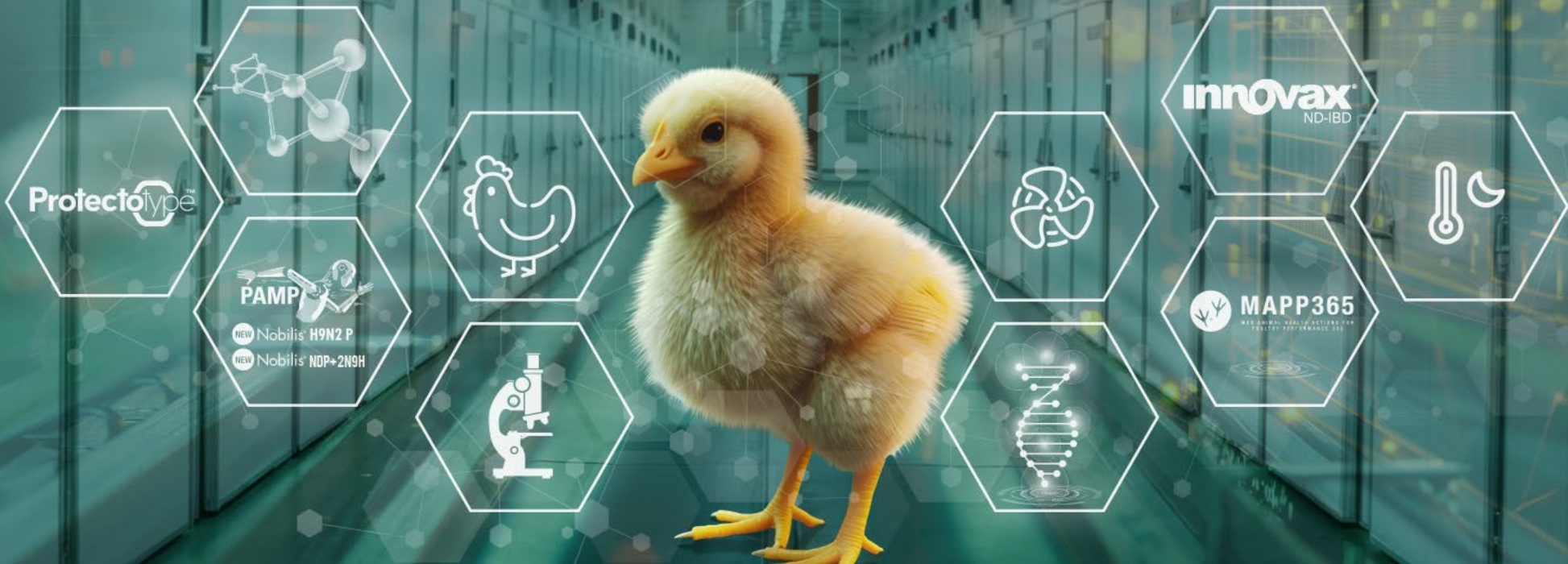




# HATCHERY ACADEMY

Excellent Hatchery Practice

# NEW ERA FOR HATCHERIES





# Tips on Biosecurity in Hatchery

**Dr. Hazem Darwish**  
**Technical & Marketing Manager**  
**Egypt**





# Agenda

- ❑ Why biosecurity is important in the hatchery industry
- ❑ Bacteria Often Found within the Hatchery
- ❑ Hatchery Contamination Sources
- ❑ Disinfectants efficacy
- ❑ Disinfectants Spectrum
- ❑ Disinfectants amount
- ❑ Biosecurity checklist.



# Why biosecurity is important in the hatchery industry





## Why biosecurity is important in the hatchery industry

### Your profit starts on the breeding farm

❑ Egg handling through the supply chain, from farm to hatchery is one of the most important procedures for the hatching industry. Biosecurity, gentle egg handling and correct packing will determine your egg hatchability, chick health, broiler or layer productivity and efficiency of your business.

❑ Everything starts with biosecurity.

Establishing strict rules and practices, such as restricted staff and vehicles entry, sanitizing before entering houses, clean nests, eliminating wild birds entering the houses, establish a pest control program, locate biosecurity clear signs around the critical areas, trained personal and minimize the number of people to be in touch with the eggs, will lead to better performance of your business.





## Why biosecurity is important in the hatchery industry

### Your profit starts on the breeding farm

- ❑ Always keeping in mind, that “less” people handling eggs will ensure “less” opportunities for contamination of your product, While packing fertile eggs, biosecurity is vital too, there is not room for dirty eggs in a hatchery, eggs are your big investment, and every rejected egg will have economic impact on your business.





## Develop a biosecurity mindset at the hatchery

In successful hatchery operations, everything starts with biosecurity.

There are procedures and protocols that need to be followed. But, in fact, biosecurity is more than that. It is a mindset, not just a series of actions. Fostering a biosecurity culture is important to its long-term success. Every employee in the hatchery needs to understand why strong biosecurity procedures are critical to the hatchery's success. When hatchery staff members know the underlying importance, they are likely to be more engaged in how they can take specific actions. The recent, widespread COVID-19 pandemic has all helped us to understand this better: it is about the determination to do the right thing in order to protect people, livestock, etc.





To establish an efficient and effective biosecurity procedure, it makes sense to invest in the highest risks that are within your control. For this reason, we will look at five **vectors that can bring pathogens into your operations**.

Once you know what the vectors – or risk factors – are, you can take appropriate measures to limit the chance of introduction into your hatchery:

- Air
- Incoming eggs
- People
- Water
- Other animals



# Bacteria Often Found within the Hatchery

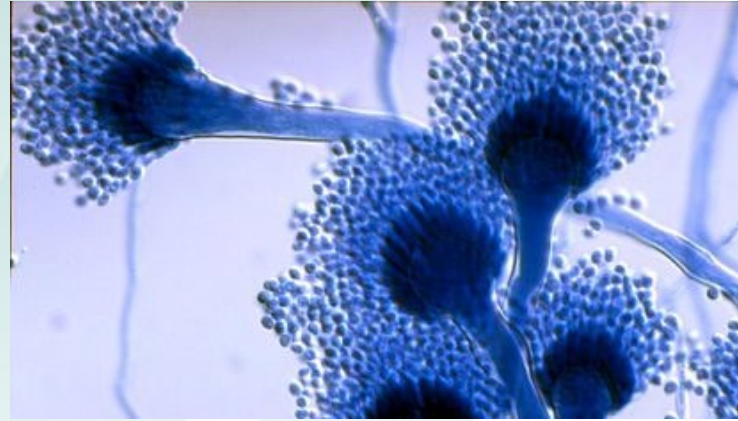




# Bacteria Often Found within the Hatchery



**Pseudomonas** -  
high early mortality rates in chicks.



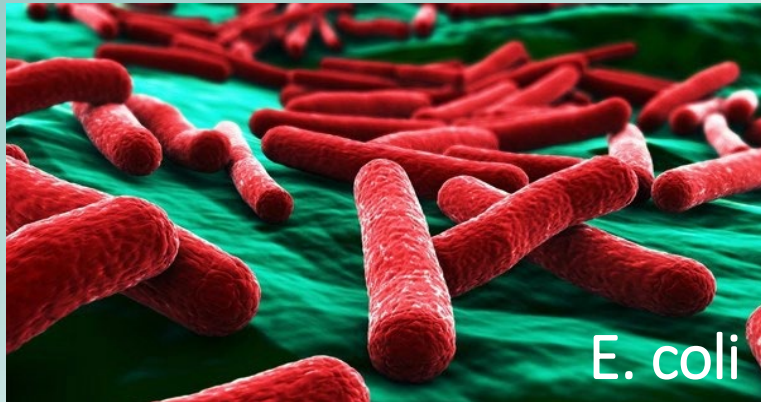
**Aspergillus** - a fungal infectious disease, in which the typical sign is gasping for breath, especially in young chicks

**Klebsiella** - Baby chicks up to two weeks of age are most susceptible to infection





# Bacteria Often Found with in the Hatchery



The *E. coli* is a natural inhabitant of the gut in *poultry*. Normally, it is kept in check by other bacterium, but if large colonies form it can cause severe discomfort, illness, and mortality.



**Streptococcus** opportunistic infections leading to acute and chronic conditions in affected birds.



*S. aureus* is worldwide. Early mortality 0-15%. Infection is usually by the respiratory route

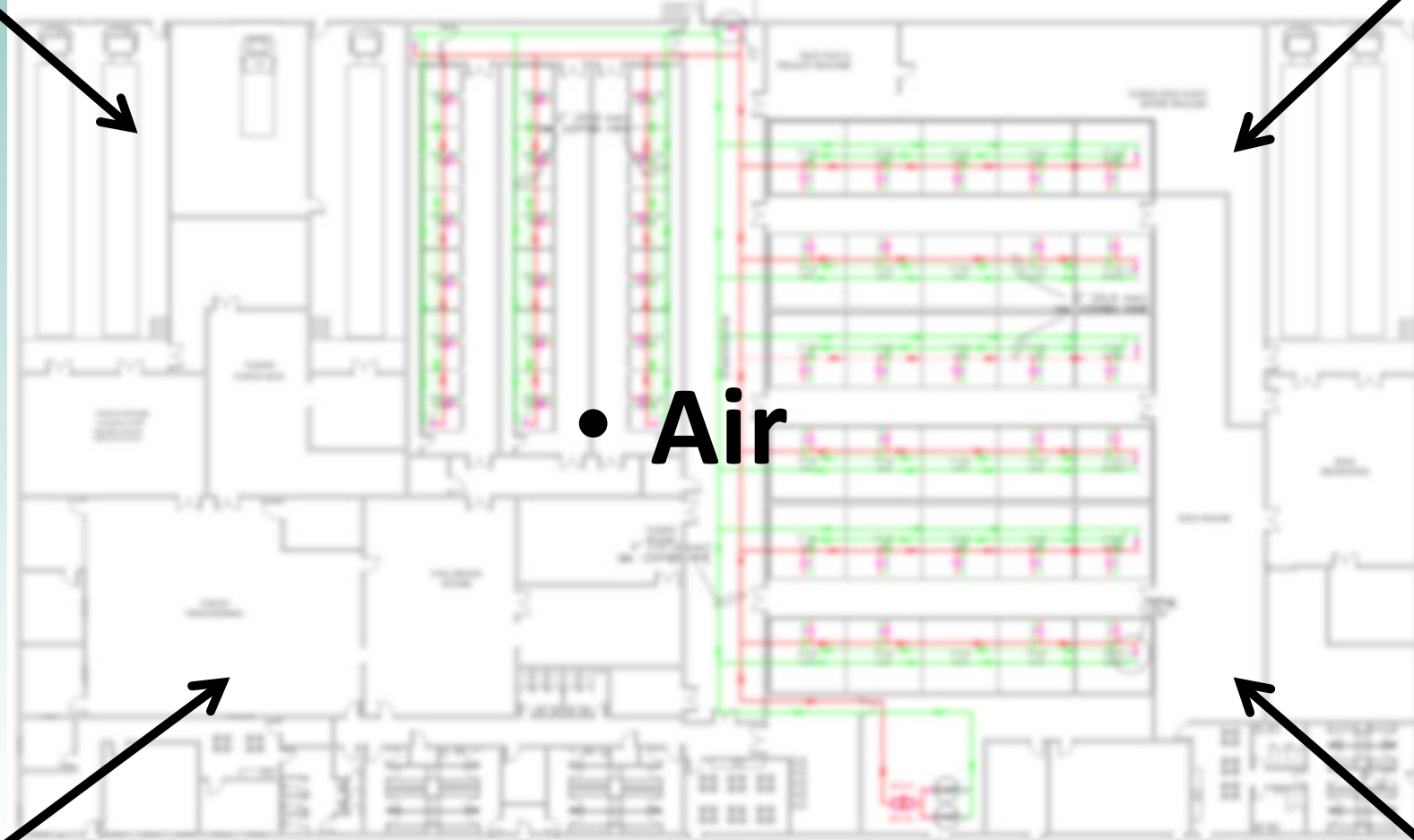


# Hatchery Contamination Sources





# Hatchery Contamination Sources





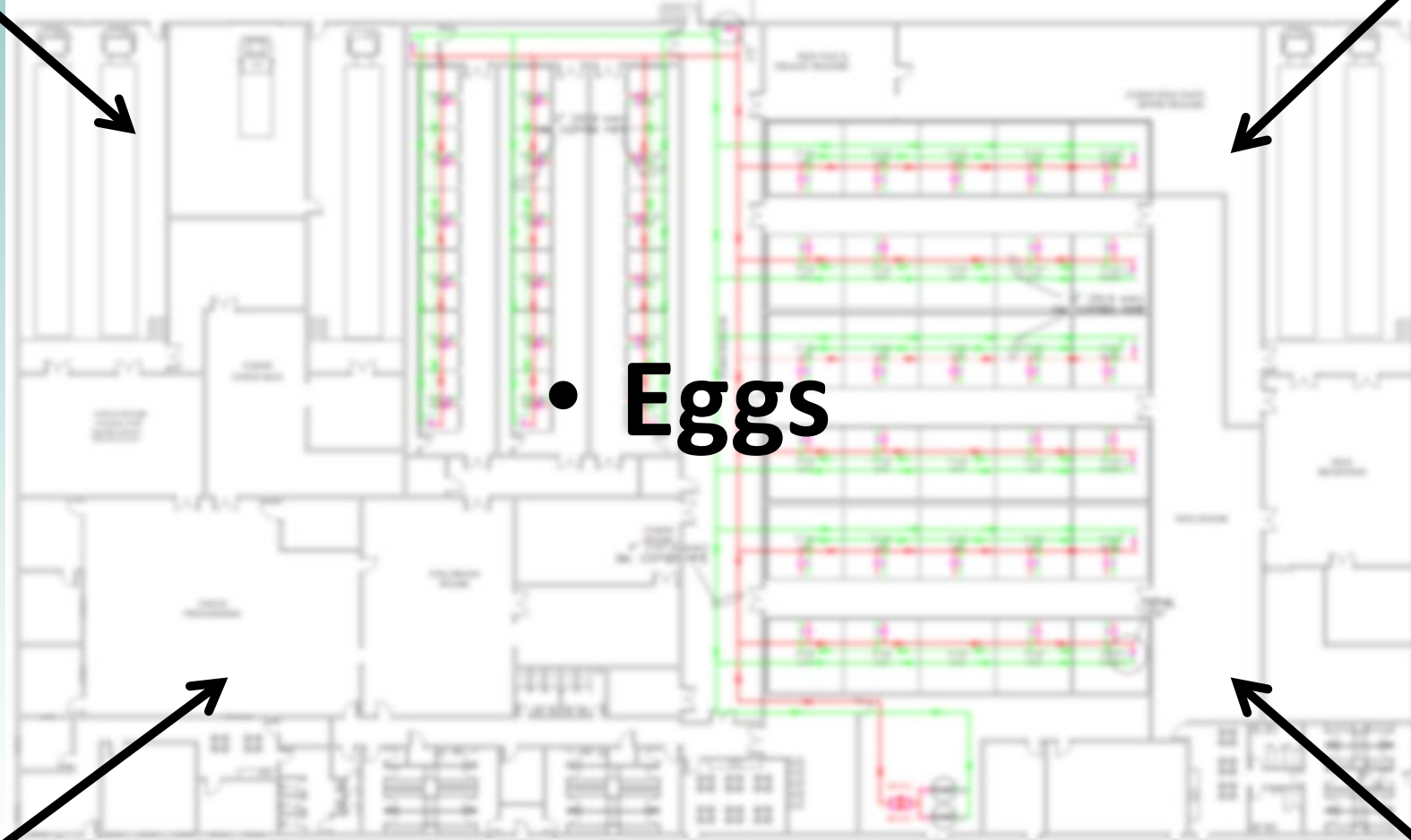
# Airborne Contamination

- Improper air flow within hatchery
  - Room pressures
  - Air flow from dirty to clean
  - Rooms open to outside
  - Dirty supply and return filters
  - Rooftop Units not operating
  - Poor design





# Hatchery Contamination Sources



• Eggs





# Egg Contamination

- Dirty eggs
  - Floor eggs
  - Dirty nest material
  - Cracks





# Egg Contamination

- **Freshly laid** 300+
- **Clean** 3,000+
- **Soiled** 26,000+
- **Very Dirty** 400,000+





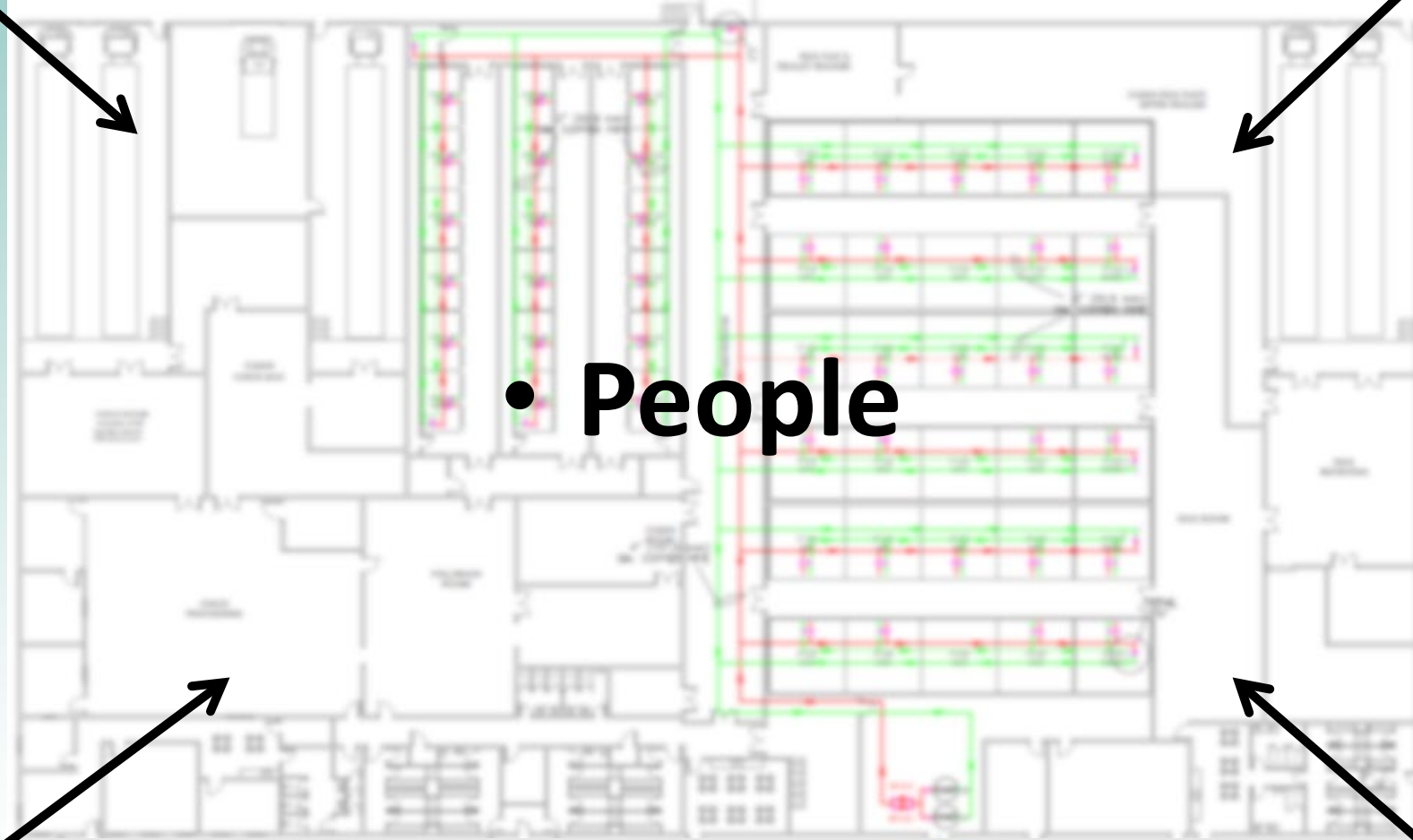
# Egg Handling / Transportation

- Hatchery fumigation
  - Incorrect sanitation or fumigation practices
  - Poor egg room sanitation
- Setting procedures
  - Sweating eggs prior to setting into incubator
  - Broken eggs





# Hatchery Contamination Sources





# People

- **Movement**
- **Documentation – Training - SOP**
- **Clothing**
- **Shower**
- **Staff crossing from clean to dirty areas**
- **Staff access to vectors of contamination**
  - **Pet Birds**
  - **Waterfowl**
  - **Spouse**





Visitor control



Withdrawal from Poultry



Protective Clothing



Shower In/Shower Out



Foot Baths



Truck Wash



Equipment sanitation

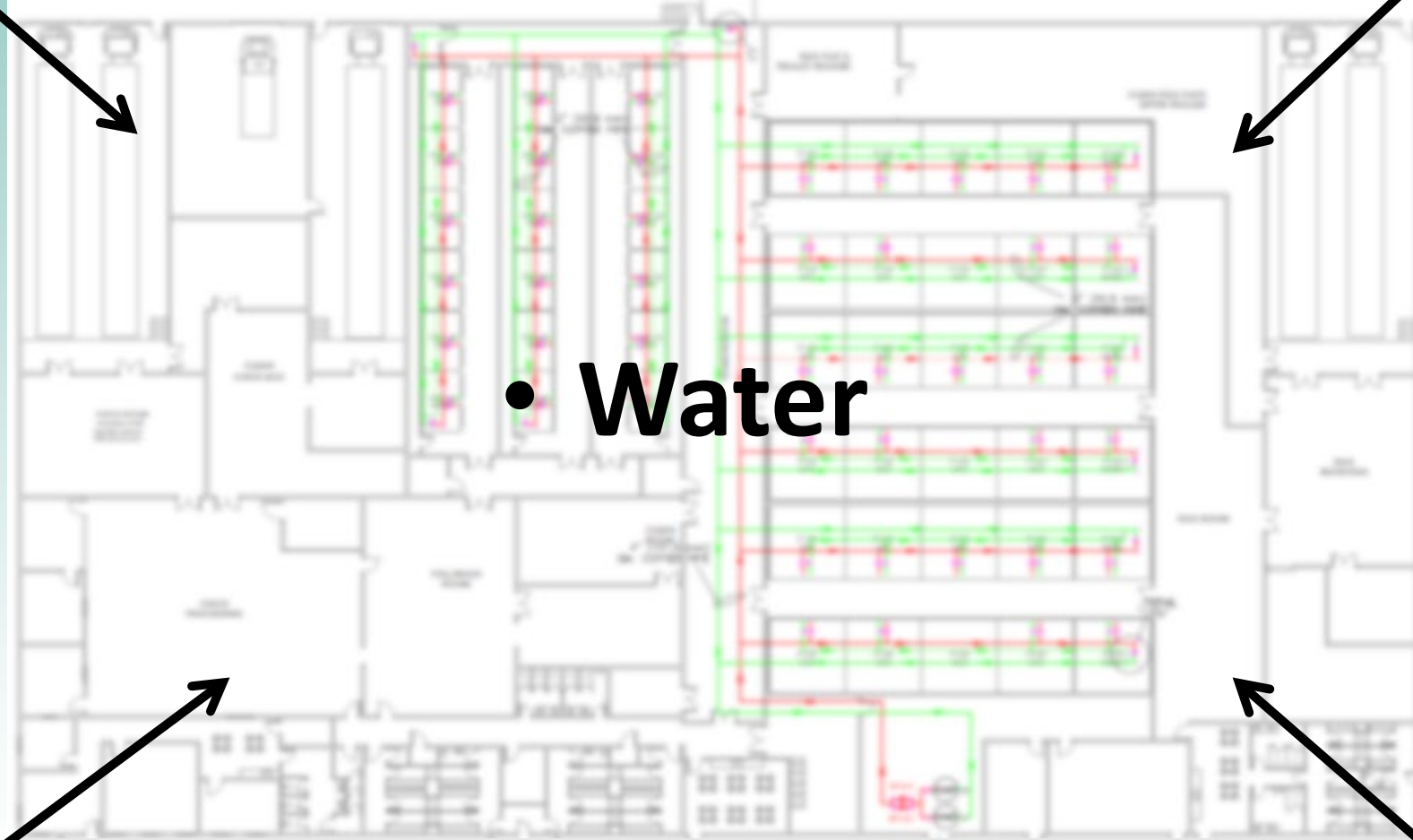


Hand washing





# Hatchery Contamination Sources





# Hatchery Water

- Water Supply
- Humidity Spray

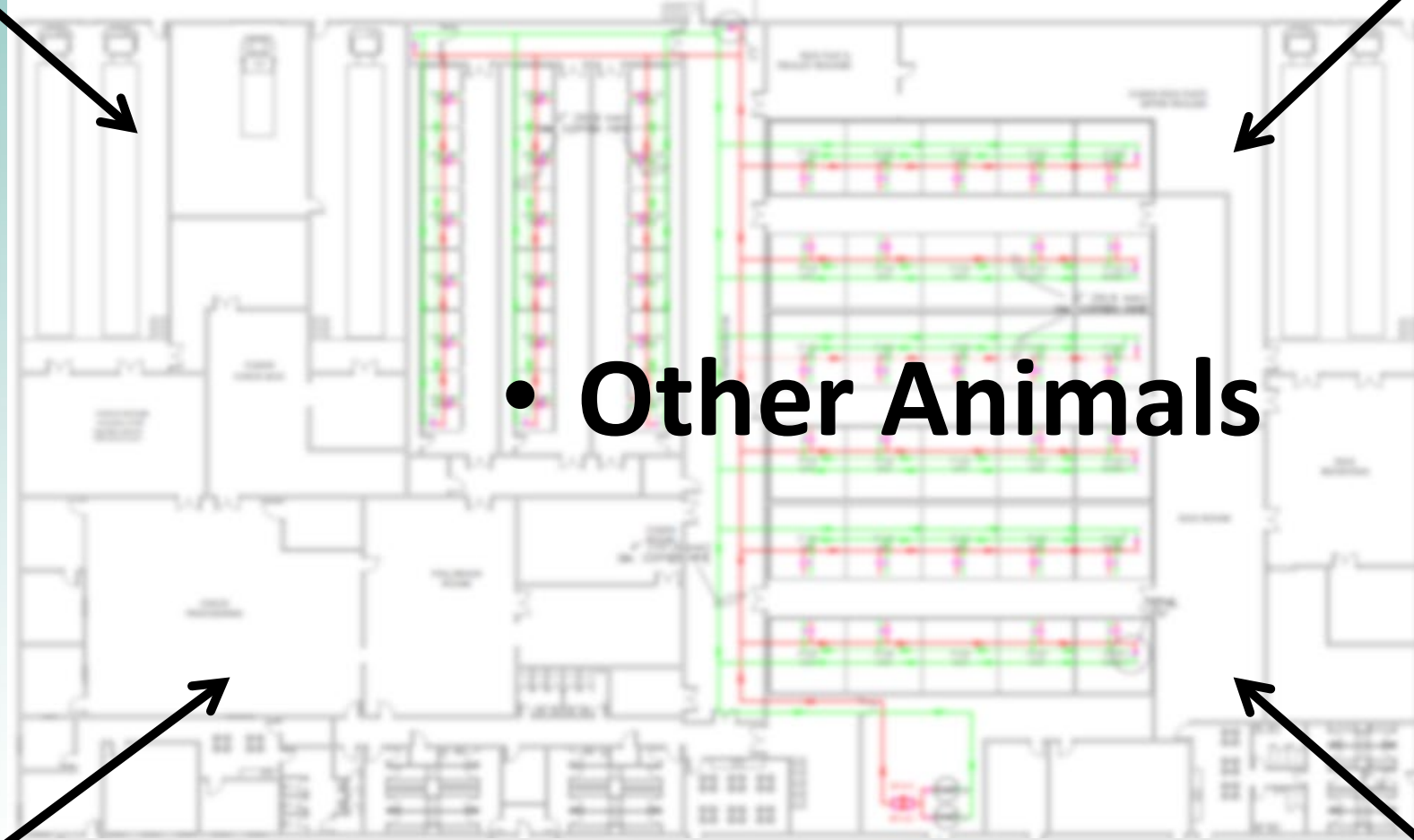
Water purification using Chlorine has been accepted as method of choice.

There are other choices for treating water.





# Hatchery Contamination Sources



• **Other Animals**





All other animals (apart from avian species) also form a risk of disease introduction. Fortunately, most of these animals can easily be prevented from entering. The greatest threats are rodents and wild birds:

- Maintain an effective rodent combat program: keep potential food sources in plastic boxes (not cardboard) and place rodent bait stations on the outside, as well as on the inside of the hatchery.
- Keep wild birds out by putting up netting.





## International Hatchery Practice Says...

**“Too much emphasis is placed on disinfectants and sanitizers and not enough on the overall approach to hygiene. The significance and importance of preparation and cleaning are often under estimated.”**

**Some things still just take plain old elbow grease to get clean!!!**





# How Can We Measure Cleanliness?

## 1. Visibly Clean

- Supervisor/manager must check constantly and have unsatisfactory results corrected.  
**INSPECT WHAT YOU EXPECT!**

## 2. Microbiologically Clean

- Monitor (direct contact swabs & air plates) to measure, maintain and improve hygiene
- Variety of testing methods available
- Reporting





# Comparing Single-Stage vs. Multi-Stage

- **Multi-Stage**

- Multiple sets
- Normal to clean 1-2 times/year with eggs present unless emptied
- Greater risk of disease transmission
- Should disease be present, multiple sets affected (3-6 weeks production)

- **Single-Stage**

- One set: all in, all out
- Cleaned & sanitized every 18 days with no eggs present
- Eliminates risk of disease residue
- Should disease be present, 1 batch of eggs affected

**Which is better for Biosecurity?**



# Disinfectants efficacy





# Pakistan Veterinary Journal

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## RESEARCH ARTICLE

### Evaluating the Bactericidal Activity of Various Disinfectants against *Pseudomonas aeruginosa* Contamination in Broiler Chicken Hatcheries

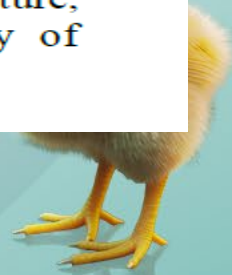
Hazem M. Ibrahim<sup>1</sup>, Heba M. Salem<sup>2,3</sup>, Soha A. Alamoudi<sup>4</sup>, Nawal Al-Hoshani<sup>5</sup>, Abdullah M. Alkahtani<sup>6</sup>, Naheda M. Alshammari<sup>7</sup>, Lamaia R. Altarjami<sup>8</sup>, Eman A. Beyari<sup>7</sup>, Mohamed T. El- Saadony<sup>9\*</sup>, and Hanan S. Khalefa<sup>10</sup>

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**Table 3:** The disinfectants used for in vitro testing efficacy against virulent strains of *P. aeruginosa* isolated from the hatchery. were classified according to their active compounds and concentration recommendations

Active compound	Disinfectant	Producer country	Composition	Concentration
Aldehyde & quaternary ammonium compounds	A	Hungary	Glutaldehyde 150 gm.-QACs 100gm- Draymarin Brilliant Blue	0.5%
	B	England	0.4gm- Nrinrazine 0.3gm-Azorobin 0.3gm	
Acidic compound	C	England	Glutaldehyde 15% - QACs 10%	0.5%
	D	Egypt	Phosphoric acid 10%- Sulfonic acid 30% - chlorinated phenols 40%	0.4%
Iodine	E	England	Orthophosphoric acid 60% - Formic acid 10%	1%
	F	USA	Iodine 5% -Phosphoric acid 14%- Alcohol ethoxylate 24%	0.25%
Peracetic acid-hydrogen peroxide	G	Belgium	1.75% titratable iodine	0.4%
			The stabilized mixture of Peracetic acid-hydrogen peroxide -organic acids- wetting agents -belong term stabilizer	2%
Ethoxylated Alcohol	H	Egypt	Sodium Hydroxide N-oxide amine Ethoxylated Alcohol	1.7%
Sodium Dichloroisocyanurate 15	I	Ireland.	2.5 gm DiChloro Iso Cyanurates 62% in form of tablet	1/15 l
	J	England	Potassium Persulfate 50% + sodium dichloroisocyanurate NaDCC	0.5%
			2.5%	





**Table 8:** The Efficacy of ten different disinfectants belong to six different chemical groups at various contact times of 10, 30, and 60 minutes against a virulent strain of *Pseudomonas aeruginosa* (titer of  $1.5 \times 10^8$  /ml) isolated from studied poultry hatchery

The used disinfectants	Concentration	Presence organic matter						Absence organic matter						
		10 min		30 min		60 min		10 min		30 min		60 min		
		Count	R %	Count	R %	Count	R %	Count	R %	Count	R %	Count	R %	
1	A	0.5%	–	100	–	100	–	100	–	100	–	100	–	100
2	B	0.5%	$3 \times 10^6$	98	–	100	–	100	$5.3 \times 10^5$	99.6	–	100	–	100
3	C	0.4%	$2 \times 10^6$	98.6	–	100	–	100	–	100	–	100	–	100
4	D	1%	–	100	–	100	–	100	–	100	–	100	–	100
5	E	0.25%	–	100	–	100	–	100	–	100	–	100	–	100
6	F	0.4%	$9 \times 10^6$	94	$3.5 \times 10^6$	97.6	–	100	–	100	–	100	–	100
7	G	2%	–	100	–	100	–	100	–	100	–	100	–	100
8	H	1.7%	$3 \times 10^7$	80	$22 \times 10^6$	85.33	$45 \times 10^5$	97	$21 \times 10^6$	86	$12 \times 10^6$	92	$2 \times 10^6$	98.66
9	I	1/15 l	–	100	–	100	–	100	–	100	–	100	–	100
10	J	0.5%	–	100	–	100	–	100	–	100	–	100	–	100

R %: reduction percent



# Disinfectants Spectrum





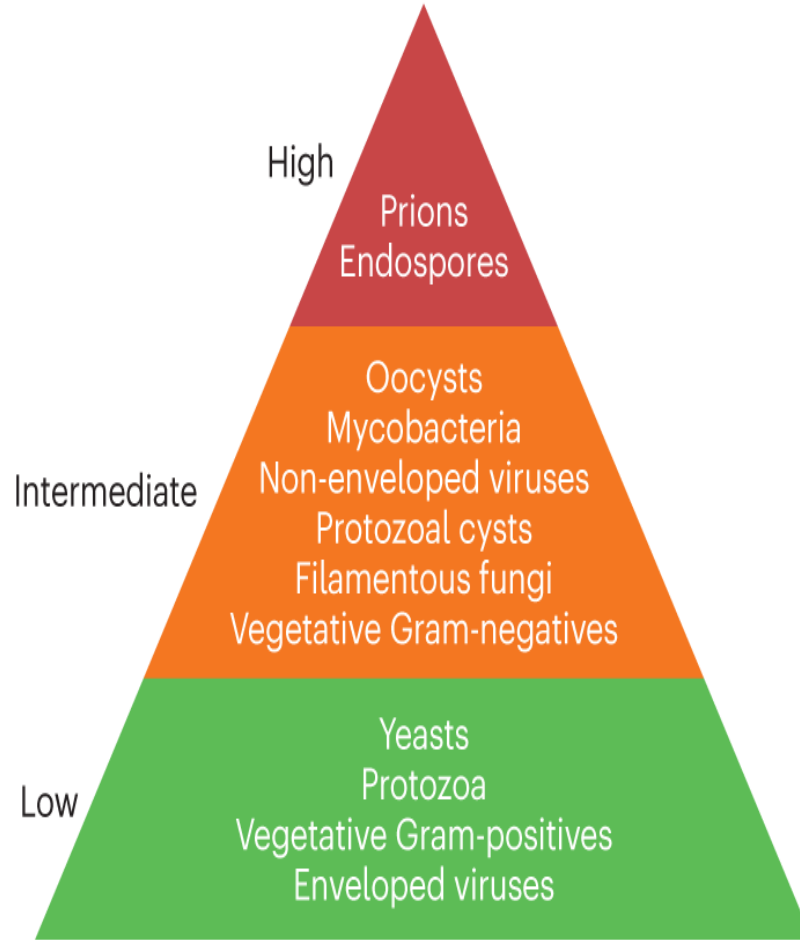
### Examples of bacteria

- *Bacillus subtilis* spores
- *Clostridioides difficile* spores
- *Mycobacterium chelonae* environmental isolates
- *Mycobacterium massiliense* environmental isolates

- *M. chelonae* standard culture collection
- *Pseudomonas aeruginosa*
- *Staphylococcus aureus* environmental isolates

- *B. subtilis* (vegetative)
- *S. aureus* standard culture collection

### Most resistant to chemical biocides



### Examples of biocides

- Ethylene oxide (sterilant)
- Peracetic acid
- ClO<sub>2</sub>
- Hydrogen peroxide
- Aldehydes
- Sodium hypochlorite

- Povidone-iodine
- Phenolics
- Complex QAC formulations
- Biguanides-based formulations

- 70% IPA/ethanol
- Simple QAC solutions
- Simple biguanide solutions
- Antimicrobial dyes





# The Antimicrobial Spectrum of Disinfectants

Chemical Disinfectants

Note: Removal of organic material must always precede the use of any disinfectant.

susceptibility of microorganisms to chemical disinfectants	Chemical Disinfectants									
	Acids (hydrochloric acid, acetic acid, citric acid)	Alcohols (ethyl alcohol, isopropyl alcohol)	Aldehydes (formaldehyde, paraformaldehyde, glutaraldehyde)	Alkalis (sodium or ammonium hydroxide, sodium carbonate)	Biguanides (chlorhexidine, Nolvasan, Chlorhex, Virisan, Hibistar)	Halogens hypochlorite	iodine	Oxidizing Agents (hydrogen peroxide, peroxyacetic acid, Trifectant, Virkon-S, Oxy-Sept 333)	Phenolic Compounds (Lysol, Oxy, Amphyl, TekTrol, Pheno-Tek II)	Quaternary Ammonium Compounds (Roccat, Zepharin, DiQuat, Parvosol, D-256)
most susceptible										
mycoplasmas	+	++	++	++	++	++	++	++	++	+
gram-positive bacteria	+	++	++	+	++	+	+	+	++	++
gram-negative bacteria	+	++	++	+	++	+	+	+	++	+
pseudomonads	+	++	++	+	+	+	+	+	++	-
rickettsiae	+	+	+	+	+	+	+	+	+	+
enveloped viruses	+	+	++	+	+	+	+	+	+	+
chlamydiae	+	+	+	+	+	+	+	+	+	-
non-enveloped viruses	-	-	+	+	-	+	+	+	-	-
fungal spores	+	+	+	+	+	+	+	+	+	+
picornaviruses (i.e. FMD)	+	N	+	+	N	N	N	+	N	N
parvoviruses	N	N	+	N	N	+	N	+	N	-
acid-fast bacteria	-	+	+	+	-	+	+	+	+	-
bacterial spores	+	-	+	+	-	+	+	+	-	-
coccidia	-	-	-	+	-	-	-	-	+	-
prions	-	-	-	-	-	-	-	-	-	-
most resistant										

LEGEND

- ++ highly effective
- + effective
- limited activity
- no activity
- N information not available

a-varies with composition  
b-peracetic acid is sporicidal  
c-ammonium hydroxide  
d-some have activity against coccidia

DISCLAIMER: The use of trade names does not in any way signify endorsement of a particular product. For additional product names, please consult the most recent Compendium of Veterinary Products. ADAPTED FROM: Linton AH, Hugo WB, Russel AD. Disinfection in Veterinary and Farm Practice. 1987. Blackwell Scientific Publications; Oxford, England; Quinn PJ, Markey BK. Disinfection and Disease Prevention in Veterinary Medicine, In: Block SS, ed., Disinfection, Sterilization and Preservation. 5th edition. 2001. Lippincott, Williams and Wilkins: Philadelphia.

the Center for Food Security & Public Health  
IOWA STATE UNIVERSITY\*  
www.cfsph.iastate.edu  
ASOD\_2010



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# Disinfectants amount





Amount of detergent & disinfectants used can be calculated as in table

Floor Area	Total Area to be treated	Volume of diluted product at 500ml/m <sup>2</sup>	Volume of disinfected at 1:100
500 m <sup>2</sup>	1250 m <sup>2</sup>	625 L	6.25 L
1000 m <sup>2</sup>	2500 m <sup>2</sup>	1250 L	12.5 L
1500 m <sup>2</sup>	3750 m <sup>2</sup>	1875 L	18.75 L



# Biosecurity checklist





## تقرير متابعة وتقييم عمليات الأمن الحيوي اليومية

ريخ اليوم :

م	البند	التقييم	المهندس المسؤل	ماتم رصده	الإجراء المتخذ
أولاً	البوابة الرئيسية لمعمل التفريخ				
1	نظافة المدخل الرئيسي				
2	تغيير المطهر بصورة دورية واستخدام التركيز المناسب				
3	رشاشات البوابة تعمل بكفاءة وتحت ضغط مناسب				
4	تطهير جميع السيارات الداخلة للمعمل بالمطهر المناسب				
6	نظافة رصيف المعمل				

م	البند	التقييم	المهندس المسؤل	ماتم رصده	الإجراء المتخذ
ثانياً	منطقة الشاورات ( امكانية الاختيار بين شاور A وشاور B )				
1	تغيير مطهر أحواض القدم بصفة دورية				
2	تواجد المطهر في خزائن الشاور				
3	نظافة الشاور من الداخل				
4	نظافة الحمامات الداخلية من الداخل				
5	نظافة الحوائط والأرضيات				
6	التأكيد على تشغيل ماكينة تطهير القدم واليد ونظافتها				
ثالثاً	صالة رص البيض				
1	نظافة رصيف تنزيل البيض				
2	نظافة الحوائط والأرضيات				
3	نظافة تراكيزات رص البيض				
4	تواجد مطهر الأيدي				
5	احكام إغلاق أبواب الصالة والثلاجات				
6	درجة حرارة الصالة من 17 إلى 19 درجة مئوية				
7	درجة رطوبة الصالة من 65 إلى 80 %				
8	نظافة المجارى والبلوعات وتطهيرها				
سادساً	صالة نقل البيض				
1	نظافة وتطهير ماكينة نقل البيض				
2	نظافة وتطهير ماكينة الحقن INOVO				
3	نظافة وتطهير الحوائط والأرضيات والسقف				
4	نظافة المجارى والبلوعات وتطهيرها				





مغسلة تروليات وتريهات البيض						سابعاً
					1	تم عملية غسل التروليات وتريهات البيض بالمهد المناسب و تحت ضغط
					2	إتمام عملية تطهير التروليات وتريهات البيض بالمطهر المناسب
					3	ترك التروليات وتريهات البيض حتى تمام الجفاف من الماء
					4	كفاءة عملية العسيل والتطهير للتروليات وتريهات البيض
					5	عسيل وتطهير المعسلة بعد الإنتهاء من العمل
					6	نظافة المجارى والبلوعات وتطهيرها
منطقة المقصات						ثامناً
					1	نظافة الصالات الرئيسية للمقصات
					2	نظافة الممرات الموجودة خلف المقصات لصالات المقصات
					3	عملية العسيل والتطهير للمقس
					4	تمام جفاف المقس بعد عملية العسيل والتطهير
					5	تواجد وتزويد أطقم التورماليين أثناء القس
					6	نظافة المجارى والبلوعات وتطهيرها

مغسلة الأقاص نقل الكتاكيت						الرابع عشر
					1	إتمام عملية عسيل الأقاص بالمهد المناسب و تحت ضغط
					2	سلامة عملية تطهير أقاص الكتاكيت بالمطهر المناسب
					3	تمام جفاف التروليات للمقس بعد عملية العسيل والتطهير
					4	عسيل وتطهير المعسلة بعد الإنتهاء من العمل
					5	نظافة المجارى والبلوعات وتطهيرها

صالة الفرز		عاشراً
	1	نظافة وتطهير الحواظ والأرضيات والأسقف
	2	نظافة وتطهير وشفافية مكينة فرم البيض
	3	نظافة وتطهير رصيف تحميل الكتاكيت ( غير موجودة بمعمل الجدود )
	4	نظافة وتطهير رصيف تحميل الفطس والفرزة ( غير موجودة بمعمل الجدود )
	5	نظافة المجارى والبلوعات وتطهيرها

مستوى الأداء	الدرجة	الوصف	الوقت	العملية
0	لا يتم	لا يتم طيئة العملية		
1	مت	يجب عمل تصحيح		
2	مقبول	يجب عمل تحسين		
3	جيد	البدء مطبق ويعتبر عمل تحسين		
4	ممتاز	البدء مطبق ولا يحتاج تحسين		

مغسلة تروليات المقصات	الثالث عشر	
	1	إتمام عملية غسل تروليات المقصات بالمهد المناسب و تحت ضغط
	2	سلامة عملية تطهير تروليات المقصات بالمطهر المناسب
	3	تمام جفاف التروليات للمقس بعد عملية العسيل والتطهير
	4	عسيل وتطهير المعسلة بعد الإنتهاء من العمل
	5	نظافة المجارى والبلوعات وتطهيرها

مجموع نقاط التقييم

نسبة التقييم = [مجموع نقاط التقييم / مجموع النقاط القياسي ] \* 100

توقيع مدير معمل التفريخ

توقيع مسئول الأمن الحيوى



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NEW Nobilis H9N2 P  
NEW Nobilis NDP+2N9H

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ND-IBD

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*Thank You...*