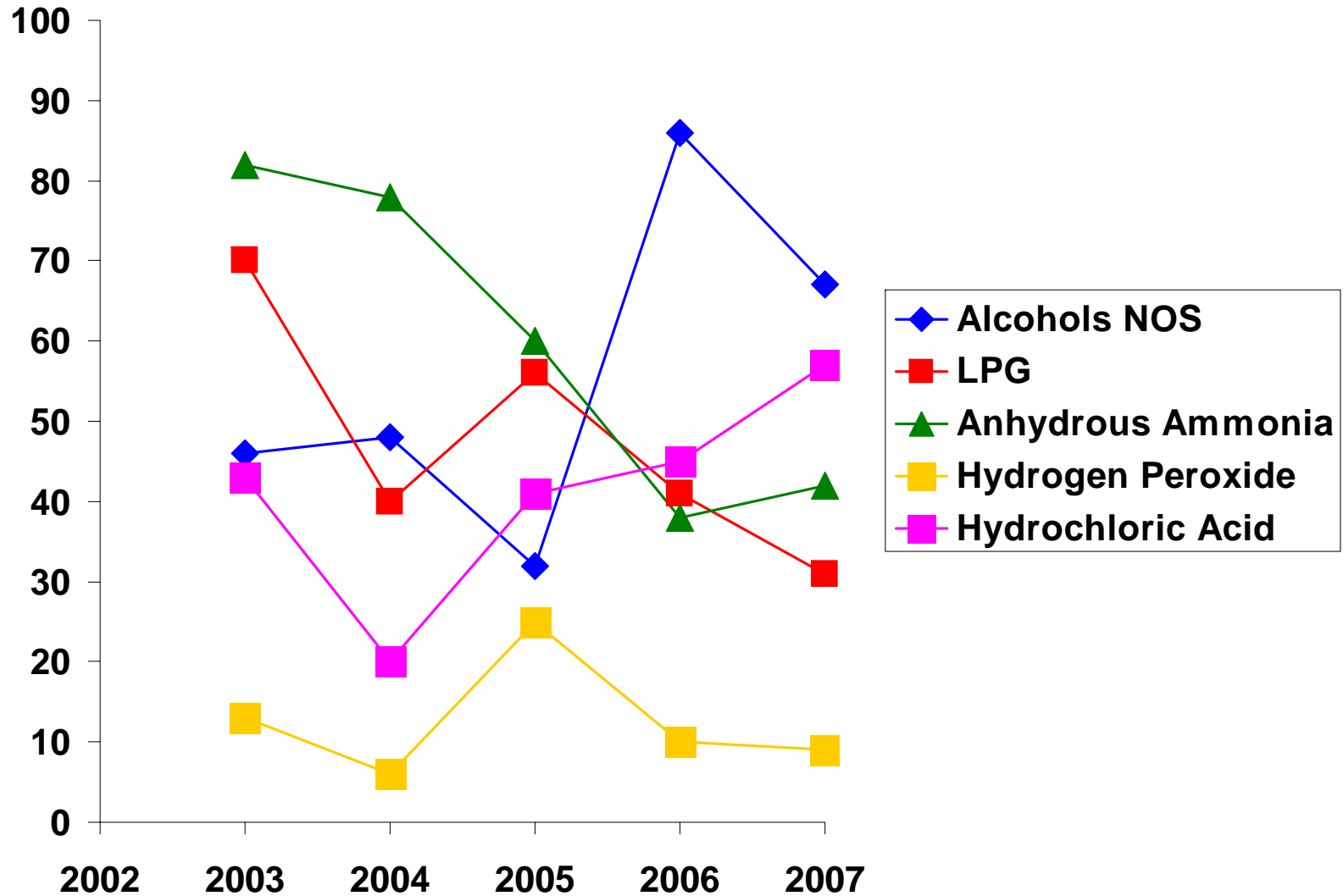
# Top Commodities for NARs 2005 - 2007



# Percent of NARs Occurring on Loaded Trips

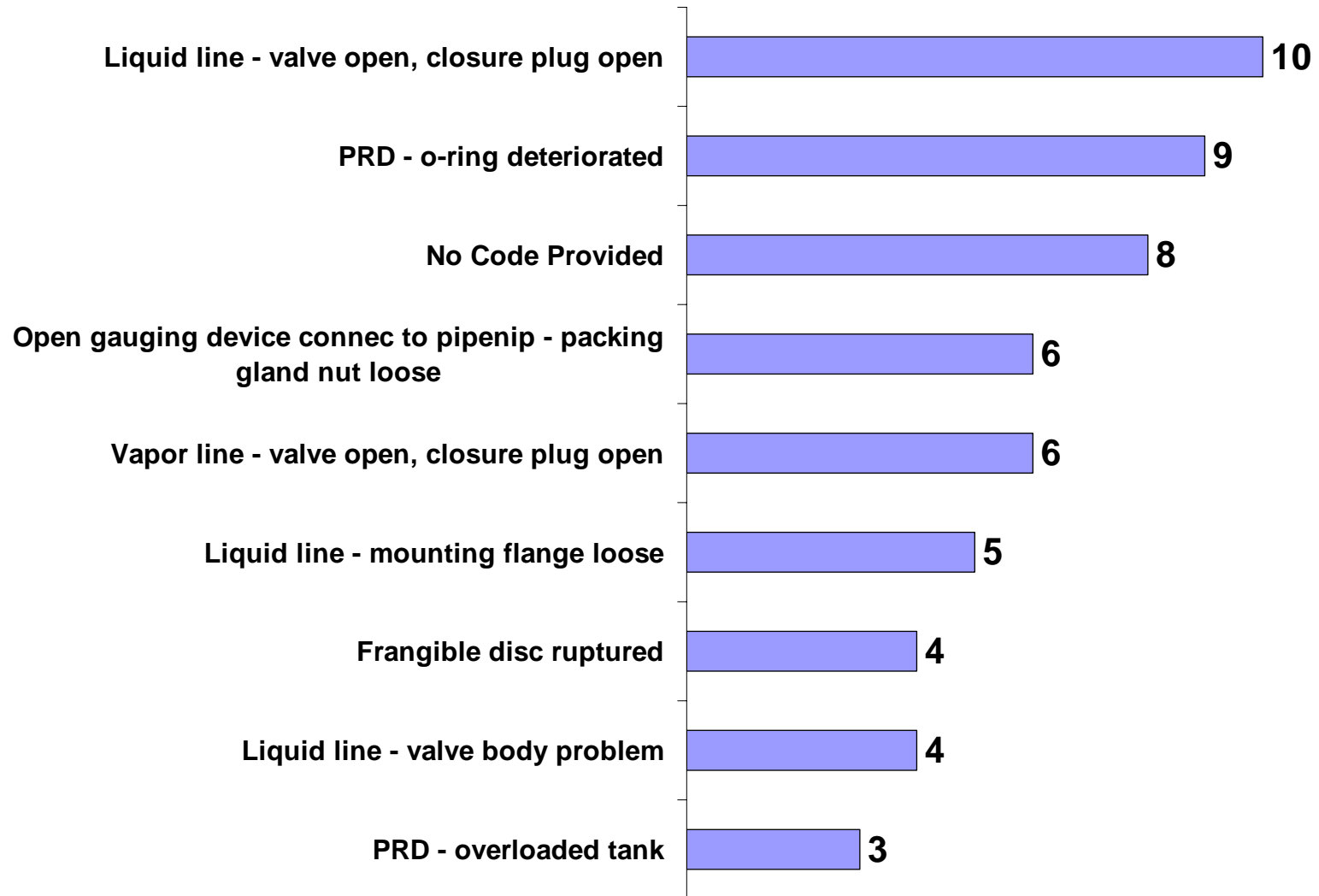


# Commodities with Trends of Interest



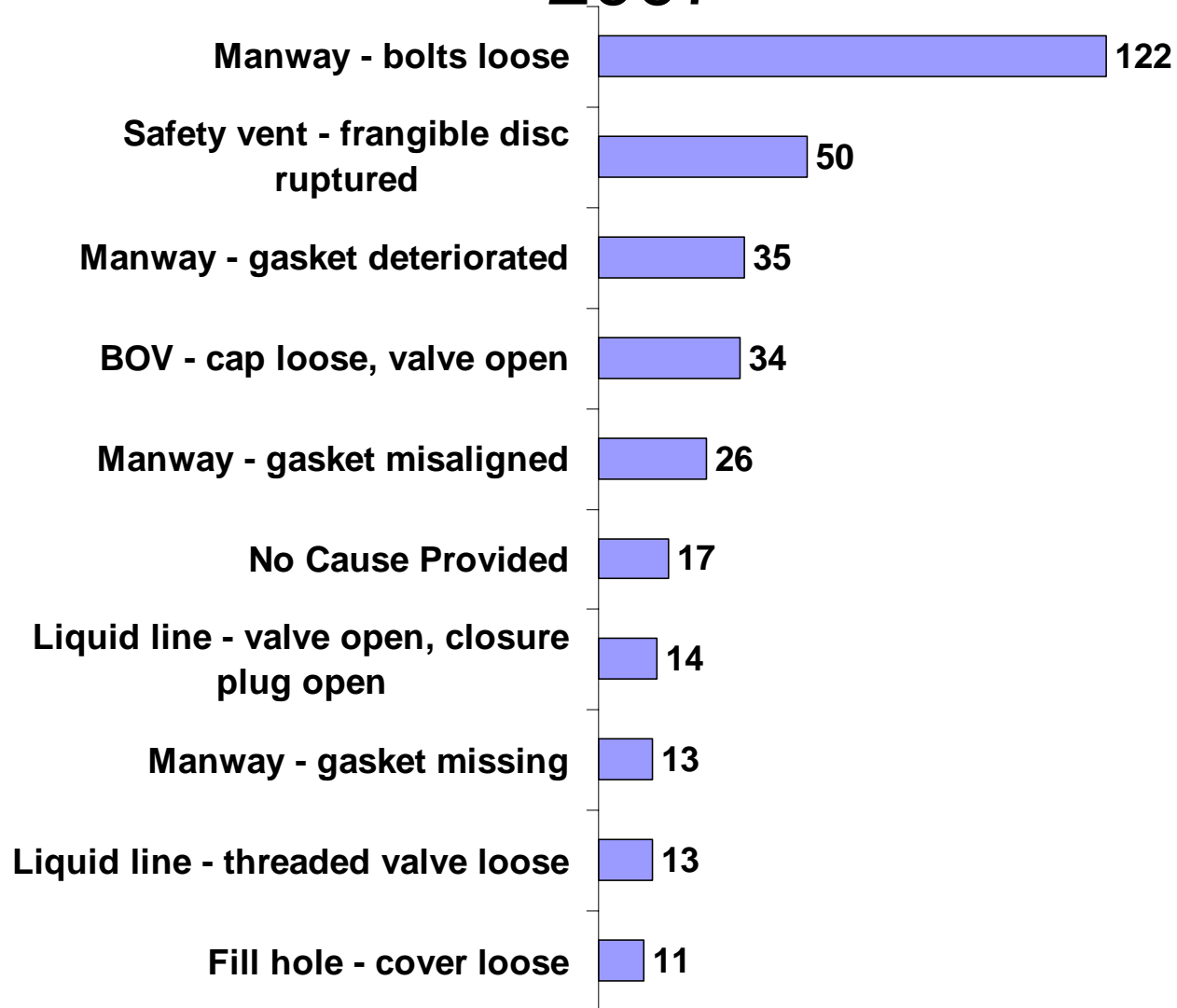
# Top Specific Causes for Pressure Cars

## 2007

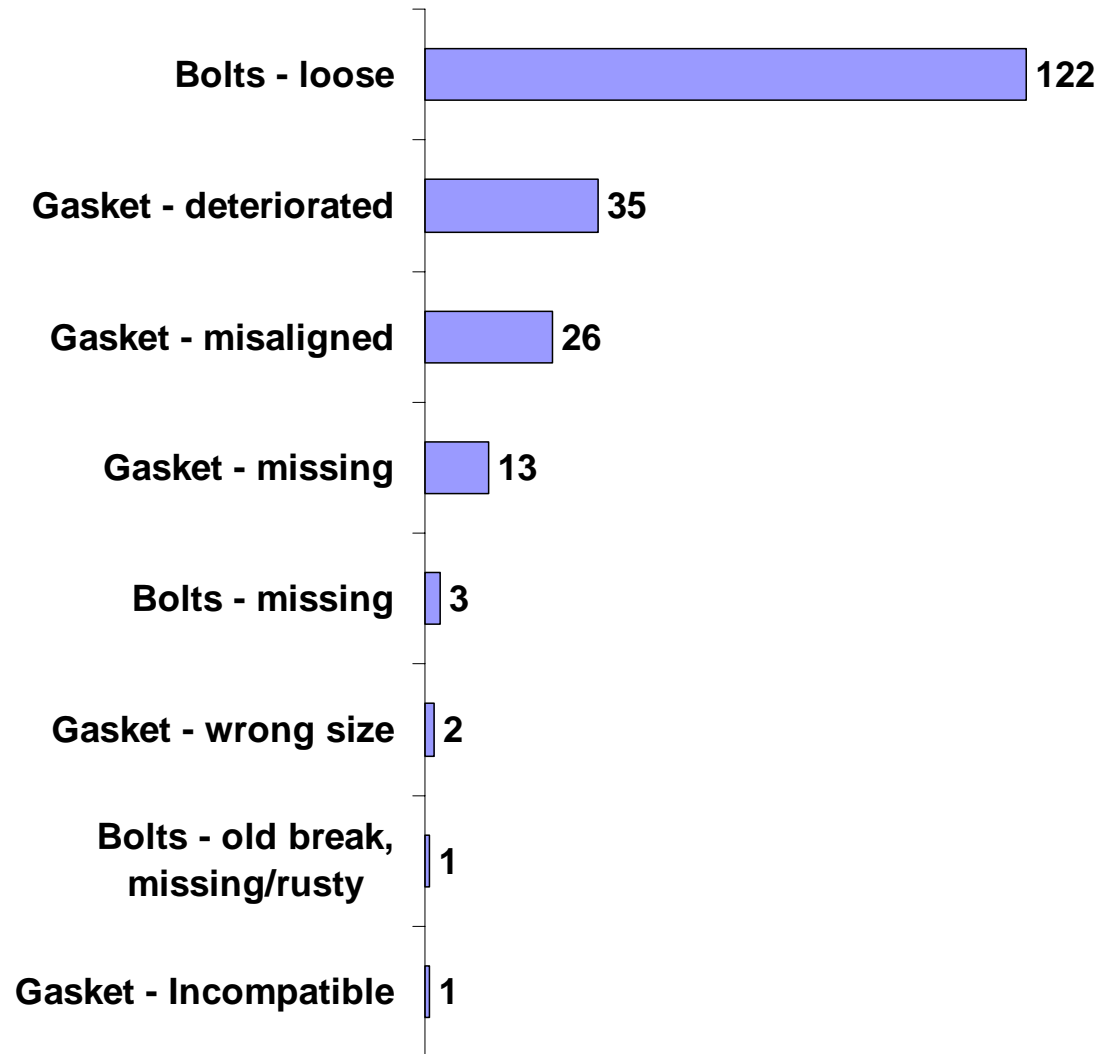


# Top Specific Causes for Nonpressure Cars

2007



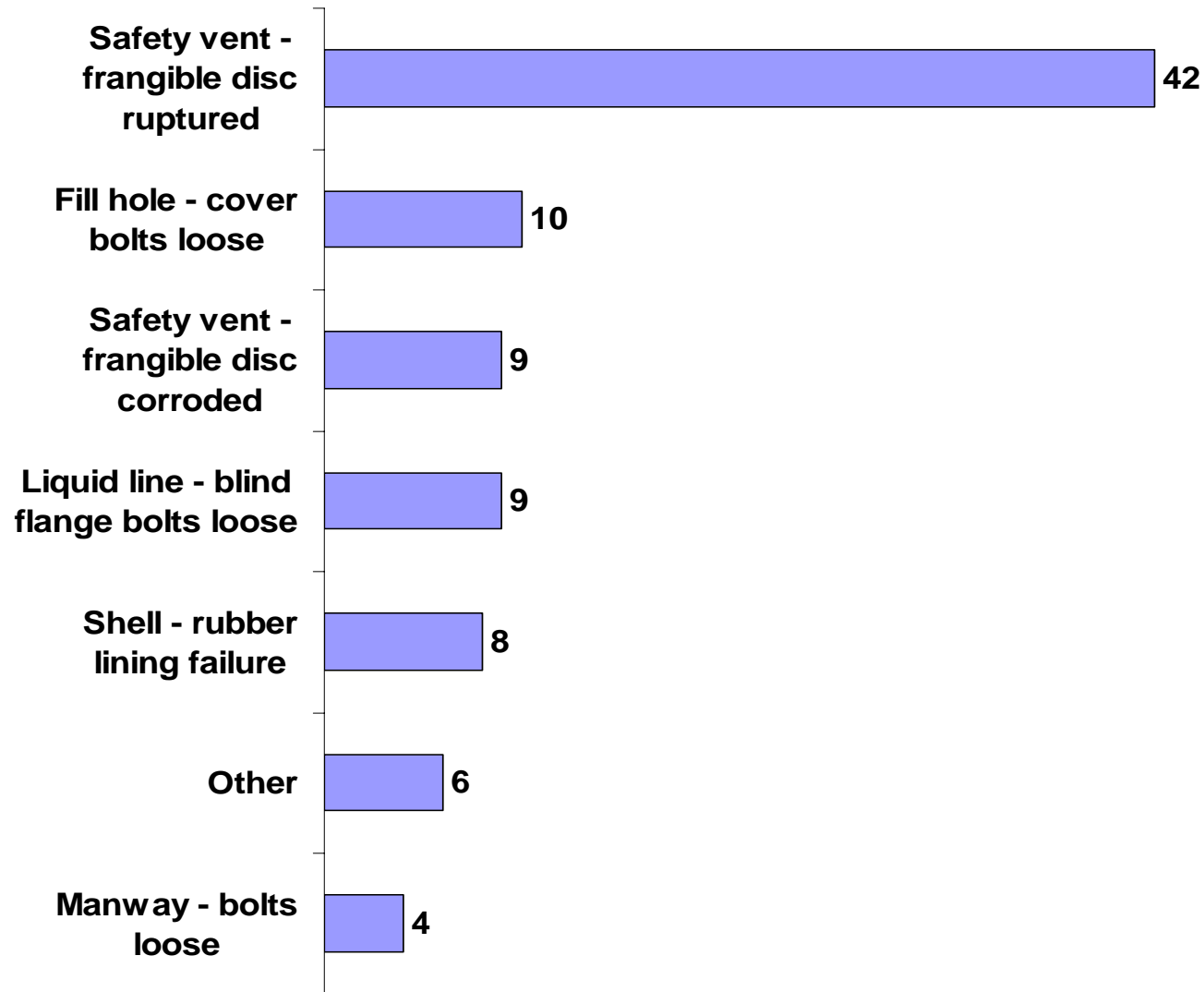
# Manway Causes for Nonpressure Cars 2007



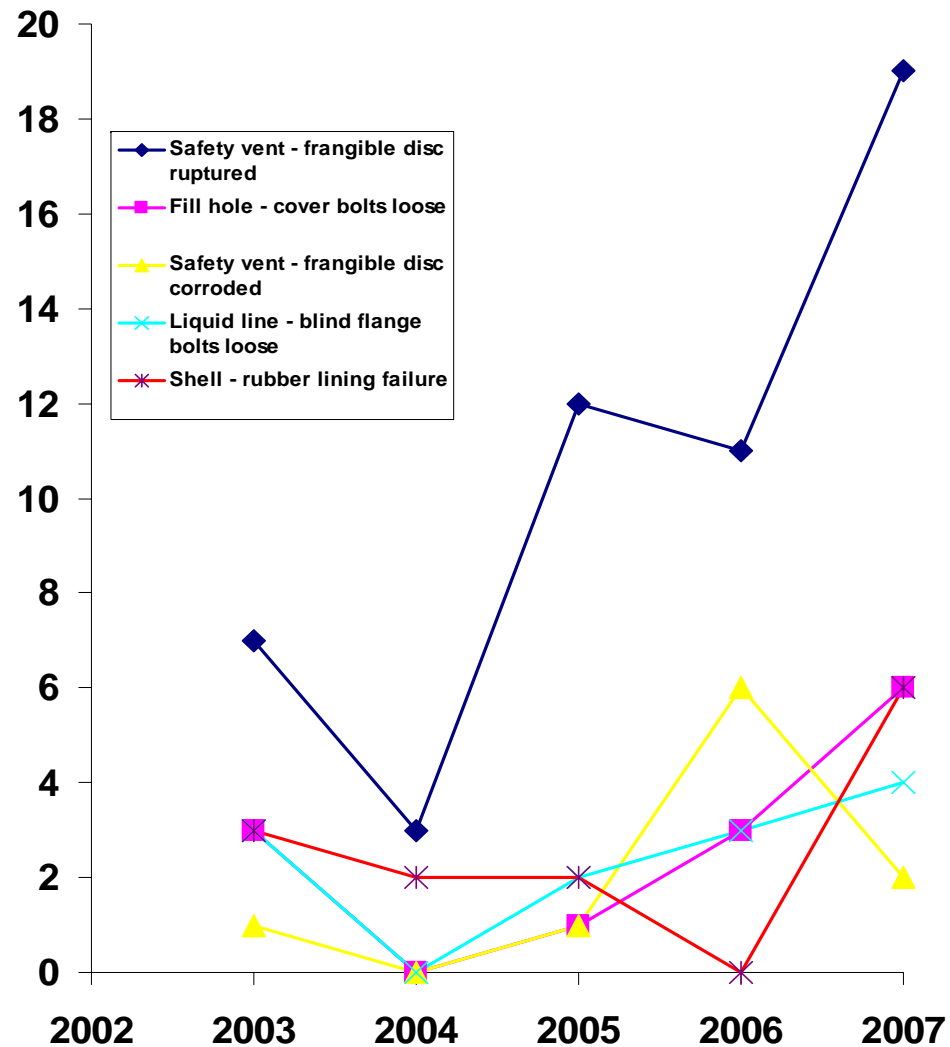
# PRV O-ring Causes 2003-2007

	2003-05 avg	2006	2007
Deteriorated - pressure car	16	14	8
Misaligned - pressure car	2	5	2
Incompatible - pressure car	0	1	0
Deteriorated - nonpressure car	2	1	1
Misaligned - nonpressure car	1	1	0
Incompatible - nonpressure car	1	0	0
Deteriorated - car spec unk	0	0	1
Total	21	22	12

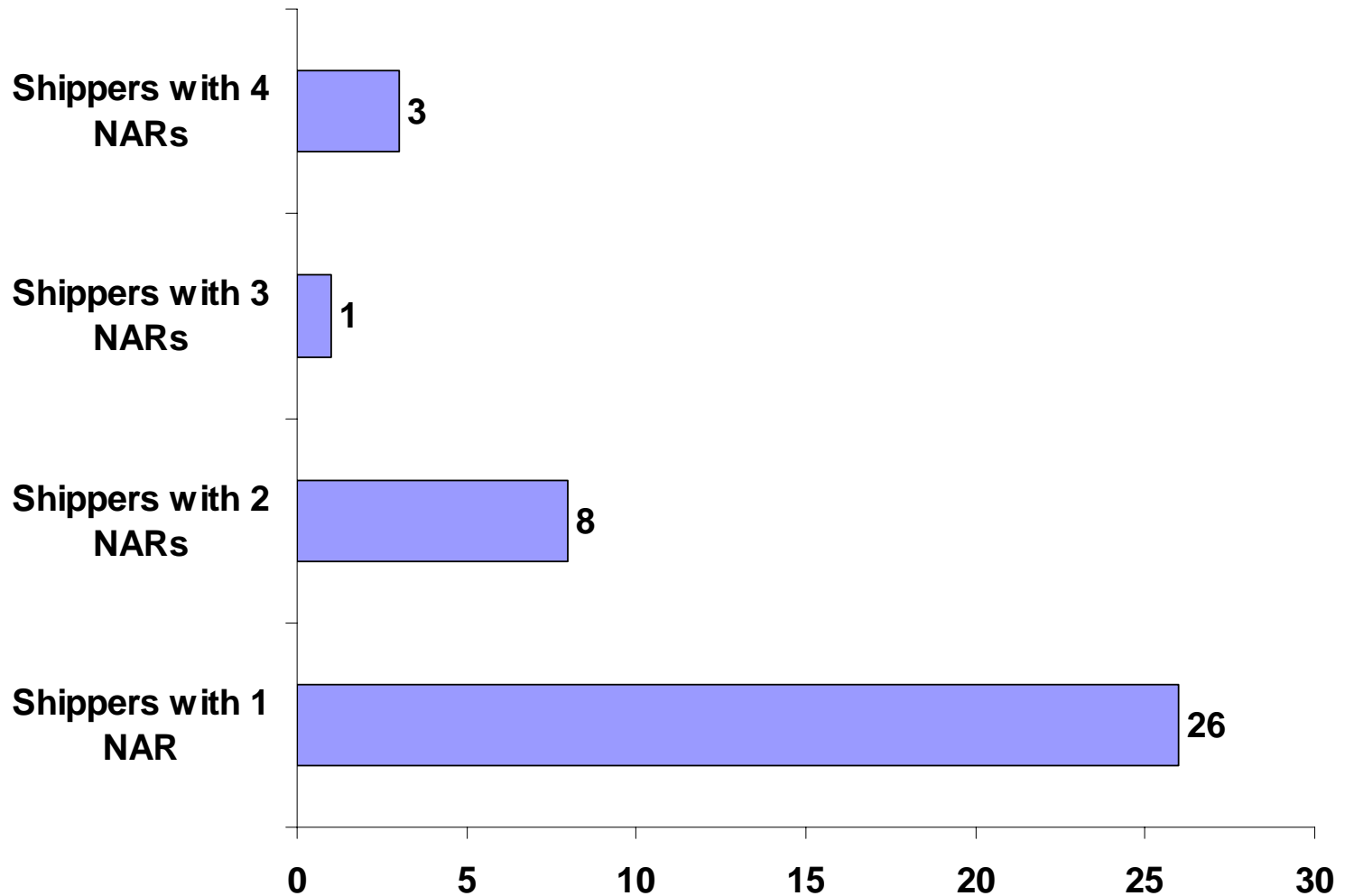
# Top Specific Causes for Hydrochloric Acid Solution 2005-2007



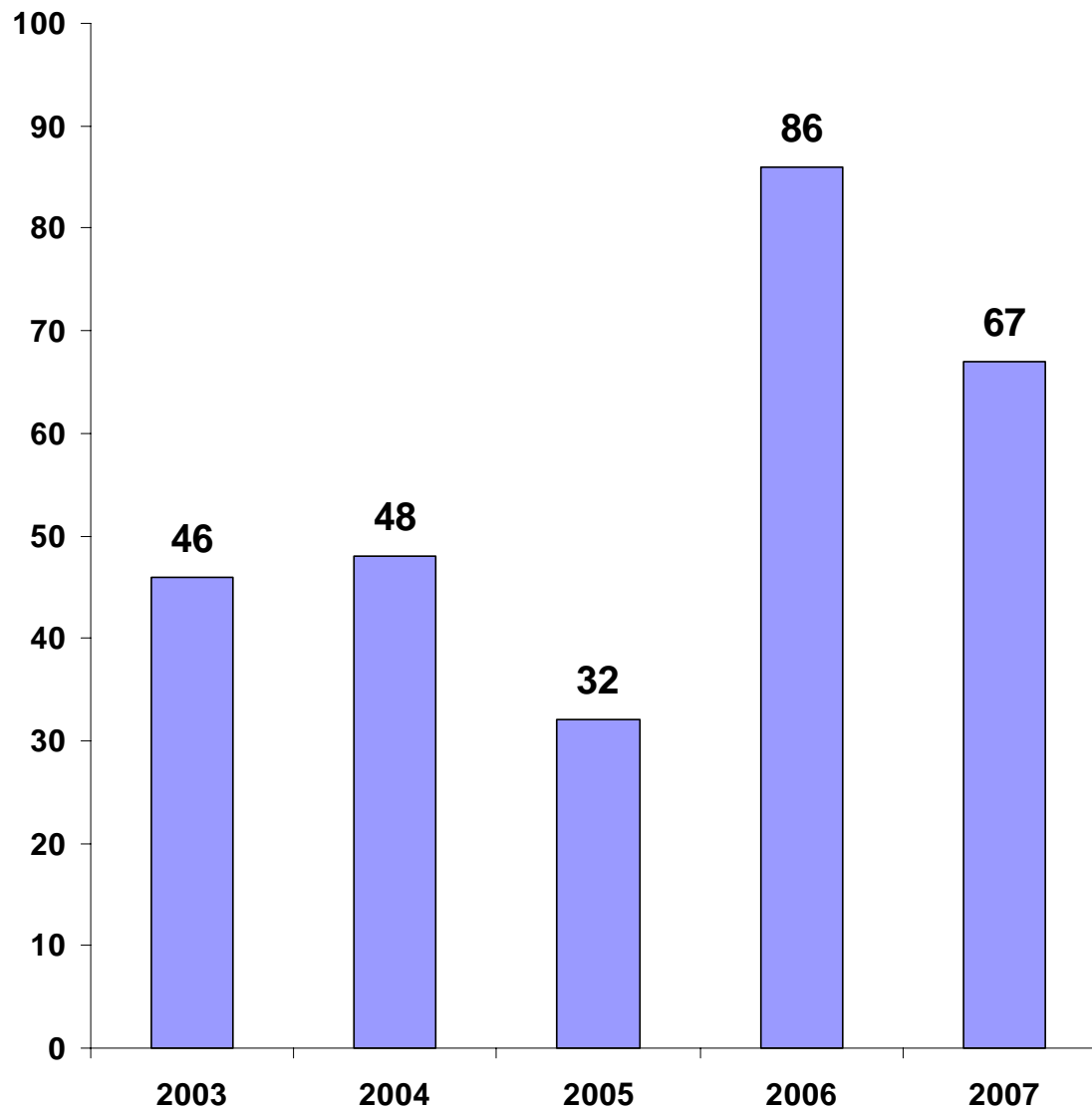
# Top Specific Causes for Hydrochloric Acid Solution



# Distribution of No. of NARs for Hydrochloric Acid Shippers

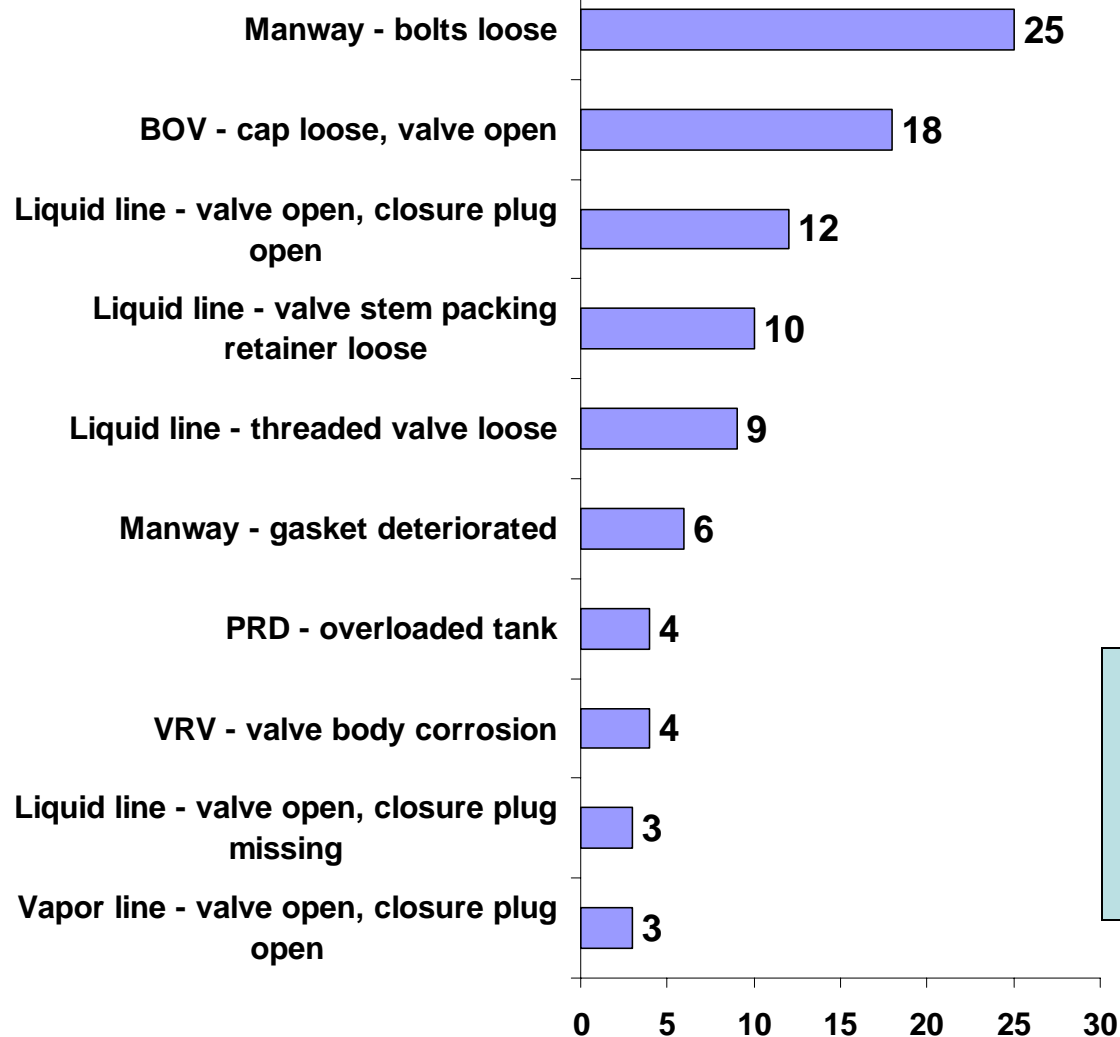


# NAR Trend for Alcohols NOS



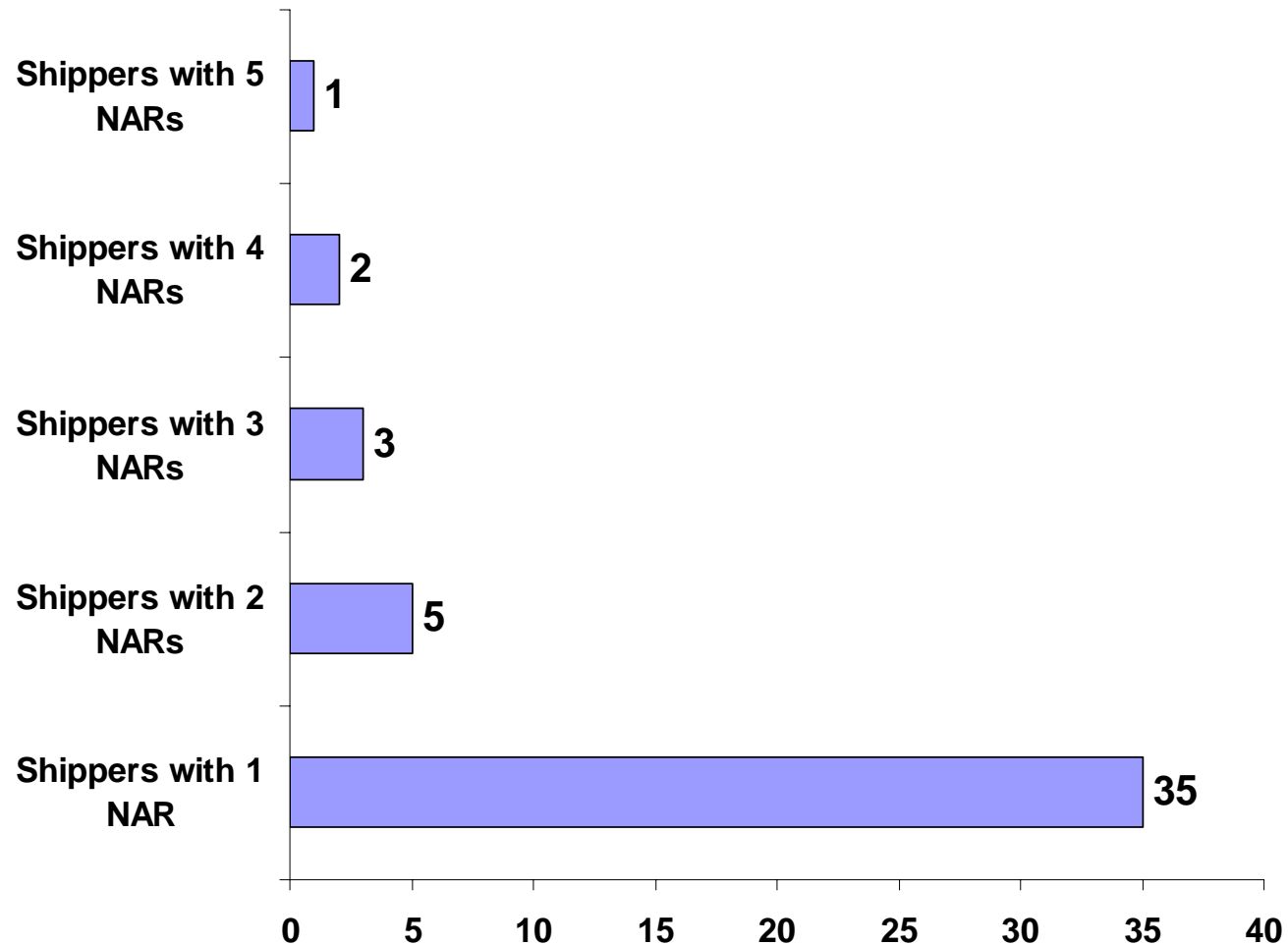
# Top Specific Causes for Alcohols NOS

2005-2007

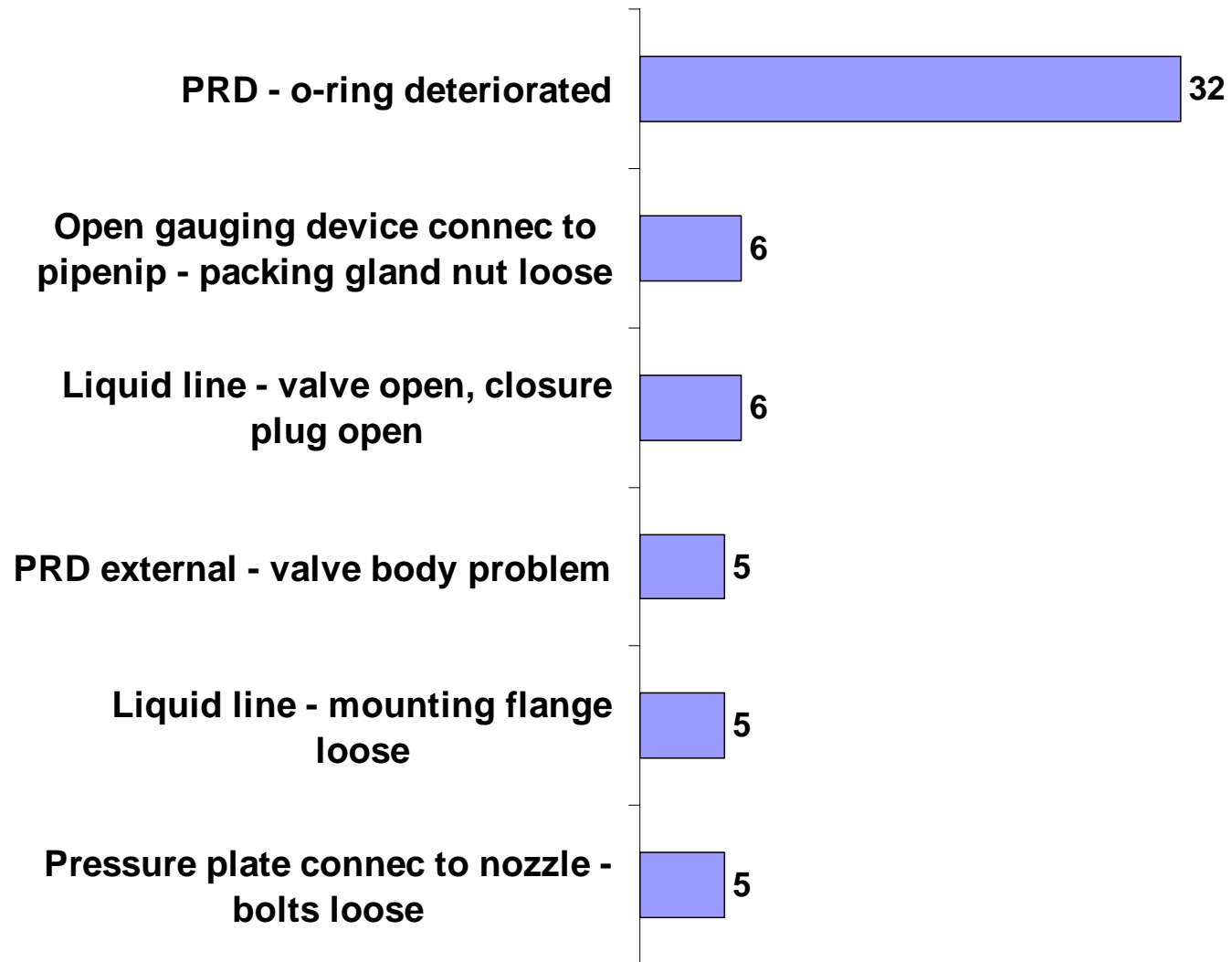


Many causes with 2 NARs – one of the largest spreads of different causes

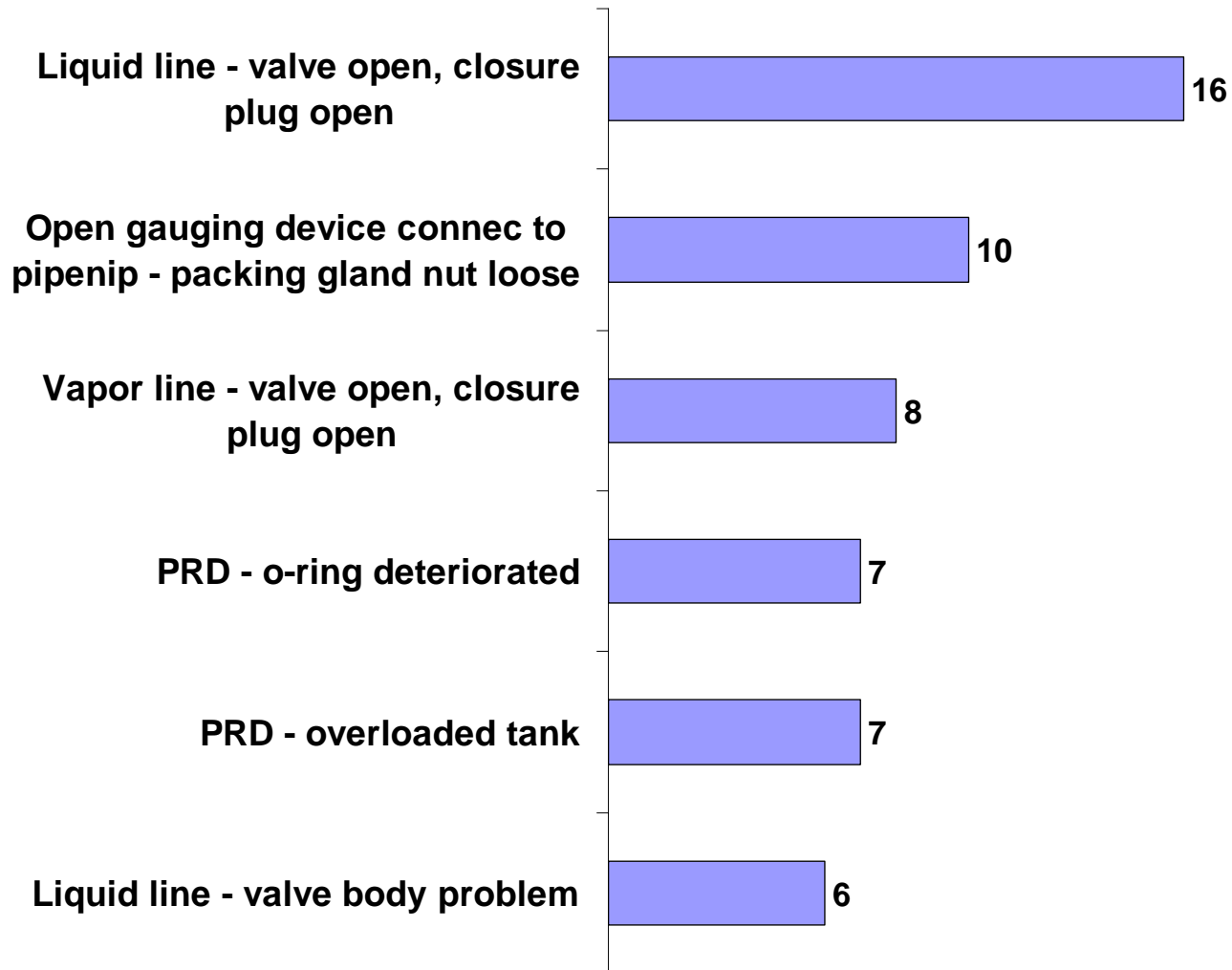
# Distribution of No. of NARs for Alcohols NOS Shippers



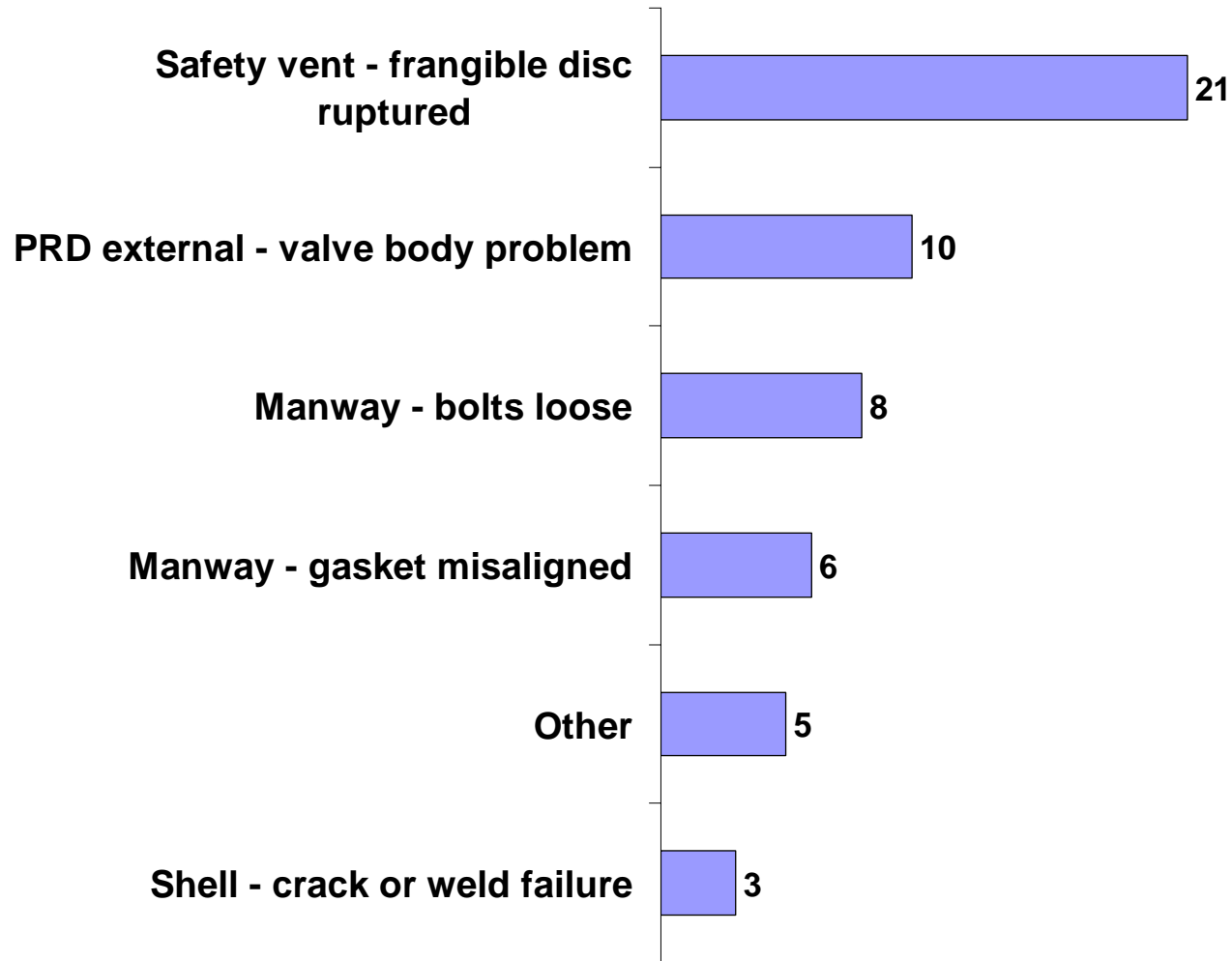
# Top Specific Causes for Anhydrous Ammonia 2005-2007



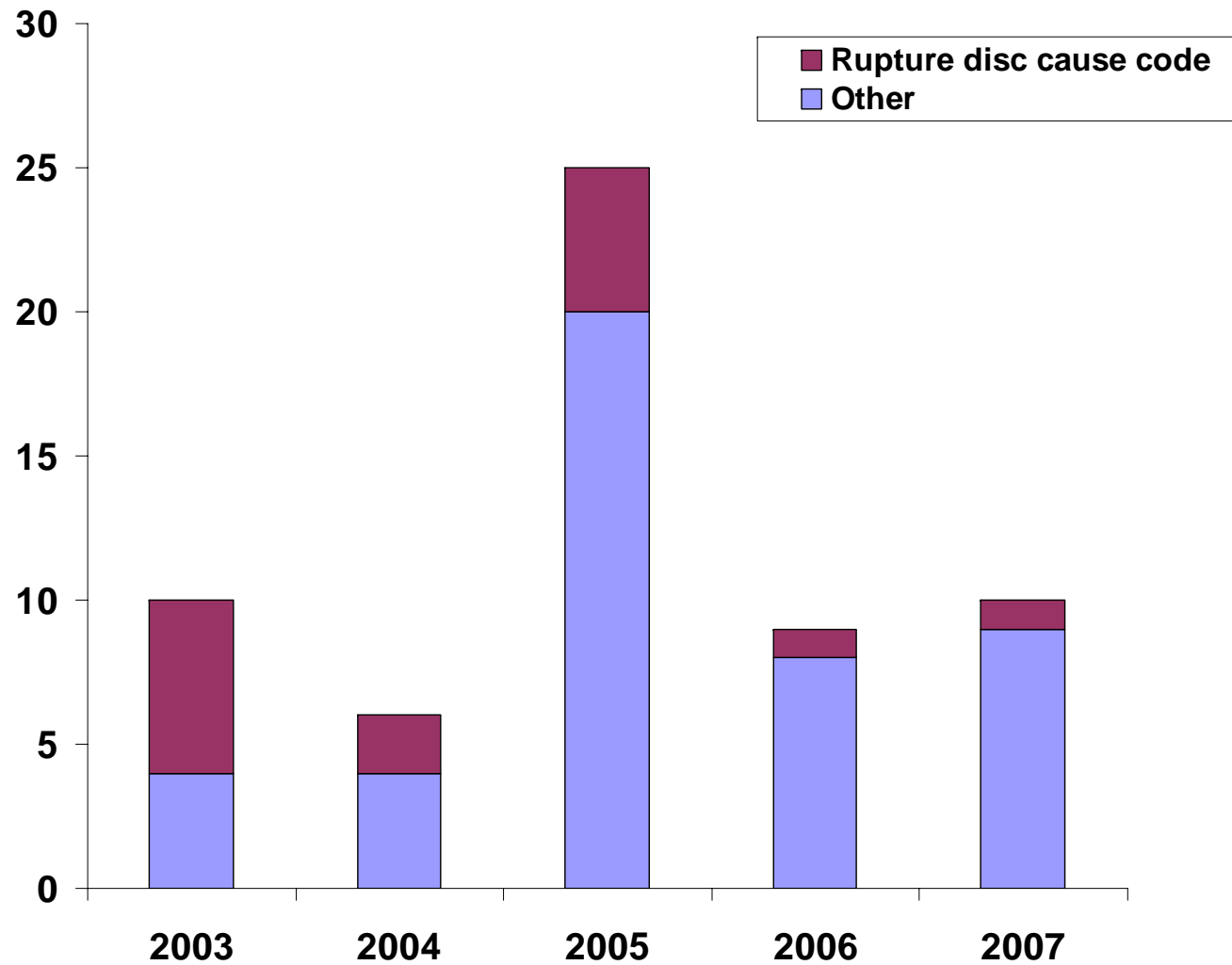
# Top Specific Causes for Liquefied Petroleum Gases 2005-2007



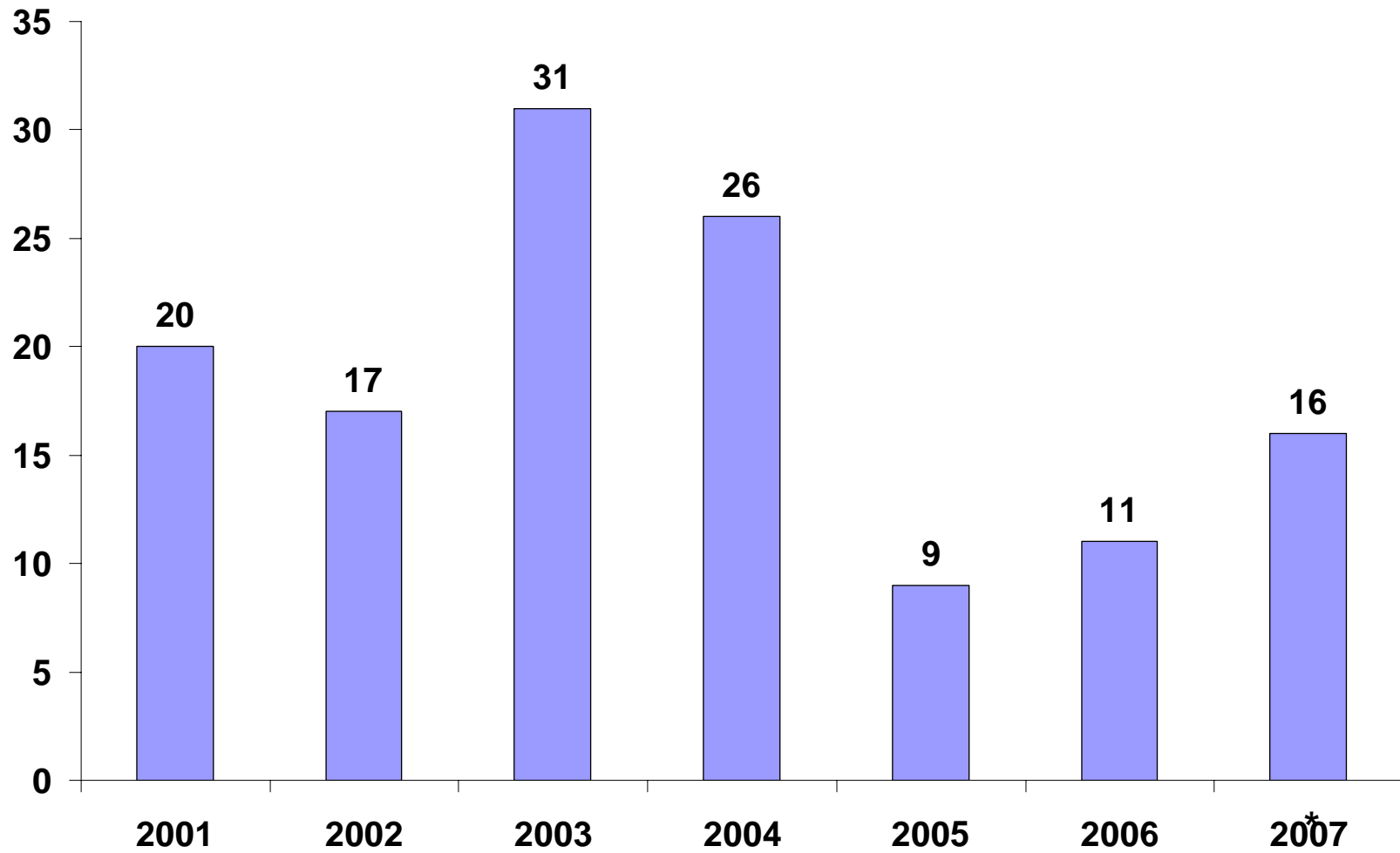
# Top Specific Causes for Sodium Hydroxide Solution 2005-2007



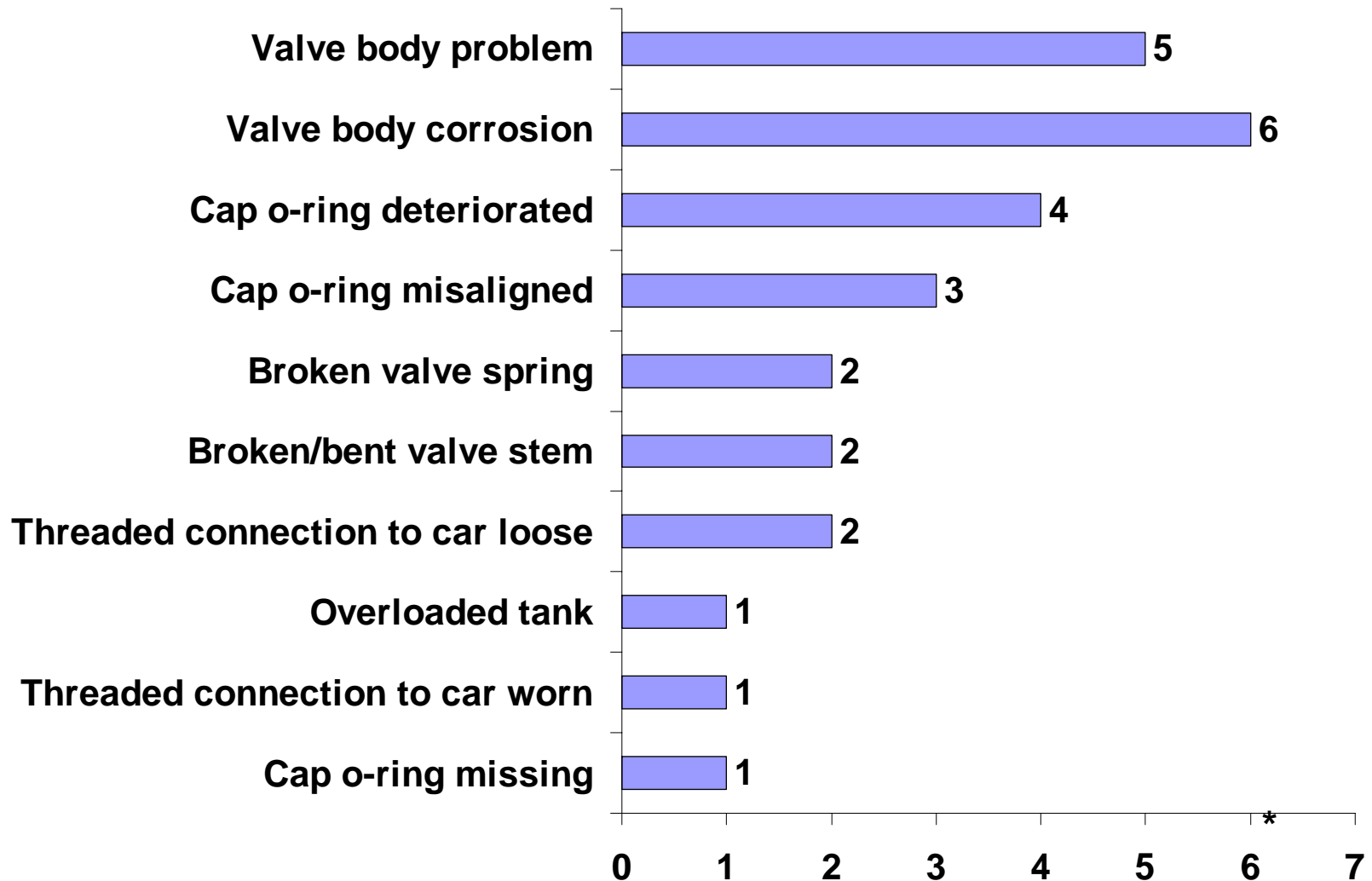
# Hydrogen Peroxide NAR Trend



# Vacuum Relief Valve NARs 2001- 2007



# Vacuum Relief Valve NAR Causes 2006- 2007



# **NAR Risk Index (NARRI) Components**

**NARRI Score =**

**Risk Factor x Consequence Factor**

# **Risk Factor Components**

## **A Preventive Factor**

- **Obvious, easily prevented etc. = 5 points**
- **All other causes = 2 points**

## **B Package/Quantity Factor**

- **1 to 5 points: load vs. residue, bulk vs. non**

## **C Product Hazard Factor**

- **1 to 10 points based on hazard class/division  
and packing group**

## **D Extenuating Hazard Factor**

- **Additional points for ESCs, PIHs etc.**

# **Consequence Factor Components**

## **E Environmental Impact Factor**

- 2 to 5 points
- Dependent on actual quantity released

## **F Human Impact Factor**

- 2 to 10 points
- Exposures, hospitalizations, deaths incurred
- Evacuations incurred

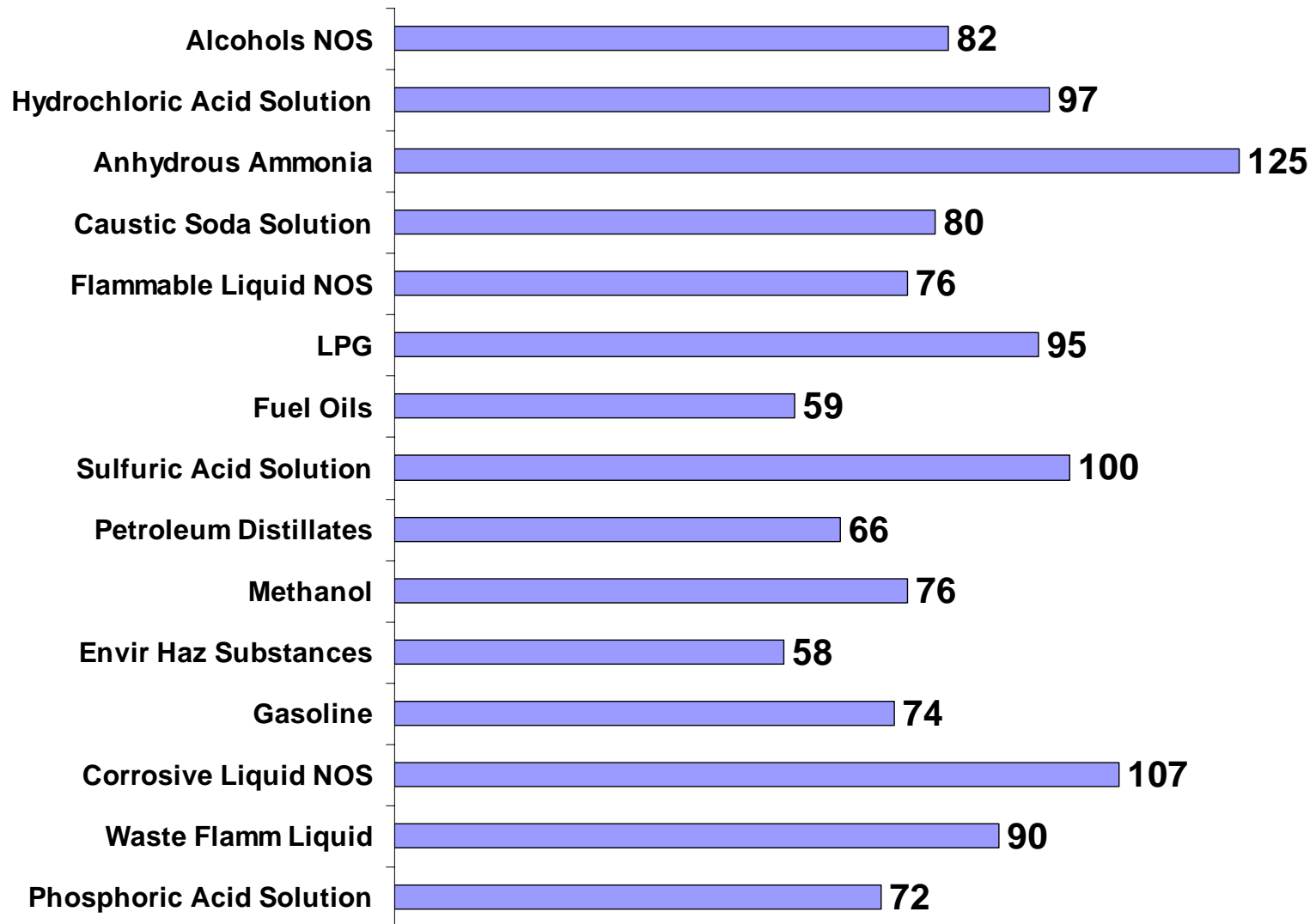
# Bringing the Factors Together

$$\text{NARRI Score} = A \times (B + C + D) \times (E + F)$$

i.e.,

Prevention x  
(Package + Hazard + Extenuating Hazard) x  
(Environmental Impact + Human Impact)

# Average NARRI for Top Commodities 2007



# NARRI Points per 1,000 Loads

## US & Canada 2006



# Commodities w/ NARRI Scores > 150

## 2007

