

# Noise Reduction for Patient Rooms – GX Solutions with the OptiCool™ Cooling System

Helmer Scientific  
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## INTRODUCTION

For many years, conventional cooling technology has been used in medical-grade refrigeration. This approach uses forced-air refrigeration systems with fixed capacity compressors and hydrofluorocarbon (HFC) refrigerants. Powerful forced-air systems contribute to uniform temperatures inside the storage area, however, systems that utilize fixed capacity compressors and HFC coolants tend to consume more energy and create more noise than newer, alternative approaches.

Technological advances, such as Helmer Scientific's OptiCool™ cooling system, which incorporates both variable capacity compressor (VCC) technology and natural hydrocarbon (HC) refrigerants, have now been developed to make it possible to achieve optimal temperature management while at the same time minimizing energy consumption, heat output, global warming potential, and sound pollution. This white paper will focus on the importance of managing noise in clinical environments.

## SOUND POLLUTION

### Hospital Noise Levels on the Rise

Hospital noise levels are one of the most common patient complaints. Noisy hospitals lead to disrupted sleep, slower recovery time, and diminished patient satisfaction. The World Health Organization recommends that average patient room noise levels remain only slightly louder than a whisper. However, the average noise level in an American hospital often exceeds 50 decibels and peaks at around 90 decibels, which is extremely harmful to patient recovery and satisfaction (1). Even small reductions in the amount of noise, by investing in new equipment and technology, can make a big difference.

### Negative Effects on Health and Healing

Various research studies conducted highlight the negative impact of noise on hospital patients. High noise levels lead to sleep deprivation, awakening, decreased oxygen saturation, high blood pressure, increased heart rates, and slower wound healing. Lack of sleep, due to noise, also impacts other important health measures and outcomes such as weight gain, heart disease, stress levels, and inflammation (2). Noise has also been tied to a higher rate of rehospitalization.

## **Patient Satisfaction & Reimbursement**

Not only does noise play a major role in health and healing, it also plays a role in patient satisfaction. The HCAHPS Survey is administered to a random sample of patients throughout the year to measure the patient perspective on hospital care. One of the questions specifically addresses the quietness of the hospital environment. Hospital noise continues to rank low on the national HCAHPS Survey. On average, only 50% of patients feel that their room is quiet enough at night.

These survey scores affect government reimbursements. Poor scores will cost the hospital money. Data shows that patients who were dissatisfied with noise levels in their rooms were significantly less satisfied with their overall hospital experience, which further impacts hospital reimbursement. Noise is a large contributing factor to patient satisfaction. Massachusetts General Hospital shared the following patient comment from their HCAHPS Survey responses from December 2011 – January 2012 (3). “The noise at night was intolerable. Alarms were going off constantly and appeared to be ignored, alarms from other rooms. It was impossible to sleep at all.”

## **Steps for Reducing Noise**

Patients are letting hospitals know that noise is a major issue. There are many ways hospitals can reduce noise levels for patients such as designating quiet hours, turning down lights, minimizing conversations at nursing stations and other areas close to the patient, designating phone call areas, optimizing clinical interventions (vital signs, blood draws, etc.), and moving rounds to outside of the quiet hours. Finally, hospitals can invest in quieter equipment, including cold storage units that are routinely installed in patient care areas and staff work areas. To implement any of these improvements, there needs to be high-level buy-in and continuous improvement processes in place to ensure the program is creating a quieter atmosphere for patients.

## **Choosing Quiet Equipment - Cold Storage**

Choosing newer, quieter equipment can impact hospital noise levels and in return, patient satisfaction. Cold storage is a category that can be traditionally known for creating excess noise in patient care and staff work areas.

Traditional medical-grade refrigeration uses forced-air refrigeration systems with fixed capacity compressors and hydrofluorocarbon (HFC) refrigerants. Powerful forced-air systems contribute to uniform temperatures inside the storage area, however, systems that utilize fixed capacity compressors and HFC coolants tend to be much louder than newer, alternative systems.

GX Solutions from Helmer Scientific utilize the OptiCool™ cooling system, which incorporates both VCC technology and natural hydrocarbon (HC) refrigerants resulting in much quieter operation. GX professional medical-grade refrigerators are 3X quieter than conventional models.

## EVALUATION



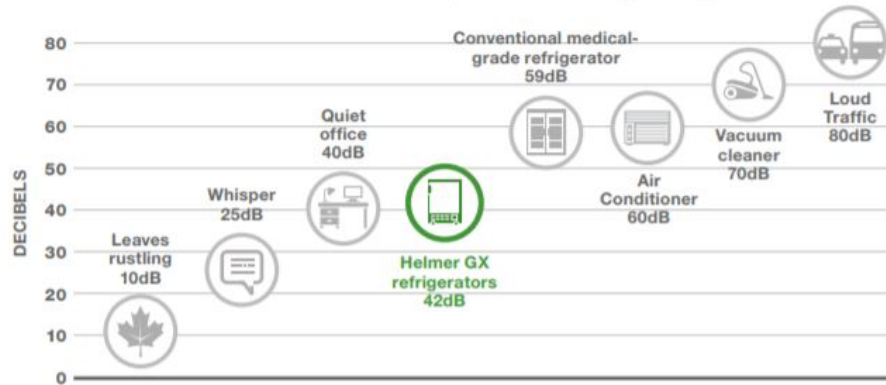
### Noise Management

#### Managing noise in the professional healthcare environment

GX professional medical-grade refrigerators are designed for noise-sensitive areas such as medication rooms, pharmacies, labs and patient rooms. Less equipment noise means fewer distractions while healthcare personnel work or patients rest.

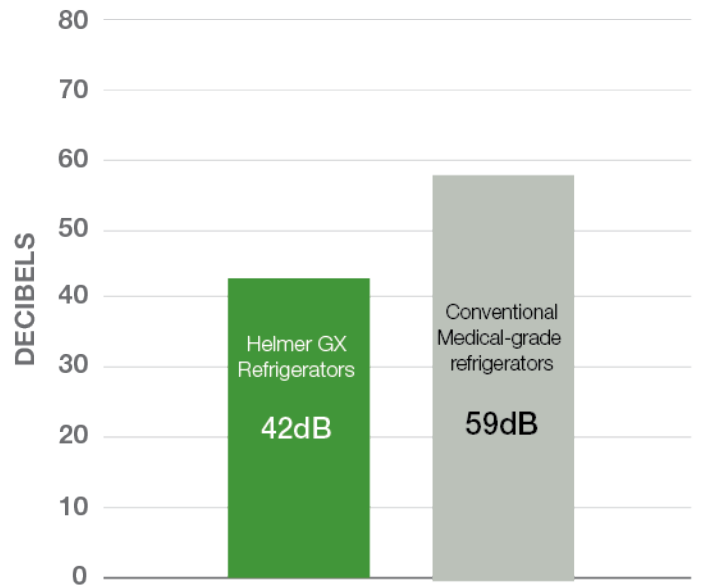
#### Noise Output

Conventional units are ~3.25x louder than GX professional medical-grade refrigerators.



Every increase of 10dB on the scale is equivalent to a 10-fold increase in sound intensity.

We evaluated a conventional undercounter medical-grade refrigerator against the Helmer Scientific GX professional medical-grade refrigerator and found that the Helmer Scientific GX professional medical-grade refrigerator is 17 decibels lower than a conventional medical-grade refrigerator. It is important to note that every increase or decrease on the decibel scale is equivalent to a 10-fold increase or decrease in sound intensity. While the conventional medical-grade refrigerator operated at 59dB, the Helmer GX refrigerators operated at only 42dB. The Helmer GX refrigerators operate at a similar sound level to a quiet office.



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## DISCUSSION

Hospitals across the country understand noise can negatively affect patient satisfaction and recovery. Many organizations are putting plans in place to enhance their care environment by lowering noise levels. Choosing equipment which does not contribute to the noisy hospital environment is one step in the right direction for increasing patient satisfaction, speeding up recovery times, and helping patients rest and heal. Studies show that dropping noise levels by simply 5 decibels is extremely noticeable to the human ear. An evaluation of the Helmer Scientific GX professional medical-grade undercounter refrigerator demonstrated that this unit is significantly quieter than a traditional medical-grade undercounter refrigerator.

The use of newer cooling technology such as OptiCool™ also has benefits beyond quiet operation. Another primary benefit is efficient operation which reduces energy use, resulting in lower cost of ownership. Additional benefits include environmental sustainability due to extremely low Global Warming Potential (GWP) and no impact on ozone depletion.

## CONCLUSION

Managing noise in hospitals is a critical issue. Noise negatively affects patient health and healing. There are many steps hospitals can take to reduce noise levels in patient care areas such as choosing quieter equipment. The Helmer Scientific GX Solutions professional medical-grade refrigerator is significantly quieter than traditional cold storage solutions. The use of OptiCool™ cooling technology reduces refrigerator sound levels by 17 decibels providing a major impact on surrounding patient care and staff work areas, while maintaining industry leading uniformity, recovery, and stability. Noise reduction will continue to be an area of focus to improve patient rest, recovery and healing.

## REFERENCES

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