

# Advancing Vivarium Efficiency and Animal Welfare through Digitalization: A operational evaluation of the DVC® System

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The paramount concern in vivarium management, as highlighted by this study, revolves around the welfare of laboratory animals, a domain where the Digital Vivarium Cage (DVC®) system marks a significant breakthrough. By enabling continuous monitoring of activity patterns, environmental conditions, and behavioural indicators, the DVC® system introduces an advanced approach to safeguarding animal well-being. It employs an AI algorithm capable of identifying behavioural anomalies such as aggression and stereotypic behaviours. This feature is instrumental in providing actionable insights for welfare assessments and interventions, thereby elevating the standard of care. Particularly, the system's ability to track nocturnal activity offers a nuanced, data-driven perspective that enhances traditional health check protocols with objective evidence of the animals' conditions.

Moreover, the integration of the DVC® system into existing Animal Management Systems (AMS) underscores its utility in scientific research by streamlining colony management and resource allocation, thereby facilitating a seamless operational workflow. This integration not only optimises task execution but also reduces manual labour, significantly improving accuracy in the animal census and asset management.

Operational efficiency is another critical aspect addressed by the DVC® system. The system's design for real-time tracking of laboratory animal cages addresses key operational challenges in vivarium management. By automating the calculation of cage per-diem costs and providing instant access to data on rack occupancy levels and cage locations, the DVC® system minimizes human error and enhances the reliability of operational workflows. The incorporation of dedicated LED indicators further aids in cage management, streamlining caretaker tasks and improving overall efficiency.

In essence, the DVC® system represents a leap forward in the scientific management of vivarium, with a pronounced emphasis on animal welfare. Its capability to offer precise monitoring and management practices through digital technology not only aligns with the scientific community's ethical responsibilities towards laboratory animals but also illustrates the transformative potential of digitalisation in achieving excellence in vivarium management. The dual benefits of enhanced animal welfare and operational efficiency position the DVC® system as a pivotal innovation in the field.