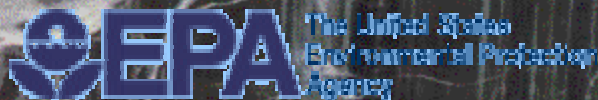


Mineralogy and Exposure Assessment

Introduction: Bruce Case



Dedicated to the memory of Chris Wagner

DIFFUSE PLEURAL MESOTHELIOMA AND ASBESTOS EXPOSURE IN THE NORTH WESTERN CAPE PROVINCE

BY

J. C. WAGNER, C. A. SLEGGES, and PAUL MARCHAND

From the Pathology Division, Pneumoconiosis Research Unit of the Council for Scientific and Industrial Research, Johannesburg, West End Hospital, Kimberley, and the Department of Thoracic Surgery, University of the Witwatersrand and Johannesburg General Hospital

(RECEIVED FOR PUBLICATION APRIL 24, 1960)

From the addendum: by June 1960 there were 47 mesotheliomas; 45 associated with crocidolite exposure

“In failing to take more seriously the paper published by Wagner et al. in 1960 the world made a costly mistake”

**- McDonald JC
1995**

What is now generally accepted

- regarding asbestos mineralogy ?
- regarding exposure assessment for “asbestos”?
- We need to step back from these to more general questions first

What *is* “asbestos”?

- John Addison will tell us!

But...

- IARC 1996: “**“Asbestos”** is often inappropriately used as a generic, homogeneous rubric, and even when an asbestos fibre type is specified, its source is rarely stated.”

Defining “asbestos” (continued)

- Wagner, ILO/ NIOSH, 1990:
- asbestos may be defined as “a **group of fibrous minerals** that can be **split longitudinally** and have **commercial uses**”.
- Wagner also noted that “**the term asbestos was originally used for chrysotile**:

Defining “asbestos” (continued)

- ...“If this had been maintained and the other minerals referred to as the amphibole fibres, the present confusion in assessing the risk hazard would not have occurred”

- Wagner JC. (1990) (NIOSH) Publication No. 90-108, Part I, pages 22-24.

BUT...

Geolib® Standard Report

Mineral Class: VIIca Silicates

(Inosilicates – **Amphibole**)

Number of Minerals: 38

ACTINOLITE **ANTHOPHYLLITE** ARFVEDSONITE
BARROISITE CROSSITE **CUMMINGTONITE** ECKERMANNITE
EDENITE FERRIKATOPHORITE-(?) FERRIWINCHITE FLUOR-
FERRO-LEAKEITE GEDRITE **GRUNERITE** HASTINGSITE
KATOPHORITE KORNITE LEAKEITE MAGNESIO-
ANTHOPHYLLITE MAGNESIO-ARFVEDSONITE
MAGNESIOCLINOHOLMQUISTITE MAGNESIOCUMMINGTONITE
MAGNESIOFERRIKATOPHORITE MAGNESIOGEDRITE
MAGNESIOKATOPHORITE MAGNESIORIEBECKITE MANGANO-
GRUNERITE MANGANOCUMMINGTONITE NYBOITE-(?)
PARGASITE POTASSIUM-FLUOR-RICHTERITE RICHTERITE
RIEBECKITE SODIUMANTHOPHYLLITE SODIUMGEDRITE
TREMOLITE

TSCHERMAKITE UNGARETTIITE

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Thus the questions must be asked:

1. Which physical or mineralogical differences **CAN OR SHOULD** form the basis for categorization?
2. Can these categories be reproducibly distinguished (AND separated)?
3. “asbestiform” ?, “cleavage fragments” ??
“transitional fibers” ???
4. Which **types** and **dimensions** of fibers are important to enumerate? (implies EM, so...)

Ideally risk assessors could agree upon well-defined parameters of concern:

Which mineral categories (e.g. **fiber types**)

cause which disease(s) (or not!!)

at which

- Exposure (-→ dose)
- Length (range?) Width (range?)
- Chemistry, crystallography...

So much for mineralogy; where does "exposure assessment" fit in?

Exposure assessment is a part of risk assessment



The first part of “exposure assessment” is *measurement*

1. **WHAT** do we measure?
2. **WHERE** do we measure? (air?
“settled dust”? Materials which may
contain the asbestos? Lung tissue?)
3. **HOW** do we measure?
(instruments? Procedures? e.g.
NIOSH 7400/7402)?

The first part of “exposure assessment”
is *measurement (continued)*

**4. How do we DEFINE and
EXPRESS THE RESULTS?**

Example: Detection limits:

**Too sensitive – “positive” in this
room – so what?**

**Too insensitive – can miss
exposures of interest.**

From exposure to dose

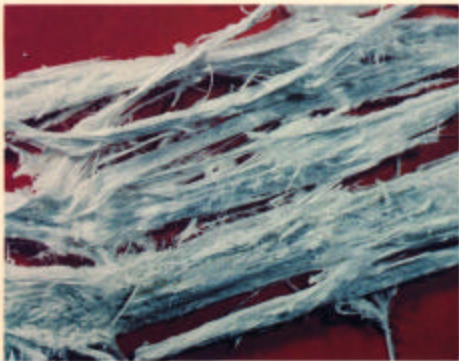


FIGURE 3. - Macrophotographs (X 3) of tremolite (top) and tremolite asbestos (bottom).

1. What is in the ground?
2. What is, or **can be**, on the ground and **in the air**?
3. What is, or **can be**, in the lung (and how and why does it get there, and what happens to it there, and
4. **what happens to US**, after that)

Dr. Addison & Dr. Sebastien

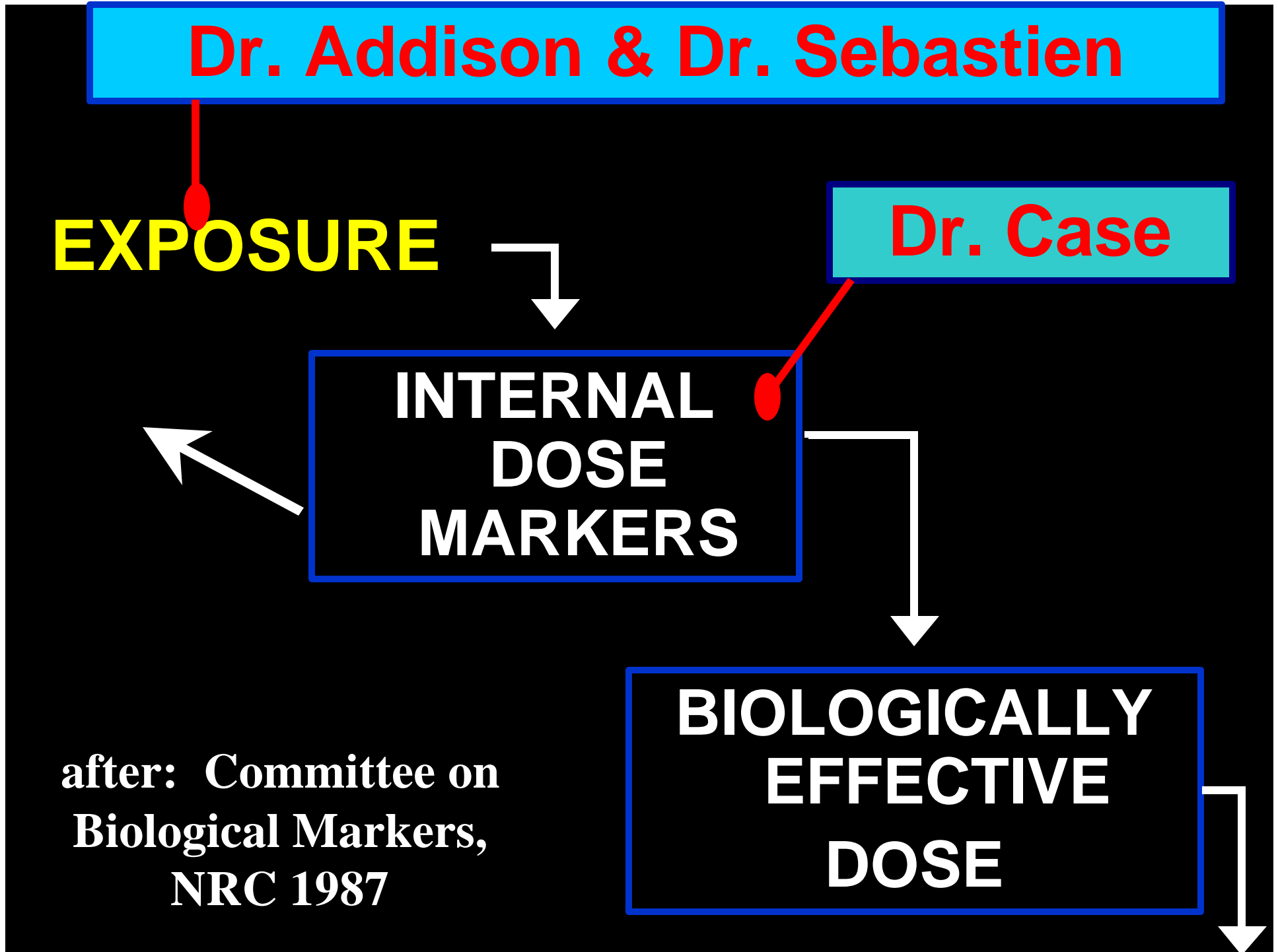
EXPOSURE

Dr. Case

**INTERNAL
DOSE
MARKERS**

**BIOLOGICALLY
EFFECTIVE
DOSE**

after: Committee on
Biological Markers,
NRC 1987



Putting exposure in perspective: 2

