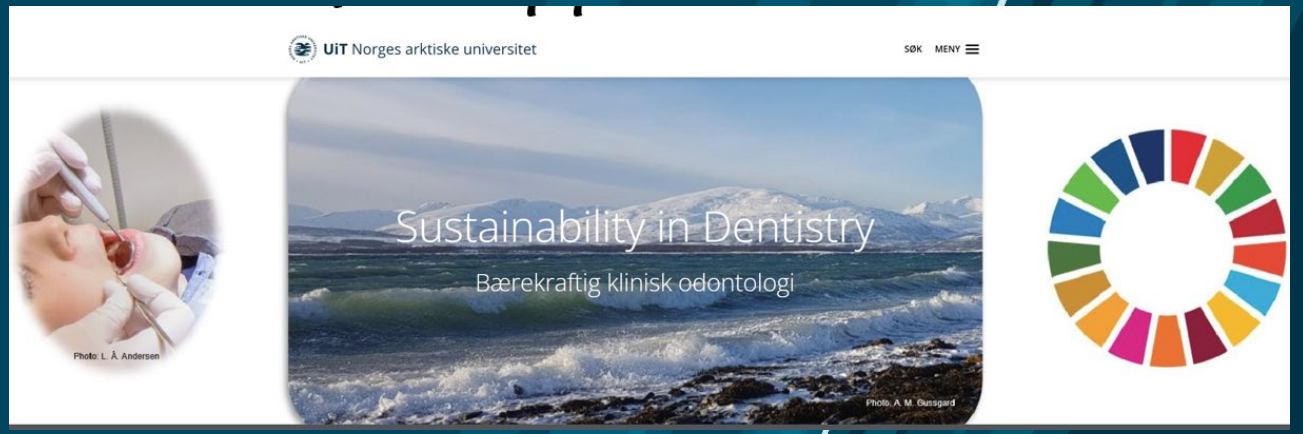
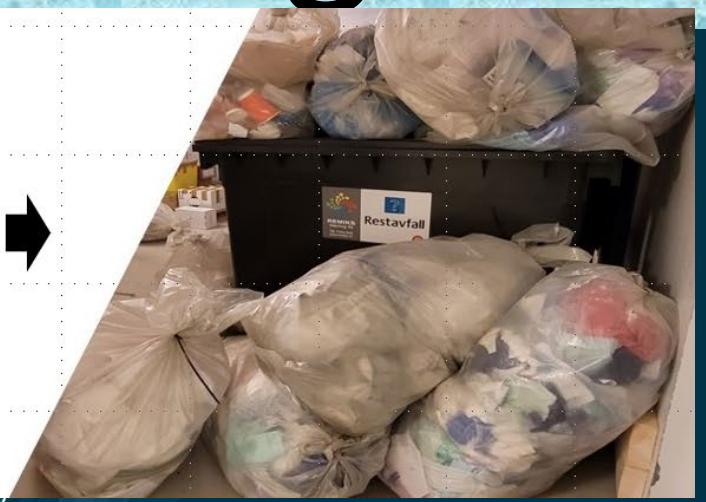
UiT The Arctic University of Norway
Institutt for klinisk odontologi
Forskningsdag 13.10.2026
Asbjørn Jokstad



Dental mikroplast-forurensning til luft og vann







Email: asbjorn.jokstad@uit.no



Partikkelforurensing til luft og vann i tannklinikker

1986 →
Dental Amalgam
Luft - HMS

2006 →
Dental Amalgam
Vannforurensing

2019 →
One Health
Luft - HMS

2020 →
Mikropartikler
Luft - HMS

2022 →
Nano-/ Mikroplast
Luft - HMS
Vannforurensing

Kvikksølvopptak på tannklinikker

En oversikt og en rapport fra forholdene i Hordaland

Asbjørn Jokstad
Nils Wandel

Tannhelsepersonell utsettes for kvikksølv av ulike former i sitt daglige arbeid. Kvikksølv har en viss flyktighet allerede ved romtemperatur og den øker sterkt med høyere temperatur. Absorpsjon av kvikksølv i dampform er høyt (80–100%) på

Amalgam waste management

A Jokstad
Toronto, Canada
P L Fan
Chicago, USA

Dental amalgam has been extensively used as a tooth filling material for many decades and has beyond doubt saved millions of teeth that otherwise would have needed to be extracted. The release of amalgam particles into dental office wastewater is a matter of particular concern as amalgam particles could then be discharged into the environment. Amalgam waste discharges contribute to mercury in the environment through direct wastewater discharge, incineration, land-filling and sewage sludge incineration, although the discharge from dentistry is probably responsible for less than 1% of the total mercury discharged annually into the environment as a result of human activities. Nevertheless, dentists, by being producers of amalgam waste, have a responsibility and a duty of care for the proper management of this waste within their practices. Appropriate measures should be taken to minimise the amount of waste where possible or take action to ensure that all generated waste is disposed of in accordance with environmental legislation.

Key words: Amalgam waste, dentistry, mercury

Dog-assisted therapy in the dental clinic: Part A—Hazards and assessment of potential risks to the health and safety of humans

Anne M. Gussgard[1] | J. Scott Weese[2] | Arne Hensten[1] | Asbjørn Jokstad[1]

Abstract
Background: Dog-assisted therapy in the dental clinic may be an attractive alternative to sedation for anxious patients. Including a dental therapy dog in a clinical set-

Dog-assisted therapy in the dental clinic. Part B. Hazards and assessment of potential risks to the health and safety of the dental therapy dog

Anne M. Gussgard[1] | J. Scott Weese[2] | Arne Hensten[1] | Asbjørn Jokstad[1]

Abstract
Background: A dental therapy dog may help anxious patients in the dental clinic overcome their fear and facilitate the completion of necessary dental care. Dental clinic activities are associated with hazards that may pose potential risks to the health

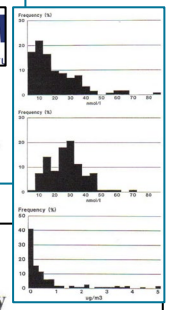
Aerosol i tannhelseklinikken Del 1: Risiko for smitte

Aerosol i tann-helseklinikken. Del 2: Tiltak for å begrense smitte

Mercury excretion and occupational exposure of dental personnel

Jokstad A: Mercury excretion and occupational exposure of dental personnel. Community Dent Oral Epidemiol 1990; 18: 143–8.

Abstract – At the annual congresses of the Norwegian Dental Association in 1986 and 1987 surveys were conducted to assess the significance of potential sources of mercury exposure. Morning urine samples and questionnaires were collected from 672 participants in 1986 and 273 participants in 1987. The mean values of the urinary mercury excretion were 39 nmol/L (SD = 29) in 1986, and 43 nmol/L (SD = 36) in 1987. The excretion values were correlated to the answers on questionnaires supplied from each participant. The data was analyzed using ANOVA, multiple





TANNbygget
Teknisk rom

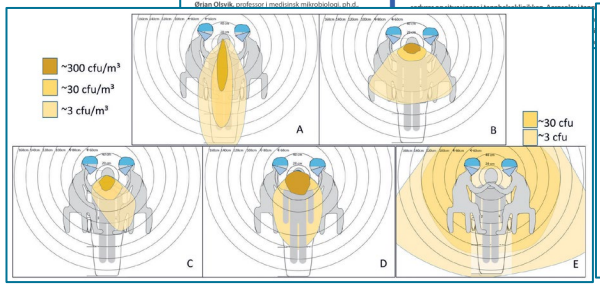
Pharmacology & Toxicology 1992, **70**, 308–313.

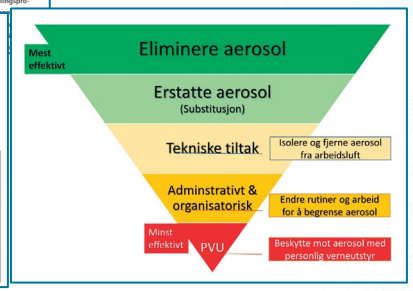
Dental Amalgam and Mercury

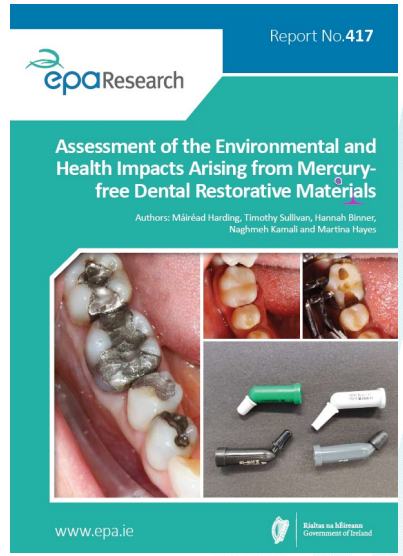
Asbjørn Jokstad[1], Yngvar Thomassen[2], Erik Bye[2], Jocelyne Clench-Aas[3] and Jan Aaseth[4]
[1]Department of Anatomy, Dental Faculty, University of Oslo, P.O Box 1052 Blindern, N-0316 Oslo 3, [2]National Institute of Occupational Health, Oslo, [3]Norwegian Institute for Air Research, Lillestrøm, and [4]Hedmark Central Hospital, Elverum, Norway

(Received October 21, 1991; Accepted December 18, 1991)

Abstract: The mercury concentrations in blood (HgB) and urine (HgU) samples, and in exhaled air (HgAir) were measured in 147 individuals from an urban Norwegian population, using cold vapour atomic absorption spectrometry. The study







Email: asbjorn.jokstad@uit.no

1. Ekstraoralt / midlertidig intraoralt (PPU, engangsartikler)

Polymer / monomer	acronym	Items in clinic waste
Acrylonitrile Butadiene Styrene	ABS	Container, handle, suture, tray
Latex rubber		Dressing, elastics, gloves, washer
Synthetic rubber / AKA «Nitrile»		Dressing, elastics, gloves, washer
Plastics, general		Lid, packaging, tube
Polyamide 6	PA/Nylon	Bag, drape, dressing, toothbrush
Polycarbonate	PC	Occludator, tray, tube
Polychloroprene / AKA "Neoprene"		Gloves
Polyester, non-woven		Disinfectant wipe
Polyethylene film		Bag, cover, drape, dressing, packaging, visor
Polyethylene resin, high/low density	LDPE / HDPE	Brush, liner, mixing tips(h), packaging(l/h), tube(h), syringe(h)
Polyethylene terephthalate	PET	Drape, glove, packaging
Polyethylene, general	PE	Glove, packaging, pouch, strips, syringe, tube
Polyisoprene		Gloves
Polypropylene injection-mould	PP	Bowl, brush, cups, , quiver, suture, syringe, tube
Polypropylene film / AKA "Prolene"	PP	Bag, drape, gown, hood, mask, packaging, wrap
Polystyrene	PS	Packaging
Polyurethane rigid/flexible foam	PU	Brush, foam cube, tube, wound dressing
Polyvinyl chloride	PVC	Bowl, drape, tube
Phthalates*		Unknown quantities / qualities, < 1%

PlastChem rødliste











Email: asbjorn.jokstad@uit.no

2. Intra-oralt medisinsk utstyr

Polymer / monomer	acronym	Items
Acrylonitrile Butadiene Styrene	ABS	Orthodontics
Ethylene glycol dimethacrylate	EGDM	Prosthesis
Ethylene-vinyl acetate / AKA poly(ethylene-vinyl acetate)	EVA/PEVA	Soft splint
Polycarbonate	PC	Orthodontics, prosthesis, mouthguards/splints/ retainers
Poly(methyl methacrylate)	PMMA	Orthodontics, prosthesis, mouthguards/splints/ retainers
Polyamide 6 / AKA Nylon	Nylon 6	Orthodontics, prosthesis, suture
Polycaprolactone	PCL	Drug delivery, grafting
Polychloroprene / AKA "Neoprene"	CR	Barrier
Polyetherether ketone	PEEK	Implants, orthodontics, prosthesis
Polyethylene glycol	PEG	Gels, impressions, lubricant
Polyethylene resin, high/low density	LDPE / HDPE	Prosthesis lining
Polyethylene terephthalate	PET	Orthodontics
Polyethylene terephthalate glycol-modified	PET-G	Orthodontics, prosthesis, vacuum formed mouthguards/splints/ retainers
Polylactic Acid	PLA	Drug delivery, grafting
Polyoxymethylene / AKA Acetal resin	POM	Prosthesis (alternative re. Allergy)
Polycarbonate-modified bis-GMA	PC-bisGMA	Orthodontics, prosthesis, vacuum formed mouthguards/splints/ retainers
Polystyrene	PS	Prosthesis (alternative re. Allergy)
Polytetrafluoroethylene	PTFE	Barrier (GBR), barrier (screw hole), spacer (restorations), crown fitting
Polyurethane, thermoplastic	TPU	Orthodontics, prosthesis, vacuum formed mouthguards/splints/ retainers
Polyvinyl chloride	PVC	Orthodontics, prosthesis, vacuum formed mouthguards/splints/ retainers
Polyvinylidene fluoride	PVDF	Orthodontics
Synthetic rubber / AKA «Nitrile»		Barrier membrane
Phthalates*		Unknown quantities / qualities, < 1%








PlastChem rødliste

Email: asbjorn.jokstad@uit.no

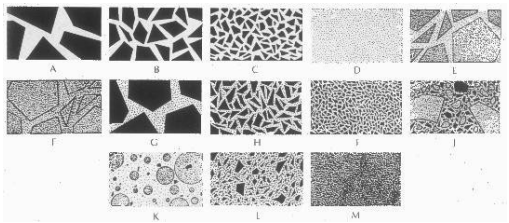
3. Intra-oral medisinsk utstyr - tannrestaurering

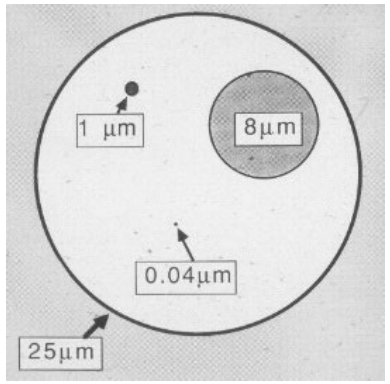
Methacrylate ester co-monomers, e.g.,	
Bisphenol A glycidyl methacrylate / "Bowen's resin"	**Bis-GMA**
Bisphenol A dimethacrylate	Bis-DMA
Bisphenol A polyethoxy dimethacrylate	Bis-MPEPP / BPEDMA
Dihydroxyethyl acrylate	DHEA
Ethoxylated Bisphenol A glycol dimethacrylate	**Bis-EMA / EBPADMA**
Ethylene glycol dimethacrylate	**EGDMA**
Glycidyl methacrylate	GMA
Hexane diol dimethacrylate	HEDMA
Hydroxyethyl methacrylate	**HEMA**
Isobutyl methacrylate	IBMA
Methyl methacrylate	MMA
Polycarbonate-modified bis-GMA	PC-bisGMA
Tricyclodecane - dihydroxyethyl acrylate	TCD-di-HEA
Triethylene glycol dimethacrylate	**TEGDMA**
Trimethylolpropane trimethacrylate	TMP-TMA
Urethane dimethacrylate	**UDMA**
Urethane modified bis-GMA dimethacrylate	U-bisGMA

PlastChem rødliste

*RBC: Resin-based composite







Fillers:
«Multipurpose composites»: 60-70%, ø 0.04+0.2-3 µm
«Nanocomposites» : 72-79%, ø 0.002-0.075 µm
«Microcomposites» : 32-50%, ø 0.04 µm
«Bulk fill composites»: 59-80%, ø 0.04+0.2-20 µm
«Flow composites » : 42-62%, ø 0.04+0.2-3 µm

\+

Filler siloxanes e.g.	
3-methacryloxypropyltrimethoxysilane	
3-glycidoxypropyl)-dimethylethoxysilane	GPMES

Email: asbjorn.jokstad@uit.no

Intraoral medisinsk utstyr – tannrestaurering > degradering

Filler siloxanes e.g.	
3-methacryloxypropyltrimethoxysilane	
3-glycidoxypropyl)-dimethylethoxysilane	GPMES

Methacrylate ester co-monomers, e.g.,	
Bisphenol A glycidyl methacrylate / AKA Bowen resin	**Bis-GMA**
Bisphenol A dimethacrylate	Bis-DMA
Bisphenol A polyethoxy dimethacrylate	Bis-MPEPP / BPEDMA
Dihydroxyethyl acrylate	DHEA
Ethoxylated bisphenol-A glycol dimethacrylate	**Bis-EMA / EBPADMA**
Ethylene glycol dimethacrylate	EGDMA
Glycidyl methacrylate	GMA
Hexane diol dimethacrylate	HEDMA
Hydroxyethyl methacrylate	HEMA
Isobutyl methacrylate	IBMA
Methyl methacrylate	MMA
Polycarbonate-modified bis-GMA	PC-bisGMA
Tricyclodecane - dihydroxyethyl acrylate	TCD-di-HEA
Triethylene glycol dimethacrylate	**TEGDMA**
Trimethylolpropane trimethacrylate	TMP-TMA
Urethane dimethacrylate	**UDMA**
Urethane modified bis-GMA dimethacrylate	U-bisGMA

+

Additives, e.g.		
Parbenate		Accelerator
Butylated hydroxytoluene	BHT	Antioxydant (inhibitor)
Camphorquinone ethyl 4-(dimethylamino) benzoate	CQ EDMAB	Initiator – light cure
Benzoyl peroxide /phenyl benzoate	BPO / BPE	Initiator - chemical
Benzophenone-3 Drometrizole trisiloxane	BP-3 DTS	Photostabilizer
Diethyl-2,5-dihydroxytrephthalate Tetrabutylammonium chloride	DDHT TBAC	Plasticizers
2-Ethylhexyl-4-(dimethylamino)benzoate	PadO	UV-absorber

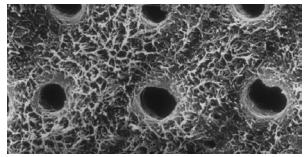
Degradation compounds, e.g.,	
Bishydroxypropoxyphenylpropane	Bis-HPPP
Bismethacryloxypropoxyphenylpropane	Bis-PMA
Bisphenol A diglycidyl ether	BADGE / DGEBA
Bisphenol A ethoxylate methacrylate	Bis-EMA(3) / …(6) / …(10)
Bisphenol F diglycidyl ether	BFDGE / BFDGE*2H2O
Urethane dimethacrylate derivative	UDMA-D2
Bisphenol A	BPA
Methacrylic acid	MAA
Triethylene glycol	TEG
Contaminants and unreacted monomers	e.g. HEMA, MMA, TEG

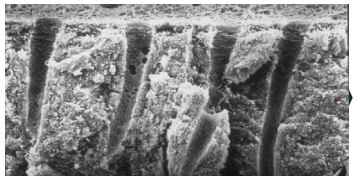
PlastChem rødliste

Ref. P Santerre / Y Finer, University of Toronto

Email: asbjorn.jokstad@uit.no

Kompositt plast – bearbeiding skaper mikropartikler





Overflatebehandling syre + bonding/adhesiv

Lyspolymerisering 50-80% mono → poly konversjon

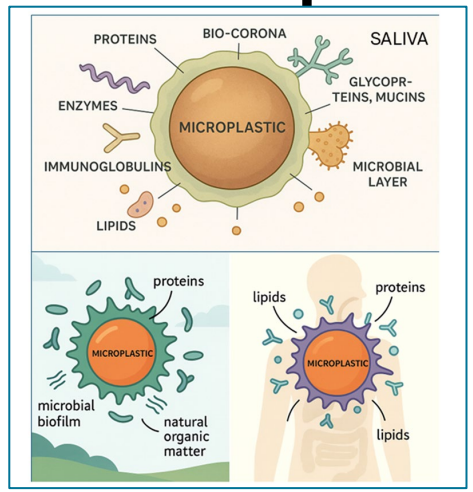


Fylling
Overskudd
Grovkontur
Finkontur
Polering

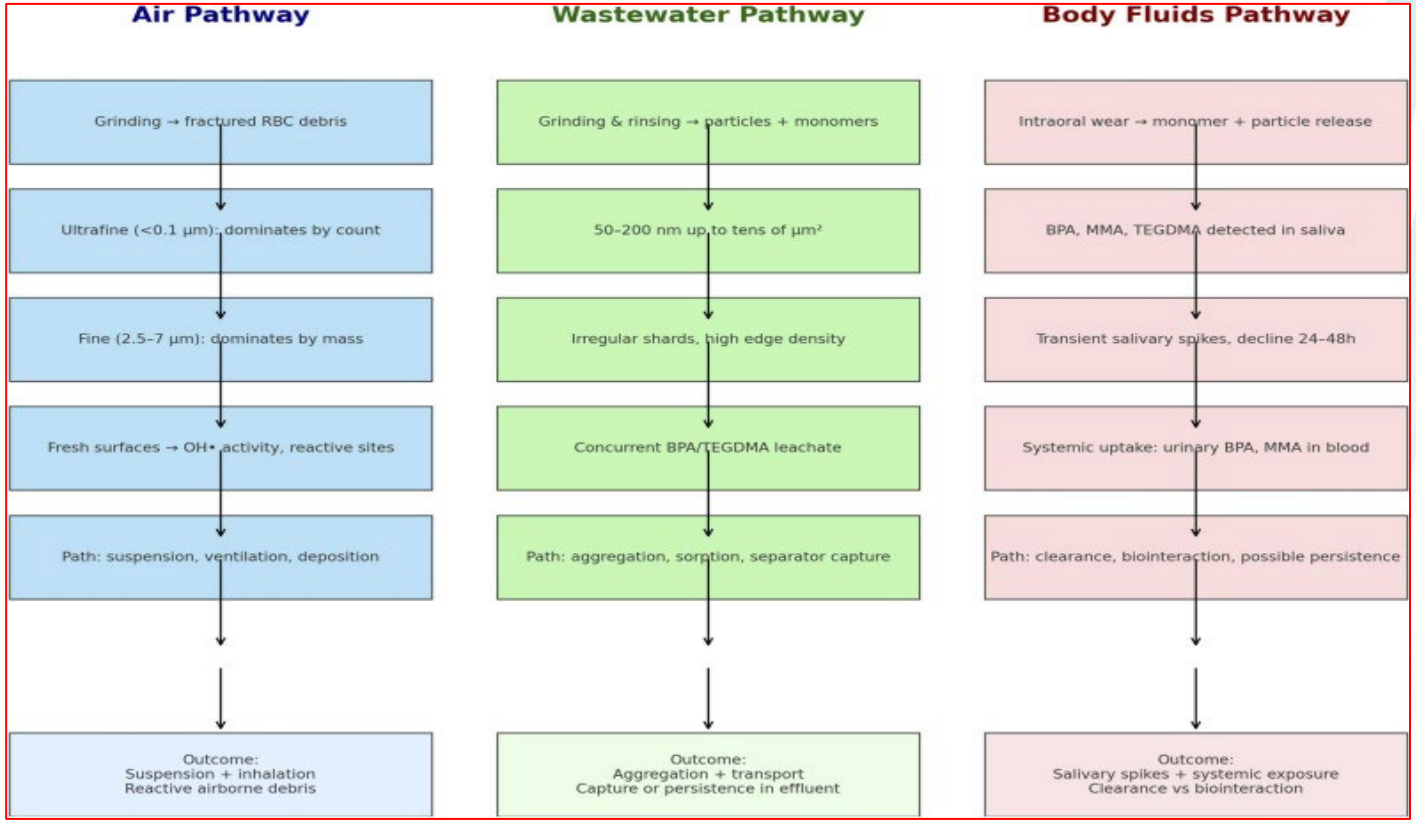
Aerosol - avsug

Lunge – hud - øye

Avløp

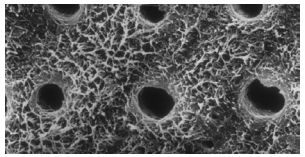


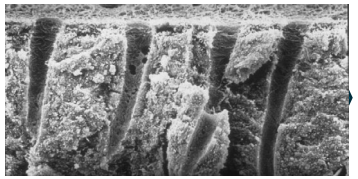
Økokorona avhengig av miljø



Email: asbjorn.jokstad@uit.no

Kompositt plast – bearbeiding skaper mikropartikler





Overflatebehandling syre + bonding/adhesiv

Lyspolymerisering 50-80% mono → poly konversjon

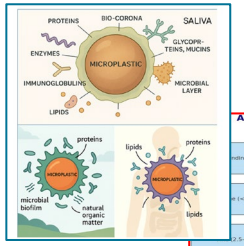


Fylling
Overskudd
Grovkontur
Finkontur
Polering

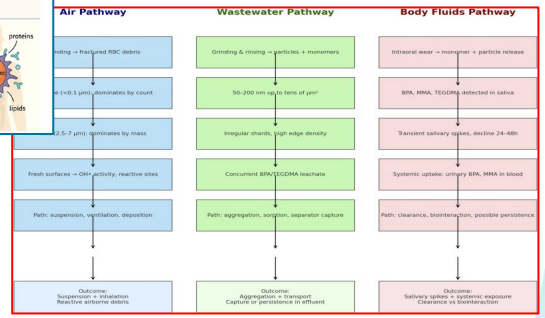
Aerosol - avsug

Lunge – hud - øye

Avløp



Økokorona avhengig av miljø



..og **mye** plastavfall

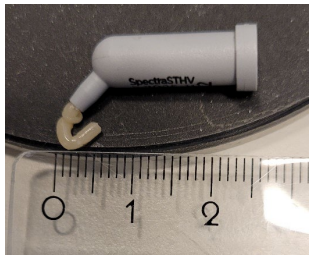
Forseglet metallpose med 4 kompyler

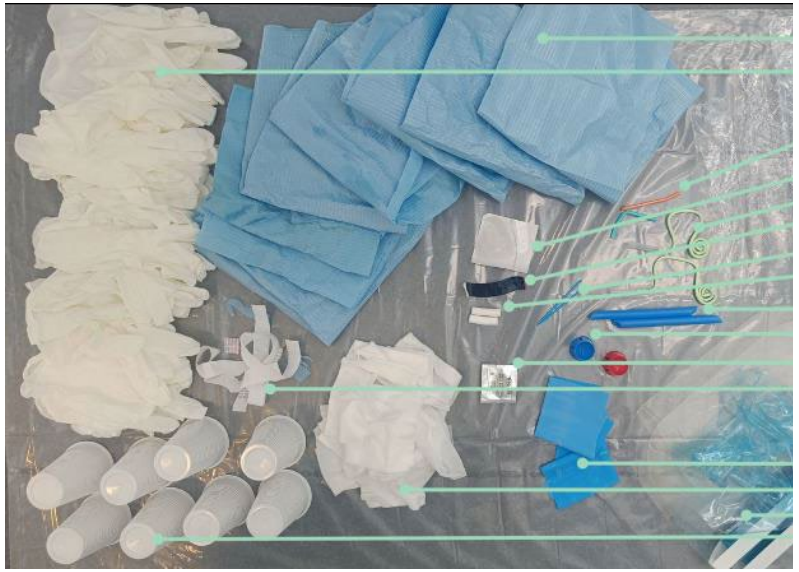


Polykarbonat (PC) m/ gummitupp



0.25 g monomer per kompyle





8 patient bibs
25 disposable gloves

Air-water syring tip
Mixing paper
Curly suction
Blue paper
Micro applicators
Cotton rolls
Vacuum suction
Dappen dishes
Rotating bur wrapping
Bib clip

Rubber dam
Disinfection wipes
Visor
8 plastic cups

~90% er plast

Avfall etter fullført fyllingsterapi i en studentklinikk

Fra: Hågå & Krage, 2023.

Email: asbjorn.jokstad@uit.no

Hvor mye plastavfall kommer fra tannklinikker?

Journal of Dentistry 118 (2022) 103948

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.elsevier.com/locate/jdent

(*http://doi.org/10.1111/cdoe.12750)

Quantification of single use plastics waste generated in clinical dental practice and hospital settings

Nicolas Martin *, Steven Mulligan, Peter Fuzesi, Paul V. Hatton

School of Clinical Dentistry & Grantham Centre for Sustainable Futures, Claremont Crescent, Sheffield, S10 2TA

England 2020

Approximate number of SUPs and associated mass (kg) generated in the UK in one year (2020) from routine adult primary care operative interventions carried out by dentists and therapists, excluding associated plastic packaging.

A	Approximate number of dental healthcare professionals (Dentists & Therapists)	≈ 47,000	
B	Working days per year (40 weeks * 4 days)	160 days	
C	Approx. number of operative procedures per day	≈ 5 days	
D	Mean number of SUPs per procedure (including generic PPE, set up and decontamination)	≈ 55 items	
E	Additional PPE items per procedure (COVID-19)	≈ 9 items	
F	Mean mass of SUPs per procedure: Procedure specific	254 g	
G	Mean mass of SUPs per procedure: Generic set up and clean up	100 g	
J	Mean mass of SUPs: Generic PPE (g)	30 g	
K	Mean mass of SUPs: COVID-19 PPE (g)	305 g	
L	**Total annual number of SUP items** (including generic PPE, set up and decontamination)	A*B*C*D	≈ 2 billion items
M	**Total annual number of SUP items** (including COVID-19 PPE)	A*B*C*(D + E)	≈ **2.4 billion items**

Engangsprodukter i plast alene

Hvor mye plastavfall kommer fra tannklinikker?

England 2020



Journal of Dentistry 118 (2022) 103948

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.elsevier.com/locate/jdent

ELSEVIER

Quantification of single use plastics waste generated in clinical dental practice and hospital settings

Nicolas Martin *, Steven Mulligan, Peter Fuzesi, Paul V. Hatton

School of Clinical Dentistry & Grantham Centre for Sustainable Futures, Claremont Crescent, Sheffield, S10 2TA

(*http://doi.org/10.1111/cdoe.12750)

Approximate number of SUPs and associated mass (kg) generated in the UK in one year (2020) from routine adult primary care operative interventions carried out by dentists and therapists, excluding associated plastic packaging.

A	Approximate number of dental healthcare professionals (Dentists & Therapists)	≈ 47,000	
B	Working days per year (40 weeks * 4 days)	160 days	
C	Approx. number of operative procedures per day	≈ 5 days	
D	Mean number of SUPs per procedure (including generic PPE, set up and decontamination)	≈ 55 items	
E	Additional PPE items per procedure (COVID-19)	≈ 9 items	
F	Mean mass of SUPs per procedure: Procedure specific	254 g	
G	Mean mass of SUPs per procedure: Generic set up and clean up	100 g	
J	Mean mass of SUPs: Generic PPE (g)	30 g	
K	Mean mass of SUPs: COVID-19 PPE (g)	305 g	
L	**Total annual number of SUP items** (including generic PPE, set up and decontamination)	A*B*C*D	≈ 2 billion items
M	**Total annual number of SUP items** (including COVID-19 PPE)	A*B*C*(D + E)	≈ **2.4 billion items**

Norge – ekstrapolert – per tannlege, 230 arbeidsdager/året

A	One single dentist	**1**	
B	Working days per year (Grytten ea 2022 - Praksisundersøkelser)	**230**	days
C	Approx. number of operative procedures per day (Norwegian Dental Association)	**10**	pats.
D	Mean number of SUPs per procedure (including generic PPE, set up and decontamination)	55	items
E	*Additional PPE items per procedure (COVID-19)*	*9*	*items*
F	Mean mass of SUPs per procedure: Procedure specific	254	gram
G	Mean mass of SUPs per procedure:eneric set up and clean up	100	gram
J	Mean mass of SUPs generic PPE (g)	30	gram
K	*Mean mass of SUPs: COVID-19 PPE (g)*	*305*	*gram*
L	Total number of SUP items (including generic PPE, set up and decontamination) A*B*C*D	126500	items
M	*Total number of SUP items (including COVID-19 PPE) A*B*C*(D + E)*	*147200*	*items*
N	Mass of procedural SUPs (kg) A*B*C*(F+G) ÷ 1000	814	kg
O	Mass of PPE SUPs (kg) (A*B*C*J) ÷ 1000	69	kg
P	*Total mass of PPE SUPs (including additional COVID-19 PPE (kg)) A*B*C*(J + K) ÷ 1000*	*771*	*kg*
Q	Total mass of SUP waste (kg) N + O	883	kg
R	*Total mass of SUP waste (kg) (including COVID-19 PPE) N + O + P*	*1654*	*kg*

Engangsprodukter i plast alene

Norge – ekstrapolert- Totalt (n= 4480 tannlegeårsverk*)

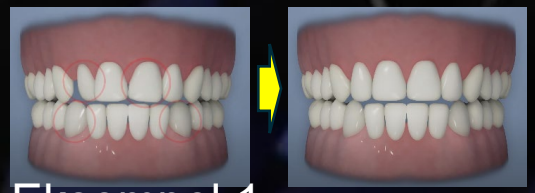
*https://www.ssb.no/en/helse/helsetjenester/statistikk/tannhelsetenesta

3 451 840 kg

3 956 736 kg

7 408 576 kg

Kompositt plast – nå mye brukt i en BOOMING nisje

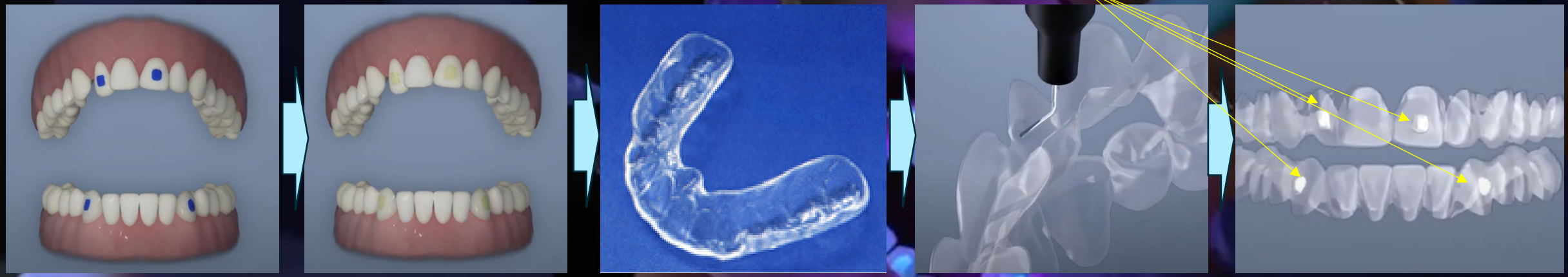


Eksempel 1

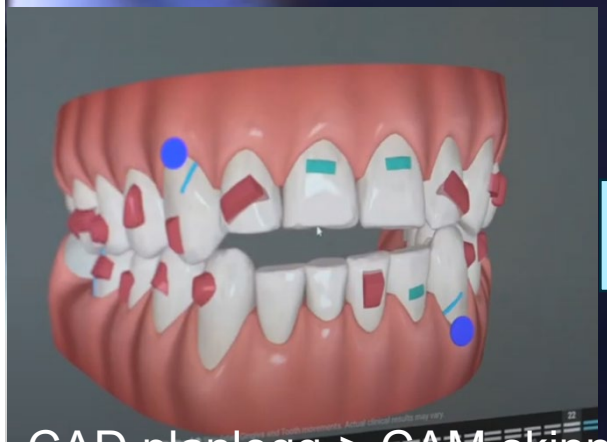
Aligner-tannregulering (mange versjoner)

f.eks Polyuretan CADCAM

RBC “attachments”



Eksempel 2



CAD planlegg-> CAM skinne



Syreets ukj -- attachments okj



RBC + fluorescent additiv

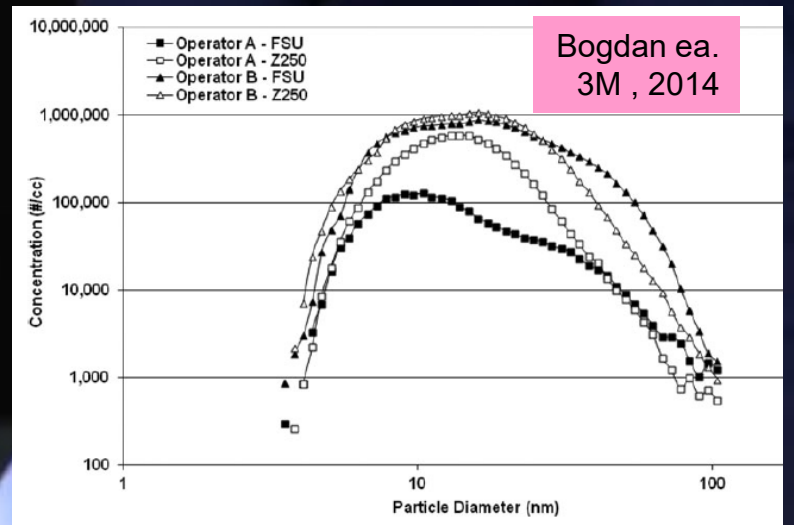


~15-80 CAM skinner byttes ut over 20-90 uker

Kompositt plast – nå mye brukt i en BOOMING nisje

Aligner-tannregulering (mange versjoner)
Fjerning av RBC-festene

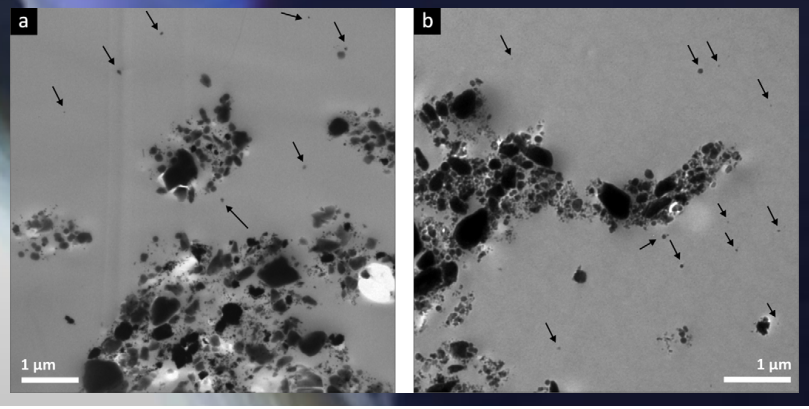
LUFTFORURENSING?



Bogdan ea.
3M , 2014

FIGURE 5. Two operators abrading the same composite materials.

Journal of Occupational and Environmental Hygiene July 2014



Van Landuyt ea
U Leuven 2012

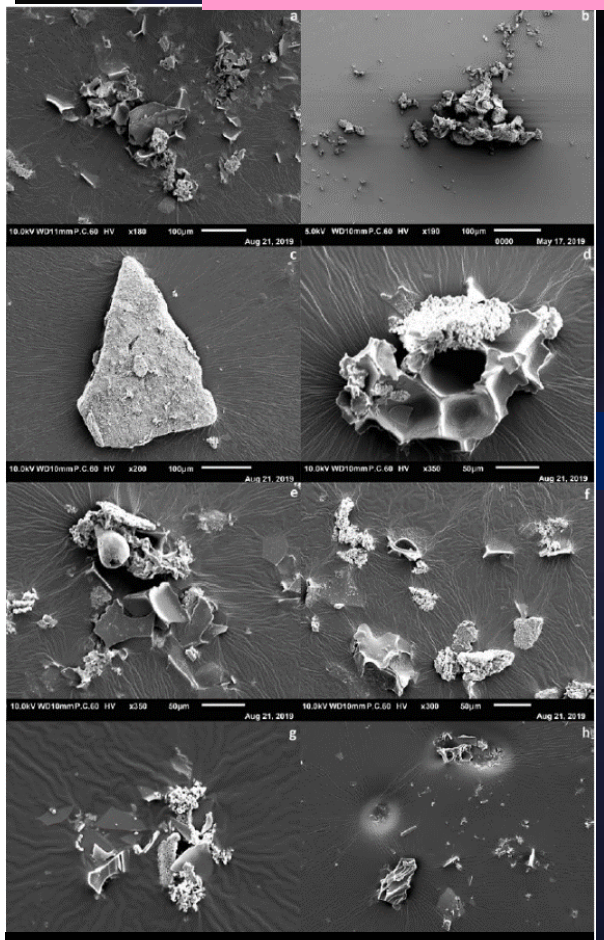
1. Nano- & mikrostørrelse → inhalasjon?
2. HMS arbeidsmiljø i en tannklinikk?

Godt sug
Munnbind med gode filteregenskaper
Kraftig vannspray
Ofte ventilasjon av klinikkrommet

Kompositt plast – nå mye brukt i en BOOMING nisje

Aligner-tannregulering (mange versjoner)
Fjerning av RBC-festene

VANNFORURENSING?



Scanning elektronmikroskopi
Ireland Environmental Agency
Harding ea 2022 - www.epa.ie

Avløp

Partikkelstørrelser
60% < 5 µm²
80% < 10 µm²
95% < 50 µm²

1. Nano- & mikrostørrelse → inhalasjon?
2. HMS arbeidsmiljø i en tannklinikk?
3. Hva skjer med mikropartiklene som forsvinner i suget og videre ut i avløpet?

Plastfyllinger – hvitt og vakkert

USE OF EPOXY RESINS IN RESTORATIVE MATERIALS

R. L. BOWEN, D.D.S.

San Diego, Calif.

INTRODUCTION

MODERN chemistry has developed a large number of synthetic resins. Some of the new types are exceptionally heat resistant, others chemically inert, and others very adhesive to certain materials. Not all of these have been examined extensively with an object of finding an application in dentistry. It

Plast har blitt brukt som tannfyllingsmateriale siden 1935. Ref Fløystad H. NTF Tidende 1950; 60:498





Czub "Bisphenol-A." In *Handbook of Engineering and Specialty Thermoplastics*. 2011. doi:10.1002/9781118104729.ch7.

1950s: The greatest growth of BPA production. Start of industrial fabrication of polycarbonates and epoxy resins with BPA as the primary monomer for their synthesis

United States Patent Office

1

3,066,112

DENTAL FILLING MATERIAL COMPRISING VINYL SILANE TREATED FUSED SILICA AND A BINDER CONSISTING OF THE REACTION PRODUCT OF BIS PHENOL AND GLYCIDYL ACRYLATE

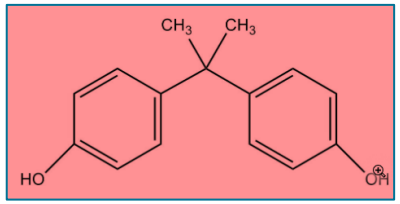
Rafael L. Bowen, Washington, D.C., assignor to the United States of America as represented by the Secretary of Commerce

No Drawing. Filed Jan. 30, 1959, Ser. No. 790,308
1 Claim. (Cl. 260—41)

oxide per 100 part
vinyl silane treated
aged 22,000 p.s.i.

METH

The filler.—Clea
the reinforcing fille
mal expansion as
as strength and ine



Bowen's resin / (Bowen's bis-GMA) / (Bowen's monomer)
En stiv, kryssbundet plastmatrise og silaniserte fillerpartikler som dannet grunnlaget for moderne dentale kompositter.

Email: asbjorn.jokstad@uit.no

Plastfyllinger – hvitt, vakkert og .....skummelt pga BPA?

USE OF EPOXY RESINS IN RESTORATIVE MATERIALS

R. L. BOWEN, D.D.S.

San Diego, Calif.

Fra 1935→

INTRODUCTION

MODERN chemistry has developed a large number of synthetic resins. Some of the new types are exceptionally heat resistant, others chemically inert, and others very adhesive to certain materials. Not all of these have been examined extensively with an object of finding an application in dentistry. It

Plast har blitt brukt som tannfyllingsmateriale siden 1935. Ref Fløystad H. NTF Tidende 1950; 60:498





United States Patent Office

1

3,066,112

DENTAL FILLING MATERIAL COMPRISING VINYL SILANE TREATED FUSED SILICA AND A BINDER CONSISTING OF THE REACTION PRODUCT OF BIS PHENOL AND GLYCIDYL ACRYLATE

Rafael L. Bowen, Washington, D.C., assignor to the United States of America as represented by the Secretary of Commerce

No Drawing. Filed Jan. 30, 1959, Ser. No. 790,308

1 Claim. (Cl. 260—41)

oxide per 100 part
vinyl silane treated
aged 22,000 p.s.i.

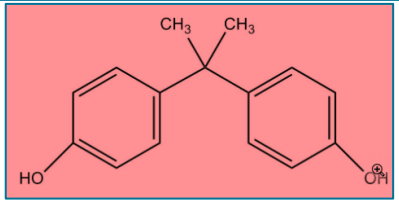
METH

The filler.—Clea
the reinforcing fille
mal expansion as
as strength and ine

Czub "Bisphenol-A." In *Handbook of Engineering and Specialty Thermoplastics*. 2011. doi:10.1002/9781118104729.ch7.

1930s: BPA exhibits high estrogenic activity (Dodds & Lawson)
1950s: the greatest growth of BPA production. Start of industrial fabrication of polycarbonates and epoxy resins with BPA as the primary monomer for their synthesis

2011: "After nearly sixty years from the first Dodds and Lawson work the question about adverse effects of BPA on human health and environmental risk caused by the BPA production and applications has come back. The problem of potential BPA toxicity, its carcinogenic effects and possible neurotoxicity is intensively studied and discussed all over the world"



Kommersielle produkter på markedet som inneholder Bisfenol A i dag

2016: 86% av 130 - Dursun doi:10.2174/1874210601610010446
2024: 84% av 236 - Dantagnan doi:10.3390/polym16081022

Email: asbjorn.jokstad@uit.no

Plastfyllinger – hvitt, vakkert og .....skummelt pga BPA?

2007-----------------------------------2012-----------------------------------2018-----------------------------------2024----------------2026

NORGE

2007
BPA rødliste
Miljødirektor.

2009
PC-tåteflasker
trukket frivillig

Forbud mot bruk av bisfenol A i tåteflasker

Kommisjonsdirektiv 2011/8/EU av 28. januar 2011 om endring av direktiv 2002/72/E for bisfenol A i tåteflasker av plast

Commission Directive 2011/8/EU of 28 January 2011 amending Directive 2002/72/EC Bisphenol A in plastic infant feeding bottles

Mattrygghet | Rettsakten på norsk (PDF) | Les i Lovdata Pro

2011/8/EU
implementert

Om endring av EØS-avtalens vedlegg II (Tekniske forskrifter, standarder, prøving og sertifisering)	
Kommisjonsforordning (EU) 2018/213 av 12. februar 2018 om bruk av bisfenol A i lakk og belegg beregnet på å komme i kontakt med næringsmidler og om endring av forordning (EU) nr. 10/2011 med hensyn til bruk av stoffet i plastmaterialer som kommer i kontakt med næringsmidler	6.9.2018 *

Regjeringen.no
Tema | Dokument | Aktuelt | Departement
Forsiden • EØS-notatbasen

Endring av matkontaktregelverket forbud mot bisfenol A

Kommisjonsforordning (EU) 2024/3190 av 19.desember 2024 om bruk av bisfenol A (BPA), andre bisfenoler og bisfenolderivater med harmonisert klassifisering for spesifikke helsefarlige egenskaper i visse materialer og gjenstander beregnet på å komme i kontakt med mat, vedrørende endringer forordning (EU) nr. 10/2011 og om opphevelse av forordning (EU) nr. 2018/2

Commission Regulation (EU) 2024/3190 of 19.December 2024 on the use o bisphenol A (BPA) and other bisphenols and bisphenol derivatives with

FORBRUKERRÅDET | Rettigheter | Finansportalen | Forbr
Forsiden > Siste nytt > Mat > Bisfenoler må ut av mat- og drikkeemballasje nå

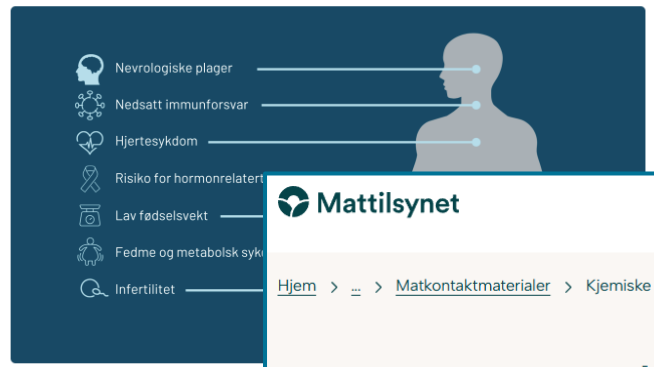
Bisfenoler må ut av mat- og drikkeemballasje nå

15. april, 2024

Etter en ny risikovurdering, foreslår EU å forby alle former for bisfenoler. Forbrukerrådet og Naturvernforbundet forventer at norske helsemyndighet nå aktivt prioriterer arbeidet med å forby stoffet, som brukes blant annet på innsiden av hermetikkbokser og brusbokser.

Bisfenol A (BPA) er et svært utbredt kjemisk stoff, som blant annet brukes i polykarbonatplast og plastflasker, samt i lakk på innsiden av hermetikkbokser.

Det er knyttet stor bekymring til BPA, som mistenkes å ha skadelige virkninger på blar annet reproduksjonsevnen, immunforsvaret, hjertet, nervesystemet, adferd og metabolismen.



Forskrift om registrering, vurdering, godkjenning og begrensning av kjemikalier (REACH-forskriften)

Dato	FOR-2008-05-30-516
Departement	Arbeids- og inkluderingsdepartementet, Justis- og beredskapsdepartementet, Klima- og miljødepartementet
Publisert	I 2008 hefte 6
Ikrafttredelse	30.05.2008, 01.06.2008
Sist endret	FOR-2026-10-01-1979
Endrer	FOR-1997-12-19-1323, FOR-1995-05-04-460, FOR-1996-07-01-715
Gjelder for	Norge
Hjemmel	LOV-1971-05-21-47-§11, LOV-1971-05-21-47-§11a, LOV-1971-05-21-47-§37, LOV-1974-06-14-39-§11, LOV-1974-06-14-39-§11a, LOV-1974-06-14-39-§37, LOV-1976-06-11-79-§4, LOV-1976-06-11-79-§5, LOV-1976-06-11-79-§8a, FOR-1977-08-05-2, FOR-1990-09-07-730, LOV-1981-03-13-6-§9, LOV-1981-03-13-6-§49, LOV-1981-03-13-6-§51, LOV-1981-03-13-6-§52a, LOV-1981-03-13-6-§78, LOV-2002-06-14-20-§26, LOV-2002-06-14-20-§27, LOV-2002-06- [+] Vis alle
Kunngjort	30.05.2008 kl. 15.05
Rettet	08.07.2021 (en forordningshenvisning fjernet i forordningsdelen)
Korttittel	REACH-forskriften

Hjemmel: Fastsatt av Miljøverndepartementet, Arbeids- og inkluderingsdepartementet og Justis- og politidepartementet 30. mai 2008 med hjemmel i lov 11. juni 1976 nr. 79 om kontroll med produkter og forbrukertjenester (produktkontrolloven) § 4, § 5 og § 8a, jf. forskrifter 5. august 1977 nr. 2 om gjennomføring av lov om kontroll med produkter og forbrukertjenester og delegeringsvedtak 7. september 1990 nr. 730, lov 13. mars 1981 nr. 6 om vern mot forurensninger og om avfall (forurensningsloven) § 9, § 49, § 51, § 52a og § 78, lov 17. juni 2005 nr. 62 om arbeidsmiljø, arbeidstid og stillingsvern mv. (arbeidsmiljøloven) § 1-4 første ledd, § 3-1 tredje ledd, § 4-5 sjette og syvende ledd og § 5-4 tredje og fjerde ledd og lov 14. juni 2002 nr. 20 om vern mot brann, eksplosjon og ulykker med farlig stoff og om brannvesenets redningsoppgaver (brann- og eksplosjonsvernloven) § 26 tredje ledd, § 27 og § 43 bokstav a og b.
Tilføyd hjemmel: Lov 14. juni 1974 nr. 39 om eksplosive varer (gjelder bare for Svalbard) § 11a og § 37 og lov 21. mai 1971 nr. 47 om brannfarlige varer samt væsker og gasser under trykk (gjelder bare for Svalbard) § 11, § 11a og § 37. Delegeringsvedtak 8. juli 1983 nr. 1245, delegeringsvedtak 1. september 2003 nr. 1161, delegeringsvedtak 30. juni 2017 nr. 1126, delegeringsvedtak 30. nov 2017 nr. 1863, delegeringsvedtak 22. mai 2024 nr. 806.
EØS-henvisninger: EØS-avtalen vedlegg II kap. XV
[...]
Rettelser: 01.12.2013 (ny versjon av 32012r0109), 26.01.2016 (nye versjoner av 15 forordninger), 15.11.2018 (korrigendum til 32017r0227 tilføyd i forordningsdelen), 19.06.2020 (ny versjon av forordningsdelen), 07.01.2021 (en lenke og en forordningshenvisning korrigert i forordningsdelen), 19.02.2021 (tegnsetting i lister tilpasset universell utforming), 08.07.2021 (en forordningshenvisning fjernet i forordningsdelen).

Mattilsynet | Språk/Langu
Hjem > ... > Matkontaktmaterialer > Kjemiske stoffer i emballasje og kjøkkenredskaper

Kjemiske stoffer i emballasje og kjøkkenredskaper

Matemballasje og kjøkkenredskaper kan være laget av materialer som inneholder kjemiske stoffer. Når mat kommer i kontakt med slike materialer, kan det føre til at stoffer havner i maten. Eksempler på dette er mykgjørere i plast og formaldehyd fra melaminplast.

Faglig gjennomgått: 22.06.2026

EUROPA

FORBUD Matembalasje
0-3 år Danmark

0-3 år Frankrike

FORBUD Tåteflaske
Frankrike
2011/8/EU

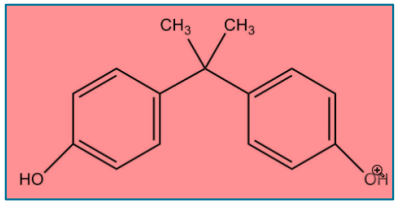
FORBUD Polykarbonat
kontakt mat max 0.6-0.05 mg/kg
EU 2018/213

FORBUD kopipapir

EFSA max 2 ng/kg BPA
dvs. x20.000 lavere enn før
ALL Matembalasje

Email: asbjorn.jokstad@uit.no

Plastfyllinger – hvitt, vakkert og .....skummelt pga BPA?



Treatment with Dental Polymer-based Restorative Materials
Exposure to Bisphenol A
Effects on Pregnancy Outcomes

Trine Lise Lundekvam Berge

Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
2019

UNIVERSITY OF BERGEN

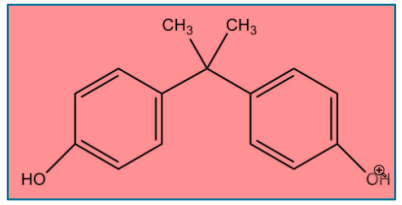
Prospektiv MoBa-studie koblet til Medisinsk fødselsregister:
90 886 svangerskap, hvorav **10 972** med selvrapporterte nye «hvite fyllinger». Regresjonsanalyser med justering for blant annet alder, paritet, utdanning, BMI, røyking og alkoholinntak.

Ingen statistisk signifikante justerte sammenhenger med de undersøkte utfallene: prematuritet, fødselsvekt/vekst, misdannelser og dødfødsel..

Utfallsmålene er relevante for svangerskapsutfall, men utilstrekkelige for å besvare det bredere spørsmålet om hormonforstyrrelser.

Email: asbjorn.jokstad@uit.no

Plastfyllinger – hvitt, vakkert og .....skummelt pga BPA?



Treatment with Dental
Polymer-based Restorative Materials
Exposure to Bisphenol A
Effects on Pregnancy Outcomes

Trine Lise Lundekvam Berge

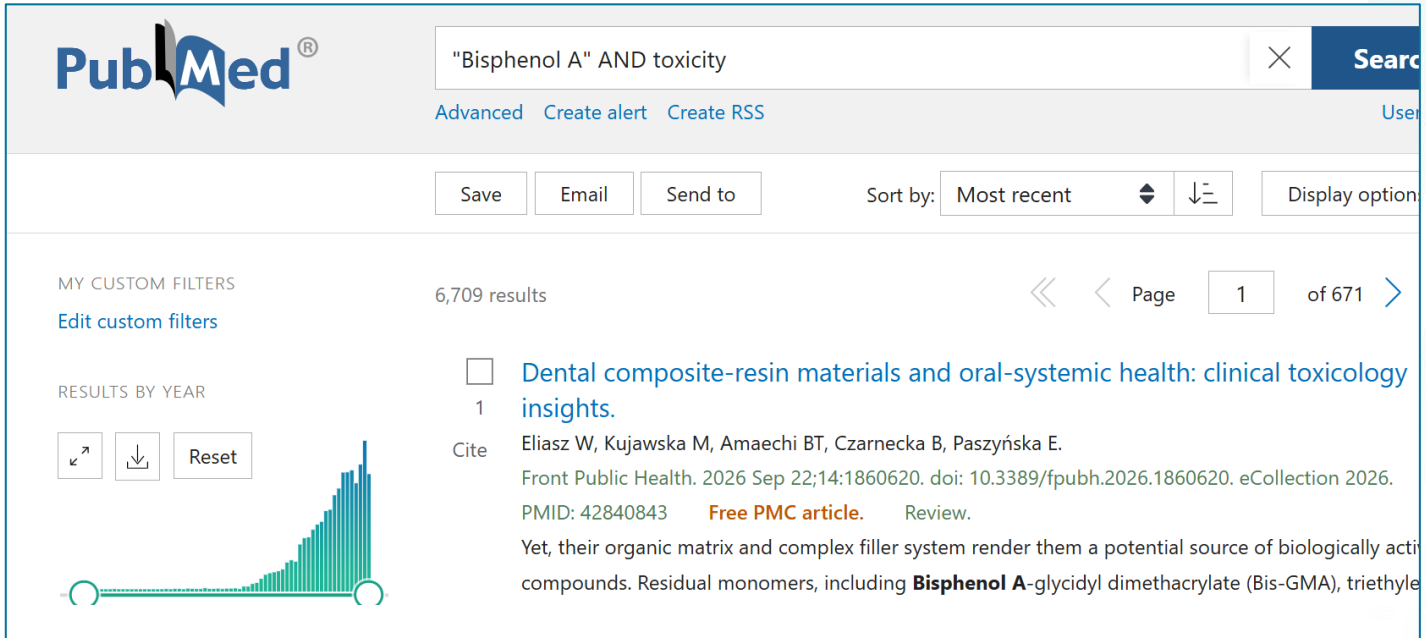
Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
2019

UNIVERSITY OF BERGEN

Prospektiv MoBa-studie koblet til Medisinsk fødselsregister:
90 886 svangerskap, hvorav **10 972** med selvrapporterte nye «hvite fyllinger». Regresjonsanalyser med justering for blant annet alder, paritet, utdanning, BMI, røyking og alkoholinntak.

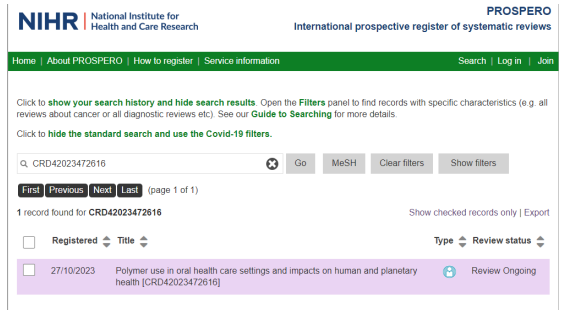
Ingen statistisk signifikante justerte sammenhenger med de undersøkte utfallene: prematuritet, fødselsvekt/vekst, misdannelser og dødfødsel..

Utfallsmålene er relevante for svangerskapsutfall, men utilstrekkelige for å besvare det bredere spørsmålet om hormonforstyrrelser.



Email: asbjorn.jokstad@uit.no

2023 – Mikroplast- kritisk evaluering


NIHR | National Institute for Health and Care Research

PROSPERO
International prospective register of systematic reviews

Home | About PROSPERO | How to register | Service information | Search | Log in | Join

Click to show your search history and hide search results. Open the Filters panel to find records with specific characteristics (e.g. all reviews about cancer or all diagnostic reviews etc). See our Guide to Searching for more details.

Click to hide the standard search and use the Covid-19 filters.

CRD42023472616 Go MeSH Clear filters Show filters

First Previous Next Last (page 1 of 1)

1 record found for CRD42023472616 Show checked records only | Export

Registered	Title	Type	Review status
27/10/2023	Polymer use in oral health care settings and impacts on human and planetary health [CRD42023472616]		Review Ongoing





Meetings > 2024 IADR/AADOCR/CADR General Session (New Orleans, Louisiana) > Social and Environmental

The Environmental Impact of Polymer Uses in Oral Health Care.

IADR International Association for Dental Research

The Environmental Impact of Polymer Uses in Oral Health Care.

Objectives: Oral care professionals use large quantities of polymers in the dental clinic for multiple purposes. There is a growing concern about the environmental impact, but waste and ecological pollution estimates remain scarce. We sought to systematical review the literature to estimate the quantity of waste and pollution related to plastic protective devices, surgical equipment, resin-based composite restorative materials (RBC) fabrication, and clinical handling of RBC. A secondary objective was to estimat

2025: samarbeid



BDJ Open

www.nature.com/bdjopen

ARTICLE OPEN

Check for updates

Polymer waste and pollution in oral healthcare clinics: a systematic review

Anne Margrete Gussgard [1] and Asbjørn Jokstad [1]✉

© The Author(s) 2025

BACKGROUND: Modern oral healthcare extensively uses polymer items and devices derive
These materials are essential for personal protective equipment, infection barriers, packagi
pandemic has led to an increased reliance on single-use polymer items, causing supply c
systematic review explores the extent of polymer waste and pollution generated in oral
MATERIALS AND METHODS: A systematic review protocol was registered with PROSPER
PRISMA guidelines and SWiM recommendations. Eligibility criteria included studies that p
polymer waste or pollution in air or wastewater from oral healthcare clinics. Comprehens
conducted across several bibliometric databases, followed by data extraction and risk of
two independent reviewers.
RESULTS: A total of thirty studies were included in the review. Sixteen papers reported on
data, while eight studies focused on pollution caused by polymer nano- and microparticl
experimental studies investigated potential leakage of monomeric eluates or polymer pa
significant variation in the amount of polymer waste generated per patient, ranging from

tidende • Sammendrag • Miljøpåvirkning av polymeravfall i tannklinikker: En oppfordring til bærekraftig klinisk praksis

Nor Tannlegeforen Tid. 2025; 135: 868-9. doi:10.56373/68dbd6a46d2cf

KLINISK HOVEDBUDSKAP

- Tannklinikker skaper betydelige mengder polymeravfall, hvorav mye er plast og engangs-artikler, som påvirker miljøet gjennom kjemiske nedbrytningsprodukter og nano- og mikro-partikler.
- En bærekraftig klinisk praksis innebærer riktig sortering og håndtering av polymeravfall.

Miljøpåvirkning av polymeravfall i tannklinikker: En oppfordring til bærekraftig klinisk praksis

Dental Materials 41 (2025) 1620–1641

Contents lists available at ScienceDirect

Dental Materials

journal homepage: www.elsevier.com/locate/dental

Check for updates

Environmental impacts from intraoral polymer devices: A systematic review

Asbjørn Jokstad *, Anne Margrete Gussgard

Department of Clinical Dentistry, Faculty of Health Sciences, UiT The Arctic University of Norway, Tromsø, Norway

Takk for oppmerksomheten!



https://uit.no/project/sustaindent

Anne M. Gussgard
Asbjørn Jokstad
Margit Hågå

Email: asbjorn.jokstad@uit.no

Samarbeidspartnere

Framtiden i våre hender https://www.framtiden.no/
NILU - Norsk institutt for luftforskning https://nilu.com/
NIVA - Norsk institutt for vannforskning https://www.niva.no/
NTF - Den norske tannlegeforening https://www.tannlegeforeningen.no/
Plandent https://www.plandent.no/
Troms tannhelsetjeneste dentalsørvisseksjon https://www.tromsfylke.no/tjenester/tannhelse/
Tromsø kommune https://www.tromso.kommune.no/vann
UiT Institutt for kjemi https://uit.no/enhet/ik