

# Session #2: Reopening Standards and Tools





Guy Bliesner  
School Safety &  
Security Analyst

guy.bliesner  
@dbs.idaho.gov



David Sturtz  
Partner

dsturtz  
@coopstrategies.com



Sharon Danks  
CEO

sharon  
@greenschoolyards.org



Cheryl Aquadro  
K12 Director

cheryl.aquadro  
@jci.com



Jeff Vincent, PhD  
Director

jvincent  
@berkeley.edu



Paul Mills  
SVP, K12 Strategy

pmills  
@cannondesign.com



# Now What? webinar series

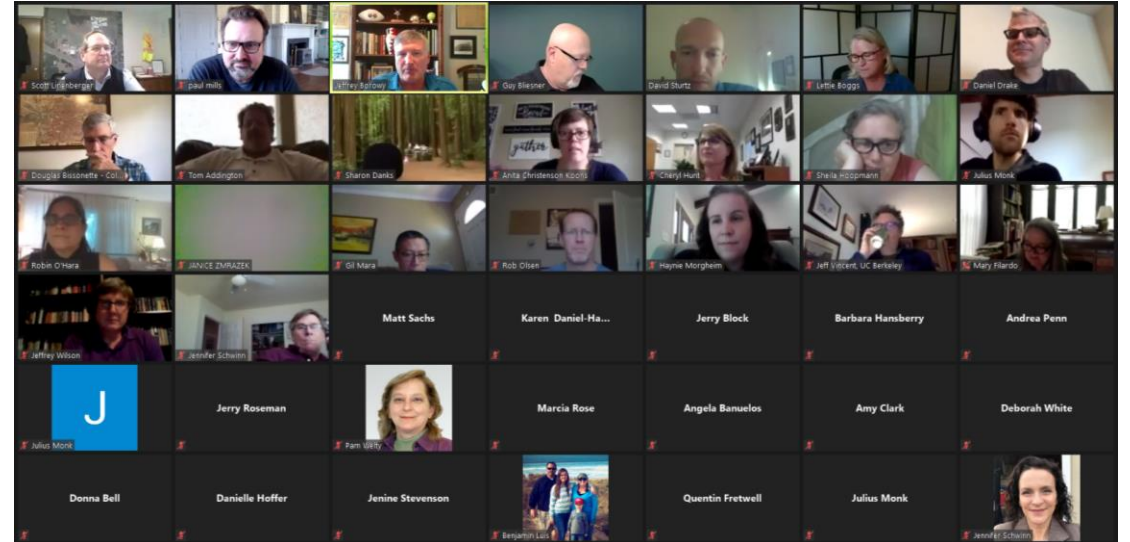
**473** Participants

**302** States & School Districts

**30** Weekly webinars

**46** Hours of content

**1,400** Combined hours of peer-to-peer dialog



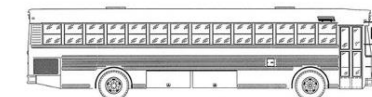
## ► NOW WHAT? SCHOOL REOPENING CONSIDERATIONS

AUGUST 27, 2020



# Webinar topics

Date	Speaker	Organization	Topics
16-Apr	Mary Filardo	NCSF	Federal Legislation
23-Apr	Mary Filardo	NCSF	Federal Legislation, Public Health Strategies for Reopening School Facilities
30-Apr	Mary Filardo	NCSF	Capacity modeling and Covid-19 response budgeting
7-May	Mary Filardo	NCSF	Capacity modeling and Covid-19 response budgeting
14-May	Paul Mills	CannonDesign	Capacity modeling and Covid-19 response budgeting
21-May	Mary Filardo	NCSF	CDC Guidance, Summary of "What's keeping you up at night"
28-May	Mary Filardo	NCSF	New CDC Guidance, Summary of Philadelphia teacher survey, operational planning framework
4-Jun	Mary Filardo	NCSF	NEW GAO Guidance and Federal Legislation.
11-Jun	Julius Monk	Durham Public Schools	Durham's reopening plans
18-Jun	Juan Mireles, Fred Yeager, Jennifer Schwinn	California Department of Education	State-specific guidance and reopening plans
25-Jun	Jeff Wilson	Huntsville City Schools	Developing and implementing professional development around Covid response
2-Jul	Debbie White	Goochland County Public Schools	Reopening with rural schools
9-Jul	Guy Bliesner	Idaho Department of Education	School Safety in the pandemic
16-Jul	Cindy Powell	Arlington Independent School District	Reopening a large district in TX
23-Jul	Kathleen Moore & Jeff Vincent	National Academies of Science, Engineering and Medicine	Reviewing the NASEM report.
30-Jul	Phoebe Beierle & Thomas Horton	USGBC	Indoor Air Quality
6-Aug	Josh Chism	Colorado Springs D11	HVAC renovations
13-Aug	David Lipton	North Carolina Department of Health & Human Services	Cleaning & Disinfecting
20-Aug	Rob Olsen & Chris Peterson	Iowa Department of Education	Athletics
27-Aug	Lauren Ancel Meyers	University of Texas, Austin	Understanding Covid-19 spread & cohort size
3-Sep	Sean Gill & Lisa Chu	Center on Reinventing Public Education	Sampling school reopening plans
10-Sep	Jeff Vincent	Center for Cities + Schools, UC Berkeley	Summary guidance for school reopening
17-Sep	Scott Leopold	Cooperative Strategies	How to approach student demographic analyses for 2020
24-Sep	Will Morris & Bobby Offterdinger	EdConnective	Professional Development
1-Oct	David Steiner	Johns Hopkins Institute for Education Policy	Learning loss during Covid and how to close the gaps.
8-Oct	Mary Filardo	NCSF	Review of lessons to-date
15-Oct	Paul Mills	CannonDesign	Applying Cohort Modeling
29-Oct	Erin Sullivan and team	JeffCo	Student and Staff Mental Health



Normal School Bus Capacity	Social Distance Absolute Maximum Capacity	Minimum Capacity Reduction
56 (14 rows x 4 seats)	7 (1 student every other row, alternating sides)	-88%



# What school operators are thinking about

- How to make decisions with limited and shifting guidance.
  - Strategies to feasibly minimize health risk.
  - How much prevention is enough?
  - How to pay for operational impact.
- 
- Learning loss.
  - (What we can learn from this experience).

# Data tools for COVID-19 response

**Social-Distancing Capacity Model**

Resulting Capacity Utilization by school

Virtual attendance (0-1.00)	Resulting Capacity Utilization by school	School Type	School Filter
0	Capacity utilization is calculated by Illinois ISBE 2020 official enrollment count into the resulting featured capacity based on social distancing parameters, utilization factors, and restructure decisions.	(All)	(All)

Capacity utilization: Classrooms only (70%)

Capacity Name	School Name	Enrollment 2019	Enrollment virtual	Capacity base	Capacity restructure	Capacity utilization Classrooms only (70%)
Albarran	Air Force Academy High School	194	194	254	95	76%
Albarran	Albarran Elem School	633	633	275	52	209%
Albarran	Agnes Agnes Elem School	468	468	272	12	172%
Albarran	Albarran Park Multicultural E.	516	516	328	77	157%
Albarran	Albarran Elem School	1600	650	220	81	202%
Albarran	Albarran College Prep	319	319	194	20	164%
Albarran	Albarran High School	186	186	151	95	122%
Albarran	Albarran Community Acad.	247	247	426	149	81%
Albarran	Albarran Leadership Acad.	831	831	424	118	201%
Albarran	Albarran High School	1,382	1,382	505	137	274%
Albarran	Albarran Community Acad.	754	754	435	147	182%
Albarran	Albarran Elem School	229	229	246	82	92%
Albarran	Albarran O Elem Int. Stu.	1,184	1,184	628	96	189%
Albarran	Albarran Community Elem S.	411	411	234	101	192%
Albarran	Albarran Elem School	360	360	244	85	122%
Albarran	Albarran Charter - Megan C.	207	207	420	183	49%
Albarran	Albarran Elem School	528	528	296	51	179%
Albarran	Albarran College and Career A.	238	238	529	400	24%
Albarran	Albarran Park Elem School	241	241	283	177	88%
Albarran	Albarran Elem School	850	850	396	104	213%
Albarran	Albarran College and Career A.	1,060	1,060	411	137	246%
Albarran	Albarran Academy	518	518	276	85	115%
Albarran	Albarran Elem Comp Math B.	266	266	135	72	197%
Albarran	Albarran Elem School/Falconer	1,460	1,460	291	92	300%
Albarran	Albarran Elem School	148	148	324	108	97%
Albarran	Albarran Elem School	387	387	257	136	151%
Albarran	Albarran Elem School	880	880	495	189	282%
Albarran	Albarran Elem School	75	75	234	52	30%

**CANNODESIGN**

## Social Distancing & Classroom/School Capacity Model

[www.cannondesign.com/classroom-capacity-calculator/](http://www.cannondesign.com/classroom-capacity-calculator/)

**Coronavirus Group Exposure Risk Calculator**

Select your County: Alameda

Population: 1,671,329

7-Day New COVID-19 Cases (total reported): 948

7-Day New COVID-19 Cases (per 100K): 57

Group Size Limit: 122

Rolling 7-Day Aggregate New Cases per 100K Population

Weekly Cases Per 100K Population

Group Size	Current	Limit
50	138 max vs. 57 current	57
100	69 max vs. 57 current	57
500	14 max vs. 57 current	57
1000	7 max vs. 57 current	57

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## School and University Cohort Exposure Risk Model

w/ Dr. Lauren Ancel Meyers, UT Austin

[www.cannondesign.com/coronavirus-risk-model/](http://www.cannondesign.com/coronavirus-risk-model/)

**Classroom Ventilation & Transmission Risk Model**

Room Dimensions: length 30, width 30, height 8

Room Use / Social Distancing: personal space 2, social distance 2, unusable perimeter linear ft 1.5

HVAC Ventilation / Filtration: total airflow (cfm) 1,500, outside air flow (cfm) 300, room use for code Classroom, Classroom age 3+

Infection Transmission: filter particle diameter MERV 13, filter efficiency 99.97%

17 occupants (16 students, 1 teacher, 3 unoccupied seats) of volume 30' x 30' (900 sf) x 9' height

8,100 of 278 cfm of outside air required by ASHRAE

108% of 278 cfm of outside air required by ASHRAE

6.2 clean air changes per hour

6.1% risk of transmission per person each 6 hours

1.0 probable transmissions

**CANNODESIGN**

## Classroom Ventilation and Transmission Risk Model

w/ Dr. Jose Jiménez, UC Boulder and ASHRAE Epidemic Task Force

<https://www.cannondesign.com/covid-transmission-risk/>

# Data tools for COVID-19 response

**Socially-Distanced Capacity Calculations Based on Locally-Determined Parameters and CPS Enrollment/Facility Inventory Data**

**Social Distancing & Classroom/School Capacity Model**

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**Coronavirus Group Exposure Risk Calculator**

**School and University Cohort Exposure Risk Model**

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**Classroom Ventilation & Transmission Risk**

**Classroom Ventilation and Transmission Risk Model**

<https://www.cannondesign.com/covid-transmission-risk/>

# Parametric Capacity Modeling

Set custom spatial parameters

Define which spaces are recapturable for capacity

## Socially-Distanced Classroom Capacity

A parametric model based on user-specified assumptions and reasonable permutations of classroom length-width dimensions.

### Model parameters

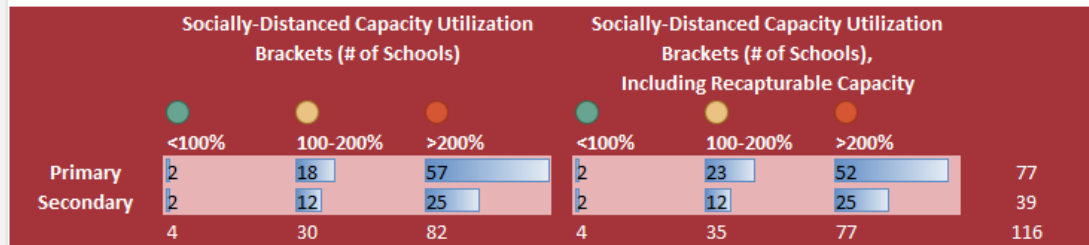
social distancing ft apart	6
personal space ft	3
avg fixed furniture depth	1.5
spaces for teacher/others	1
Classroom SF range low	700
Classroom SF range high	800

### Utilization Factor

Primary	0.95
Secondary	0.75

### % of Rooms Recaptured

Primary Art Room	0%
Primary Cafeteria	100%
Primary Computer Lab	100%
Primary Drama	100%
Primary Music Room	0%
Primary PE/Dance	0%
Primary PTA/Community	100%
Primary Pullout Room	0%
Primary Science Room	0%
Primary Stage	100%
Secondary Media Center	100%
Secondary PTA/Community	0%
Secondary Pullout Room	25%



District	School Name	School type	social distanced capacity	social distanced recaptureable capacity	utilization social distanced	utilization social distanced with max recaptureable space
Central District	Waimalu El	ES	284	159	138%	88%
Central District	Aiea El	ES	211	97	150%	103%
Central District	Alvah Scott El	ES	299	179	159%	99%
Central District	Webling El	ES	239	53	178%	146%
Central District	Pearl Ridge El	ES	259	44	187%	160%
Central District	Aiea High	HS	546	236	183%	128%
Central District	Aiea Intermediate	MS	373	64	162%	138%
Central District	Wahiawa El	ES	278	138	143%	95%
Central District	Solomon El	ES	501	209	153%	108%
Central District	Iliahi El	ES	211	95	178%	123%
Central District	Wheeler El	ES	382	75	178%	149%
Central District	Helemano El	ES	276	77	187%	146%
Central District	Kaala El	ES	228	96	189%	133%
Central District	Inouye El	ES	341	114	193%	144%
Central District	Leilehua High	HS	918	280	179%	137%
Central District	Wahiawa Middle	MS	526	96	156%	132%
Central District	Wheeler Middle	MS	400	146	195%	143%
Central District	Kipapa El	ES	374	86	151%	123%
Central District	Mililani Ike El	ES	358	101	173%	135%
Central District	Mililani Waena El	ES	380	98	201%	160%
Central District	Mililani Mauka El	ES	381	116	204%	156%
Central District	Mililani Uka El	ES	301	234	234%	132%
Central District	Mililani High	HS	1073	147	244%	215%
Central District	Mililani Middle	MS	685	127	274%	231%
Central District	Red Hill El	ES	246	96	181%	130%
Central District	Salt Lake El	ES	320	117	218%	160%
Central District	Shafter El	ES	187	45	222%	179%
Central District	Moanalua El	ES	287	105	228%	167%
Central District	Moanalua High	HS	950	206	213%	175%
Central District	Moanalua Middle	MS	337	88	253%	200%
Central District	Mokulele El	ES	236	125	95%	62%

'What-if' implications for each school or entire portfolio



# Demo

[www.cannondesign.com/classroom-capacity-calculator/](http://www.cannondesign.com/classroom-capacity-calculator/)

[www.cannondesign.com/massachusetts-capacity-dashboard/](http://www.cannondesign.com/massachusetts-capacity-dashboard/)

[www.cannondesign.com/chicago-capacity-dashboard/](http://www.cannondesign.com/chicago-capacity-dashboard/)

[www.cannondesign.com/atlanta-capacity-dashboard/](http://www.cannondesign.com/atlanta-capacity-dashboard/)

[www.cannondesign.com/brevard-capacity-dashboard/](http://www.cannondesign.com/brevard-capacity-dashboard/)

[www.cannondesign.com/buffalo-capacity-dashboard/](http://www.cannondesign.com/buffalo-capacity-dashboard/)

# Data tools for COVID-19 response

Virtual attendance: 0-1.00  
 Social Distancing: library, personal space, social distance, unusable length/width, teacher desks, teaching wall desks  
 Capacity Utilization Factors: 0-1.00  
 Socially-Distanced Capacity Calculations Based on Locally-Determined Parameters and CPS Enrollment/Facility Inventory Data

Campus Name	School Name	Enrollment 2019 SBE	Enrollment virtual	Capacity base	Capacity recapture	Capacity utilization Classrooms only (With recapture)
Abbott	Air Force Acad High School	194	194	254	55	76%
Adams	Adams Elem School	633	633	275	53	209%
Agassiz	Agassiz Elem School	468	468	272	12	172%
Albany Pa.	Albany Park Multicultural C.	516	516	328	77	157%
Alcott	Alcott Elem School	650	650	229	81	309%
Alcott Co.	Alcott College Prep	319	319	194	20	164%
Aldridge	Aldridge Elem School	185	185	151	95	123%
Alford	Wentworth Elem School	247	247	426	149	61%
Almy	Marine Leadership Academ.	813	813	414	118	201%
Amundson	Amundson High School	1,382	1,382	505	137	274%
Amundson	Amundson Community Acad.	754	754	455	147	162%
Armour	Armour Elem School	229	229	246	92	92%
Armstrong	Armstrong G Elem Intl. Stu.	1,184	1,184	608	96	195%
Ashburn	Ashburn Community Elem S.	411	411	214	101	192%
Ahne	Ahne Elem School	300	300	244	65	123%
Aspin-Ha.	ASPIHA Charter - Haugen C.	207	207	420	163	49%
Audubon	Audubon Elem School	528	528	296	61	178%
Austin Co.	Austin College and Career A.	238	238	929	409	26%
Avalon Pa.	Avalon Park Elem School	241	241	283	177	85%
Azueta	Azueta Elem School	850	850	396	104	215%
Back of th.	Back of The Fields 8th-10	1,000	1,000	411	137	246%
Banham	Mayo Elem Academy	318	318	276	85	115%
Barnard	Barnard Elem Comp Math 8.	266	266	135	72	197%
Berry	Berry Elem School/Falconer	1,469	1,469	291	92	505%
Barton	Barton Elem School	316	316	324	108	97%
Bass	Bass Elem School	387	387	257	136	151%
Battman	Battman Elem School	880	880	495	189	202%
Beard	Beard Elem School	75	75	234	52	39%

## Social Distancing & Classroom/School Capacity Model

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Coronavirus Group Exposure Risk Calculator  
 Select your County: Alameda  
 Population: 1,671,329  
 7-Day New COVID-19 Cases (total reported): 948  
 7-Day New COVID-19 Cases (per 100K): 57  
 Group Size Limit: 122  
 Rolling 7-Day Aggregate New Cases per 100K Population  
 Weekly Cases Per 100K Population  
 Group Size Limit (Implied for <50% Risk of One Case per Week)

## School and University Cohort Exposure Risk Model

w/ Dr. Lauren Ancel Meyers, UT Austin

[www.cannondesign.com/coronavirus-risk-model/](http://www.cannondesign.com/coronavirus-risk-model/)

Classroom Ventilation & Transmission Risk  
 Room Dimensions: length 30, width 30, height 9  
 Room Use / Social Distancing: personal space, social distance, unusable perimeter linear ft  
 HVAC Ventilation / Filtration: total airflow (cfm), outside airflow (cfm), room use for code, Classroom age in years  
 Infection Transmission: 17 occupants (16 students, 1 teacher, 3 unoccupied seats) of volume 30' x 30' (900 sf) x 9' height  
 8,100 cfm of 278 cfm of outside air required by ASHRAE  
 6.2 clean air changes per hour  
 6.1% risk of transmission per person each 6 hours  
 1.0 probable transmissions

## Classroom Ventilation and Transmission Risk Model

w/ Dr. Jose Jiménez, UC Boulder and ASHRAE Epidemic Task Force

<https://www.cannondesign.com/covid-transmission-risk/>

## ▶ INTRODUCTIONS

Dr. Lauren Ancel Meyers



- Professor of Integrative Biology Sciences at UT Austin
- Trained as a mathematical biologist at Stanford Universities and has been in the field of network epidemiology using machine learning to improve outbreak forecasting and control.
- Leads an interdisciplinary team of scientists, engineers, and public health experts in uncovering the social and biological drivers of epidemics and building models for the CDC and other global health agencies to track and mitigate emerging diseases including COVID-19, pandemic influenza, Ebola, HIV, and Zika.

## Quick threshold

1. **Look up:** number of confirmed cases per 100,000 people over the last 7 days

Durham county: **77** cases per 100,000

Hillsborough county: **32** cases per 100,000

2. **Calculate:** threshold for 50% chance that a student/staff will arrive infected

S = number of people at school

C = case reporting rate

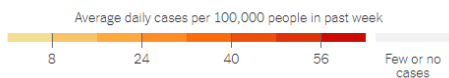
**Threshold =  $69,000 \cdot C/S$**

3. **Compare:** 7-day case counts to safety threshold

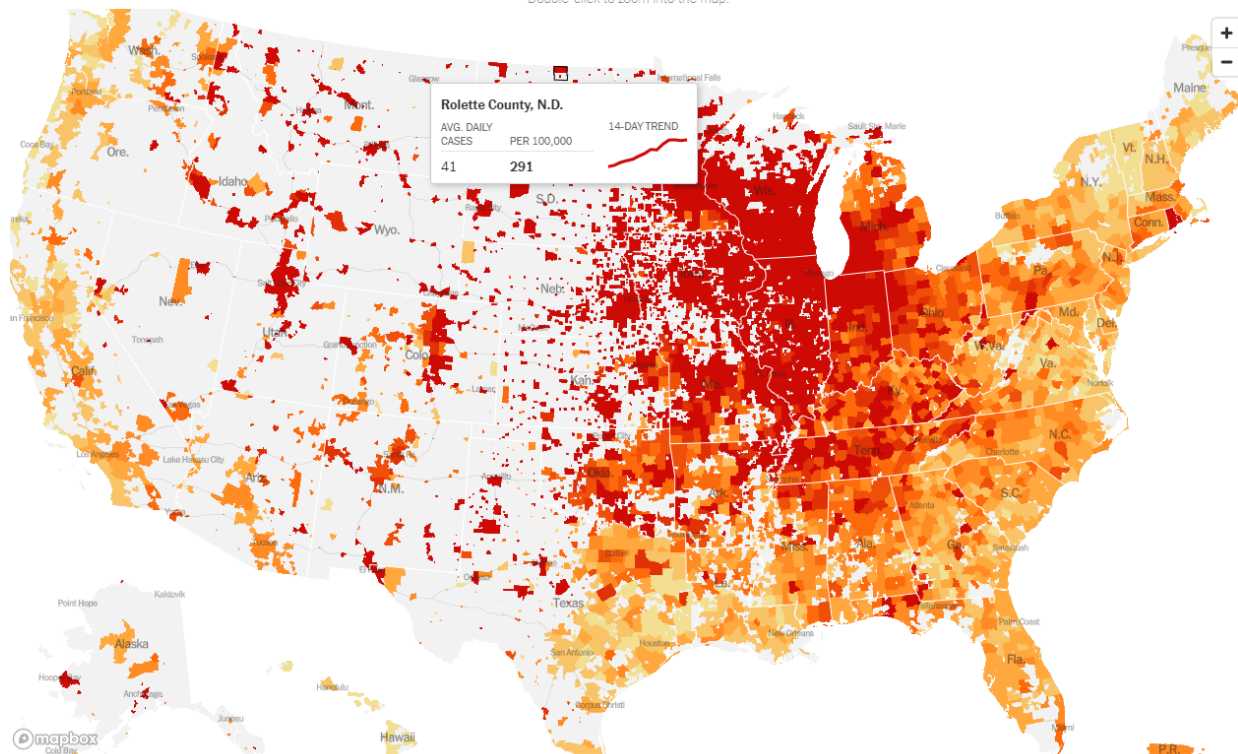
Assuming 1 in 10 cases detected (0.1)

S	Threshold
25	276
50	138
75	92
100	69
200	35
300	23
400	18
500	14

Hot spots Total cases Deaths Per capita



Double-click to zoom into the map.



	TOTAL CASES	PER 100,000	DAILY AVG. IN LAST 7 DAYS	▼ PER 100,000	WEEKLY CASES PER CAPITA
					FEWER MORE
North Dakota MAP »	56,357	7,395	1,309.3	171.8	March 1 Nov. 10
Eddy	290	12,680	9.9	431	
Walsh	983	9,238	43	404.1	
Cavalier	240	6,380	13.6	360.8	
Nelson	247	8,579	8.9	307.6	
Rolette	840	5,926	41.3	291.2	
Pierce	234	5,887	11	276.7	
Stutsman	1,543	7,453	56.6	273.2	
Ward	5,161	7,630	180.6	267	
Pembina	391	5,749	16.6	243.7	

Demo

[www.cannondesign.com/coronavirus-risk-model/](http://www.cannondesign.com/coronavirus-risk-model/)

# Data tools for COVID-19 response

Virtual attendance (0-1.00)	Receptable Capacity (0-1.00)	Resulting Capacity Utilization by school	School Type (All)	School Filter (All)
0	cafeteria	Capacity utilization is calculated by Illinois SBE 2023 official enrollment counts into the resulting factored capacity based on social distancing parameters, utilization factors, and recapture decisions.		

Campus Name	School Name	Enrollment 2019 SBE	Enrollment 2023 virtual	Capacity base	Capacity recapture	Capacity utilization Classrooms only (With recapture)
Abbott	Air Force Acad High School	194	194	254	55	76%
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Avalon Pa.	Avalon Park Elem School	241	241	283	177	85%
Azueta	Azueta Elem School	850	850	396	104	213%
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Banisher	Marys Elem Academy	318	318	276	85	115%
Barnard	Barnard Elem Comp Math 8.	266	266	135	72	129%
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**Socially-Distanced Capacity Calculations Based on Locally-Determined Parameters and CPS Enrollment/Facility Inventory Data**

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## Social Distancing & Classroom/School Capacity Model

[www.cannondesign.com/classroom-capacity-calculator/](http://www.cannondesign.com/classroom-capacity-calculator/)

**Coronavirus Group Exposure Risk Calculator**

Select your Country: **California** | Set case reporting rate: **0.1**

**Rolling 7-Day Aggregate New Cases per 100k Population**

7-Day New COVID-19 Cases (total reported)	CA	National
948	44,958	912,665

7-Day New COVID-19 Cases (per 100k): **57** | **114** | **280**

Group Size Limit: **122** | **61** | **25**

**When-If Scenarios:** Enter desired group sizes to compare threshold of 7-Day New Cases per 100k to current.

Group Size	Current	Scenario
50	57	138 max vs. 57 current
100	57	69 max vs. 57 current
500	57	14 max vs. 57 current
1000	57	7 max vs. 57 current

**Group Size Limit (implied for <50% Risk of One Case per Week)**

**Weekly Cases Per 100k Population**

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## School and University Cohort Exposure Risk Model

w/ Dr. Lauren Ancel Meyers, UT Austin

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**Classroom Ventilation & Transmission Risk**

**Room Dimensions:** length 30, width 30, height 8

**Room Use / Social Distancing:** personal space, social distance, unusable perimeter linear ft

**HVAC Ventilation / Filtration:** total airflow (cfm), outside air-flow (cfm), room use for code, Classroom age 3+

**Infection Transmission:** infection in room, exposure (hr), occupant movement, occupant speaking, PPE masks, PPE mask compliance, Clean mess

**Transmission Risk Based on Room Volume, Occupancy, Exposure Time, Ventilation, and Filtration (per Wells Riley Formula)**

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17 occupants (16 students, 1 teacher, 3 unoccupied seats) of volume 30' x 30' (900 sf) x 9' height

8,100 of 278 cfm of outside air required by ASHRAE

108% clean air changes per hour

6.2 risk of transmission per person each 6 hours

6.1% probable transmissions

1.0 probable transmissions

## Classroom Ventilation and Transmission Risk Model

w/ Dr. Jose Jiménez, UC Boulder and ASHRAE Epidemic Task Force

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# Wells Riley Equation

$$P_I = \frac{C}{S} = 1 - \exp\left(-\frac{Iqpt}{Q}\right)$$

$P_I$  is the probability of infection,

$C$  is the number of infection cases,

$S$  is the number of susceptibles,

$I$  is the number of infectors,

$p$  is the pulmonary ventilation rate of a person,

$q$  is the quanta generation rate,

$t$  is the exposure time interval, and

$Q$  is the room ventilation rate with clean air.

Demo

[www.cannondesign.com/covid-transmission-risk/](http://www.cannondesign.com/covid-transmission-risk/)



# Discussion

A word cloud featuring the phrase "Thank You" in multiple languages. The words are arranged in a roughly rectangular shape, with "THANK YOU" being the largest and most prominent. Other languages include Spanish, Arabic, Hebrew, Chinese, Hindi, Indonesian, Japanese, and Korean. The words are in various orientations, some horizontal and some vertical.

**THANK YOU**

**GRACIAS**  
**ARIGATO**  
**SHUKURIA**

**DANKSCHEEN**  
**SHUKRIA**  
**BIYAN**

**TASHAKKUR ATU**  
**YAQHANYELAY**  
**SUKSAMA**  
**EKHMET**

**MEHRBANI**  
**GRAZIE**  
**PALDIES**  
**BOLZIN**  
**MERCI**

**JUSPAXAR**  
**GOZAIMASHITA**  
**EFCHARISTO**

**KOMAPSUMNIDA**  
**MAAKE**  
**LAH**  
**MINMONCHAR**

**TINGKI**  
**SPASIBO**  
**SHACHALHYA**  
**CHALTU**  
**YUSPAGARITAM**  
**HUR**  
**WADEEJA**  
**MATTEKA**  
**UNALCHEESH**  
**UNALCHALHYA**  
**HEBASTAHNY**  
**GAEJTTHO**  
**AGUYJE**  
**FAKAAUE**  
**MAKETU**  
**SIKOMO**