For premises owners and managers

### **INTEGRATED VECTOR MANAGEMENT (IVM)**

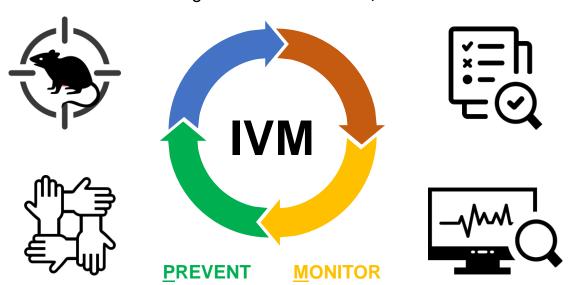
IVM should be a practical and sustainable plan that encompasses the coordination of efforts in rat prevention across stakeholders, with a robust system of surveillance and monitoring in place for early detection and swift action, coupled with regular reviews of current trends and measures. When prevention systems fail, control measures should be deployed, and eradication should be swift to contain any infestation from spreading.

### **CONTROL**

When thresholds are exceeded, control measures are implemented, with potential increase in bait deployment and chemical treatment, inspection for and eradication of nesting sites.

### **ASSESS**

Effectiveness of control measures are recorded and evaluated, gaps in control measures and threshold levels are reviewed. Identifying pests, identifying gaps in infrastructure and workflow processes.



Multi-disciplinary approach to prevention of pest intrusion, addressing gaps in infrastructure, workflow processes, and changing of attitudes and behaviour.

Monitoring trends, extent of infestation, regular inspection of high-risk areas such as food storage and equipment storage, as well as baits, traps, and other monitoring devices to ensure effectiveness, and to prevent rats that are caught from dying and rotting, causing further health and hygiene issues.



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### **COMMON PEST RODENTS**

### **Norway Rat**



- Tail length <u>shorter</u> than combined length of head and body
- Ears small, <u>would not</u>
   <u>cover eyes</u> when folded forwards and down
- Prefer living in burrows, nests in buildings and other man-made structures
- Generally wary of new objects

### **Roof Rat**



- Tail length <u>longer</u> than combined length of head and body
- Ears large, <u>can reach</u> <u>eyes</u> when folded forwards and down
- Prefer living in elevated areas, such as roofs, attics and trees
- Generally wary of new objects

### **House Mouse**



- Adults much smaller in overall size and lighter in weight
- Prefer living in warm dry areas, including homes and buildings
- Generally exhibits exploratory behaviour
- May be confused with young rat

### **Asian House Shrews**

- **NOT** a rodent
- Not known to be a disease vector
- Similar to size of House Mouse
- Long, sharp snout, tiny eyes and small ears
- Produces high-pitched squeaks for communication
- Prefer living in burrows, crevices, and other small, undisturbed spaces

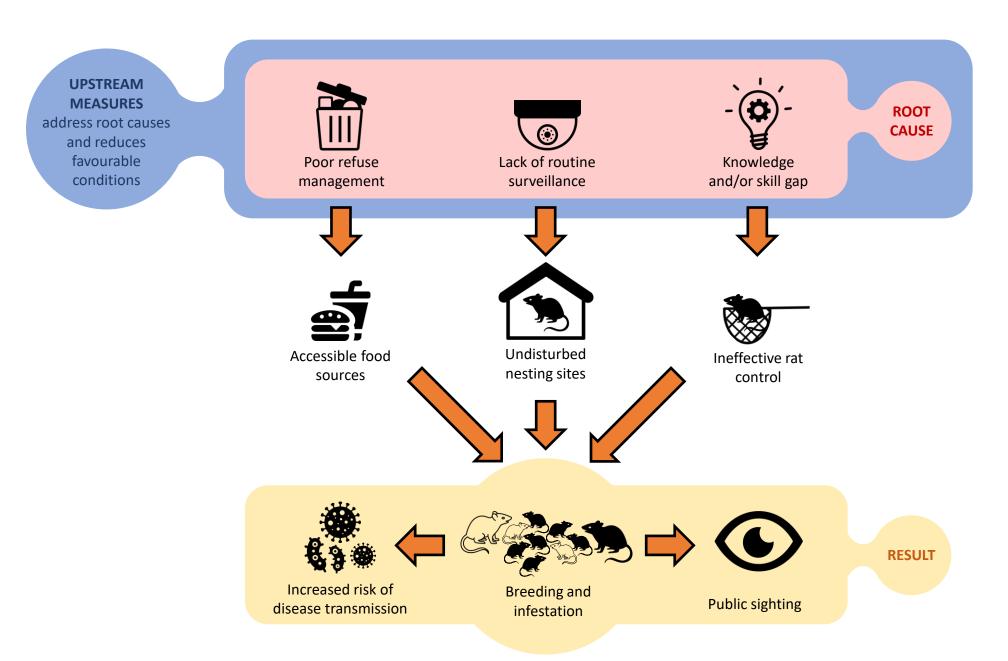




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#### PREVENTION AS KEY STRATEGY

A proactive approach (known as upstream measures) addresses root causes to prevent rats from entering or harbouring within the premises. It is a sustainable and cost-effective measure in the long run, compared to treating growing infestations after a rat population has established. These include **maintaining good housekeeping**, **proper refuse management** and **removing access or entry points (rat proofing)**, which create an environment that is less attractive and accessible to rats.





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#### **SURVEILLANCE AND MONITORING TOOLS**

#### **FEEDBACK VISUAL INSPECTION NON-TOXIC BAIT STATION CONVENTIONAL TOOLS RAT BAIT** Based on public sighting Labour-intensive Labour-intensive to monitor regularly May not be reliable May disrupt business activities Relatively inexpensive May not be able to pinpoint access point and nesting site Relies on expertise of inspector **CAMERAS ARTIFICIAL INTELLIGENCE SENSORS** ECH TOOLS (IoT) Passive infrared (PIR) / Normal, IR, thermal, Video analytics, data movement, weight, vibration borescope analysis, rat recognition, trend prediction Relies on internet connection Relies on internet Reduce false positives connection May or may not be real-time notification May or may not be real-For targeted management time notification For targeted management For targeted management SINGLE-KILL **MULTI-KILL**

# CH TOOLS



- Immediate kill
- Relies on internet connection
- May or may not be realtime notification



- Immediate kill
- Reduce labour to clear carcasses
- Relies on internet connection
- May or may not be realtime notification



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### **CONTROL MEASURES**

	RAT CAGES	GLUE TRAPS	SNAP TRAPS
		GLUE	
TRAPS	• Reusable, cost-effective	• Single-use, cost-effective	• Reusable, cost-effective
T.	<ul><li>Requires bait to be effective</li><li>Rats are caught live</li></ul>	Bait not required, but may enhance catch rate	Bait not required, but may enhance catch rate
	Difficult to manage on large	Quick to deploy, scalable	Quick to deploy, scalable
	scale	<ul> <li>Hazard to non-target animals if not deployed in tamper-resistant boxes</li> </ul>	<ul> <li>Safety hazard if not deployed in tamper- resistant boxes</li> </ul>

	ANTICOAGULANT RODENTICIDE	NON-ANTICOAGULANT RODENTICIDE
S	<ul> <li>Causes internal bleeding leading to death</li> </ul>	<ul> <li>Causes clotting of blood leading to death</li> </ul>
BAITS	<ul> <li>Lethal dose consumed over several days</li> </ul>	<ul> <li>Lethal dose achieved in single feed</li> </ul>
	<ul> <li>Used in tamper-resistant bait boxes or in burrow treatments</li> </ul>	<ul> <li>Used in tamper-resistant bait boxes or in burrow treatments</li> </ul>
	Highly toxic, must be secured to prevent contamination	<ul> <li>Highly toxic, must be secured to prevent contamination</li> </ul>

