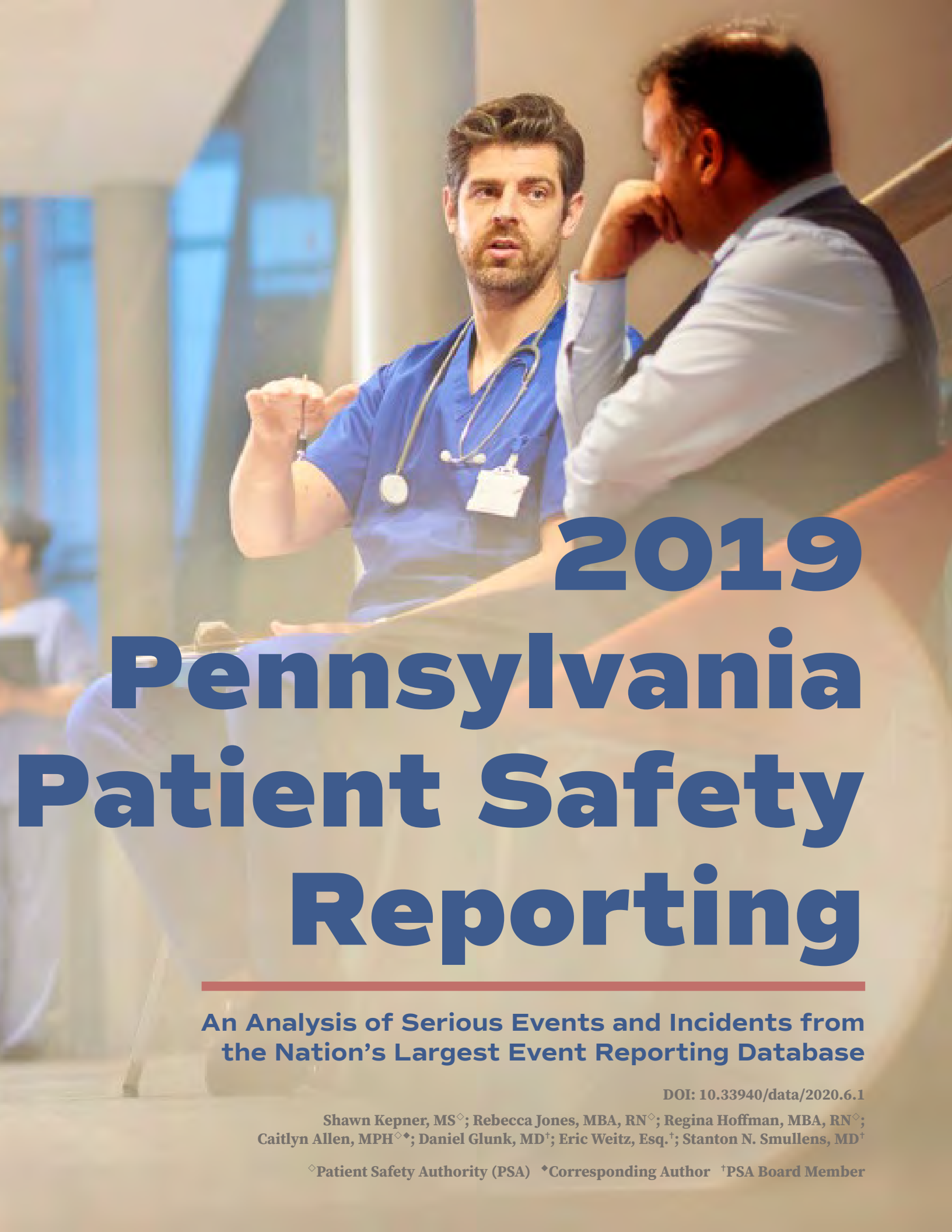

2019 Pennsylvania Patient Safety Reporting

An Analysis of Serious Events and Incidents from the Nation's Largest Event Reporting Database

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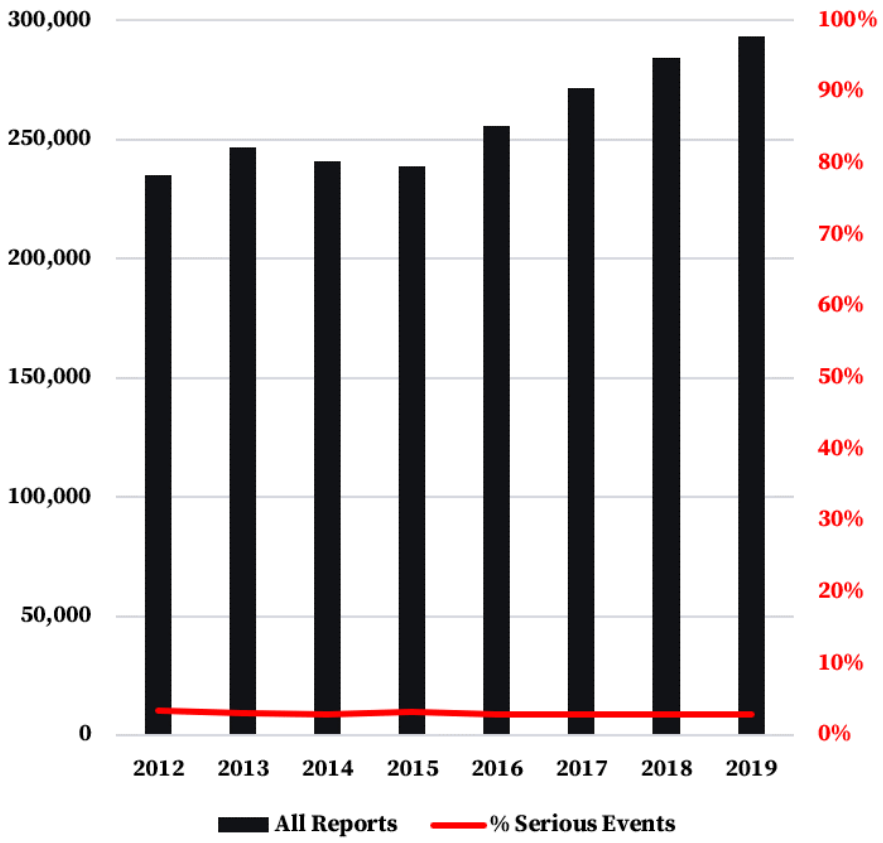
Abstract

Pennsylvania is the only state that requires acute healthcare facilities to report all events of harm or potential for harm. With over 3.6 million acute care event reports, the Pennsylvania Patient Safety Reporting System (PA-PSRS) is the largest repository of patient safety data in the United States and one of the largest in the world. Of the 293,400 patient safety event reports submitted by Pennsylvania's acute care facilities in 2019, 97% were from hospitals, and 3% were from ambulatory surgical facilities (ASFs).

The vast majority of these reports were Incidents (284,847), rather than Serious Events (8,553). Reporting rates for both hospitals and ASFs increased 26% from 2015 to 2019, which is likely due to changes in reporting guidance in 2015. For each of the last five years, the most frequently reported event type was "Error Related to Procedure/Treatment/Test," (EPTT), with this event type accounting for 33% of all submitted acute care event reports in 2019. "Medication Error," "Complication of Procedure/Treatment/Test" and "Fall" events were also reported frequently, accounting for 18%, 16%, and 11% of all submitted event reports in 2019, respectively.

The increase in reporting rates each year may reflect improvements in patient safety culture across the Commonwealth, and the analysis within this article highlights a number of areas in which continued patient safety efforts can be applied to reduce harm in acute care settings.

Figure 1. All Reports and Serious Event Reports by Year



Introduction

Pennsylvania is the only state that requires healthcare facilities to report all events of harm or potential for harm. Serious Events and Incidents are reported to the Pennsylvania Patient Safety Reporting System (PA-PSRS)*, which is the largest repository of patient safety data in the United States, and one of the largest in the world, with over 3.6 million acute care records. The overwhelming majority (97.1%) of all acute care event reports are Incidents. For 2019, there were 284,847 Incidents and 8,553 Serious Events for a total of 293,400 reported events.

The counts of all events and the percentage that are Serious Events reported over the last eight years are provided in **Figure 1**. The total number of event reports has increased during the last four years. The number of reported Serious Events has increased over the past three years with the largest annual increase occurring in 2019 (+5.7%). This article will show details of the PA-PSRS acute care data along with longitudinal and categorical insights that can be used for improving patient safety.

Definitions

Terms describing patient safety occurrences, including "serious event," "medical error," "adverse event," "harm," and "incident" are often used interchangably. However, within the context of this manuscript they have distinct meanings and indications for whether they must be reported in Pennsylvania under Act 13. (See **Figures 2** and **3** for a detailed description.)

Methods

The data from PA-PSRS event reports were extracted on January 30, 2020 to include all reports submitted during calendar year 2019.

We also obtained data from the Pennsylvania Health Care Cost Containment Council[+] (PHC4), and those data represent January 1 through June 30, 2019. Therefore, any 2019 rates based on PHC4 data used to normalize reporting trends were estimated via projections of Q3 and Q4 2019, which were based on the rates of increase for the 2018 quarters.

Results

Harm Scores

Harm scores are assigned by healthcare facilities at the time of reporting. **Table 1** describes the categories of harm

Table 1. PA-PSRS Harm Scores

	Harm Score	Definition
Incidents	A	Circumstances that could cause adverse events
	B1	An event occurred but it did not reach the individual
	B2	An event occurred but it did not reach the individual because of active recovery efforts by caregivers
	C	An event occurred that reached the individual but did not cause harm and did not require increased monitoring
	D	An event occurred that required monitoring to confirm that it resulted in no harm and/or required intervention to prevent harm
Serious Events	E	An event occurred that contributed to or resulted in temporary harm and required treatment or intervention
	F	An event occurred that contributed to or resulted in temporary harm and required initial or prolonged hospitalization
High Harm	G	An event occurred that contributed to or resulted in permanent harm
	H	An event occurred that resulted in a near-death event (e.g., required ICU care or other intervention necessary to sustain life)
	I	An event occurred that contributed to or resulted in death

Table 2. All Reports by Facility Type

		2017	2018	2019
ASFs	Incidents	6,728	6,946	7,348
	Serious Events	1,820	1,756	1,887
	All Reports	8,548	8,702	9,235
Hospitals	Incidents	257,249	269,309	277,499
	Serious Events	6,066	6,338	6,666
	All Reports	263,315	275,647	284,165
All Reports	Incidents	263,977	276,255	284,847
	Serious Events	7,886	8,094	8,553
	Total	271,863	284,349	293,400

Note: ASFs (Ambulatory Surgical Facilities) includes ambulatory surgery centers, birthing facilities, and abortion facilities).

Patient Safety Event[1]
an event, occurrence, or situation that could have resulted or did result in harm to a patient and can be but is not necessarily the result of a defective system/process design, a system breakdown, equipment failure, or human error. They can also include adverse events, no-harm events, near misses, and hazardous conditions.

Adverse Event[2]
an event that results in unintended harm to the patient by an act of commission or omission rather than by the underlying disease or condition of the patient, and may or may not have been preventable.

Incident[3]
an event, occurrence, or situation involving the clinical care of a patient in a medical facility which could have injured the patient but did not either cause an unanticipated injury or require the delivery of additional healthcare services to the patient.

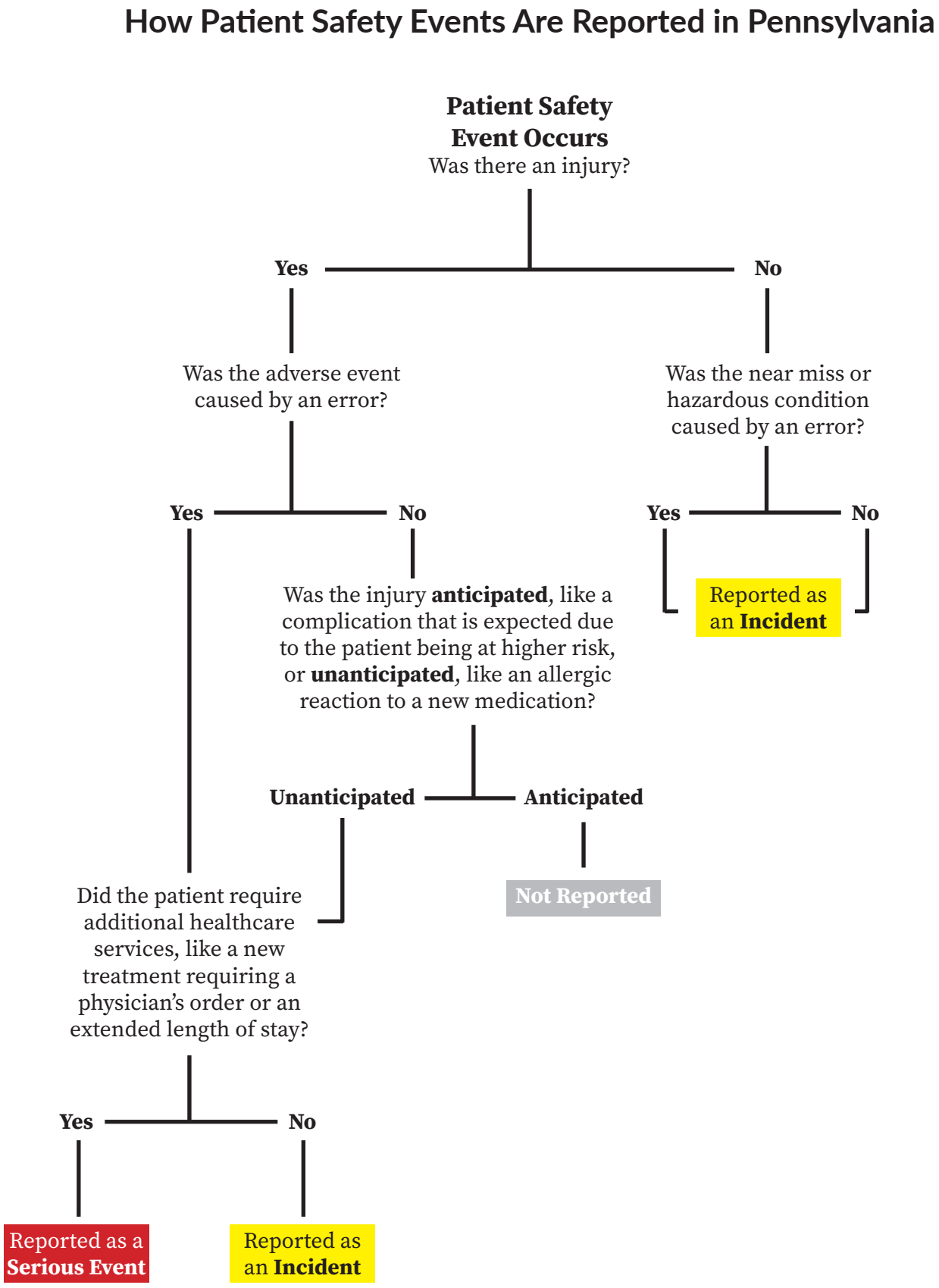
Serious Event[3]
an event, occurrence, or situation involving the clinical care of a patient in a medical facility that results in death or compromises patient safety and results in an unanticipated injury requiring the delivery of additional healthcare services to the patient.

Medical Error[4]
failure of a planned action to be completed as intended; the use of a wrong plan to achieve an aim; or failure of an unplanned action that should have been completed.

*PA-PSRS is a secure, web-based system through which Pennsylvania hospitals, ambulatory surgical facilities, abortion facilities, and birthing centers submit reports of patient safety–related incidents and serious events in accordance with mandatory reporting laws outlined in the Medical Care Availability and Reduction of Error (MCARE) Act (Act 13 of 2002).[1] All reports submitted through PA-PSRS are confidential and no information about individual facilities or providers is made public.

⁺The Pennsylvania Health Care Cost Containment Council (PHC4) is an independent state agency responsible for addressing the problem of escalating health costs, ensuring the quality of healthcare, and increasing access to healthcare for all citizens regardless of ability to pay. PHC4 has provided data to this entity in an effort to further PHC4's mission of educating the public and containing healthcare costs in Pennsylvania. PHC4, its agents, and its staff, have made no representation, guarantee, or warranty, express or implied, that the data—financial, patient, payor, and physician-specific information—provided to this entity are error-free, or that the use of the data will avoid differences of opinion or interpretation. This analysis was not prepared by PHC4. This analysis was done by the Patient Safety Authority. PHC4, its agents and its staff, bear no responsibility or liability for the results of the analysis, which are solely the opinion of this entity.

Figure 2. Patient Safety Event Reporting in Pennsylvania



Note: Figure 2 is meant to provide a high–level overview of event reporting in Pennsylvania and is not meant to replace the Reporting Guidance issued in 2016. For more information, visit patientsafety.pa.gov.

Figure 3. Hospital Patient Days and Reported Events in Pennsylvania – 2019

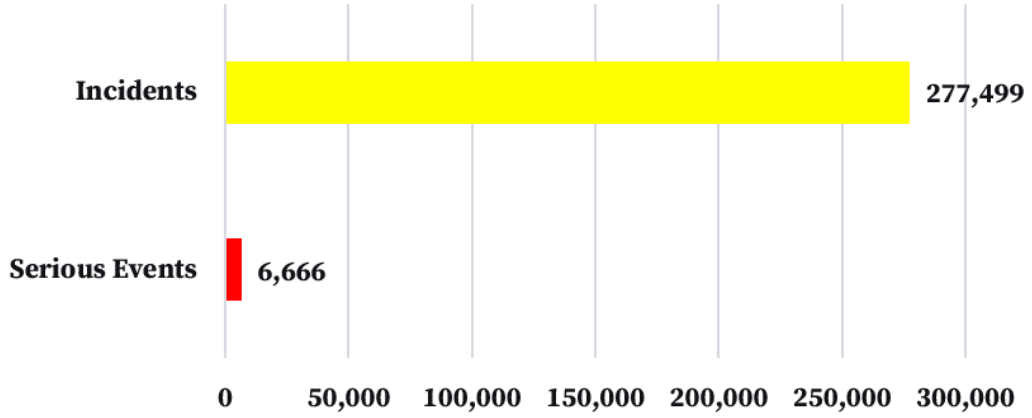
A patient day is the basic unit to show the total amount of time someone is in the hospital. If Mr. Smith is admitted to a hospital and spends three days there, that would be counted as three patient days.

In 2019, there were an estimated 8,800,000 patient days for Pennsylvania hospitals and an 284,165 reported events (1 reported event for every 31 patient days).

284,165 Reported Events

8,800,000 Patient Days

Of those 284,165 reported events, only 2% were Serious Events, meaning the vast majority of reported events in Pennsylvania are Incidents.



Note: Identifiable patient information (e.g., name and date of birth) is not reported. Therefore, there is no way to know if a patient experienced more than one event over the course of the year.

Figure 4: Distribution of Reports by Harm Score by Year (2017–2019)

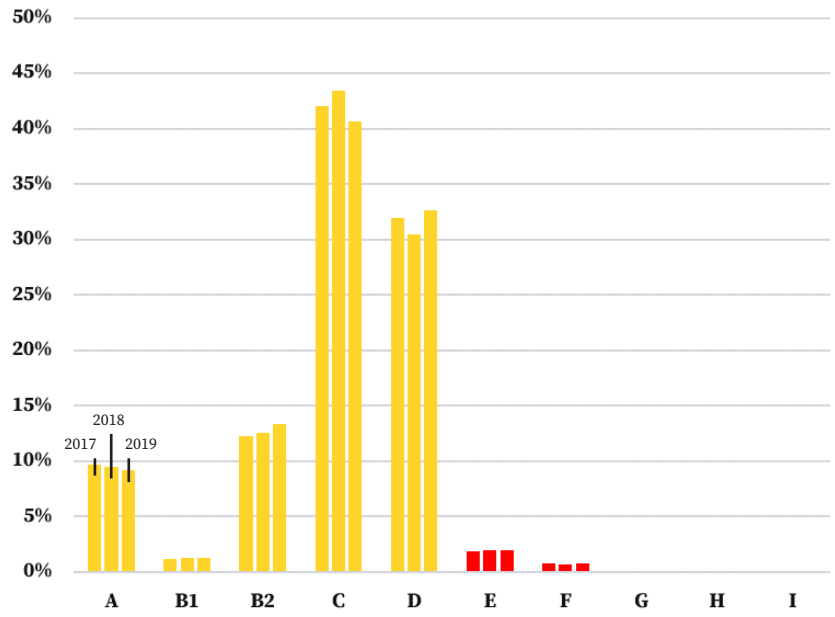


Table 4: Percentage of Reports by Harm Score by Year (2017–2019)

	A	B1	B2	C	D	E	F	G	H	I
2017	9.7	1.2	12.3	42.0	31.9	1.9	0.8	0.0	0.0	0.1
2018	9.5	1.3	12.5	43.4	30.5	2.0	0.7	0.0	0.0	0.1
2019	9.2	1.3	13.3	40.7	32.6	2.0	0.8	0.0	0.0	0.1

Note: The raw numbers for harm scores G and H are greater than zero, even though they are shown with 0.0% above due to rounding to the nearest tenth of a percent.

Table 3: All Reports and High Harm Event Reports by Year

Submission Date	High Harm Reports	All Reports
2005	726	169,069
2006	623	195,860
2007	595	211,792
2008	573	219,758
2009	572	226,398
2010	507	225,255
2011	519	228,856
2012	417	235,247
2013	364	246,609
2014	396	240,777
2015	473	238,882
2016	410	255,716
2017	445	271,863
2018	343	284,349
2019	415	293,400

Figure 5: All Reports and High Harm Event Reports by Year

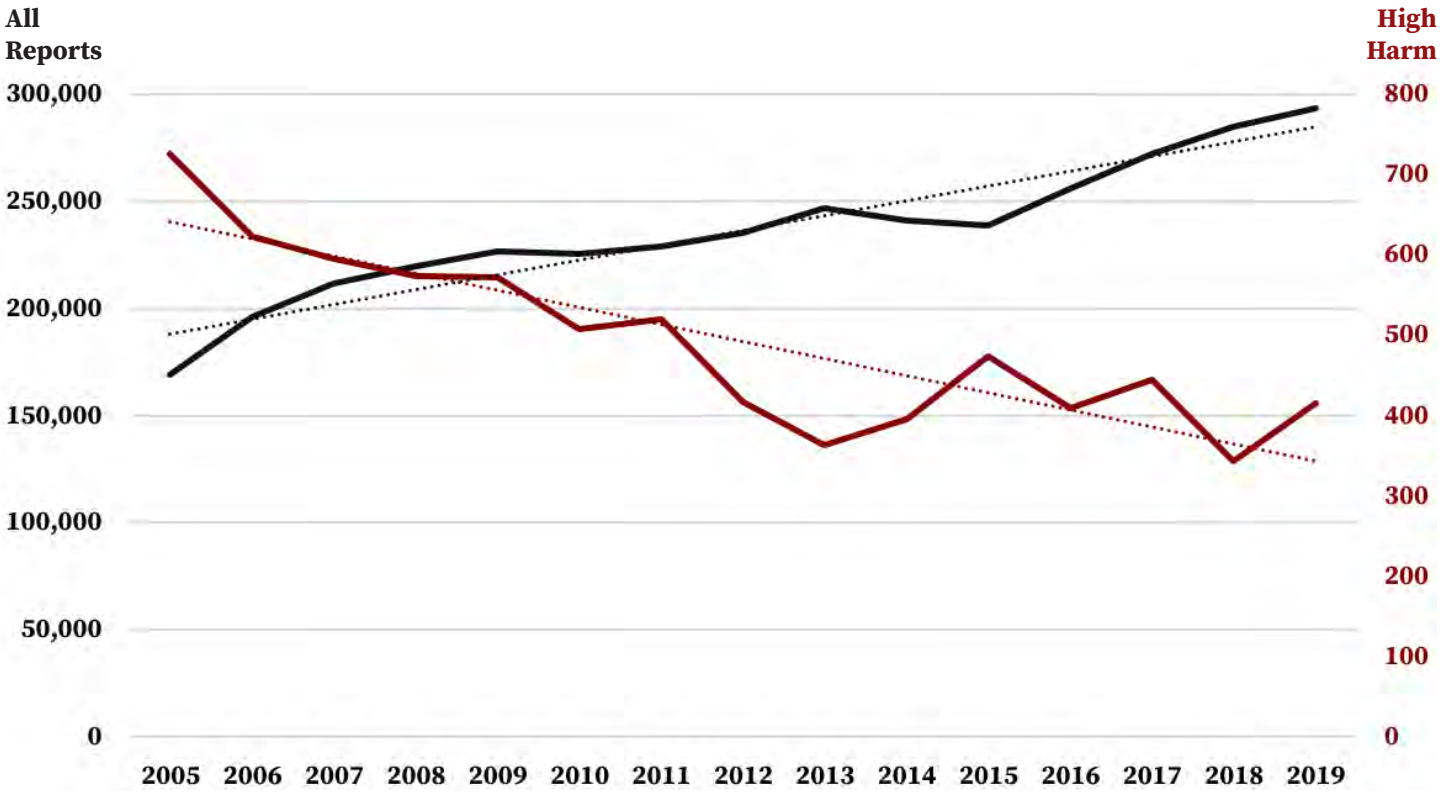
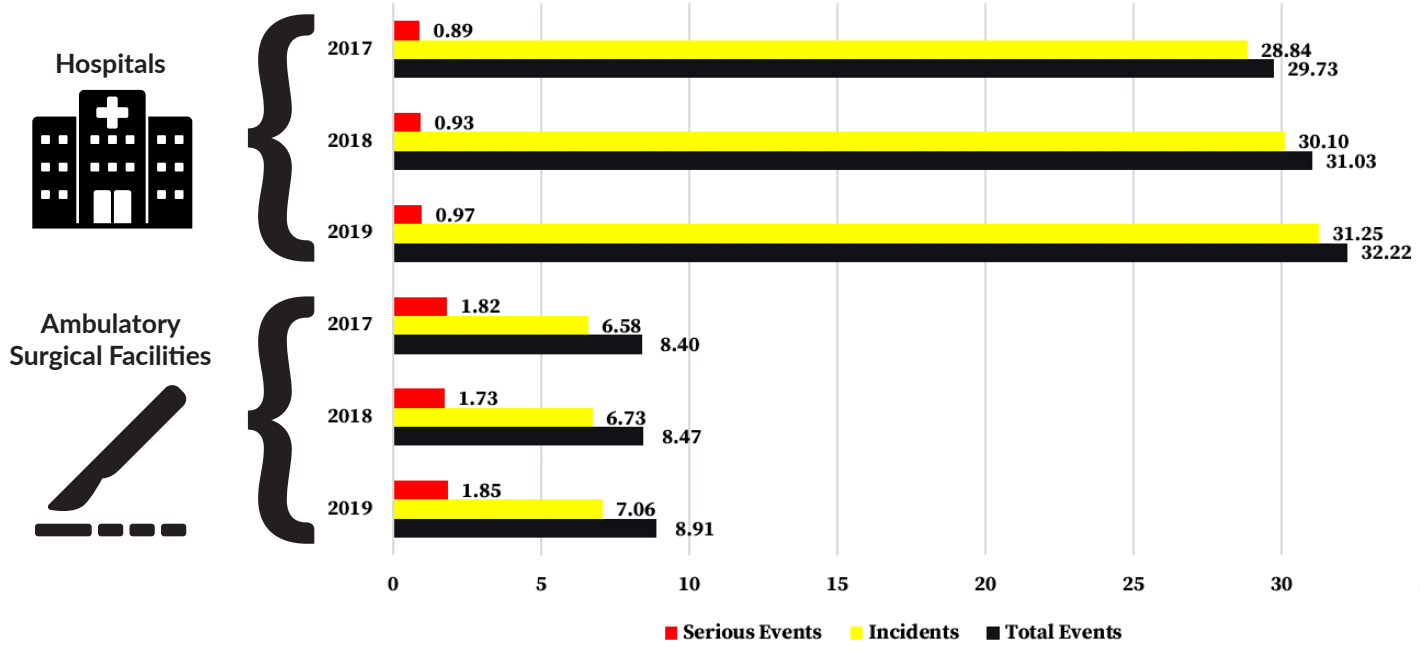


Figure 6. Event Reporting Rates by Hospitals (per 1,000 patient days) and Ambulatory Surgical Facilities (per 1,000 Surgical Encounters) by Year

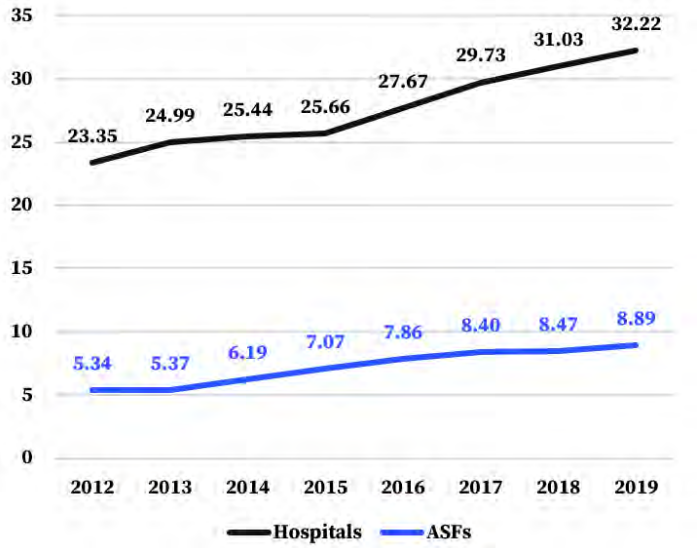


scores across an increasing level of patient harm. Harm scores A through D are classified as Incidents, harm scores E through I are classified as Serious Events, and harm scores G, H, and I are considered High Harm events. **Table 2** shows a breakdown of Incidents and Serious Events by facility type from the last three years.

The distribution of all events by harm score submitted during years 2017–2019 is shown in **Figure 4** and **Table 4**. Consistently, the largest number of acute care events are reported with a harm score of C (4 out of every 10), followed by harm scores D, B2, and A. Together, these four harm scores account for 96% of all event reports submitted during years 2017–2019. Also, among Serious Event reports, approximately two-thirds are classified as harm score E.

Next, the High Harm reports are trended over time along with the total for all reports (**Figure 5** and **Table 3**). While the total number of reports submitted each year is on a linear increasing trend, the number of High Harm events has decreased by 311 (43%) from 2005 to 2019. The decrease was sharper from 2005–2013 and plateaued during 2012–2019. The number of High Harm events increased from 343 in 2018 to 415 in 2019 (a 21% increase). However, this increase was not unexpected given the trend for High Harm events reported over time. The number of High Harm events reported in 2018 was lower than expected by the trend, which may be responsible for the larger than expected increase between 2018 and 2019.

Figure 7: Reporting Rates for Hospitals (per 1,000 Patient Days) and ASFs (per 1,000 Surgical Encounters)



Reporting Rates

In addition to looking at increases or decreases in the total number of acute care events, normalized data—such as rates—can be used to assess changes in reporting per patient days for hospitals and per surgical encounters for ambulatory surgical facilities (ASFs). As shown in **Figure 6**, ASFs have a higher rate of reporting Serious Events compared to hospitals. The reporting rate for both hospitals and ASFs (**Figure 7**) increased 26% from 2015 to 2019, which is likely due to changes in reporting guidance in 2015.

Event Types

When a report of an Incident or Serious Event is submitted to PA-PSRS, an event type along with one or two more levels of subtype are chosen to reflect the nature of the event.

Figure 8: Number of Reports Submitted by Event Type in Descending Order by 2019 Frequency

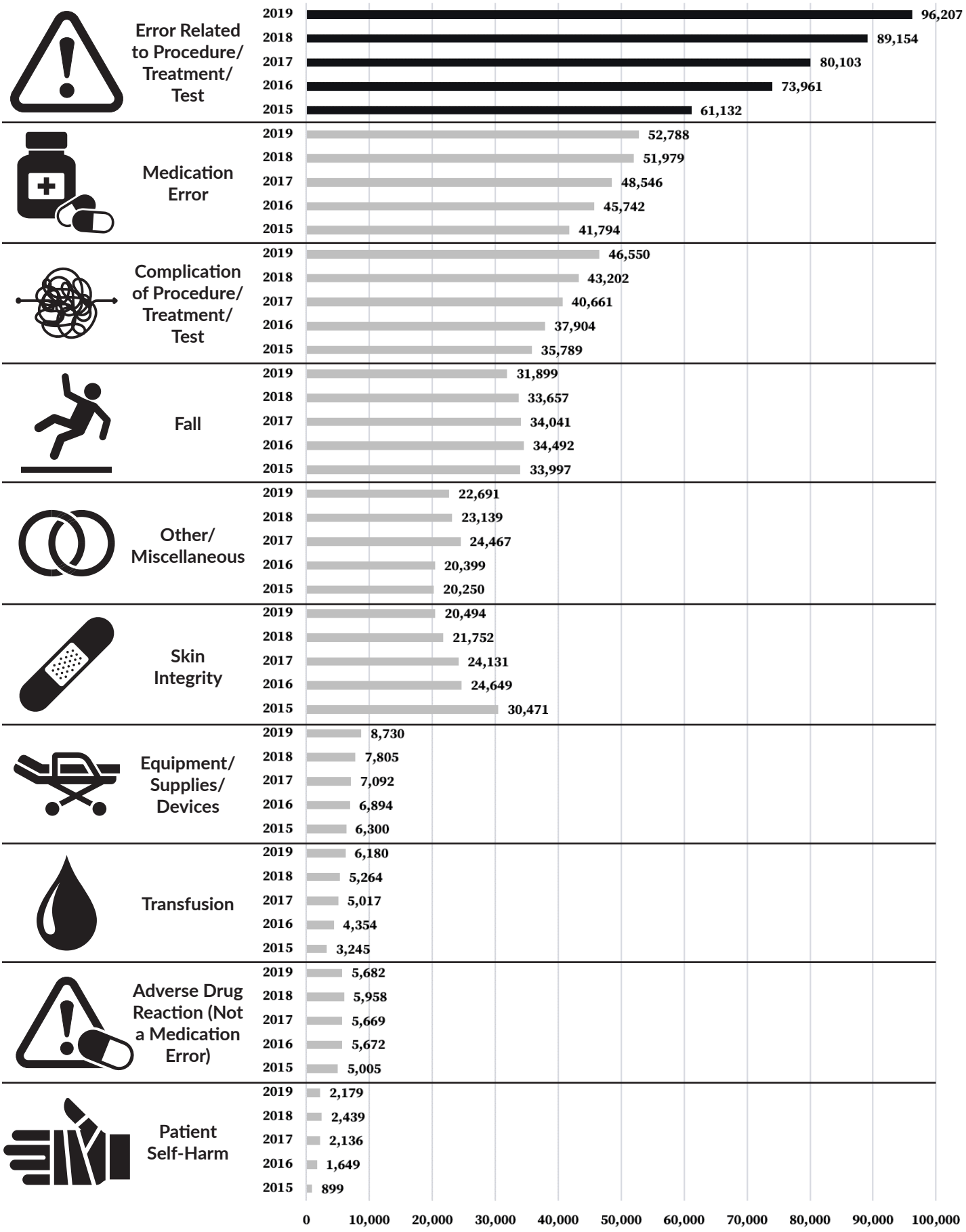


Figure 9: Number of Serious Event Reports for Error Related to P/T/T by Sub Type in Descending Order by 2019 Frequency

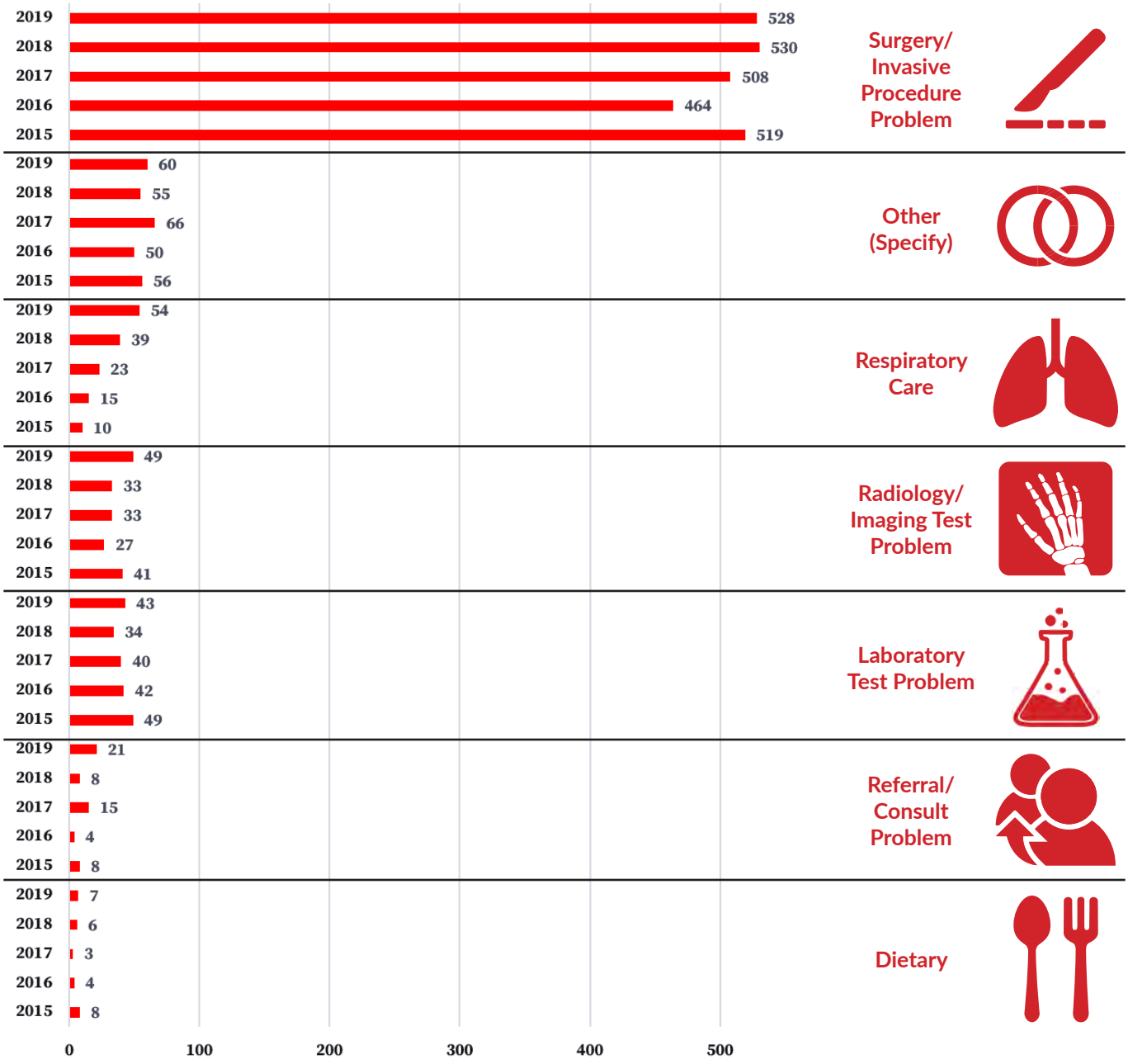
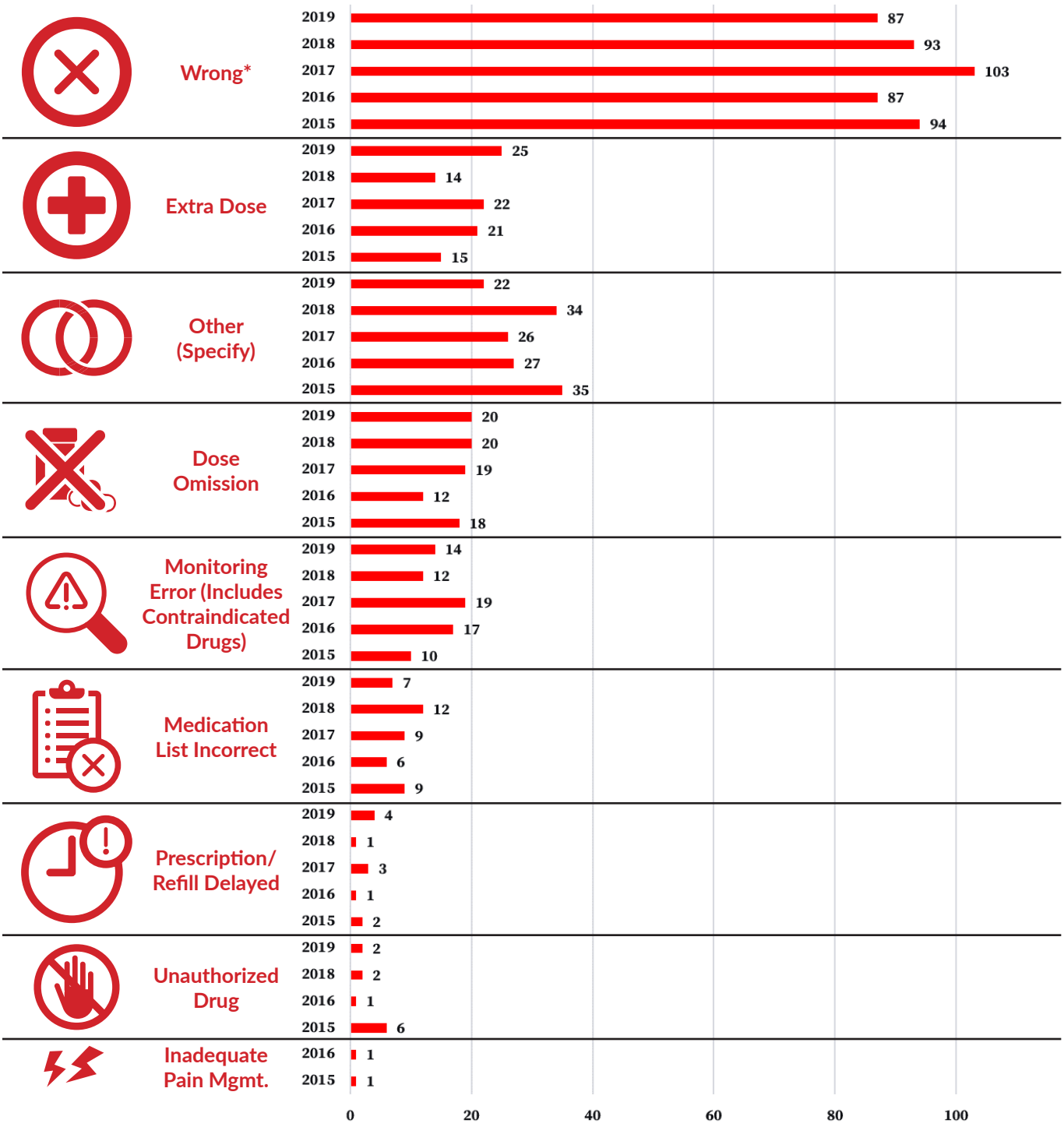
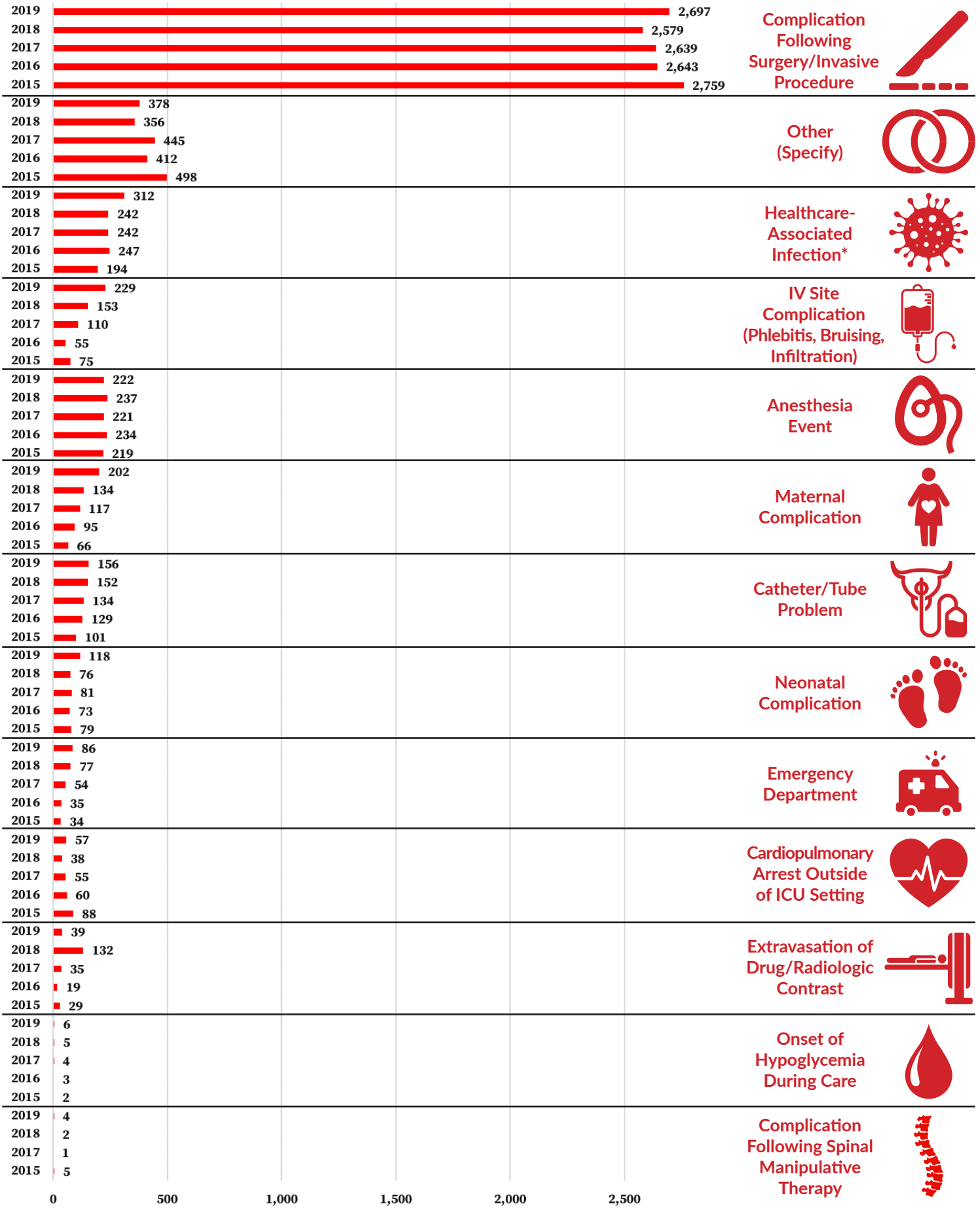


Figure 10: Number of Serious Event Reports for Medication Error by Sub Type in Descending Order by 2019 Frequency



*Wrong covers several types of events such as wrong dose, drug, dosage form, rate, time, route, concentration, etc.

Figure 11: Number of Serious Event Reports for Error Related to P/T/T by Sub Type in Descending Order by 2019 Frequency



*Includes only healthcare-associated infections (HAIs) reported in PA-PSRS; Does not include infections reported by hospitals to CDC's National Healthcare Safety Network (NHSN)

Events are defined by 228 possible combinations of event types and subtypes. In the PA-PSRS reporting taxonomy for Incidents and Serious Events, there are 10 main event types, and **Figure 8** shows the number of reports submitted for each event type over the past five years. For each of the last five years, the most prevalent event type was "Error related to Procedure/Treatment/Test;" in 2019, this event type accounted for 96,207 reports, which accounted for 33% of all submitted acute care event reports. This category of event type has shown an increase each year since 2015 and an overall increase of 57% from 2015 to 2019.

The second most common event type was "Medication error." This event type accounted for 52,788 reports in 2019, which was 18% of all submitted reports. The third most prevalent event type was "Complication of Procedure/Treatment/Test," with 46,550 reports submitted, which accounted for 16% of all events. Finally, event type "Fall" accounted for 11% of reports submitted in 2019.

Error Related to Procedure/Treatment/Test

Across all event reports, an increase in laboratory test problems drives the increase in the Error Related to Procedure/Treatment/Test category. However, according to **Figure 9**, laboratory test problems are not associated with an increase in Serious Events. The increase in reports of laboratory test problems was predominately due to a few facilities with increasing attention to specimen quality issues that did not cause harm to the patients.

Medication Error

Over half of all events involving medication errors are reported under the event subtype "Wrong." However as shown in **Figure 10**, there has been no increase in Serious Events in this subcategory of medication error reports.

Figure 12: Number of Reports Submitted by Event Type and Harm Score by Year

Year of Event Submission	Event Harm Score	Error Related to Procedure / Treatment / Test	Medication error	Complication of Procedure / Treatment / Test	Fall	Other / Miscellaneous	Skin Integrity	Equipment / Supplies / Devices	Transfusion	Adverse Drug Reaction	Patient Self-Harm
2017	A	12,772	2,929	2,102	225	4,065	1,686	1,267	1,069	51	281
	B1	1,321	776	143	75	670	15	166	62	6	8
	B2	10,393	18,337	659	315	1,839	38	1,073	634	25	24
	C	42,898	18,258	10,866	19,475	8,739	6,463	3,293	2,351	1,202	612
	D	12,031	8,045	22,753	13,006	8,336	15,322	1,228	883	4,142	1,048
	E	462	143	2,400	673	544	598	50	14	186	131
	F	173	45	1,480	251	202	7	12	4	47	19
	G	22		40	6	7	1			1	1
	H	9	7	79	8	10		1		5	2
	I	22	6	139	7	55	1	2		4	10
	Total	**80,103**	**48,546**	**40,661**	**34,041**	**24,467**	**24,131**	**7,092**	**5,017**	**5,669**	**2,136**
2018	A	13,735	3,013	2,308	208	4,184	1,053	1,193	965	53	194
	B1	1,453	1,010	161	85	677	10	149	75	4	5
	B2	10,960	20,182	617	320	1,768	52	1,053	600	15	39
	C	49,364	19,888	12,067	19,641	7,990	5,579	3,882	2,730	1,370	861
	D	12,937	7,698	23,866	12,442	7,721	14,279	1,472	877	4,299	1,151
	E	489	140	2,606	717	538	758	47	11	163	159
	F	180	44	1,391	224	189	21	8	5	43	18
	G	9	1	25	1	3					
	H	6	1	51	11	11				6	
	I	21	2	110	8	58		1	1	5	12
	Total	**89,154**	**51,979**	**43,202**	**33,657**	**23,139**	**21,752**	**7,805**	**5,264**	**5,958**	**2,439**
2019	A	14,697	2,889	2,018	201	3,806	741	1,192	1,251	56	24
	B1	1,909	963	113	63	496	21	161	98		6
	B2	12,930	21,253	573	383	1,941	45	1,412	523	25	38
	C	50,972	18,970	11,542	17,091	6,461	5,125	4,124	3,120	1,358	680
	D	14,937	8,532	27,798	13,232	9,010	13,910	1,762	1,136	4,003	1,256
	E	547	124	2,710	707	667	632	63	39	176	151
	F	173	52	1,550	205	245	16	10	11	43	17
	G	8	1	34	3	4	4	2		1	
	H	13	3	71	5	8		2	1	11	1
	I	21	1	141	9	53		2	1	9	6
	Total	**96,207**	**52,788**	**46,550**	**31,899**	**22,691**	**20,494**	**8,730**	**6,180**	**5,682**	**2,179**

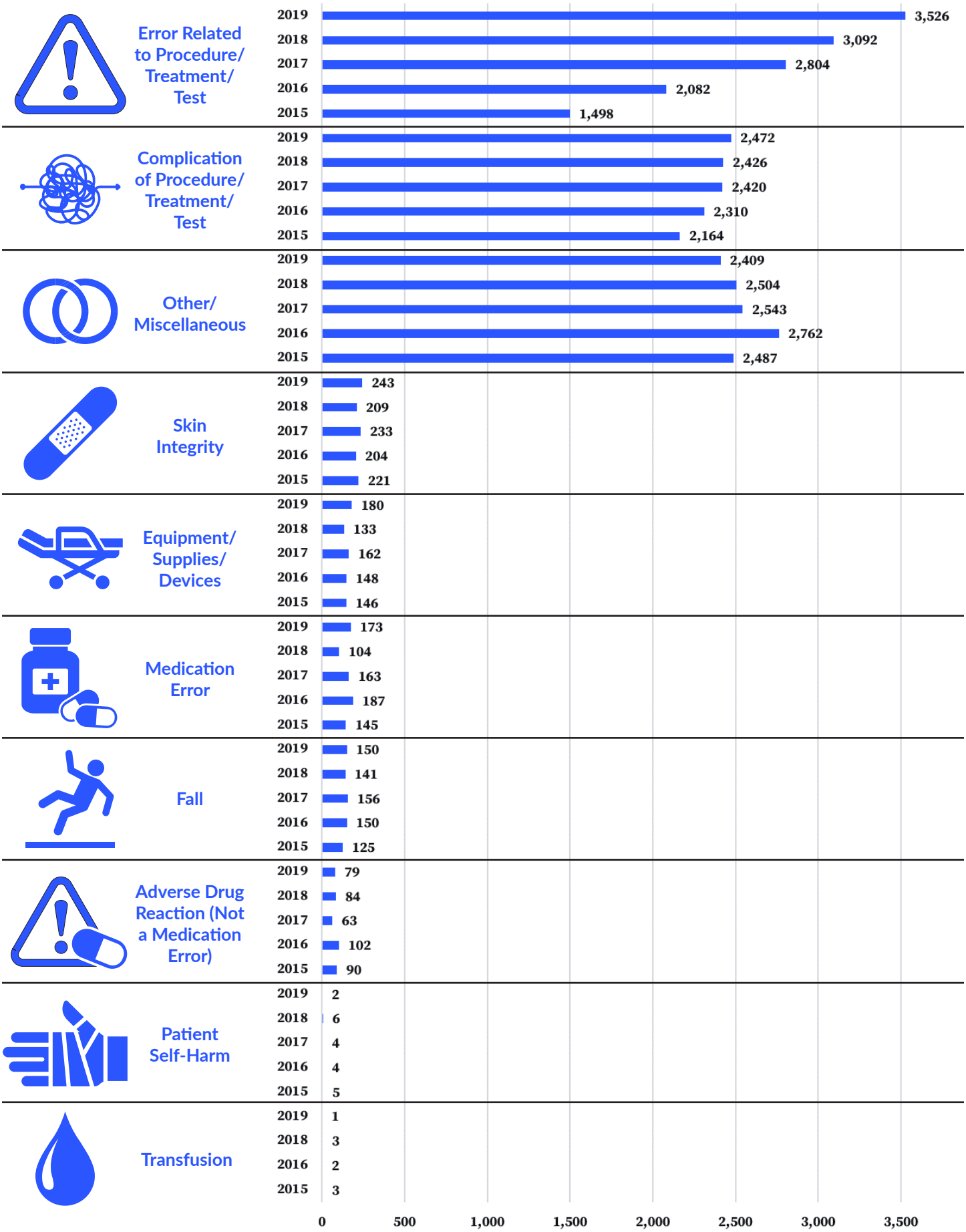
Figure 13: Number of Event Reports by Care Area Group and Harm Score – 2019

Care Area Group	A	B1	B2	C	D	E	F	G	H	I	Grand Total
Administration	99	10	137	122	73	10	3				454
Emergency	4,782	401	2,794	13,026	5,784	230	77	5	8	21	27,128
ICU	2,078	231	1,716	9,736	10,307	478	42	4	11	29	24,632
Imaging/Diagnostic	1,153	153	1,313	6,327	6,384	213	106	1	9	10	15,669
Intermediate Unit	701	147	592	3,543	4,003	110	21	2	4	7	9,130
Labor and Delivery	474	46	285	1,428	2,934	145	29	3	5	9	5,358
Laboratory	909	405	1,755	6,019	1,436	21	6				10,551
Med/Surg	5,187	542	4,089	23,583	23,520	861	186	6	11	34	58,019
NICU	286	35	1,879	3,450	926	27	2	1	2	2	6,610
Nursery	87	14	64	460	706	18	2		1		1,352
OB/GYN Unit	413	95	382	1,429	1,800	134	52	4	3	5	4,317
Other	1,091	218	1,977	4,750	3,266	243	122	4	2	7	11,680
Outpatient/Clinic	831	191	1,829	3,877	2,916	146	72	4	2	6	9,874
Pediatric	933	138	6,446	5,147	1,344	31	12				14,051
Pharmacy	199	94	1,381	1,180	604	1	4				3,463
PICU	589	40	5,964	4,512	657	15	2		2	4	11,785
Psychiatric Unit	426	58	307	4,585	4,801	481	58		2	10	10,728
Rehab Services	106	9	70	935	754	26	8			1	1,909
Rehab Unit	453	53	459	4,363	3,834	164	34	1	1	8	9,370
Respiratory	97	13	62	457	115	2					746
Specialty Unit	1,553	157	1,185	6,747	7,349	218	63		8	14	17,294
Surgical Services	4,428	780	4,437	13,767	12,063	2,242	1,421	22	44	76	39,280
Grand Total	26,875	3,830	39,123	119,443	95,576	5,816	2,322	57	115	243	293,400

Figure 14: Number of Event Reports by Care Area Group and Event Type – 2019

Care Area Group	Error Related to Procedure / Treatment / Test	Medication Error	Complication of Procedure / Treatment / Test	Fall	Other / Misc	Skin Integrity	Equipment / Supplies / Devices	Transfusion	Adverse Drug Reaction	Patient Self-Harm	Grand Total
Administration	113	186	44	8	74	8	9	8	3	1	454
Emergency	13,756	3,435	2,829	2,285	2,626	312	423	993	359	110	27,128
ICU	7,524	4,275	3,824	1,162	1,101	4,641	738	1,054	283	30	24,632
Imaging/Diagnostic	6,464	245	5,118	758	623	572	488	31	1,367	3	15,669
Intermediate Unit	2,320	1,563	1,433	1,241	997	1,014	161	265	125	11	9,130
Labor and Delivery	1,164	452	3,125	110	250	56	83	91	27		5,358
Laboratory	9,813	35	105	83	137	24	42	304	7	1	10,551
Med/Surg	12,383	10,886	9,620	10,883	5,241	6,093	847	1,322	628	116	58,019
NICU	2,851	2,254	704	13	194	132	365	91	6		6,610
Nursery	485	68	695	10	58	16	16	4			1,352
OB/GYN Unit	1,204	684	1,643	185	276	107	107	85	24	2	4,317
Other	4,792	1,749	1,331	1,179	1,176	493	334	295	309	22	11,680
Outpatient/Clinic	3,960	1,470	826	773	539	227	243	215	1,609	12	9,874
Pediatric	2,905	7,243	1,534	590	897	242	464	121	42	13	14,051
Pharmacy	86	3,231	12	2	27	1	10		94		3,463
PICU	3,228	6,441	967	55	268	284	437	100	5		11,785
Psychiatric Unit	284	1,213	192	4,880	1,919	295	26		115	1,804	10,728
Rehab Services	214	59	166	893	191	333	42	2	6	3	1,909
Rehab Unit	909	1,914	695	2,877	1,006	1,771	87	19	82	10	9,370
Respiratory	220	299	64	24	63	23	50	1	2		746
Specialty Unit	3,641	3,277	2,513	3,313	1,745	1,595	301	593	285	31	17,294
Surgical Services	17,891	1,809	9,110	575	3,283	2,255	3,457	586	304	10	39,280
Grand Total	96,207	52,788	46,550	31,899	22,691	20,494	8,730	6,180	5,682	2,179	293,400

Figure 15: Number of Reports Submitted by Event Type and Year – ASFs Only



Complication of Procedure/Treatment/Test

Although the total number of events reported as Complications of Procedure/Treatment/Test has increased each year since 2015, **Figure 11** shows that the associated Serious Events have had a small effect on the increase.

Event Type and Harm Score

Figure 12 contains submitted reports distributed by harm score for each of the 10 main event types. This is the first visualization in this article that cross tabulates the report counts across two of the main categorical topics mentioned at the beginning of this section. For the most prevalent event type, "Error related to Procedure/Treatment/Test," harm score C is reported most frequently; the intersection of this event type and harm score was the most common in 2019, with a total of 50,972 events and representing 17% of all reported events. The next most common intersection is "Complication of Procedure/Treatment/Test" and harm score D, representing 27,798 events in 2019.

Care Area

Care area is an informative dimension to look at to determine whether there are indications of patient safety concerns specific to particular care areas. Within the acute care data, there are 179 care areas to capture where events occur. These care areas are placed into one of 23 possible care area groups in order to cross tabulate a more manageable number of category elements with other variables of interest. In **Figure 13** we show a cross tabulation of care area group with harm score. Highlighting and shading is used to show the cells in which event report counts were concentrated in 2019. In this figure, the largest concentrations of event reports appear in the cross sections of the Med/Surg care area group and harm scores C and D. Also, Surgical Services is responsible for large portions of harm scores E and F. There are other insights that can be acquired by looking at the table across a row or down a column to see the distribution of event reports over a care area group or a harm score.

A cross tabulation of care area group and event type is provided in **Figure 14**. Almost half of the Medication Errors in 2019 were from the Med/Surg, Pediatric, and PICU care area groups. Also, the largest two concentrations of event reports are at the intersections of "Error Related to Procedure/Treatment/Test" with Surgical Services and Emergency care area groups. The Med/Surg, Laboratory, ICU, and Imaging/Diagnostic care area groups also contribute large numbers to the "Error Related to Procedure/Treatment/Test" event type.

Ambulatory Surgical Facilities

Hospitals submitted 97% of the 293,400 acute care event reports in 2019. Therefore, it is helpful to look at the facilities other than hospitals, which are grouped as Ambulatory Surgical Facilities (ASFs), comprised mostly of ambulatory surgical centers, along with abortion facilities and birthing centers. The distribution of event reports across the event types for ASFs is shown in **Figure 15**. ASFs show a different distribution compared to the overall data distributed in **Figure 8**. Compared to all reports, medication errors and falls drop down the list for ASFs. Also, the relatively large increase in reported errors related to procedures, treatments, and tests at ASFs is due in large part to an increase in reported cancellations of procedures.

Conclusion

There were 293,400 acute care events reported in PA-PSRS during 2019, representing a 3.2% increase over 2018. Reports of Incidents and Serious Events have increased each year since 2016. The number of reported high harm events has decreased from 726 in 2005 to 415 in 2019. The top four event types, accounting for more than three quarters of the acute event reports in 2019, are "Error Related to Procedure/Treatment/Test," "Medication Error," "Complication of Procedure/Treatment/Test," and "Fall." Overall, the increase in reporting rates each year may reflect improvements in patient safety culture across the Commonwealth, and the analysis within this article has highlighted a number of areas in which continued patient safety efforts can be applied to the greatest effect in acute care facilities.

Note: This analysis was exempted from review by the Advarra Institutional Review Board.

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