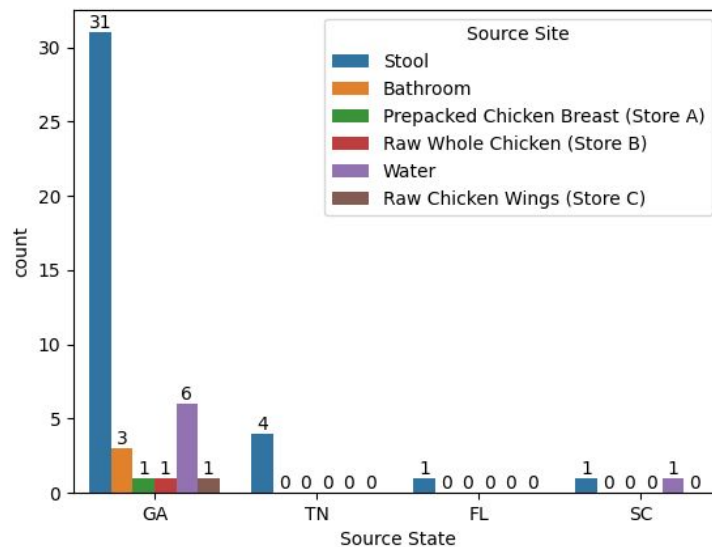
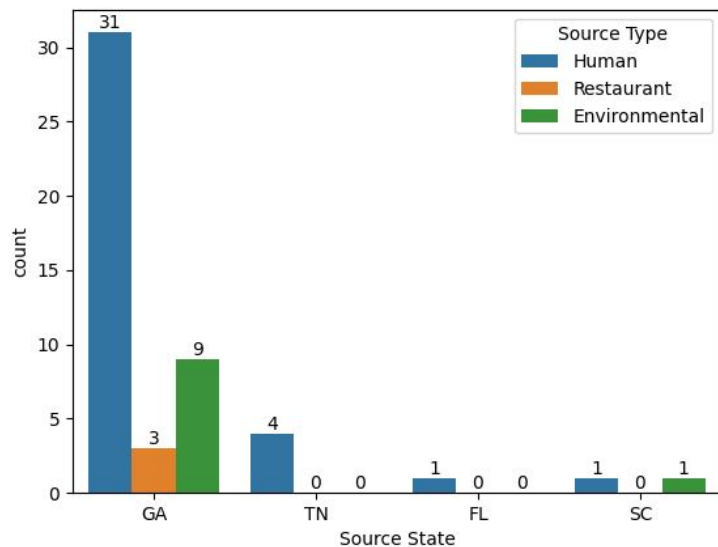




Comparative Genomics - Results

Team 2 (Group 4): Gautham Krishna Sankar Ramalaxmi, Ishika Verma, Jyothi Guruprasad, Pushti Dhananjay Mehta, Shreya Rajasekar, Varsha Srinivasan

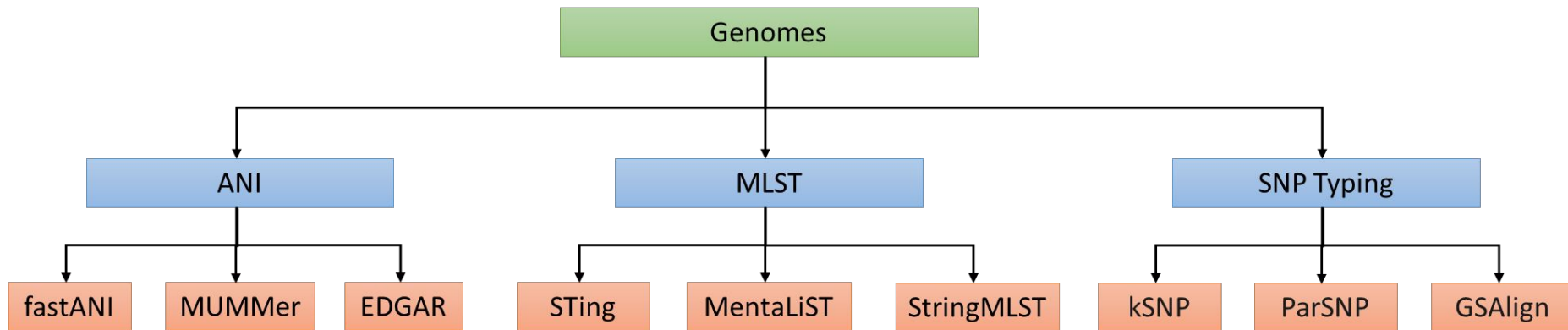
About the isolates



Origin of the 50 isolates from different US states

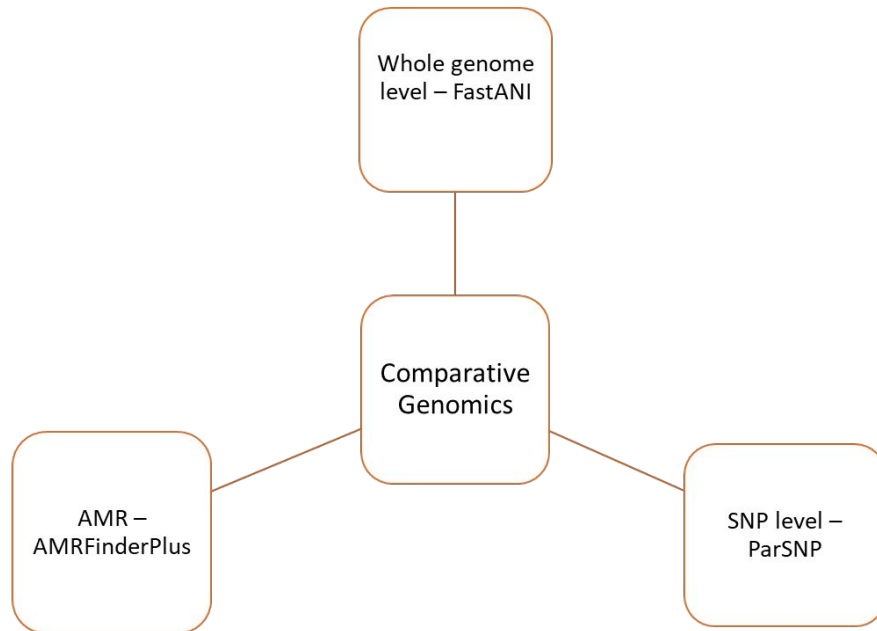


Initial Pipeline





Workflow



FastANI Results



FastANI

Installation

- `conda create -n fastani`
- `conda install -c bioconda fastani`

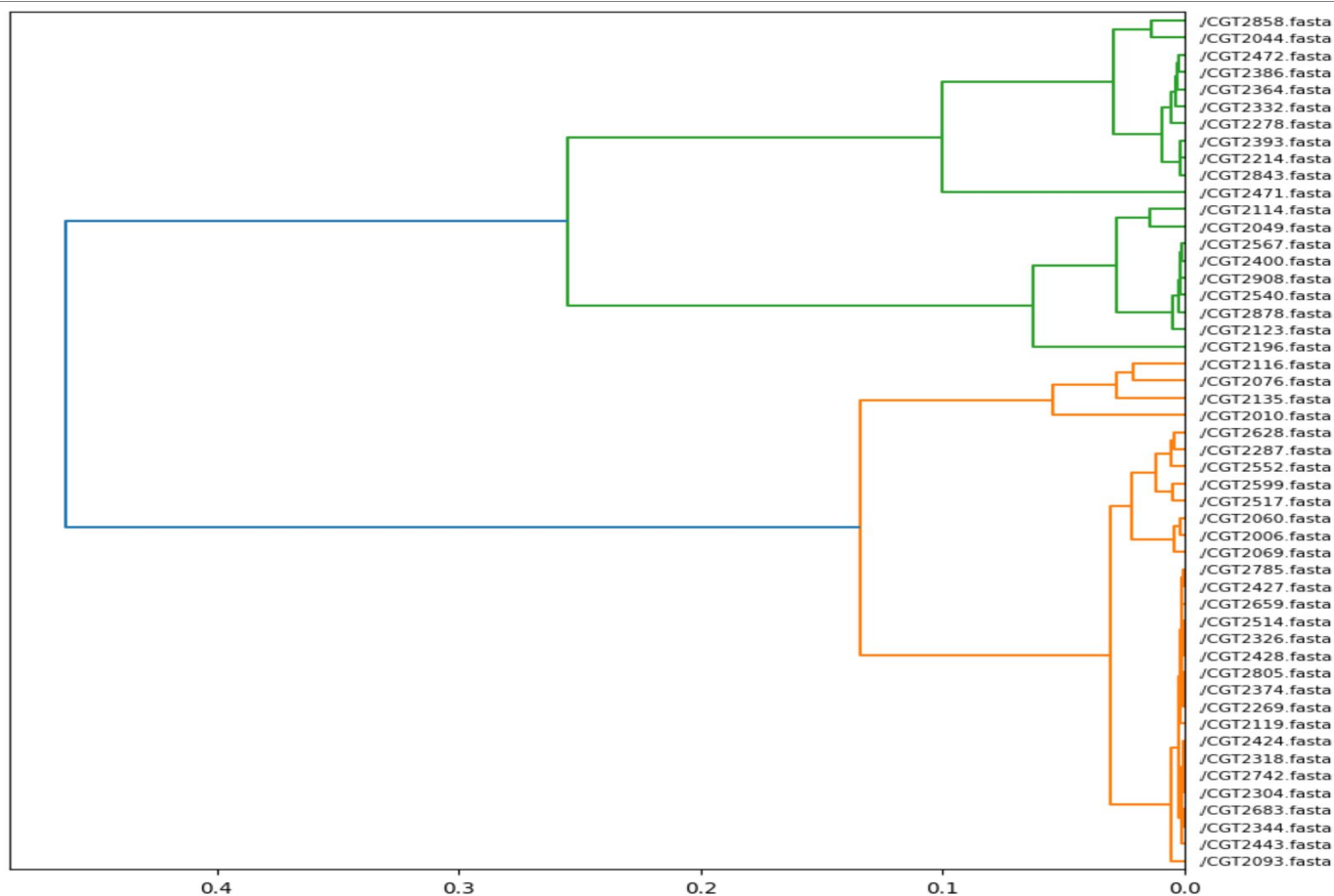
Running FastANI

- `conda activate fastani`
- `FastANI --ql <list-of-fasta-files> --rl <list-of-fasta-files> --threads 10 -o output.out`

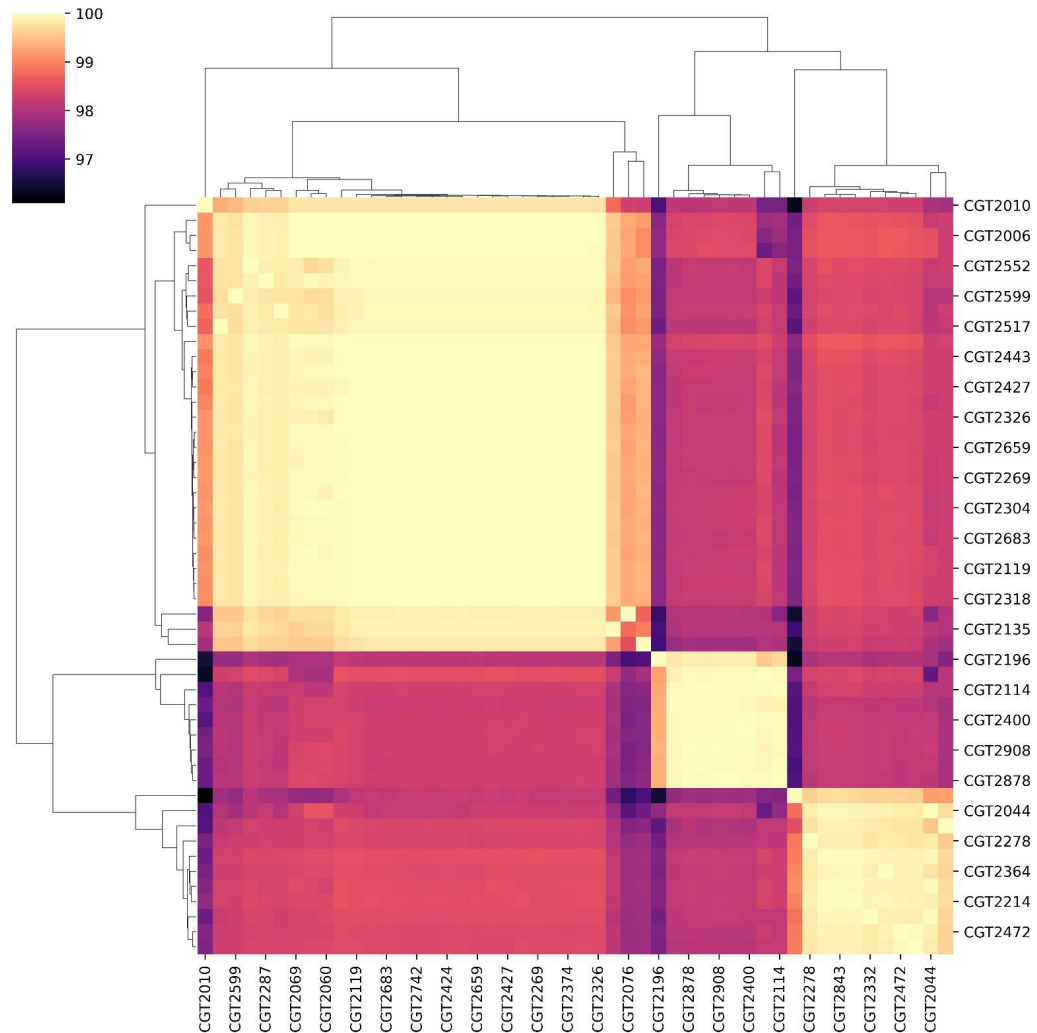
Visualization

- Used biopython, scipy.cluster.hierarchy for creating a phylogenetic tree
- Used matplotlib and seaborn for creating the heatmap.

Phylogenetic Tree



Heatmap



ParSNP Results



ParSNP

Installation

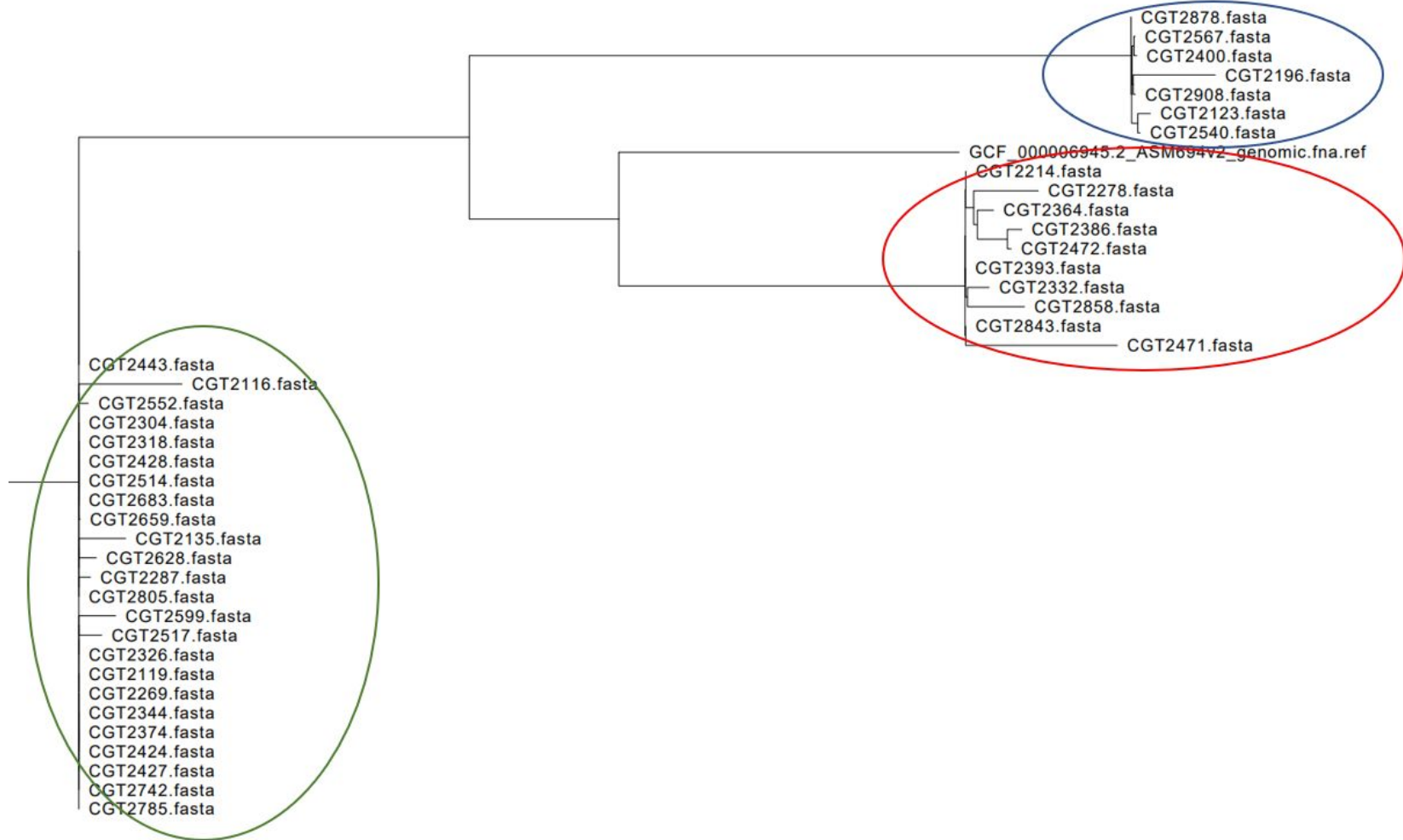
- `conda create -n par`
- `conda install -c bioconda parsnp`

Running Parsnp

- `conda activate par`
`parsnp \`
`-d contigs\`
`-r GCF_000006945.2_ASM694v2_genomic.fna\`
`-o parsnp_outdir \`
`-p 4`

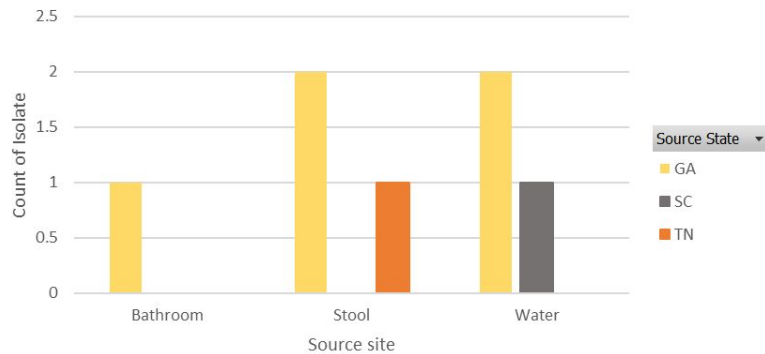
Visualization:

- `figtree parsnp_outdir/parsnp.tree`



Count of Isolate

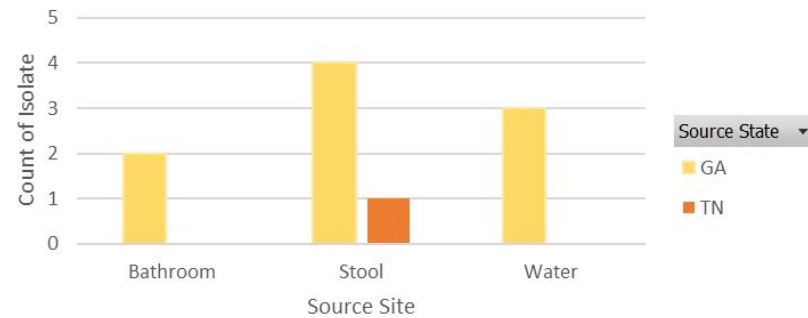
Cluster 1



Source Site

Count of Isolate

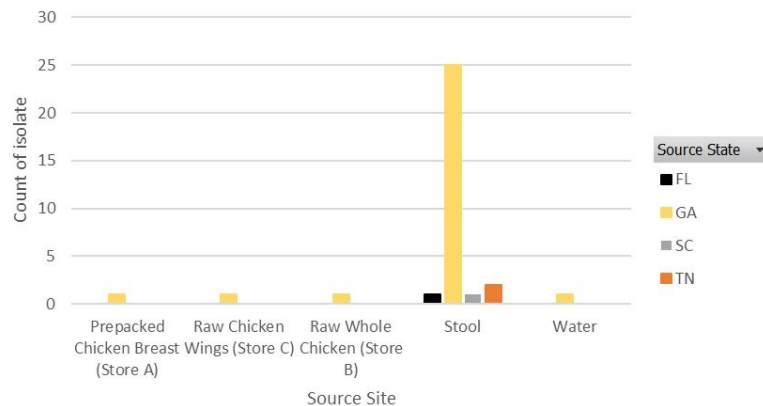
Cluster 2



Source Site

Count of Isolate

Cluster 3



Source Site

AMRFinderPlus Results

AMRFinderPlus



Role	Gene	Resistant to
antibiotic inactivation enzyme	Not identified	aminoglycoside
antibiotic resistant gene variant or mutant	Not identified	fosfomycin
antibiotic target protection protein	mfd	fluoroquinolone
protein(s) and two-component regulatory system modulating antibiotic efflux	kdpE	aminoglycoside
gene altering cell wall charge	PmrE	polymyxin
protein(s) conferring antibiotic resistance via molecular bypass	bacA	
efflux pump complex or subunit conferring antibiotic resistance	Not identified	
efflux pump complex or subunit conferring antibiotic resistance; protein modulating permeability to antibiotic; protein(s) and two-component regulatory system modulating antibiotic efflux	marA	
efflux pump complex or subunit conferring antibiotic resistance; protein(s) and two-component regulatory system modulating antibiotic efflux	Not identified	

Recommendations to the CDC



Courses of action

- Investigate the storage and distribution facilities of GA, FL, TN & SC
- Investigate the water treatment facilities in these states and test for Salmonella
- Investigate conditions in which poultry is raised
- Recall suspected contaminated batches of poultry
- Investigate the condition of public restrooms



General guidelines to prevent Salmonella infection

- Always wash hands after going out, touching animals and using the restroom
- Do not touch your mouth or face after touching animals; disinfect first
- Keep raw foods and meats separated
- Make sure the food you eat is well-cooked and hot
- Refrigerate perishable food within 2 hours of cooking



Task Delegation

- FastANI - Ishika, Shreya
- MLST-Based Methods - Jyothi, Varsha
- ParSNP - Pushti,
- AMRFinderPlus - Gautham Krishna
- CDC Recommendations - Varsha