

Addressing food contact chemicals in standards: Insights from recent research

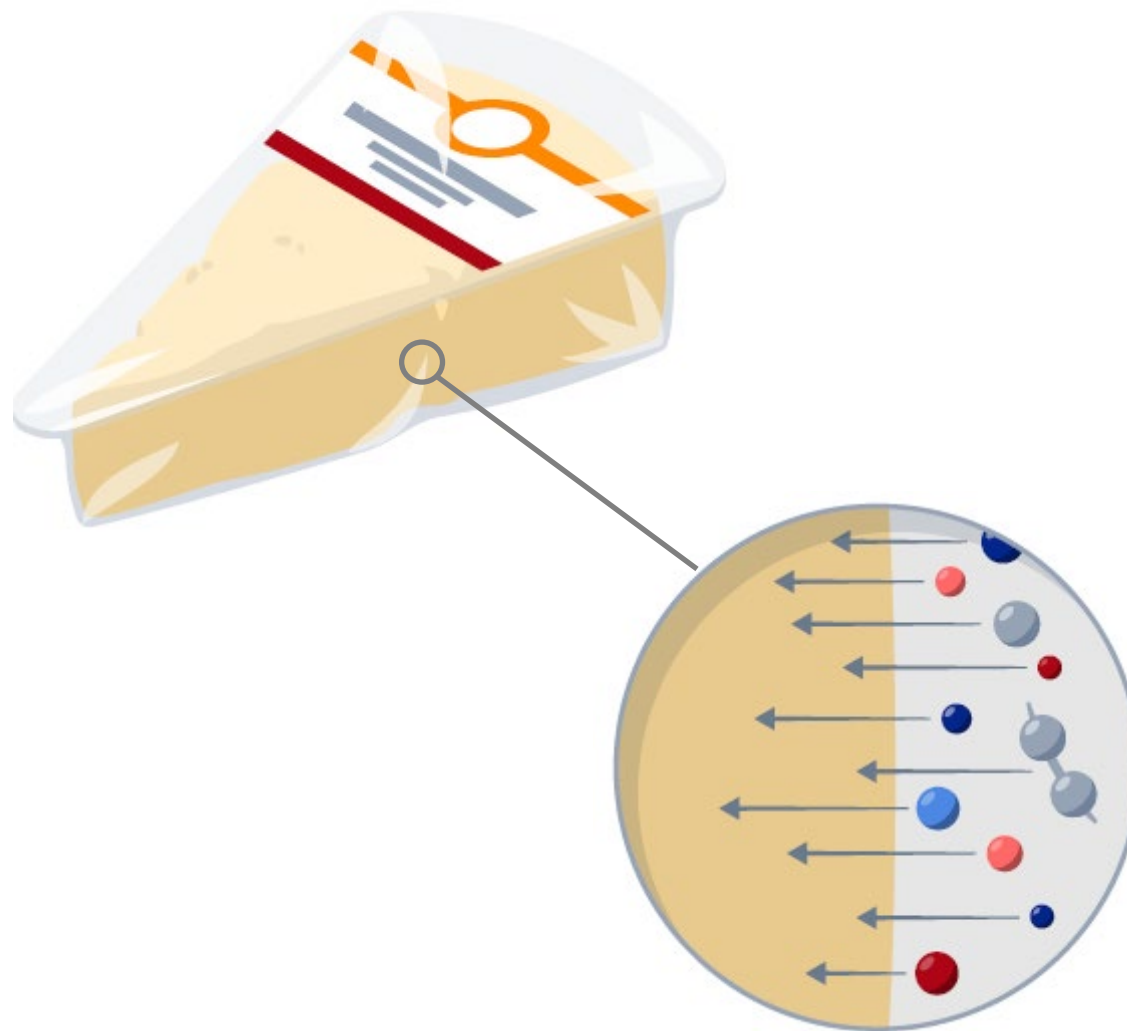
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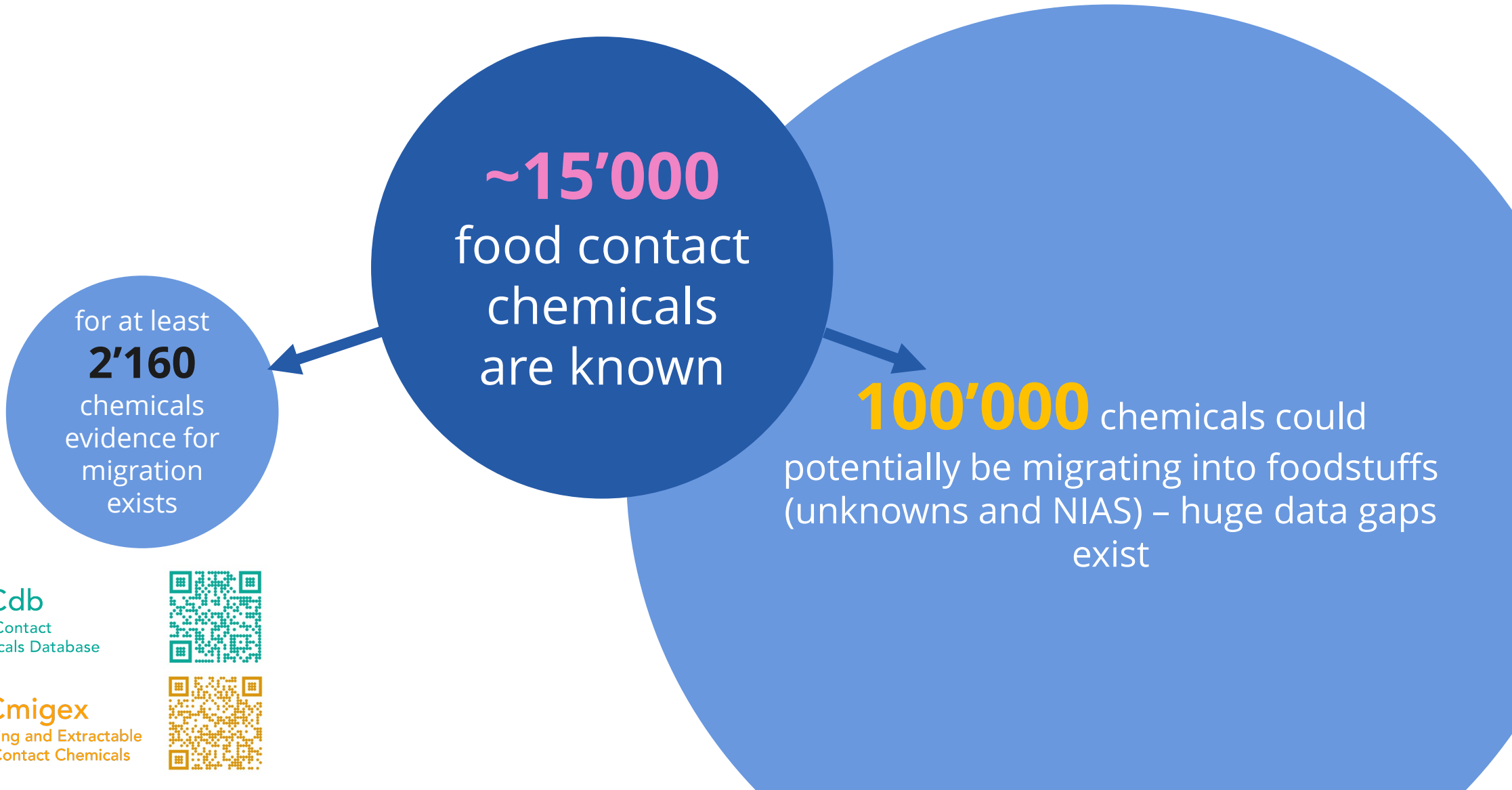
Food
Packaging
Forum

chemical migration

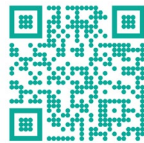




How many food contact chemicals are there?



FCCdb
Food Contact
Chemicals Database



FCCmigex
Migrating and Extractable
Food Contact Chemicals





Influencing migration into food



See our fact sheet



FCCs are being found in people



- **3,601 FCCs detected in people**
- **25% of all known FCCs**
- Includes hazardous chemicals such as **CMRs, EDCs, STOT**
- Many chemicals **lack data on potential hazards**

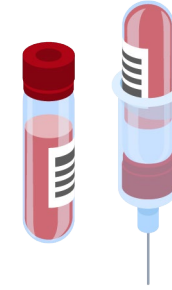


FCChumon
Food Contact Chemicals
Monitored in Humans





Harmful FCCs with big health costs



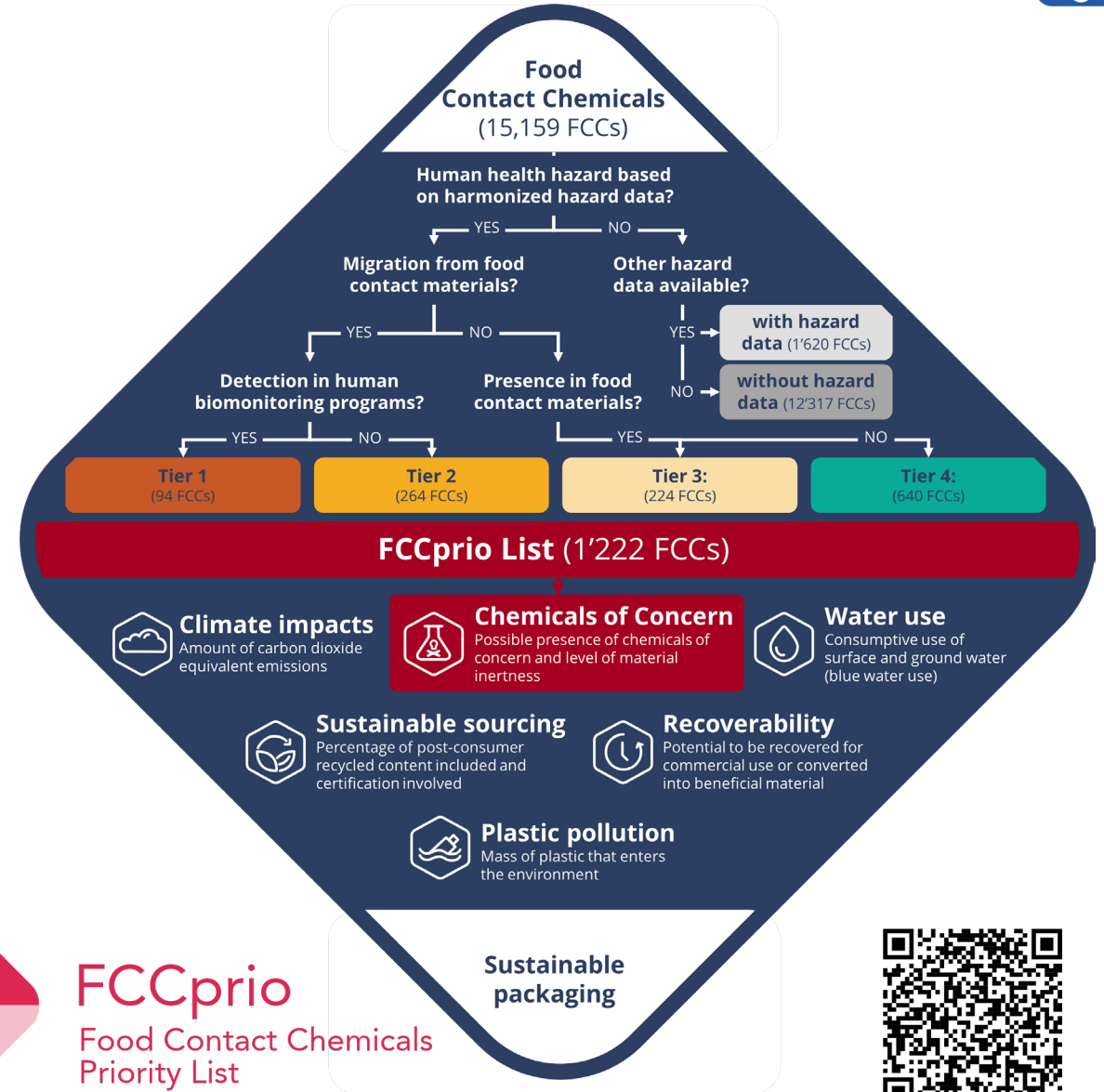
- Linked to many diseases **beyond just cancers**
- **\$249 billion annually in health costs** just in the US (Trasande et al, 2024)
 - From exposures to: polybrominated diphenylethers (PBDE), phthalates, bisphenols, and PFAS
- Estimated ca. **57,000 preterm births** due to **phthalates** in 2018 in the US (Trasande et al, 2024)
 - Associated health costs of \$3.84 billion
- **356,238 deaths** globally from cardiovascular disease attributed to just **DEHP** exposure (Hyman et al, 2025)
 - 10.4 million years of human life lost





Identifying chemicals of concern

- New **FCCprio List** identifies:
 - Carcinogenic, mutagenic, toxic to reproduction (CMR)
 - Endocrine disruption
 - Specific target organ toxicity after repeated exposure
 - Persistent, bioaccumulative, and toxic (PBT)
 - Persistent, mobile, and toxic (PMT)
- 94 are top priority:
 - harm health, migrate into food, and are detected in humans



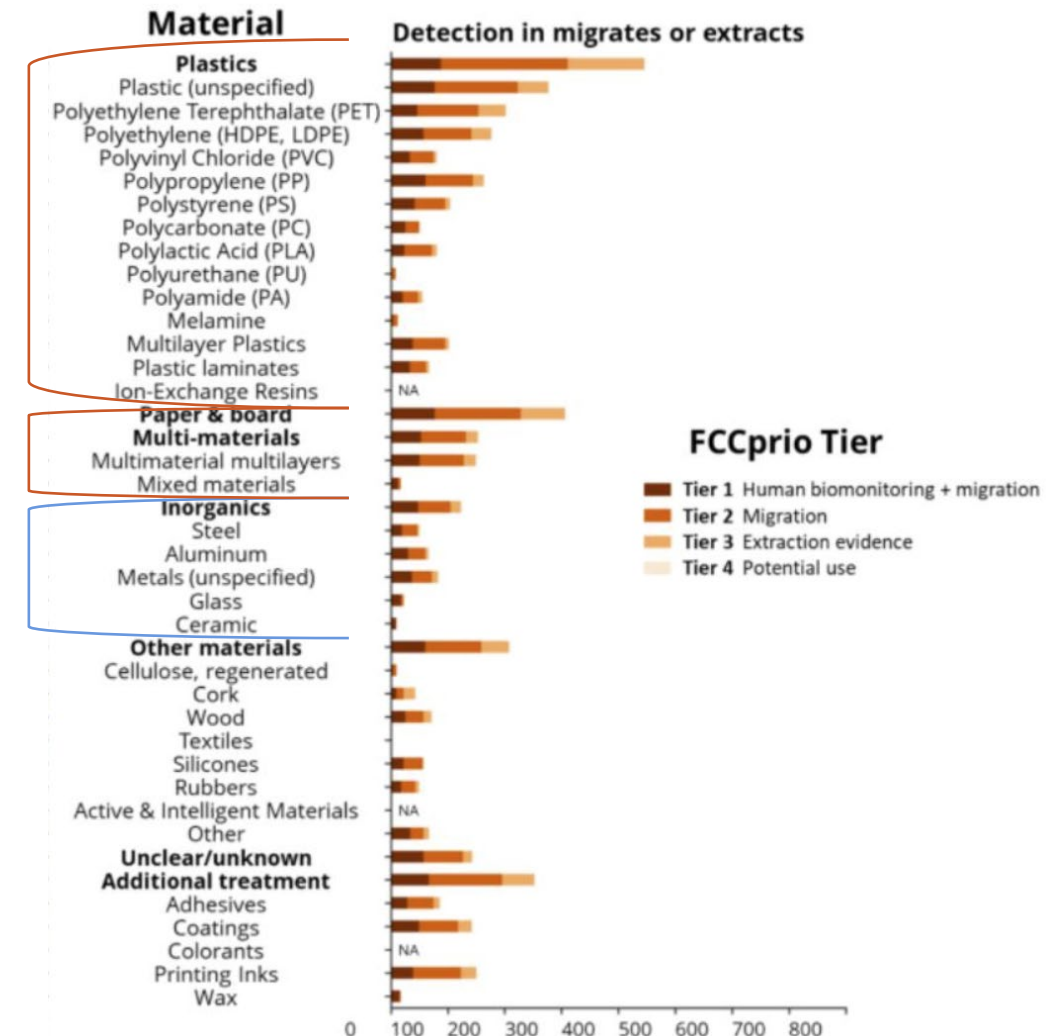
FCCprio
Food Contact Chemicals
Priority List





CoCs by food contact material

- **Plastics, paper, and board** found to have the most CoCs
 - Chemically complex
 - Non-inert (higher migration)
- **Inorganics** (stainless steel, glass, and ceramics) found to have the least CoCs
 - Chemically simpler
 - More-inert (less migration)
- **NIAS** not yet considered
 - Inherently higher for complex materials & more migration from less inert materials





Same principles apply to reuse

- **Same FCMs** used in reuse applications (just thicker)
- **Recycled plastics** found to **contain more chemicals** than virgin
 - higher levels of hazardous chemicals
 - hazardous chemicals not known to be used
- Recycled and reusable plastics generate **micro- and nanoplastics** (same as virgin)





How could we ensure FCMs are fully safe?

- **Current approach:** track & test thousands of upstream chemicals
- **Proposed approach:** shift the focus onto broader testing of final products (considers NIAS)
- **Need development** of new testing methods and bioassays
- Standards could **incentivize development of proper testing** methods and their use



Cancers

- Breast cancer
- Prostate cancer
- Kidney cancer



Cardiovascular diseases

- Hypertension
- Atherosclerosis
- Myocardial infarction



Reproductive disorders

- Male infertility
- Female infertility



Brain-related disorders

- Hypothyroidism
- Abnormal neurodevelopment



Immunological disorders

- Immunosuppression
- Asthma
- Allergies



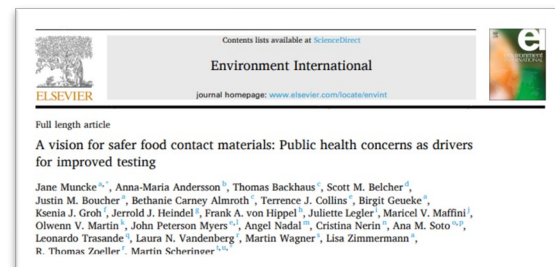
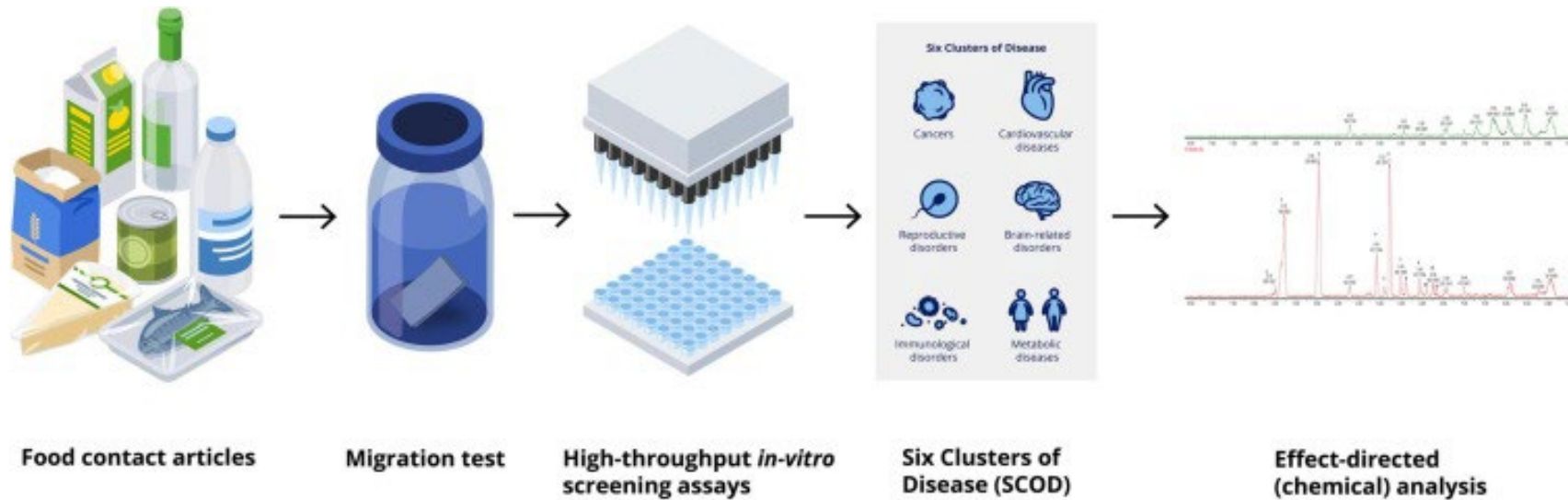
Metabolic diseases

- Diabetes type 1/2
- Obesity
- Non-alcoholic fatty liver disease



The vision

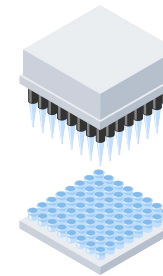
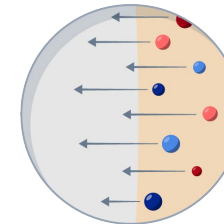
- A world where food contact materials are free from hazardous and untested chemicals.





Key learnings from the evidence

- **Hazardous chemicals** should not be overlooked when making reuse system decisions.
- Complex and **less inert materials (plastics and paper) can contain and release many more chemicals** than more inert materials (glazed ceramics, stainless steel, and glass).
- Science is still evolving, and **thorough final product testing is needed.**





Ways to address these challenges

- **Remove known chemicals of concern** from food packaging, prioritize essential uses, develop alternatives and testing
- **Enhance transparency:** disclosure of chemical composition, allow consumer self-determination
- **Simplify chemistry:** reduce the number of additives for same functions, reduce non-intentionally added substances
- **Consider material complexity and inertness** when selecting for reuse and refill systems



Use the UP Scorecard to consider chemicals of concern

Product		Climate ...	Water use ...	Chemicals of Concern ...	Sustainable Sourcing ...	Recoverability ...	Plastic Pollution ...	Summary Score ...
ceramic mug (User-Defined) Reused 500 times 0% recycled content	⋮	57	38	38	100	100	100	72
stainless steel tumbler (User-Defined) Reused 500 times 30% recycled content	⋮	52	31	38	100	100	100	70
paper cup, PLA lined 10% recycled content	⋮	39	57	13	26	1	96	39
paper cup, PE lined 10% recycled content	⋮	35	62	13	26	1	92	38
paper cup, insulated, PLA lined 10% recycled content	⋮	1	38	13	26	1	97	29
EPS foam cup 0% recycled content	⋮	56	49	13	1	1	1	20



Thank you!



www.FoodPackagingForum.org

