

ANALYSIS OF 2015 INMATE
DEATH
REVIEWS IN THE
CALIFORNIA
CORRECTIONAL
HEALTHCARE SYSTEM

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I. INTRODUCTION

The California Correctional Healthcare System (CCHCS) entered Federal Receivership in April 2006, when a Federal judge, citing longstanding substandard medical care causing many unnecessary deaths in the California state prison system, found the state to be in violation of prisoners' rights under the eighth amendment to the US Constitution.

This represents the tenth annual analysis of inmate death reviews in the CCHCS under the Federal Receiver.

This report will again describe the CCHCS death review process and how it is used as a major tool for improving the overall quality of healthcare. It will describe the development and use of a taxonomy for medical errors, identify preventable and possibly preventable deaths, and identify and trend all causes of death, serious care lapses, and preventable deaths.

This and all previous death report analyses are available at the CCHCS website (cphcs.ca.gov/Deathreviews.aspx).

II. DEATH REVIEW PROCESS

The death review process is described in the Receiver's Inmate Medical Services Policies and Procedures, Volume 1, Chapter 29. "The CCHCS shall...maintain a Death Reporting and Review Program which shall be responsible for completing an independent review of every patient death which occurs within the custody of the California Department of Corrections and Rehabilitation (CDCR)."

The purpose of this policy is to "identify patterns of lapses in care related to the cause of death, determine opportunities for improvement in the delivery of health care, and meet mandated requirements ..."

Within five calendar days of any inmate death, an initial death review summary is submitted from the institution where the death occurred to the headquarters Death Review Unit. The initial report includes a chronology of significant events including the emergency medical response, any identified lapses in health care delivery and any identified system issues which may have contributed to the death.

At the Death Review Unit, each death is then assigned a physician death reviewer and a nurse reviewer at CCHCS headquarters. Each case undergoes an exhaustive review of the patient's medical and nursing care. Every clinical encounter in the six months prior to death is described and the quality of care is evaluated. If warranted, the reviewer is expected to go back earlier than six months. Each death classified as suicide or possible suicide undergoes an additional separate review by a suicide case reviewer and the Suicide Prevention and Response Focused Improvement Team. Each suspected drug overdose also includes a Mental Health Program review.

Factors evaluated include the quality of patient triage and evaluation, timeliness of access to care, quality of each clinical encounter, responses to all laboratory and diagnostic imaging studies, quality of care for any identified

chronic medical condition, adherence to published guidelines for care, and the timing and quality of emergency responses. The presence of a primary care physician and the quality of the primary care model of care is also evaluated.

In every case, the cause of death is determined, using autopsy findings if available. All care lapses are noted, even if such a lapse did not contribute to the patient's death.

The reviewer then makes a judgment as to whether the death was preventable, possibly preventable, or not preventable.

All completed death reviews are presented by the assigned reviewer to the Death Review Committee (DRC). The DRC is a multidisciplinary committee appointed by the Statewide Chief Medical and Nursing Executives. The DRC is comprised of three physicians, three nurses, one mental health representative who votes on preventability of suicide cases, one representative from custody who votes on deaths with custody involvement, and one (nonvoting) Quality Management representative. The DRC is co-chaired by a physician and nurse. Following presentation of each case, the DRC votes on the category of preventability and the cause of death.

Other functions of the DRC are to identify opportunities for improvement in healthcare policies, to make recommendations for changes to interdisciplinary care guides, to make recommendations for statewide training or continued education programs, to refer system issues to institutional, headquarters, and quality improvement programs and committees, and to highlight areas in need of improvement. Extreme departures from the standard of care are immediately referred to the Medical, Nursing or Mental Health Peer Review Committees or, in the case of sentinel events, to the Patient Safety Program.

The major purpose of the Death Reporting and Review Policy is to reduce the occurrence of preventable deaths.

III. DEFINITIONS

The following definitions are used in this report:

Care Lapse – Any departure from the standard of care which poses a risk to patient safety.

Extreme Departure – Care given that may cause injury or expose patients to some substantial risk of injury or harm which no other reasonable or 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.

IV. CLASSIFICATION FOR LAPSES IN CARE

Based on the 2006 and 2007 CCHCS death reviews, a classification system describing care lapses of fourteen different types was proposed to the DRC and in 2008 it was incorporated into the death review template. This taxonomy for medical error was presented at the 2009 annual meetings of the National Commission on Correctional Health Care and the American Correctional Health Services Association.

The taxonomy has been a useful quality improvement tool for identifying the common reasons for substandard healthcare and preventable deaths. It has been used to identify potentially unsafe clinical practice, gaps in the healthcare system, opportunities for system and process redesign, and educational strategies for CCHCS clinical staff.

The fourteen categories of care lapse are:

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

Type 2 – Failure to follow clinical guidelines 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 guidelines include 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.

2015 CCHCS Death Review Analysis

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.

V. STUDY FINDINGS

A. NUMBER AND CAUSES OF INMATE DEATH, 2015

There were 355 inmate deaths in 2015. Causes of death and preventability status are shown in Table 1, and are listed by the primary condition that led to patient death. For example, if a patient died from systemic infection (sepsis) caused by a compromised immune system induced by chemotherapy for cancer, then that cancer is listed as primary cause of death. Cancer of the liver is a special category of malignancy because it is almost always a consequence of end stage liver disease (cirrhosis) caused by chronic hepatitis virus infection. Therefore, it is included as a cause under liver disease.

With the exception of the 24 deaths by suicide, the 19 deaths by drug overdose, the 16 homicide deaths, and the 1 death by trauma, all of the remaining 295 deaths occurred as a consequence of underlying chronic disease.

TABLE 1. CCHCS CAUSES OF DEATH AND PREVENTABILITY STATUS, 2015.

NUMBER OF CASES	CAUSES OF DEATH NON-PREVENTABLE	POSSIBLY PREVENTABLE
93	Cancer 92: CA-lung (27); CA-pancreas (9); CA-brain (8); CA-colon (7); CA-unknown primary site (6); CA-lymphoma, non Hodgkin (6); CA-acute myeloid leukemia (4); CA-bladder (4); CA-prostate (4); CA-esophagus (2); CA-multiple myeloma (2); CA-small intestine (2); CA-tongue (2); CA-biliary duct (1); CA-face (1); CA-kidney (1); CA-larynx (1); CA-malignant melanoma (1); CA-ovary (1); CA-sarcoma, Ewing (1); CA-schwannoma (1); Leiomyosarcoma (1)	1: CA-testicular
62	Cardiovascular Disease 58: Sudden cardiac arrest (38); Acute myocardial infarction (9); Congestive heart failure (6); Cardiac arrhythmia (2); Cardiomyopathy (2); Aortic stenosis (1)	4: Sudden cardiac arrest (3); Acute myocardial infarction (1)
57	Liver Disease 56: End stage liver disease (cirrhosis) (37); CA-liver (19)	1: End stage liver disease (cirrhosis)
27	Infectious Disease 26: Sepsis/Septic Shock (15); HIV/AIDS (3); Pneumonia - bacterial (2); Necrotizing fasciitis (2); Infective endocarditis (1)	1: Infective endocarditis
24	Suicide	
19	Drug Overdose	

NUMBER OF CASES	CAUSES OF DEATH NON-PREVENTABLE	POSSIBLY PREVENTABLE
16	Homicide 15: Homicide by Inmate(s) (12) (1); Homicide by other (3)	1: Homicide by Inmate(s)
15	Cerebrovascular Disease 15: Stroke-hemorrhagic (11); Stroke-ischemic (3); Stroke-embolic (1)	
10	Pulmonary 10: Chronic obstructive pulmonary disease (9); Acute respiratory distress syndrome (1)	
7	Renal Disease 6: End stage renal disease	1: End stage renal disease
6	Circulatory System 5: Pulmonary Embolism	1: Pulmonary Embolism
6	Gastrointestinal Disease 6: Bowel obstruction (2); Perforated duodenal ulcer (2); Crohn disease (1); Pancreatitis (1)	
5	Hematology 5: Myelodysplasia (3); Aplastic anemia (1); Thrombotic thrombocytopenic purpura (TTP) (1)	
4	Neurological Disease 4: Myasthenia gravis (1); Seizure disorder (1); Dementia (1); Parkinson disease (1)	
1	Auto Immune 1: Systemic lupus erythematosus	
1	Metabolic 1: Hypoglycemia	
1	Respiratory System 1: Acute respiratory failure	
1	Trauma 1: Traumatic-closed head injury	
355	Grand Total 343	12

In 2015, the top seven causes of death were cancer (92 cases, 25.9%), cardiovascular disease (62 cases, 17.5%), end stage liver disease (58 cases, 16.3%), infectious diseases (27 cases, 7.6%) suicide (24 cases, 6.7%), drug overdose (19 cases, 5.4%) and homicide (16 cases, 4.5%).

Male deaths accounted for 97 percent of all CCHCS deaths in 2015. Table 2 shows the top causes of death in CCHCS inmates from 2007 to 2015 and Table 3 compares the top causes of death in CCHCS inmates in 2015 to those of American males in 2013 -- the most recent data from the Centers for Disease Control and Prevention.

TABLE 2. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2007-2015.

	2015	2014	2013	2012	2011	2010	2009	2008	2007
1	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer
2	Cardiovasc. Disease (17.5%)	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	Suicide	End Stage Liver Disease
3	End Stage Liver Disease (16.3%)	Cardiovasc . Disease	Cardiovasc . Disease	Cardiovasc . Disease	Cardiovasc . Disease	Cardiovasc . Disease	Cardiovasc . Disease	End Stage Liver Disease	Cardiovasc . Disease
4	Infectious Disease (7.6%)	Suicide	Suicide	Suicide	Suicide	Suicide	Suicide	Cardiovasc . Disease	Suicide
5	Suicide (6.7%)	Drug Overdose	Drug Overdose	Homicide	Pneumonia	(tied) Drug Overdose; Homicide	Drug Overdose	Drug Overdose	Homicide
6	Drug overdose (5.4%)	Pneumonia	Homicide	Drug Overdose	Homicide		Pneumonia	Pneumonia	HIV/AIDS
7	Homicide (4.5%)	Homicide	Sepsis	(tied) Sepsis; Infectious	Sepsis	Pneumonia	Congestive Heart Failure	HIV/AIDS	Stroke

	2015	2014	2013	2012	2011	2010	2009	2008	2007
8	Stroke (4.2%)	Pulmonary	(tied) Pulmonary; Pneumonia	Disease	Drug Overdose	Congestive Heart Failure	Homicide	Congestive Heart Failure	Drug Overdose
9	Pulmonary (2.8%)	(tied) Infectious Disease; Stroke- Hemorrhagic		Stroke	Stroke	(tied) Coccidioid omycosis; End Stage Renal Disease, Stroke		Sepsis	Pneumonia

TABLE 3. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2015 AND IN AMERICAN MALES IN 2013

CCHCS INMATES 2015	AMERICAN MALES 2013
Cancer (25.9%)	1. Cardiovascular (24.6%)
Cardiovascular (17.5%)	2. Cancer (23.5%)
Liver disease (end stage) (16.3%)	3. Accidental injury (6.3%)
Infectious diseases (7.6%)	4. Chronic respiratory (5.4%)
Suicide (6.7%)	5. Stroke (4.1%)
Drug overdose (5.4%)	6. Diabetes mellitus (3.1%)
Homicide (4.5%)	7. Suicide (2.5%)
	10. Chronic liver disease (1.8%)

The top causes of death in the prison population are significantly different than the top causes of death in American men. The top three causes of death in the prison population are cancer, end stage liver disease and cardiovascular disease (heart attacks, sudden cardiac arrests and congestive heart failure.) By comparison, the top three causes of death in American males are cardiovascular disease (24.6 %) and cancer (23%), which together account for almost half of all deaths, with unintentional injuries (6.3%) a distant third. Chronic liver disease (1.8%) ranks tenth. (www.cdc.gov/men/lcod/2013/index.htm)

In the CCHCS in 2015, cancer was the leading cause of death but the 92 cases of cancer included 22 separate malignant conditions. Of these, cancer of the lung was the most frequent, and can be attributed to the high incidence of smoking in the incarcerated.

Cardiovascular disease is the number two cause of death in the CCHCS population, which, like the rest of American society, has a large percentage of patients who smoke, lack exercise and have a significant burden of hypertension, diabetes and high cholesterol levels, all major risk factors for coronary artery disease.

Liver disease is the third leading cause of death in the inmate population, and is caused by the hepatitis C virus, which currently infects 26% of all CCHCS inmates.

Recent advances in the treatment of chronic hepatitis C infection hold promise for greatly reducing mortality, but it will be many years before the promise of these new therapies will be realized.

Although infectious disease is the fourth leading cause of death in the CCHCS in 2015, that cause now includes multiple causes of infection which in prior years were catalogued as separate and distinct causes. (Sepsis, HIV /AIDS, pneumonia, and coccidioidomycosis are all now counted in this category.)

Suicide is two and a half times more prevalent in the CCHCS population than in free society, owing to the high incidence of major depression endemic in prison.

Drug overdoses are a consequence of the high incidence of opioid addiction in the prison population. Opioid addiction has become a major public health problem in the United States and there is a highly visible campaign to educate the public and the medical profession to recognize opioid addiction, to change patients' expectation of opioids in the management of acute and chronic non cancer pain, and to disseminate guidelines to alter physicians' practices of opioid prescription.

Although homicide represents 4.5% of all CCHCS deaths, homicide deaths in African American males are also 4.5% of all deaths, and ranks as the number five cause of death in that population. In Hispanic American males, homicide ranks ninth and is 2% of all deaths. Ironically, the murder rate in Washington DC is 13/100,000, comparable to the homicide rate in CCHCS of 12.5/100,000.

B. LIFE EXPECTANCY IN THE CCHCS, 2015

In December of 2015, the CCHCS population was 127,815, of which 122,374 (95.7%) were males and 5,441 (4.3%) were females. Of the 355 deaths in 2015, 345 (97.2%) occurred in male patients and 10 (2.8%) occurred in female patients.

Table 4 shows the age at death for all CCHCS inmates.

TABLE 4. RANGES AND AVERAGE AGES AT DEATH AMONG ALL CALIFORNIA INMATES, 2015

	AGE RANGE	AVERAGE AGE
Age of all 345 male decedents	20 – 96	57
Age of all 10 female decedents	23 – 72	52
Age of suicides, drug overdoses, and homicides	20 – 73	41
Suicide	21 – 73	42
Drug overdose	20 – 57	40
Homicide	23 – 71	42
Age of all 355 deaths excluding suicide, drug overdose, and homicide	20 – 96	60

In 2015, the average age of all male decedents was 57 years. The female decedents averaged 52 years of age.

The ten female patients who died in 2015 averaged 52.4 years (range 23 - 73). Of these 10 deaths, four were caused by end stage liver disease. There were three cancer deaths - lung, tongue and ovary, two suicides and one accidental traumatic death.

Drug overdoses, suicides and homicides affected a significantly younger population, averaging 41 years at time of death. Excluding these three causes for death in the younger prison population, the average life expectancy in the male patients was 60 years, some 20 years shorter than that of the average American male.

The major factors which specifically influence mortality in prisoners in 2015 are no different from those in prior years. These include drug addiction, depression, and violence.

In heroin and methamphetamine addicts, the intravenous injection of drugs with shared needles can cause the transmission of hepatitis C virus, which is endemic in the prison population and which causes inflammatory liver disease culminating in cirrhosis. Liver cancer occurs in the setting of a cirrhotic liver. All of the 57 cases of liver cancer and end stage liver disease were caused by hepatitis C virus infection.

Depression led to 24 suicides in 2015. Suicide has been the fourth leading cause of death in seven of the past eight years. Depression may also play a role in the patient who has repeated non adherence to medical advice, and to some drug overdose deaths.

Violent lifestyles, prison crowding, the occasional riot and the prison gang subcultures have all contributed to the high incidence of homicide in the incarcerated.

C. NON PREVENTABLE DEATHS IN 2015

There were 343 deaths thought to be not preventable in 2015, representing 96.6% of all deaths. Table 1 lists the numbers and causes for these deaths. Excepting suicides, drug overdoses and homicides, these deaths were a consequence of underlying chronic disease.

D. POSSIBLY PREVENTABLE DEATHS IN 2015

There were a total of 12 possibly preventable deaths in 2015, representing 3.4% of all deaths. Table 5 shows the causes of these deaths.

TABLE 5. CAUSES OF POSSIBLY PREVENTABLE DEATH AMONG CALIFORNIA INMATES, 2015.

NUMBER OF CASES	CAUSE OF DEATH
4	CARDIOVASCULAR – sudden cardiac arrest (3); acute myocardial infarction (1)
1 each	CANCER – testicular; CIRCULATORY – Pulmonary Embolism; HOMICIDE; INFECTIOUS DISEASE – Endocarditis; (END STAGE) LIVER DISEASE; METABOLIC - Hypoglycemia; (END STAGE) RENAL DISEASE; SUICIDE
12	Total

Each of these 12 deaths is now briefly described, noting the type of lapse or lapses which were most contributory to the death.

Type 1 lapses - failure to recognize, identify or adequately evaluate important symptoms or signs - contributed to the first four cases.

A 63 year old man died of a ruptured spleen. Shortly after an altercation with another inmate, the patient was briefly examined in the yard, but refused extensive evaluation and was returned to his cell after vital signs were noted to be stable. He collapsed and died 24 hours later. Autopsy revealed unexpected splenic laceration and hemoperitoneum, as well as fractured ribs and a puncture wound of the right arm, all undocumented in the medical record note describing the brief post assault examination. A **type 1 lapse** (failure to adequately examine the patient) and a **type 13 lapse** (patient non adherence with recommendation for optimal care) both contributed to this possibly preventable death.

A 55 year old man died of acute myocardial infarction. The patient had known coronary artery disease and had received triple bypass ten years previously. On the day prior to death, the patient complained of chest pain. A nursing encounter resulted in the diagnosis of musculoskeletal pain and ibuprofen was prescribed by the on call physician. This **type 1 lapse** (failure to adequately evaluate important “red flag” symptoms in a known cardiac patient) contributed to this possibly preventable death.

A 52 year old man died of pulmonary embolism. On the day prior to his death he had been evaluated for symptoms of severe lightheadedness, shortness of breath and an abnormal electrocardiogram, but was sent back to his cell when the symptoms resolved. This **type 1 lapse** - failure to react appropriately to important symptoms - contributed to his possibly preventable death on the following day, when he presented with a similar complex of symptoms which persisted and progressed to cardiovascular collapse and death. Autopsy showed bilateral pulmonary embolism.

A 65 year old man died of acute myocardial infarction. A normal cardiac stress scan was done six months previously. The patient complained of recurring episodes of almost daily chest pain relieved by nitroglycerine. He was referred for a routine cardiology evaluation, but died on the evening of his most recent evaluation by primary care. A **type 1 lapse** – failure to react aggressively to these recurrent complaints of angina, despite the negative recent stress test - contributed to this possibly preventable death.

Type 2 lapses - failure to follow established guidelines for care - were cited in the following three cases.

A 62 year old man with hepatitis C liver cirrhosis died of liver cancer. The patient had a normal liver ultrasound in early 2013. The next scan was done 21 months later, during which time the patient had seen four different primary care providers on multiple occasions. This **type 2 lapse** from the CDCR guidelines (which call for every six month screening by ultrasound for early liver cancer) contributed to a possibly preventable death since some early stages of liver cancer are thought to be curable by ablation, resection or liver transplant.

A 64 year old man died of sudden cardiac death. Two months prior to death, he had been evaluated for chest pain, but the RN evaluator failed to initiate a chest pain protocol. One month prior to the sudden death, the primary care physician saw the patient in routine followup of chronic diabetes and high cholesterol, but failed to review the RN encounter log. This **type 2 lapse** (failure to review intervening encounters,) resulted in a missed opportunity to evaluate the patient for treatable coronary artery disease.

A 44 year old man died of suicide by strangulation. Hours prior to death, he had been evaluated by the on call psychiatrist who, because of methamphetamine use, auditory hallucinations and expression of suicidal intent, ordered the patient to be placed in a Mental Health Crisis Bed under suicide precautions. Instead, the patient was placed in a medical bed where there was access to an electrical cord, which the patient used to strangle himself. This **type 2 lapse** (failure to follow established guidelines) and a subsequent **type 14 lapse** (three minute delay in activation of basic life support) both contributed to this possibly preventable death.

Type 4 lapses – failure to respond appropriately to an abnormal test result – contributed to death in the following three cases.

A 50 year old man with brittle diabetes and habitual refusal to have blood sugars checked (**type 13 lapse**) died of presumed hypoglycemia several hours after a blood sugar of 49 was noted by nursing personnel who did not notify the on call physician (**type 4 lapse**), but ordered the patient a dextrose tablet which was later discovered on the bedside table.

A 33 year old man with secondary polycythemia of unknown etiology died of metastatic testicular cancer. The diagnosis was delayed by one year because the consulting hematologist felt the cause of polycythemia to be secondary to the patient's obesity and sleep apnea and failed to initiate a routine search for underlying

malignancy, which is also known to cause polycythemia. (**Type 4 lapse**). As testicular cancer can be quite responsive to treatment when diagnosed early, this case was felt to be possibly preventable.

A 54 year old man died of bacterial endocarditis complicated by epidural abscess and septic emboli to the brain, liver, spleen and kidneys. The initiation of an appropriate antibiotic was delayed by ten days because an abnormal urine culture and sensitivity was not communicated to the treating physicians. This delay (**type 4 lapse**) contributed to a possibly preventable death.

A type 7 lapse – a procedural complication – was seen in the following case.

A 57 year old man with end stage renal failure on hemodialysis died of a complication of a procedural error (**type 7 lapse**), when a hemodialysis catheter was inadvertently placed in a carotid artery, which led to a stroke with fatal complications.

A type 8 lapse- a medication prescribing error - contributed to the following case.

A 55 year old man died of presumed uncontrolled seizures. Because of two missed opportunities to modify anticonvulsants after the patient was having seizures with increasing frequency, the death was possibly preventable. (**Type 8 lapse**, failure to modify medication appropriately)

E. THE TAXONOMY FOR CARE LAPSES - 2015

One of the major purposes of the death review process is to identify care lapses, regardless of whether these lapses lead directly or indirectly to patient death. The taxonomy for classifying and tracking care lapses in the CCHCS was described previously. Table 6 summarizes the number of lapses in 2015.

TABLE 6. SUMMARY OF CARE LAPSES, 2015.

LAPSES OF CARE TYPES	# OF LAPSES IN 343 NON PREVENT ABLE DEATHS	# OF LAPSES IN 12 POSSIBLY PREVENT ABLE DEATHS	TOTAL LAPSES IN ALL 355 DEATHS
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	30	6	36
#2 – Failure to follow established guidelines for evaluation and/or management of a specific condition	26	4	30
#3 – Delay in access to care sufficient to result in harm to the patient	22	0	22
#4 – Failure to adequately pursue abnormal test results	11	4	15
#5 – Failure of provider-to-provider communications including botched handoffs	10	0	10

LAPSES OF CARE TYPES	# OF LAPSES IN 343 NON PREVENT ABLE DEATHS	# OF LAPSES IN 12 POSSIBLY PREVENT ABLE DEATHS	TOTAL LAPSES IN ALL 355 DEATHS
#6 – Fragmentation of care such that individual responsibility for patient is waived	10	0	10
#7 – Surgical/procedural complication resulting in iatrogenic injury	2	1	3
#8- Medication prescribing error	11	2	13
#9- Medication delivery error	5	1	6
#10- Practicing outside the scope of one’s professional capabilities	0	0	0
#11- Unsupervised mid-level (nurse practitioner or physician assistant) care	0	0	0
#12 – Failure to communicate effectively with the patient	2	0	2
#13 – Patient non-adherence with recommendation for optimal care	19	1	20
#14 – Delay in emergency response or failure to follow emergency response protocol	17	0	17
#15 – Other (legacy charting)	11	0	11
All Types	176	19	195

There were 176 lapses in the 343 not preventable deaths (0.51 lapses/case) and 19 lapses in the 12 possibly preventable deaths (1.6 lapses/case.)

Types 1, 2, 3, and 13 lapses accounted for 55% of all care lapses.

Types 1,2, and 4 lapses accounted for 74% of the lapses in the possibly preventable deaths.

Legacy charting appears for the first time in this year’s analysis under the “Other” category. Legacy charting refers to the practice of “cutting and pasting” or simply copying a previous note in the medical record in order to save time in documentation. When suspected to have potential serious consequences, the offender is referred to the appropriate body for corrective education.

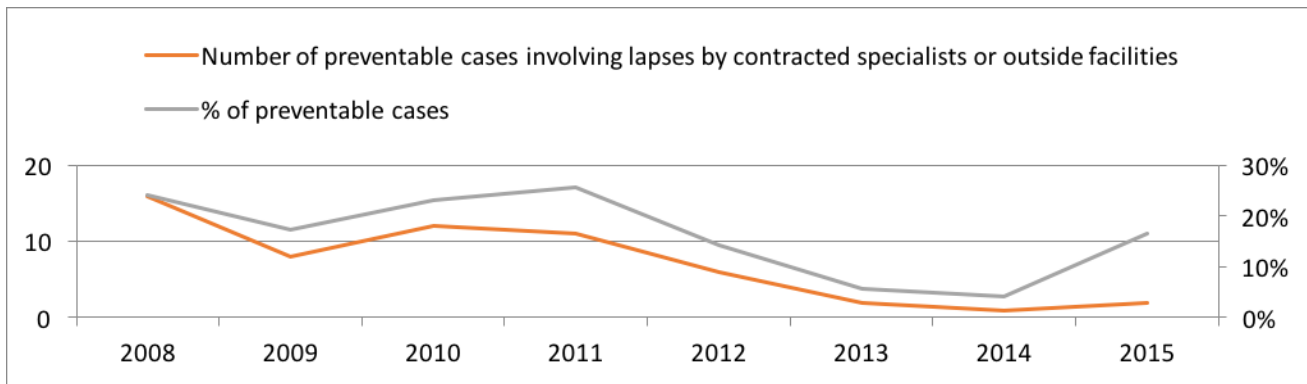
F. DEATHS ATTRIBUTED TO LAPSES BY CONTRACTED SPECIALISTS AND OUTSIDE FACILITIES

In the early years of the Receivership there were significant numbers of possibly preventable deaths attributed to lapses by contracted specialists and outside facilities. Two cases in 2015 involved contracted specialists.

In case 9, a consultant failed to complete an evaluation for causes of polycythemia, and in case 11, a consultant made an error in placement of a hemodialysis catheter. These two cases represent 16.7% of all possibly preventable deaths.

Figure 1 graphs the number and percent of possibly preventable deaths as a consequence of consultant or contracted facility lapses. The absolute number of these cases has significantly decreased in the past three years of analysis.

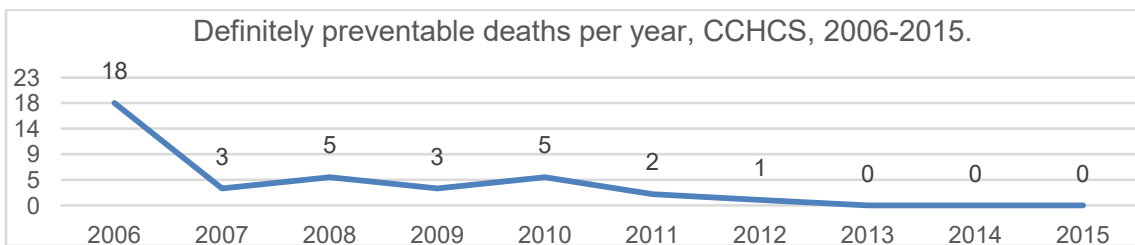
FIGURE 1. POSSIBLY PREVENTABLE DEATHS OF CALIFORNIA PRISON INMATES INVOLVING LAPSES BY CONTRACTED SPECIALISTS OR OUTSIDE FACILITIES, 2008-2015.



G. DEFINITELY PREVENTABLE DEATHS IN 2015

The Figure 2 run chart shows the definitely preventable deaths from 2006-2015.

FIGURE 2. TREND IN CCHCS DEFINITELY PREVENTABLE DEATHS, 2006-2015.



In 2015, for the third consecutive year in the history of the Receivership, there were no definitely preventable deaths identified.

VI. DISCUSSION OF TRENDS

A. TRENDS IN PRISON MORTALITY RATES IN CALIFORNIA AND THE UNITED STATES

Table 7 depicts annual death rates in the California Correctional Healthcare System from 2006-2015 and death rates for all state prisons from the US Bureau of Justice, which are available for the years 2006-2013. (bjs.gov)

TABLE 7. ANNUAL DEATH RATES AMONG CALIFORNIA AND U.S. STATE PRISON INMATES, 2006- 2015.

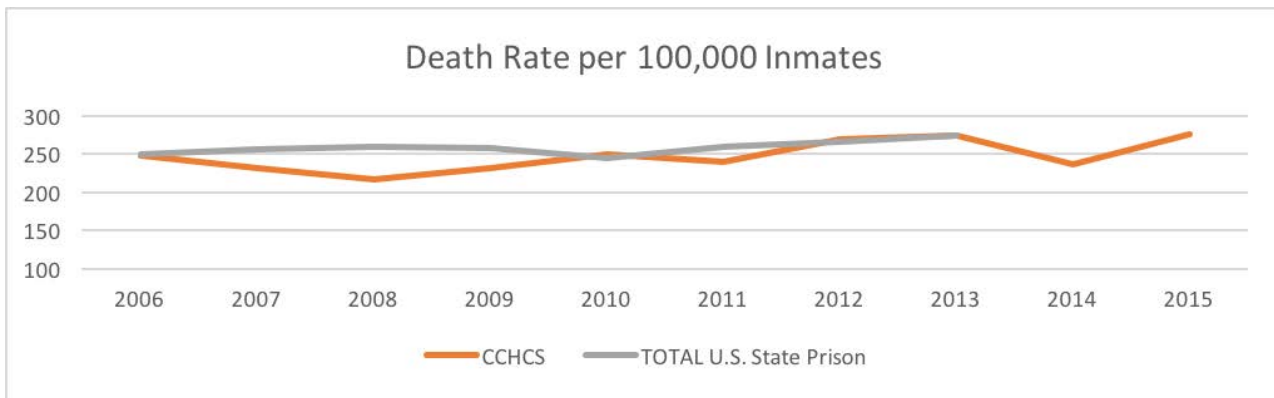
YEAR	CCHCS NUMBER OF DEATHS	CCHCS NUMBER OF INMATES*	CCHCS DEATH RATE PER 100,000 INMATES	TOTAL U.S. STATE PRISON DEATH RATE PER 100,000
2006	424	171,310	248	249
2007	395	170,786	231	256
2008	369	170,022	217	260
2009	393	169,459	232	257
2010	415	166,700	249	245
2011	388	161,843	240	260
2012	362	134,929	268	265
2013	366	133,297	275	274
2014	319	135,225	236	NA
2015	355	128,824	276	NA
Average (Range)			247 (217-276)	258 (249-274)

NA = data not yet available

*Annual number of inmates calculated by averaging the population at the end of each quarter. (Reference CDCR.ca.gov archived monthly population reports.)

Figure 3 shows the trended death rates in the CCHCS from 2006-2015, compared to the trended death rates in all US state prison systems from 2006 - 2013. There appear to be no significant differences between the California state prison rates of death and the rates of death encountered in all other US State prison systems.

FIGURE 3. TRENDED DEATH RATES IN THE CCHCS, 2006-2015.



B. TRENDS IN CAUSES OF MORTALITY - SUICIDES AND HOMICIDES

Suicides - There were 23 suicides in 2015, 6.5% of all the deaths in the CCHCS. This rate of suicide is 17.9/100,000. The rate of suicide deaths in California remains higher than the national rate. Table 8 shows the number and rate of deaths by suicide in the CCHCS and shows corresponding annual suicide rates/100000 in all US prisons in the corresponding years for which data is available.

TABLE 8. NUMBERS AND RATES OF SUICIDE-RELATED DEATHS IN CALIFORNIA AND ALL US STATE PRISONS, 2006-2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	AVG
Suicides	43	33	38	25	34	34	32	30	23	24	31.5
CCHCS Suicide Rate/100,000	25.1	19.3	22.3	14.8	20.4	21	23.7	22.5	17.0	18.6	20.5
U.S. State Prison Rate/100,000	17	16	15	15	16	14	16	15	NA	NA	15.5

NA = data not yet available

FIGURE 4. SUICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006 – 2015.

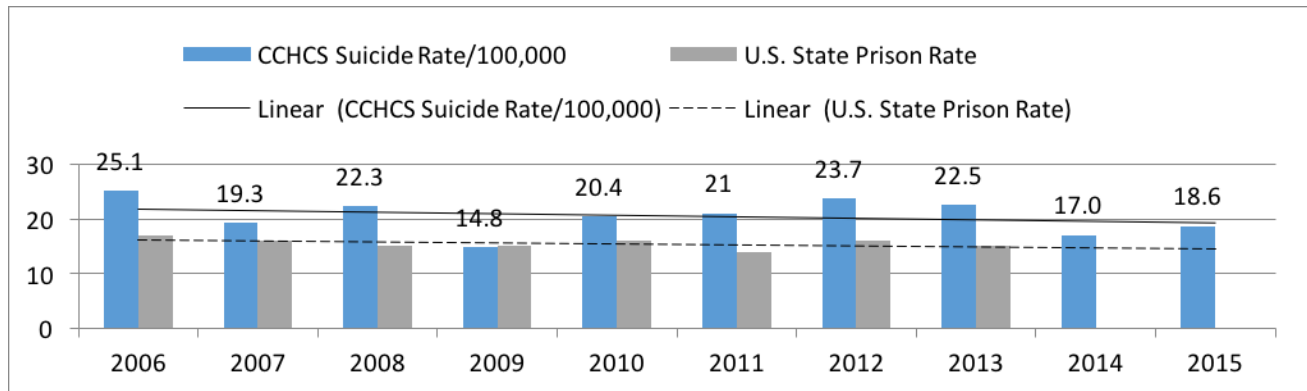


Figure 4 illustrates the trends in suicide death rates, which from 2006-2014 have averaged 20.4/100,000, 32% higher than the national average of 15.5/100,000 (US statistics available for 2006-2012). This rate may be trending downward in the past two years.

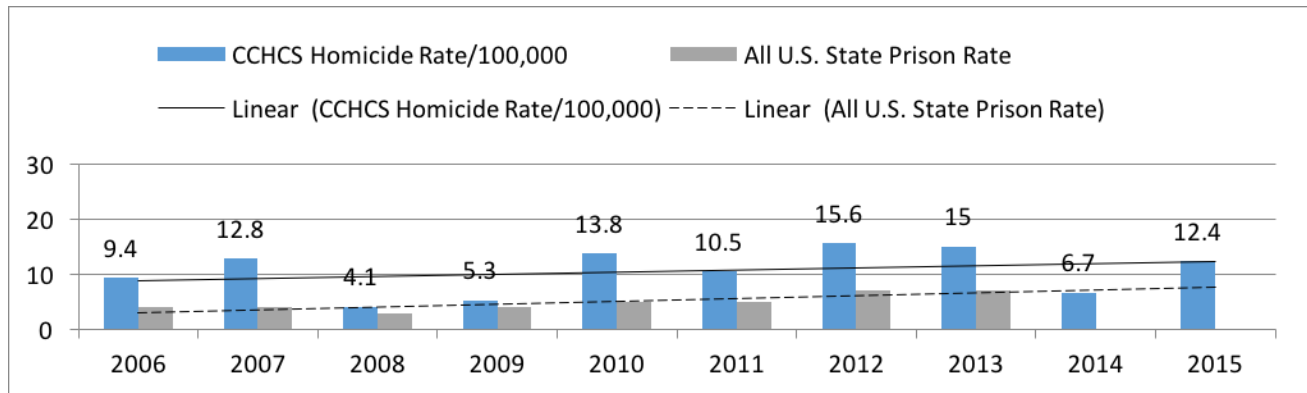
Homicides - There were sixteen deaths by homicide in 2014, 4.5 % of all CCHCS deaths – a rate of 12.4/100,000 inmates. Table 9 shows the number and rate of homicide deaths in California state prisons and nationally and Figure 5 trends these rates.

TABLE 9. NUMBERS OF HOMICIDE-RELATED DEATHS IN CALIFORNIA AND ALL U.S. STATE PRISONS, 2006-2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	AVG
Homicides	16	22	7	9	23	17	21	20	9	16	16
CCHCS Homicide Rate/100,000	9.3	12.9	4.1	5.3	13.8	10.5	15.6	15.0	6.7	12.4	10.6
U.S. State Prison Rate/100,000	4	4	3	4	5	5	7	7	NA	NA	4.9

NA = data not available

FIGURE 5. HOMICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006 – 2015.



The average homicide rate from 2006-2015 is still twice the national average homicide rate from 2006-2013 and both rates have trended slightly upward.

C. TRENDS IN CCHCS PREVENTABLE DEATHS 2006-2015

California is the only state prison system that makes a determination of the number of preventable deaths that occur each year. The process has been explained in section II of this report.

Table 10 shows the number of preventable deaths among California inmates from 2006-2015 and calculates the rate of preventable death/100,000 inmates in each year.

TABLE 10. RATES OF PREVENTABLE DEATHS AMONG CALIFORNIA INMATES, 2006-2015.

YEAR	PREVENTABLE DEATHS			INMATE POPULATION	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	40	42 total	134,929	30.4
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

Figures 6 and 7 show the continuing favorable trend in the absolute numbers of preventable deaths and corresponding preventable death rates in the CCHCS from 2006-2015. Figure 6 shows absolute numbers and figure 7 shows rates of preventable death.

FIGURE 6. NUMBER OF PREVENTABLE DEATHS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM, 2006-2015.

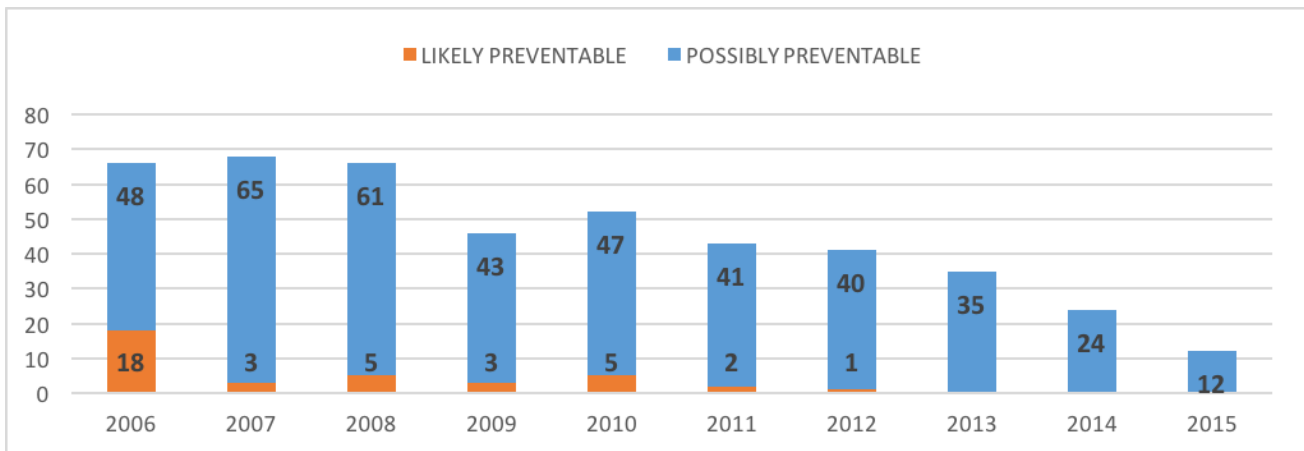
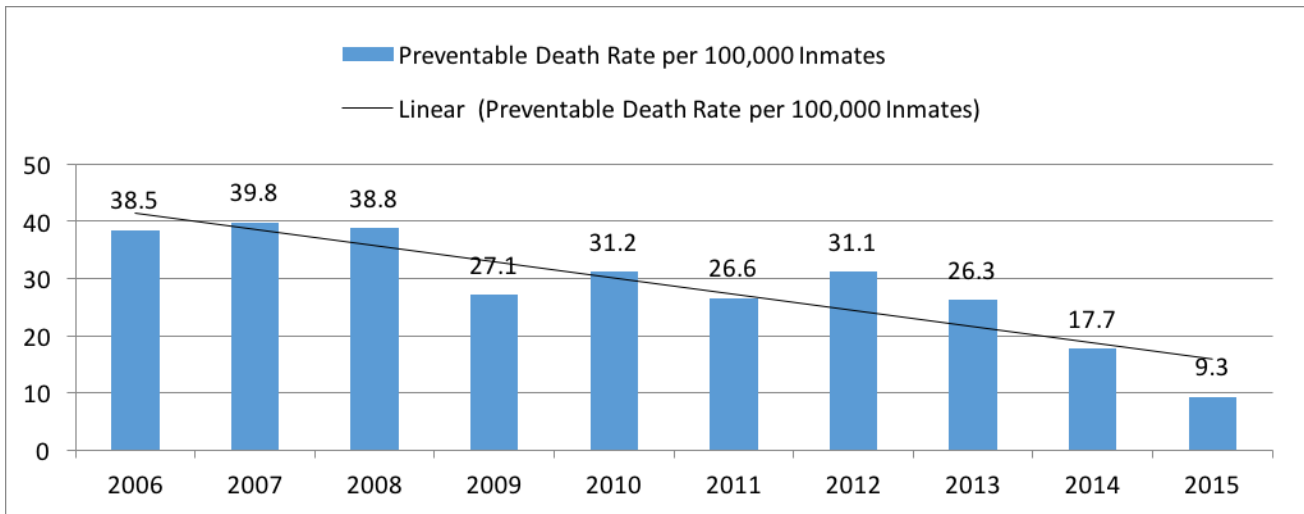


FIGURE 7. PREVENTABLE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.



In 2015, there were 12 possibly preventable deaths and no definitely preventable deaths, for a rate of 9.3/100,000. This is the lowest number of preventable deaths and the lowest preventable death rate since the inception of the receivership.

D. TRENDS IN CARE LAPSES

1. The relationship between lapses and patient complexity

Although lapses in care occur frequently in medical practice, the vast majority are without significant clinical consequence because there is a lot of redundancy built into our medical systems of care and because most primary care patients are basically healthy.

One recent study found that 58% of significantly abnormal abdominal ultrasounds ordered to screen for aortic aneurysms were not documented in the patient’s electronic medical records for over three months. (This would be a type 4 lapse in the CCHCS taxonomy – a failure to adequately pursue abnormal test results.) In this study, the median time to recognition of the abnormal report was 237 days! Yet, none of these cases resulted in a bad outcome. (Annals of Internal Medicine, 2009:151,21-27.)

The number of lapses also rises in proportion to the number of medical encounters. So patients at highest risk for experiencing care lapses are those that are older, sicker, take more medications, and/or those who have a higher volume of encounters such as patients with chronic pain, recurrent symptoms or severe mental illness.

In 2015, the 355 CCHCS patients who died were demonstrably complex.

MEDICATIONS – The 355 patients who died in 2015 were taking from 0 to 37 medications each. The average number of medications was 9.

ASSOCIATED CONDITIONS – Table 11 lists the number and type of coded conditions noted in the 355 death reviews for 2015 in addition to the primary cause of death. In all, 961 associated conditions were involved in the 355 cases. There were 16 specific conditions which were present in 10 or more cases.

TABLE 11. FREQUENCY OF ASSOCIATED CONDITIONS IN CCHCS INMATE DEATHS (EXCLUSIVE OF PRIMARY CAUSE OF DEATH), 2015.

CONDITION	NUMBER OF CASES
Hypertension	170
Hepatitis C virus (including end stage liver disease and liver cancer)	114
Diabetes mellitus	87
Severe mental illness (including schizophrenia, major depressive, schizoaffective, bipolar, borderline personality, and delusional disorders)	70
Coronary artery disease	62
Chronic obstructive pulmonary disease (emphysema)	54
Dyslipidemia	52
Benign prostatic hyperplasia	36
Gastroesophageal reflux disease	27

CONDITION	NUMBER OF CASES
Asthma	21
Congestive heart failure	18
Seizure disorder	17
Atrial fibrillation	16
Coccidioidomycosis	15
History of stroke (Cerebrovascular accident)	13
Hypothyroidism	13
Other Conditions (appearing in fewer than 10 cases each)	176
TOTAL	961

The number of cases with associated behavioral conditions is probably under-documented because the mental health system is not yet completely integrated into the medical system and the medical reviewers do not have a priority for identifying all mental health diagnoses.

In the 355 deaths in 2015, the average number of associated health conditions was 2.7.

2. The Relationship Between Number of Lapses and Preventable Deaths

Previous CCHCS reports have demonstrated the relationship between the number of lapses occurring in a single case and a resultant cascade of events which can culminate in a preventable death. This has been reinforced by the findings in these annual reviews.

Table 12 and Figure 8 compare the average number of lapses in possibly preventable cases with the number of lapses in not preventable deaths.

TABLE 12. NUMBER OF LAPSES BY CATEGORY OF PREVENTABILITY, 2015.

PREVENTABILITY	# DEATHS	# LAPSES	AVERAGE LAPSES/DEATH
Likely preventable	0	n/a	n/a
Possibly preventable	12	19	1.6
Not preventable	343	176	0.5

In 2015, as in all prior years, possibly preventable deaths experienced three times the number of lapses per case than the not preventable deaths.

FIGURE 8. AVERAGE NUMBER OF LAPSES PER CASE BY PREVENTABILITY, 2007-2015.

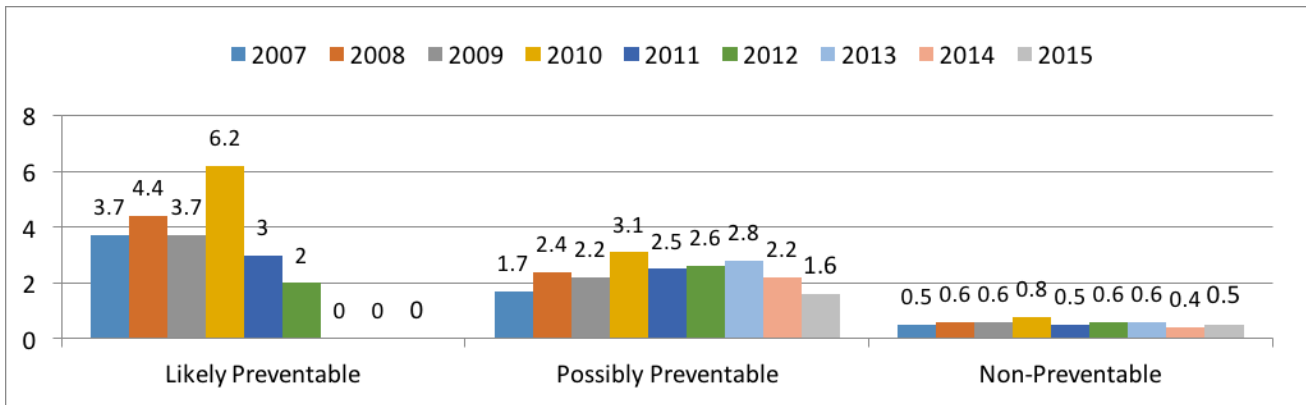
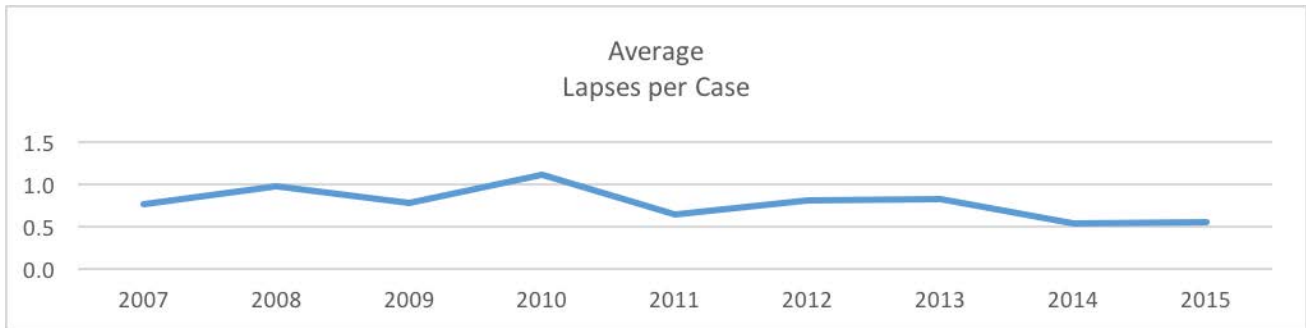


Table 13 shows the number of care lapses identified in each year and Figure 9 shows the trend in the rate of care lapses per death from 2007 - 2015.

TABLE 13. NUMBER OF LAPSES, BY PREVENTABILITY, IN CALIFORNIA CORRECTIONAL SYSTEM DEATHS, 2007-2015.

YEAR	DEFINITELY PREVENTABLE		POSSIBLY PREVENTABLE		NON-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

FIGURE 9. TREND IN ANNUAL AVERAGE OF CARE LAPSES PER DEATH, CCHCS, 2007-2015.



In the death reviews for both 2014 and 2015 there were fewer identified care lapses, resulting in a lower rate of lapse/death than in previous years.

VII. TARGETED OPPORTUNITIES FOR IMPROVEMENT

A. THE PRIMARY CARE MODEL 2009-2015 AND PREVENTABLE DEATHS

In 2007, CCHCS identified the Primary Care Model as a major strategy for ensuring continuous, integrated and coordinated care, especially for those patients who have chronic, complex health conditions. Beginning in 2009, primary care teams were installed in all California prisons, creating a higher level of accountability for patient health outcomes. The primary care teams are expected to practice with high standards, to advocate for their patients, to use evidence based guidelines in the management of chronic medical conditions, to promote active patient involvement and self management, to be responsible for timely access to necessary care, and to follow and direct their patients’ care before and after care transitions when they leave the prison for emergencies, hospitalizations, or specialist visits.

The CCHCS death reviewers look for an identifiable primary care physician guiding the care for each patient. Table 14 and Figure 10 show the number and percentage of cases in which a primary care physician could be identified by the reviewer.

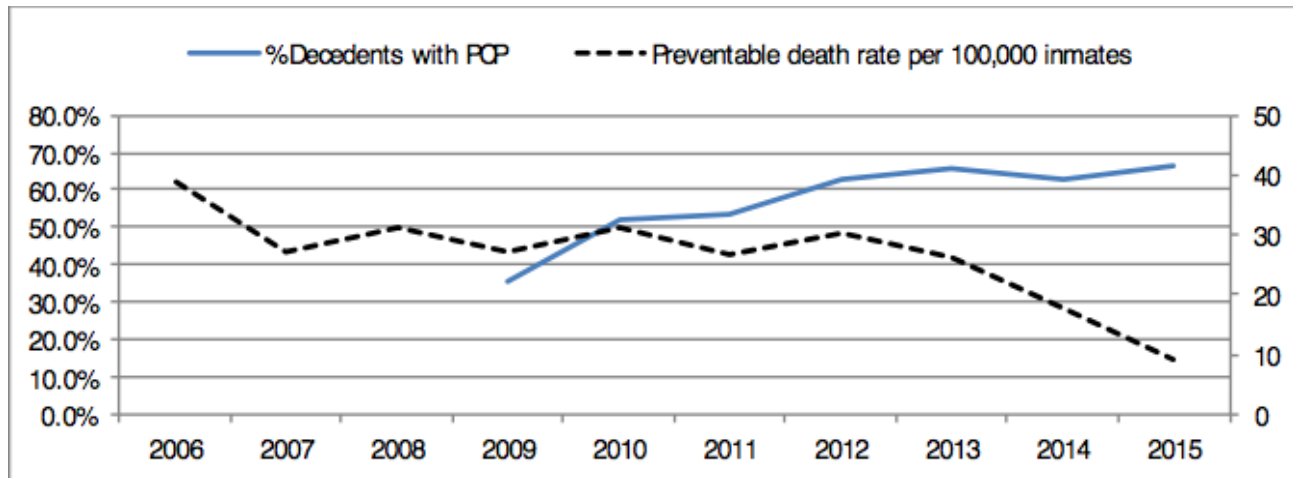
TABLE 14. IDENTIFIABLE PRIMARY CARE IN CALIFORNIA INMATE DEATH CASES, 2009 – 2015.

YEAR	CASES WITH IDENTIFIED PRIMARY CARE PHYSICIAN	TOTAL DEATHS	% OF TOTAL	PREVENTABLE DEATH RATE PER 100,000 INMATES
2006	NA	424	NA	38.5
2007	NA	395	NA	39.8
2008	NA	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	62.70%	30.4
2013	240	366	65.6%	26.3
2014	200	319	62.7%	17.7
2015	237	355	66.8%	9.3

NA = data not available

Figure 10 tracks the percentage of deaths with an identifiable primary care physician and compares these rates with the rates of preventable death in the CCHCS during the same years.

FIGURE 10. PERCENTAGE OF DEATHS IN THE CCHCS WITH AN IDENTIFIED PRIMARY CARE PHYSICIAN, AND CORRESPONDING RATES OF PREVENTABLE DEATH, 2009-2015.



Since the initial systemwide implementation of the primary care model, the penetration of primary care in the prisons has nearly doubled, from 36% in 2009 to 67% in 2015. During the same period, the preventable death rate dropped by two thirds, from 27-30% to below 10%.

In October 2015, the CCHCS adopted the Complete Care Model, which is a further refinement of the Primary Care Model and should result in even greater systemwide emphasis on system integration and continuous data-driven improvement using principles of population health management.

B. TRENDS IN SPECIFIC CAUSES OF PREVENTABLE DEATH

Beginning in 2013, the CCHCS targeted specific action in five areas of preventable death: cardiovascular disease, end stage liver disease, cancer, drug overdose, and infection by the fungus *coccidioides immitis*, or “Valley Fever.” This section tracks results in these targeted areas.

Table 15 shows the mortality rates from preventable deaths from cardiovascular disease, end stage liver disease, and other cancers.

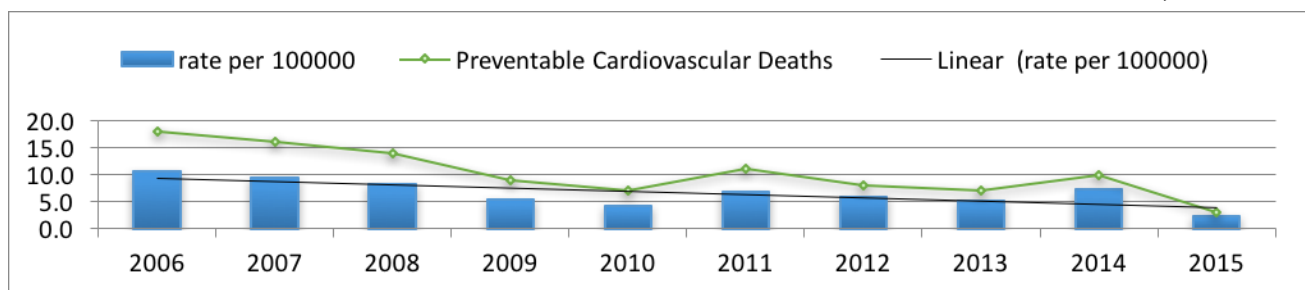
TABLE 15. NUMBERS AND RATES OF PREVENTABLE DEATHS FROM CARDIOVASCULAR, END STAGE LIVER DISEASE, AND CANCER IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.

YEAR	PREVENTABLE CARDIOVASCULAR DEATHS		PREVENTABLE ESLD DEATHS		PREVENTABLE 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

1. Preventable Cardiovascular Death Rates

Figure 11 shows reduction in preventable cardiovascular disease over the past nine years.

FIGURE 11. PREVENTABLE CARDIOVASCULAR DEATHS - NUMBER OF PREVENTABLE CASES AND RATES OF DEATH IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.

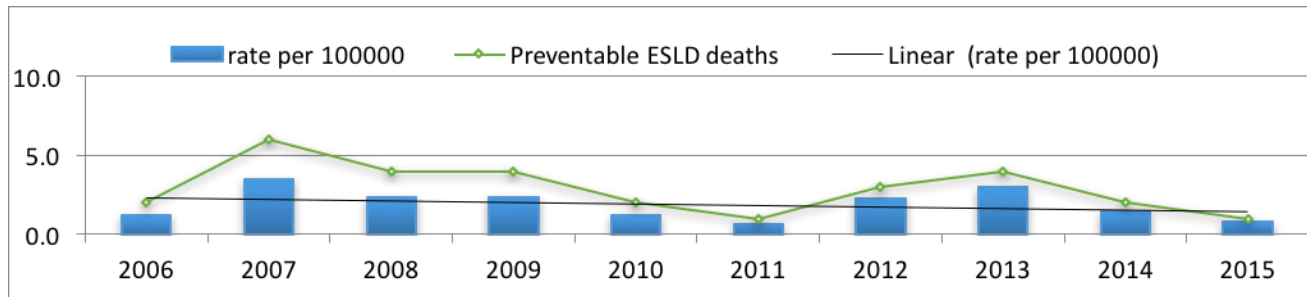


The rate of preventable cardiovascular death in 2015 is one quarter the rate at the beginning of the Receivership. These gains can be attributed to the continued emphasis on recognition of “red flag” symptoms of heart attack (reduction of type 1 lapses) and on better management of chronic heart disease and identification and treatment of risk factors (adherence to care guidelines).

2. Preventable End Stage Liver Disease Death Rates

Guidelines for the management of chronic liver disease were first developed in 2008 and have undergone periodic review and updating because of advancements in the pharmacologic treatment of chronic hepatitis C viral infection, and the need for widespread education on screening for early hepatic cancers in these patients. The number of preventable deaths from end stage liver disease (including liver cancer) remain relatively small and there has been no significant trend in preventable ESLD death rates (Figure 12).

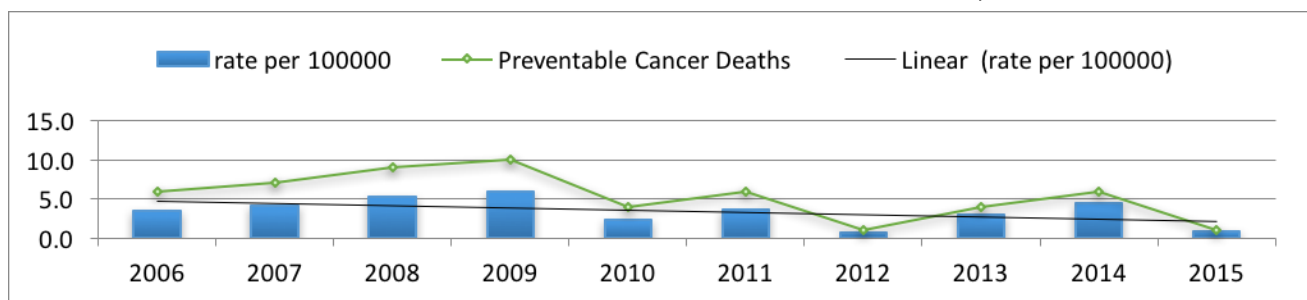
FIGURE 12. PREVENTABLE END STAGE LIVER DISEASE DEATHS - NUMBER OF PREVENTABLE CASES AND RATES OF DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.



3. Preventable Cancer Death Rates (excluding liver cancer)

Figure 13 shows trended death rates from preventable cancer. There has been a slight downward trend in the rate of death since 2009. This can be attributed to improved rates of routine cancer screening and /or improvements in chronic cancer care.

FIGURE 13. PREVENTABLE CANCER DEATHS - NUMBER OF PREVENTABLE CASES AND RATES OF DEATH IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.



4. Drug Overdose Death Rates

The mitigation of drug overdoses was addressed in the CCHCS 2010 Performance Improvement Plan with the creation of pain management and narcotic prescription guidelines, and education to prevent drug diversion and to limit the unnecessary prescription of opiates.

TABLE 16. NUMBERS AND RATES OF DRUG OVERDOSE-RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM AND IN ALL U.S. PRISONS, 2006-2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	AVG
CCHCS drug overdoses	17	9	19	14	23	12	15	24	19	19	17.1
CCHCS rate/100,000	9.9	5.3	11.2	8.3	13.8	7.4	11.1	18.0	14.1	14.7	11.5
US State Prison Rate	4	3	4	4	3	4	3	4	NA	NA	3.6

NA=Data not available

FIGURE 14. DRUG OVERDOSE DEATH RATES IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM 2006-2015.

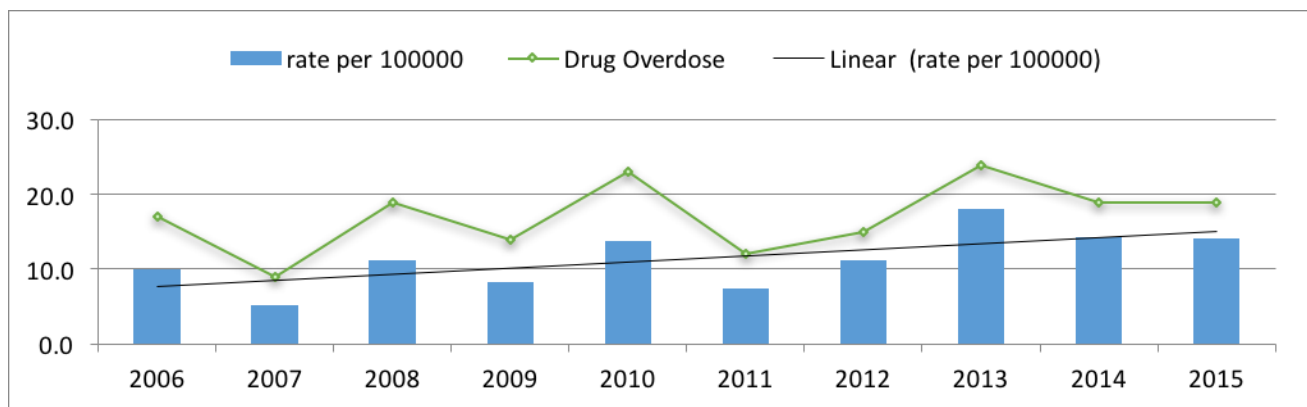


Table 16 and Figure 14 depict the numbers and rates of death from drug overdose from 2006-2015. There has been an average of 17.1 deaths per year from drug overdose from 2006-2015. Despite the Performance Improvement plan mentioned above, there has been a disappointing increase in the rate of drug overdose death, which remains three times higher than the national average for state prisons. The prevention of drug overdose deaths in the United States general population has been a recent subject of great interest and concern and there have been significant efforts to educate the public and physicians, and to seek ways to better manage the opioid addiction epidemic. The use of naloxone prescriptions (an overdose reversing drug) for all patients with chronic opioid use, the avoidance of prescribing of opiates for non-cancer chronic pain, and the use of buprenorphine in the treatment of addicted patients are all being advocated nationally. The naloxone and buprenorphine strategies have not yet made their way into the Pain Management guidelines of the CCHCS and should be considered for incorporation in any upcoming revision.

5. Coccidioidomycosis Death Rates

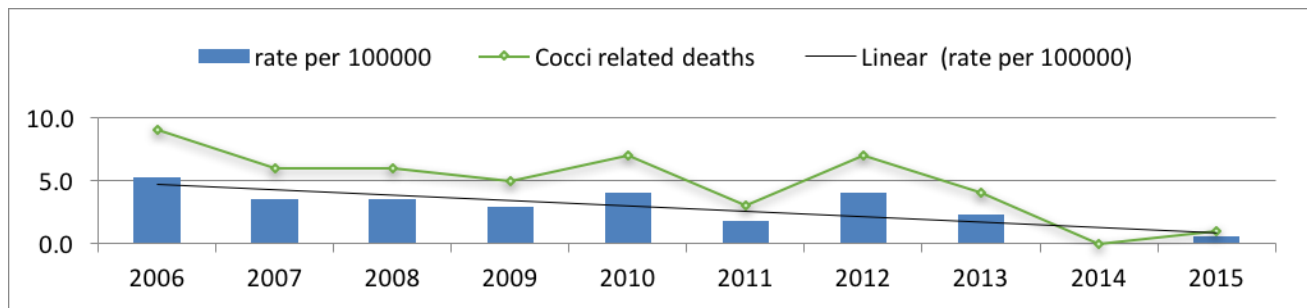
Coccidioidomycosis immitis is a fungal disease transmitted in dust borne spores in the Central California Valley, where eight California prisons are located. A Federal court order in September 2013 mandated the restricting of high risk patients from being housed in these prisons. Coupled with a system wide emphasis on early recognition and treatment for this disease, this has been effective in greatly reducing the number of cocci deaths. Table 17 and

Figure 15 show the effectiveness of this program, which required the transfers of thousands of at risk patients. There was only one (not preventable) death from pulmonary coccidioidomycosis in 2015, and there were none in 2014.

TABLE 17. COCCIDIOIDOMYCOSIS RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cocci related deaths	9	6	6	5	7	3	7	4	0	1

FIGURE 15. COCCIDIOIDOMYCOSIS RELATED DEATHS AND DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2015.



C. THE CALIFORNIA HEALTH CARE FACILITY.

The newest California prison, the California Health Care Facility, opened in 2013. This is an Intermediate Institution prison designated for the care of more complex, high risk patients – those with high medical acuity, high nursing acuity and specialized nursing needs, who require proximity to tertiary care resources. (All renal dialysis patients, for example, are housed there.) As of December 2015, there were 2,194 inmates housed at CHCF. This specialized facility is staffed by appropriately trained physicians and other healthcare personnel.

D. THE 2013 - 2015 PERFORMANCE IMPROVEMENT PLAN

1. The CCHCS Statewide Performance Improvement Plan - August 2013.

The priority improvement areas were in the areas of consistent care teams, population and care management, improved scheduling and access to care, medication management, health information management, and continuous evaluation and improvement.

- a. Improving the care given to “high risk patients” focused on integrating critical primary care model elements with the identification, classification and appropriate placement of these patients in Intermediate Institutions (settings designed for more specialized care such as the California Health Care Facility described above).
- b. Identification and management of patients with polypharmacy (patients receiving more than 10 medications and/or two or more psychotropic medications) and use of a polypharmacy registry to improve

their care coordination. (The majority of the patients who died in 2015 would be included in such a registry.)

- c. A standardized Medical Scheduling and Tracking System to increase access and decrease variability.
- d. Identification and dissemination of best practices.
- e. Use of a Master Patient Registry and subregistries such as for chronic hepatitis C, gender dysphoria and HIV infected patients to track processes for patients who share common conditions and to incorporate population health management strategies into the CCHCS.
- f. A statewide patient safety program including training and adoption of a culture of patient safety, root cause analysis training, a health care incident reporting system and regular patient safety reports.

2. CCHCS Care Guides

An integral part of the process for improving care in the CCHCS is the development, distribution and training on Care Guides.

One of the early initiatives of the Receiver was the development of the guideline for management of patients with hepatitis C virus infection. There are now two relevant CCHCS care guides - one for hepatitis C which focuses on the identification of infected patients, monitoring for complications, and screening for treatment candidates. A separate care guide directs the management of patients with end stage liver disease (cirrhosis), the final consequence of chronic hepatitis C infection. This guide directs clinicians in the best way to manage the manifold complications of cirrhosis (ascites, esophageal venous varices, portal hypertension, spontaneous bacterial peritonitis, and liver cancer).

The care guides are evidence based tools for physicians and care teams. Most of the high risk, high frequency conditions are covered by care guides. Front line providers and nursing staff are expected to use these tools to guide the day to day management of their patients. Each care guide is organized into three major sections:

- A Clinical Summary section which includes goals, diagnostic criteria, alerts for special clinical situations, treatment options, and monitoring recommendations;
- A Decision Support Section, which contains tools for real-time management of these patients according to the best evidence based practices;
- A Self Management section, with handouts for patients to enhance their understanding of their disease and recommendations and rationales for self management.

Twenty-two care guides are currently in use, accessible online (cphcs.ca.gov/careguides.aspx) and referenced when standards of care are determined in death review cases. These care guides cover Anticoagulation*, Asthma, Chest Pain, Coccidioidomycosis, Chronic Obstructive Pulmonary Disease, Cognitive Impairment/Dementia, Diabetes, Dyslipidemia (formerly hyperlipidemia)*, End Stage Liver Disease (cirrhosis)*, Gender Dysphoria*, Hepatitis C*, HIV*, Hunger Strike (Fasting and Re-feeding), Hypertension, Major Depressive Disorder**, Pain

Management, Palliative Care, Schizophrenia**, Seizure Disorders, Skin and Soft Tissue Infections, Tuberculosis diagnosis and isolation* , and Wound and Skin Ulcer Management. *revised 2015; **new 2015

Taken together, these care guides could be models for any system of healthcare.

3. The *Clinical Spotlight*

Used in targeted provider education, the *Clinical Spotlight* is a quarterly publication developed by the Clinical Support Unit and distributed to all clinicians in order to highlight brief clinical practice communications. The two new Spotlights for 2015 were on onychomycosis and influenza.

E. INSTALLATION OF AN ELECTRONIC MEDICAL RECORD

The CCHCS continues to be burdened by a paper medical record system with attendant inefficiencies in recording, retrieval, and sharing of critical medical information both within and outside of the institutions. Any complex system of healthcare wrestles with inherent complexity, inefficiency and the risk of human error. Installation of the Cerner electronic medical record system began in October 2015 with four pilot institutions. System wide installation should improve documentation, reporting and health information exchange with resulting gains in quality.

F. DRC REFERRALS TO PEER REVIEW COMMITTEES

The DRC also makes referrals to professional Peer Review Committees for individual lapses, to the Mental Health Department, to the Quality Management and Utilization Management Committees, to specific regional and institutional CEOs, to the Emergency Management Committee and to other groups dealing with Ethics, Patient Safety, and Adverse Sentinel Events.

In 2015, as a result of the death review process, there were 38 referrals to Medical Peer Review, 242 referrals to the Nursing Professional Practice Council, 4 referrals to Mental Health Peer Review, and 3 referrals to Patient Safety.

In the first two years of the Federal Receivership, there were at least two dozen physician sanctions which resulted from these referrals, most involving suspension or revocation of privileges.

In 2015, there were NO sanctions (modification, suspension, restriction or revocation of privileges, or any proposed final actions including letters of admonition, warning, reprimand, or censure) as a result of any referrals.

VIII. CONCLUSIONS

The history of the Receivership of the California Correctional system is one of evolution - from its initial years of identification and sanction of unsafe practicing physicians to its current emphasis on developing and maintaining a culture of quality improvement and patient safety with an emphasis on systemic problem identification and improvement. The system was once a reactive system which provided largely episodic care. Now there is a proactive health care system with an emphasis on a primary care model of prevention, continuity and coordination of care.

This tenth annual analysis of death reviews in the California Correctional Healthcare System has highlighted continual improvements in outcomes as measured by impressive reductions in the number and rate of care lapses, further significant reductions in the number and rate of possibly preventable deaths and the disappearance of definitely preventable deaths. In 2006, the first year of the Receivership there were 18 definitely preventable deaths and 48 possibly preventable deaths. In 2015, there were no definitely preventable deaths and 12 possibly preventable deaths.

Of late, there has been heightened interest in exploring the problem of medical error as one of the leading causes of death in the world. In a 2016 article in the *British Journal of Medicine* (BMJ 2016:353 - [doi:10.1136/bmj.i2139](https://doi.org/10.1136/bmj.i2139)), the authors note that the annual list of common causes of death in the United States and elsewhere, does not include “medical error” because causes of death are entered in death certificates by using the coding system of the International Classification of Diseases, which does not have a code for causes of death involving communication lapses, diagnostic errors, poor judgment, inadequate skill, and other human and system factors. They estimate that deaths due to medical error in all of these forms might rank as the third leading cause of death, just behind heart disease and cancer.

The ten-year experience of the CCHCS as reported in these annual death reviews shows that preventable death, if broadly defined as death possibly or definitely caused by medical error, would have ranked #3 in cause of death in 2006 (15.5% of all deaths), and in 2015 would have ranked #9 (3.4% of all deaths). This CCHCS project is a singular contemporary analysis showing how a systematic retrospective review of all deaths using a taxonomy for classifying medical error, can identify opportunities to reduce the incidence of preventable death.

The mandated reduction in the California prison population took place largely between 2010 and 2012 (Table 10) and preceded but did not coincide with the dramatic reduction in preventable deaths which occurred in 2014 and 2015.

Specific areas of concern remain, and these include the continued high frequency of drug overdoses and the need for better integration of the medical and mental health systems.

Going forward, the CCHCS in October 2015 adopted a policy for further reinforcing the foundation for medical care delivery. The Complete Care Model is based on a well-known industry standard, the Patient Centered Medical Home (PCMH). This model redesigns medical care as high performing primary care practices. It incorporates principles of continuous, comprehensive, coordinated, accessible and patient centered care. It uses population management, with paneling of all patients into physician led teams, with daily huddles designed to identify care gaps using evidence-based guidelines for chronic conditions. It monitors performance using quality dashboards which drive continuous improvement. Much of this work has already been done in the CCHCS and the primary care model was described briefly in section VII-A of this report.

The PCMH is a model of care toward which much of the nation’s best health care systems are striving. It has been adopted by best practice organizations like the Kaiser system and Brigham and Women’s Hospital. There is an established accreditation process through the National Committee for Quality Assurance, with proven tools describing how to do the hard work to redesign systems and create a culture of continuous improvement. It makes use of proven principles of quality improvement developed by internationally recognized organizations like the Institute for Healthcare Improvement.

The adoption of the Complete Care Model is a significant commitment to innovative continuous improvement and should culminate in an even more integrated and safer system of prison health care.