3.2 CO_2-based indicators

Only the results for Santiago are presented, but the results are similar for the climate of Concepción. The cumulative exceeding exposure above 1000 ppm during the entire heating period is given in Figure 10 for the father and child_1. We also plotted the percentage of time spent in the four CO_2 concentration classes specified in EN16798-1 for the three levels of airtightness, with the interior doors open and closed (Figure 11).

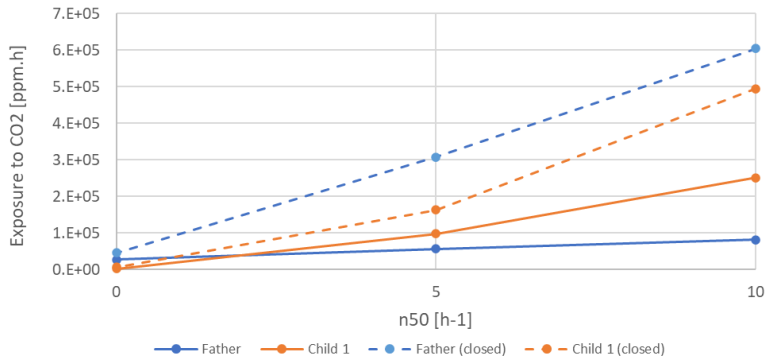

Figure 10: Cumulative exceeding exposure to CO_2 for the father and child_1.

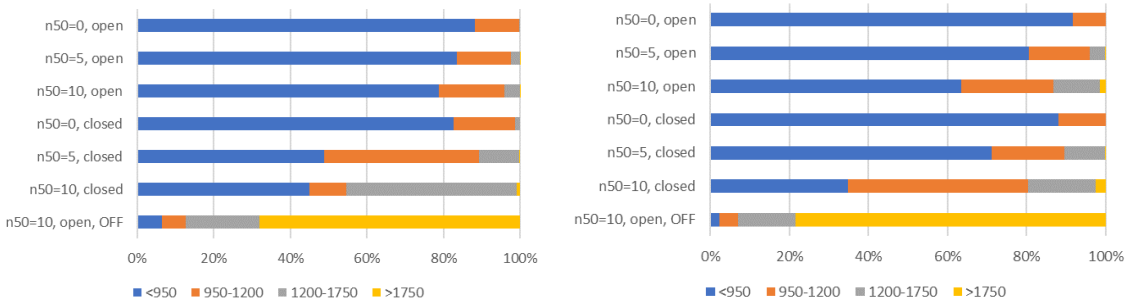

Figure 11: Percentage of time spent in four CO_2 concentration (ppm) classes for the father (left) and child_1 (right).

The decrease of the supplied airflows in both bedrooms for a leaky house leads to a significant increase of the CO_2-exposure for both father and child_1. The highest exposure values are observed for the least airtight house (n_{50}=10h^{-1}) with closed doors, which is consistent with the trends found for the airflows. In this case, the father and the child spent only 45% and 35% of their time, respectively, in an indoor space with a CO_2 concentration lower than 950 ppm, while the ventilation system was in continuous operation. On the other hand, a very good airtightness (n_{50}=0h^{-1} in our study) makes it possible to provide the design values of the airflows most of the time and, consequently, to maintain the CO_2 concentration below 950 ppm during 92% of the time for child_1 when the doors are open and 88% when they are closed. As a basis for comparison, the case of a poorly airtight house (n_{50}=10h^{-1}) with open doors was also considered, but this time without any exhaust ventilation system (bottom bar in the figure). In this case, the indoor air quality is not guaranteed at all, as the occupant is exposed to CO_2 concentrations above 1750 ppm most of the time.