Dear Sir,

In his In-Depth Review paper, Semple [1] states ‘Exposure assessment plays a vital role in occupational and environmental medicine’. This applies particularly to occupational hygiene as a tool for protecting the health of workers against adverse effects of such exposure. However, occupational medicine is more concerned with adverse effects following internalization (absorption) of e.g. chemical agents, basing expectations on recognized (internal) dose–effect relationships. Semple writes ‘Exposure, in terms of occupational and environmental medicine, is the process of contact between an individual and a substance . . . ’; then defines this further as ‘and may take place by one or more of four routes: by inhalation, skin contact, ingestion or injection’.

This extends ‘exposure’ (a condition rather than a process), to include internalization, i.e. ‘absorption’ by tissue cells, thus not distinguishing exposure from absorption. While ‘Exposure assessment’ is defined as the science involved in characterising pathways, time course and
magnitude of an individual’s contact with the material under study’ the IPCS Risk Assessment Terminology document [2] defines exposure as ‘Contact between an agent and a target. Contact takes place at an exposure surface over an exposure period’.

The American Conference of Government Industrial Hygienists and the Control of Substances Hazardous to Health Regulations base their recommended exposure limits for chemical agents on ‘exposure–effect’ or ‘dose–response’ relationships, in fact using quantified environmental exposure as proxy for internal dose.

This might explain the definition of ‘exposure route’ in the IPCS document [2], which is aimed at promoting chemical safety control by engineers and occupational hygienists. This definition reads ‘The way in which an agent enters a target after contact (e.g. by ingestion, inhalation or dermal absorption)’.

Notably, the medical connotation of the word ‘route’, as ‘the means by which a drug or agent is administered or enters the body (oral, intravenously, trans dermal etc.)’, implies absorption into body cells.

As exposure is by definition confined to contact between agent and target surface, exposure route is a misnomer and should be replaced by ‘exposure pathway’, clearly defined as ‘the course an agent takes from the source to the target’. For health professionals, the term exposure route should therefore be avoided and renamed ‘absorption route’.

Under ‘Measuring exposures’ [1], it is stated that ‘Ingestion exposure is difficult to assess directly, but can be carried out indirectly using biological monitoring when the contribution from other routes of exposure is well understood’.

Surely this refers to measuring the effects of absorption of the agent following ingestion by biological monitoring methods and not of exposure at the surface of the gastro-intestinal tract?

Interested readers are referred to another paper by the same author [3] and the IPCS document [2]. The case study on inhalation on page 104–106 in Part 2 of this document [2] illustrates the above points and should help medical authors to clearly differentiate between concepts such as exposure and absorption and avoid definitions used by other disciplines if these clash with valid occupational medicine concepts.

J. T. Mets (retired)
e-mail: jttmets@telkomsa.net

References