Buildings as first lever of environmental medicine

Suzanne DÉOUX

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HEALTHY BUILDINGS DAY
Buildings, first human environment

- by its proximity
- by the time spent

On average, a day

- 20 h in confined spaces
- 16 h at home
- 9.30 h in the bedroom

Source: OQAI. National French Campaign Housing
Indoor air, first contribution to human exposures

Source: Jan Sundell
How does the building influence health?

physical
psychic
social

HEALTH
Air, key figures

- AIR
- 3 minutes without breathing
- 3 days without drinking
- 30 days without eating
- 100% of the time
- 15 000 l/d
- 6 l/minute
- Whole blood volume goes into lungs: 1 min, 5 L blood
- Birth: 50 millions
- 2 years: 300 millions
- Lungs: 75 m²
Odors

Performance loss

Infections

Irritations

Inflammations

Allergies & asthma

Cancers

Headache, dizziness, fatigue

Cardiovascular diseases

CO Intoxication

Endocrine disruption Reprotoxicity

Various disorders
Weell-being
Reduced socioeconomic costs
Less influenza, allergies, infections
Lower absenteeism
Performance increase
Reduced Sick Building Syndrome

Well-being at home, at school, in the office

11 November 2019
HEALTHY BUILDINGS DAY 2019
Daylight benefits

**NATURAL LIGHT**

**VISUAL EFFECTS**
- Visibility
- Activity
- Colors
- Security

**NON VISUAL EFFECTS**
- Circadian rhythms
- Hormones *melatonin*/*cortisol*
- Behaviors *mood*/*vigilance*
- Aesthetic pleasure

**ÉCONOMIE**
- Installation
- Maintenance
- Energy
- Environment

**ARCHITECTURE**
- Form
- Composition
- Style
- Codes and standards

Modified from J. Veitch, 1998, NTC Canada and T. Govén et al. Sweden
The challenges to overcome?

Favour a global building design approach... for human well-being.
The challenges to overcome?

Favour a global approach in regulations... for human well-being

Circular economy

& health

& health in the loop
Thank you for your attention

s.deoux@medieco.fr
What are the easiest ways to make a building healthier?

Good practices

- **Building enveloppe that creates good daylight environments**
  daylight, transparence, fluidity of spaces – to favour daylight penetration essential for our biorhythms, meetings between buildings occupants, and communication

- **Active Design**: bring daylight into staircases, corridors, all circulation areas to boost physical activity, exchanges in a warm atmosphere

- **Reduce air pollution sources**
  Outdoor air filtration, reduce radon transfer, choose building and decoration components with low emission of pollutants

- **Ensure efficient air renewal conditions**
  - At building delivery, 68% of mechanical ventilation systems of individual houses do not comply with the regulation
  - 10-15mn windows opening cause CO₂ levels to drop by 50% and VOC content to be divided by 4 after a polluted activity.

(CETE 2012. JOBERT R. Analyse qualitative et technique des dysfonctionnements.)