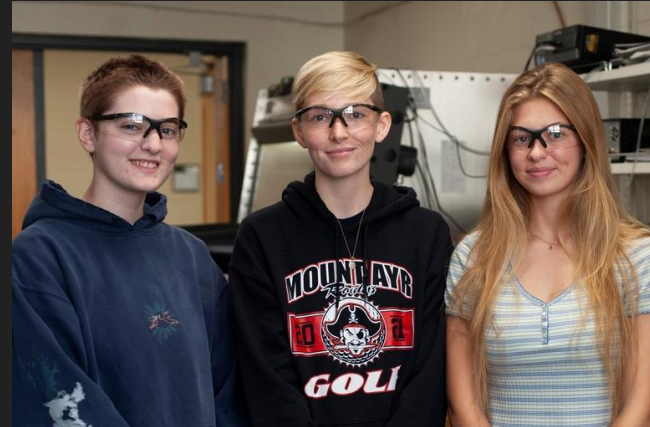




Microbial Growth
on Disposable
Masks: How
Gross are They?

Rural Scholars

- Rural students make up 50% of the UI student body, but only 17% of undergraduate researchers
- Rural Scholars program aims to introduce first-year students from rural areas to scientific research
 - Fall semester: tour different labs, learn about ongoing projects, pick a research question
 - Spring semester: lab work, presentation



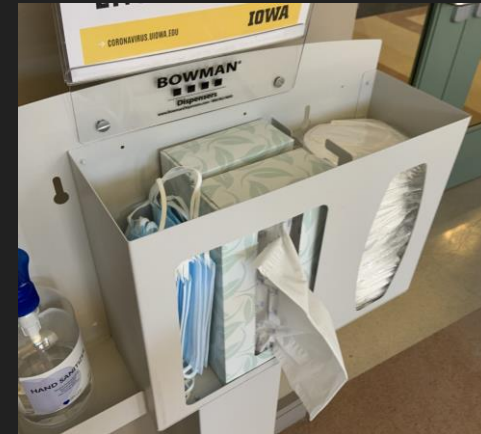
Introduction

Research Question: How much bacteria is growing on disposable masks? What factors affect this growth?

Significance: University provides free masks to students and masks were required in some spaces.

Research Plan:

- Collect masks from different campus locations
- Grow cultures on petri dishes
- Quantify number of visible growths after one week



Data Collection

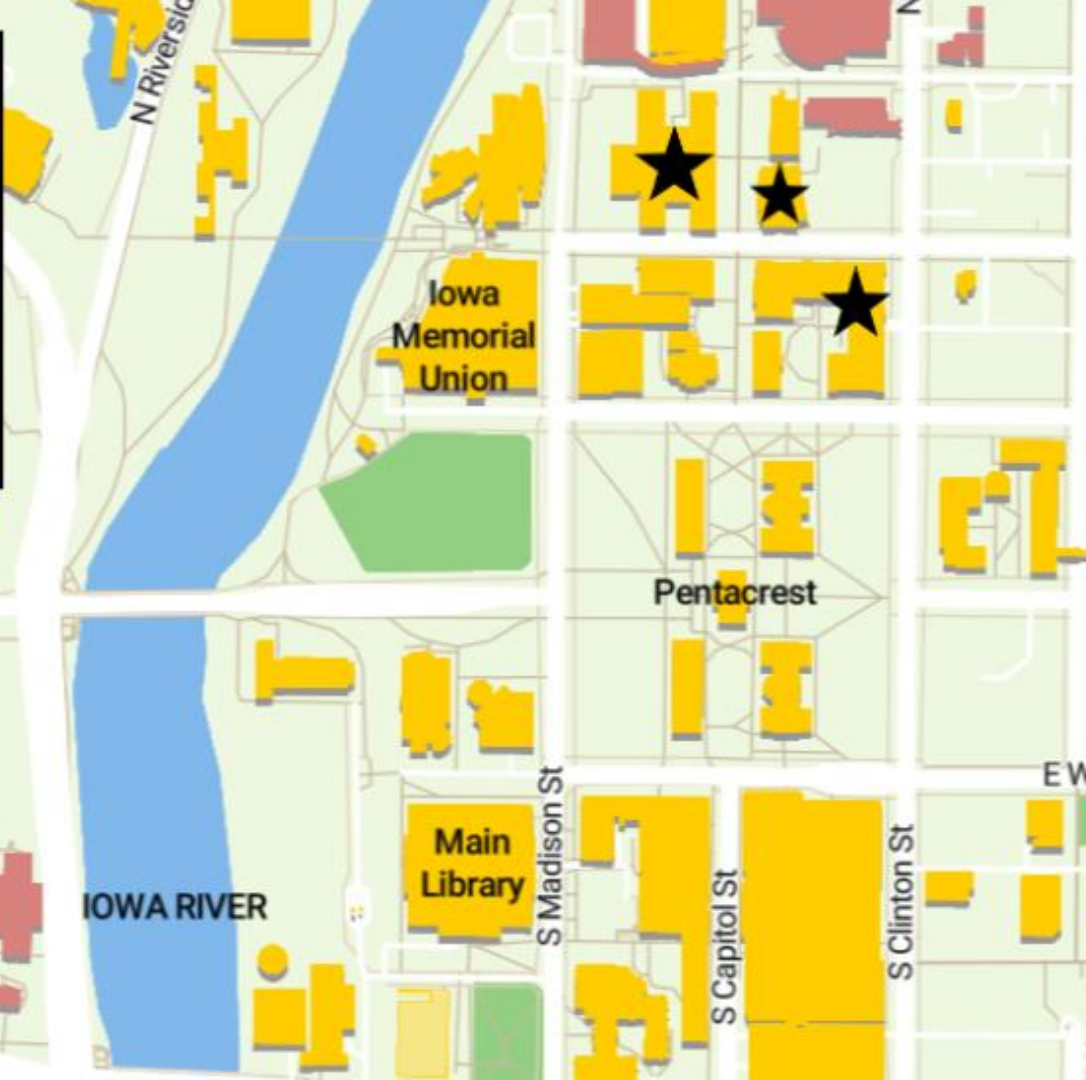
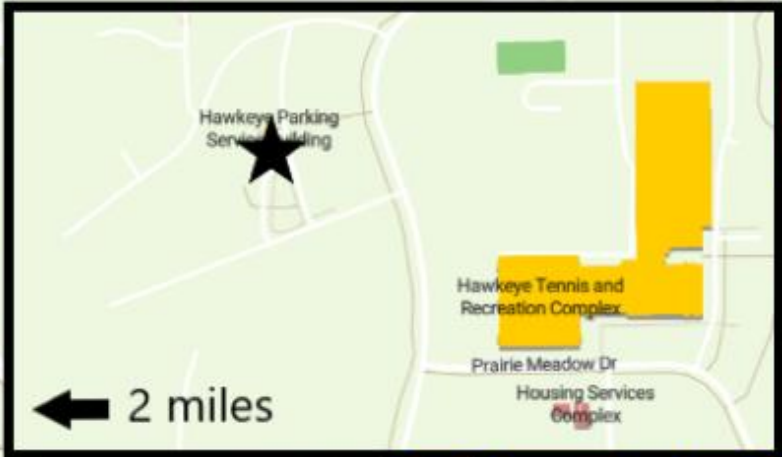
- Five locations over four weeks
- Two masks taken from each location - top and bottom

Locations:

- University Hospital
- Hawkeye Commuter Lot (“Hawklot”)
- Chemistry Building
- Pomerantz Career Center
- Pappajohn Business Building



Woolf A



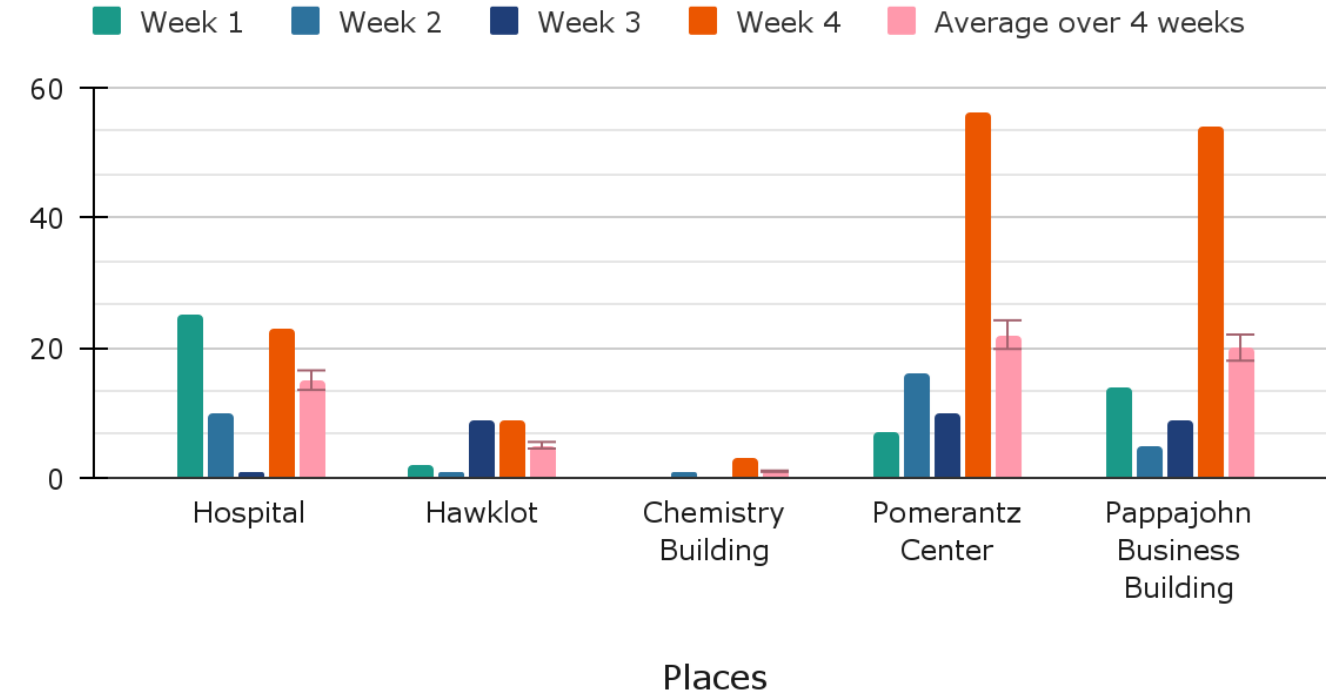
Procedure

1. Samples were collected (same days/times)
 2. Masks were swabbed onto nutrient agar petri dishes
 - a. Dishes were prepared prior – agar solution was autoclaved, then poured in a Laminar flow hood
 - b. Swabs were wetted with water
 - c. Swabbing was done in Laminar flow hood
 3. Dishes were parafilmed and placed in incubator at 32 °C (89.6 °F)
 4. Samples were incubated for one week then analyzed
- Perfecting the process took three months of our semester of research!



Data - Overall by building

Number of Visible Growths



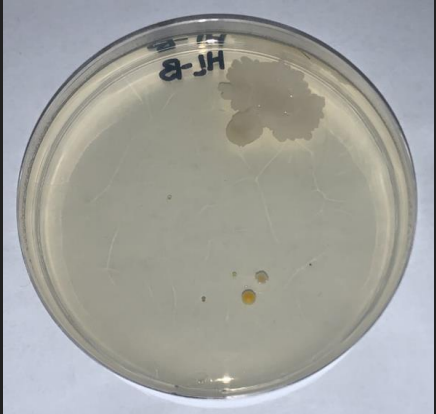
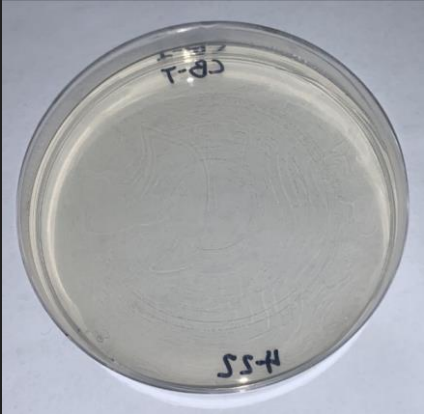
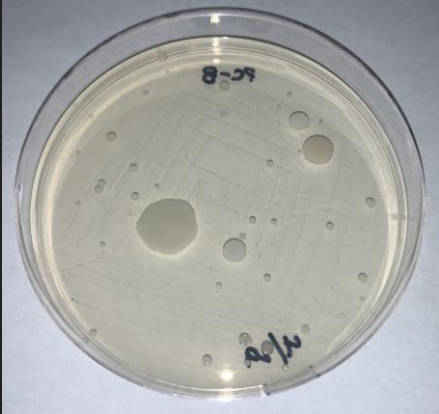
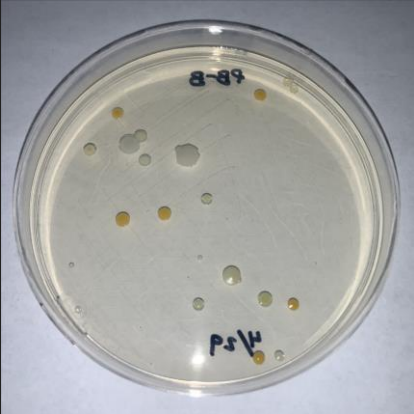
Pictures

PBB

Pomerantz Center

Chem Building

Hawklot



Week 4

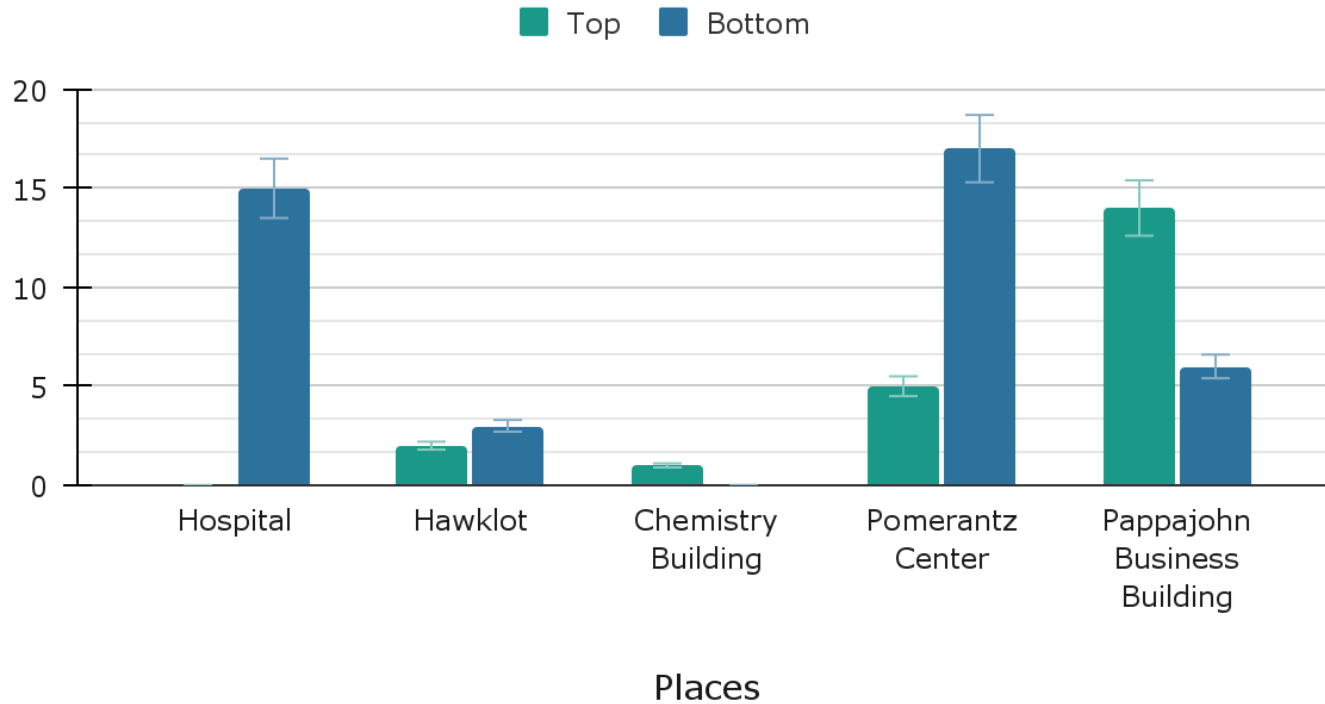
Week 4

Week 3

Week 3

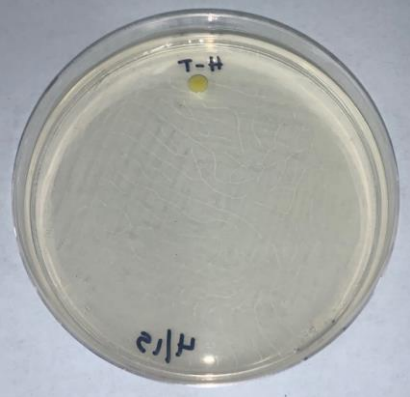
Data - Top vs. Bottom

Average Growth after Four Weeks



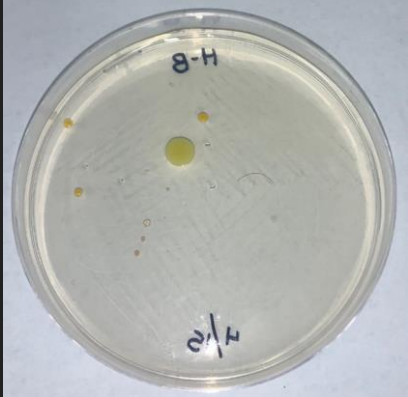
Pictures

Hospital Top



Week 2

Hospital Bottom



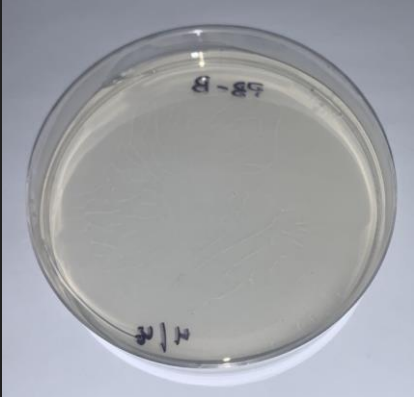
Week 2

PBB Top



Week 1

PBB Bottom



Week 1

Colors

Pomerantz Center



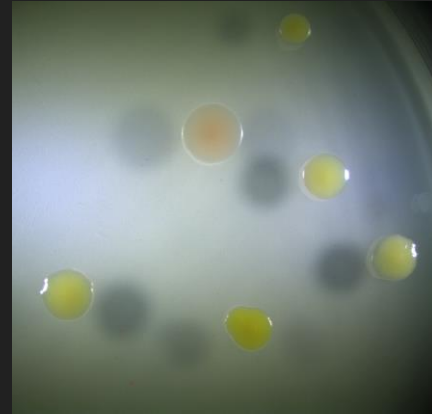
Week 2

Pomerantz Center



Week 2

Hospital



Week 4

PBB



Week 1

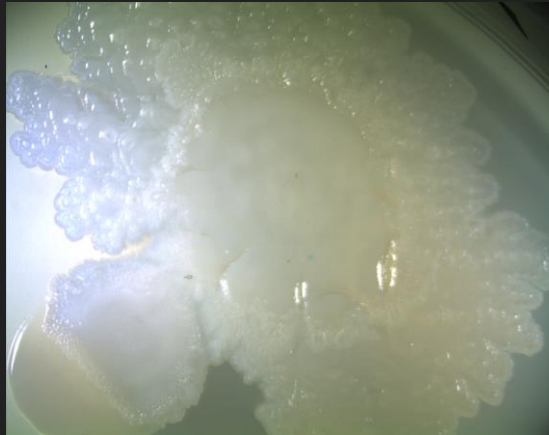
Shapes

Hawklot



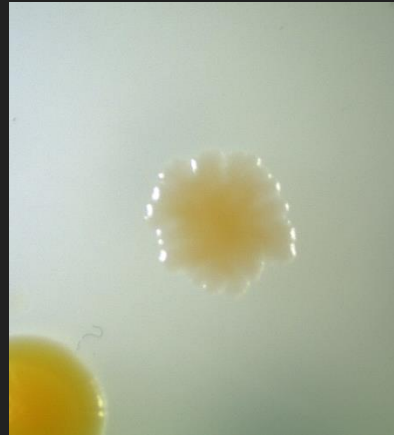
Week 4

Hawklot



Week 3

Hawklot



Week 3

Pomerantz



Week 4

Conclusions and Discussions

- Most Growths: Pomerantz Center (average 11)
- Least Growths: Chemistry Building (average 1)
- This bacteria is likely already in the air or in your mouth. We did not find any evidence that this bacteria is harmful.

- [Study from the Journal of Orthopaedic Translation](#) showed increasing bacteria rates are caused by individual wearing mask
- [Study from Oman Medical Journal](#) showed bacteria rates on masks correlate with air quality

Further Research

- DNA testing on bacteria
- Compare high foot traffic to low foot traffic
- Wash masks and test output*
- Compare microbial growth on different mask materials*
- Similar research on other university campuses
- Compare microbial growth in different weather conditions

Questions?

- Ask anything about:
 - Research Project
 - University of Iowa
 - Rural Scholars Program/Undergrad Research

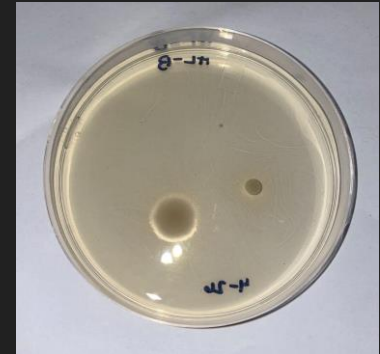
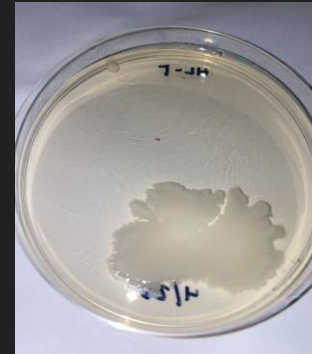
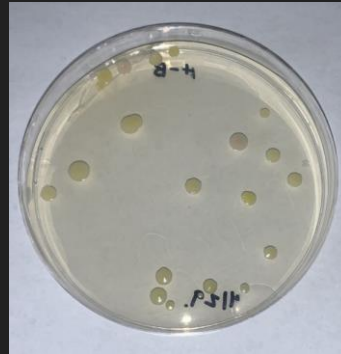
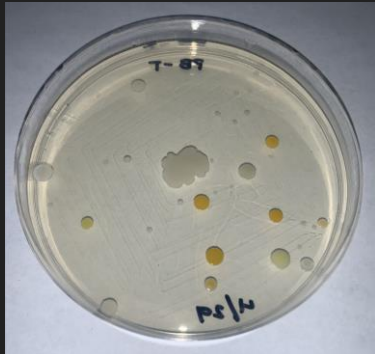
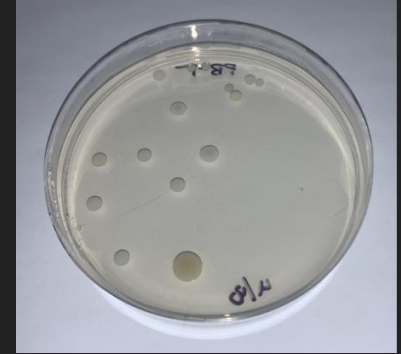
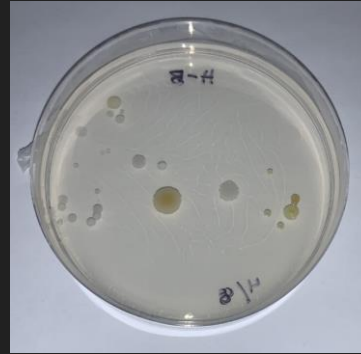


Table 1. Weekly growths of the top and bottom sample for each location.

Number of Visible Growths												
	HL-T	HL-B	H-T	H-B	C-T	C-B	PC-T	PC-B	PB-T	PB-B	BL1	BL2
Week 1	1	1	0	25	0	0	2	5	14	0	0	0
Week 2	1	0	1	9	1	0	6	10	3	2	0	0
Week 3	2	7	0	1	0	0	9	1	6	3	0	
Week 4	5	4	0	23	3	0	3	53	34	20	0	

Table 2. Average growths per sample per week.

	H	C	PC	PB	HL
Week 1	13	0	4	7	1
Week 2	5	1	8	3	1
Week 3	1	0	5	5	5
Week 4	12	2	28	27	5
Average per sample per week	7	1	11	10	3

Table 3. Average growth per week for each location.

	Hospital	C	PC	PB	HL
Average # of Growths Top	0	1	5	14	2
Average # of Growths Bottom	15	0	17	6	3
Average # of Growths Overall	7	1	11	10	3