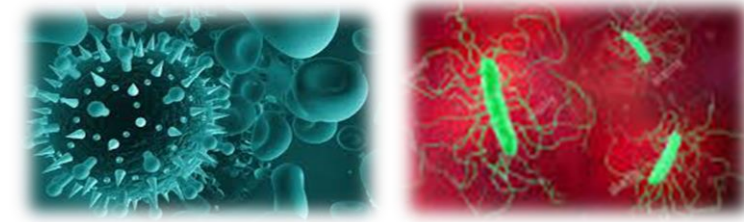


A TIME SERIES ANALYSIS OF RESPIRATORY SYNCYTIAL VIRUS (RSV) AND ITS POSSIBLE ASSOCIATION WITH *Clostridium difficile* INFECTIONS (CD)

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Introduction: RSV and CD have seasonal variations with higher incidence during winter

- ❑ RSV and CD infections show seasonality and are more common in winter. CD infections are potentially life threatening complication after the antibiotic therapy (1).
- ❑ Besides antibiotic use and other risk factors which influence the CD incidence the study in Canada showed that infections with RSV could impact incidence of CD (2). This fact is important as the global CD incidence is increasing and not all factors which influence it are well understood.
- ❑ NIJZ and Biotechnical Faculty Ljubljana performed a pilot investigation to describe the time series of RSV and CD infections and antibiotics prescribed for respiratory infections during years 2012 to 2016 with the aim to evaluate the potential effect of RSV infections on CD infections.

Methods: time series analysis, cross correlation analysis

- ❑ Data used for investigation were obtained from sentinel network for acute respiratory infections (RSV) and from surveillance databases on antibiotic use and CD.
- ❑ Weekly time series of CD infections, relative number of RSV infections and amount of four different antibiotics prescribed were examined to determine seasonal and trend component of each time series.
- ❑ Cross correlation analysis was performed to investigate if there is some correlation between CD infections and four time series.

Results: no important correlation between the CD and relative RSV time series

- ❑ Weekly time series of CD infections shows small positive trend component and even smaller seasonal component with period of 52 weeks (one year). The large part of variability of CD infections could be explained with random effect of weeks.
- ❑ The time series of relative RSV has evident seasonal component with the same period as CD with maximums during winter, and negative trend component.
- ❑ There is no important correlation between the CD and relative RSV time series even not between lagged time series (cross-correlation).

We found that there exists some positive cross-correlation between CD infections and number of prescribed fluoroquinolones.

- ❑ Other two antibiotics (macrolides, beta lactam antibiotics) do not correlate with CD infections.
- ❑ There was negative correlation between CD and trimetophrim sulphametasole.

Figure 1: Weekly data of relative RSV in Slovenia in the period 2012-16 and moving averages of order 4 (ma(4)) and 52 (ma(52)).

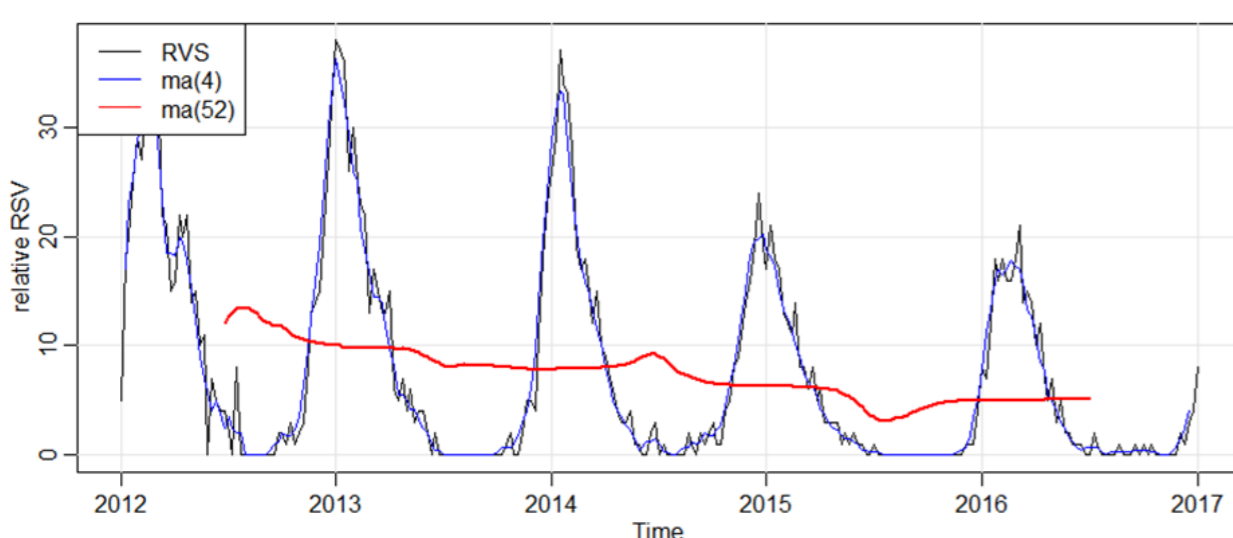
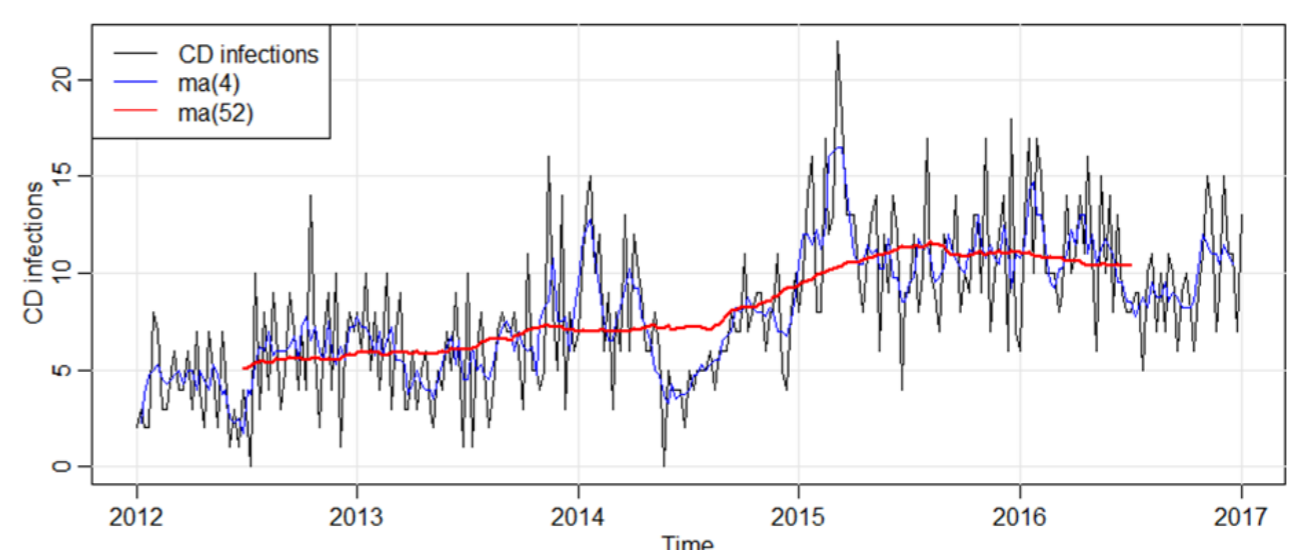


Figure 2: Weekly number of the number of CD infections in the period from 2012-16 and moving average of order 4 (ma 4)) and 52 (ma52)).



Conclusion: further studies are needed with longer time series

- ❑ The analysis gave some preliminary data.
- ❑ Further studies which include data of RSV and CD infections with longer time series are needed to assess the possible impact of RSV on CD infections; other time series could be included in analysis as well on example meteorological data.

Literature:

1. Chmielewska M, Zycinska K, Lenartowicz B, Hadzik -Blaszcyk M, cieplak M, Kur Z, Wardyn KA. *Clostridium difficile* Infection due to Penumonia Treatment: Mortality Risk Models. *Advx Exp Med Biol.* 2017; 955: 59-63.
2. Gilca R, Fortin E, Frenete C, Longtin Y, Gourdeau M. Seasonal Variations in *Clostridium difficile* Infections Are Associated with Influenza and Respiratory Syncytial Virus Activity Independently of Antibiotic Prescriptions: a Time Series Analysis in Québec, Canada. *Antimicrob Agents Chemoth* 2012; 56: 639-46.

Photos:

- https://www.google.com/search?biw=1680&bih=936&tbm=isch&sa=1&ei=33GSW7CgBKvIrgTmnLmoDg&q=photography+of+respiratory+syncytial+virus&oq=photography+of+respiratory+syncytial+virus&gs_l=img.12...79030.91136.0.95433.34.31.3.0.0.0.343.3199.23j6j1j1.31.0...0...1c.1.64.img..0.4.293...35i39k1j0i19k1j0i30i19k1j0i8i30i19k1.0.beBf2fMssDE
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