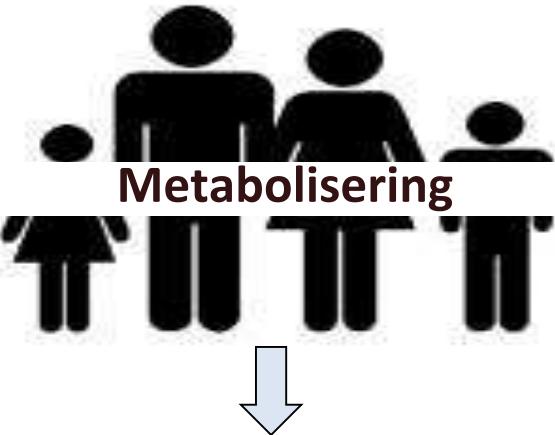
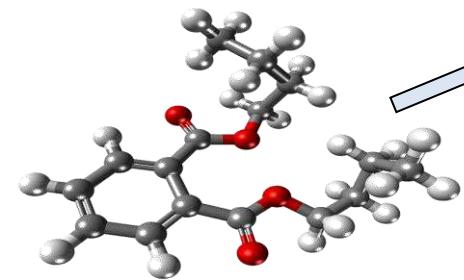


## **Danskernes udsættelse for hormonforstyrrende stoffer**

Seniorforsker, kemiker Hanne Frederiksen  
Afdeling for Vækst og Reproduktion, Rigshospitalet

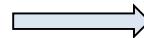
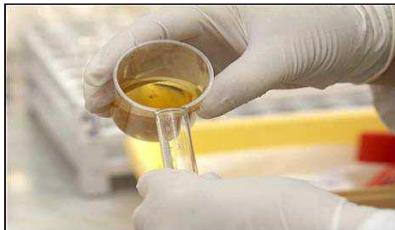
# Måling af Hormonforstyrrende stoffer

Eksponering



Serum  
Fedtvæv  
Sædvæske  
Fostervand  
Brystmælk

Metabolitter udskilles i urin (4-24 timer)



# Ikke-persistente stoffer



**Phthalater**

Plastblødgørende stoffer i industrielle produkter



**Parabener**

Anti-mikrobielle konserveringsmidler



**UV-filtre**



**Phenoler**

Polykarbonat og epoxy-resin



**Triclosan og Triclocarban**

Anti-mikrobielle konserveringsmidler

- Optages via kosten, ved indånding og gennem huden
- Anti-androgene og østrogene effekter

## 9 Phenoler

Bisphenol A	BPA
Triclosan	TCS
Triclocarban	TCCB
Benzophenone-3	BP-3
2,4-Dichlorophenol	2,4-DCP
2,5-Dichlorophenol	2,5-DCP
2,4,5-Trichlorophenol	2,4,5-TCP
2-Propylphenol	2-PP
4-Propylphenol	4-PP

## 7 Parabener

Methyl paraben	MeP
Ethyl paraben	EtP
iso-Propyl paraben	i-PrP
n-propyl paraben	n-PrP
iso-Butyl paraben	i-BuP
n-Butyl paraben	n-BuP
Benzyl paraben	BzP

## 9 UV-filtre

Benzophenone	BP
Benzophenone-1	BP-1
Benzophenone-2	BP-2
Benzophenone-3	BP-3
5-chloro-2-hydroxybenzophenone	BP-7
4-methyl-benzophenone	4-MBP
4-hydroxy-benzophenone	4-HBP
3-(4-methylbenzylidene)-camphor	4-MBC
3-benzylidene camphor	3-BC

## 32 Phthalat-metabolitter fra 14 phthalater

Phthalate diester		Human urine metabolite	
Di-methyl phthalate	DMP	Mono-methyl phthalate	MMP
Di-ethyl phthalate	DEP	Mono-ethyl phthalate	MEP
Di-iso-propyl phthalate	DPrP	Mono-propyl phthalate	MPrP
Di-n-butyl phthalate	DnBP	Mono-n-butyl phthalate	MnBP
		Mono-(3-hydroxybutyl) phthalate	MHBP
Di-iso-butyl phthalate	DiBP	Mono-iso-butyl phthalate	MiBP
Butylbenzyl phthalate	BBzP	Mono-benzyl phthalate	MBzP
Di-n-pentyl phthalate	DPP	Mono-n-pentyl phthalate	MPP
		Mono-(4-hydroxypentyl) phthalate	MHPP
		Mono-(4-oxopentyl) phthalate	MiPrP
Di-(2-ethyl-hexyl) phthalate	DEHP	Mono-(2-ethyl-hexyl) phthalate	MEHP
		Mono-(2-ethyl-5-hydroxyhexyl) phthalate	MEHHP
		Mono-(2-ethyl-5-oxohexyl) phthalate	MOEHP
		Mono-(2-ethyl-5-carboxypentyl) phthalate	MECPP
		Mono-(2-carboxymethyl-hexyl) phthalate	MCMHP
Di-n-hexyl phthalate	DHxP	Mono-n-hexyl phthalate	MHxP
		Mono-(5-hydroxyhexyl) phthalate	MHHxP
		Mono-(5-carboxypentyl) phthalate	MCPeP
Di-cyclohexyl phthalate	DCHP	Mono-cyclohexyl phthalate	MCHP
Di-n-heptyl phthalate	DHpP	Mono-n-heptyl phthalate	MHepP
		Mono-(6-hydroxyheptyl) phthalate	MHHpP
		Mono-(6-carboxyhexyl) phthalate	MCHxP
Di-octyl phthalate	DOP	Mono-octyl phthalate	MOP
		Mono-3-carboxypropyl phthalate	MCPP
Di-iso-nonyl phthalate	DiNP	Mono-iso-nonyl phthalate	MiNP
		Mono-hydroxy-iso-nonyl phthalate	MHiNP
		Mono-oxo-iso-nonyl phthalate	MOiNP
		Mono-carboxy-iso-octyl phthalate	MCiOP
Di-iso-decylphthalate	DiDP	Mono-iso-decyl phthalate	MidP
		Mono-(9-hydroxydecyl) phthalate	MHiDP
		Mono-(9-oxodecyl) phthalate	MOiDP
		Mono-(9-carboxynonyl) phthalate	MCiDP

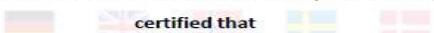
## 32 Phthalat-metabolite

Phthalate diester		Hu
Di-methyl phthalate	DMP	Mc
Di-ethyl phthalate	DEP	Mc
Di-iso-propyl phthalate	DPrP	Mc
Di-n-butyl phthalate	DnBP	Mc
		Mc
Di-iso-butyl phthalate	DiBP	Mc
Butylbenzyl phthalate	BBzP	Mc
Di-n-pentyl phthalate	DPP	Mc
		Mc
		Mc
Di-(2-ethyl-hexyl) phthalate	DEHP	Mc
		Mc
Di-n-hexyl phthalate	DHPxP	Mc
		Mc
		Mc
Di-cyclohexyl phthalate	DCHP	Mc
Di-n-heptyl phthalate	DHnP	Mc
		Mc
		Mc
Di-octyl phthalate	DOP	Mc
		Mc
Di-iso-nonyl phthalate	DiNP	Mc
		Mc
		Mc
Di-iso-decylphthalate	DiDP	Mc
		Mc
		Mono-(2-oxooctyl) phthalate
		Mono-(9-carboxyethyl) phthalate
		MCiDP



## CERTIFICATE OF PARTICIPATION

COPHES Coordination Team and the Quality Assurance Unit



certified that

Copenhagen University Hospital  
Department of Growth and Reproduction

served as

COPHES/DEMOCOPHES Reference Laboratory 2011/2012

For the analysis of  
phthalate metabolites and bisphenol A  
in human urine

Project Leaders

COPHES Quality Assurance Unit

BiPRO Reinhard Joas  
BiPRO, Munich

Institute Salud Carlos III  
Madrid, Spain



Pierre Biot  
FPS Health, Food Chain  
Safety and Environment,  
Brussels



Institute for Prevention  
and Occupational Medicine  
Bochum, Germany

## 9 Phenoler

	BPA
ol	TCS
ol	TCCB
enol	BP-3
ol	2,4-DCP
ol	2,5-DCP
enol	2,4,5-TCP
	2-PP
	4-PP

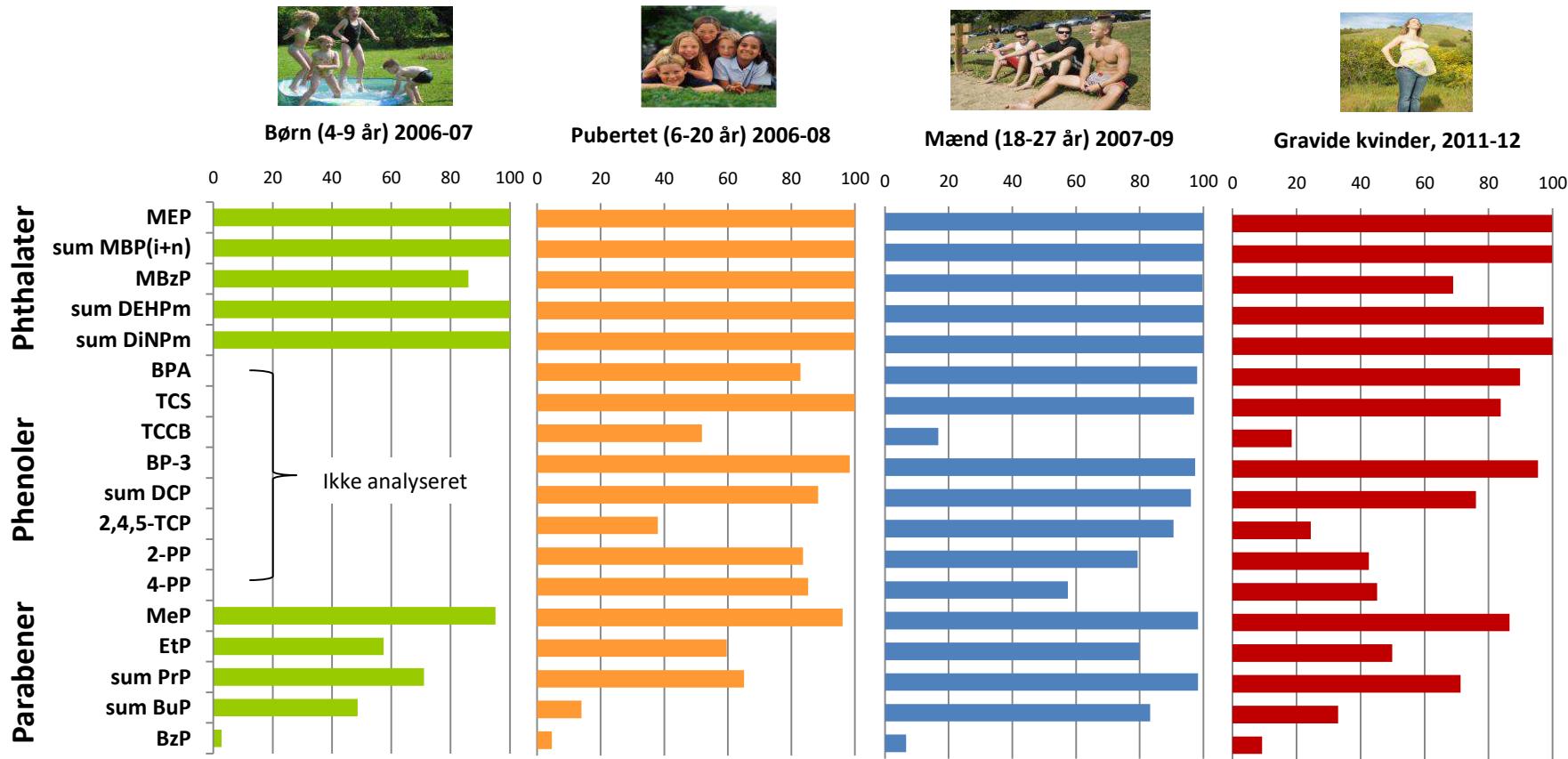
## 7 Parabener

	MeP
ol	EtP
	i-PrP
ol	n-PrP
	i-BuP
ol	n-BuP
	BzP

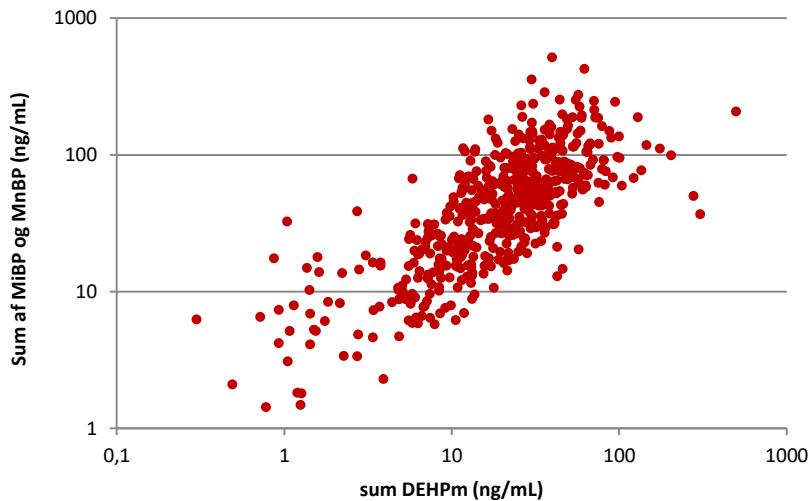
## 9 UV-filtre

	BP
/benzophenone	BP-1
enone	BP-2
enone	BP-3
enone	BP-7
enone	4-MBP
dene)-camphor	4-HBP
iphor	4-MBC
iphor	3-BC

# Procent deltagere med målbare koncentrationer af ikke-persistente stoffer



## Korrelation mellem ikke-persistente stoffer hos gravide kvinder



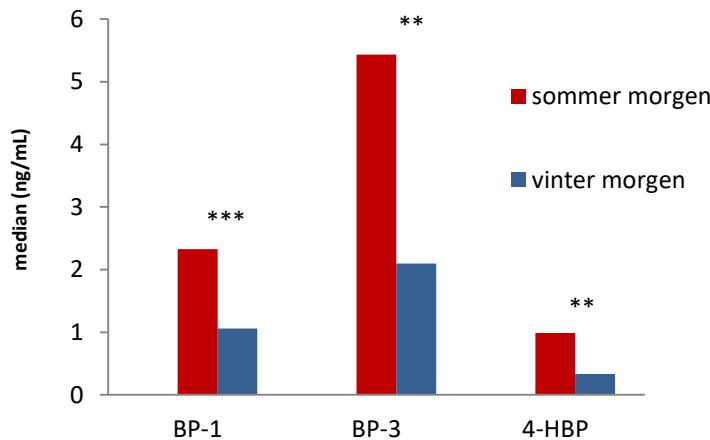
- Danskere eksponeres for mange phthalater, phenoler og parabener samtidig

## Phthalat- eksponering gennem det første leveår

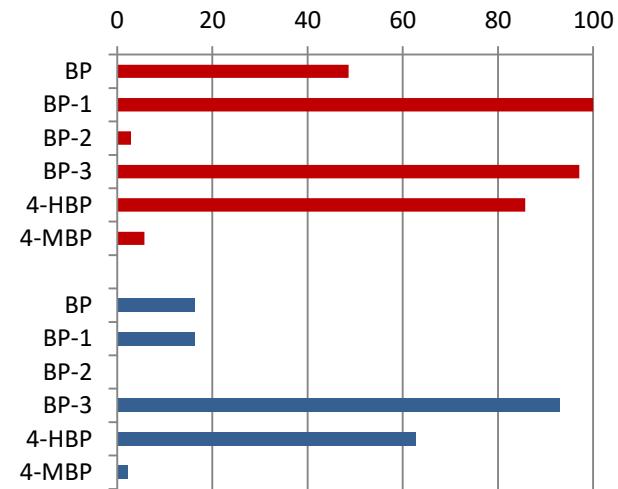


- Mindst 30% af alle børn eksponeres gennem det første leveår for phthalater på et niveau, der overskridt EFSA's anbefalinger for anti-androgene stoffer

# UV-filtre i danske børnehavebørn

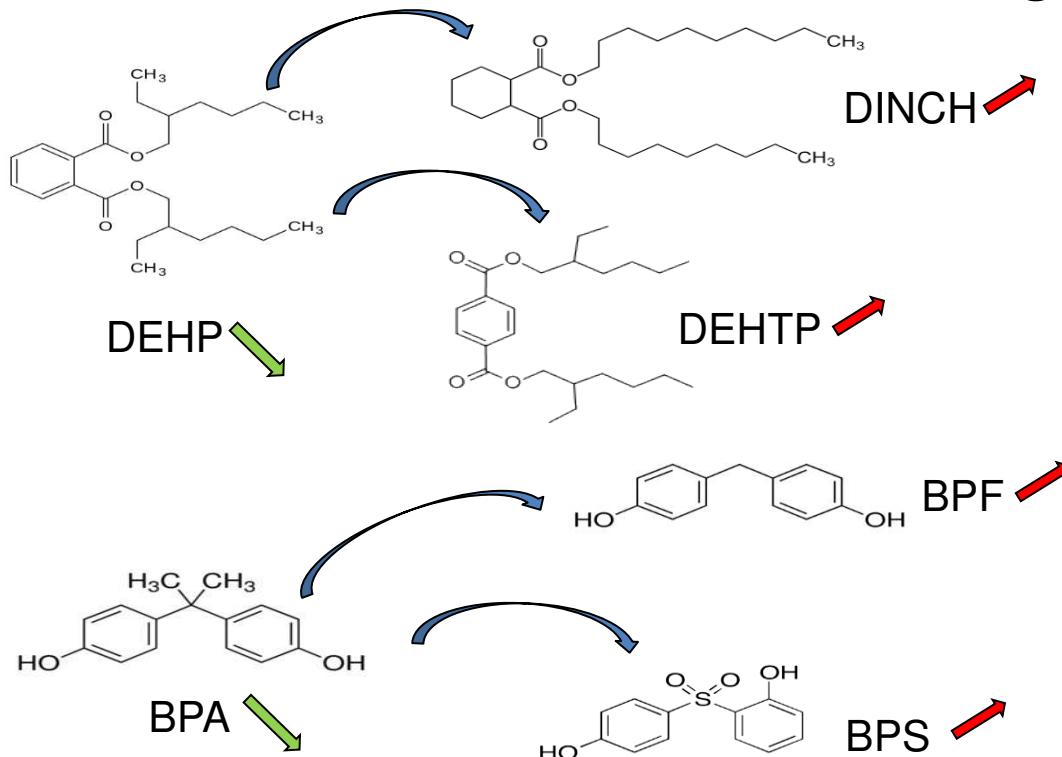


Procent børn med målbare UV-filterkoncentrationer



- Børn eksponeres for nogle UV-filtre året rundt
- Nogle UV-filtre bruges også som absorbere i forbrugerprodukter

# Udfasning og substitution



➤ Kræver nye metoder og nye analyser



