Hierarchy of OELs: Where Have We Been? Where Do We Go?

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Presentation Highlights

- Historical Evolution
- OEL Setting Processes Today
  - Traditional, threshold approach
  - Newer ideas
    - Risk based
    - Band based

Global Evolution

- Pre 1900
- Early 1900s
- 1940s-1970s
- Post 1970s

Today's OEL Processes

- **US Environment (1920s start)**
  - 1927 Walsh Healey Act
  - 1946 ACGIH
  - 1971 OSHA
  - 1971 NIOSH
  - 1984 AIHA
  - State Level Efforts

Today's OEL Processes

- **European Union**
  - ACGIH TLVs a starting point
  - SCOEL (Scientific Committee on OELs)
  - Individual country efforts…eg UK
    - Control of Substances Hazardous to Health Regulations (COSHH) from 1988
    - 1980-2005, annual update, ~ 500 WELs
    - Since 2005, new WELS-implement IOELVs
  - 2007 REACh

REACh

- EU effort
- 2007 Regulation on Registration Evaluation & Control of Chemicals (REACh)
- Prescribed DNELs
- Include EH&S risks
- Lower than traditional OELs

China's OEL Development

- Great Wall

China's OEL Process

- **1950s**, Republic of China published first exposure standards.
- **1990s**, Emphasis on Occupational Disease Prevention
- **Today**, 339 Conservative Compulsory OELs
- **Today**, Health is Primary Consideration
- **Today**, Strive for Economic & Technological Feasibility

Comparison: China's OELs, TLVs and WELs

Hazardous Agents	China's OEL PC-TWA (mg/m^3)		ACGIH TLV TWA (mg/m^3)	UK OEL TWA (mg/m^3)
Methanol	25		262	266
Lead, fume & dust	0.03, fume 0.05, dust		0.05	0.15
n-Hexane	100		176	72
Dimethylformamide	20		29.9	15
Crystalline Silica/ Quartz (respirable)	10%≤free SiO_2≤50%	0.7	0.025	0.1
	50%＜free SiO_2≤80%	0.3		
	free SiO_2＞ 80%	0.2		
Noise (8hr per day)	85dbA		85dbA	85dbA

Democratic Republic of India

India's OEL Processes

- Safety Focus and Huge Unorganized Workforce
- Lack of Occupational Disease Data
- Meager Spending on Public Health
- No Coherent National Policy
- **1948** Factories Act, Permissible Limits of Exposure of Chemical and Toxic Substance

India's Permissible Limits of Exposure

Substance (mg/m3)	ACGIH	UK OEL	INDIA
Asbestos	0.1 f/cc	0.1 f/cc	0.1 f/cc
Benzene	1.6	3.25	1.5
Beryllium	0.002	0.002	0.002
Carbon Monoxide	28	35	55
Hexavalent Cr (Sol) Hexavalent Cr (Insol)	0.05 0.01	0.05	0.05 0.05
Manganese fume	0.2	0.5	1.0
Total Dust	10	10	10
Vinyl Chloride	2.5	7.8	10

Latin America Overview

Latin America General Information

Official Language: Spanish and Portuguese most spoken

Number of Countries: 43

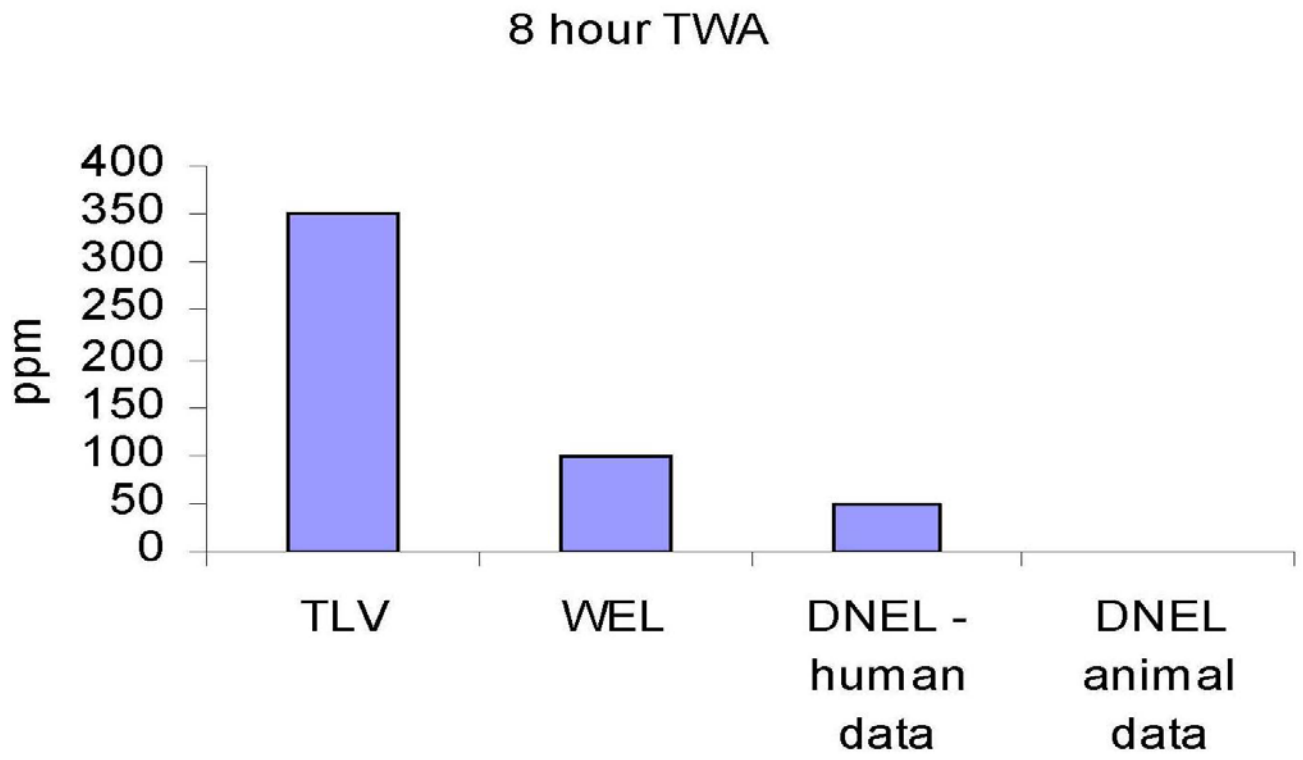
Social Inequality is a major roadblock.
25% of the population lives with less than $2 / day.

Brazil leading country economically,
followed by Mexico, Argentina and Colombia

Latin American Countries

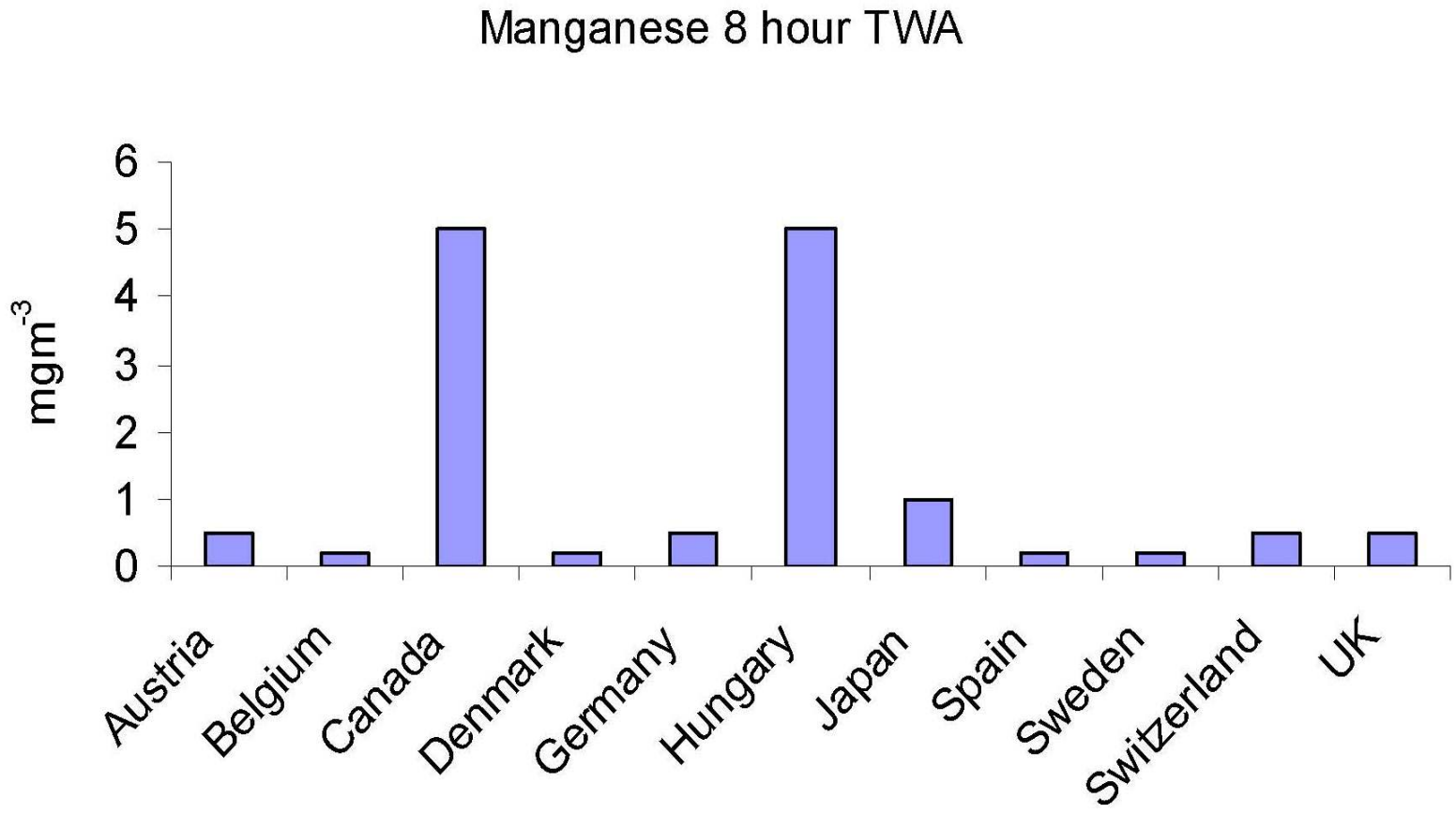
COUNTRY	EXPOSURE LIMITS	DATE
BRAZIL	ACGIH	ACTUAL
ARGENTINA	ACGIH	ACTUAL
CHILE	ACGIH	ACTUAL
COLOMBIA	ACGIH	ACTUAL
MEXICO	ACGIH	1998
VENEZUELA	ACGIH	2001 (Under review)

Derivation of DNELs: 1,1,1 Trichloroethane



Source: Alison Searl, PhD, Director of Analytical Services, IOM Consulting, *Some Current Approaches to OEL Setting in the EU*, BOHS, Occupational Hygiene Conference, Thistle Hotel, Bristol, 2008.

Various OELs for Manganese



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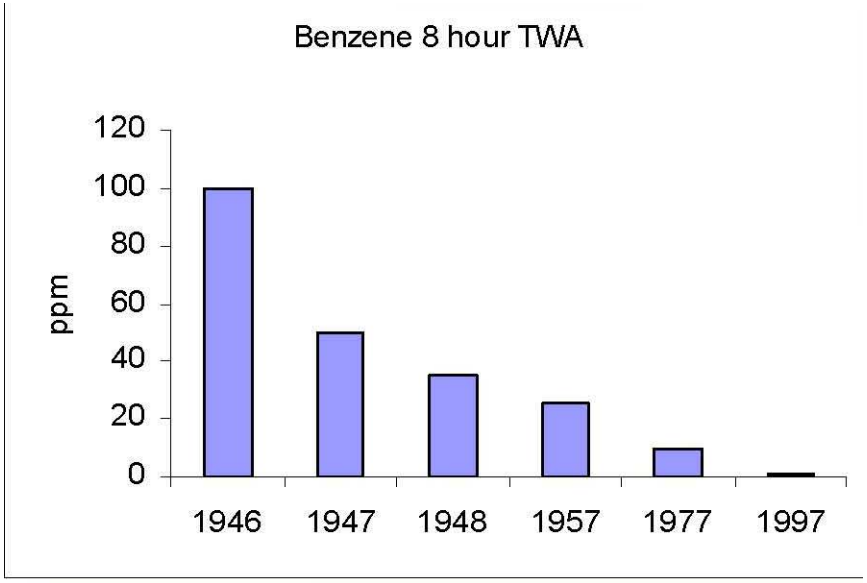
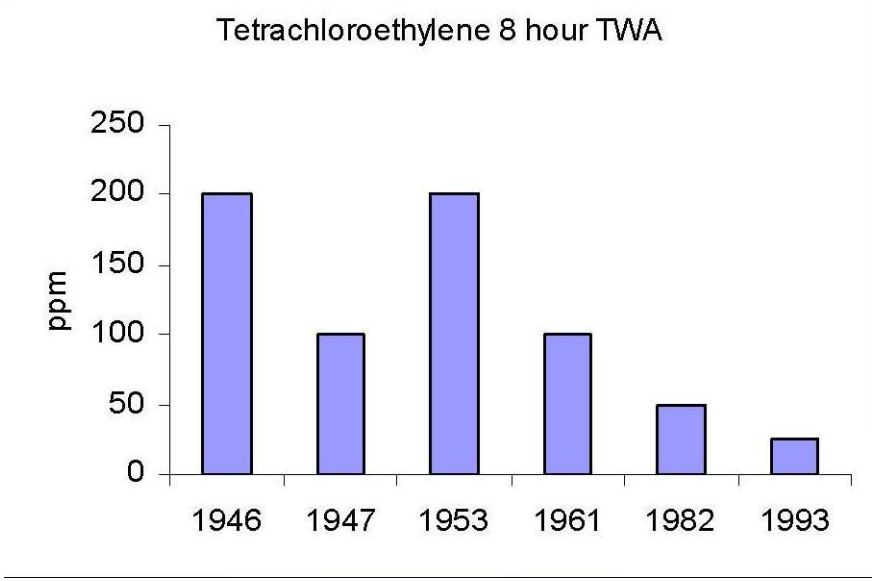
ACGIH Threshold Limit Values





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OEL Global Challenges

- # of chemicals in commerce
- OELs not well understood
- New emphasis--full cycle risks
- Not everyone values OELs
- Basic data--quality & reliability
- Resources and expertise

OEL Global Challenges

- Varied risk determination processes…varied protection levels
- Measurement method issues
- REACh--new playing field
- OELs not set at zero risk, but *acceptable* risk.

Critical Questions

- Do OELs have value today?
- Who should participate in OEL setting processes?
- Are there alternatives to traditional OELs?

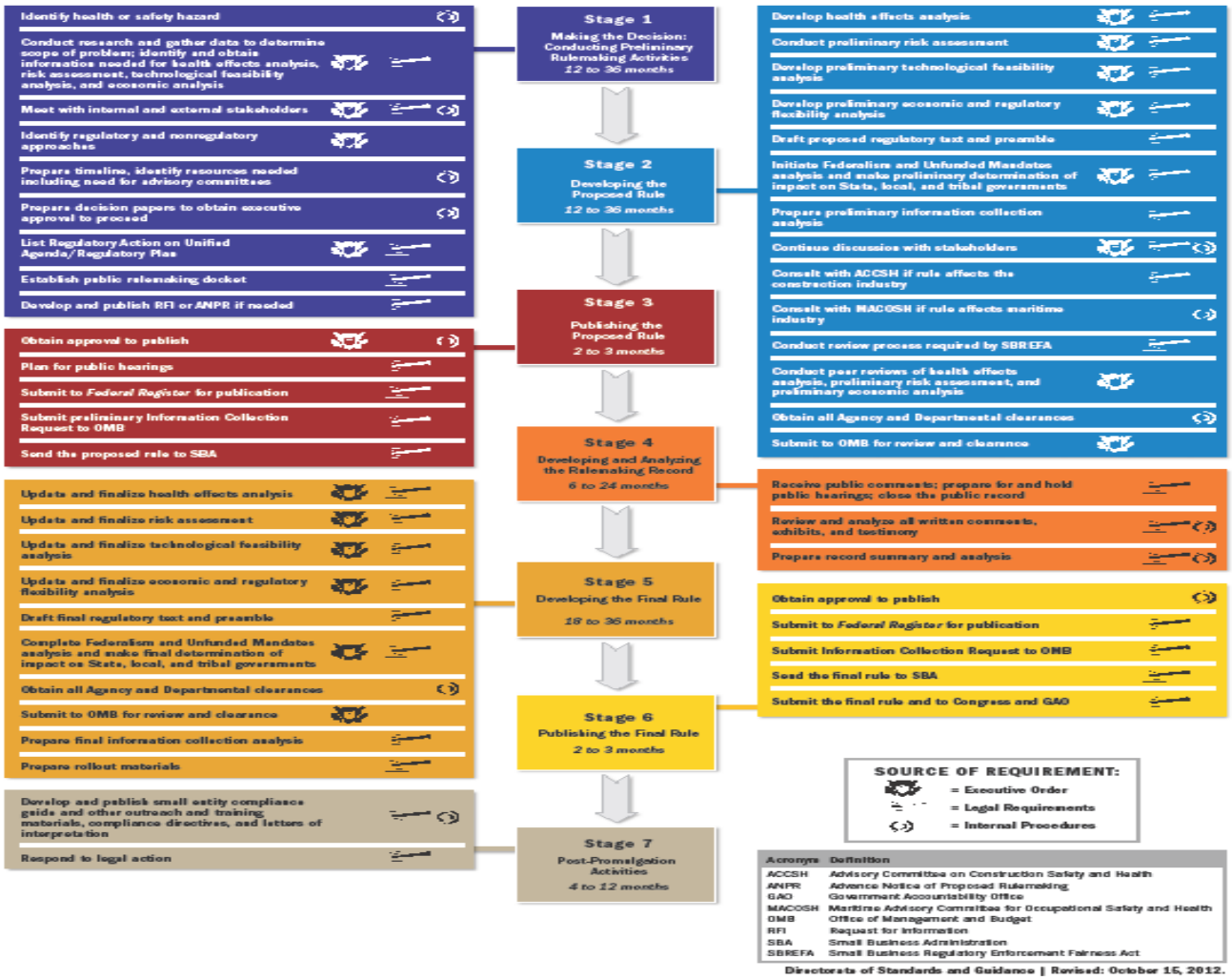
Do OELS Have Value?

- Risk assessments
- Respirator selection
- Exposure priority setting
- Purchase decisions
- Control recommendations for product consumers

Who Should Participate?

- Neutral 3rd party?
- International body?
- Role of U.S. organizations, federal agencies, state agencies or professional organizations?

THE OSHA RULEMAKING PROCESS



Acronyms	Definition
ACCSH	Advisory Committee on Construction Safety and Health
ANPR	Advance Notice of Proposed Rulemaking
GAO	Government Accountability Office
MACOSH	Maritime Advisory Committee for Occupational Safety and Health
OMB	Office of Management and Budget
RFI	Request for Information
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act

Directorate of Standards and Guidance | Revised: October 15, 2012.

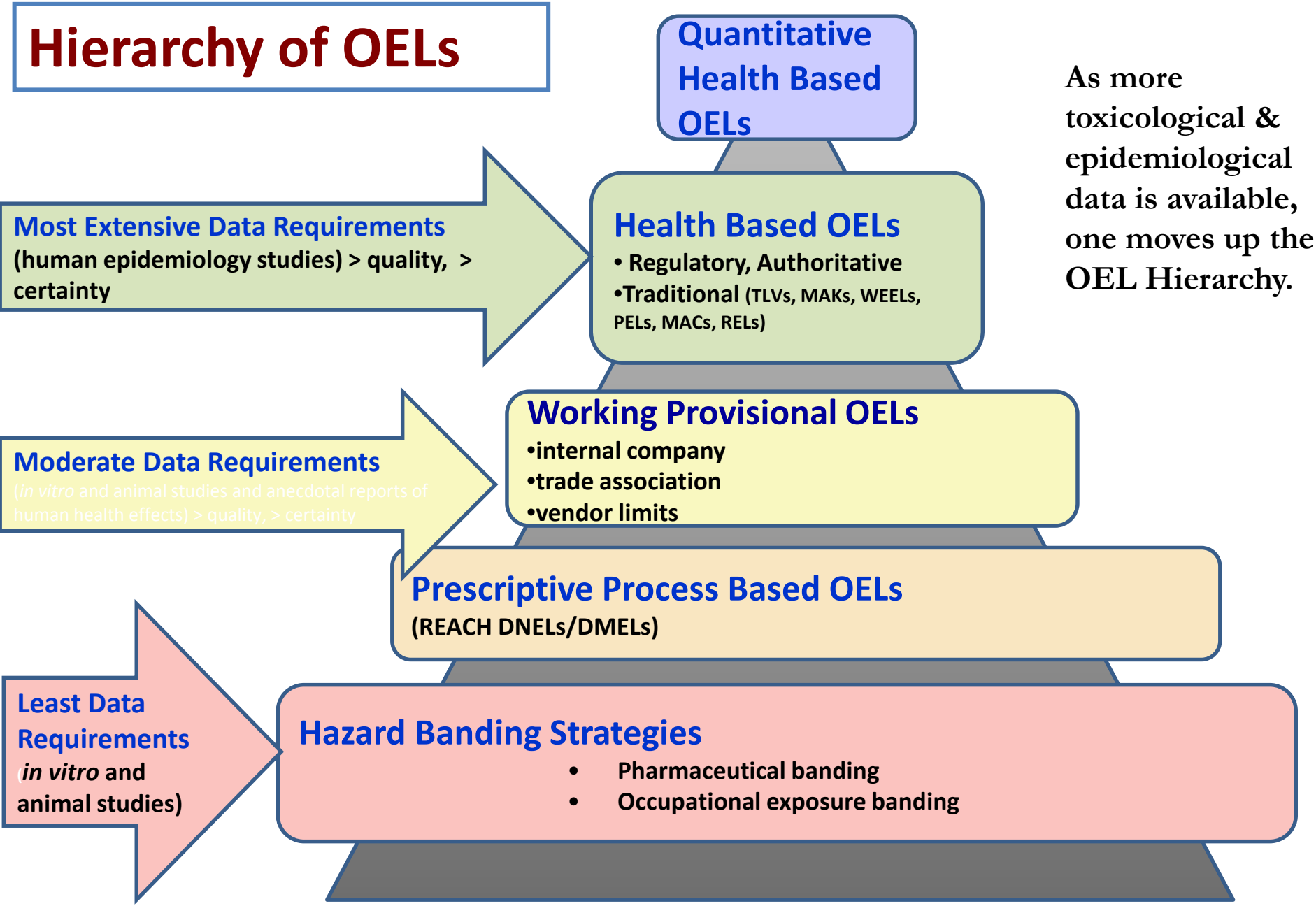
Federal Process Rulemaking Steps

- Step # 1: Conduct Preliminary Rulemaking Activities (12-36 months)
- Step # 2: Develop Proposed Rule (12-36 months)
- Step # 3: Publish Rule (2-3 months)
- Step # 4: Develop & Analyze Rulemaking Record (6-24 months)
- Step # 5: Develop Final Rule (18 -36 months)
- Step # 6: Publish Final Rule (2-3 months)
- Step # 7: Post-Promulgation Activities (4-12 months)
- **Timeline: 4.5 - 12. 5 years**

Alternatives: to Traditionally-Derived OELs?

- Occupational Exposure Bands
- Quantitative or Risk Based OELs
- Risk Based Environmental Limits

Hierarchy of OELs



As more toxicological & epidemiological data is available, one moves up the OEL Hierarchy.

National Poll--Learnings

- Most Chemicals Not Have OELs
- Today, **Suite of OEL Setting Tools** Exist Globally
- **"Hierarchy of OEL"** Processes May Bridge Risk Assessment and Management Gaps

National AIHA Engagement

- National AIHA-PEL Advisory Group formed 2.0 years ago.
- AIHA input to Federal-OSHA request.
- Support of NIOSH's Occupational Hazard Banding initiative.
- Upgrade of Hierarchy of OEL Tools.