

PSI 1: Measuring Hospital Standardised Mortality Rates	
Origin: PSI by SimPatIE	
Dimension	Description
Description of Specific Aspects of Patient Safety	Hospital Standardised Mortality Ratio (HSMR) was first developed to monitor the quality of care delivered. Yet, death is the ultimate harm to a patient regarding patient safety. Thus HSMR is an adequate PSI (1;2).
Level of Determination of Patient Safety	Safety is assessed at the aggregated patient level.
Aim of the PSI	The PSI aims at surveillance of institution-wide in-hospital mortality.
Source(s)	HSMR was developed by B. Jarman, London.
Extent of Clinically Testing	<p>Since 1999 HSMR has been used in all National Health Service hospitals in England, and the results have been published. The method has also been used and tested in Sweden where it was applied to the national patients' registry. Registration of death is statutory, which increases the data registrations and makes the registration specific.</p> <p>By testing the method predictive differences in HSMR was found, they were: the number of in-hospital doctors per 100 beds, number of GPs per 100000 habitants in the area of interest, the number of acute admissions, and the part of patients suffering from comorbidity like pneumonia and heart insufficiency (1).</p>
Evidence of Clinically use of Standards	No evidence of clinically use of standards was found.
PSI category	Institution-Wide PSI.
Data definitions	<p>Individual patient registration of age, sex, postal code, one primary and up to six secondary ICD-9 discharge diagnosis, kind of hospitalisation (elective or acute), date of admission and discharge, information on where the patient is discharged to and finally whether the patient is discharged alive.</p> <p>HSMR can be assessed for all diagnosis, for separate diagnosis, for departments and for the whole hospital.</p> <p>Organisational registration of number of beds, number of doctors and nurses employed in the hospitals in the area, number of GPs in the area and information on socio economics in the background population of the area.</p>
Numerator Description	Numbers of deaths given a specific diagnose.
Denominator Description	The total number of admissions given the specific diagnosis stratified by age (10 years intervals), sex, elective/acute admission and total time of hospitalisation.
Data Source	Administrative data.

Identifying the institutional context	This PSI is relevant to quality improvement and accreditation.
Care Setting	The PSI applies institution-wide.
Professionals Responsible for Health Care	All authorised health care workers.
Lowest Level of Health Care Delivery Addressed	Individual clinical units or departments.
Allowance for Patient Factors	Age (10 years intervals), sex, comorbidity.
Stratification by Vulnerable Populations	Age (10 years intervals), sex, elective/acute admission and total time of hospitalisation.
Standard of Comparison	No time frame of the comparison set. Hospital-wide surveillance.
Scoring	<p>Only the 85 primary admission diagnoses contributing to 80% of all in-hospital deaths are counted. All transfers between hospitals are excluded.</p> <p>To know about differences in primary illness and comorbidity the 15 most often discharge diagnosis (covering chronic diseases and acute cause of admission) are to be found as the primary diagnosis related to 50% of all in hospital deaths (Please see (1) for further definition)</p> <p>For each of the 85 included primary discharge diagnoses the yearly cumulative mortality proportion (CMP) of the hospital is assessed, that is dividing the number of deaths given a specific diagnoses by the total number of admissions given the specific diagnosis stratified by age (10 years intervals), sex, elective/acute admission and total time of hospitalisation.</p> <p>The expected yearly CMP is assessed for each stratum multiplied by the total strata specific CMP.</p> <p>HSMR is assessed as the ratio of the observed versus the expected CMP for each of the primarily discharge diagnosis multiplied by 100.</p> <p>By means of stepwise regression analysis risk factors for differences in HSMR are identified. The steps are: 1) general hospital data (e.g. part of acute admitted patients) 2) individual hospital data (e.g. number of beds) 3) society related data (e.g. number of GPs per 100000 habitants in the area). Please see (1) for further scoring advise.</p>