Burden of acute respiratory virus infections: An epidemiological perspective

Stefania Maggi
CNR Aging Branch
Padua (Italy)
• Review epidemiological trends of common respiratory viral infections

• Review why older adults are more at risk of severe illness from respiratory viral infections

• Discuss the long-term consequences of common respiratory viral infections in the elderly population

• Discuss preventative approaches to mitigate the impact of respiratory viral infections
The European burden of the **tripledemic** in older adults

LTC, long-term care


**SARS-COV 2**

About **276 million** (36% of the worldwide cases of SARS-Cov2) and caused about **2 million deaths**

**INFLUENZA**

Each year up to **50 million people** contract symptomatic influenza, resulting in an estimated **15,000 to 70,000 flu-related deaths**

~90% of deaths are among older adults

**RSV**

Hospitalisations for adults in the EU, Norway and the United Kingdom are on average **158,000 per year**

In LTC facilities the prevalence can reach 10%, with 20% risk of hospitalisation and 5% of death
Incidence of influenza symptoms (ILI) in Italy
Seasons 2009/10 – 2022/23

Cases x 1,000 assisted

Weeks

65+ anni

Other viruses  11.0%
RSV  21.4%
Influenza  15.8%
SARS-CoV-2  51.8%

Country-specific information may not be transferable to other countries.

Reasons behind the increase in incidence of respiratory viral infections

• Reduced exposure to acute respiratory viral infections other than SARS-CoV-2 over the past three years, and the subsequent loss of natural immunity against such viruses\(^1\)

• Highly transmissible SARS-CoV-2 subvariants continue to appear\(^2\)

• Exposure to cold temperatures in the winter is often associated with increased incidence and severity of acute respiratory viral infections\(^3\)

The consequence of the COVID-19 pandemic on other respiratory illnesses and potential future impact

Co-infection

- Co-infection between SARS-CoV-2 and other viruses such as influenza or RSV may result in worse outcomes compared with SARS-CoV-2 only\(^1,2\)
- Compared with SARS-CoV-2 alone, SARS-CoV-2/influenza co-infection was associated with:
  - ▲ **Increased** risk of invasive mechanical ventilation\(^1,2\)
  - ▲ **Increased** risk of in-hospital mortality\(^1,2\)

As social contact returned to pre-pandemic levels, we have seen a resurgence in influenza during winter 2022–2023 to levels higher than before the COVID-19 pandemic\(^3\)

Coinfections in patients with confirmed SARS-CoV-2¹

«In patients aged >65 years, coinfection with SARS CoV-2 and other respiratory viruses, together with concomitant diseases, causes worsening of the clinical picture and complications, and can be fatal.

Screening of patients with SARS CoV-2 for other respiratory viruses is needed to select appropriate treatments and to prevent a fatal outcome of the disease»

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Older adults are more susceptible to infectious diseases and to a potential decrease in vaccine efficacy\(^1\)

Older adults are more vulnerable to infections

- Immunosenescence
- Comorbidity
- Frailty

Vulnerable Population

- Increased risk of hospitalisation
- Increased risk of disability
- Increased risk of mortality

For all respiratory VPDs!!!!!
Older patients with pre-existing medical conditions may be at risk of experiencing poor ID’s outcomes

Older adults are more likely to have pre-existing medical conditions than younger individuals

• More comorbidities
• More medications upon hospitalisation
• Lower prevalence of typical symptoms
• More frequent in-hospital complications

Based on speaker’s expert opinion
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Complications during follow-up period in hospitalised RSV patients

Real-world observational study conducted using the US Medicare database from Jan 2011 – Dec 2015

- Significant increase in healthcare utilization following hospitalisation
- Healthcare cost increased by $9,210 per patient post-RSV diagnosis, mainly due to the higher rates of hospitalization, longer LOS due to the exacerbation of existing comorbidities

Limitations:
- Study utilized claims data that were primarily coded for administrative purposes rather than clinical accuracy (therefore susceptible to coding errors and diagnosis discrepancies).
- LOS, length of stay; HR, high risk; RTI, respiratory tract infection.
- Country-specific information may not be transferable to other countries.

<table>
<thead>
<tr>
<th>Complication</th>
<th>Hospitalized HR</th>
<th>Hospitalized Non-HR</th>
<th>Outpatient HR</th>
<th>Outpatient Non-HR</th>
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<tbody>
<tr>
<td>Upper and Lower RTI</td>
<td>88%</td>
<td>84%</td>
<td>64%</td>
<td>82%</td>
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<tr>
<td>Lower RTI</td>
<td>48%</td>
<td>46%</td>
<td>50%</td>
<td>57%</td>
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<tr>
<td>Dyspnea</td>
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<td>77%</td>
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<tr>
<td>Pneumonia</td>
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<td>41%</td>
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<tr>
<td>Arrhythmias</td>
<td>14%</td>
<td>9%</td>
<td>18%</td>
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<tr>
<td>Respiratory Failure</td>
<td>28%</td>
<td>22%</td>
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<tr>
<td>Chest Pain</td>
<td>26%</td>
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<td>Hypoxia</td>
<td>43%</td>
<td>17%</td>
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<tr>
<td>Acute bronchitis</td>
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<td>24%</td>
<td>26%</td>
<td>24%</td>
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<tr>
<td>Cough</td>
<td>54%</td>
<td>28%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>Upper RTI</td>
<td>54%</td>
<td>28%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>6%</td>
<td>14%</td>
<td>19%</td>
<td>14%</td>
</tr>
</tbody>
</table>

N = 756
N = 37
N = 399
N = 436
Influenza is associated with severe outcomes, not only limited to the respiratory system

A heavy, multidimensional impact

- **Neurological**: 8x increased risk of stroke
- **Cardiovascular**: 10x increased risk of heart attack in adults over 40
- **Loss of independence**: 20% experience loss of independence
- **Loss of autonomy**: 8x increased risk of stroke
- **Diabetic complications**: 74% increased abnormal glycemic events
- **Lower respiratory**: 8x increased risk of pneumonia in children under age 14

The WHO estimates that 17 million people in Europe have experienced Long COVID during the first two years of the pandemic. SARS-CoV-2 variants continue to circulate and the risk of post-acute complications remains; a recent study of 56,003 UK patients found that even after Omicron infection, 4.5% suffered persistent symptoms. It is therefore likely that Long COVID will provide a substantial medical and economic burden for the foreseeable future. There is an urgent need to understand mechanisms of disease and develop effective treatments based on this understanding.
Overall, we found a reduction in odds of long COVID with the omicron variant versus the delta variant of 0.24–0.50 depending on age and time since vaccination. However, the absolute number of people experiencing long COVID at a given time depends on the shape and amplitude of the pandemic curve. For example, given the high numbers of people infected with omicron in the UK from December, 2021, to February, 2022, our data are consistent with the UK Office for National Statistics, who estimated that the numbers of people experiencing long COVID actually increased from 1.3 million in January, 2022, to 1.7 million in March, 2022. (...)

Future numbers with long COVID will inevitably rise

*Case-control observational study (self-reported data from the UK COVID Symptom Study app)*

**N= 56,003 UK adult Omicron cases (20 Dec 2021 – 9 March 2022)**

**N= 41,361 UK adult Delta cases (1 Jun 2021 – 27 Nov 2021)**

**Country-specific information may not be transferable to other countries.**

**Limitations:** as these were self-reported data, there was no direct testing of infectious variants (assumed from national data) and no objective measures of illness duration.

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COVID-19 vaccines were estimated to have saved nearly 20 million lives globally in the first year of vaccination (Dec 2020–Dec 2021)¹

Global impact of the first year of COVID-19 vaccination: a mathematical modelling study

THE LANCET

Based on official reported COVID-19 deaths, we estimated that vaccinations prevented...14.4 million...deaths from COVID-19. When considering excess death, the estimate rose to 19.8 million, representing a global reduction of 63% in total deaths during the first year of COVID-19 vaccination.

¹Includes all global authorized vaccines. ¹Estimated using excess deaths. Estimates of excess deaths can provide information about the burden of mortality potentially related to the COVID-19 pandemic, including deaths that are directly or indirectly attributed to COVID-19.

COVID-19: Current challenges

✓ As of 10 August 2023, 70.5% of the world population has received at least one dose of a COVID-19 vaccine

✓ Despite this, COVID-19 is predicted to be an enduring health issue

❖ Vaccine hesitancy and fatigue
❖ Waning immunity
❖ New variants

Preventative actions

• In Europe, ECDC and EMA advise that future vaccination campaigns in view of the upcoming cold season should prioritize people who are most at risk of contracting serious diseases. EU national authorities take final decisions on boosters and on the type of vaccines recommended, taking into account factors such as the epidemiological situation, the impact of COVID-19 in different population groups and the emergence of new variants.

• Non-pharmaceutical interventions\(^2\)

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Non-pharmacological interventions...some have collateral effects for older adults\textsuperscript{1,2}

**Non-pharmacological interventions of the COVID-19 pandemic**

- Physical distancing
- Mask wearing
- Ban on mass gatherings
- Orders to stay-at-home
- Travel restrictions

**Now**

- Social isolation and withdrawal
- Continued fear of SARS-CoV-2
- Difficulty accessing services
- Poor physical and mental health
- Reduced hospital/care home visitation

RSV vaccines for adults ≥60 years approved in 2023

In May 2023, the FDA approved two RSV vaccines for adults ≥60 years: GSK3844766A\(^1\) and RSVpreF (PF-06928316)\(^2\)

On June 21, 2023, the Advisory Committee on Immunization Practices recommended that persons aged ≥60 years may receive a single dose of RSV vaccine, using shared clinical decision-making\(^3\)

July 2023, EMA approved RSVpreF (PF-06928316) for adults ≥60 years\(^4\)

Raising awareness about RSV will be key to educating the public and healthcare professionals on the importance of vaccination campaigns\(^5\)

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Country-specific information may not be transferable to other countries.
ECDC review indicated strong evidence for immunising two large risk groups (to prevent severe disease):

- **Older adults**
- **All persons (over six months of age) with chronic medical conditions**

Many countries use the age of 65 years as a threshold

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1. Influenza: Recommended vaccinations. Available at: [https://vaccine-schedule.ecdc.europa.eu/Scheduler/ByDisease?SelectedDiseaseId=15&SelectedCountryIdByDisease=-1](https://vaccine-schedule.ecdc.europa.eu/Scheduler/ByDisease?SelectedDiseaseId=15&SelectedCountryIdByDisease=-1). Accessed 31 Aug 2023;
Influenza vaccination coverage rates across EU/EEA countries in elderly individuals (2021–2022)

*Data for 2020–2021

Healthcare providers could more often recommend and practice vaccine co-administration; this would not risk patient safety and health, would improve protection against vaccine-preventable diseases, and would help comply with national vaccination calendars.

Conclusions

Ongoing challenges in older adults include risk of severe disease in the most vulnerable individuals, long-COVID, and co-infections.

Relaxation of non-pharmaceutical interventions in conjunction with continued evolution of SARS-CoV-2 viruses will maintain the risk of COVID-19 and increase the risk posed by other respiratory infections which preferentially impact older adults.

Older adults and high-risk individuals should receive COVID-19 boosters and vaccines for other VPDs according to national recommendations, possibly in co-administration, to optimize the vaccine coverage.

VPD, vaccine preventable disease