



**What is the connection between  
primary liver/biliary tract cancer and  
waste water?**



First knowledge, a cohort study:

591 wastewater workers

1545 water supply workers

Followed 1965 – 1998.

Cohort making was possible through the  
Union of Copenhagen waste water  
workers.



Occ Environ Med 2003; 60: 595-598:  
591 wastewater workers from the dep of  
sewage of the municipality of Cph and  
from 2 waste water treatment plants.  
Followed by registry linkage:  
Personal identification number, Danish  
Death Certificate Registry and Danish  
Cancer Registry



Occ Environ Med 2003; 60: 595-598:

Mortality

Total RR 1,25 (1,03 – 1,51)

Cancer RR 1,34 (0,95 - 1,89)



Occ Environ Med 2003; 60: 595-598:

Cancer	N	
All	68	RR 1,27 (0,97 – 1,67)
Respiratory	20	RR 1,65 (1,00 – 2,74)
Lung cancer	17	RR 1,48 (0,46 – 4,74)
Digestive c	14	RR 1,38 (0,71 – 2,71)
Primary Liver c	4	RR 8,9 (1,5 – 51,5)



Occ Environ Med 2003; 60: 595-598:

4 primary liver(biliary tract cancers:

2 hepatocellular cancers

2biliary tract cancers



Occ Environ Med 2003; 60: 595-598:

Why primary liver/biliary tract cancers  
among waste water workers?

One study from Malaysia: Aflatoxin found  
in a waste water plant. J Environ Sci  
Health A37(3), 309-320 (2002)



## Primary Liver/biliary tract cancer:

Aflatoxin

Trichloethylen (WHO group 2A,  
1997)

Hepapitis B and C

Liver cirrhosis (alcohol and ??)

Overweight?



## Primary Liver/biliary tract cancer:

1980 -1997 no registration of hepatitis B  
and C among wastewater workers

No excess of liver cirrhosis



One other study also found excess cases  
of liver cancer (and of laryngeal cancer):

AMJ Ind Med 1991; 19; 75-86

La Fleur J et al.

A few studies on extra mutagen activity in  
the urine from wastewater workers



July 2010:

New case of primary biliary tract cancer:  
52 year old male, engaged for 24 years at  
a waste water plant in Copenhagen.

Educated as panel beater, further  
education as engineer since then  
engineer on call - supervisor in the  
combustion area at the wastewater plant.  
Supervision work.



July 2010:

The new cancer case:

No Hepapitis

The case was recognized and  
compensated as an occ. disease.



Danish Technical University accepted to search for *Aspergillus Flavus* in humid, warm places in the waste water plant.

Result: The fungus A.F. cannot grow in a Danish wastewater plant.

Conclusion: No aflatoxin cause.



## Primary Liver/biliary tract cancer:

Aflatoxin

Trichloethylen

Hepapitis B and C

Liver cirrhosis (alcohol and ??)

Overweight?



Trichlorethylen has been used  
for cleaning hands among car  
mechanics in Dk. in the  
1970'es.



Until recently there was a lorry repair shop within the wastewater plant.  
Trichlorethylen use?

A 2007 meta analysis found 15 studies but no one showed a correlation between Trichloethylen and primary liver cancer.