**Dettaglio abstract**

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**Title:** Risk of COVID-19 in-hospital mortality in people living with HIV compared to general population according to age and CD4 strata: data from the Icona network

**Presentation type:** Oral Communication

**Session/Topic**
Emerging issues in HIV-1 infection


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**Abstract**

**Background:** Some evidence suggests that people living with HIV (PLWH) are at higher risk of COVID-19 mortality when compared to the general population (GenPop). Our aim was to assess whether PLWH with COVID-19 had an increased risk of in-hospital mortality compared to the GenPop in the Italian setting, according to CD4 cell count (<vs ≥200 cell/mm3) and age strata (<vs ≥65 years).

**Methods:** A retrospective observational study was conducted in 19 Italian ICONA centers (February 2020-November 2022). Hospitalized PLWH and GenPop with a confirmed SARS-CoV-2 infection, matched by calendar period of enrolment were included. The main outcome of interest was in-hospital mortality. A competing risk unadjusted and adjusted by Fine-Gray Cox regression model with discharge as the competing event have been used to estimate the association between a 5 levels’ exposure (GenPop <65 years vs GenPop ≥65 vs PLWH <65 and CD4 ≥200 vs PLWH <65 and CD4 <200 vs PLWH ≥65 years) and in-hospital mortality. Besides the calendar period, the model was further adjusted for age, sex, ethnicity, lung disease, and region of the enrolling site. A subanalysis including only patients with lung disease or PO2/FiO2<300 ad admission was also performed.

**Results:** 7,401 COVID-19 patients have been included in the study, 240 (3.2%) PLWH, and 7,161 (96.8%) GenPop. Characteristics of the study population are reported in Table 1. PLWH were younger (55 (IQR 46-62) vs 68 (55-80) years, p<0.001) and more frequently male (77.7% vs 60.1%, p<0.001) when compared to the GenPop. PLWH showed a median CD4 cell count (<vs ≥200 cell/mm3) and age strata (<vs ≥65 years).

**P02/FiO2<300 ad admission was also performed.**

GenPop. Characteristics of the study population are reported in Table 1. PLWH were younger (55 (IQR 46-62) vs 68 (55-80) years, p<0.001) and more frequently male (77.7% vs 60.1%, p<0.001) when compared to the GenPop. PLWH showed a median CD4 cell count of 397 (IQR 154-626) cell/mm3 with 30.2% <200 cells/mm3 and 23.8% had an HIV-RNA >50cp/mL. The crude in-hospital mortality was higher in the GenPop group when compared to PLWH [1.283/7.161 (17.9%) vs 34/240 (14.2%)]. The unadjusted estimates of in-hospital mortality according to age and CD4 strata are reported in Figure 1. In the final Fine-Gray regression model (Table 2A), after adjusting for potential confounders, when compared to the GenPop <65 years a significantly higher risk of in-hospital death was observed for the GenPop ≥65 years [adjusted Subdistribution Hazard Ration (aSHR) 1.92 (95% CI 1.48-2.49)], PLWH <65 years with CD4 <200 [aSHR 5.90 (95% CI 3.49-9.98)] and PLWH ≥65 years [aSHR 1.99 (95%CI 1.05-3.77)], whereas
PLWH <65 with CD4 ≥200 did not [aSHR 1.13 (95%CI 0.53-2.39)]. Data were confirmed in the sub-analysis including only patients with documented pneumonia or PO2/FiO2<300 at admission (Table 2B).

**Conclusions:** PLWH with low CD4 count have an increased risk of COVID-19 in-hospital mortality. We found that in PLWH aged <65 with a CD4 cell count <200 cell/mmc, COVID-19 in-hospital mortality was 6-fold higher than GenPop, after controlling for the key confounding factors. The effect of low CD4 cell count seems to be mitigated in those aged ≥65 where the COVID-19 course is mainly age-drive. This study was funded by a Gilead Srl unrestricted grant (Fellowship Program)
### Table 1. Characteristics of the study population.

<table>
<thead>
<tr>
<th>Variable</th>
<th>GenPop</th>
<th>PLWH</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (95% CI)</td>
<td>74 (64-83)</td>
<td>74 (66-82)</td>
<td>0.12</td>
</tr>
<tr>
<td>70 yrs or more, n (%)</td>
<td>4123 (55.8)</td>
<td>4118 (54.3)</td>
<td>0.27</td>
</tr>
<tr>
<td>Male sex, n (%)</td>
<td>4622 (99.1)</td>
<td>4377 (99.2)</td>
<td>0.60</td>
</tr>
<tr>
<td>White race, n (%)</td>
<td>6080 (99.9)</td>
<td>8191 (99.9)</td>
<td>0.001</td>
</tr>
<tr>
<td>ARV treatment</td>
<td>157 (4.8)</td>
<td>221 (4.5)</td>
<td>0.048</td>
</tr>
<tr>
<td>Kaposi's sarcoma</td>
<td>204 (4.3)</td>
<td>293 (4.2)</td>
<td>0.71</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>83 (2.1)</td>
<td>35 (0.8)</td>
<td>0.002</td>
</tr>
<tr>
<td>Hodgkin's lymphoma</td>
<td>79 (1.7)</td>
<td>27 (0.6)</td>
<td>0.008</td>
</tr>
<tr>
<td>NHL/L</td>
<td>27 (0.6)</td>
<td>27 (0.6)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

### Table 2. Two-Grey Cox regression model with discharge as the competing event to estimate the association between 9 levels’ exposure (A) all participants, (B) subgroup of patients with PO2/FIO2 <200 or pneumonia at admission

<table>
<thead>
<tr>
<th>Variable</th>
<th>aSHR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) all participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GenPop 65 years</td>
<td>1</td>
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</tr>
<tr>
<td>PLWH &lt;65 years and CD4 &lt;200 cells/mmc</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PLWH &lt;65 years and CD4 &lt;200 cells/mmc</td>
<td>1</td>
<td></td>
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<tr>
<td>GenPop 65 years</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PLWH &lt;65 years and CD4 &lt;200 cells/mmc</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(B) PO2/FIO2 &lt;200 or pneumonia at admission</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GenPop 65 years</td>
<td>1</td>
<td></td>
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<tr>
<td>PLWH &lt;65 years and CD4 &lt;200 cells/mmc</td>
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<tr>
<td>PLWH &lt;65 years and CD4 &lt;200 cells/mmc</td>
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</table>

**References:**
1. ARV treatment: Lamivudine, tenofovir, stavudine, abacavir, didanosine, d4T, zidovudine, nevirapine, efavirenz, ritonavir, amprenavir, indinavir, nelfinavir. CD4: CD4 T-lymphocyte count; PO2/FIO2: partial pressure of oxygen in arterial blood; FIO2: fraction of inspired oxygen; GenPop: general population; PLWH: people living with HIV/AIDS; CI: confidence interval.