

ANALYSIS OF 2019 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 2005 after a ruling that found California in violation of prisoner’s rights under the Eighth amendment to the constitution. Although parts of the California prison system have been remanded to State responsibility, the Receiver continues oversight over the medical care in California’s 35 state prisons.

This is the fourteenth annual analysis of inmate mortality reviews in the CCHCS. Following the format of prior years’ analyses, this report will describe the mortality review process, and the classification of the causes of deaths in the prison system.

It will also examine trends in the causes of mortality and will go on to describe the opportunities for improvement which were noted by the statewide mortality review committee. Overall prison mortality rates, and trends in specific causes of mortality in the prisons, will be discussed. The general categories of “unexpected” and “expected” deaths will be analyzed, and the opportunities for improvement will be categorized and analyzed.

This and all prior mortality review analyses can be accessed at <https://cchcs.ca.gov/reports/>

The vision and mission statements of the Receivership, as articulated in the Receiver’s [Triannual Reports](#) throughout 2019, are:

Vision

As soon as practicable, provide constitutionally adequate medical care to patients of the California Department of Corrections and Rehabilitation within a delivery system the State can successfully manage and sustain.

Mission

Reduce avoidable morbidity and mortality and protect public health by providing patients timely access to safe, effective and efficient medical care, and integrate the delivery of medical care with mental health, dental and disability programs.

II. MORTALITY REVIEW PROCESS

Before 2018, the mortality reviews sought to identify patterns in lapses in care, particularly those that might have contributed to a patient’s death. Each death was classified as preventable, possibly preventable or not preventable. A major purpose of the death review process was to reduce the occurrence of “preventable” death. As was noted in prior analyses, this process had major limitations in that there were no established criteria for attribution of preventability. For example, a death from sudden cardiac arrest might have been called “possibly preventable” because of a failure of clinicians to evaluate chest pain in the days or weeks prior to the patient’s death but another death from the same cause might have been called “not preventable”, because in

the judgment of the reviewer, even a proper evaluation of these symptoms might NOT have prevented the death.

A “taxonomy of lapses” was used from 2007–2017 to track both individual and system departures from the standard of care. This taxonomy was a precursor to the current practice of identifying “opportunities for improvement”.

In December 2017, the Receiver asked for a formal assessment of the CCHCS Mortality Review Policy and Practice. This assessment, conducted by faculty at the Criminal Justice and Health program at the University of California at San Francisco (UCSF), noted that the evolving standard in mortality review represents a shift away from a person centered (individual lapses) approach toward one of systemic improvement. Following the completion and submission of this assessment, the Receiver directed that a series of changes in the Death Review Process occur.

Beginning in 2018, the Mortality Review Unit and the Quality Management division were directed to:

- Eliminate the “preventable death” finding and replace it with the findings of “expected or unexpected” death with or without “opportunities for improvement (OFI)”;
- Assess the mortality review process by tracking and reporting on opportunities for improvement (OFI) generated by the review; and
- Utilize identified OFI to design and implement statewide system improvements.

When an inmate death occurs, an initial death report is submitted by the institution where the death occurred via the Electronic Health Record System (EHRS) to headquarters (HQ) mortality review staff by 1200 hours on the business day following the date of death. The institution medical and nursing management then complete a local death summary within five calendar days. This initial summary 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 death.

The HQ mortality review staff assigns each death to a physician reviewer and a nurse reviewer. An extensive review of the patient’s clinical records which are relevant to the history of the patient’s cause of death is conducted. This includes, at a minimum, the review of clinical care dating back six months prior to the death; however, reviewers may include older records if relevant to determine the trajectory of the terminal event. The quality of care experienced by the patient 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 and nationally recognized standards of care, 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/or adherence to a primary or complete 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.

Each mortality review is presented at the HQ Mortality Review Committee (MRC). The MRC membership is appointed by the Statewide Deputy Directors of Medical and Nursing Services. The MRC consists of three

physicians, three nurses, one mental health professional, one custody representative, and one (non-voting) member of the Quality Management staff. The MRC is co-chaired by a physician and nurse executive member. Following discussion of the case, the DRC votes to attribute cause of death and assigns the case to one of four categories: expected or unexpected death, with or without opportunity(ies) for improvement.

In addition to Opportunities for Improvement, the MRC also identifies Potential Quality Issues, or PQI, which refers to incidents with potential quality implication that occur outside the CCHCS prison system, in one of the Healthcare Provider Networks that contract with the state to provide hospital care or specialist care that is not otherwise available within the 35 prison facilities.

The final mortality report is sent to Institution (prison) and Regional health care leadership and findings are entered in the Electronic Health Care Incident Reporting (eHCIR) system.

III. DEFINITIONS

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

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

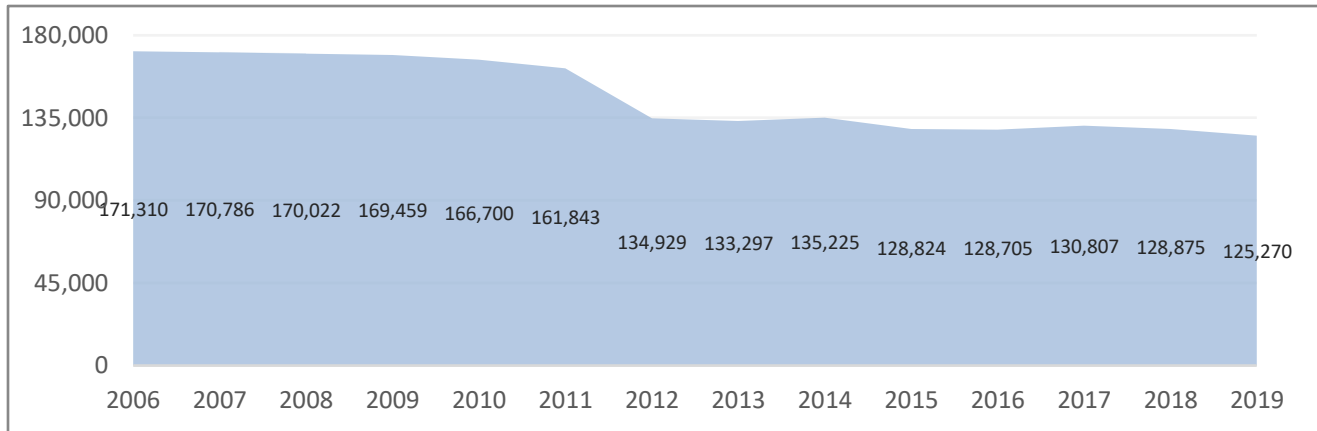
Opportunity for Improvement: An occasion or situation from which it is possible to improve systems or processes related to the delivery of health care.

Potential Quality Issue: A health care incident, regardless of severity, which occurs during the course of treatment by a Healthcare Provider Network facility or provider and requires submission of a written Potential Quality Issue referral.

IV. THE CALIFORNIA STATE PRISON POPULATION IN 2019

In 2006, when the Receivership was created, the California prison population numbered 171,310 (average of prison population in custody at the end of each calendar quarter). Court mandated efforts to reduce the population in response to prison overcrowding resulted in a significant decrease in the number of prisoners in custody, as shown in Figure 1. In calendar year 2019, the average prison population at the end of each quarter numbered 125,270.

FIGURE 1. CALIFORNIA PRISON POPULATION (AVERAGES OF QUARTER-END NUMBERS), 2006–2019.



The following discussion uses the prison population as of June 30, 2019 (125,472) as the reference point, since the prison statistics office uses this population baseline in its most recent reports. The demographic statistics are sourced from the [Offender Data Points](#) report published in October 2020 by the California Department of Corrections and Rehabilitation (CDCR) Office of Research.

Age – The average age of the California prison population in June 2019 (the latest month for which there are statistics) was 40.1 years, with males averaging 40.2 and females 38.1 years of age. The majority of prisoners are in the age ranges from 18–45. The 83,085 individuals under 45 represent nearly two thirds (66.2%) of the total prison population. The prison population has gradually increased in average age, with prisoners older than 55 comprising 16% of the CCHCS population in 2019, compared with 12.5% in 2015. ([Offender Data Points](#), Tables 13.15 and 13.16.)

Sex – In June 2019, there were 119,781 males and 5,691 females in custody. Males represented 95.5% and females 4.5% of the prison population. ([Offender Data Points](#), Table 13.1.)

Ethnicity – The In-custody population as of June 2019 was 28.2% Black (35,483 inmates), 44.2% Hispanic (55,496), 20.9% white (26,235), with all other ethnicities making up the remaining 6.6% (8,258). ([Offender Data Points](#), Table 13.13)

By comparison, the [US Census Bureau estimated](#) the 2019 California general population to be 6.5% Black, 39.4% Hispanic, 36.5% white, 15.5% Asian and 4.0% multiple races.

These statistics call out the overrepresentation of California’s Black and Hispanic populations in its prison system. Black overrepresentation is the most significant, as this group comprises 6.5% of the general population and 28.2% of inmates. Hispanics, comprising 39.4% of the general population and 44.2% of inmates, are also disproportionately represented.

V. STUDY FINDINGS

A. Number and Causes of Inmate Death

There were 399 inmate deaths in 2019. Of these, 391 occurred in males (98%) and 8 in females (2%). The causes of inmate death in 2019 are detailed in Table 1.

TABLE 1. CAUSES OF DEATH AMONG ALL CALIFORNIA INMATES, 2019.

NUMBER OF CASES	CATEGORY AND CAUSES OF DEATH
89	Cancer 27 lung; 11 colorectal; 5 kidney; 5 pancreas; 5 prostate; 5 unknown primary; 4 multiple myeloma; 3 gall bladder; 3 leukemia (2 acute myeloid, 1 chronic myeloid) ; 2 bladder; 2 brain; 2 esophagus; 2 head & neck; 2 lymphoma (1 b-cell); 1 breast; 1 liver (not ESLD-related); 1 mesothelioma; 1 myelodysplasia; 1 oropharynx; 1 pheochromocytoma; 1 small intestine; 1 solitary fibrous tumor; 1 stomach; 1 testis; 1 tonsil
64	Drug Overdose 38 single opiate; 9 amphetamine; 8 opiate + amphetamine; 4 mixed opiate; 3 opiate + alcohol; 1 opiate + nortriptyline; 1 calcium channel blocker
52	Cardiovascular Disease 28 sudden cardiac arrest; 12 congestive heart failure; 7 acute myocardial infarction; 2 cardiac arrhythmia; 1 abdominal aortic aneurysm; 1 embolic stroke; 1 sudden cardiac arrest/acute myocardial infarction
45	Advanced (End Stage) Liver Disease (ESLD) 32 with liver cancer (hepatocellular carcinoma, or HCC); 13 end stage liver disease without HCC
38	Suicide
26	Infectious Disease 11 pneumonia (1 fungal); 7 sepsis; 4 endocarditis; 2 influenza A; 1 disseminated coccidioidomycosis; 1 myocarditis, viral
22	Homicide
18	Pulmonary 5 chronic obstructive pulmonary disease; 4 aspiration pneumonia; 4 pulmonary fibrosis; 1 asthma/COPD; 1 interstitial lung disease; 1 post-procedure hemorrhage; 1 sarcoidosis; 1 spontaneous pneumothorax
10	Neurological Disease 5 dementia; 2 Parkinson disease; 1 amyotrophic lateral sclerosis; 1 seizure disorder; 1 subdural hematoma
9	Gastrointestinal Disease 2 upper gastrointestinal hemorrhage; 1 large intestine volvulus; 1 bowel obstruction; 1 esophageal perforation; 1 incarcerated (inguinal) hernia; 1 perforated diverticulum; 1 sepsis (post-op complication); 1 shock, hemorrhagic

NUMBER OF CASES	CATEGORY AND CAUSES OF DEATH
7	Accidental Injury 1 accidental electrocution; 1 accidental gastric perforation; 1 alcohol intoxication; 1 bowel perforation; 1 intracranial hemorrhage; 1 acute aspiration; 1 serotonin syndrome
5	Cerebrovascular Disease 5 stroke (3 ischemic; 2 hemorrhagic)
4	Circulatory System 2 peripheral vascular disease; 1 pulmonary embolism; 1 shock, hemorrhagic
4	Endocrine/Metabolic/Nutrition/Immunity 2 obesity hypoventilation syndrome, 1 congenital IgG deficiency; 1 diabetes mellitus
3	Renal Disease 3 end stage renal disease (on hemodialysis)
1	Adverse Medication Reaction 1 acute hepatic failure caused by medication
1	Autoimmune 1 dermatomyositis
1	HIV/AIDS
399	Grand Total

As in all previous years of this analysis, cancer was the leading cause of death (89 cases). Of these, cancers of the lung (27 cases) and colorectal cancer (11 cases) were the most frequent, followed by cancers of the kidney, pancreas, prostate, and cancer of unknown primary site (5 cases each). Although liver cancer accounted for 33 cases, 32 of these were counted as manifestations of chronic liver disease because they were known to arise as a consequence of the chronic liver inflammation and scarring seen in cirrhosis of the liver.

Drug overdose was the second leading cause of death (64 cases).

The third leading cause of death was cardiovascular disease (53 cases). Sudden cardiac arrest (28 cases), congestive heart failure (12 cases), and acute myocardial infarction (7 cases) together amounted for nearly 90% of the deaths in this category.

The fourth leading cause was chronic liver disease (45 cases), of which 32 were simultaneously affected by liver cancer.

Suicide was the fifth most frequent cause of death in 2019 (38 cases).

The sixth leading cause of death was infectious disease (26 cases), including 10 cases of pneumonia. This was followed by homicide (22 cases), pulmonary disease excluding pneumonia (19 cases), and chronic neurologic disease (10 cases).

Table 2 compares the top causes of death among California inmates, from 2006 to 2019. This shows that in 2019, although cancer remained the top cause of death in the incarcerated, drug overdose replaced cardiovascular disease as the second most frequent cause of death. Chronic or end stage liver disease including HCC remained fourth, but suicide moved up to fifth, followed by infectious diseases, homicide, chronic pulmonary disease, and chronic neurologic diseases. Not shown in the table are gastrointestinal disorders (tenth), accidental injuries (eleventh), and cerebrovascular diseases (twelfth).

TABLE 2. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2006–2019.

YEAR	RANK								
	1	2	3	4	5	6	7	8	9
2019	Cancer	Drug Overdose	Cardio-vascular Disease	Advanced Liver Disease*	Suicide	Infectious Disease**	Homicide	Pulmonary	Neurological Disease
2018	Cancer	Cardio-vascular Disease	Drug Overdose	End Stage Liver Disease*	Infectious Disease**	(tied) Suicide, Homicide		Pulmonary	Circulatory System
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
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	

YEAR	RANK								
	1	2	3	4	5	6	7	8	9
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.

The next table, Table 3, takes the top causes of death among California prison inmates in 2019 and compares the death rates to those for California males over the age of 25 in 2018, the latest year for which such figures are available from the CDC. These two populations are dissimilar in that California inmates may be younger than age 25 and the proportions of inmates in older categories are not strictly comparable to that of the general population. Since females comprise only 2% of California inmate deaths, they are also excluded from this analysis. Notwithstanding these caveats, some interesting comparisons can be seen.

Cancer, cardiovascular disease and advanced liver disease are the top three causes of death from chronic disease processes in the California state prisons. By contrast, cardiovascular disease and cancer death rates are much higher in the general population and chronic liver disease death rates are much lower. Cerebrovascular disease (stroke), the third most common intrinsic disease process in the general population was much more frequent than in the prison population.

Drug overdose represents the second most common cause of death in the prison population with a rate of 51/100,000. This rate is almost twice the frequency in the general California male population, which is 26.9/100,000. (In the CDC data, unintentional injuries include all drug overdoses as well as vehicular accidents; a subcategory more comparable to CCHCS drug overdoses was defined.)

Suicide was the fifth most common cause of death in the prisons, while it was tenth most common in the civilian population. But the rate of suicide in prison was 30.3, comparable to the rate in the civilian population of 23.4.

Homicide in the CCHCS (17.6) was about twice as frequent as homicide in the general population (8.5).

TABLE 3. TOP CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2019, AND CALIFORNIA MALES, 2018.

California State Prison Inmates Top 15 Causes	2019 Rate per 100,000	California Males age 25+ Top 15 Causes*	2018 Rate per 100,000
Cancer	71.0	Diseases of heart (I00-I09,I11,I13,I20-I51)	260.3
Drug Overdose	51.1	Cancer -Malignant neoplasms (C00-C97)	236.1
Cardiovascular Disease	41.5	Accidents (unintentional injuries) (V01-X59,Y85-Y86)	65.3
		Drug Poisonings and other non-suicidal or homicidal drug-related causes	26.9
Liver Disease (incl. HCC)	35.9	Cerebrovascular diseases (I60-I69)	54.1
Suicide	30.3	Chronic lower respiratory diseases (J40-J47)	49.1
Infectious Disease	20.8	Alzheimer disease (G30)	41.8
Homicide	17.6	Diabetes mellitus (E10-E14)	40.1
Pulmonary	14.4	Influenza and pneumonia (J09-J18)	26.5
Neurological Disease	8.0	Chronic liver disease and cirrhosis (K70,K73-K74)	26.5
Gastrointestinal Disease	7.2	Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	23.4
Accidental Injury	5.6	Essential hypertension and hypertensive renal disease (I10,I12,I15)	18.9
Cerebrovascular Disease	4.0	Parkinson disease (G20-G21)	16.5
Circulatory System	3.2	Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	16.2
Endocrine/Metabolic/Nutrition/ Immunity	3.2	Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	8.5
Renal Disease	2.4	Pneumonitis due to solids and liquids (J69)	6.7

*Centers for Disease Control and Prevention, National Center for Health Statistics. *Underlying Cause of Death 1999-2018 on CDC WONDER Online Database*, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2018, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Dec 6 and 13, 2020.

A. Life Expectancy and the Bimodal Pattern of Deaths in the CCHCS, 2019

The average age of all male inmates who died in 2019 was 65 years; the average age of deceased female inmates was 56 years. By comparison, males and females in the general American populace have life expectancies of 76 and 81 years, respectively. (Source: [National Vital Statistics Reports, Vol. 69, No. 12, November 17, 2020](#))

In the prison population, the youngest inmate death was at age 22, the oldest at age 96. There is a bimodal distribution of ages at death. Table 4 shows ranges and average ages at death among California inmates, depending on cause. In 2019, drug overdoses, suicides, and homicides caused death at an average age of 42.7, while the average age of death by all other causes was 64.

TABLE 4. RANGES AND AVERAGE AGES AT DEATH AMONG ALL CALIFORNIA INMATES, 2019.

	Age Range	Average Age
Age of all 391 male decedents	22 – 96	57.5
Age of all 8 female decedents	38 – 72	53.9
Age of suicides, drug overdoses, and homicides	22 – 75	42.7
Suicide	22 – 67	40.0
Drug overdose	23 – 75	43.9
Homicide	27 – 72	43.8
Age excluding suicide, drug overdose, and homicide	23 – 96	64.0

B. Expected and Unexpected Deaths in 2019

1. Expected Deaths

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

There were 203 cases of expected death in 2019. These deaths were the result of chronic disease processes like cancer, end stage liver disease, chronic infections, cardiovascular processes like congestive heart failure, pulmonary processes like chronic obstructive pulmonary disease or pulmonary fibrosis, and neurologic diseases like Parkinson or Alzheimer Disease.

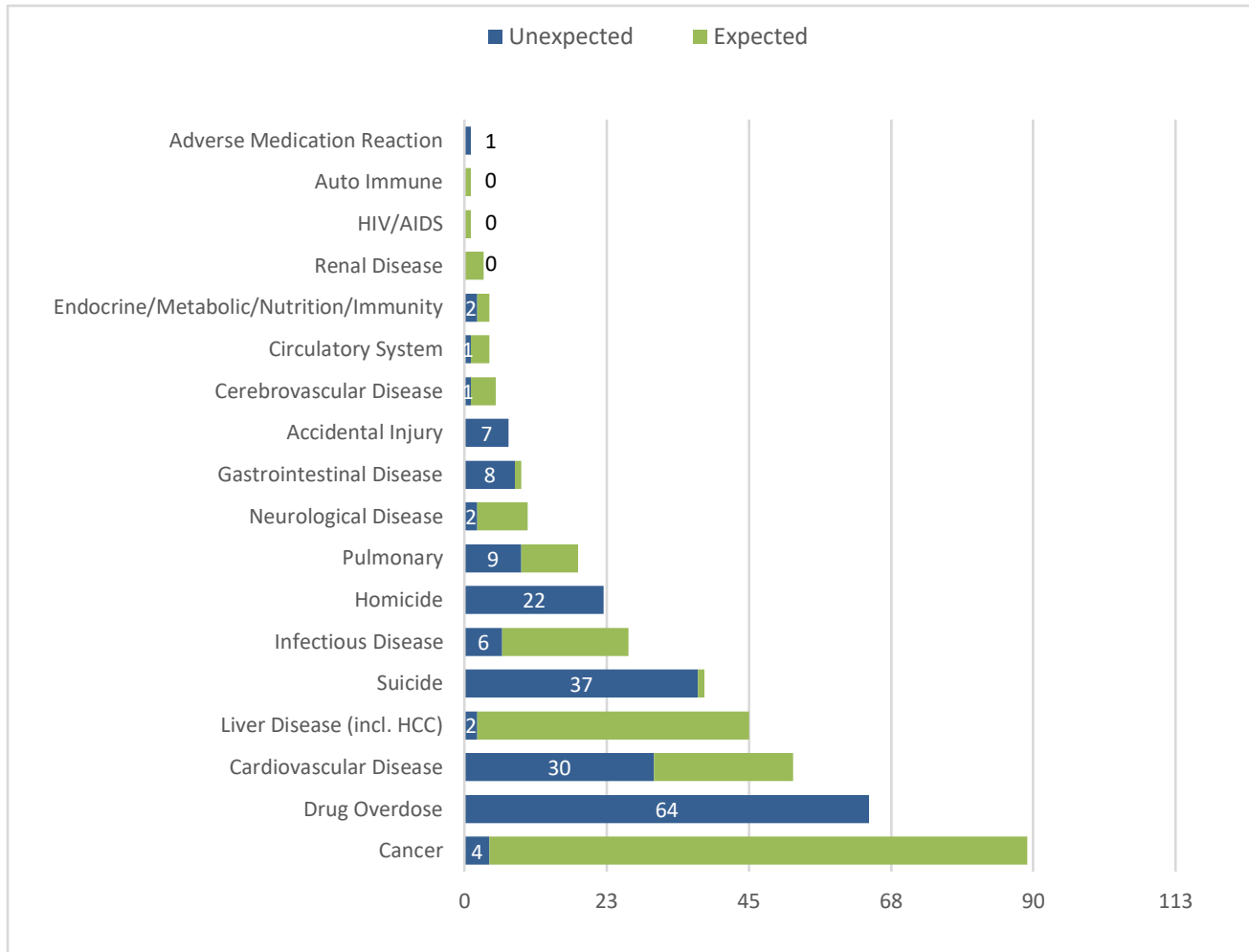
2. Unexpected Deaths

Unexpected Death: An unanticipated death which is not related to the natural course of a patient’s illness or underlying condition

There were 196 cases of unexpected death in 2019. Drug overdoses, accidents (unintentional injuries), suicides, and homicides together accounted for 130 or 66.3% of these. Sudden cardiac arrests were an additional 27 or 14.8%.

Figure two compares unexpected and expected deaths in each causation category.

FIGURE 2. INMATE DEATHS BY EXPECTATION AND CATEGORY, CCHCS 2019.



C. Opportunities for Improvement, 2019

Opportunity for Improvement (OFI): An occasion or situation from which it is possible to improve systems or processes related to the delivery of health care.

The Mortality Review Committee, during its deliberations of each case, has a responsibility to identify any opportunity for improvement and forward that opportunity to the appropriate prison and region for further review.

A single OFI in a Mortality Review can be relatively minor (minor documentation inconsistencies) or potentially quite serious (lost request for a diagnostic test during a patient transfer, resulting in delay in diagnosis of a treatable condition). There is currently no standardized way to grade the seriousness of any single OFI. That assessment takes place during the OFI review process.

In 2019, a total of 431 OFIs were identified. Of these, 169 occurred in unexpected deaths and 262 occurred in expected deaths.

Since the redesign of the Mortality Review process in 2018, there has been as yet no formal classification for OFI determinations.

But for purposes of this analysis of Mortality Reviews, an interim classification system was devised in 2018 and refined in 2019, in which OFI have been divided into nine categories, as follows:

1. Opportunities for improvement in education, documentation and training on CCHCS Emergency Protocols
2. Opportunities to improve application of the “Model of Care” as described in the CCHCS Complete Care Model
 - a. To apply the general Primary Care Team model
 - b. To apply complex care management for improved coordination or continuity
 - c. To improve meeting access timeframes for routine and urgent care
 - d. To improve opportunities to transfer a patient to a more appropriate level of care
 - e. To optimize care near the end of life -
 - i. Applying Physician’s Orders for Life Sustaining treatment (POLSTs) and Do Not Resuscitate (DNR) orders
 - ii. Honoring POLST and DNR orders
 - iii. Improving pain management, especially in cancer care
3. Opportunities to improve clinical decision making through better recognition and management of important clinical signs and symptoms
4. Opportunities to improve recognition and follow up of abnormal laboratory and other test results
5. Opportunities to better adhere to care guides for specific diseases or conditions or risk factors
 - a. Care Guides for specific conditions
 - b. Falls Prevention
 - c. Pressure Injury Avoidance
 - d. Medication Management
6. Opportunities to improve communication between providers in primary care teams and care transitions.
7. Opportunities to prevent delays in diagnosis and/or treatment
8. Opportunities to improve medical record documentation
9. Miscellaneous opportunities for improvement

Table 5 shows the Opportunities for Improvement and their numbers in unexpected and expected deaths.

TABLE 5: OPPORTUNITIES FOR IMPROVEMENT – INTERIM CLASSIFICATION FOR 2019 MORTALITY REVIEWS AND FREQUENCY IN UNEXPECTED AND EXPECTED DEATHS

Opportunities for Improvement	Frequency in Unexpected deaths	Frequency in Expected deaths	Total
1. Opportunities for better education/training and improved documentation on CCHCS emergency medical response protocols.	41	9	50
2. Opportunities to improve application of the “Model of Care” as described in the CCHCS Complete Care Model			
a. Opportunity to apply the general Primary Care Team model	1	-	1
b. Opportunities to apply complex care management for improved care coordination	5	15	20
c. Opportunities to improve access by meeting timeframes...			
...for ROUTINE care	5	9	14
...for URGENT care	2	4	6
d. Opportunities to transfer a patient to a more appropriate level of care	2	10	12
e. Opportunities to optimize care near the end of life by...			
i. ...applying Physician’s Orders for Life Sustaining treatment (POLSTs) and Do Not Resuscitate orders	13	28	41
ii. ...honoring POLST orders	1	20	21
iii. ...Improving pain management, especially in cancer care	1	5	6
iv. Other opportunities in end of life care	-	3	3
3. Opportunities to improve clinical decision making through recognition and management of Important clinical signs and symptoms	30	34	64
4. Opportunities to improve recognition and follow up of abnormal laboratory and other test results	21	27	48
5. Opportunities for better adherence to care guides for specific diseases, conditions, or risk factors			
a. Care guides for specific conditions	11	14	25
b. Fall prevention	2	15	17
c. Pressure ulcer avoidance	2	18	20
d. Medication management	6	7	13
6. Opportunities to improve communication between providers in primary care teams and care transitions			
a. Specialty Care	3	2	5
b. Hospital	1	2	3
c. Mental health	-	1	1
d. Custody	-	1	1
e. Interfacility Transfer	1	4	5
f. Emergency Dept	2	1	3
g. PCP-PCP	1	-	1
h. PCP-Nursing	2	2	4
7. Opportunities to prevent delays in diagnosis and/or treatment	4	22	26
8. Opportunities to improve medical record documentation	7	9	16

Opportunities for Improvement	Frequency in Unexpected deaths	Frequency in Expected deaths	Total
9. Miscellaneous Opportunities for Improvement	5	-	5
TOTAL	169	262	431

The following discussion addresses each of the above OFI categories, as well as Potential Quality Issues (PQIs), which are incidents referred to outside facilities or providers.

1. Opportunities for improvement in education, training and documentation of emergency medical responses.

Total: 50
41 in cases of unexpected death; 9 in cases of expected death

In 2018, there were 58 OFI noted in this category, and a major statewide quality initiative to redesign and improve the Emergency Medical Response (EMR) Program was started. The [EMR Program](#) was rewritten in March of 2019 and training was completed in 14 institutions by the end of 2019. This training will not be completed in all 35 of the CCHCS institutions until April of 2021.

In 2019 there were a total of 50 cases in which OFI in this category were noted. Since there were many more emergency protocols activated in cases of unexpected death, these accounted for 41 of the 50 OFI. Delays in activation of a 9-1-1 call were noted in 16 cases.

Other citations included lapses in documentation, the underuse of Narcan to reverse possible narcotic overdose, difficulties in securing intravascular access, response to abnormal ECG patterns, not checking blood glucose for hypoglycemia, and suboptimal stabilization of the spine.

2. Opportunities to improve application of the “Model of Care” as described in the CCHCS Complete Care Model

The model of care outlined in the [Complete Care Model](#) (CCM) is the foundation for delivery of all care in the CCHCS. The CCM is based on the standard of the Patient Centered Medical Home. It creates Interdisciplinary Care Teams and assigns each patient to a care team’s panel of patients. CCM policies and procedures are designed to promote continuous, comprehensive, coordinated and patient centered care. Care teams follow standards for access to testing or specialty referral, standards for preventive care, screening for treatable conditions, and evidence based management of acute and chronic illnesses. The CCM uses processes such as daily care team huddles, panel management strategies, performance dashboards, master patient registries, patient summaries, and decision support tools such as Care Guides for common conditions.

a. *Applying complex care management to improve care coordination*

Total: 20

5 in cases of unexpected death; 15 in cases of expected death

The opportunity to apply complex care management is based on the risk stratification of patients by the primary care teams. There are criteria for identifying patients who are at high risk for adverse outcomes. Complex care management involves team based strategies to mitigate the risk. The criteria for complex case management include severe concurrent mental illness, certain high risk diagnoses such as metastatic cancer, dementia or chronic debilitating conditions like Parkinson disease, polypharmacy, advanced age, loss of function requiring assistance with activities of daily living, hospice level of care, multiple recent hospitalizations and multiple specialists involved in care. Risk stratification tools and criteria can be found in the [Health Care Department Operations Manual](#).

b. *Meeting access timeframes for routine and urgent care.*

Total: 20 (14 Routine; 6 Urgent)

(5 Routine, 2 Urgent in unexpected deaths; 9 Routine, 4 Urgent in expected deaths)

Standards for access in the CCHCS are as follows:

Primary care: Emergency – same day, Urgent – 1 day, Routine – 14 days, post hospital discharge – 5 days
Specialty care: High priority – 14 days, medium priority – 45 days, routine priority – 90 days

Examples of cases not meeting these standards included urgent labs ordered but not done in a patient with weakness, an urgent specialty referral to interventional radiology delayed because of incorrect dates on a form, and a two-month delay in an urgent physical therapy referral for an acute injury.

c. *Transferring a patient to a more appropriate level of care.*

Total: 10

2 in cases of unexpected death; 8 in cases of expected death

These are missed or delayed opportunities to transfer patients to levels of care more appropriate to their clinical status. Several patients had “red flag symptoms or signs” – a new fall and severe leg edema, hematemesis, new or persistent shortness of breath, altered level of consciousness – but were not sent out for evaluation. Three patients were prematurely discharged from hospital but readmitted one day later. The importance of recognizing and properly evaluating potentially serious symptoms and signs is discussed later.

d. *Optimizing care at the end of life*

Total: 71

15 in cases of unexpected death; 56 in cases of expected death

The CCHCS honors the ethical principal of patient autonomy and directs physicians to provide a physician order for life sustaining treatment (POLST) for patients that fulfill certain criteria. Patients that are “elderly, frail, burdened with serious chronic medical conditions, or have less than six months’ life expectancy” should have the opportunity to provide specific directions for their end of life care. The primary care team is expected to have periodic discussions regarding goals of treatment or continued treatment in the face of advanced illness. Following this discussion, a patient may decide against resuscitation in the event of a terminal emergency. This decision would generate a “DNR/DNI” (do not resuscitate/do not intubate) order.

i. POLST/DNR discussions in appropriate patients not initiated

Total: 41

13 in cases of unexpected death; 28 in cases of expected death

In 2019, the Mortality Review Committee noted 41 cases in which discussions leading to POLST orders were not initiated in appropriate patients.

ii. POLST/ DNR in place but patient desires not honored

Total: 21

1 in cases of unexpected death; 20 in cases of expected death

Another 21 patients had specific orders written for no further life-sustaining treatment but nevertheless experienced attempted cardiopulmonary resuscitation or were sent out to hospital emergency rooms and experienced hospitalizations and other life-sustaining measures.

The overwhelming majority of these patients had inoperable or metastatic cancers or late stage chronic illnesses.

iii. Opportunity to better manage pain, especially in cancer patients

Total: 6

1 in cases of unexpected death; 5 in cases of expected death

The management of pain in cancer patients or patients who have other reasons for severe or intractable pain is a goal for all primary care teams.

In 2019, there were six citations for cases in which patients might have experienced better management of pain. Five of the six patients had cancer.

3. Opportunities to improve clinical decision making by improved recognition and management of important clinical signs and symptoms

Total: 64

30 in cases of unexpected death; 34 in cases of expected death

There were 64 instances in which important clinical signs and/or symptoms were thought to have been incompletely evaluated or evaluated at a slower pace than indicated.

Table 6 shows each of these OFI and (if known) the eventual diagnosis that each symptom or sign heralded.

TABLE 6. SIGNS AND SYMPTOMS INCOMPLETELY OR BELATEDLY EVALUATED AND EVENTUAL DIAGNOSES, CCHCS, 2019.

Sign or Symptom	Eventual Diagnoses
1. weight loss (7 cases)	cancer-kidney (2), cancer-multiple myeloma (1), cancer-stomach (1), cancer-unknown primary (1)
2. hypotension (5 cases)	bowel perforation (1), sepsis (1), SCA (1)
3. chest pain (4 cases)	AMI (2), SCA (1)
4. dysphagia (4 cases)	cancer-esophagus (2), cancer-tonsil (1)
5. SOB (4 cases)	AMI (1), pneumonia (1)
6. tachycardia (4 cases)	
7. hematochezia (4 cases)	cancer-colon (1), cancer-unknown primary (1), lymphoma (1)
8. altered mental status (2 cases)	stroke (1)
9. leg swelling (2 cases, incl. 1 unilateral)	deep vein thrombosis (1)
10. weight gain (2 cases)	
11. abdominal pain post injury	bowel perforation
12. agitation	suicide
13. back pain	cancer-lung, metastatic
14. bradycardia	SCA
15. confusion	intracranial hemorrhage
16. decreased level of consciousness	bowel perforation
17. dehydration	pneumonia
18. dizziness	
19. fresh needle tracks, abnormal vital signs	substance abuse disorder
20. hematuria	
21. history of neck swelling	cancer-lung

Sign or Symptom	Eventual Diagnoses
22. hypertension	
23. irregular heart rate	
24. jaundice	cancer-gallbladder
25. nausea	
26. nausea, vomiting	opioid withdrawal
27. new heart murmur	endocarditis
28. recurrent UTI	sepsis from UTI
29. skin infection	
30. skin ulcer	rhabdomyolysis
31. suicidal ideation	suicide
32. syncopal episode	cancer-unknown primary
33. throat pain	
34. tremor	
35. urinary retention	cancer-prostate
36. vision loss	

Previous reviews have discussed the concept of “red flag” symptoms or signs as indicators of potential serious diseases. Examples in 2019 included chest pain or shortness of breath as indicators of acute myocardial infarction or pneumonia. Various cancers were signaled by unexplained weight loss, dysphagia (difficulty swallowing), hematochezia (rectal bleeding), atypical or uncontrolled back pain or new onset of jaundice. Unsuspected bowel perforation was heralded by hypotension or altered level of consciousness. Other important red flags were unilateral visual loss (metastatic cancer), unilateral leg swelling (cancer of the kidney), sudden confusion (intracranial hemorrhage), and a new heart murmur (endocarditis).

4. Opportunities to improve recognition and action in response to abnormal laboratory and other diagnostic test results

Total: 48

21 in cases of unexpected death; 27 in cases of expected death

There were 48 OFI in this category, 21 in unexpected deaths and 27 in expected deaths. The majority of these occurred because of a lack of continuity of providers, poor communication on weekends or shift changes, or lack of adherence to procedures intended to ensure that all test results are conveyed in a timely manner to a member of the patient’s care team. Some of these instances may have led to significant delays in diagnosis or treatment, as will be discussed in a later section.

5. Opportunities to better adhere to care guides for specific diseases or conditions or risk factors

a. Care Guides

Total: 25

11 in cases of unexpected death; 14 in cases of expected death

The Care Guides are tools created by the CCHCS for use by clinicians and care teams in the management of patients with the following diseases or conditions: Advanced Liver Disease, Anticoagulation, Asthma*, Chest Pain, Chronic Wound Management, Clozapine, Coccidioidomycosis, Chronic Obstructive Pulmonary Disease, Cognitive Impairment/Dementia, Diabetes, Dyslipidemia (high or abnormal cholesterol), Foreign body ingestion/insertion*, Gender Dysphoria, Hepatitis C, HIV*, Hunger Strike, Hypertension*, Major Depressive Disorder, Medication Assisted Treatment for Opioid Use disorder in Pregnancy (new), Pain Management, Palliative Care*, Schizophrenia, Seizure Disorders, Skin and Soft Tissue Infections*, Tuberculosis, and Weight Management (new). Care Guides revised in 2019 are noted by an asterisk (“*”).

Similar resources for nursing staff 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, Musculoskeletal Complaints, Respiratory Distress, Seizure, Tetanus Prophylaxis, Upper Respiratory Infections, and Wound Care.

In 2019, there were 25 total OFI in this category, with 11 cited in unexpected deaths and 14 in the expected deaths. There were eight citations for failure to apply lung cancer screening in high risk patients, which is currently a grade B recommendation by the USPSTF but not an official CCHCS guideline. Three cases involved delayed or no follow-up in cases of known cancer (skin, thyroid, colorectal). There were three cases in which Hepatitis C virus infection or advanced liver disease guidelines were not followed, including one case in which liver cancer screening was delayed and three cases in which a contraindicated non-steroidal anti-inflammatory agent was prescribed. There were two OFI in management of acute chest pain or the use of statins in high risk cardiac patients, and two cases of late or no suicide risk evaluations in appropriate candidates. Single instances of the following were cited: foot ulcer care, using the pneumonia severity index in assessing the need for hospitalization, using antibiotics in chronic lung disease exacerbations, timely follow-up with esophagoscopy in a patient with Barrett’s esophagus, follow-up on known deep vein thrombosis in a calf vein, inadequate bowel prep pre-colonoscopy, and inadequate preoperative evaluation of thrombocytopenia.

b. Opportunities to mitigate fall risk

Total: 17

2 in cases of unexpected death; 15 in cases of expected death

Patients at risk for falls are expected to be identified by their care teams. Patients should also be reassessed for fall risk whenever their clinical condition changes significantly or worsens. Measures are then put into place to mitigate fall risk. These might include adequate room lighting, bed placed in a lower position, call devices within reach, handrail safety, mobility support items, non-slip footwear, personal items within reach, traffic paths free of clutter, and locked wheelchair wheels.

Of the 17 OFI in this category, twelve of these patients experienced falls and on case review were found not to have had fall assessments done despite being at high risk — wheelchair bound, confusional state, dizziness, etc. Several of these patients were on palliative care for cancer or dementia. Four of the OFI involved falls experienced when protocols were not being followed. One case was a Potential Quality Issue sent to an outside hospital where a patient had experienced multiple falls.

c. Pressure Ulcer (Injury) Avoidance

Total: 20

2 in cases of unexpected death; 18 in cases of expected death

Pressure injuries are a major source of morbidity and expense at hospitals and long-term care institutions. Risk factors for pressure injury are immobilization, malnutrition, sensory loss and decreased circulatory perfusion. Reducing the incidence of pressure induced injuries has been a national goal since the Healthy People 2010 initiative. Of the 20 OFI cited for pressure injury in 2019, nine cases were acquired during inpatient stays at contracted hospitals, and eleven were acquired by severely ill and bedridden patients at CCHCS institutions.

d. Medication Management

Total: 13

6 in cases of unexpected death; 7 in cases of expected death

There were 13 OFI involving possible improved management of medication. These included three cases of medication relatively contraindicated in chronic liver or kidney disease, two instances of complications of anticoagulation, two prescriptions of medication relatively contraindicated in cardiac conduction abnormalities (prolonged QT syndrome and Wolff Parkinson White pre-excitation syndrome), and one case each involving prescription of codeine for a patient with a history of substance abuse, overuse of antibiotics, choice of antibiotic for urinary tract infection, missed parenteral antibiotics because of clotted intravascular access, and one case of a patient caught “cheeking” medications that had been “direct observed therapy”.

6. Opportunities to improve communication between providers in primary care teams and care transitions

Total: 23 (10 in cases of unexpected death; 13 in cases of expected death)

Interfacility transfer: 5 (1; 4)
Care Team – Specialty Care: 5 (3; 2)
PCP – Nursing: 4 (2; 2)
Care Team – Hospital: 3 (1; 2)
Care team – Emergency Dept: 3 (2; 1)
PCP – PCP: 1 (1; 0)
Care Team – Mental health: 1 (0; 1)
Care Team – Custody: 1 (0; 1)

The accurate transfer of clinical information between care teams at transitions of medical care is important for high quality patient care. Lost or inaccurate information as to patients’ end of life wishes for care, for example, can lead to unnecessary procedures or expensive and painful efforts to prolong life in the emergency room, hospital, or intensive care unit. Inaccurate or missing information in communications from specialists to the primary care teams or vice versa, can lead to critical tests being delayed or not done. Information missing or lost when patients are transferred from a jail to the state prison, or with transfers within the state prison system can lead to missed diagnoses. There were 20 OFI in this general category. Of these, 5 cited deficiencies in communication at time of interfacility transfer, 5 cited miscommunication between the primary care team and the specialist, 4 cited care team – nursing, 3 cited care team – hospital communication, 3 cited care team – emergency room, and 1 each cited primary care – primary care, primary care – mental health, and primary care – custody communications.

7. Opportunities to prevent delays in diagnosis or treatment

Total: 26
4 in cases of unexpected death; 22 in cases of expected death

Delays in diagnosis or treatment should be avoided whenever possible. In 2019, there were 31 cases in which significant delays were noted. Table 7 describes the cases, the duration of delay, and the eventual diagnosis. All of these cases generated one or more opportunities for improvement, and most have been counted elsewhere.

TABLE 7. SIGNIFICANT DELAYS IN DIAGNOSIS OR TREATMENT, CCHCS, 2019.

Test	Delay	Diagnosis
Delays in diagnosis resulting from abnormal laboratory or other diagnostic test results without timely follow-up: 17 cases		
1. abnormal chest x-ray	3 mo	lung cancer
2. abnormal chest x-ray	2 yr	lung cancer

Test	Delay	Diagnosis
3. abnormal CT scan	1 mo	multiple myeloma
4. abnormal CT scan	2 mo	liver cancer
5. abnormal CT scan	6 mo	lung cancer
6. abnormal CT scan	8 mo	lung cancer
7. abnormal CT scan	8 mo	liver cancer
8. abnormal CT scan	14 mo	lung cancer - metastatic
9. abnormal echocardiogram abnormal ultrasound	10 mo 11 mo	severe mitral valvular stenosis with congestive heart failure
10. abnormal ultrasound, abdomen	7 mo	liver cancer
11. anemia	4 yrs	myelodysplasia
12. biopsy, esophagus	5 mo	esophageal cancer
13. biopsy, lung	2 mo	liver cancer - metastatic
14. lab - elevated PSA	5 mo	prostatic cancer - metastatic
15. abnormal lab - anemia	5 mo	stomach cancer
16. abnormal lab chemistry	2+ yrs	multiple myeloma
17. abnormal lab - anemia	8 mo	colon cancer - recurrent
Delays resulting from red flag symptoms or signs not followed up: 8 cases		
1. severe abdominal pain	12 hours	bowel perforation
2. blood in stool, abnormal rectal exam	4 mo	colon cancer
3. blood in stool	6 yrs	cancer of unknown origin
4. cough, persistent	3 mo	lung cancer
5. cough, hemoptysis	4 mo	lung cancer
6. dysphagia	7 mo	tonsillar cancer, recurrent
7. dysphagia, wt. loss	12 mo	esophageal cancer
8. acute change in mental status	49 min	stroke
Screening Guidelines Not Followed: 1 case		
1. abdomen ultrasound in cirrhosis	3 yr	liver cancer
Delayed Referrals: 2 cases		
1. mental health	2 wks	suicidal ideation
2. orthopedic	5 wks	hand fracture
Multifactorial: 3 cases		
1. recurrent massive ascites; abnormal paracentesis results; delayed referral to liver specialist	6 mo	cancer - mesothelioma
2. lost biopsy result; delayed oncology referral; missed MRI result	13 mo	lung cancer
3. back pain and weight loss, anemia, abnormal abdominal ultrasound; delayed oncology referral	24 mo	renal cell cancer

The proper recognition and management of abnormal results of laboratory and other diagnostic tests requires sequencing of multiple systemic steps. Workflows involve the ordering of tests and processing of those orders, receipt of test results, tagging of abnormal results, and a clinician response which is appropriate and timely. Each of these steps carries potential for delay.

In 2019, glitches in one or more of these steps resulted in 17 cases of delayed diagnosis ranging from 1 month to 4 years. Cases can sometimes be complicated by patient non-adherence to recommendations for follow-up testing.

A delay in diagnosis can also occur when an error in clinical judgment results in a failure to optimally evaluate an important clinical sign or symptom (clinical “red flags”). There were 8 of these “red flag” cases in the 2019 mortality reviews – significantly fewer than the 18 such cases in 2018. Unexplained weight loss, gastrointestinal blood loss, persistent pain, or difficulty swallowing (dysphagia) were red flags signifying potential cancers.

A delay in access to one or more specialist consultations resulted in significant delays in 3 cases.

In all, 26 of the 31 cases resulted in delayed diagnosis and/or treatment of various cancers.

8. Opportunities to improve medical record documentation

Total: 16

7 in cases of unexpected death; 9 in cases of expected death

The adoption of the electronic medical record has created a requirement for more complete documentation of visits, which has been time consuming for providers. This has created an unfortunate workaround by some providers who “cut and paste” sections of prior patient encounters in service of personal efficiency (termed legacy charting). Time pressure also can result in inadequate or inaccurate documentation. The need to incorporate records of patient encounters outside the prison system of care (such as outside specialist notes or hospital or emergency room visits) can result in such encounters being unavailable or missing for a time. The 16 OFI in this category showed four missing reports from hospital procedures, two missing hospital discharge summaries, two legacy charting citations, two missing physician notes, three missing RN notes, one laboratory report filed on the wrong patient, one missing MRI report and one undated outside record.

9. Miscellaneous Opportunities for Improvement

Total: 5

5 in cases of unexpected death; 0 in cases of expected death

In 2019, there were five miscellaneous OFI: a missed opportunity to evaluate a patient for his new refusals of care; a missed opportunity to refer a patient to a mental health provider for a possible medication adjustment; a missed intake history and physical; a premature hospital discharge with next-day readmission; and missed documentation of custody rounding frequency.

10. Potential Quality Issues (PQI)

Potential Quality Issue: A health care incident, regardless of severity, which occurs during the course of treatment by a Healthcare Provider Network facility or provider and requires submission of a written Potential Quality Issue referral.

Although the primary health care provided to California's prisoner population takes place in outpatient and inpatient units within the 35 CDCR institutions, there is much care that cannot be provided within the system. Therefore, for the past decade, the CCHCS has contracted with Health Net, an independent outside contractor, which provides inpatient medical and surgical services, emergency department care, and certain medical and surgical specialty services.

Any OFI identified by the Mortality Review Committee that involves one of these contracted facilities or individual providers generates a PQI which is forwarded to the hospital, emergency department, or specialist involved.

In 2019, there were 24 PQIs generated. All have been counted in the descriptions of the various OFI categories.

- 8 PQI involved a single hospital where pressure injuries/ulcers developed in patients.
- 4 were premature discharges and readmissions within 24 hours; one for completed stroke, a second for hospital acquired pneumonia, a third who suffered an unexpected death after a closed head injury, and a fourth who was readmitted after developing pneumothorax following a lung biopsy.
- 2 involved managing abnormal tests - one an abnormal chest X-ray and another an abnormal ECG
- 2 were poor medical record documentation
- 1 each of the following -a medical device complication (patient's endotracheal tube fell out after intubation during an ambulance ride), a case management need for patient with metastatic cancer, an inadequate preoperative evaluation of a patient at high cardiac risk, suboptimal management of hemorrhagic shock, an incomplete specialist review of medical records leading to delay in cancer diagnosis, inadequate communication between nephrologist and primary care team ,a fall sustained in hospital, a delay in transfer of a stable patient back to his home institution

There is currently no formal process that centrally tracks the responses to these PQIs. Each PQI is managed by the prison facility where the patient received his primary team care.

VI. DISCUSSION OF TRENDS

This section examines mortality trends in key areas. Where referenced, comparative U.S. State Prison data are sourced from the U.S. Bureau of Justice Statistics (BJS) [Mortality in State and Federal Prisons, 2001-2016 – Statistical Tables](#), Table 4 (NCJ 251920, February 2020).

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

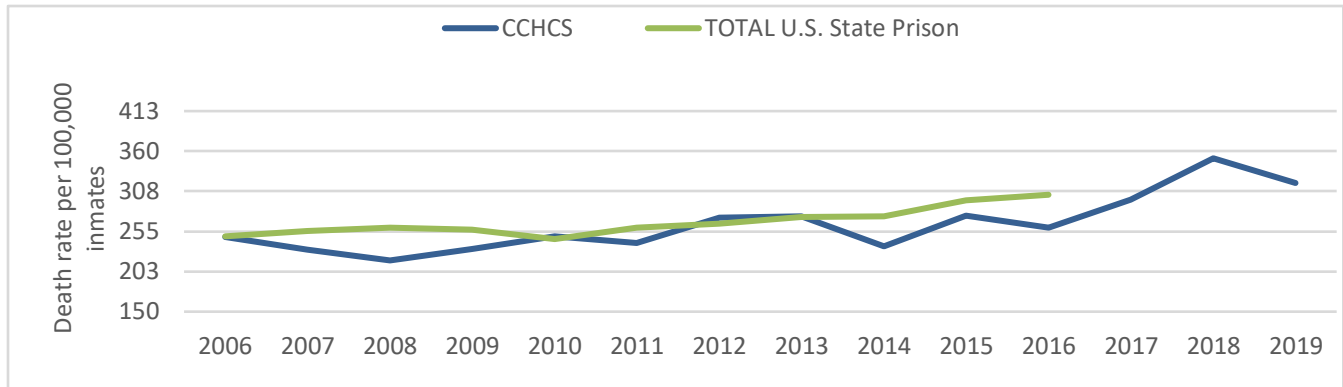
The following table shows the number of deaths and the corresponding mortality rates in California prisons from 2006–2019, compared to mortality rates at all U.S. state prisons.

TABLE 8. ANNUAL MORTALITY RATES AMONG CALIFORNIA AND U.S. STATE PRISON INMATES, 2006–2019.

YEAR	CCHCS Number of Deaths	CCHCS Number of Inmates	CCHCS Death Rate per 100,000	TOTAL U.S. State Prison Death Rate per 100,000
2006	424	171,310	248	249
2007	395	170,786	231	258
2008	369	170,022	217	261
2009	393	169,459	232	259
2010	415	166,700	249	246
2011	388	161,843	240	260
2012	369	134,929	273	265
2013	366	133,297	275	274
2014	319	135,225	236	274
2015	355	128,824	276	296
2016	334	128,705	260	303
2017	388	130,807	297	<i>not available</i>
2018	452	128,875	351	<i>not available</i>
2019	399	125,270	319	<i>not available</i>
Average (Range)			264 (217–351)	267 (245–303)

The following figure charts the trended death rates for the CCHCS from 2006–2019, and the trended death rates for all US prisons from 2006–2016 (most recent year available). The rate of death in California prisons has been higher in the past three years, and appears to have been rising since 2014. The overall US prison death rates also appear to be rising since 2014, although the data since 2016 are not yet available.

FIGURE 3. TRENDED ANNUAL DEATH RATES AMONG CALIFORNIA AND U.S. STATE PRISON INMATES, 2006–2019.



B. Discussion of Trends in CCHCS Mortality Rates

In 2018 and 2019 the CCHCS mortality rates of 351 and 319 were the highest in the 14-year history of this report. Possible reasons for this include the general aging of the prison population, as well as specific causes that contribute disproportionately to the increase.

1. Aging. It is known that death rates in general increase with age. And as was noted in a previous section of this report, the age of the CCHCS population has been gradually increasing, especially over the years from 2015–2019, when the number of patients over the age of 55 increased from 12.5% to 16% of the population. (CDCR Offender Data Points, Tables 13.15 and 13.16.)

In 2019, CCHCS staff analyzed age-adjusted mortality rates for “non-natural” versus “natural” causes of death. Non-natural causes are accidents, homicides, suicides and drug overdoses. All other causes of death are natural.

The analysis concluded that there was NO statistically significant increase in age adjusted deaths from natural causes. There WAS a statistically significant increase in age adjusted deaths related to drug overdoses, suicides and homicides.

2. Specific causes. The inmate population reached a new lower baseline after the mandated reduction was accomplished in 2012. For the purposes of this analysis, an adjusted baseline mortality rate is established for the period between 2012 and 2015. This is then compared to the mortality rates in the subsequent four-year period, 2016–2019, during which the aging of the general population was demonstrated.

The trends in mortality for the non-natural causes of drug overdose, homicide, and suicide are discussed in the next section. Trends in mortality for three of the natural causes – cardiovascular disease, lung cancer and advanced liver disease – are also discussed.

C. Effect of Selective Causes of Death on Mortality Rates from 2012 through 2019

Previous analyses of CCHCS prison mortality have noted that there was a court mandated effort to decrease the prison population because overcrowding was a major barrier to effective medical care. By 2012, there was a

reduction of some 25,000–30,000 prisoners in the CCHCS, essentially creating a new baseline in the CCHCS population.

Table 9 compares the four-year period from 2012 to 2015 with the most recent four-year period from 2016 to 2019. In addition to the overall mortality rate, the mortality due to selected causes is compared.

TABLE 9. COMPARISON OF CCHCS MORTALITY RATES, 2012–2015 AND 2016–2019.

Mortality Rates	2012–2015 mean (range)	2016–2019 mean (range)	Delta
Mortality Rate, overall	264 (236 -- 276)	307 (260 - 351)	+43
Drug Overdose	14.5 (11.1 - 18.0)	38.1 (22.5 - 51.1)	+23.6
Cardiovascular	39.6 (31.9 - 48.1)	46.5 (40.4 - 51.9)	+6.9
Homicide	12.4 (6.7 - 15.6)	19.3 (14.5 - 23.3)	+6.9
Suicide	20.5 (17.0 - 23.7)	24.4 (20.2 - 30.3)	+3.9
Lung Cancer	16.1 (12.6 - 21.0)	17.8 (9.9 - 24.8)	+1.7
Advanced Liver Disease	50.0 (43.5 - 53.4)	35.5 (29.8 - 44.2)	-14.5

The overall mortality rate increased by 16% (43/100,000), from an average of 264/100,000 in 2012–2015 to an average of 307/100,000 in 2016–2019.

Although drug overdose (+23.6), cardiovascular diseases (+6.9), homicides (+6.9), suicides (+3.9), and lung cancer (+1.7) all contributed to the increase in mortality rates, drug overdose was by far the largest contributor, accounting for 55% of the recent increase in CCHCS mortality.

Advanced liver disease mortality, by contrast, decreased significantly (by 14.5/100,000) during the most recent four-year period.

D. Annual Mortality Rates in Specific Causes of Death, 2012–2019

1. Drug overdose

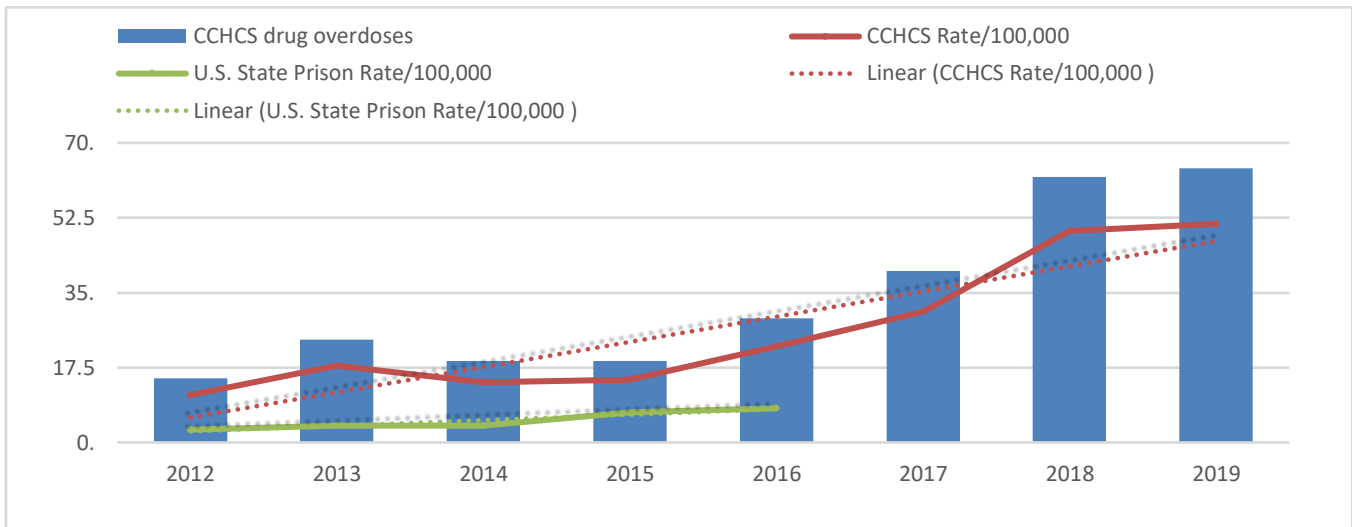
TABLE 10. NUMBERS AND RATES OF OVERDOSE DEATHS, CCHCS 2012–2019, AND U.S. STATE PRISONS 2012–2016.

Year	CCHCS drug overdoses	CCHCS Overdose Rate/100,000	U.S. State Prison Overdose Rate/100,000*
2012	15	11.1	3
2013	24	18	4
2014	19	14.1	5
2015	19	14.7	4
2016	29	22.5	3

Year	CCHCS drug overdoses	CCHCS Overdose Rate/100,000	U.S. State Prison Overdose Rate/100,000*
2017	40	30.6	n/a
2018	62	48.1	n/a
2019	64	51.1	n/a

*U.S. State Prison data includes drug and alcohol intoxication.

FIGURE 4. NUMBERS AND RATES OF OVERDOSE DEATHS, CCHCS 2012–2019, AND U.S STATE PRISONS 2012–2016.



There has been a dramatic increase in the number of deaths and death rates from drug overdose from 2016–2019, mirroring the “opioid epidemic” experience in the general population of the United States. Of the 64 overdose deaths in 2019, all but one were caused by illicit opioids and/or amphetamines. Various opioids (heroin, morphine, fentanyl, opioids, codeine) either alone or in combination, were detected in 54 of these cases. Fentanyl, the powerful synthetic opioid increasingly seen in fatal overdoses in the civilian population, was detected in 12 cases. Methamphetamines, either alone or in combination with opioids, were detected in 17 cases. None of these deaths were caused by opioids prescribed to the patients by CCHCS physicians. There was one overdose caused by ingestion of a prescribed calcium channel blocker, an antihypertensive drug.

The Substance Use Disorder Treatment program manages drug addiction as a chronic disease and uses medication assisted treatment, cognitive behavioral interventions, support in special housing units, and facilitated transition to community-based post release programs. This innovative program began implementation in one facility in late 2019 and multidisciplinary training is scheduled to be completed in all 35 state prison facilities by mid-2021.

2. Suicide

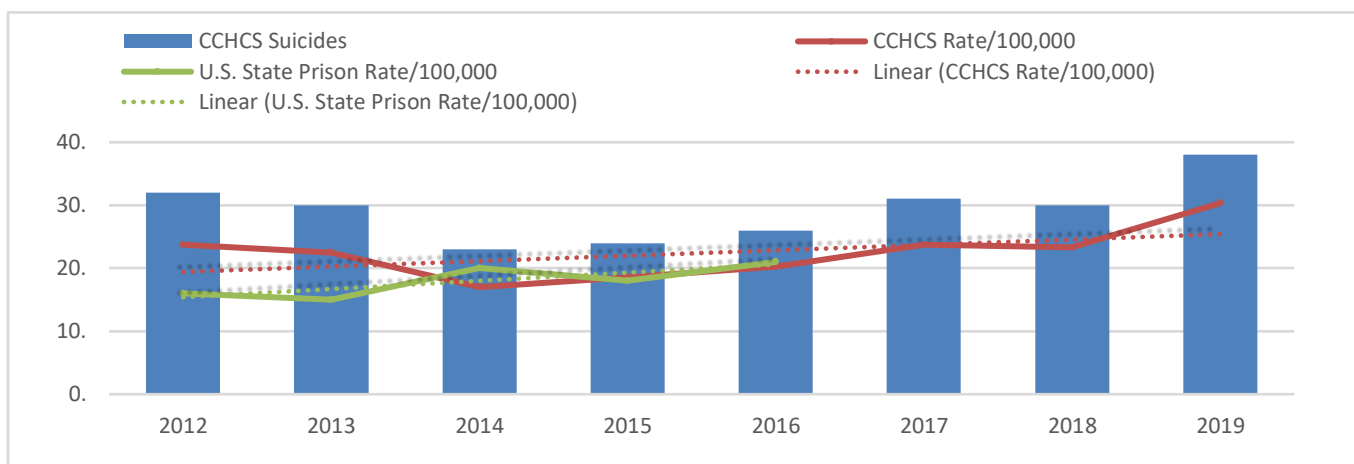
Suicide is reaching epidemic levels in many parts of the country and has steadily increased over the last four years in California’s state prisons. The California prison system recognizes that each suicide constitutes a tragedy reaching well beyond the walls of the prison.

Unfortunately, the 38 suicides in 2019 produced the highest ever suicide rate in California prisons. Suicide was the second leading cause of unexpected death and the fifth leading cause of all deaths in the CCHCS in 2019. Table 11 and figure 5 show the numbers, rates and trends of suicide from 2012 through 2019.

TABLE 11. NUMBERS AND RATES OF SUICIDES, CCHCS 2012–2019, AND U.S STATE PRISONS 2012–2016.

Year	CCHCS Suicides	CCHCS Suicide Rate/100,000	U.S. State Prison Suicide Rate/100,000
2012	32	23.7	16
2013	30	22.5	15
2014	23	17	20
2015	24	18.6	18
2016	26	20.2	21
2017	31	23.7	n/a
2018	30	23.3	n/a
2019	38	30.3	n/a

FIGURE 5. SUICIDE RATES IN CCHCS, 2012–2019, AND U.S. STATE PRISONS 2012-2016.



The numbers and rates of suicide for the period of 2016–2019 show an increasing trend over the baseline period of 2012–2015. Almost all of the suicide patients had coexisting mental health disorders and were being followed and treated by mental health providers concurrently with medical providers in the care teams. There have been ongoing efforts to recognize and treat severe depression and suicidal ideation and to improve the communication between the behavioral health and medical departments of CCHCS.

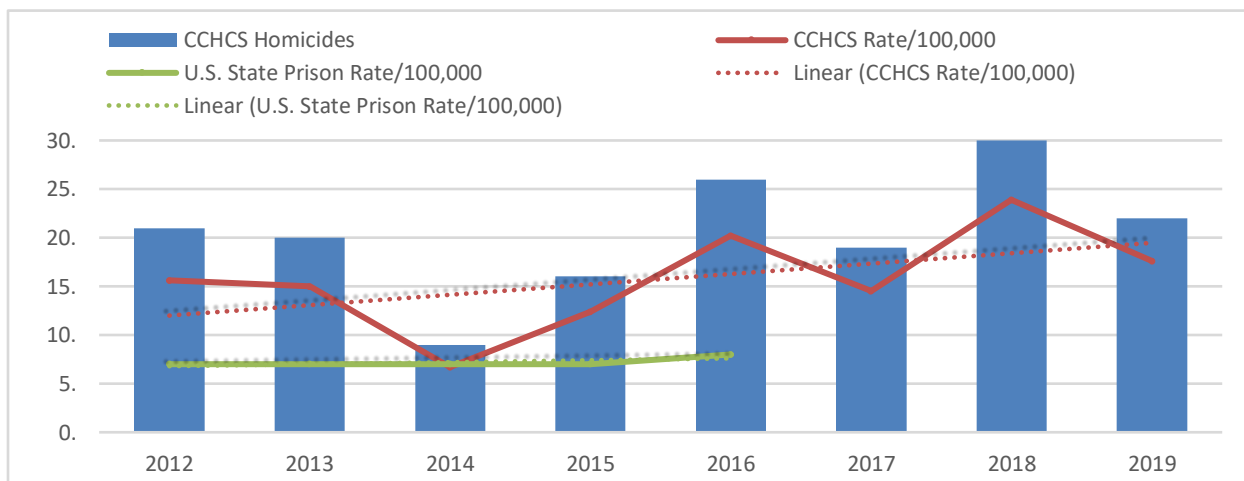
Since 1995, CDCR has funded the operations of the Coleman Special Master appointed by the federal court overseeing CDCR’s mental health care system (the Coleman court). There is now a comprehensive system of suicide risk evaluations, treatment plans, and suicide prevention. These include new and enhanced suicide prevention training for all CDCR staff, specialized emergency procedures training for all potential first responders to suicides in progress, and training for mental health clinicians on suicide risk assessment and risk management. A range of mental health services includes informational videos and pamphlets, institutional suicide prevention events and procedures for protecting inmates during particularly vulnerable periods. An annual report to the California State legislature on Suicide Prevention and Response in CDCR is required. The [2019 report](#) is available.

3. Homicide

TABLE 12. NUMBERS AND RATES OF HOMICIDES, CCHCS 2012–2019, AND U.S STATE PRISONS 2012–2016.

Year	CCHCS Homicides	CCHCS Homicide Rate/100,000	U.S. State Prison Homicide Rate/100,000
2012	21	15.6	7
2013	20	15	7
2014	9	6.7	7
2015	16	12.4	7
2016	26	20.2	8
2017	19	14.5	n/a
2018	30	23.3	n/a
2019	22	17.6	n/a

FIGURE 6. NUMBERS AND RATES OF HOMICIDES, CCHCS 2012–2019, AND U.S STATE PRISONS 2012–2016.



The 2019 numbers (22) and death rate (17.6) for homicide were lower than in 2018, when the homicide mortality rate of 23.3 was the highest since these reports began. All of the homicides were committed by other inmates. The homicide rate continues to be more than twice the national average for state prisons, which averaged 7.2 for the five-year period from 2012–2016.

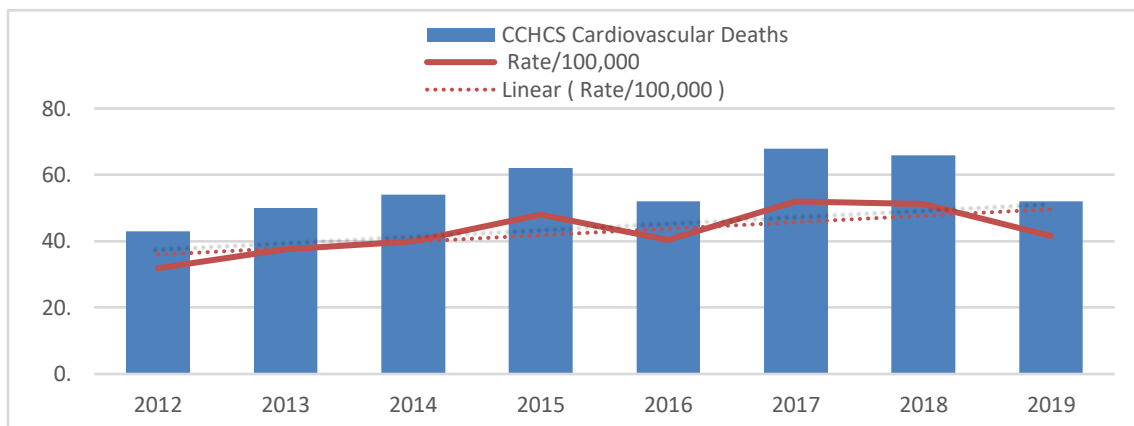
4. Cardiovascular Disease

Cardiovascular disease was the third most common cause of all deaths in 2019. Table 13 and figure 7 show the numbers, rates, and trends of cardiovascular death from 2012 through 2019.

TABLE 13. NUMBERS AND RATES OF CARDIOVASCULAR DEATHS, CCHCS 2012–2019.

Year	CCHCS Cardiovascular Deaths	Mortality Rate/100,000
2012	43	31.9
2013	50	37.5
2014	54	39.9
2015	62	48.1
2016	52	40.4
2017	68	52
2018	66	51.2
2019	52	41.5

FIGURE 7. NUMBERS AND RATES OF CARDIOVASCULAR DEATHS, CCHCS 2012–2019.



There was a decrease in the number and rate of cardiovascular death in 2019. This may be a result of increased attention to the CCHCS Care Guides for chest pain, diabetes, dyslipidemia and hypertension, which provide guidelines for the management of the significant risk factors for coronary heart disease, and stress the importance of management of clinical red flag symptoms indicating acute coronary syndromes or exacerbations of congestive heart failure.

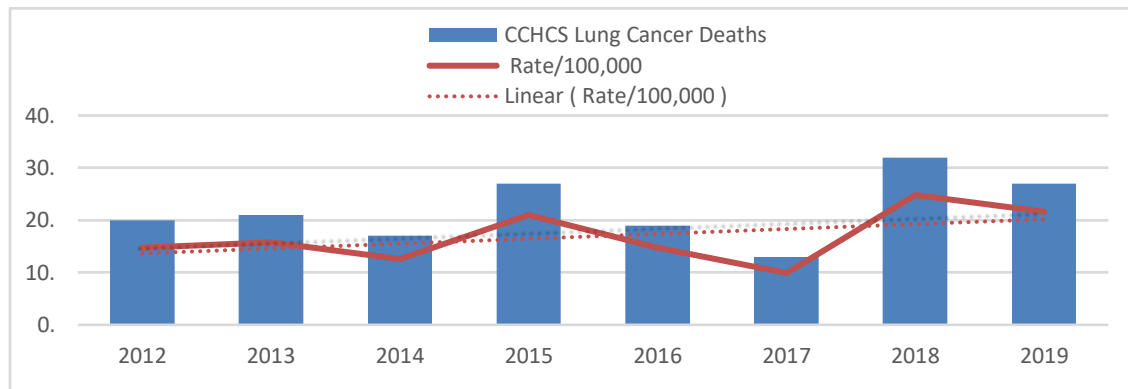
5. Lung cancer

Lung cancer historically has been the leading cause of cancer death in CCHCS, and 2019 was no exception. Table 14 and figure 8 show the numbers, rates and trends of lung cancer mortality from 2012 through 2019.

TABLE 14. NUMBERS AND RATES OF LUNG CANCER DEATHS, CCHCS 2012–2018.

Year	CCHCS Lung Cancer Deaths	Rate/100,000
2012	20	14.8
2013	21	15.8
2014	17	12.6
2015	27	21
2016	19	14.8
2017	13	9.9
2018	32	24.8
2019	27	21.6

FIGURE 8. NUMBERS AND RATES OF LUNG CANCER DEATHS, CCHCS 2012–2018.



There is no obvious explanation for the increase in the rate of CCHCS lung cancer deaths in 2018 and 2019. Lung cancer is also the leading cause of cancer death in males in the United States. In recent years there has been movement toward the evidence based recommendation for screening for lung cancer at an earlier stage. In 2014, the US Preventive Services Taskforce issued a Grade B recommendation for the use of low dose CT scanning to screen for lung cancer in high risk smokers older than 55. The CCHCS has not yet adopted this recommendation.

6. Advanced liver disease (end stage liver disease and liver cancer combined)

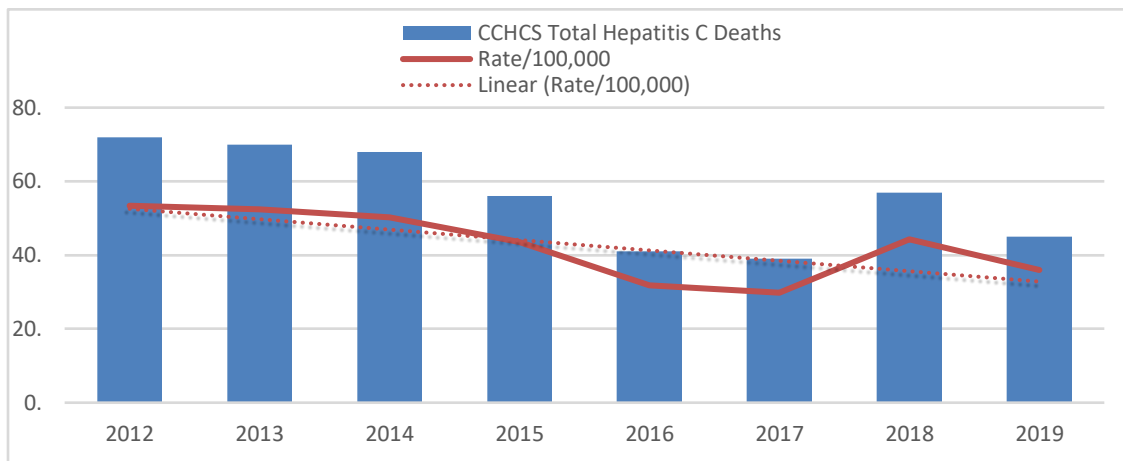
Advanced or end-stage liver disease, including cirrhosis and liver cancer, was the fourth leading cause of death in 2019. Liver cancer accompanies cirrhosis. In the prison population, both are caused by the high prevalence of

chronic hepatitis C infection. Table 15 and Figure 9 show the numbers, rates and trends of liver cancer deaths, cirrhosis deaths and total advanced liver disease deaths represented by chronic hepatitis C infection in the years 2012–2019.

TABLE 15. NUMBERS AND RATES OF ADVANCED LIVER DISEASE DEATHS, CCHCS 2012–2018.

Year	CCHCS Liver Cancer Deaths	CCHCS Cirrhosis Deaths	Total Hepatitis C Deaths	CCHCS Number of Inmates	CCHCS Hep C Associated Death Rate per 100,000 Inmates
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
2018	28	29	57	128,875	44.2
2019	32	13	45	125,270	35.9

FIGURE 9. NUMBERS AND RATES OF ADVANCED LIVER DISEASE DEATHS, CCHCS 2012–2019.



The CCHCS has adopted a number of initiatives to improve screening and treatment of hepatitis C. These include the periodic ultrasound screening for liver cancer and clinical strategies for addressing specific complications such as esophageal varices and spontaneous bacterial peritonitis. Importantly, the recent initiative for treatment of hepatitis C with safe and effective agents was a major CCHCS project, and over 6000 eligible patients were treated in 2018 and 2019. All of these initiatives have contributed to the impressive 29% reduction in advanced liver disease mortality from 2016-2019.

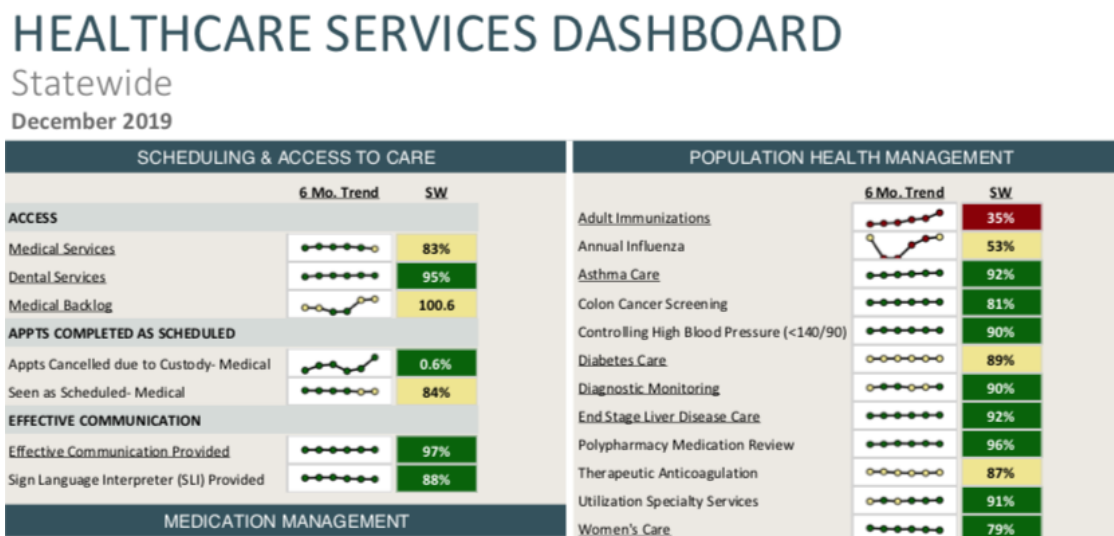
VII. QUALITY IMPROVEMENT INITIATIVES

In 2015, CCHCS adopted the Complete Care Model for its healthcare delivery system. Its core principles are continuous, comprehensive, coordinated, patient centered, preventive and accessible care which makes use of a well-functioning health information system. Many clinical tools have been introduced to help staff reach performance targets in the service of this model.

These tools include:

- Institution Dashboards and Care Team Registries with monthly performance reports.** The Statewide and Institution dashboards track key performance indicators. They are used to assess system progress in meeting performance objectives and to identify areas that need improvement. Examples can be accessed at the CCHCS website: <https://cchcs.ca.gov/reports>. Figure 10 shows a partial statewide dashboard.

FIGURE 10. PARTIAL VIEW OF A CCHCS HEALTHCARE SERVICE DASHBOARD.



Source: [CCHCS Public Dashboard December 2019 \(PDF\)](#)

The Care Team Registries help teams manage their paneled patient populations, enabling, for example, identification of individual patients in need of recommended screening. They are used to monitor key performance indicators for managing chronic diseases like asthma, diabetes and advanced liver disease. Adherence to scheduling and access standards are monitored. Regular medication reconciliation can be done for patients on multiple prescriptions. These monthly dashboards are used by health care managers in each of the 35 CCHCS facilities to track performance and to target areas needing improvement.

- Patient registries** assist care teams and institutions to identify overdue or missing services in their high risk patients. Registries for patients with Advanced Liver Disease, Diabetes, and Hypertension are examples.
- Care Guides for specific clinical conditions** have been described previously.

- **Performance Improvement Priorities.** The Quality Management Program is responsible for reviewing health care areas considered to be high risk, high volume, high cost, and problem-prone and identifies organization-wide improvement priorities.

Selection of performance improvement initiatives is based on information from mortality review, the health care incident reporting system, and other sources.

The 2019-2022 Performance Improvement Plan introduced ten new initiatives in the following areas: Emergency Medical Response, Substance Use Disorder, Hypertension, Hepatitis C Virus, Wellness, Women's Care, Inpatient Access to Care, Transfers, Infection Control, and New Perspectives on Hospitalizations and Adverse Outcomes related to drug overdose, self-harm, assault, and homicide.

Each of the following initiatives were identified as priorities in part based on mortality review OFI and other health care incident data.

- **Emergency Medical Response** — A statewide initiative for onsite hands on training with a standardized curriculum, crash carts and tools for resuscitation. Mortality reviews in this and prior years showed EMR protocol problems as a significant source of OFI.
- **Integrated Substance Use Disorder Treatment Program** (approved July 2019) — Substance use disorder screening for all new patients. Medication assisted treatment (MAT) with buprenorphine, naltrexone, or methadone offered to patients with opioid use disorder who meet criteria. All appropriate providers receive training in order to receive waivers allowing prescription of MAT. The rising incidence of drug overdose made it the second leading cause of death in 2019.
- **Hypertension** — New registry for care teams to more closely monitor patients whose blood pressure is not yet controlled and to ensure appropriate monitoring of renal function and lipids. Poorly controlled blood pressure is a significant risk factor for mortality from cardiovascular disease, the third leading cause of death in 2019.
- **Hepatitis C Treatment** — CCHCS has a markedly increased prevalence of hepatitis C virus (HCV) infection compared to the community. Chronic HCV is the precursor to advanced liver disease. The availability and use of direct acting agents for the treatment of HCV has been associated with decreases in liver-related death, need for liver transplantation, liver cancer rates, and liver-related complications, even among those patients with advanced liver fibrosis. Aggressive treatment of hepatitis C started in fiscal year 2017-2018. In fiscal 2018-2019, treatment was expanded to all HCV risk groups. Treatment is now completed in more than 10,000 patients. The advanced liver disease registry and hepatitis C treatment initiative have contributed to the recent significant decrease in advanced liver disease deaths.
- **Wellness** — Performance goals for immunizations and cancer screening will be established to partially address the mortality rate from cancer, the leading cause of death in the prison population.
- **Transfers** — In 2018 there were a monthly average of 10,000 transfers from one institution to another within the CCHCS and an additional large number of intra-facility transfers from one setting to another.

All of these handoffs have contributed to the possibility of delays in care, a significant area of OFI. This initiative establishes a 7-day standard for Primary Care Teams seeing newly transferred high risk or complex patients, and a 30-day standard for medical and low risk patients.

- **Infection Control** — New metrics for control of infections will be established in 2020.
- **New Hospitalization Trend Monitoring** — In 2020, perspectives on overdoses, injury and homicides will be used to establish and monitor new hospitalization and ED utilization metrics.

VIII. CONCLUSIONS

Recent rises in the CCHCS mortality rate culminated in 2018 and 2019 with respective mortality rates of 351 and 319 per 100,000 — the highest in the past fourteen years. This increase in the all-cause CCHCS death rate is attributed to increased numbers of deaths from non-natural causes — drug overdose, suicide and homicide. A recent somewhat higher mortality rate for cardiovascular disease may also be contributing.

At the same time there has been a significantly lower rate of mortality from advanced liver disease, attributed to initiatives directed at identification and treatment of chronic hepatitis C infection, screening and early detection of liver cancers, and guidelines for optimal management.

In 2018 the mortality review process for the CCHCS underwent significant transformation. The practice of identifying lapses in care which could inform the avoidance of preventable death was replaced by an effort to identify systemic opportunities for improvement. These findings are integrated into a system of total quality improvement which results in the planning and implementation of major system wide improvement projects.

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. By the end of 2019 there were 19 such delegated institutions. These delegations are based on favorable reviews of medical care by the Office of the Inspector General, and are subject to ongoing periodic monitoring by the Receiver.

The maturation of the Complete Care Model coupled with transparent use of performance dashboards and the ongoing design and implementation of targeted improvement projects should continue to drive ongoing progress in the compassionate care of all patients in the California Correctional Healthcare System.
