Supplementary material to the manuscript

“Burden of acute kidney injury among adult hospital patients in the Italian Lombardy Region – a 20 years real world data analysis”

Content

[Methods - 2 -](#_Toc107828895)

[Supplementary Table S1. Codes of the international classification of disease 9th revision used for identification of AKI - 2 -](#_Toc107828896)

[Results - 3 -](#_Toc107828897)

[Supplementary Figure 1. Mortality rate (per 100,000 general population) due to AKI, 2000-2019 - 3 -](#_Toc107828898)

[Supplementary Figure 4. Annual cost of treatment for hospitalized patients (million Euro) with AKI, 2000-2019 - 4 -](#_Toc107828899)

[Supplementary Figure 5. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by age - 5 -](#_Toc107828900)

[Supplementary Figure 6. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by sex - 5 -](#_Toc107828901)

[Supplementary Figure 7. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by age and sex - 6 -](#_Toc107828902)

[Supplementary Figure 8. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2018, by province - 6 -](#_Toc107828903)

[Supplementary Figure 9. Blood components transfusion (% of patients) during hospitalization due to AKI, 2000-2019, by age - 7 -](#_Toc107828904)

[Supplementary Figure 10. Blood components transfusion (% of patients) during hospitalization due to AKI, 2000-2018, by province - 7 -](#_Toc107828905)

[Supplementary Table S2. Main epidemiological metrics of AKI burden - 8 -](#_Toc107828906)

[Supplementary Table S3. Health care utilization and costs of treatment for patients with AKI - 9 -](#_Toc107828907)

# Methods

### Supplementary Table S1. Codes of the international classification of disease 9th revision used for identification of AKI

|  |  |
| --- | --- |
| ICD-9 code | Diagnosis |
| 584 | Acute kidney failure  |
| 584.5 | Acute kidney failure with lesion of tubular necrosis |
| 584.6 | Acute kidney failure with lesion of renal cortical necrosis |
| 584.7 | Acute kidney failure with lesion of renal medullary [papillary] necrosis |
| 584.8 | Acute kidney failure with other specified pathological lesion in kidney |
| 584.9 | Acute kidney failure unspecified |
| 634.3 | Spontaneous abortion complicated by renal failure |
| 634.30 | Spontaneous abortion, complicated by renal failure, unspecified |
| 634.31 | Spontaneous abortion, complicated by renal failure, incomplete |
| 634.32 | Spontaneous abortion, complicated by renal failure, complete |
| 635.3 | Legally induced abortion complicated by renal failure |
| 635.30 | Legally induced abortion, complicated by renal failure,unspecified |
| 635.31 | Legally induced abortion, complicated by renal failure, incomplete |
| 635.32 | Legally induced abortion, complicated by renal failure, complete |
| 636.3 | Illegal abortion complicated by renal failure |
| 636.30 | Illegally induced abortion, complicated by renal failure, unspecified |
| 636.31 | Illegally induced abortion, complicated by renal failure, incomplete |
| 636.32 | Illegally induced abortion, complicated by renal failure, complete |
| 637.3 | Legally unspecified abortion complicated by renal failure |
| 637.30 | Unspecified abortion, complicated by renal failure, unspecified |
| 637.31 | Unspecified abortion, complicated by renal failure, incomplete |
| 637.32 | Unspecified abortion, complicated by renal failure, complete |
| 638.3 | Failed attempted abortion complicated by renal failure |
| 638.31 | Failed attempted abortion complicated by renal failure, Incomplete |
| 638.32 | Failed attempted abortion complicated by renal failure, Complete |
| 639.3 | Kidney failure following abortion and ectopic and molar pregnancies |
| 669.3 | Acute kidney failure following labor and delivery |
| 669.30 | Acute kidney failure following labor and delivery, unspecified as to episode of care or not applicable |
| 669.32 | Acute kidney failure following labor and delivery, delivered, with mention of postpartum complication |
| 669.34 | Acute kidney failure following labor and delivery, postpartum condition or complication |
| 590.11 | Infections of kidney with lesion of renal medullary necrosis |
| 580.4 | Acute glomerulonephritis with lesion of rapidly progressive glomerulonephritis |
| 788.5 | Oliguria and anuria |
| 958.5 | Traumatic anuria |

# Results



### Supplementary Figure 1. Mortality rate (per 100,000 general population) due to AKI, 2000-2019



**Supplementary Figure 2. Mortality rate (per 100,000 population) due to AKI, 2000-2019, by age and sex.**

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**Supplementary Figure 3. Mortality during hospitalisation (%) due to AKI, 2000-2019, by age and sex.**



### Supplementary Figure 4. Annual cost of treatment for hospitalized patients (million Euro) with AKI, 2000-2019



### Supplementary Figure 5. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by age



### Supplementary Figure 6. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by sex



### Supplementary Figure 7. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2019, by age and sex



### Supplementary Figure 8. Hemodialysis procedure (% of patients) during hospitalization due to AKI, 2000-2018, by province



### Supplementary Figure 9. Blood components transfusion (% of patients) during hospitalization due to AKI, 2000-2019, by age



### Supplementary Figure 10. Blood components transfusion (% of patients) during hospitalization due to AKI, 2000-2018, by province

### Supplementary Table S2. Main epidemiological metrics of AKI burden

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Number of hospital admissions | In-hospital mortality (%) | YLLs, number | Crude rates per 100,000 population (95% CI) | Age-standardized rates per 100,000 population (95% CI) |
| Hospitalization rate | YLLs rate | Mortality rate | Hospitalization rate | YLLs rate | Mortality rate |
| 2000 | 1552 | 14.2 | 1525.6 | 32.9 (31.2-34.5) | 32.3 (30.7-33.9) | 4.7 (4.1-5.3) | 35.3 (33.5-37.2) | 32.4 (30.8-34.1) | 5.2 (4.5-6.0) |
| 2001 | 2101 | 15.4 | 2577.1 | 43.9 (42.0-45.7) | 53.8 (51.7-55.9) | 6.8 (6.0-7.5) | 46.7 (44.7-48.8) | 53.1 (51.0-55.2) | 7.4 (6.6-8.2) |
| 2002 | 2472 | 14.2 | 2628.6 | 50.8 (48.8-52.8) | 54.0 (51.9-56.1) | 7.2 (6.5-8.0) | 54.1 (52.0-56.3) | 53.1 (51.1-55.2) | 8.0 (7.2-8.9) |
| 2003 | 3324 | 13.9 | 3565.5 | 67.1 (64.8-69.4) | 72.0 (69.6-74.3) | 9.3 (8.5-10.2) | 72.2 (69.7-74.7) | 71.1 (68.8-73.5) | 10.4 (9.5-11.4) |
| 2004 | 3032 | 13.5 | 2830.4 | 60.1 (57.9-62.2) | 56.1 (54.0-58.1) | 8.1 (7.3-8.9) | 63.9 (61.6-66.2) | 55.4 (53.4-57.5) | 9.0 (8.1-9.9) |
| 2005 | 3501 | 13.5 | 3751.3 | 68.4 (66.1-70.6) | 73.3 (70.9-75.6) | 9.2 (8.4-10.1) | 71.8 (69.4-74.2) | 72.4 (70.0-74.7) | 10.0 (9.1-10.9) |
| 2006 | 3730 | 14.6 | 3608.6 | 71.6 (69.3-73.8) | 69.2 (67.0-71.5) | 10.5 (9.6-11.3) | 74.4 (72.0-76.8) | 68.7 (66.5-71.0) | 11.1 (10.2-12.1) |
| 2007 | 4114 | 15.3 | 4318.8 | 77.5 (75.1-79.8) | 81.3 (78.9-83.7) | 11.9 (11.0-12.8) | 79.7 (77.2-82.1) | 80.0 (77.6-82.4) | 12.4 (11.5-13.4) |
| 2008 | 4438 | 13.7 | 3844.1 | 82.0 (79.6-84.4) | 71.0 (68.8-73.2) | 11.3 (10.4-12.2) | 83.7 (81.2-86.2) | 71.2 (68.9-73.5) | 11.6 (10.7-12.6) |
| 2009 | 4536 | 14.0 | 3751.9 | 82.5 (80.1-84.9) | 68.3 (66.1-70.4) | 11.6 (10.7-12.5) | 83.4 (81.0-85.8) | 68.3 (66.1-70.5) | 11.8 (10.9-12.7) |
| 2010 | 4275 | 14.0 | 3270.5 | 76.4 (74.1-78.7) | 58.5 (56.5-60.5) | 10.7 (9.9-11.6) | 76.5 (74.2-78.8) | 58.6 (56.6-60.6) | 10.7 (9.9-11.6) |
| 2011 | 4456 | 14.3 | 3269.4 | 78.4 (76.1-80.7) | 57.5 (55.6-59.5) | 11.2 (10.4-12.1) | 77.7 (75.4-80.0) | 57.7 (55.8-59.7) | 11.0 (10.2-11.9) |
| 2012 | 4960 | 13.1 | 3360.6 | 86.0 (83.7-88.4) | 58.3 (56.3-60.3) | 11.2 (10.4-12.1) | 84.3 (82.0-86.7) | 58.7 (56.7-60.7) | 10.9 (10.1-11.7) |
| 2013 | 5023 | 12.8 | 3066.5 | 86.0 (83.7-88.4) | 52.5 (50.7-54.4) | 11.0 (10.1-11.8) | 83.4 (81.1-85.7) | 52.8 (50.9-54.7) | 10.4 (9.6-11.3) |
| 2014 | 4974 | 12.1 | 2743.4 | 84.1 (81.8-86.5) | 46.4 (44.7-48.1) | 10.2 (9.4-11.0) | 80.5 (78.3-82.8) | 46.7 (44.9-48.5) | 9.5 (8.8-10.3) |
| 2015 | 5671 | 12.7 | 3260.6 | 94.9 (92.4-97.4) | 54.6 (52.7-56.4) | 12.1 (11.2-13.0) | 89.9 (87.6-92.3) | 54.9 (53.0-56.8) | 11.1 (10.3-11.9) |
| 2016 | 5381 | 13.3 | 3075.1 | 89.1 (86.7-91.5) | 50.9 (49.1-52.7) | 11.8 (11.0-12.7) | 83.0 (80.8-85.3) | 50.2 (48.5-52.1) | 10.5 (9.8-11.3) |
| 2017 | 5704 | 12.8 | 2926.6 | 93.7 (91.3-96.1) | 48.1 (46.3-49.8) | 12.0 (11.1-12.9) | 86.6 (84.3-88.9) | 47.6 (45.9-49.4) | 10.6 (9.8-11.4) |
| 2018 | 5593 | 12.9 | 3293.1 | 91.2 (88.8-93.6) | 53.7 (51.9-55.5) | 11.8 (10.9-12.7) | 83.1 (80.9-85.3) | 54.0 (52.2-55.9) | 10.2 (9.5-11.0) |
| 2019 | 5547 | 13.2 | 2703.1 | 90.5 (88.1-92.9) | 44.1 (42.4-45.8) | 11.9 (11.1-12.8) | 81.3 (79.2-83.5) | 43.6 (41.9-45.3) | 10.1 (9.3-10.8) |

YLLs - Years of life lost

### Supplementary Table S3. Health care utilization and costs of treatment for patients with AKI

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Number of hospital admissions | Annual cost, million Euro | % of patients who received in hospital |
| Hemodialysis | Peritoneal dialysis | Lung ventilation | Blood transfusion |
| 2000 | 1552 | 5.2 | 10.0 | 0.1 | 0.3 | 10.6 |
| 2001 | 2101 | 7.1 | 9.3 | 0.1 | 0.6 | 9.7 |
| 2002 | 2472 | 8.3 | 7.6 | 0.2 | 0.5 | 10.6 |
| 2003 | 3324 | 11.6 | 6.9 | 0.2 | 0.5 | 10.6 |
| 2004 | 3032 | 10.3 | 7.0 | 0.2 | 0.4 | 11.4 |
| 2005 | 3501 | 12.6 | 6.8 | 0.1 | 0.4 | 10.7 |
| 2006 | 3730 | 13.5 | 6.7 | 0.1 | 0.2 | 12.3 |
| 2007 | 4114 | 15.2 | 6.4 | 0.0 | 0.3 | 12.5 |
| 2008 | 4438 | 17.2 | 6.4 | 0.0 | 0.3 | 11.5 |
| 2009 | 4536 | 17.7 | 6.5 | 0.0 | 0.3 | 13.3 |
| 2010 | 4275 | 17.1 | 7.0 | 0.0 | 0.4 | 13.1 |
| 2011 | 4456 | 18.0 | 7.8 | 0.1 | 0.5 | 15.1 |
| 2012 | 4960 | 20.2 | 7.7 | 0.0 | 0.5 | 14.3 |
| 2013 | 5023 | 20.4 | 7.1 | 0.0 | 0.3 | 13.8 |
| 2014 | 4974 | 20.2 | 8.0 | 0.0 | 0.3 | 14.5 |
| 2015 | 5671 | 23.1 | 6.6 | 0.1 | 0.3 | 13.6 |
| 2016 | 5381 | 22.1 | 7.5 | 0.0 | 0.6 | 14.7 |
| 2017 | 5704 | 23.4 | 7.4 | 0.1 | 0.5 | 14.0 |
| 2018 | 5593 | 22.9 | 7.3 | 0.0 | 0.6 | 14.6 |
| 2019 | 5547 | 22.9 | 7.4 | 0.0 | 0.5 | 14.9 |