THE 2025 PHYSICAL AGENTS AND NOISE EXPOSURE REGULATIONS WORKSHOP

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LAUNCH OF THE NEW PHYSICAL AGENTS AND NOISE EXPOSURE REGULATIONS

Disclaimer

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- The views expressed herein represent the author's views and I declare NO Conflict of Interest
- All images are to portray messaging with the aim of highlighting key messaging

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1. Regulations

Anything New?

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- Heat & Cold Stress
- Illumination
- Indoor Air Quality
- Vibration
- Non-ionising radiation
- Noise

Anything New?

- Information, Instruct, Train
- Duties:
  - Sellers, Designers etc
  - Employers
  - Employees
- ***Exposure Assessment***
  - Monitoring
- **Competent person**
  - Skills, knowledge, attributes

Anything New?

- OHS Act Section 8:

establishing, as far as is reasonably practicable, ***what hazards to the health or safety of persons are attached to any work which is performed****, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures*

Competent Person?

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Key qualities often associated with competence include **expertise**, **problem-solving abilities**, **adaptability**, **integrity**, and **communication skills**. Each of these traits contributes to a broader definition of competence, tailored to the specific demands of a given role or context

Competent Person?

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Table 2: Occupational exposure limits for electromagnetic fields*

Frequency range	Incident E-field strength – E_{inc} V/m^{-1}	Incident H-field strength – H_{inc} A/m^{-1}	Incident power density – S_{inc} W/m^{-2}
0,1 to 30 MHz	$660/f_M^{0,7}$	$4,9/f_M$	n/a
> 30 to 400 MHz	61	0.61	10
> 400 to 2 000 MHz	$3/f_M^{0,5}$	$0,008/f_M^{0,5}$	$f_M/40$
> 2 to 300 GHz	n/a	n/a	50

*Note: levels for exposure are averaged over 30 minutes and for the whole-body.

3.1.5.3
running r.m.s. acceleration value
frequency-weighted running r.m.s. vibration acceleration, in metres per second squared, defined by the expression

$$a_{w,\theta}(t) = \left(\frac{1}{\theta} \int_{t-\theta}^{t} a_w^2(\xi) \mathrm{d}\xi \right)^{1/2} \qquad (3)$$

Competent Person?

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SAIOH Self Assessment Programme:

	Total Percentage per Category	100%		93%		83%	
	Subject knowledge requirement	Required Skills: OHA Familiar	Assessment Score	OHT Practice	Assessment Score	OH Proficiency	Assessment Score	Theoretical and Practical Evidence for Skill Level Selection
13	**Radiation – ionising and non-ionising excluding light/ illumination (see 12):**	Be able to give examples of the main types of ionising and non-ionising radiation.	8	Be able to describe the electromagnetic spectrum and the main types of radiation.	9	Be able to describe the types of instruments used to measure the different types of radiation, with emphasis on non-ionising radiation.	10	
	The recognition of radiation types and sources, measurement and suitable control.	Be able to identify typical work environments where these types of radiation may be present.	8	Be able to describe Lasers and health effects associated with exposure to lasers.	8	Be able to describe the basic physics of radionuclide and half life.	7	
		Be able to identify SA legislation covering exposure to ionising radiation.	10	Be able to describe UV and IR radiation, potential health effects and typical work processes where these types of radiation may occur.	8	Describe the types of occupational hygiene measurements that may be used to evaluate workers exposure to radioactive sources.	7	
				Know which government departments are responsible for ionising and non-ionising radiation and what legislation applies to the control of ionising and non-ionising radiation in South Africa.	9	Be able to identify the main measurement units used to evaluate ionising radiation.	8	
				Be able to describe the main types of ionising radiation, potential health effects and typical work environments where these may be found.	10	Be able to describe the potential penetration for the main forms of ionising radiation.	7	
						Describe the main approaches used to reduce exposure to the main types of ionising radiation.	8	
						Describe the types of control used to reduce workers exposure the main types of non-ionising radiation.	7	
						Describe the types of medical surveillance that may be used to evaluate workers who may be exposure to radioactive sources.	6	

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2. Occupational Hygiene

Definition

The discipline of **anticipating**, **recognizing**, **evaluating** and **controlling** health hazards in the working environment with the objective of protecting worker health and well-being and safeguarding the community at large

"The goal is good control"

Definition

ANTICIPATION –identifying potential hazards in the workplace before they are introduced

RECOGNITION - identifying the potential hazard that a chemical, physical or biological agent - or an adverse ergonomic situation - poses to health

Definition

EVALUATION of the extent of exposure to the chemical hazards, physical or biological agents (or adverse ergonomic situation) in the workplace. This often involves measurement of the personal exposure of a worker to the hazard/agent in the workplace, **particularly at the relevant interface between the environment and the body**, e.g. breathing zone, hearing zone, and assessment of the data in terms of recommended occupational exposure limits (OELs), where such criteria exist

Definition

CONTROL of the chemical, physical or biological agent - or adverse ergonomic situation, by procedural, engineering or other means where the evaluation indicates that this is necessary

"The goal is good control"

Control Hierarchy

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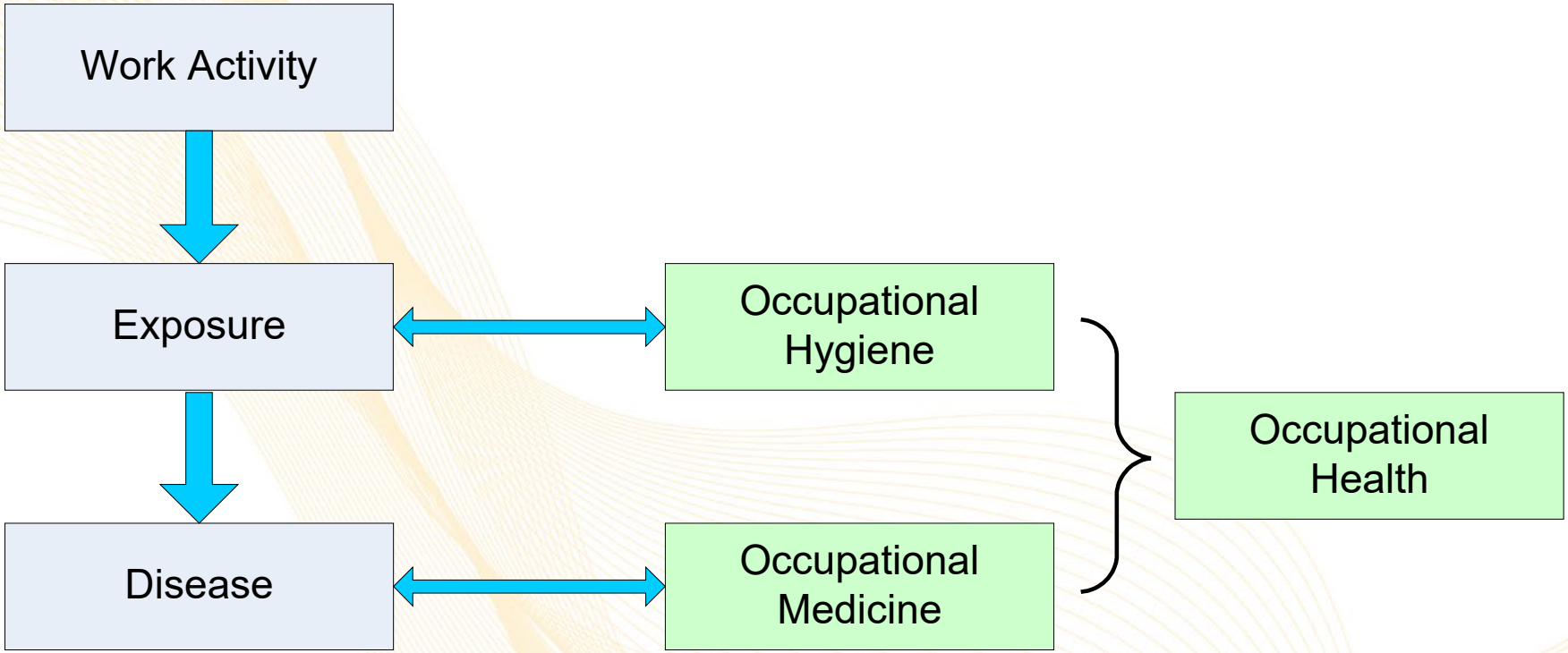
"The goal is good control"

Workplace Stressors

- Chemical: Hazardous Chemical Agents
- Biological: Hazardous Biological Agents
- **Physical**: Noise, Thermal, Radiation (Ionising and non-ionising), Human Vibration, Illumination
- Ergonomics
- Psychosocial

OH Organogram



Why Occupational Hygiene?*

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- 2,200,000 work-related deaths per year
- 450,000 deaths each year from exposure to airborne matter
- 152,000 deaths per year from carcinogens in the workplace
- 37% of Lower Back Pain is attributed to occupation
- Majority workplace disease related

* WHO Estimates

Why Occupational Hygiene?

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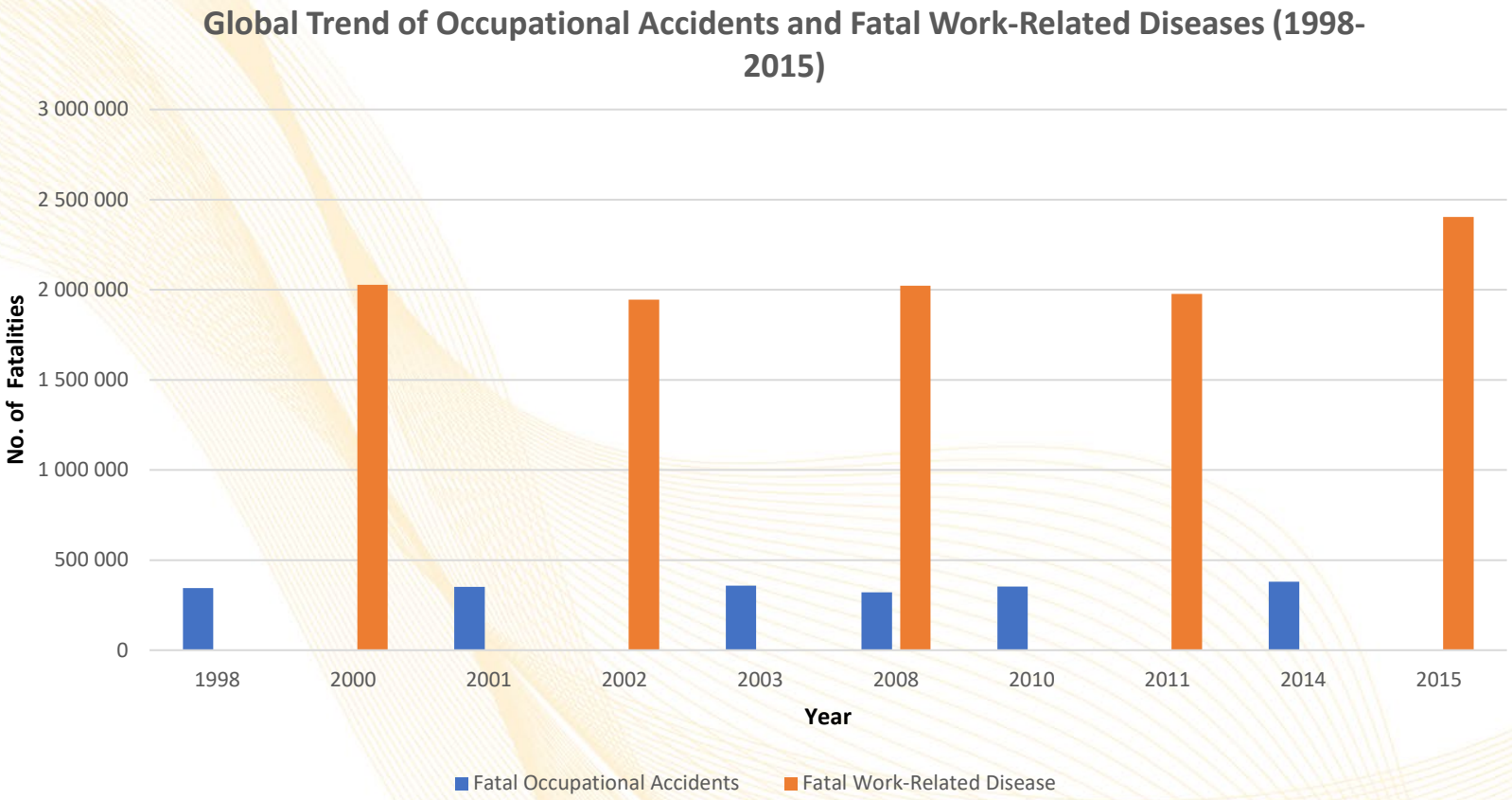

Workplace exposure to air pollution (particulate matter, gases and fumes) was responsible for 450,000 deaths

Why Occupational Hygiene?

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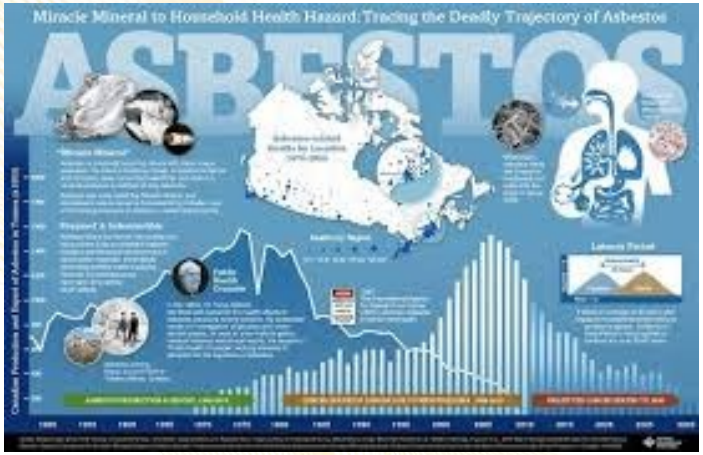

Why Occupational Hygiene?

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That means approximately **228 people have died** from work related injury or ill health since we started the session this morning

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3. Assessing Exposure

Exposure?

Exposure?

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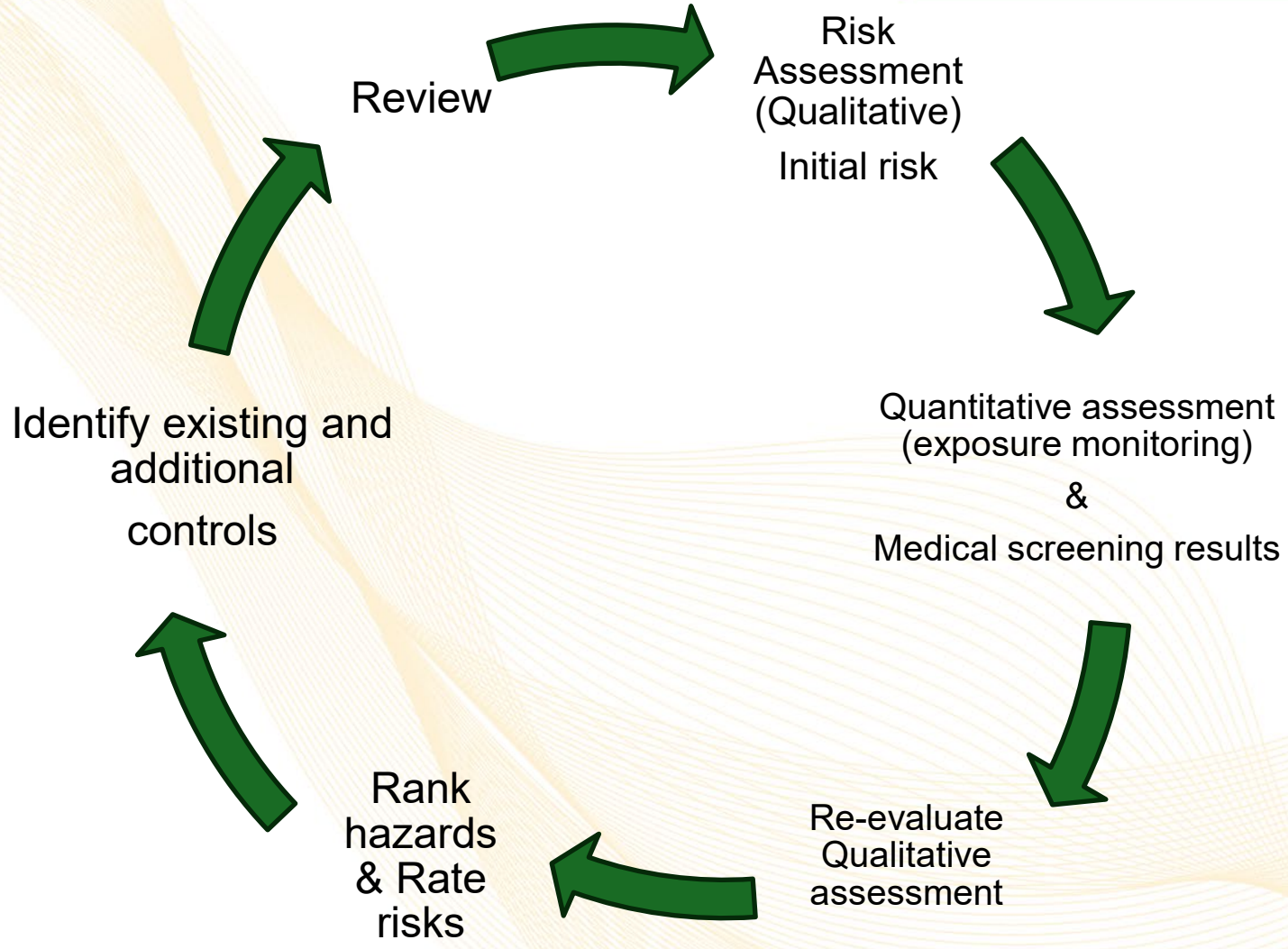
The fact of experiencing something or being affected by it because of being in a **particular situation** or **place**

Assessing Exposure



Assessing Exposure

- Assessment = Subjective but informed decision on the level of risk
- This requires:
    - Full information
    - **Competent Person**
- Assessment is not the same as ‘measurement’ or ‘monitoring’
- Measurements can contribute to an assessment

Assessing Exposure

- It may be necessary to obtain some monitoring data
- The aim is to assist in ensuring the health protection of employees
  - Sampling strategy adopted should be appropriate to the reason for the type of survey to be conducted
  - Justify: instrumentation, methodology, results, recommendations

Assessing Exposure

- Where the assessment indicates a risk to health, it is necessary to specify the steps to be taken to achieve effective control
- This is an important, integral part of the assessment, which is **NOT** deemed to have been completed without this aspect being addressed

"The goal is good control"

Assessing Exposure

- Record the Assessment:
  - Demonstrates compliance
  - Helps with the assessment process
  - Helps drive the actions
  - Helps the review process

Assessing Exposure

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- Carry out actions:
  - It is important to ensure that recommendations from any assessment are implemented properly
  - Many assessments fail to control exposure because the actions are **not implemented**

Assessing Exposure

- Initial assessment not relevant forever
- Periodic re-assessments undertaken regularly and whenever it is suspected that the assessment is no longer valid
    - Significant changes to:
        - The substances/agents involved and/or their sources
        - The plant, e.g. modified engineering control
        - The process or method of work
        - The volume or rate of production

Assessing Exposure

- Adverse results from:
  - Personal exposure monitoring
  - Health surveillance monitoring (e.g. lung function, audiometry, biological monitoring)
  - Monitoring of process control (e.g. fugitive emissions)
- Cases of occupational disease
- New information i.e. TiO_2 reclassification, SiO_2 lowering of OEL

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4. Assessing Exposure: Quantification

Quantifying exposures

to **measure** or **judge the size** or **amount** of something

- Instrumentation reliability
- Repeatability of measurement
- Traceability
- Conformance
- Ability to be calibrated

Quantifying exposures

- Measurement uncertainty
  - Measurement uncertainty is a parameter associated with the results of a measurement that defines the spread of the values that may reasonably be assigned to the measured magnitude. Therefore, **when any measurement device is used, it is important to know the uncertainty** that the device will produce so that it can be included in the results

Quantifying exposures

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- EMF measurement uncertainty for example:
  - Frequency deviation
  - Linearity error
  - Anisotropy
  - Calibration uncertainty
  - Resolution
  - Repeatability
  - Temperature deviation

Quantifying exposures

Calculating measurement uncertainty is explained in the document GUM (Guide to the Expression of the Uncertainty in Measurement)

$$Em = Eact + \Sigma\, \partial j$$

- Where
- *Eact = Actual electric field strength*
- *Em = Measured electric field strength*
- *∂j = Contribution of source of uncertainty j*

EMF Risk?

Quantifying exposures

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5. Stay Healthy!