SOUND SOLUTIONS
CASE STUDY

ACOUSTICS & PATIENT SATISFACTION IN HOSPITALS

Addressing acoustics with a multi-prong approach for absorbing, blocking and covering sound has been a winning formula for decades. In hospitals, where gypsum ceilings and other hard surfaces often contribute to a poor acoustical environment by refle ting and reverberating sound, there has been a growing need to apply a better approach and a return to the A, B, C formula as a basis for good acoustical construction and design.

Volumes of research support the importance and impact noise levels have on patients (see study list on page 2) and hospitals are paying attention. In its monthly update to its employees and staff, The University Hospital/ SUNY Upstate Medical University cites the following impact of high noise levels on patients and encourages employees to participate in reducing these levels to improve patient satisfaction.

THE IMPACT OF HIGH NOISE LEVELS ON PATIENTS

- Sleep Disruption/Awakening
- Decreased Rate of Wound Healing
- Higher Incidence of Rehospitalization

Hospitals like The Saint Alphonsus Regional Medical Center in Boise, Idaho have also attested to the marked improvement in the satisfaction reported for patient rooms and attributed to reducing noise, upgrading the ceiling tile and moving to single patient occupation for greater privacy. Their satisfaction surveys used a 10 point scale and patients rated their quality of sleep at 7.3 in the new upgraded private rooms versus 4.9 in the old semiprivate rooms.

The importance of sleep quality in contributing to patient recovery is well documented. Proper acoustics and using sound masking has been recognized as contributing positively to the healthcare environment to foster this.

CHALLENGE:

At Holy Spirit Hospital in Camp Hill, PA they had traditionally used hard ceilings in their construction, but this created acoustical problems in patient rooms, as Tim De- Blaey, vice president for cardiovascular services explained, "Although using hard ceilings in the patient rooms made it easier to clean than tile, we were in a quandary about why our rooms sounded like echo chambers."

Speech Privacy Can Be Objectively Measured Using Articulation Index (AI) and Privacy Index (PI)

Speech Privacy Levels	AI	PI
Normal	≤0.15	≥85%
Confidential	≤0.05	≥95%
Secure	Special consideration required	

As per ***ASTM E - 1130*** Standard for Speech Privacy
AI varies from 0 (absolute privacy) to 1.0 (perfect intelligibility, no privacy)
PI is a related rating system and the inverse of the AI
An AI of 0.15 is a health care standard versus an AI of 0.20 for open office plan as a standard

THE ABC'S OF ACOUSTICS

Combining high performance ceiling tile to absorb and block sound, and adding a quality sound masking system to cover the remaining sounds that are not absorbed or blocked is the best way to approach the acoustic design for privacy and for comfort.

ABSORPTION

- **NRC** or **Noise Reduction Coefficient** measures the degree to which a surface or material absorbs sound.
- **AC** or **Articulation Class** measures how well a ceiling panel prevents sound from refle ting back down to adjacent workspaces in an open-plan environment.

BLOCKING

- **STC** or **Sound Transmission Class** measures how well a wall or partition prevents sound from transmitting to the other side.
- **CAC** or **Ceiling Attenuation Class** indicates the ability of a ceiling panel to block sound transmission.

COVERING:

- **AI** or **Articulation Index** represents how well speech can be understood in a given space.
- **PI** or **Privacy Index** represents how well the elements in, and the properties of, a space render outside conversations

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"Since the installation of the masking, patients have commented about how quiet the heart center is and how well they slept."

-Tim Deblaey
VP, Cardiovascular Services
Holy Spirit Hospital

Holy Spirit needed to address their HIPAA requirements and wanted a solution to the acoustical problems patients were experiencing in the patient rooms. They felt this was impacting the patient's comfort.

SOLUTION:

After researching a number of alternatives and companies, Holy Spirit felt that Lencore was the right choice to take on their challenge.

Holy Spirit Hospital opted for sound masking because it was more cost effective than other solutions they were considering. "The sound masking system did everything for us," said DeBlaey. "From a HIPAA standpoint it helped mitigate some of the information sharing and it got rid of the echo effect in patient rooms." Tim added, "Before, one of the major complaints that came up through our patient survey system was noise level, particularly after hours when things are quiet in the hall with the exception of the nurse's station. Since the installation of the masking, patients have commented about how quiet the Heart Center is and how well they slept."

OUTCOME:

Investing in a quality sound masking system and upgrading ceiling tiles effectively "covered" potential breaches in oral privacy and helped Holy Spirit meet their HIPAA oral privacy objectives and avoid potential liability.

"When we opened our new Heart Center with patient rooms fit ed with sound masking, our patient satisfaction rating jumped to 98 percent," added Tim DeBlaey. "The system is also a positive for our staff. Nurses can maintain a normal tone of voice without interrupting patients."

THE FINAL DIAGNOSIS:

The supporting research and data all agree. Patients that can rest better and that are more comfortable are more likely to heal faster, have lower incidence of re-hospitalization and report greater satisfaction with their hospital stays.

Protecting privacy and providing comfort enables Lencore, as part of a multi-prong approach, to make the difference between an unhappy patient and a patient who is truly satisfied with their hospital experience.

RELATED HEALTH CARE STUDIES

- National Center for Biotechnology Information (NCBI) – *Environmental Noise as a Cause of Sleep Disruption in an Intermediate Respiratory Care Unit* by Aaron, Charlisle, Carskadon, Meyer, Hill, and Millman.
- Annals of Emergency Medicine – *Comparison of the Auditory and Visual Privacy of Emergency Department (ED) Treatment Areas* by Barlas, Sama, Ward, and Lesser.
- The Journal of The Acoustical Society of America – *Noise Levels in Johns Hopkins Hospital* by Busch-Vishniac, West, Barhill, Hunter, Orellana, and Chivukula.
- Occupational and Environmental Medicine – *Acoustics and Psychosocial Environment in Intensive Coronary Care* by Blomkvist, Eriksen, Theorell, Ulrich, and Rasmanis.
- The American Journal of Emergency Medicine – *Noise in the ED* by Tijunelis, Fitzsullivan, and Henderson.
- Public Health Brief – *Noise and Hospital Stay* by Fife and Rappaport.

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