What about Singing and HVAC?

Dr. Carol Dieckman (University of Arizona)

Singing is bad if singer is shedding virus, and they will not know if they are. If they are far away from others, ok. My strong suggestion is for individual singers or a couple at a time and not near anyone. No choirs, definitely not standing next to each other. And, give up hymns by congregation. We have been having some beautiful duets, trios, with/without accompaniment pre-recorded. Angelica made me cry last Sunday with Let it Be recorded in her living room. I think as churches re-open, these small groups could come into the church if there is physical space for them

I think the more air you're pumping through the filters, the better. I think what's worse is for the air not moving at all in closed, small rooms with lots of people. If there are vents making drafts across the church at head level, that could perhaps be problematic. That would have to be assessed. In any case, everyone in church should be masked, so if a worshipper is pre-symptomatic and doesn't know it, they won't infect anyone else.

Dr. Kathy Spindler (University of Michigan)

My TWiV cohost Rich Condit attended the same 2.5 hour webinar that David refers to, and Rich wrote: "Bottom line...chorus singing is a risky business and there is no safe way to do it. Our chorus is going to wait for informed recommendations for local officials for gatherings, but my guess is that it will be a long time before we get together again. When we do, it will be by mutual consent and with whatever minimal precautions we can take (wash hands, don't attend sick) and with the clear understanding that some at risk individuals may prefer to stay home indefinitely." This is devastating for all singers, for sure.

Dr. David Yost (CDC and Indian Health Services)

I think Carol has basically covered the choir issue, but for some supporting reference there was an excellent (but long) webinar held on May 5th by leading choir professionals around the country. You can find the link and summary at:

https://www.nats.org/cgi/page.cgi/_article.html/Featured_Stories_/NATS_COVID_Resources_Page
https://www.middleclassartist.com/post/nats-panel-of-experts-lays-out-sobering-future-for-singers-no-vaccine-no-safe-public-singing

The basic conclusion of these experts is that there is no safe way for singers to rehearse and perform together until there is a vaccine and effective treatment in place. They specifically note that there are no spacing solutions for groups that eliminate risk and that there are no facial barriers (masks) that are safe for singing. These sobering conclusions have devastated choir teachers and directors around the country but appear to be the correct stance based on the current information and interventions we have available. In our case for CPC in Pinetop, we plan to recommend that music be performed only by well-spaced instrumentalists with the possibility of vocal soloists/duets/trios who 1) have extended distancing from any congregation members and 2) have already shared contact with other performers outside of the church setting (in the case of duets, trios)..

As for HVAC issues, my expertise is limited. Frequent air exchanges, one-way flow, and high-quality filtration are standard recommendations to reduce any airborne infectious spread. However, I have not yet seen specific HVAC recommendations regarding COVID.

Marc Traeger

There are some general HVAC recommendations. The CDC has recommendations for medical facilities regarding Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency. This can be found at: **https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#tableb1**

Of interest, the CDC recommends that, for instance, an inpatient room in a hospital have a minimum of 6 minimum total air changes per hour (among many other areas; see multiple tables). When we look at air change rates in typical rooms and buildings, typical rates are found at: **https://www.engineeringtoolbox.com/air-change-rate-room-d_867.html**

This site states that churches typically have 8-15 air changes per hour. Looping back to the CDC website, that many air exchanges would require approximately 18 – 35 minutes for airborne contaminants to be eliminated by air exchange alone (in health facilities these numbers are used to guide housekeepers to wait a certain period of time before cleaning a room or area before the next person/patient enters). I would think that churches would be able to ask their local HVAC contractors to estimate the total air exchanges of any particular building.

However, from my reading there is minimal if any evidence of infection caused by aerosol contamination of COVID-19 compared to droplet (6 foot distancing) and fomite (surface contamination to hand to mouth) contamination. There have been warnings that one should not shake off potentially contaminated gowns or clothing because of concern of the re-aerosolization of virus on the clothing (but no actual reports of this actually causing human infection). The corona virus SARS-1, fortunately not circulating at present, had evidence of some aerosol infection from a sewer line but I have found no reports of aerosols from COVID-19 causing human infection, despite lab experiments showing that possibility. In our tracing efforts from every positive case on the reservation I work on (now >200 cases), we have always been able to attribute infection to direct contact, droplet or fomite transmission.

All of that to say, the air conditioning and ventilation systems in churches should have minimal contribution to transmission of virus and that social distancing and cleaning of surfaces (or just plain time allowances for virus to inactivate on surfaces) will determine the vast majority of transmission or not of virus in churches. One should NOT shut off an HVAC system out of concern that it will spread virus; on the contrary HVAC systems will help clear the virus, however minimal the amount in aerosolized form. Please let me know if you have any reports or evidence of the contrary; this is simply the opinion I have come to after a fairly extensive (and daily) search of the literature and scientific evidence.

Choral Singing and COVID-19

In March of 2020, sixty members of the Skagit Valley Chorale assembled for their weekly rehearsal at Mount Vernon Presbyterian Church in Mount Vernon, WA. Three weeks later, 45 of those singers had contracted COVID-19 and two had died. "Experts said the choir outbreak is consistent with a growing body of evidence that the virus can be transmitted through aerosols — particles smaller than 5 micrometers that can float in the air for minutes or longer."
Source: https://www.latimes.com/world-nation/story/2020-03-29/coronavirus-choir-outbreak

According to Dr. Kevin Kavanaugh, in an article for MJH Life Sciences, a medical media company, "The combination of singing in close quarters and decreased ventilation is nothing short of a petri dish for viral growth." Summarizing the scientific reports on choral singing and disease transmission:
- Speaking releases 2–10 times as many particles as coughing.
- Airborne droplet nuclei generated by singing is 6 times more than that emitted during normal talking.
- A 10-minute conversation, talking in a normal volume would yield an invisible 'cloud' of approximately 6,000 aerosol particles.
- Singing = coughing in number of particles emitted. Singing, however, is sustained.

Source: https://www.chorusamerica.org/resource/tool/rehearsal-guide-choral-singing-time-covid-19

The CDC guidelines include several recommendations for faith organizations, including modifying such usual practices as collecting donations (avoid passing the plate) and Communion. The guidelines, however, do not suggest anything about singing…. The Evangelical Lutheran Church in America's Metropolitan New York Synod will recommend that churches refrain from singing and that if music is performed during a service, it should be a solo instrument or a prerecording…. Jeff Schlegelmilch, who worked as an epidemiologist in Boston and is deputy director of the National Center for Disaster Preparedness at Columbia University said, "It's always safer to say no [to choral singing]. You have a lot of people in an enclosed space for a period of time."

Jamie Aten, executive director of the Humanitarian Disaster Institute at Wheaton College, has urged churches to exercise caution in reopening because any rules they try to create, such as limits on singing, might be difficult to enforce. "We can take steps to mitigate possible harm from covid-19 in our churches, but until we know more, we don't really know where our safety boundaries are."

Source: https://www.washingtonpost.com/religion/2020/05/07/church-reopen-sing-masks-service/