

# ANALYSIS OF 2017 INMATE DEATH REVIEWS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM

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## I. INTRODUCTION

The California Correctional Healthcare System (CCHCS) was placed under Federal Receivership in October 2005, when the State of California was found to be violating State prisoner rights under the eighth amendment to the U.S. Constitution. Medical care in the state's prisons was so poor that an estimated average of one inmate each week died as a result of malpractice or neglect.

Since that time, the Receivership has been transforming the CCHCS in order to provide constitutionally adequate medical care to the inmates in the 35 prison facilities. The CCHCS website, [cchcs.ca.gov](http://cchcs.ca.gov), highlights the mission of the Receiver:

- to reduce unnecessary morbidity and mortality and protect public health by providing timely access to safe, efficient, coordinated medical care; and
- to move from a system of chaotic care that was largely episodic to a system of proactive, planned, informed, patient-centered and professional care.

This is the twelfth annual analysis of inmate death reviews in the CCHCS.

It describes the CCHCS death review process and how it is intended to reduce the occurrence of preventable deaths. All causes of death, serious care lapses and preventable deaths are identified and trended from 2006 through 2017.

This and all prior death report analyses are available at <https://cchcs.ca.gov/reports/>.

## II. DEATH REVIEW PROCESS

The CCHCS maintains a Death Reporting and Review Program in which every patient death occurring within the custody of the California Department of Corrections and Rehabilitation (CDCR) is reviewed. The purpose of the program is to identify patterns of lapses in care related to the cause of death and to determine opportunities for improvement in the delivery of health care.

When an inmate death occurs, an initial death review summary is submitted within five calendar days to the statewide Death Review Unit (DRU) by the institution where the death occurred. This initial report includes a chronology of significant events including the emergency medical response, any identified lapses in health care delivery and any identified system issue which may have contributed to death.

At the DRU, each death is assigned to a physician reviewer and a nurse reviewer. An extensive review of the patient's medical and nursing care is conducted. Every clinical encounter in the six months prior to death, and if relevant, beyond six months, is reviewed. The quality of care experienced by the patient at each encounter is evaluated. Factors evaluated include the quality of triage and evaluation, timeliness of access to care, the quality of care for any chronic medical condition, adherence to published evidence-based care guides, responses to all abnormal laboratory and X-ray studies, and the timing and quality of emergency response. In addition, the presence of a primary care physician and adherence to a primary care model of care delivery is noted.

All suicides or possible suicides undergo a separate case review by a member of the Suicide Prevention and Response Focused Improvement Team (SPRFIT), which includes a Mental Health Program review.

In every case, the cause of death is determined. Care lapses are noted, especially any that may have contributed to the patient death. The physician reviewer then makes a judgment as to whether the death was preventable, possibly preventable or not preventable.

Each death review is presented by the assigned reviewer to the Death Review Committee (DRC). The DRC membership is appointed by the Statewide Deputy Directors of Medical and Nursing Services. The DRC consists of three physicians, three nurses, one mental health professional, one custody representative, and one (non-voting) member of the Quality Management staff. The DRC is co-chaired by a physician and nurse executive member. Following discussion of the case, the DRC votes to attribute cause of death and the level of preventability.

Functions of the death review process include identifying individual providers for further peer review, identifying opportunities for improvement in healthcare policies and practices, making recommendations for changes to existing interdisciplinary care guides, and highlighting systemic areas in need of improvement. Extreme departures from the standard of care are referred to the Medical, Nursing or Mental Health Peer Review Committees or in the case of any sentinel event, to the Patient Safety Program.

A major purpose of the death review process is to reduce the occurrence of preventable death.

### **III. DEFINITIONS**

The following definitions are taken from the *Inmate Medical Services Policies and Procedures, Volume 1, Chapter 29.1, Death Reporting and Review Program Policy*, and are used in this report.

*Expected Death:* A medically anticipated death which is related to the natural course of a patient's illness or underlying condition.

*Unexpected Death:* Any unanticipated death which is not related to the natural course of a patient's illness or underlying condition.

*Extreme Departure:* Care given that may cause injury or expose patients to some substantial risk of injury or harm which no other reasonable and competent provider would provide under the same or similar circumstances.

*Not Preventable Death:* A death that could not have been prevented or significantly delayed despite identified opportunities for improvement in the medical care or systemic issues.

*Possibly Preventable Death:* A death wherein opportunities for clinical intervention or significant lapses related to care delivery have been identified that may have prevented or significantly delayed the patient's death.

*Preventable Death:* A death wherein opportunities for clinical intervention or significant lapses related to care delivery have been identified that would have prevented or significantly delayed the patient's death.

*Care lapse:* Any departure from the standard of care which poses a risk to patient safety.

## IV. TAXONOMY OF CARE LAPSES

In 2008, a taxonomy of types of medical errors or care lapses was incorporated into this annual review and was used to organize the findings of the DRC reviewers. When used systematically, this taxonomy has proven to be a useful quality improvement tool for identifying the common reasons for substandard healthcare that might result in preventable deaths. It has been useful for identifying potentially unsafe clinical practice, opportunities for system and process redesign, and educational strategies for CCHCS clinical staff.

In the 2008 taxonomy, care lapses are organized into fourteen separate types.

*Type 1* – Failure to recognize, evaluate and manage important symptoms and signs – so called clinical “red flags.”

*Type 2* – Failure to follow clinical care guides or departmental policies developed and endorsed by the medical department of the CCHCS. These include evidence-based guidelines for the management of asthma, diabetes mellitus, hepatitis C infection, HIV/AIDS, chronic pain, and care at the end of life. Other care guides outline standards for the management of hypertension, acute coronary syndromes, congestive heart failure, cardiac arrhythmia, and anticoagulation.

*Type 3* – Delay in access to the appropriate level of care, of sufficient duration as to result in harm to the patient.

*Type 4* – Failure to identify and appropriately respond to abnormal test results.

*Type 5* – Failure of appropriate communication between providers, especially at points where transfers of care occur (care transitions).

*Type 6* – Fragmentation of care resulting from failure of an individual clinician or the primary care team to assume responsibility for the patient’s care - lack of a primary care model.

*Type 7* – Iatrogenic injury resulting from a surgical or procedural complication.

*Type 8* – Medication prescribing error, including failure to prescribe an indicated medication, failure to do appropriate monitoring, or failure to recognize and avoid known drug interactions.

*Type 9* – Medication delivery error, including significant delay in a patient receiving medication or a medication delivered to the wrong patient.

*Type 10* – Practicing outside the scope of one’s professional capability (may apply to nursing staff, midlevel practitioners, or physicians).

*Type 11* – Failure to adequately supervise a midlevel practitioner, including failure to be readily available for consultation or an administrative failure to provide for appropriate supervision.

*Type 12* – Failure to communicate effectively with the patient.

*Type 13* – Patient non-adherence with suggestions for optimal care.

*Type 14* – Delay or failure in emergency response, including delay in activation or failure to follow the emergency response protocol.



In 2016, the DRC developed a new taxonomy for classifying care lapses. This new taxonomy is more detailed in capturing the various causes for errors in coordination and continuity of care, clinical management, medication management, emergency medical care, transportation, nursing encounters, and utilization management. This new taxonomy is not yet in use with the analysis of 2016 and 2017 death reviews. Both to support longitudinal analyses, and because the new taxonomy has not yet been consistently adopted by the physician and nurse reviewers in the DRC, the current review continues to use the original 2008 taxonomy.

## **V. THE CALIFORNIA PRISON POPULATION IN 2017**

At the beginning of the Receivership in 2006, prison overcrowding was identified as a major factor contributing to the delivery of substandard medical care. Between 2008 and 2015, the California Department of Corrections and Rehabilitation (CDCR) significantly reduced the prison population by 25 percent.

In 2006, the number of inmates in the CCHCS was 171,310.

By 2015, the average number of inmates in the CCHCS was 128,477. In 2017, the average number of total inmates was 130,807. Of those, 124,888 (95.5%) were males and 5,919 (4.5%) were females.

## **VI. STUDY FINDINGS**

### **A. Number and Causes of Inmate Death with Preventability Status, 2017**

There were 388 inmate deaths in 2017; 378 in males (97.4%) and 10 in females (2.6%). Of these, the death review committee designated 373 deaths as not preventable, 14 deaths as possibly preventable and 1 death as (definitely) preventable. Table 1 shows the causes of death and preventability status in 2017.

Cancer (98 cases) was the top cause of death, with lung cancer (14 cases), colon cancer (8 cases; 7 not preventable and 1 possibly preventable) and multiple myeloma (6 cases) the top 3 types of cancer.

Cardiovascular disease (68 cases) was the second leading cause of death, with sudden cardiac arrest (27 cases), congestive heart failure (17 cases; 16 not preventable and 1 possibly preventable) and acute myocardial infarction (13 cases; 11 not preventable and 2 possibly preventable) accounting for 57 cases or 84% of all cardiovascular deaths.

Liver disease (41 cases) was the third most common cause of death. As in past years, we have grouped end stage liver disease and liver cancer together because liver cancer is a consequence of cirrhosis (end stage liver disease) and the two conditions almost always coexist in the same patient. As in past years, chronic hepatitis C infection was the underlying cause of end stage liver disease with or without liver cancer in the California prison population. Hepatitis C virus infected 14% of all CCHCS prisoners in 2016, and disproportionately infected patients who died in 2017 (32%).

Drug overdose (40 cases) was the fourth most common cause of death in 2017. Suicide (31 cases) and homicide (19 cases) were the sixth and seventh most common reasons for death in the CCHCS in 2017.

Infectious disease (33 cases) was the fifth most common cause of death in 2017; this category covers a variety of different causes, including 15 cases of pneumonia, 8 cases of sepsis, 4 cases of infectious endocarditis, and single cases of cellulitis HIV/AIDS, influenza, meningitis and necrotizing fasciitis.

TABLE 1. CAUSES OF DEATH AND PREVENTABILITY STATUS AMONG ALL CALIFORNIA INMATES, 2017.

NUMBER OF CASES	CAUSES OF DEATH NOT PREVENTABLE	PREVENTABLE/POSSIBLY PREVENTABLE
98	<p><b>Cancer</b>            95 NOT PREVENTABLE: 13 Lung; 7 Colon; 6 Multiple Myeloma; 5 Bladder; 5 Kidney; 5 Prostate; 5 Unknown primary; 4 Melanoma; 4 Pancreas; 3 Bile duct; 3 Esophagus; 3 Larynx; 3 Leukemia-Acute Myelogenous; 3 Squamous Cell; 3 Stomach; 2 Lymphoma, non Hodgkin; 2 Myelodysplasia; 2 Myelofibrosis; 2 Nasopharynx; 2 Renal; 1 Anus; 1 Brain; 1 Breast; 1 Duodenum; 1 Hodgkin Lymphoma; 1 Hypopharynx; 1 Leukemia-Acute Lymphoblastic; 1 Leukemia-Acute Monocytic; 1 Mesothelioma; 1 Rectum; 1 Synovial Sarcoma; 1 Testes; 1 Tonsil</p>	<p>3 POSSIBLY PREVENTABLE:            1 Colon, 1 Stomach, 1 Testes</p>
68	<p><b>Cardiovascular Disease</b>            63 NOT PREVENTABLE: 27 Sudden Cardiac Arrest; 16 Congestive Heart Failure; 11 Acute Myocardial Infarction; 2 Cardiomyopathy; 2 Coronary Artery Disease; 2 Aortic Dissection; 1 Acute myocarditis; 1 Aortic aneurysm Dissection; 1 Post-CABG complication</p>	<p>5 POSSIBLY PREVENTABLE:            2 Acute Myocardial Infarction; 2 Cardiac Arrhythmia; 1 Congestive Heart Failure</p>
41	<p><b>Liver Disease</b>            41 NOT PREVENTABLE: 22 End Stage Liver Disease (incl. 1 non-HepC) ; 18 Liver Cancer; 1 Acute Hepatic Failure</p>	
40	<p><b>Drug Overdose</b>            40 NOT PREVENTABLE: 39 Non-prescribed: 11 Heroin; 11 Methamphetamine; 6 Fentanyl; 5 Unknown Opiate; 3 Opiate plus Methamphetamine; 3 Opiate plus Fentanyl. 1 Prescribed: 1 Antipsychotic</p>	
32	<p><b>Infectious Disease</b>            31 NOT PREVENTABLE: 15 Pneumonia (includes 6 aspiration pneumonia); 4 Infectious Endocarditis; 7 Septicemia; 1 Cellulitis; 1 HIV/AIDS; 1 Influenza; 1 Meningitis</p>	<p>2 POSSIBLY PREVENTABLE:            1 Necrotizing cervical fasciitis; 1 Septicemia</p>
31	<p><b>Suicide</b>            29 NOT PREVENTABLE</p>	<p>1 PREVENTABLE            1 POSSIBLY PREVENTABLE</p>

19	<b>Homicide</b> 19 NOT PREVENTABLE: 19 Homicide by Inmate(s)	
11	<b>Cerebrovascular Disease</b> 11 NOT PREVENTABLE: 6 Stroke, Ischemic; 5 Stroke, Hemorrhagic	
10	<b>Pulmonary</b> 10 NOT PREVENTABLE: 7 Chronic Obstructive Pulmonary Disease; 3 Pulmonary Fibrosis	
7 each	<b>Circulatory System</b> 7 NOT PREVENTABLE: 5 Pulmonary Embolism; 1 Shock, Hypovolemic; 1 Third-degree Heart Block <b>Renal Disease</b> 7 NOT PREVENTABLE: 6 End Stage Renal Disease; 1 Chronic Renal Failure <b>Gastrointestinal Disease</b> 6 NOT PREVENTABLE: 3 Upper GI Hemorrhage; 1 Ischemic Bowel Syndrome; 1 Pancreatitis; 1 Ulcerative Colitis	1 POSSIBLY PREVENTABLE: 1 Aspiration
6	<b>Neurological Disease</b> 5 NOT PREVENTABLE: 3 Dementia; 1 Alzheimer Dementia; 1 Colloid cyst of third ventricle	1 POSSIBLY PREVENTABLE: 1 Neuroleptic Malignant Syndrome
4	<b>Trauma</b> 3 NOT PREVENTABLE: 1 Accidental Trauma; 1 Shock, Hypovolemic; 1 Traumatic Rupture of Spleen	1 POSSIBLY PREVENTABLE: 1 Subdural Hematoma
3	<b>Autoimmune</b> 3 NOT PREVENTABLE: 1 Systemic Lupus Erythematosus; 1 Mixed Connective Tissue Disease; 1 Rheumatoid Arthritis	
2	<b>Accidental Injury to Self</b> 2 NOT PREVENTABLE	
1 each	<b>Metabolic</b> 1 NOT PREVENTABLE: General Deterioration <b>Unknown</b> 1 NOT PREVENTABLE: Possible Homicide	
388	<b>Total</b> 373 NOT PREVENTABLE	1 PREVENTABLE 14 POSSIBLY PREVENTABLE

Table 2 compares the top causes of death in CCHCS men with those in the free living American male population. Significant differences can be seen. In the prison population, cancer (25.3%) was the number one cause of death while cardiovascular disease (17.5%) was second most frequent and liver disease (10.6%) was third. These three accounted for 53% of all deaths. For the American male population in 2015 (the last year for which statistics are available), cardiovascular disease (24.4%) was number one, cancer (22.8%) ranked number two, and accidental injury was a distant third (6.8%). Chronic liver disease accounted for 1.9% and ranked tenth.

Drug overdose, infectious diseases, suicide and homicide were all significantly higher in the prison population than in free living American males.

TABLE 2. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2017, COMPARED TO AMERICAN MALE DEATHS, 2015 (MOST RECENT DATA AVAILABLE).

CCHCS 2017	AMERICAN MALES 2015
1. Cancer (25.3%)	1. Cardiovascular (24.4%)
2. Cardiovascular (17.5%)	2. Cancer (22.8%)
3. Liver disease (end stage), includes liver cancer (10.6%)	3. Accidental injury (6.8%)
4. Drug overdose (10.3%)	4. Chronic respiratory (5.3%)
5. Infectious diseases (8.5%)	5. Stroke (4.2%)
6. Suicide (8.0%)	6. Diabetes mellitus (3.1%)
7. Homicide (4.9%)	7. Suicide (2.5%)
8. Cerebrovascular Disease (2.8%)	8. Alzheimer’s Disease (2.5%)
9. Pulmonary (2.6%)	9. Influenza and pneumonia (2.0%)
10. Renal disease (1.8%)	10. Chronic liver disease (1.9%)

## B. Life Expectancy in the CCHCS, 2017

The average age at death of all CCHCS male patients in 2017 was 56 years. That of females was 54 years. Non incarcerated American males and females enjoy a life expectancy some two decades longer. In 2016, the American male life expectancy was 76.3 years.

Life in prison is hard and relatively short, and life expectancy appears to be bimodal. Drug overdoses, suicides and homicides cause death at an average of 38 years, whereas prisoners dying from all other causes live to an average age of 62 years.

TABLE 3. RANGES AND AVERAGE AGES AT DEATH AMONG ALL CALIFORNIA INMATES, 2017

	AGE RANGE	AVERAGE AGE
Age of all 378 male decedents	21 – 91	56
Age of all 10 female decedents	32 – 82	54
Age of suicides, drug overdoses, and homicides	21 – 67	38
	21 – 61	34
Drug overdose	22 – 67	41
	22 – 61	39
Age excluding suicide, drug overdose, and homicide	22 – 91	62

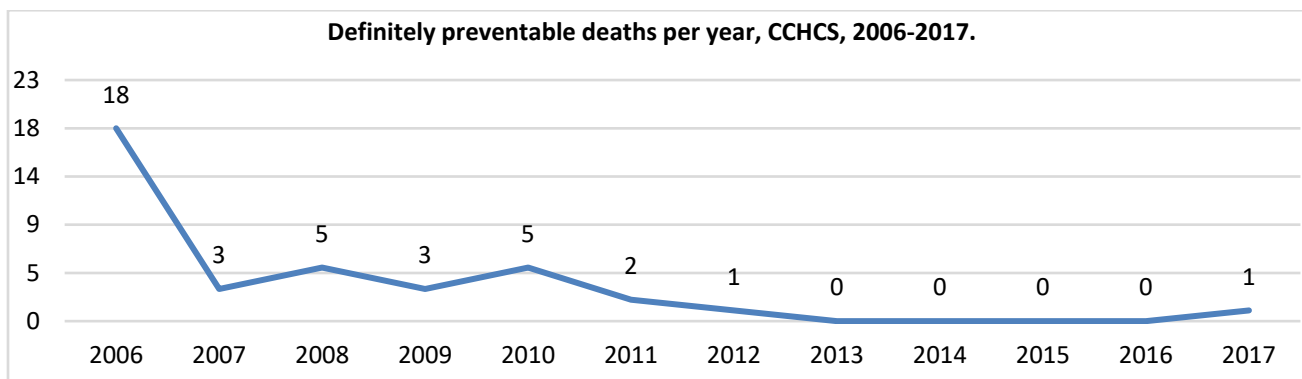
### C. Not preventable Deaths in 2017

The 373 deaths classified by the DRC as not preventable in 2017 were 96.1% of the total. As seen in Table 1, there were 40 drug overdoses, 29 suicides, 19 homicides, 3 cases of accidental trauma and 2 cases of accidental self-injury. The remaining 293 deaths were the result of chronic underlying disease.

### D. (Definitely) Preventable Deaths in 2017

Figure 1 shows the run chart for all definitely preventable deaths in the CCHCS from 2006 through 2017.

FIGURE 1. TREND IN CCHCS DEFINITELY PREVENTABLE DEATHS, 2006–2017.



There was one (definitely) preventable death in 2017. This is the first case since 2012 that was thought to be definitely preventable by the members of the Death Review Committee. This case is described below.

**A type 2 lapse** – failure to follow clinical guidelines for care, and **a type 14 lapse** – delay or failure in emergency response – contributed to this preventable death.

*A 28 year old man died of suicide by asphyxiation. Failure to adequately monitor the patient during suicide watch, and a subsequent twenty five minute delay in activation of 911 contributed to this preventable death.*

### E. Possibly Preventable Deaths in 2017

There were 14 deaths classified by the DRC as possibly preventable in 2017. Table 4 shows the causes of death in these cases.

TABLE 4. CAUSES OF POSSIBLY PREVENTABLE DEATH AMONG CALIFORNIA INMATES, 2017.

NUMBER OF CASES	CAUSE OF DEATH
5	CARDIOVASCULAR DISEASE: 2 Acute Myocardial Infarction; 2 Cardiac Arrhythmia; 1 Congestive Heart Failure
3	CANCER: 1 Colon, 1 Stomach, 1 Testes
2	INFECTIOUS: 1 Necrotizing cervical fasciitis; 1 Septicemia
1 each	GASTROINTESTINAL DISEASE: Aspiration NEUROLOGICAL DISEASE: Neuroleptic Malignant Syndrome SUICIDE TRAUMA: Subdural Hematoma
<b>14</b>	<b>Total</b>

Each case is described briefly below and the type of lapse most contributory to each death is noted.

*A **type 1 lapse**—failure to recognize or evaluate important symptoms or signs – was identified as a significant factor in eleven cases of possibly preventable death.*

- 1. A 56 year old man died of sepsis secondary to a necrotizing neck infection. Failure to adequately evaluate persistent fever and dysphagia in this known diabetic led to a delay in diagnosis which contributed to his possibly preventable death.*
- 2. A 66 year old man with post polio syndrome and a clinical picture of intestinal obstruction died of aspiration of gastric contents. Failure to properly evaluate the patient’s lethargy and distended abdomen coupled with failure to review an abnormal abdominal X-ray may have contributed to this death.*
- 3. A 52 year old man with end stage renal failure on hemodialysis died of sudden cardiac arrest. The patient complained of an inability to move. This was not evaluated for 90 minutes, when the patient suddenly became unresponsive. Resuscitation was unsuccessful.*

4. *A 36 year old man died of a cardiac arrhythmia in an out of state facility. The consulting cardiologist failed to aggressively evaluate new onset atrial fibrillation coupled with an abnormal echocardiogram showing severe cardiac dysfunction, and the patient died one day later in the prison to which he had been returned.*
5. *A 72 year old man with diabetes mellitus died of sudden cardiac arrest. Poorly managed diabetes mellitus and prolonged hypoglycemia may have contributed to his death.*
6. *A 62 year old man died of septic shock from acute and chronic cholecystitis. A one month delay in diagnosis was thought to result from a failure to aggressively evaluate a recurrent fever.*
7. *A 70 year old man died of cancer of the stomach. An incomplete evaluation of chronic weight loss caused an 8 month delay in diagnosis which possibly contributed to the patient's death.*
8. *A 46 year old man died of apparent neuroleptic malignant syndrome. Incomplete evaluation of high fever and other abnormal vital signs in the setting of multiple psychoactive medications led to several days delay in diagnosis, contributing to this possibly preventable death.*
9. *A 73 year old man with multiple cardiac risk factors died of probable myocardial infarction. Failure to aggressively evaluate nausea, hypotension and tachycardia contributed to this cardiac death.*
10. *A 26 year old man died of metastatic testicular cancer. The diagnosis was delayed by 13 months because of failure to follow up an abnormal testicular examination. The resulting delay in treatment contributed to this possibly preventable death.*
11. *A 74 year old man died of an acute subdural hematoma and brain contusion. A one hour delay in evaluation of the patient after a spontaneous fall in the prison yard was thought to contribute to a delay in treatment which might have prevented his death.*

A **type 2 lapse**—failure to follow clinical guidelines for care – contributed to the following possibly preventable death.

12. *A 60 year old man with hypertension died of congestive heart failure. Failure to regularly monitor and treat his high blood pressure during the six year period that preceded his death might have contributed to the development of congestive heart failure.*

A **type 4 lapse**—failure to identify or appropriately respond to abnormal test results – contributed to the following possibly preventable death.

13. *A 71 year old man died of metastatic colon cancer. A failure to adequately evaluate anemia and a positive stool occult blood test led to an 18 month delay in diagnosis.*

A **type 14 lapse**—delay or failure in emergency response – contributed to the following possibly preventable death.

14. A 31 year old man died of multiple self inflicted lacerations with resultant exsanguination. A 36 minute delay in activating 911 may have contributed to his death.

## F. The Taxonomy for Care Lapses in 2017

One of the primary purposes of the death reviews is to identify lapses in care, regardless of whether these lapses lead to a patient death. Recognition of lapses presents opportunities for system improvement and for targeted provider and staff education. The taxonomy for tracking these lapses has been described. Table 5 summarizes these lapses in all of the 2017 deaths.

TABLE 5. SUMMARY OF CARE LAPSES, 2017.

LAPSES OF CARE TYPES	# OF LAPSES IN 373 NOT PREVENTABLE DEATHS	# OF LAPSES IN 14 POSSIBLY PREVENTABLE DEATHS	# OF LAPSES IN 1 PREVENTABLE DEATH	TOTAL LAPSES IN ALL 388 DEATHS
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	29	10		39
#2 – Failure to follow established guidelines for evaluation and/or management of a specific condition	10	1	1	12
#3 – Delay in access to care sufficient to result in harm to the patient	6	1		7
#4 – Failure to adequately pursue abnormal test results	1	3		4
#5 – Failure of provider-to-provider communications including botched handoffs	2	1		3
#6 – Fragmentation of care such that individual responsibility for patient is waived	3			3
#7 – Surgical/procedural complication resulting in iatrogenic injury				
#8 – Medication prescribing error	5			5
#9 – Medication delivery error	3			3
#10 – Practicing outside the scope of one’s professional capabilities	1			1
#11 – Unsupervised mid-level (nurse practitioner or physician assistant) care				
#12 – Failure to communicate effectively with the patient	1			1



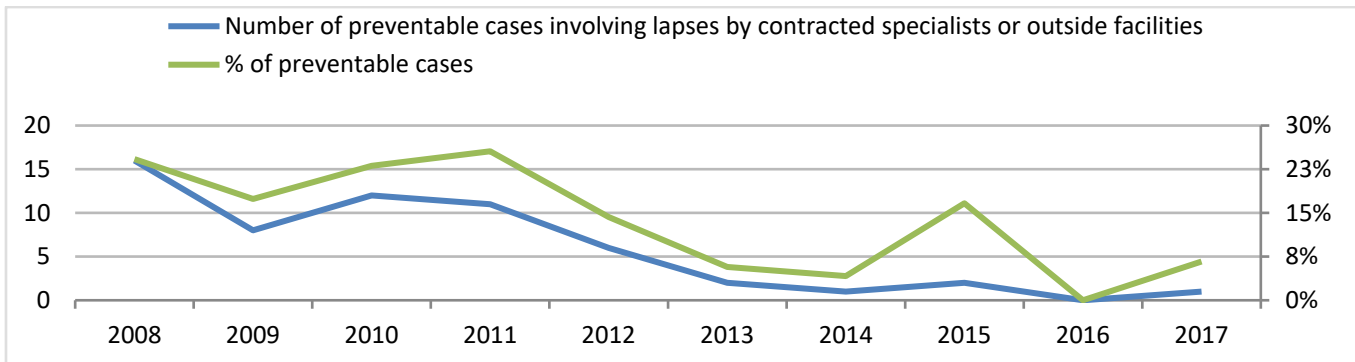
LAPSES OF CARE TYPES	# OF LAPSES IN 373 NOT PREVENTABLE DEATHS	# OF LAPSES IN 14 POSSIBLY PREVENTABLE DEATHS	# OF LAPSES IN 1 PREVENTABLE DEATH	TOTAL LAPSES IN ALL 388 DEATHS
#13 – Patient non-adherence with recommendation for optimal care	6			6
#14 – Delay in emergency response or failure to follow emergency response protocol	25	1	1	27
#15 – Other	16			16
<b>All Types</b>	<b>108</b>	<b>17</b>	<b>2</b>	<b>127</b>

The DRC reviewers identified 108 lapses in the 373 not preventable deaths, 17 lapses in the 14 possibly preventable deaths, and 2 lapses in the one definitely preventable death. In total, there were 127 lapses noted in the 388 death reviews.

### G. Preventable Deaths Attributed to Lapses by Contracted Specialists and Outside Facilities

In 2017, there was one case in which a consulting specialist in an out-of-state contracted facility failed to adequately manage a patient with signs and symptoms of severe coronary artery disease, resulting in a possibly preventable death (case #4 of possibly preventable deaths, above).

FIGURE 2. POSSIBLY PREVENTABLE DEATHS OF CALIFORNIA PRISON INMATES INVOLVING LAPSES BY CONTRACTED SPECIALISTS OR OUTSIDE FACILITIES, 2008–2017.



## VII. DISCUSSION OF TRENDS

### A. Trends in Prison Mortality Rates in California and the United States

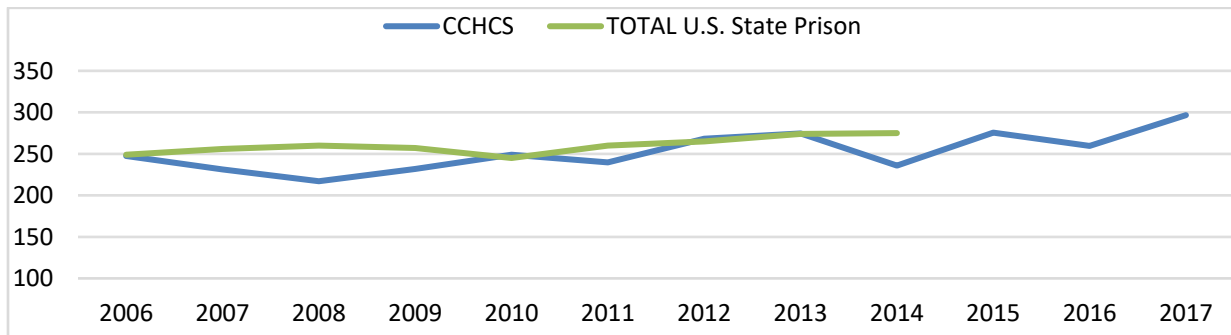
Annual death rates in the CCHCS are shown in Table 6 and compared to rates in all U.S. state prisons. (U. S Bureau of Justice statistics, [bjs.gov](http://bjs.gov)). The 2017 death rate is 297/100,000 inmates for CCHCS. This represents the highest annual mortality rate in the past 12 years. The average death rate from 2006–2014 for all U.S. State prisons is 260/100,000. Comparable statistics for the years 2015–2017 are not available.

TABLE 6. ANNUAL DEATH RATES AMONG CALIFORNIA AND U.S. STATE PRISON INMATES, 2006–2017.

YEAR	CCHCS NUMBER OF DEATHS	CCHCS NUMBER OF INMATES	CCHCS DEATH RATE PER 100,000 INMATES	TOTAL U.S. STATE PRISON DEATH RATE PER 100,000
2006	424	171,310	248	249
2007	395	170,786	231	256
2008	369	170,022	217	260
2009	393	169,459	232	257
2010	415	166,700	249	245
2011	388	161,843	240	260
2012	362	134,929	268	265
2013	366	133,297	275	274
2014	319	135,225	236	275
2015	355	128,824	276	<i>not available</i>
2016	334	128,705	260	<i>not available</i>
2017	388	130,807	297	<i>not available</i>
<b>Average (Range)</b>			<b>252 (217–297)</b>	<b>260 (245–275)</b>

Figure 3 below shows the trended death rates for the CCHCS from 2006–2017, and the trended death rates for all US prisons from 2006– 2014. There has been a slight increase in the rates of death both in California and in all US prisons.

FIGURE 3. TRENDED DEATH RATE PER 100,000 INMATES, CCHCS AND TOTAL U.S. STATE PRISONS, 2006–2017.



### B. Trends in Specific Causes of Mortality: Top Causes

Table 7 shows the top nine causes of death in the CCHCS from 2006–2016. Beginning in 2015, cardiovascular causes of death overtook end stage liver disease as the number 2 overall cause of death. In 2017, drug overdose deaths rose to become the fourth most common cause of death, and suicides and homicides remained as the sixth and seventh most common causes of death in the incarcerated population. Comparisons with the 2016 death review analysis show that there were 16 more cancer deaths, 16 more cardiovascular deaths, and 11 more drug overdose deaths in 2017 than in 2016. These 43 additional deaths in 2017 account for most of the difference in the mortality rates between 2017 and 2016.

TABLE 7. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2006–2017.

YEAR	RANK								
	1	2	3	4	5	6	7	8	9
2017	Cancer	Cardio-vascular Disease	End Stage Liver Disease*	Drug Overdose	Infectious Disease**	Suicide	Homicide	Cerebro-vascular Disease	Pulmonary
2016	Cancer	Cardio-vascular Disease	End Stage Liver Disease*	Infectious Disease**	Drug Overdose	(tied) Suicide, Homicide		Cerebro-vascular Disease	Pulmonary
2015	Cancer	Cardio-vascular Disease	End Stage Liver Disease*	Infectious Disease**	Suicide	Drug Overdose	Homicide	Cerebro-vascular Disease	Pulmonary
2014	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	Drug Overdose	Pneumonia	Homicide	Pulmonary	(tied) Infectious; Stroke-Hemorrhagic
2013	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	Drug Overdose	Homicide	Sepsis	(tied) Pulmonary; Pneumonia	
2012	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	Homicide	Drug Overdose	(tied) Sepsis; Infectious		Stroke

YEAR	RANK								
	1	2	3	4	5	6	7	8	9
2011	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	Pneumonia	Homicide	Sepsis	Drug Overdose	Stroke
2010	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	(tied) Drug Overdose; Homicide		Pneumonia	Congestive Heart Failure	(tied) Coccidioidomycosis; End Stage Renal Disease; Stroke
2009	Cancer	End Stage Liver Disease*	Cardio-vascular Disease	Suicide	Drug Overdose	Pneumonia	Congestive Heart Failure	Homicide	
2008	Cancer	Suicide	End Stage Liver Disease*	Cardio-vascular Disease	Drug Overdose	Pneumonia	HIV/AIDS	Congestive Heart Failure	Sepsis
2007	Cancer*	End Stage Liver Disease	Cardio-vascular Disease	Suicide	Homicide	HIV/AIDS	Stroke	Drug Overdose	Pneumonia
2006	Cancer*	Cardio-vascular Disease	End Stage Liver Disease	Suicide	Drug Overdose	Homicide	Pulmonary	End Stage Renal Disease	Stroke

\* Liver Cancer was counted as Cancer in 2006 and 2007; as Liver Disease from 2008 onward.

\*\* Beginning with 2015, Pneumonia and Sepsis were included in Infectious Disease, which also includes HIV/AIDS.

### C. Trends in Specific Causes of Mortality: End Stage Liver Disease and Liver Cancer from 2008–2016

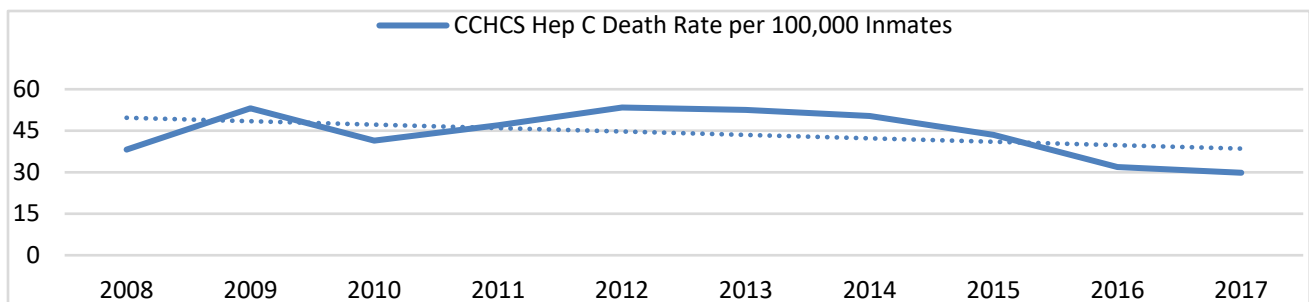
In 2008, these annual analyses began tracking liver cancer and ESLD (cirrhosis) together, since in the California prison population both are sequelae of chronic viral hepatitis C infection. Chronic liver disease has consistently ranked as one of the top three causes of death in this population. In 2017, it accounted for 39 deaths, 10% of the total. Table 8 shows the observed numbers of deaths from chronic hepatitis C infection from 2008–2017.

TABLE 8. CCHCS CHRONIC HEPATITIS C ASSOCIATED DEATHS, 2008–2017.

YEAR	LIVER CANCER DEATHS	CIRRHOSIS DEATHS	TOTAL HEPATITIS C ASSOCIATED DEATHS	CCHCS NUMBER OF INMATES	CCHCS HEP C ASSOCIATED DEATH RATE PER 100,000 INMATES
2008	30	35	65	170,022	38.2
2009	30	60	90	169,459	53.1
2010	22	47	69	166,700	41.4
2011	23	53	76	161,843	47.0
2012	25	47	72	134,929	53.4
2013	27	43	70	133,297	52.5
2014	21	47	68	135,225	50.3
2015	19	37	56	128,824	43.5
2016	23	18	41	128,705	31.9
2017	18	21	39	130,807	29.8

Figure 4 shows the trended death rates from liver cancer, cirrhosis, and all chronic hepatitis C from 2008 to 2017.

FIGURE 4. CCHCS CHRONIC HEPATITIS C ASSOCIATED DEATH RATES, 2008–2017.



In the past two years there appears to be a significant lowering of the death rate from hepatitis C sequelae which may coincide with the CCHCS practice of prescribing newly available treatments for chronic hepatitis C infection in appropriate candidates, as well as the emphasis on following the care guides for complications of hepatitis C.

### D. Trends in Specific Causes of Mortality: Suicide

In 2017, suicide was the sixth leading cause of death in the CCHCS. Table 9 and Figure 5 show numbers of deaths from suicide and the trended death rates by suicide for California state prisons compared to all US prisons.

TABLE 9. NUMBERS AND RATES OF SUICIDE-RELATED DEATHS: CALIFORNIA, ALL U.S. STATE PRISONS, 2006–2017.

YEAR	CCHCS SUICIDES	CCHCS SUICIDE RATE/100,000	U.S. STATE PRISON SUICIDE RATE/100,000
2006	43	25.1	17
2007	33	19.3	16
2008	38	22.3	15
2009	25	14.8	15
2010	34	20.4	16
2011	34	21	14
2012	32	23.7	16
2013	30	22.5	15
2014	23	17	20
2015	24	18.6	<i>not available</i>
2016	26	20.2	<i>not available</i>
2017	31	23.7	<i>not available</i>
AVERAGE	31	20.7	16

FIGURE 5. SUICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM (2006-2017) AND U.S. STATE PRISONS (2006–2014).

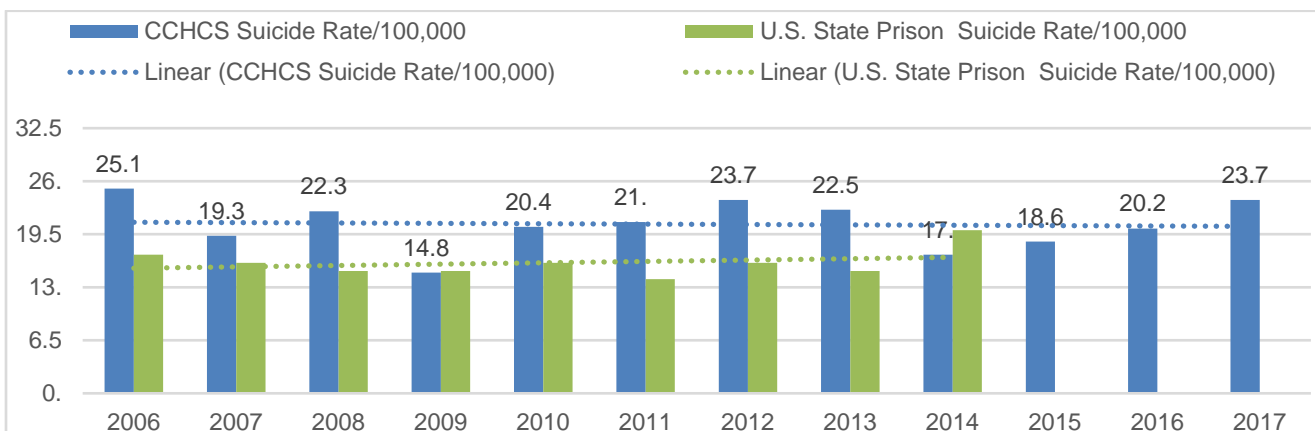


Figure 5 indicates no significant trend in the rate for CCHCS or the rate for all U.S. State prisons, though the average suicide rate for California is 25% higher (20.7) than the average suicide rate for all U.S. state prisons through 2014 (16.0).

### E. Trends in Specific Causes of Mortality: Homicide

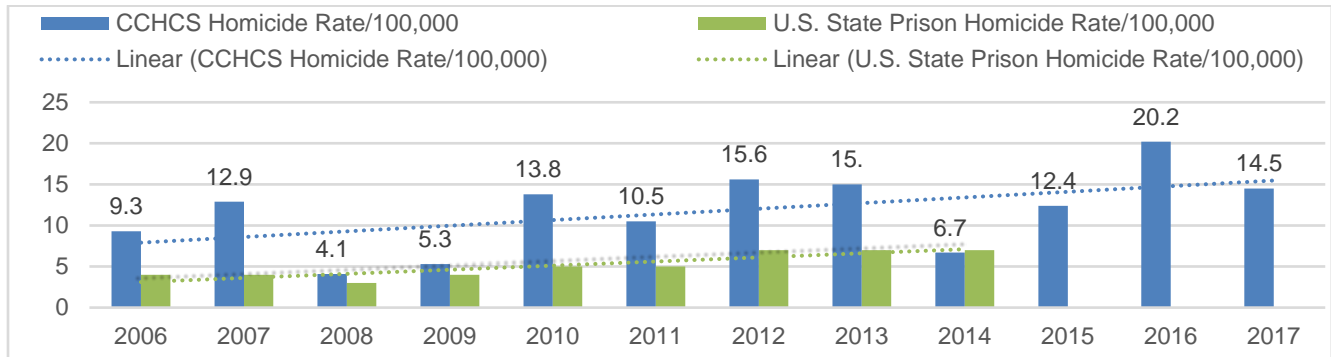
In 2017, homicide was the seventh leading cause of death in the CCHCS. There were 19 deaths by homicide, representing 4.9% of all deaths. Table 10 shows numbers and rates of homicides in the California prisons (2006–2017) and compares the rates with those of U.S. state prisons (2006 - 2014).

TABLE 10. NUMBERS OF HOMICIDE-RELATED DEATHS IN CALIFORNIA AND ALL U.S. STATE PRISONS, 2006–2017.

YEAR	CCHCS HOMICIDES	CCHCS HOMICIDE RATE/100,000	U.S. STATE PRISON HOMICIDE RATE/100,000
2006	16	9.3	4
2007	22	12.9	4
2008	7	4.1	3
2009	9	5.3	4
2010	23	13.8	5
2011	17	10.5	5
2012	21	15.6	7
2013	20	15	7
2014	9	6.7	7
2015	16	12.4	<i>not available</i>
2016	26	20.2	<i>not available</i>
2017	19	14.5	<i>not available</i>
<b>AVERAGE</b>	17	11.7	5.1

Figure 6 graphs those same figures and shows the trends of homicide death rates over time. The homicide death rate in CCHCS prisons (11.7) is more than twice that of all U.S. state prisons (5.1). The rate of homicide deaths is increasing. In 2016, the death rate by homicide was the highest since 2006, but in 2017 the rate dropped closer to the historical average. Last year’s analysis mentioned a special report for the Bureau of Justice Statistics prepared in 2005, which noted that the homicide rate in all U.S. state prisons had dropped by 93% from 54/100,000 in 1980 to 4/100,000 in 2002. ([bjs.gov/content/pub/pdf/shsplj.pdf](https://www.bjs.gov/content/pub/pdf/shsplj.pdf))

FIGURE 6. HOMICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM AND ALL U.S. STATE PRISONS, 2006–2017.



### F. Trends in All Preventable Deaths, 2006–2017

The rates of all (definitely) preventable and possibly preventable deaths are shown for each year from 2006 to 2017 in Table 11. In 2017, that rate was 11.5/100,000.

TABLE 11. RATES OF PREVENTABLE DEATHS AMONG CALIFORNIA INMATES, 2006–2017.

YEAR	PREVENTABLE DEATHS			INMATE POPULATION	ALL PREVENTABLE DEATH RATE PER 100,000 INMATES
	DEFINITELY	POSSIBLY	ALL		
2006	18	48	66 total	171,310	38.5
2007	3	65	68 total	170,786	39.8
2008	5	61	66 total	170,022	38.8
2009	3	43	46 total	169,459	27.1
2010	5	47	52 total	166,700	31.2
2011	2	41	43 total	161,843	26.6
2012*	1	42	43 total	134,929	31.9
2013	0	35	35 total	133,297	26.3
2014	0	24	24 total	135,225	17.7
2015	0	12	12 total	128,824	9.3
2016	0	18	18 total	128,705	14.0
2017	1	14	15 total	130,807	11.5

\*Note: Figures for 2012 here are as reported in the original Analysis of 2012 Death Reviews. An error in the 2012 data was subsequently introduced into this table in the Analysis of 2014 Death Reviews. It has been corrected here.



Figures 7 and 8 show the favorable downward trend in overall preventable death which began in 2009, the fourth year of the Receivership.

FIGURE 7. NUMBER OF PREVENTABLE DEATHS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM, 2006-2017.

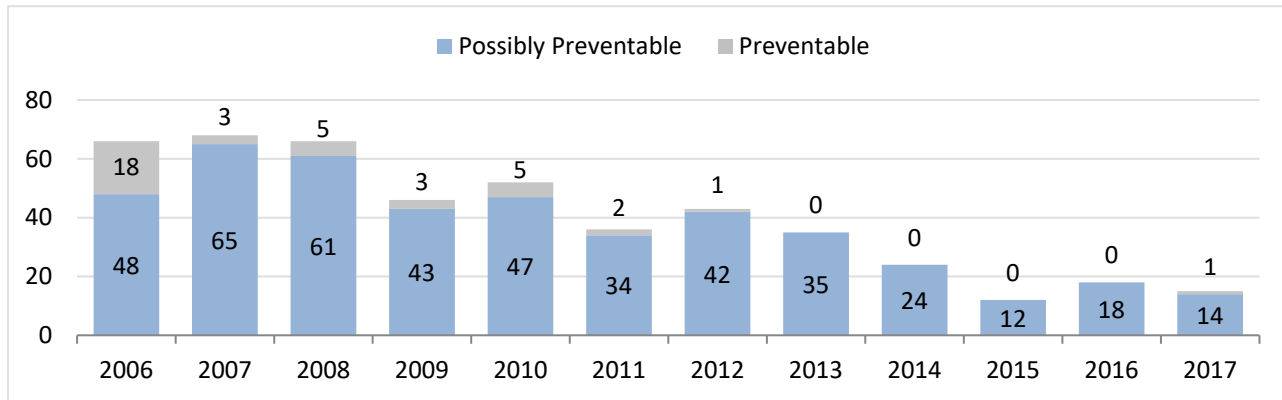
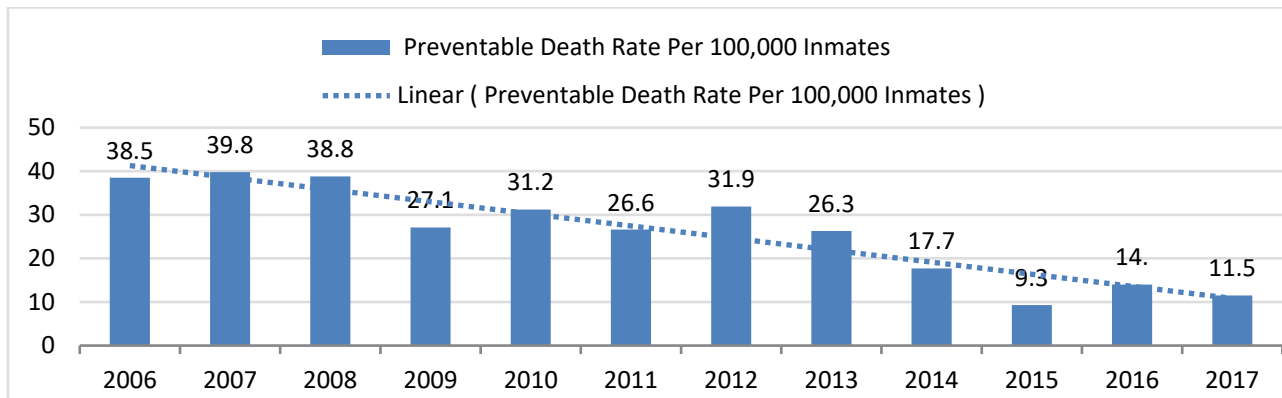


FIGURE 8. PREVENTABLE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.

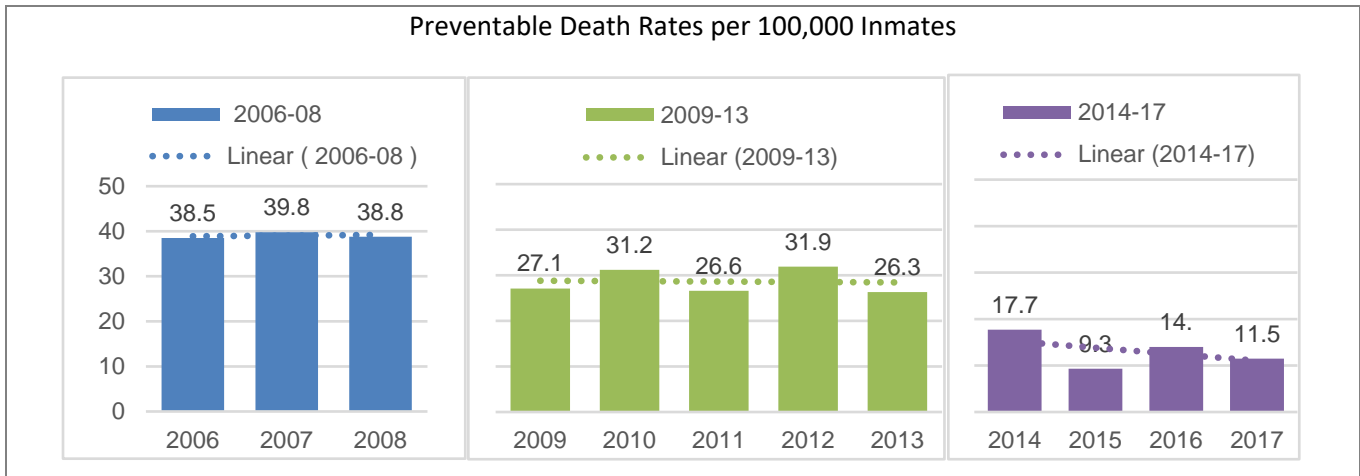


There appear to be three periods reflected in Figure 8. The first three years of the receivership, 2006–2008, was a period during which a major goal was the identification and elimination of unsafe practicing physicians. During this period, the overall preventable death rate averaged 39.0.

From 2009–2013 there was a period of significant improvement. This period coincides with the Receiver’s redesign of the system of care. The Receiver’s Turnaround Plan submitted in 2008 emphasized timely access to competent medical providers in a system of primary care, timely access to prescribed medication and treatment, timely access to a system of specialty care, and to the construction of new healthcare infrastructure including a new medical prison facility intended to house the chronically medically ill. During this five-year period, the overall preventable death rate averaged 28.6.

The last four years, 2014–2017, coincides with the intent to create a culture of quality improvement and a further maturation of the redesign described above, and the opening of the California Health Care Facility. In addition, a mandated reduction in the prison population intended to reduce the severe overcrowding in the prisons, was successful in reducing the total CCHCS population from an average of 168,353 (2006–2011) to an average of 131,965 (2012–2017), a reduction of 21.6%. During this most recent four-year period, the overall preventable death rate averaged 13.1.

FIGURE 8A. THREE PERIODS IN PREVENTABILITY TRENDS, CCHCS 2006-2017.



### G. Trends in Care Lapses

#### 1. The Relationship Between the Number of Lapses and Patient Complexity

Lapses occur frequently in the practice of medicine in every system of care, but because patients are basically healthy, the majority of lapses in an outpatient setting do not result in significant adverse clinical outcomes.

When patients are sicker and more complicated, with more chronic medical conditions coexisting with severe mental illness or substance abuse, they require more prescription medications, more specialty care, more emergency department visits and hospitalizations. Sicker patients are at greater risk of experiencing an adverse outcome.

In 2015 and 2016, this review looked at all of the patients who died and counted the number of chronic medications prescribed and the number of associated medical conditions exclusive of the primary cause of death. Table 12 shows the findings in those two years.

TABLE 12. FREQUENCY OF ASSOCIATED CONDITIONS (EXCLUSIVE OF PRIMARY CAUSE OF DEATH) IN CCHCS INMATE DEATHS, 2015 AND 2016.

CONDITION	NUMBER OF CASES	
	2015	2016
Hypertension (HTN)	170	145
Hepatitis C	114	88
Diabetes mellitus (DM)	87	78
Dyslipidemia (DLP)	52	68
Severe mental illness	70	67
Coronary artery disease (CAD)	62	56

CONDITION	NUMBER OF CASES		
	2015	2016	
Chronic obstructive pulmonary disease (COPD)	54	53	
Gastroesophageal reflux disorder (GERD)	27	38	
Chronic pain/Osteoarthritis	*	27	
Chronic kidney disease (CKD)	*	26	
Cancer	*	26	
Asthma	21	26	
Benign prostate hypertrophy (BPH)	36	25	
Obesity	*	25	
Cancer-liver, ESLD	*	24	
Seizure disorder	17	23	
Congestive heart failure	18	*	
Atrial fibrillation	16	*	
Coccidioidomycosis	15	*	
History of stroke (Cerebrovascular accident)	13	*	
Hypothyroidism	13	*	
Other Conditions (appearing in fewer than 10 cases each, including those marked ‘*’ above)	176	231	
<b>TOTAL ASSOCIATED CONDITIONS</b>	<b>961</b>	<b>1155</b>	
Total Deaths	355	334	
<b>AVERAGE ASSOCIATED CONDITIONS PER DECEDENT</b>	<b>2.7</b>	<b>3.5</b>	
PRESCRIBED MEDICATIONS PER DECEDENT:	AVERAGE	9	9
	RANGE	0-37	0-24

**Prescribed Medications** – The 334 decedents in 2016 were taking an average of nine prescription medications (range zero to 24). The 355 patients who died in 2015 were also prescribed an average of nine medications (range zero to 37).

**Associated conditions** – The average number of associated conditions for the 355 decedents in 2015 was 2.7 and for the 334 decedents in 2016 was 3.5. These conditions are in addition to the designated cause of death. Their contribution to the overall burden of chronic disease within the primary care setting adds to the complexity of management and increases the chance for care lapses to occur.

There is no reason to believe that the decedents in 2017 were any less complex and any less susceptible to a higher incidence of care lapses.

## 2. The Relationship Between Number of Lapses and Preventability of Death in 2017

Prior annual death report analyses have shown a relationship between the number of lapses occurring in a single case and a cascade of consequences which can lead to preventable death. In the medical literature, this has been called the “Swiss cheese effect” – multiple errors lining up to result in an adverse outcome. The findings for 2017 reinforce this observation.

Table 13 shows that in 2017 the average number of lapses in possibly preventable deaths (1.2) were four times the average number of lapses in the not preventable deaths (0.3). There were two lapses contributing to the one definitely preventable death in 2017.

TABLE 13. NUMBER OF LAPSES BY CATEGORY OF PREVENTABILITY, 2017.

PREVENTABILITY	# DEATHS	# LAPSES	AVERAGE LAPSES/DEATH
Preventable	1	2	2.0
Possibly preventable	14	17	1.2
Not preventable	373	108	0.3

FIGURE 9. AVERAGE NUMBER OF LAPSES PER CASE BY PREVENTABILITY, 2007–2017.

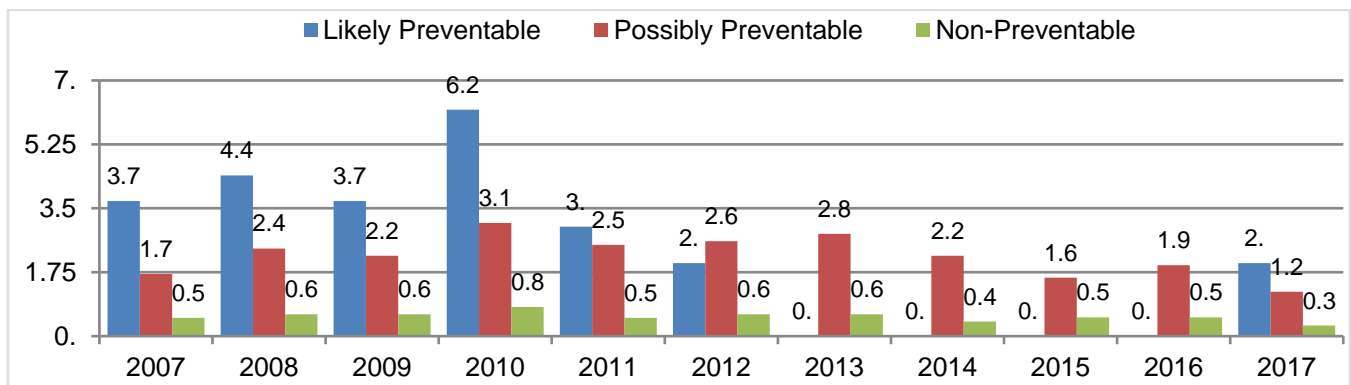


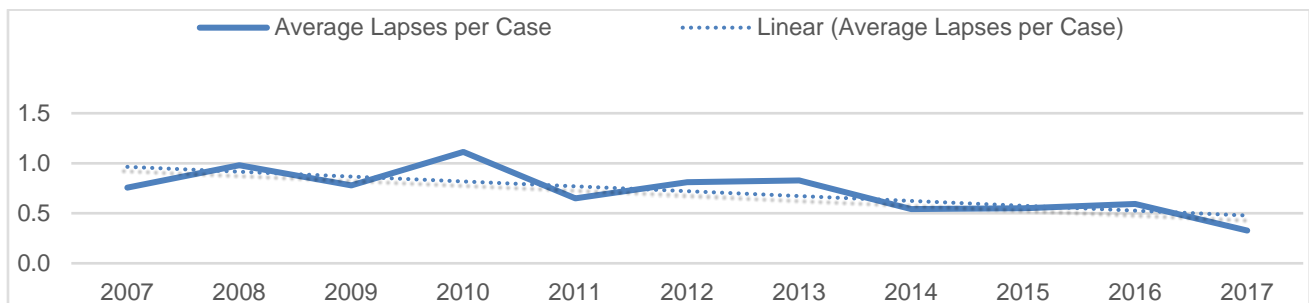
Figure 9 shows trended data for the average number of lapses per case by their preventability determination. For all years, lapses in (definitely) preventable cases averaged 3.8, in possibly preventable cases averaged 2.3 and in not preventable cases averaged 0.5.

Table 14 shows the total number of lapses from 2007 to 2017.

TABLE 14. NUMBER OF LAPSES, BY PREVENTABILITY, IN CCHCS DEATHS, 2007–2017.

YEAR	DEFINITELY PREVENTABLE		POSSIBLY PREVENTABLE		NOT PREVENTABLE		TOTAL NO. OF LAPSES	NO. OF CASES	AVG LAPSES PER CASE
	#	%	#	%	#	%			
2007	11	4%	109	36%	179	60%	299	395	0.8
2008	22	6%	147	41%	193	53%	362	369	1.0
2009	11	4%	90	29%	205	67%	306	393	0.8
2010	31	7%	147	32%	284	61%	462	415	1.1
2011	6	2%	92	37%	154	61%	252	388	0.6
2012	2	1%	105	34%	198	65%	305	362	0.8
2013	0	0%	97	32%	206	68%	303	366	0.8
2014	0	0%	53	31%	120	69%	173	319	0.5
2015	0	0%	19	10%	176	90%	195	355	0.5
2016	0	0%	35	18%	163	82%	198	334	0.6
2017	2	2%	17	13%	108	85%	127	388	0.3

FIGURE 10. TREND IN ANNUAL AVERAGE OF CARE LAPSES PER DEATH, CCHCS, 2007–2017.



The last column in Table 13 is trended in Figure 10, showing that the annual number of care lapses for all cases has been trending downward since 2010, and in 2017 the rate was 0.3 lapses per case – the lowest in the history of the Receivership.

## VIII. TARGETED OPPORTUNITIES FOR IMPROVEMENT

### A. The Primary Care Model and Preventable Deaths

Planning for a primary care model of care in the CCHCS began in 2007, and by 2009 it had been partially implemented in all California state prisons. A primary care medical home creates an environment for ensuring continuous, integrated, coordinated and planned care, especially for patients with chronic or complex combinations of medical illness. Primary care teams are expected to have accountability for patient outcomes, to advocate on behalf of their patients and to use evidence-based guidelines in managing chronic conditions. They are responsible for timely access to appropriate care including specialty referrals, and for coordinating follow-up care after their patients are sent to hospital emergency rooms or experience hospitalizations.

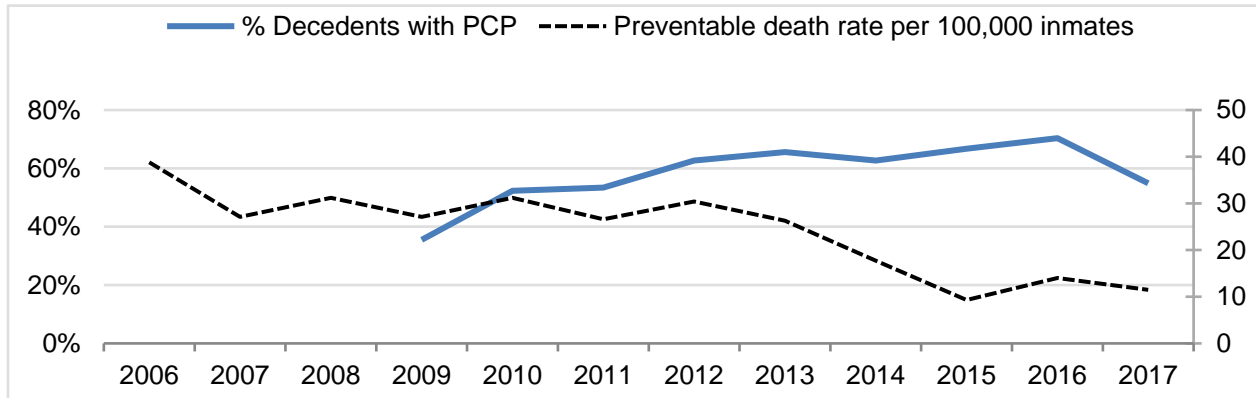
TABLE 15. IDENTIFIABLE PRIMARY CARE IN CALIFORNIA INMATE DEATH CASES, 2009–2017.

YEAR	CASES WITH IDENTIFIED PRIMARY CARE PHYSICIAN	TOTAL DEATHS	% OF TOTAL	PREVENTABLE DEATH RATE PER 100,000 INMATES
2006	<i>not available</i>	424	NA	38.5
2007	<i>not available</i>	395	NA	39.8
2008	<i>not available</i>	369	NA	38.8
2009	141	393	35.5%	27.1
2010	217	415	52.3%	31.2
2011	209	388	53.4%	26.6
2012	230	367	62.7%	30.4
2013	240	366	65.6%	26.3
2014	200	319	62.7%	17.7
2015	237	355	66.8%	9.3
2016	235	334	70.4%	14.0
2017	207	388	54.9%	11.5

In 2009, the DRC began identifying patients who had an identifiable primary care physician (PCP) and were also looking for instances in which the primary care model was not working well. Care lapses types 5 and 6 directly address the primary care model. Table 15 shows, for 2009–2017, the number and percentage of cases in which the reviewer could identify a primary care clinician.

As shown in Figure 11, there appears to be an inverse correlation between the percent of decedents with an identified PCP and the overall preventable death rate.

FIGURE 11. PERCENTAGE OF DEATHS IN THE CCHCS WITH AN IDENTIFIED PRIMARY CARE PHYSICIAN, AND CORRESPONDING RATES OF PREVENTABLE DEATH, 2009–2017.



### B. Trends in Specific Targeted Causes for Preventable Death

TABLE 16. NUMBERS AND RATES OF PREVENTABLE DEATHS FROM CARDIOVASCULAR, END STAGE LIVER DISEASE, AND CANCER IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.

YEAR	PREVENTABLE CARDIOVASCULAR DEATHS		PREVENTABLE ESLD AND LIVER CANCER DEATHS		PREVENTABLE (NON-LIVER) CANCER DEATHS	
	Number	Rate/100,000	Number	Rate/100,000	Number	Rate/100,000
2006	18	10.5	2	1.2	6	3.5
2007	16	9.4	6	3.5	7	4.1
2008	14	8.2	4	2.4	9	5.3
2009	9	5.3	4	2.4	10	5.9
2010	7	4.2	2	1.2	4	2.4
2011	11	6.8	1	0.6	6	3.7
2012	8	5.9	3	2.2	1	0.7
2013	7	5.3	4	3.0	4	3.0
2014	10	7.4	2	1.5	6	4.4
2015	3	2.3	1	0.8	1	0.8
2016	2	1.6	5	3.9	2	1.6
2017	5	3.8	0	0.0	3	2.3

Table 16 shows the raw data from which the run charts are constructed for three specific types of preventable death: 1. cardiovascular, 2. end stage liver/ liver cancer and 3. (non liver) cancer.

### 1. Preventable Cardiovascular Death Rates

FIGURE 12. PREVENTABLE CARDIOVASCULAR DEATHS – NUMBER OF PREVENTABLE CASES AND RATES OF DEATH IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.

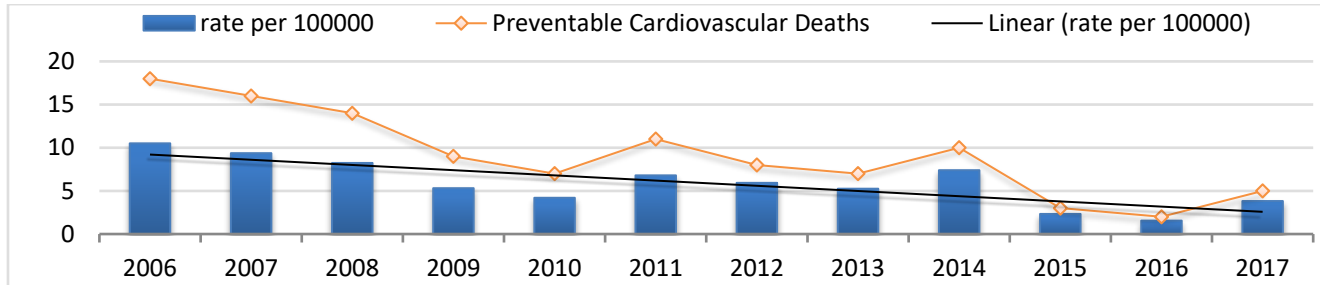
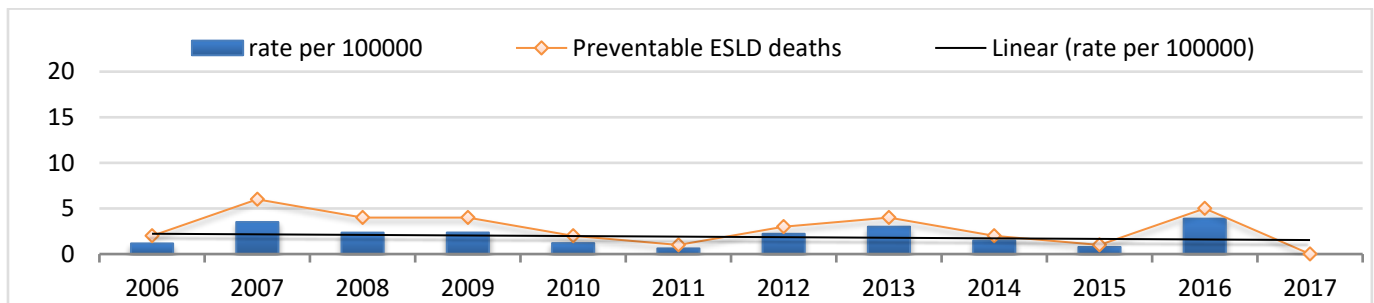


Figure 12 demonstrates a continuing reduction in preventable deaths from cardiovascular (CV) disease, attributable to the CCHCS emphasis on better recognition and management of red flag symptoms and signs of heart attack (reduction of type 1 lapses) and on better management of acute and chronic heart disease syndromes and evidence-based treatment of CV risk factors. All of these are addressed in the CCHCS Care Guidelines for Chest Pain, Hypertension, Dyslipidemia and Diabetes Mellitus. Failures to manage patients according to these Care Guidelines may result in a type 2 care lapse.

### 2. Preventable End Stage Liver Disease (including liver cancer) Death Rates

Figure 13 shows the run chart for the number of preventable cases and rates of death from end stage liver disease, including hepatocellular carcinoma (liver cancer).

FIGURE 13. PREVENTABLE END STAGE LIVER DISEASE DEATHS – NUMBER OF PREVENTABLE CASES AND RATES OF DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.



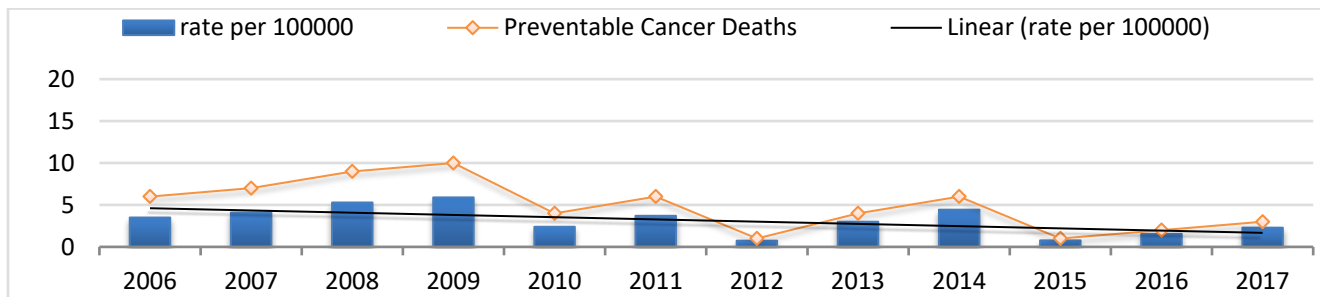
In 2016, there were five cases of preventable death because of failure to follow the guideline for ultra sound screening intended to detect early treatable hepatocellular cancer in patients with chronic hepatitis C. The DRC recommended a targeted educational effort directed at the care teams in the CCHCS. And in 2017 there were no cases of preventable deaths due to end stage liver disease and liver cancer.



### 3. Preventable (Non-liver) Cancer Death Rates

As seen in Figure 14, the improvement in preventable cancer deaths continues, especially during the past three years. In 2017, the three possibly preventable deaths from cancer were all attributed to delays in diagnosis. Two of these deaths resulted from failure to evaluate “red flag” symptoms. Weight loss signaled a cancer of the stomach and diagnosis was delayed by 8 months. An abnormal testicular examination indicated a testicular cancer, but there was a diagnostic delay of 13 months. And an abnormal laboratory test showing anemia and a positive test for blood in the stool signaled a colon cancer but there was a delayed diagnosis of 18 months.

FIGURE 14. PREVENTABLE CANCER DEATHS – NUMBER OF PREVENTABLE CASES AND RATES OF DEATH IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.



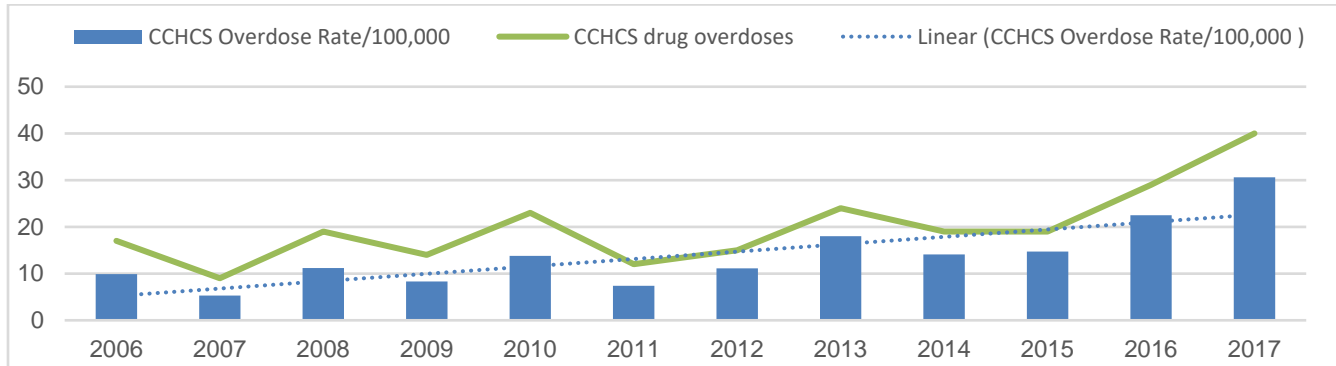
### 4. Deaths from Drug Overdose

Table 17 shows CCHCS annual rates of death from drug overdose from 2006 to 2017. Similar rates for all US prisons are also shown, but data is only available through 2014.

TABLE 17. NUMBERS AND RATES OF DRUG OVERDOSE-RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM AND IN ALL U.S. PRISONS, 2006–2017.

YEAR	CCHCS DRUG OVERDOSES	CCHCS RATE/100,000	U.S. STATE PRISON RATE/100,000
2006	17	9.9	4
2007	9	5.3	3
2008	19	11.2	4
2009	14	8.3	4
2010	23	13.8	3
2011	12	7.4	4
2012	15	11.1	3
2013	24	18.0	4
2014	19	14.1	4
2015	19	14.7	<i>not available</i>
2016	29	22.5	<i>not available</i>
2017	40	30.6	<i>not available</i>
Avg	20	13.9	3.7

FIGURE 15. DRUG OVERDOSE DEATH RATES IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM, 2006–2017.



Death from drug overdose in the CHCS continues to rise at a very significant rate, mirroring the experience in American society at large. For the years 2006–2014, the CCHCS drug overdose death rate averaged 12.6, a little more than three times the total US prison rate of 3.7.

For the years 2015–2017, the rate has averaged 22.6, and has been increasing every year. There are no comparable rates for all US prisons in that period.

In 2017, there were 40 cases of drug overdose. Only one case involved prescribed medication, and the drugs responsible in that case were a combination of antipsychotic agents.

As seen in Table 1, all opioid overdoses were due to non prescribed illicit sources of heroin or other opioids. The most common illicit agents used in these cases were heroin or morphine (22), fentanyl (9), and methamphetamines (13). These numbers add up to more than 40 because in 6 cases there were combinations of drugs used. The opioid antagonist Narcan was utilized unsuccessfully during the emergency resuscitation in 35 of the 39 cases involving narcotic agents. In most of these cases, the patients had been unresponsive for many minutes to hours before staff were notified and emergency protocols instituted.

The CCHCS prisons are not shielded from the "opioid epidemic". Illicit opioids and amphetamines are widely available and patients are especially vulnerable to their effects, including death by overdose.

## 5. Coccidioidomycosis Death Rates

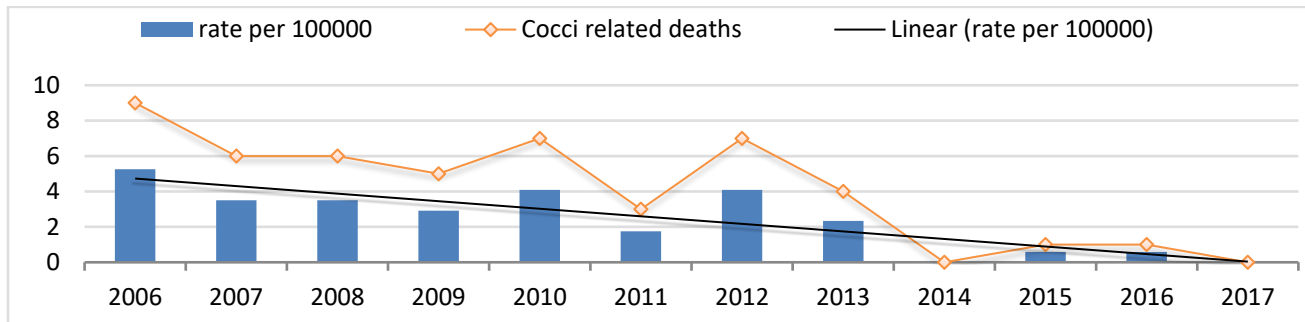
Coccidioidomycosis, a fungal infection endemic to the eight prisons located in the San Joaquin corridor of central California, was responsible for as many as 9 deaths annually in susceptible inmates. A Federal order to remove high risk patients from these 8 prisons has resulted in a major success story for the CCHCS. Compared to the 47 deaths from cocci from 2006 to 2013, there were only two deaths from 2014 to 2016, and none in 2017.

TABLE 18. COCCIDIOIDOMYCOSIS RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.

YEAR	COCCI RELATED DEATHS
2006	9
2007	6
2008	6
2009	5
2010	7
2011	3
2012	7
2013	4
2014	0
2015	1
2016	1
2017	0

Figure 16 is a run chart trending numbers of deaths and death rates from coccidioidomycosis.

FIGURE 16. COCCIDIOIDOMYCOSIS RELATED DEATHS AND DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006–2017.



## IX. PERFORMANCE IMPROVEMENT PLANS AND TOOLS

In past annual analyses the different performance improvement strategies, plans, and tools developed and utilized by the receivership have been described in some detail. These have included, but are not limited to, the following:

### A. The CCHCS Statewide Performance Improvement Plan 2016–2018

This plan ([https://cchcs.ca.gov/wp-content/uploads/sites/60/2017/08/T31\\_20160201\\_Appendix1.pdf](https://cchcs.ca.gov/wp-content/uploads/sites/60/2017/08/T31_20160201_Appendix1.pdf)) highlighted the adoption of The Complete Care Model, emphasizing continuous, coordinated, comprehensive and planned patient centered care with a focus on access, prevention and population health management. Population health management strategies include the use of registries for patients with chronic conditions, and the distribution of indicator dashboards to track the performance of health care teams in meeting standards of care. For example, the end stage liver disease registry dashboard tracks the percentage of patients who have received liver cancer screening ultrasounds, as well as the prescription of certain medications known to be of value in preventing complications of severe liver disease.

The Health Care Services Dashboards can be accessed here: <https://cchcs.ca.gov/wp-content/uploads/sites/60/2018/10/Public-Dashboard-2018-08.pdf>. There are dashboards common to all of the state prisons, distributed monthly. These are useful for monitoring a host of key performance indicators in the management of chronic diseases like asthma, diabetes and advanced liver disease. Patients on ten or more chronic medications are subject to medication reconciliation. Adherence to scheduling and access standards for primary care and specialty care are monitored. Routine screening for colon cancer and women’s health maintenance are tracked. These monthly dashboards are used by health care managers in each of the 35 CCHCS facilities to track performance and to target areas for improvement.

### B. CCHCS Care Guides

The Care Guides (<https://cchcs.ca.gov/clinical-resources/>) are tools for use by clinicians and care teams in the management of patients with the following conditions: Anticoagulation, Asthma, Chest Pain, Chronic Wound Management, Clozapine, Coccidioidomycosis, Chronic Obstructive Pulmonary Disease, Cognitive Impairment/Dementia, Diabetes, Dyslipidemia (high or abnormal cholesterol), End Stage Liver Disease, Gender Dysphoria, Hepatitis C, HIV, Hunger Strike (fasting and referring), Hypertension, Major Depressive Disorder, Pain Management, Palliative Care, Schizophrenia, Seizure Disorders, Skin and Soft Tissue Infections, and Tuberculosis.

Similar resources for nurses are also in use and include Protocols and Encounter forms for patients with Abdominal Trauma, Allergic Reaction(s), Asthma, Burns, Chest Pain, Chest Trauma, Constipation, Dental Conditions, Earache, Epistaxis, Eye injury/ irritation, Female Genitourinary Complaints, Headache, Hemorrhoids, Rash, Insect Stings, Intravenous Therapy, Loss of Consciousness, (non traumatic) Musculoskeletal Complaints, Respiratory Distress, Seizure, Tetanus Prophylaxis, Upper Respiratory Infections, and Wound Care.

## C. The Electronic Medical Record

Statewide implementation of the Electronic Health Records System was completed in November 2017.

## X. CONCLUSIONS

This twelfth annual review shows a continuing increase in the all cause CCHCS death rate, possibly due to an increase in the average age of the California prison inmate population cause by release of large numbers of younger inmates. In 2017, the overall death rate of 297/100,000 was the highest in the past 12 years. Although most of this increase can be attributed to non preventable deaths from cancer and cardiovascular disease, there has also been a continued dramatic rise in deaths by illicit opioid and amphetamine drug overdose.

The CCHCS under the Federal Receiver has continued its major redesign of the system of care, which has resulted in significant improvement in major outcomes, achieved for a complex patient population.

There was a significant decline in the number of cited care lapses in 2017, with 0.3 lapses per case the lowest rate in the eleven years that this measure has been tracked.

The death rate from preventable cardiovascular deaths continued a favorable downward trend.

A targeted effort to improve the monitored surveillance for liver cancer in end stage liver disease resulted in a significant reduction in possibly preventable liver cancer deaths, which went from 5 cases in 2016 to 0 cases in 2017.

Overall preventable death rates have continued to decrease. The fifteen total preventable deaths in 2017 represented a rate of 11.5/100,000. This compares with the average rate of 39/100,000 during the first three years of the Receivership, and continues the favorable downward trend.

The success of the Receivership in transforming healthcare in the California state prisons has resulted in a process of revocable delegation. By March of 2018, 16 of the 35 California prisons had been delegated from the Receivership back to the State of California based on favorable reviews of medical care by the Office of the Inspector General, and subject to ongoing periodic monitoring by the Receiver.

These and other successes can be followed in the triennial reports of the Receiver to the Federal Judiciary: [https://cchcs.ca.gov/wp-content/uploads/sites/60/2018/06/T38\\_20180601\\_TriAnnualReport.pdf](https://cchcs.ca.gov/wp-content/uploads/sites/60/2018/06/T38_20180601_TriAnnualReport.pdf)

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