



At least one HIPAA issue is widely misinterpreted, so it is a potential source of unanticipated liability costs for healthcare providers and insurers. The issue has viable cost-effective solutions, but a lack of awareness has created a vacuum that needs to be addressed.



Controlled Assess, Ceiling Tile-Based System, Providing State-of-the-Art Direct-Field Speech Privacy Technology

The issue is this: Health and Human Services (HHS's) March 2002 proposed HIPAA changes appear to relax requirements on "incidental use or disclosure." But a closer look reveals Oral Privacy is an area of significant exposure for covered entities and insurers. The proposed changes state a "...disclosure [of Patient History Information, or PHI] that occurs as a result of a failure to apply reasonable safeguards...is ...a violation of the Privacy Rule." **What is The Office of Civil Rights (OCR's) message? Incidental disclosure is tolerable only if reasonable means to prevent it have been implemented**, in accord with the December 2000 guidance that "the same protections afforded to paper and electronically based information must apply to verbal communications as well."

Covered entities are required to identify "reasonable means" in the form of best practices as a basis for compliance.

But accepted standards from ISO, ANSI, and ASTM already define "Oral Privacy" in a manner that can be quantitatively measured. They also describe available methods for monitoring private environments where Oral Privacy is required but walls are impractical. These standards already meet the "reasonableness" test and provide "best practices" to follow. And they enable providers to go about their business without disruption or fear of disclosure.

Four important facts:

- Oral privacy can be measured with instruments.
- Oral privacy is defined by ISO, ANSI, and ASTM standards.
- Oral privacy can be provided without restricting physician behavior or retraining.
- Oral privacy can be provided without walls or capital expenditure.

Who Is Affected?

- Pharmacies
- Physician's offices
- Medical clinics
- Public health authorities
- Life insurers
- Billing agencies
- Information system vendors
- Service organizations
- Hospitals
- Military medical bases
- Employers



The View from HHS & OCR?

William Braithwaite, senior HHS advisor and HIPAA West/East keynote speaker, points out that "ignorance [of standards and best practices] will not be seen as an acceptable defense for non-compliance." Nevertheless, many entities have ignored Oral Privacy-in most cases, they are unaware that objective standards exist that can be inexpensively applied. But in the long run, inattention or inaction are unlikely to be judged "reasonable safeguards."



Speech Privacy Systems

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The world's best HIPAA Oral Privacy "tool kit" will only have four tools in it, and most of these tools are available off-the-shelf. In addition, you can use them separately or in combination to achieve the level of privacy you need or want to achieve. They include:

- **NRC**-rated ceiling tiles (they absorb sound so that conversations don't "travel").
- **STC**-rated **HTL** curtains (they help block sound so that the person in the next bed can't overhear the conversation between a doctor and patient) .
- **NRC**-rated portable panels (they absorb and block sound).
- "**Speech Privacy Systems**" (also known as "sound masking") that have been tested to meet the privacy standards.

Of the four tools in your HIPAA "tool kit", "**Speech Privacy Systems**" (sound masking) is the one that has the greatest impact.

No walls are needed to achieve oral privacy using "sound masking." This makes it an ideal solution for most health care situations-everything from emergency rooms to nurses' stations to waiting rooms all the way to the call centers at health insurance companies where customer service representatives handle patient inquiries.



Factors That Contribute to a Comfortable, yet Effective, Background Sound System

It should be obvious that adequate oral privacy can be obtained if the background sound level is high enough. If a patient is seated under a particularly noisy return air grille, he or she may not be aware of intruding speech from the nurses' station, and therefore, clearly has adequate oral privacy; however, the patient may be annoyed by the excessive noise. Similarly, a background sound system can be turned up very loud until everyone has sufficient speech privacy, but this also results in annoyance. However, it is possible to design a system in which both requirements are met - adequate **speech privacy** and **freedom from annoyance**.

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Understanding the Levels of Speech Privacy

An **Articulation Index (AI)** is a measure of the **intelligibility of speech**, expressed as a percentage of speech that is understood by the listener when heard out of context. It is expressed as a number between 0 and 1.

The **American Society for Testing and Materials (ASTM)** E1130-90 precisely defines the levels of Speech or "Oral Privacy" as:

- **"Confidential Privacy"** - "Speech privacy may be described as 'confidential' when speech cannot be understood. This degree of speech privacy is indicated at Articulation Index values at or below 0.05."
- **"Normal Privacy"** - "At Articulation Index values between 0.05 and 0.20, 'normal' speech privacy is indicated. In this range, concentrated effort is required to understand intruding speech."
- **"Unacceptable Privacy"** - "Speech becomes more readily understood at Articulation Index values greater than 0.20. Some describe 'unacceptable' privacy as values above 0.30."
- **"No Privacy"** - At Articulation Index values above 0.40, there is essentially no privacy.

The **Privacy Index (PI)** is a measure for rating the speech privacy performance of an architectural space (or lack of speech intelligibility) where the PI is calculated from the Articulation Index according to the following:

PI = (1 - AI) * 100%.

- **"Confidential Privacy" = PI > 95%**
- **"Normal Privacy" = PI between 95 - 80%**
- **"Unacceptable Privacy" = PI between 80 - 60%**
- **"No Privacy" = PI < 60%**

NRC - Noise Reduction Coefficient

The measure of acoustical absorption calculated at specific mid-range frequencies.

STC - Sound Transmission Coefficient

A classification of the sound insulating properties of a material or structure.

HVAC - Heat, Ventilating, & Air Conditioning

Speech Privacy Systems - (Also Known As Sound Masking)

A technology that was first developed in the late 1960s to meet the needs of security-conscious government agencies for confidentiality and privacy.

Factors That Contribute Cont...

The first requirement is proper *tonal quality* or balance of frequencies in the background sound. A second requirement is that the background *sound level should not exceed approximately 48 dBA*. Finally, the sound must be *spatially uniform*, in both tonality and sound level, at the listener's ear elevation so that speech privacy levels don't change as the person moves about the clinic, waiting room, or office.

The importance of this last requirement, spatial uniformity, is not well understood even by some vendors of background sound systems. It is unusual to find systems that achieve uniformity of better than 4 or 5 dB in the important speech frequencies. Variances of this magnitude result in dramatic changes in speech privacy levels throughout the office if the system is properly adjusted so that the highest levels do not exceed 48 dBA.

As a result, most systems are adjusted for average levels of about 48 dBA to 54 dBA at many locations, causing annoyance to a significant percentage of users. Alternatively, the system is adjusted to a lower average level, compromising oral privacy. These factors, unfortunately, have contributed to the opinion among some users that background sound systems are either too loud or are not very effective.

The **VoiceArrest Speech Privacy System** delivers adequate speech privacy and freedom from annoyance at 45 dBA.

dBA - Relationship of perceived sound levels to dBA:
A 10 dBA increase in sound energy is perceived as a doubling in loudness.

Indirect Field Technology

Until recently, virtually all speech privacy systems were designed and installed into the **plenum**. A typical speech privacy system uses loudspeakers *above* the suspended acoustical ceiling that *must be individually adjustable* to provide the correct frequency distribution and precise operating level of ambient sound, *at least if considered on an average basis throughout the space*.

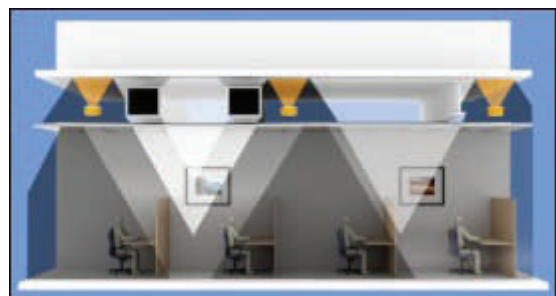
However, achieving adequate spatial uniformity of ambient sound is a serious challenge faced by masking system designers, and it is a challenge that few are able to provide consistently using loudspeakers above the ceiling.

Even a 3 decibel variation from one workspace to another can have a dramatic effect on speech privacy. However, the performance of most systems varies by more than that primarily because of the sound attenuation characteristics of typical ceiling and plenum materials and openings that vary substantially from point to point.

Plenum - The space above the suspended acoustical ceiling.

Figure 1 illustrates the difficulty in achieving good uniformity with an above-ceiling system. The conventional wisdom is that the ceiling will "spread out" the sound in the plenum, improving the uniformity. What actually happens is that **the plenum typically causes a lack of uniformity**.

Practical plenums hide large structural elements, such as HVAC ductwork or structural beams, which effectively compartmentalize the sound. Even if the plenum is atypical and contains no large elements, openings in the ceiling for air returns and lighting fixtures permit proportionately more sound to be emitted below them.



For an animated presentation, visit:
<http://www.qtquiet.com/media/flash1.html>

Figure 1. Typical plenum and suspended ceiling acoustical variations cause non-uniformity in the background sound below. Ductwork and building beams compartmentalize the sound; acoustically absorbent fireproofing in some areas and not in others causes non-uniformity above, and openings for return air in the ceiling or light fixtures further deteriorate uniformity below. Typical variability below is 4 or 5 decibels.



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Direct Field Technology

Recent innovations have now made it possible to use a ceiling-mounted speech privacy system that is able to provide much better uniformity of masking sound throughout typical open plan offices. This system uses **Direct Field Technology** with loudspeakers that radiate sound directly into the occupied space below rather than into the above-ceiling plenum.

The principal advantage of emitting the sound directly into the space below is that the non-uniformity caused by HVAC openings in the ceiling, or ventilation slots in lighting fixtures, or by building structural, fireproofing, large ducts or other mechanical components in the plenum no longer have any significant effect on the spatial distribution of masking sound.

By contrast with an above-ceiling system, the uniform gray in Figure 2 illustrates the good uniformity possible with an in-ceiling background sound system. By properly choosing emitters or speakers with ultra-wide dispersion, the background sound is very uniform at the listener's ear elevation.

Direct Field Technology - The use of ultra-wide angle dispersion emitters (speakers), radiating sound directly into the designated listening space below.



For an animated presentation, visit:
<http://www.qtquiet.com/media/flash2.html>

Figure 2. Ultra-wide dispersion emitters radiating directly into the listening space below results in spatial variability of less than 1 decibel throughout the office.



Features of the VoiceArrest Direct Field Speech Privacy System

- **Multi-Channel Technology**

VoiceArrest is a true four-channel speech privacy system. It comprises four separate incoherent channels all the way from the digital-generating source to the last emitter (speaker). Four channels accurately simulate the turbulent air eddies characteristic of HVAC system air movement sound generation. This allows the **VoiceArrest System** to sound entirely natural.

The VoiceArrest System sounds entirely natural and unobtrusive. Users are not subjected to harsh sound quality due to acoustical interference effects caused by adjacent coherent radiators (speakers) so common with plenum-based masking systems. Few, if any, visitors will even notice the **VoiceArrest System** running, and those who do will think they are hearing the HVAC system.

- **Optimum Spectrum**

The **VoiceArrest Speech Privacy System** provides a sound spectrum that delivers uniformly throughout the coverage area. Direct field technology means the spectrum is not **distorted by** the ceiling assembly or obstructions and variances in the plenum space above.

The **VoiceArrest System** is the only system whose coverage meets the ASTM E1041 requirements for spatial variation and temporal uniformity.

Amazingly, the variation in the spectral balance at any office or cubicle is typically within 1 decibel of optimum at any octave band over the entire critical voice frequency range of 250 Hz to 4,000 Hz.

Although typical plenum-masking systems may appear to exhibit fair uniformity as measured by an **A-Weighted Sound Pressure Level Meter**, their variation within the critical speech bands far exceeds that routinely provided by the **VoiceArrest Speech Privacy System**.

Distorted by the frequency-dependent acoustical transmission loss characteristics of the ceiling assembly or the acoustical spatial variance in the above-ceiling plenum space.

A-Weighted - A-Weighted Sound Pressure Level
The standard measure of sound pressure level that approximates the sensitivity of the human ear at moderate sound levels. A-Weighted Sound Pressure Level de-emphasizes high and low frequencies because the ear poorly perceives these.



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- **Lower Operating Level**

The spatial and spectral uniformity delivered by the **VoiceArrest Speech Privacy System** permits its operation at substantially lower sound levels than competitive systems while maintaining masking effectiveness. While other masking systems must be operated at 51-54 dB with a well-designed system to comply with new oral privacy requirements for most locations, the **VoiceArrest Speech Privacy System** is normally operated at 48 dB under the same conditions.

A frequent comment by users experienced with plenum masking systems is that the **VoiceArrest Speech Privacy System** "is not loud enough" to provide good speech privacy. Yet objective comparative standard measurements of the **Articulation Index*** clearly demonstrate that **VoiceArrest** is at least as effective as louder plenum-based systems. The result is unsurpassed speech confidentiality with **dramatically reduced acoustical obtrusiveness and user awareness of the system.**

- **Truly Independent Control of Sound Levels in Open and Closed Office Areas**

A common issue in many offices is that the above-ceiling air plenum is shared by both open and closed offices areas. For reasons of economy, the separating walls often do not extend more than an inch or two above the suspended acoustical tile ceiling. Therefore, when masking is delivered to the open area at an appropriate level, sound in an enclosed office typically builds up to excessive levels, even if there are no masking loudspeakers above it. Until now, the only solution was to "starve" the adjacent open areas.

Direct Field Technology used by the **VoiceArrest System** means the masking sound intended for the open office area is entirely restricted to the open area. There is no unwanted bleed over effect into enclosed offices or conference rooms.

If masking is desired in the enclosed space, a separate zone can be provided, and its level is controlled independently.

- **Cost Effectiveness**

The **VoiceArrest Speech Privacy System** meets a compelling need by providing state-of-the-art speech privacy at a modest price. Configuring and installing does not require hiring engineering consultants, and since it's a low-voltage system, your facilities or maintenance personnel can install the system if desired. Therefore, speech privacy now becomes cost-effective, even for the smallest of office spaces.

The cost-effectiveness of the **VoiceArrest Speech Privacy System** is even more dramatic in larger spaces where a single Control Module can be used to treat up to 30,000 square feet. For areas larger than 30,000 square feet or where zone volume control is desired, simply use additional Control Modules.

With the **VoiceArrest Speech Privacy System**, you receive the highest quality system available, while saving over plenum-based systems.

Articulation Index (AI) is defined by ASTM Standard E1130 [2002], Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index.

- **Determining Specific Needs**

Using **VoiceArrest** "Direct Field Speech Privacy Technology" eliminating the need for on site engineering analysis since the system isn't affected by distortions created by ceiling assemblies, or acoustical spatial variance in the above-ceiling plenum space.

We begin by gathering information about the area(s) in which the system is to be installed. Then by using a "floor plan", and if possible a "**reflected ceiling plan**", we determine the number and placement for the emitters needed.

When you decide to proceed with the project, we have trained, competent installers ready to implement your new speech privacy system.

Once installed, the **VoiceArrest Speech Privacy System** provides the proper tonal quality and sound levels with unsurpassed spatial uniformity into the designated areas without the need for time-consuming, costly tuning adjustments to compensate for acoustical effects.

reflected ceiling plan - A layout showing the positioning of the acoustic ceiling grid, and the location of light fixtures, air return grilles, sprinkler heads, or any other elements located on the acoustic ceiling tiles.



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