

# 5G Technology and Possible Health Effects

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# 5G Technology

- Radio Frequency (RF) using frequencies from 600 MHz to 60 GHz
- Higher frequencies allow higher data rates, needed for Hi-Def Tele-Health, and self driving cars
- Uses “beamforming” – the energy is directed to the user not transmitted where not needed
- Millimeter frequencies are absorbed on the surface most objects
- Many transmitters will be use at lower power
- Cellular transmitters are only on during data transfer or phone call
- Typical transmitters broadcast continuously (TV, radio stations)

# Health Concerns?

- World Health Organization (WHO) with the International Agency for Research on Cancer (IARC) classify RF exposure as Group 2B.
- Group 2B : *The agent (mixture) is "possibly carcinogenic to humans"*.
- Group Includes Potassium Bromate (used in flour), aloe vera, gasoline (with oil, diesel, and exhaust), pickled vegetables, talcum powder, or being a firefighter, drycleaner, or carpenter.
- This group is below Group 2A (probable) and well below Group 1 (likely) classification
- RF or cell phones are not included in California's Prop 65.

# Likely and Probable Carcinogenic

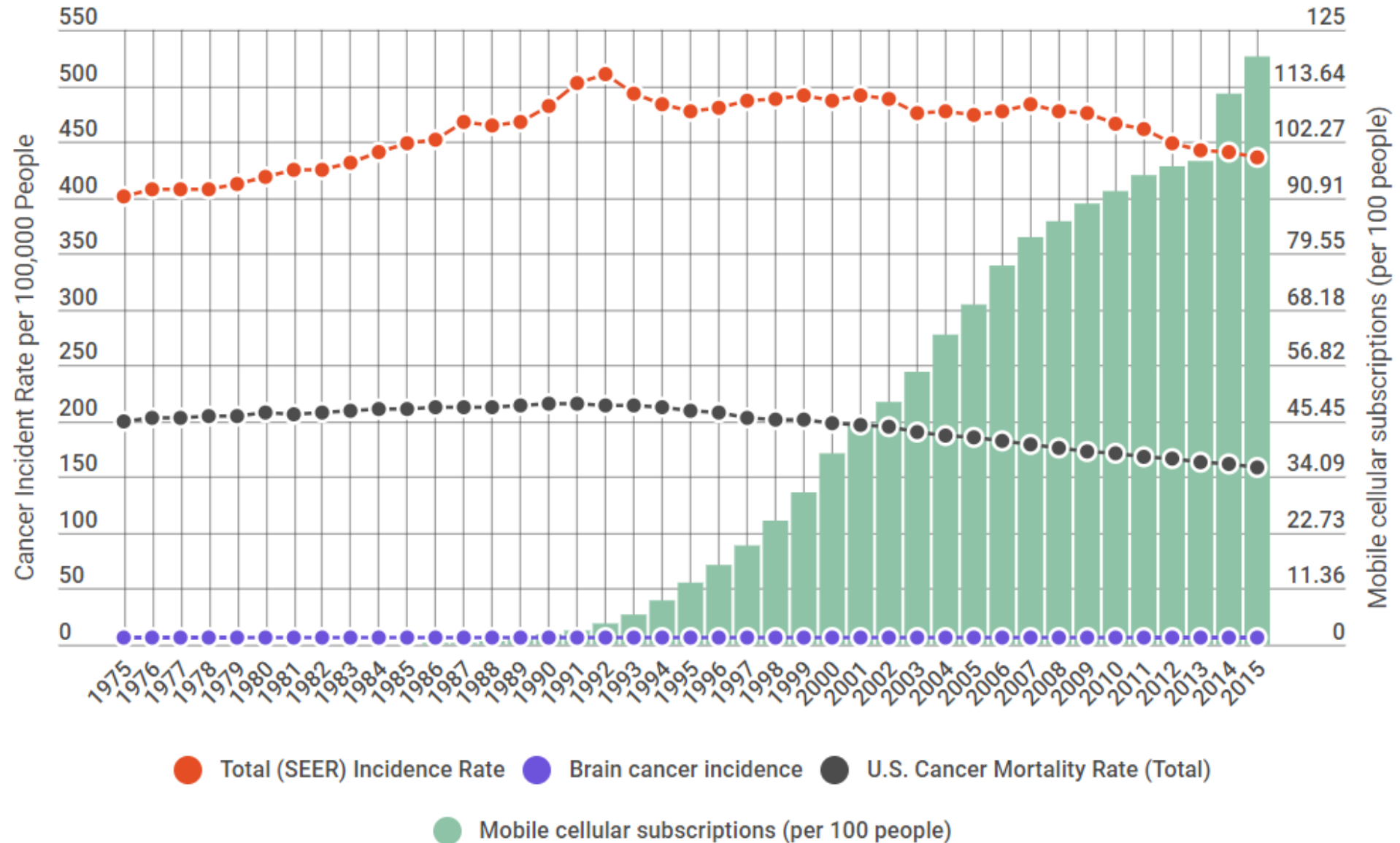
## Group 1

- Vinyl chloride (PVC)
- Nickel
- Sunlight (UVA, UVB, UVC) including tanning beds
- Air Pollution
- Leather and Wood dust
- Drinks with Alcohol
- Processed meat
- Estrogen

## Group 2A

- Frying food
- Drinking hot beverages
- Being a barber or hairdresser
- Cobalt metal with tungsten carbide (drill bits)
- Red Meat
- Working second shift
- Lead compounds
- Testosterone

# U.S. incidences of cancer and cellular subscriptions



# Research of Biological Effects

- Research in this frequency range has been performed for decades
- Current research include 5G modulations show no different result
- Research of millimeter wave show it is useful for therapy and a better method for breast cancer determination
- One study found rats subjected to millimeter waves were healthier and lived longer than the control group
- Ubiquitous: used for communication, radars, automotive safety
  - blind spot indicators
  - proximity indicators
  - emergency braking

Thank You

Questions?