INFECTIOUS DISEASE FORECASTING PART I
VACCINATION IN WASHOE COUNTY, NEVADA: THE MEDICAL INTELLIGENCE PERSPECTIVE

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MENINGOCOCCAL MENINGITIS
STREPTOCOCCUS (COVERED BY PREVNAR)
HEPATITIS A
HEPATITIS B

Hepatitis B Forecast

- Case Count
- Forecast High
- Forecast Low
- Historical Observations

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ROTAVIRUS
PERTUSSIS
MUMPS
NO BASELINE MEASLES IN WASHOE COUNTY, BUT IT IS EASILY IMPORTED (US FORECAST BELOW)
NO TETANUS REPORTED IN WASHOE, BUT IT IS ENDEMIC IN THE SOIL (US NATL FORECAST BELOW)
WASHOE COUNTY FORECAST

We are monitoring influenza A activity at this time. Overall, local influenza activity is mirroring national trends and is in decline.

We are forecasting increases in activity for the following diseases at the local level:

• Coccidioidomycosis
• Group A strep, invasive
• Malaria
• Meningitis, bacterial
• Q Fever
• Rotavirus gastroenteritis
• Shigellosis
• Tuberculosis

All of these are Class 0 Disruptors.
We are not issuing a forecast alert for influenza A or B at this time, a Class 2 Disruptor and a Class 1 Disruptor, respectively. As previously mentioned, influenza activity at the national level is in decline.

We are forecasting increases in activity for the following diseases at the national level:

• Human metapneumovirus (hMPV)
• Measles
• Parainfluenza Type 3 (HPIV-3)
• Shigellosis

All of these are Class 0 Disruptors.
INFECTIOUS DISEASE FORECASTING: PART II

DRUG RESISTANCE INTELLIGENCE

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Urinary tract infections represent 8% of all hospital admissions and up to 1/3 of ICU admissions.

E. coli is the dominant pathogen and is multi-drug resistant in northern Nevada.
  - Cipro is the #1 drug prescribed in Nevada for urinary tract infections.
  - E. coli in Nevada became resistant to Cipro in 2005.
    - Multi-drug resistance = 3X mortality rate.

Estimated 312M in healthcare expenses in Washoe County and Carson Valley just for urosepsis annually.

C. diff, a potentially lethal outcome of drug resistance
  - Here in Washoe County: a major problem.
LIVE FORECAST: WASHOE COUNTY / MDR GRAM NEGATIVES (CARBAPENEM-RESISTANT)
LIVE FORECAST: WASHOE COUNTY C. DIFF

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CIPRO-E. COLI RESISTANCE ACROSS ACUTE CARE FACILITIES, WASHOE COUNTY (INC. CARSON VALLEY)
CIPRO-E. COLI RESISTANCE ACROSS ACUTE CARE FACILITIES, WASHOE COUNTY (INC. CARSON VALLEY)

<table>
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<tr>
<th>Current Susceptibility (%)</th>
<th>APC</th>
<th>P-Value</th>
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<td>Cefazolin- 1st gen</td>
<td>Cefuroxime- 2nd gen</td>
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**Time to Cross 85% Threshold**

- 2030
- 2013
- 2018
- 2028
- 2025
- 2028
- 2052
- 2009
- Infinity
- Infinity
- 2032
SUMMARY

• Several antimicrobials were associated with statistically significant decline of susceptibilities below 85%: cefazolin, amoxicillin-clavulanate, ciprofloxacin, levofloxacin, and trimethoprim-sulfamethoxazole.

• Antimicrobials predicted to have a statistically significant decrease of *E. coli* susceptibilities below 85% within the next 10 to 15 years included ceftazidime, cefuroxime, ceftriaxone, gentamicin, and tobramycin.
HOW DRUG RESISTANCE INTELLIGENCE IS USED IN PRESCRIBER GUIDANCE

• It is one factor among many other factors such as:
  • Cost of the drug
  • Local availability of the drug
  • Organ penetrance / therapeutic levels
  • Side effects