



GMDAC Briefing Series:
Towards safer migration in Africa: Migration and Data in
Northern and Western Africa

CALCULATING “DEATH RATES” IN THE CONTEXT OF MIGRATION JOURNEYS: Focus on the Central Mediterranean

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This publication has been issued without formal editing by the Publications unit of IOM.

This material has been funded by UK Aid from the United Kingdom government; however, the views expressed do not necessarily reflect the United Kingdom government's official policies.

Cover Image: The "boat cemetery" in Lampedusa where the boats used by the migrants are stored to be destroyed later.

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ABOUT

GMDAC

Established in Berlin in September 2015, the International Organization for Migration's Global Migration Data Analysis Centre (GMDAC) was set up to respond to calls for better international migration data and analysis. Data are key to inform migration governance, improve programming and promote a better public understanding of migration.

BRIEFING SERIES

The briefing series "Towards safer migration on the Central Mediterranean Route", launched by IOM's GMDAC, aims to provide accurate, comprehensive and policy-oriented information on key issues related to migration on the Central Mediterranean Route (CMR). The series is published as part of the 'Safety, Support and Solutions' programme implemented by IOM, funded by the UK's Department for International Development (DFID). The programme's main objective is to contribute to safer and more orderly migration along the CMR, resulting in fewer deaths and less suffering along migratory routes. The programme includes activities in ten countries – Algeria, Burkina Faso, Côte d'Ivoire, the Gambia, Guinea, Libya, Senegal, Mali, the Niger and Morocco. IOM's GMDAC aims to disseminate information products to policymakers and other stakeholders on mobility dynamics and relevant topics along the CMR, with a view to improve knowledge and understanding of these and enable actors to effectively manage emerging migration trends for the benefit of countries and migrants. Issues in this series will be published throughout the programme period.



CONTENT

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LAYOUT DESIGN AND DATA VISUALIZATION

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- More than 20,000 migrants have died trying to cross the Mediterranean since 2014.
- The annual death toll has been falling in recent years; however, it is often argued that the “rate of migrant deaths” remains high, and that the risks that migrants face on their journeys have increased.
- This briefing provides an overview of what factors to consider when calculating and interpreting such statistics and demonstrates how differences in the underlying data result in different mortality rates.
- Calculating a mortality rate involves selecting a specific population, time period and points of comparison. However, in the context of irregular migration routes, calculating this figure is challenging for two main reasons: (1) the underlying data on deaths during migration and migration flows are highly incomplete, and (2) the choices made when making the calculation itself can significantly bias the final mortality rate figure.
- The authors argue that it is often difficult to calculate the “rate of migrant deaths” accurately given the lack of reliable and complete data on migrant flows and fatalities. For example, the number of deaths may not be fully reported and data on the profile of persons on the move may be lacking. Some population groups, for example, might have a higher risk of death, such as children, and this might affect death rates when higher numbers of children are trying to cross borders.
- How the population at risk of dying in the Central Mediterranean is defined can make a significant difference to mortality rate calculations. For example, if the population at risk is defined as the total number of people who arrived to Italy and Malta, as well as those who were intercepted at sea by Libya and Tunisia and the recorded fatalities at sea, the calculation of the mortality rate shows that in 2019, for every 21 people who attempted the Central Mediterranean Sea crossing, one person died (4.78%). However, if only the number of people who arrive in Italy and the recorded fatalities are used to calculate the population at risk, then the mortality rate was one death for every 13 people crossing to Europe over the Central Mediterranean (7.82%).
- The authors conclude that it is important to make clear when presenting “migrant death rates” how such calculations are made. They suggest that such figures should be interpreted and used with caution, in-line with the limitations of the underlying data.

INTRODUCTION

Since the beginning of 2014, IOM's Missing Migrants Project has recorded the deaths of over 20,000 people in the Mediterranean Sea as they tried to make the dangerous migration journey to Europe. Yet beyond the total numbers of fatalities, other approaches are needed to understand this catastrophic loss of life. One way is to look at mortality rates, also known as “death rates,” which measure the number of deaths in proportion to the size of a particular population over a specific period of time.

In the context of migration, death rates are calculated based on the number of known deaths in relation to the number of known attempts to use irregular migration routes over specific time periods. Calculating mortality rates in the context of migration is relatively new and requires several crucial caveats. This briefing provides an overview of what factors to consider when calculating and interpreting these statistics and demonstrates how differences in the underlying data result in different mortality rates.

1. CALCULATING THE RATE OF DEATH

Traditionally, mortality rates have been used to predict and plan for population growth over time. Among other factors, the mortality rate of a population is strongly associated with age distribution, income and levels of socioeconomic equality (Marquez, 2016; Mújica et al. 2014). Mortality rates are also used to document the impacts of humanitarian situations, such as war, famine and during outbreaks of disease (Checchi and Roberts, 2005). In these cases, those involved in calculating and responding to these mortality rates are primarily humanitarian and political actors who have the capacity to intervene in such scenarios. Mortality rates provide a crude but standard way for these actors to determine that a crisis has gone “too far” and that intervention is necessary (ibid.).

Figure 1: Mortality rate equation



The diagram illustrates the mortality rate equation. On the left, a dark blue box contains the text "MORTALITY RATE =". To the right of this box is a horizontal line. Above the line is a circular icon with a white exclamation mark on a dark blue background, with the text "# fatalities" below it. Below the line is another circular icon with a white 'x' and two white human figures on a dark blue background, with the text "# total population at risk" below it.

$$\text{MORTALITY RATE} = \frac{\text{\# fatalities}}{\text{\# total population at risk}}$$

One way in which mortality rates have been applied to the context of migration is to assess the risk of dying on a migration journey or in the attempt to cross an international border irregularly, meaning outside legal channels recognized by states (Carling, 2007). Mortality rates can be used to understand the context of such deaths beyond total number of fatalities by providing information on how many people have died compared to the number who have travelled on the same migration route (Steinhilper and Gruijters, 2018).

While mortality rates can give an indication of risk over specific time periods and specific geographies of irregular migration routes, it is important to weigh the value of making and publicizing these calculations when there are incomplete data and different interpretations of how to measure the total population at risk.

2. THE CHALLENGES AND LIMITATIONS OF ESTIMATING MORTALITY RATES ON MIGRATION ROUTES

Calculating a mortality rate involves selecting a specific population, time period and point of comparison. However, in the context of irregular migration routes, calculating this figure is challenging for two main reasons: (1) the underlying data on deaths during migration and migration flows are highly incomplete, and (2) the choices made when making the calculation itself can significantly bias the final mortality rate figure.

The underlying data

The data required to calculate mortality rates are only available for a few migration routes globally, and even then, there are significant data issues that call into question the accuracy of mortality rate calculations, namely:

- **The lack of reliable and complete data on migrant deaths and disappearances:** There are many challenges involved in documenting the deaths and disappearances of people during migration journeys, and all existing counts of migrant fatalities have gaps (Brian and Laczko, 2014; Singleton et al., 2017). This is largely because the majority of such deaths happen in the context of irregular migration, meaning that they often occur in areas which are physically remote or outside of well-monitored routes. As a result, the resulting remains are often not found, and deaths or disappearances may not be reported to the authorities in a timely manner, if at all. On routes which involve transit over water, such as the Central Mediterranean route, it is even more likely that people die without a trace. For example, while Missing Migrants Project attempts to document “invisible shipwrecks,” in which there is evidence of a departure, but none of rescue or interception and therefore the passengers would have likely been lost at sea, it is likely that not all cases are accounted for in IOM’s records.

These challenges, inherent to all attempts to track migrant fatalities, are complicated by the fact that few official sources collect and publish data on the number of people who died during irregular migration journeys in their territory. The deaths of non-nationals may not be recorded in a centralized, accessible database, or may not be categorized as “migrant deaths” per se. In many cases, those who have died on migratory journeys are never identified (Robins, 2019), meaning that their remains are even less likely to be included in counts of migrant fatalities. For these reasons, the data available on fatalities during migration are best understood as minimum estimates.

- **The lack of reliable data on migration flows:** Mortality rates are usually measured for a clearly defined population group; however, quantifying this population is very difficult in the context of migrant journeys, and particularly irregular migration flows (IOM, 2019b). Irregular migration routes change often and do not necessarily have a defined geography. Routes also often fall under multiple authorities which collect data on migratory flows in different ways. Changes in policies and administrative practices related to border control may result in changes in irregular migration figures, which may not necessarily reflect an actual variation in the number of people transiting on a given migration route. For example, increased surveillance and patrolling may mean that a growing proportion of migrants are detected or apprehended. These issues make it difficult to accurately compare flow data collected over time.

Another difficulty in establishing the population being assessed in the context of migration flows is that mortality rates are calculated on the total number of individuals in a population, not the total number of attempted journeys or movements. It is possible that available flow data count the same individuals more than once if they have used (or attempted to use) the same migration route multiple times.

- **Even when accurate data on migration flows are available, they are not always disaggregated by sex or age:** This lack of disaggregation hinders the adjustment of the mortality rate according to the composition of the population. To calculate a mortality rate correctly for a specific group – such as men compared to women, or for people from a certain country – the denominator needs to reflect changes to the specific population at risk during the chosen time period, especially when there is an over-representation of certain groups. In the Central Mediterranean context, for example, adult men have typically made up the majority of migrants who arrive irregularly in Italy (IOM, 2019a).

The calculation itself

The choices made when calculating the rate can result in significant bias of the final mortality rate figure:

- **The time period chosen for calculations can bias mortality rates:** If there are no deaths during a short time period on a migration route, it does not necessarily mean that there is no risk of death. For example, if a mortality rate is calculated for one month in which there are no known deaths or disappearances on the Central Mediterranean crossing from North Africa to Europe, the mortality rate would be zero. However, the following month, there may be a large boat that sinks and as a result, many lives that are lost. As such, mortality rates calculated for short time periods can be skewed by incidents in which there are a large number of deaths as well as when there is an absence of them, and therefore they may not reflect the actual risk of migration routes overall (Steinhilper and Gruijters, 2018).
- **There are no standard criteria² to define a situation on a migratory route as an emergency:** The context of irregular migration is unique from other humanitarian contexts, in which mortality rates are used to determine if emergency intervention is needed, because it is nearly impossible to determine the standard mortality rate for the population at risk for the purposes of comparison (in other words, to have an idea of the “normal” mortality rate). People trying to migrate across the Mediterranean Sea to Europe, for example, come from many countries across Africa, Asia and the Middle East, differ in ages and profiles and face varying risks. In other words, the profiles of people on the move change constantly in terms of size and composition and do not represent a normal population structure, making it extremely difficult to identify when intervention is needed. Defining a mortality rate in such a context calls into question the purpose for which such a calculation is needed.

3. CALCULATING “DEATH RATES” FOR THE CENTRAL MEDITERRANEAN ROUTE

The calculation of mortality rates for people attempting to migrate across the Mediterranean is affected by the lack of reliable and complete data on migrant flows and fatalities, as described in the section above. Migrant deaths at sea are particularly difficult to document, as many people drown and their remains are never recovered. Estimates of the number of people who went missing at sea are based on survivors’ accounts and cannot be verified. Therefore, any records of deaths and disappearances are best understood as a minimum estimate of the true number of migrant fatalities. For the purpose of this briefing, we rely on the incidents of death recorded by IOM’s Missing Migrants Project (2019c).

The challenges with defining the population at risk is exemplified in the Mediterranean, where the “Western,” “Eastern” and “Central” routes are commonly referenced as the three main routes across the Mediterranean Sea to reach Europe,³ and yet there is strong evidence that these routes increasingly overlap. For example, in 2019, 17 per cent of people who arrived irregularly in Italy by sea departed from Turkey and 7 per cent from Greece (UNHCR, 2019). This does not fit into any of the three commonly referenced routes. Since June 2018, hundreds of migrants have been rescued off the coast of Libya but have been taken to ports in France and Spain, rather than Italy and Malta, which are the typical countries of arrival for this route. Such changes affect mortality rate calculations for the Central Mediterranean route, which – due to data availability – typically include the number of people registered upon irregular arrival in relevant countries, and not by where they are rescued at sea.

As mentioned in the previous section, changes in policies and administrative practices related to border control may prompt an increase in irregular migration figures, which may not necessarily reflect an actual rise in flows. For example, while data on the number of people arriving irregularly in Europe are relatively complete,

² There are different trains of thought and practice around what mortality rate constitutes a humanitarian emergency. The standard threshold has been a crude mortality rate of 1 death per 10,000 people a day, or 2 deaths per 10,000 per day for under-five years. The Sphere Project (available at www.spherestandards.org) and the UNHCR (see more at www.refworld.org/docid/46a9e29a2.html) use a threshold of two times the “normal mortality rate” for the same population.

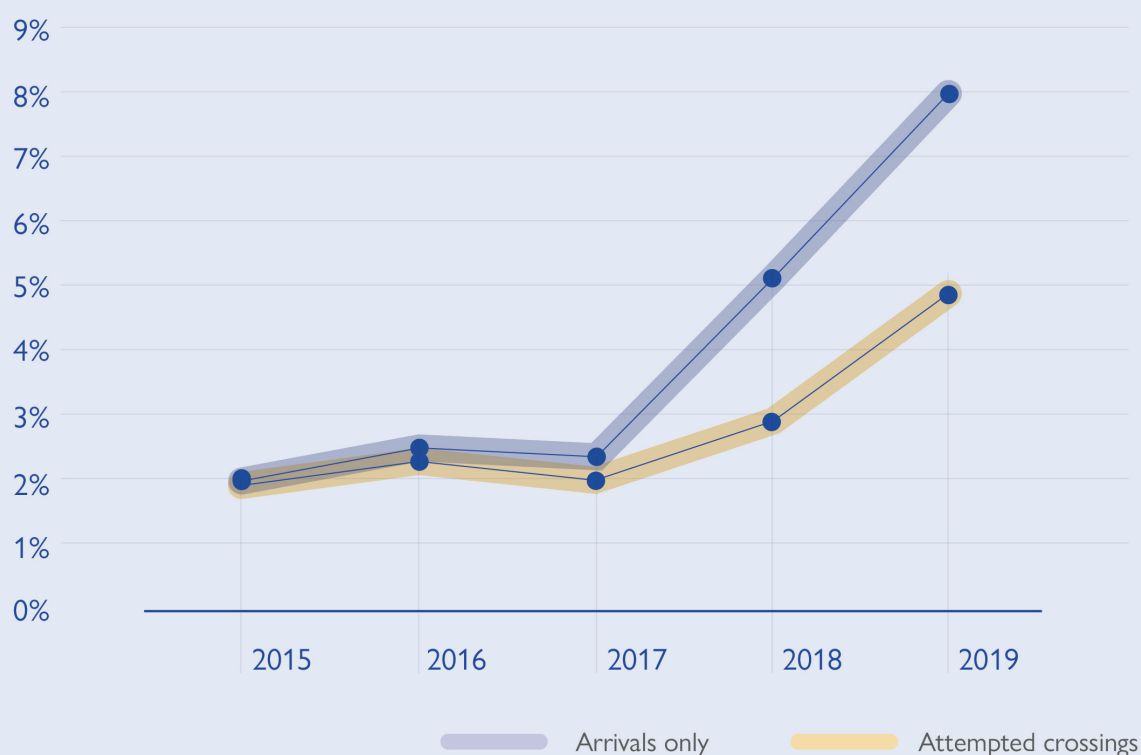
³ The “Western Mediterranean route” is defined above. The “Central Mediterranean route” is generally considered to be the migration route from the North Coast of Africa to Italy and Malta, while the “Eastern Mediterranean route” is most often used to describe the irregularized migration route by sea from Turkey to Greece and Cyprus. See the Annex to this briefing for the data underlying this calculation.

since 2016 interceptions by North African authorities have increased in the Central Mediterranean, which profoundly impacts how mortality rates are calculated on this route. In 2016, the Tunisian and Libyan Coast Guard intercepted 8 per cent of migrants attempting to cross the Central Mediterranean to Europe, which increased to 16 per cent in 2017, and 41 per cent in 2019.⁴

How the population at risk of dying in the Central Mediterranean is defined also makes a significant difference to mortality rate calculations. If the population at risk is defined as the total number of people who attempted the crossing (the “attempted crossings” calculation) – including data on irregular arrivals to Italy and Malta, interceptions at sea by Libya and Tunisia and recorded fatalities – the calculation of the mortality rate shows that in 2019, for every 21 people who attempted the Central Mediterranean Sea crossing, one person died (4.78%). However, if only the number of people who arrive in Italy is used as the population at risk (the “arrivals-only” calculation), then the mortality rate is one death for every 13 people crossing to Europe over the Central Mediterranean (7.82%).

Figure 2: Comparison of “arrivals-only” and “attempted crossings” calculations for death rates in the Central Mediterranean, 2015–2019.⁵

COMPARISON OF “ARRIVALS-ONLY” AND “ATTEMPTED CROSSINGS” CALCULATIONS FOR DEATH RATES IN THE CENTRAL MEDITERRANEAN, 2015–2019



Note: Tables with the “attempted crossings” mortality rates for all three Mediterranean routes are available at the end of this briefing.

⁴ See the Annex to this briefing for the data underlying this calculation.

⁵ In the “total population” calculation, the denominator includes the number of people who arrived in Italy and Malta, the number of people who were intercepted at sea and returned to Libya and Tunisia, and the number of people who died or went missing at sea. The denominator used for the “arrivals-only” calculation only includes the number of people who arrived in Italy and Malta plus the number of people who lost their lives at sea. In both calculations, data on fatalities are sourced from IOM’s Missing Migrants Project; data on arrivals in Italy and Malta are sourced from national authorities via IOM’s Displacement Tracking Matrix (DTM); and data on interceptions are sourced from IOM Libya and IOM Tunisia.

Critically, both calculations indicate that the probability of dying while crossing the Central Mediterranean has increased in 2018 and 2019 compared to 2016 and 2017, despite a decrease in the absolute number of deaths and disappearances recorded on the Central Mediterranean crossing. It is important to remember the bigger picture: just 30 years ago, there were nearly no migrant deaths in the Mediterranean Sea, but since 2014, more than 20,000 lives have been lost (IOM, 2020).

CONCLUSIONS AND WAY FORWARD

FIVE RECOMMENDATIONS TO BETTER CALCULATE, ASSESS AND INTERPRET THE MORTALITY RATE

The meaning of a “risk of death” is subjective for each individual person. This means that, besides the accuracy of mortality rates in the context of migration, the purpose of promoting such numbers should be questioned, considering there is no standard mortality rate for comparison to compel action to reduce deaths. The use of such mortality rates in the Mediterranean context in recent years has shown that the same figures can rather be used to support arguments opposing migration. Although mortality rates can help indicate the risks of migration routes on a technical level, the message to the public should be that deaths during migration are continuing and that even one death is too many.

In the meantime, this briefing offers five recommendations for how mortality rates on migration can accurately be calculated, assessed and interpreted:

1. Any calculation of a death rate should be preceded by an assessment of data limitations and biases. Issues with the methodologies and definitions used by data sources, as well as possible biases, breaks in the data time series and comparability of data over time must be considered.
2. Producers of mortality rates should always clearly indicate the data used and describe the formula by which this “death rate” was calculated.
3. To decrease bias, calculations should be conducted over longer time periods. Additionally, comparisons should ideally be made for equivalent time periods (e.g. January – June 2018 to January – June 2019) given the seasonal nature of migration flows.
4. Producers of mortality rates should consider the policy implications of releasing such figures.⁶ At a minimum, they should consider the pros and cons of putting these figures in the public domain.
5. It is essential to always interpret mortality rates in the context of the wider context of irregular migration. Without sufficient pathways for legal migration, people can take huge risks which can, in the worst cases, result in death.

The authors of this briefing encourage those reading migration mortality rates to critically interpret the figures in light of the limitations discussed here. Readers should keep in mind that because migrant fatalities are undercounted and attempted crossings are underestimated, death rates are often imprecise estimates at best. As such, such reported “death rates” should only be seen as indicative of trends, rather than as highly reliable measures.

⁶ See Checchi, 2018 for a more in-depth discussion of sensitivity and situational analysis in humanitarian contexts.

ANNEX

“ATTEMPTED CROSSINGS” CALCULATIONS FOR DEATH RATES IN THE WESTERN, EASTERN AND CENTRAL MEDITERRANEAN ROUTES

Table 1: “Attempted crossings” calculations for death rates in the Western, Eastern and Central Mediterranean routes, full year 2015–2019

DEATH RATES IN THE WESTERN, EASTERN AND CENTRAL MEDITERRANEAN ROUTES, 2015–2019

	WESTERN MEDITERRANEAN	CENTRAL MEDITERRANEAN	EASTERN MEDITERRANEAN	TOTAL (all three routes)
2015	0.62%	1.98%	0.08%	0.36%
2016	0.87%	2.27%	0.21%	1.20%
2017	0.77%	1.98%	0.12%	1.41%
2018	1.23%	2.88%	0.29%	1.34%
2019	1.67%	4.78%	0.05%	0.99%

Note: All data used for these calculations, including notes on data issues, are available for download from missingmigrants.iom.int/downloads.

BIBLIOGRAPHY

- Brian, T. and F. Laczko
2014 Fatal Journeys: Tracking Lives Lost during Migration. IOM, Geneva. Available at <https://publications.iom.int/books/fatal-journeys-tracking-lives-lost-during-migration>.
- Carling, J.
2007 Migration Control and Migrant Fatalities at the Spanish-African Borders. *International Migration Review*, 41(2):316–343.
- Checchi, F.
2018 Estimation of population mortality in crisis-affected populations: Guidance for humanitarian coordination mechanisms. London School of Hygiene and Tropical Medicine, London. Available at www.who.int/health-cluster/resources/publications/LSHTM-Mortality-Estimation-Options-oct2018.pdf.
- Checchi, F. and L. Roberts
2005 Interpreting and using mortality data in humanitarian emergencies: A primer for non-epidemiologists. Humanitarian Practice Network, London. Available at <https://odihpn.org/wp-content/uploads/2005/09/networkpaper052.pdf>.
- International Organization for Migration (IOM)
2020 Shipwreck Off Coast of Libya Pushes Migrant Deaths on the Mediterranean Past 20,000 Mark. Available at www.iom.int/news/shipwreck-coast-libya-pushes-migrant-deaths-mediterranean-past-20000-mark.
- 2019a Displacement Tracking Matrix. Mixed Migration Flows to Europe - Monthly Overview. (December 2019). IOM, Geneva. Available at <https://dtm.iom.int/reports/europe-%E2%80%94-mixed-migration-flows-europe-monthly-overview-december-2019>.
- 2019b Irregular migration. Migration Data Portal. IOM GMDAC, Berlin. Available at <https://migrationdataportal.org/themes/irregular-migration>.
- 2019c Missing Migrants Project database. Available at <https://missingmigrants.iom.int/downloads> (accessed 18 March 2020).
- Marquez, P.
2016 Income inequality and differential mortality: An ominous combination. World Bank Blogs. Available at <https://blogs.worldbank.org/voices/income-inequality-and-differential-mortality-ominous-combination>.
- Mújica, O., E. Vázquez, E. Duarte, J. Cortez-Escalante, J. Molina and J. Barbosa da Silva
2014 Socioeconomic inequalities and mortality trends in BRICS, 1990–2010. *Bulletin of the World Health Organization*, 92:405–412. Available at www.who.int/bulletin/volumes/92/6/13-127977/en/.
- Robins, S.
2019 Analysis of Best Practices in the Identification of Missing Migrants: Implications for the Central Mediterranean. Central Mediterranean Route Thematic Report Series. IOM, Geneva. Available at <https://publications.iom.int/books/central-mediterranean-route-thematic-report-series-analysis-best-practices-identification>.
- Singleton, A., F. Laczko and J. Black
2017 Measuring unsafe migration: The challenge of collecting accurate data on migrant fatalities. *Migration Policy Practice*, 7(2):4–9. Available at <https://publications.iom.int/books/migration-policy-practice-vol-vii-number-2-april-september-2017>.
- Steinhilper, E. and R. Gruitjers
2018 A Contested Crisis: Policy Narratives and Empirical Evidence on Border Deaths in the Mediterranean. *Sociology*, 52(3):515–533. Available at https://ora.ox.ac.uk/objects/uuid:0f62fe51-2b65-4b88-9d2a-c280906c0fb1/download_file?file_format=pdf&safe_filename=Border%2Bdeaths%2Bin%2Bthe%2BMediterranean_final.pdf&type_of_work=Journal+article.
- United Nations High Commissioner for Refugees (UNHCR)
2019 Italy Sea Arrivals Dashboard - December 2019. UNHCR, Geneva. Available at <https://data2.unhcr.org/en/documents/download/73536>.



The “boat cemetery” in Lampedusa where the boats used by the migrants are stored to be destroyed later.
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