

The QUIET Children's Hospital



Children's Hospital of Pittsburgh of UPMC established a goal to design one of the quietest hospitals in existence, due in large part to continuing research that links a quiet hospital environment with improved patient healing and medical staff satisfaction.

Children's Hospital thus worked closely with its architects and engineers to focus on sound transmission between hospital areas, concentrating in particular on the following:

- Patient room to patient room
- Public space to patient room
- Service areas to patient room
- Patient room access corridors
- Exam room to exam room
- Exam room to public space
- Toilet room to public space
- Consultation rooms/conference rooms to public space
- Consultation rooms/conference rooms to patient rooms
- Staff lounges to patient rooms

Noise remediation was considered within each phase and component of the design process, including architectural, building systems, integrated systems, and equipment. The process even included several trips to hospitals recognized for their quietness. In the end, many sound-attenuating measures were incorporated into the design of the new replacement facility, including:

Architectural

1. Masonry exterior walls at most patient rooms
2. Insulated exterior wall assemblies with insulated sealed glazing units
3. Laminated, insulated sealed glazing units at Sleep Study patient rooms
4. Floor-to-deck full-height partitions, sealed and insulated
5. Multi-layer drywall demising partitions at patient rooms, including double-studded partitions at headwalls
6. Acoustic ceiling tile in lieu of hard ceilings used in most areas
7. Extensive carpeted areas
8. Extensive use of door seals
9. Double concrete slab between mechanical penthouse and patient floor
10. Enclosed staff work areas and consult rooms at the center, away from the public corridors and patient bedrooms
11. Sound-deadened elevator cab enclosures

Building Systems

12. Vibration isolation bases and isolators on all mechanical equipment
13. Isolators on all ductwork and piping within 50 feet of isolated equipment
14. Flexible connections on all air-handling systems
15. Remote central plant location, which eliminates/reduces chiller, boiler, cooling tower, and generator noise
16. Low sound-generating cooling towers on inlet and outlet
17. Variable Frequency Drives on most equipment to reduce maximum flow and associated noise levels
18. Variable Frequency Drives provide soft start so associated noise of starting equipment is eliminated
19. Vibration isolation bases on main electrical switchgear
20. Critical-grade mufflers and vibration isolation springs on emergency generators
21. Vibration isolation springs on medical air compressors and vacuum pumps
22. Cast iron piping for storm and sanitary building stacks
23. Sound mitigation specification requirements for elevator operation
24. Sound mitigation specification requirements for pneumatic tube operation
25. Use of personal communication devices in lieu of overhead paging

Integrated Systems and Equipment

26. Reduction of overhead paging to only the "behind the curtain" areas
27. Silent notification of nurse call through integration to wireless phones and/or Vocera badges
28. Silent notification of alarms from physiological monitoring equipment through integration to wireless phones and/or Vocera badges
29. Equipment alarms annunciated to the command center, not locally at the medical equipment
30. "Soft" wheels on mobile carts

Summary

With more than 30 different measures incorporated into the design, Children's Hospital of Pittsburgh of UPMC achieved its goal and has reached unprecedented levels of quietness within the new hospital.



Children's
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