POSTER #18

International Biosafety Guidelines as baseline for multiple risk management in forensics institutions.

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Objectives: To adopt the biosafety guidelines proposed by World Health Organization on the conception and management of forensics facilities due to the lack of an specific international framework. *bioseguridadmj@csjn.gov.ar

Introduction:

Forensics sciences represent the concourse of different sources of a multitude of dangers which after being identified and weighted deploying a set of significative threats to the subjects involved in the criminalistic investigation, the population and the criminal evidence itself. Due to the lack of international guidelines for the conception of facilities dedicated to forensics sciences, each significative danger has to be mitigated either over the people exposed, the evidence or the environment, the common factor to do so, is the consideration of biological risk as something highly prevalent for forensics evidence, and with this in mind, prescriptions from World Health Organization for biosafety and biocontainment allow us to draw a baseline, from which each relevant risk different to biological must be considered an added to the conception for the design of new facilities or the upgrade of existing buildings.

Method:

During the determination of the mitigation method for each relevant risk identified in the forensics work, we performed a matrix over the basis of the management for biological risk described as Biosafety Level 2 (BSL2) in the 3rd edition WHO Laboratory Biosafety Manual, adding specific countermeasures to each source of danger identified, as depicted in Table 1.

Table 1 Mitigation for each source of danger in forensic activity

Area / RISK	Physical	Chemical		Biological		Radiation	
	Activity	**Activity involved**	**Containment or Mitigation Technology or media (PPE other than adequate garment)**	**Activity involved**	**Containment or Mitigation Technology (PPE other than adequate garment)**	**Activity involved**	**Containment or Mitigation Technology**
Toxicology and legal chemestry	Concealment methods opening maneuvers. Sharps and puncture	Storage and handling of VOC -Acids-Bases-Abuse drugs.	•ANSI/AIHA 9.5 •Fume hoods, •Point extraction devices •42CFR84 Certified Respirator +chemical adsorption filter	Sample extraction and handling Aerosols Splashes Sharps	•Class II B2 Biosafety Cabinets NSF 49 certified •42CFR84 Certified Respirator •Sharps container	UV en análisis Thin Layer Chromatography	UV protection googles or desktop screens ANSI Z87.1 or EN166 certified
Clinical Biochemestry	NO	Storage and handling acids and bases, carcinogenic substances	ANSI/AIHA 9.5 Added to biological risk	Sample extraction and handling Aerosols Splashes Sharps	•Class II Biosafety Cabinets A2 NSF 49 certified •Sharps container	UV exposure during spot analysis	UV protection googles or desktop screens ANSI Z87.1 or EN166 certified
Histopathology	Goods and evidence handling (formalin fixed reserve material) Gross dissection Microtome knives	Storage and handling of VOC Formaldehyde dilution and handling Carcinogenic colorants	ANSI/AIHA 9.5 Point extraction devices Back & downdraft Pathology workstations + Bio-risk Respirator +chemical adsorption filter	Gross dissection Aerosols Splashes Sharps	•Class II B2 Biosafety Cabinets NSF 49 certified OR •Back & downdraft Pathology workstations + 42CFR84 Certified Respirator +chemical adsorption filter •Sharps container •Eye protection.	No	No
Coroners	Body lifting. Autopsy procedures	Formaldehyde solution	ANSI/AIHA 9.5 Bio-risk Respirator +chemical adsorption filter based on risk assessment	Autopsy procedures Aerosols Splashes Sharps	•42CFR84 Certified Respirator •Sharps container •Eye protection.	RX	X ray lead room shield
Radiology	Body and evidence lifting.	Developing chemicals	ANSI/AIHA 9.5	Body handling Aerosols Splashes	•42CFR84 Certified Respirator +chemical adsorption filter based on risk assessment •Eye protection.	X Rays	X ray lead room shield
Antropology	Aerosol generation during bone sawing	No	ANSI/AIHA 9.5 Point extraction devices	Aerosols	•42CFR84 Certified Respirator •Eye protection.	No	No
Manteinance	Goods and equipment handling and fixing. Ergonometric effort analysis Machinery risk detection program	Acids Oleous mists Phenolic vapors from recycled wood coffins construction VOC	Room : Local exhaust for welding and painting Personnel: Appropriate PPE	Aerosols Splashes in cold rooms and sewage system repairment	•42CFR84 certified Respirator	Exposure to UV during arc welding	Face shield ANSI Z87.1 Certified.

Constructive considerations

HVAC: A very sensitive aspect for the conception of forensics buildings is odor management, this will impact directly on the community perception and social component of environmental impact, this can be avoided by using odor control technologies as Activated Carbon.

100% fresh air is mandatory in terms of removal of contaminants from work space.

Constitutive elements and sealing technologies for the ductwork must prevent damage by corrosive and harsh environments not only under vapor phases but also for different condensates that may form within the system.

For those BSL3 Autopsy room, besides all redundancy to warrant continuous operation, exhaust units will be provided with tandem HEPA filtration since there is no primary containment device for those aerosols created during an highly infectious autopsy.

Sewage: The normal cleaning of the autopsy tables generate a high lipid content liquid waste with the risk of clogging the piping, that can be avoided by using chemical detersive additives and thermal jacketing, all the way down to the liquid waste treatment plant

Flooring: The choice process for the correct floor should include the avoidance of chemical adsorption for substances commonly used for toxicological research and histopathology, cementitious, epoxidic or synthetic seamless laminated flooring with the less mineral load possible is preferable.

Furniture: Such as for the flooring selection, chemical adsorption should be considered, avoiding wood, or wood derivates. Handles, hinges and locks should be also corrosion resistant

Special considerations.

BMS: Building management systems will be able to handle each relevant aspect of the facility, such as HVAC, Engineering alarms, Sewage controls, Access and security concerns as those dealing with chain of custody for criminal evidence.

Conclusion: This sort of working scenario mixes up considerations learned from sanitary engineering, architecture, chemical higiene and safety, odor control from industry and other fields of hazardous work environments.

International guidelines or concensus should be discussed and established to delineate the bases for design and improvement of this kind of buildings.