Analysis of 2020 California Correctional Health Care Services Inmate Mortality Reviews

Kent Imai, MD
Consultant to the California Prison Receivership

12/22/2021

Table of Contents

Tables and Figures

I. Introduction

Healthcare services for the California prison system, now called the California Correctional Health Care Services, or CCHCS, were placed under Federal Receivership in October 2005. The Receivership was established by the U.S. District Court as the result of a 2001 class-action lawsuit against the state of California over the quality of medical care in the state's prisons. The court found that the medical care was a violation of the Eighth Amendment of the U.S. Constitution, which forbids cruel and unusual punishment of the incarcerated.

Since 2005, the Receivership has been transforming CCHCS in order to provide constitutionally adequate medical care to the inmates in the 35 prison facilities. By 2015, the Receivership began delegating institutions back to the California Department of Corrections and Rehabilitation (CDCR). In the same year, the Complete Care Model, based on the industry standard known as the Patient-Centered Health Home, became the foundation for CCHCS health care services delivery.

In January 2020, CDCR and CCHCS released a new, joint vision and mission statement with an emphasis on restorative justice, successful community reintegration and public safety.

The new vision and mission statement reflected "the ongoing commitment of CDCR and CCHCS to provide education, treatment, rehabilitation, health care, and restorative justice in a safe and humane environment."

Vision

We enhance public safety and promote successful community reintegration through education, treatment, and active participation in rehabilitative and restorative justice programs.

Mission

To facilitate the successful reintegration of the individuals in our care back to their communities equipped with the tools to be drug-free, healthy, and employable members of society by providing education, treatment, rehabilitative and restorative justice programs, all in a safe and humane environment.

This analysis of calendar year 2020 inmate mortality reviews in the CCHCS is the fifteenth consecutive annual report, covering every year of the Receivership.

Following the format of prior years, this report will describe the mortality review process and classification of the causes of deaths in the prison system.

The general categories of "unexpected" and "expected" deaths will be analyzed. Opportunities for improvement will be categorized and analyzed. California prison mortality rates and trends in specific causes of mortality will be discussed.

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

A. Mortality Review Process

Prior to 2018, the mortality review process was conducted to identify lapses in care which might have contributed to "preventable deaths" in the prison system. In 2018 a formal assessment of the CCHCS Mortality Review Policy and Practice, conducted at the behest of the Receiver, recommended focusing on system improvement rather than individual lapses in keeping with the most current standard of practice among health care organizations and patient safety programs.

Any inmate death triggers an initial death report generated by the prison in which the death occurs. This report goes through the Electronic Health Record System to the central headquarters (HQ) mortality review unit staff. Then a local death summary is submitted to HQ within five business days. This summary includes significant clinical events, the emergency medical response, any identified lapses in health care delivery and any systemic issues that may have contributed to the patient's death.

HQ mortality review staff assigns each death to both a physician and nurse reviewer. An extensive review of the patient's clinical record is conducted, dating back at least six months prior to the date of death. A reviewer may include older records if relevant to determine the antecedents to the terminal event. The quality of care experienced by the patient is evaluated including 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 imaging studies, and the timing and quality of emergency response.

All suicides or possible suicides undergo an additional, separate case review by a member of the Suicide Prevention and Response Focused Improvement Team (SPRFIT).

The results of these reviews are then 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. Following discussion

of the case, the MRC attributes the cause of death and assigns the death to one of four categories: expected or unexpected death, with or without findings for opportunity(ies) for improvement.

In addition to Opportunities for Improvement (OFI), the MRC also identifies Potential Quality Issues (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.

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.

The overall effort is intended to:

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

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

Potential Quality Issue (PQI): 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.

C. The California State Prison Population in 2020

The Receivership was created in 2006, when the California prison population numbered 171,310. Federal Court mandated reductions, upheld by the US Supreme Court, resulted in a significant decrease in the number of inmates in custody. Additional legislative actions also contributed to the

reduction in inmate population. These included Assembly Bill 109 in 2011- an "Alternate Custody Program", which had some felonies and parole violations remain in county jail; Proposition 36 in 2012, the Three Strikes Reform Act; Proposition 47 in 2014, converting some felonies into misdemeanors; and Proposition 57 in 2017, which increased good behavior opportunities for inmates. By December 31, 2019, the prison population was 124,027. The COVID-19 pandemic resulted in a further reduction following 1) an Executive Order by the California Governor in March 2020 which suspended the intake of new inmates from county jails into state prisons and 2) CDCR's actions in spring and summer of 2020 to reduce population and maximize space. By December 31, 2020, the California prison population was 95,432, of which 92,116 were housed in the 35 state prison facilities. This population was 102.8% of the designed capacity of the prisons, the lowest number since 2006. https://www.cdcr.ca.gov/research/population-reports-2/

Figure 1 shows the prison population from 2006-2020.

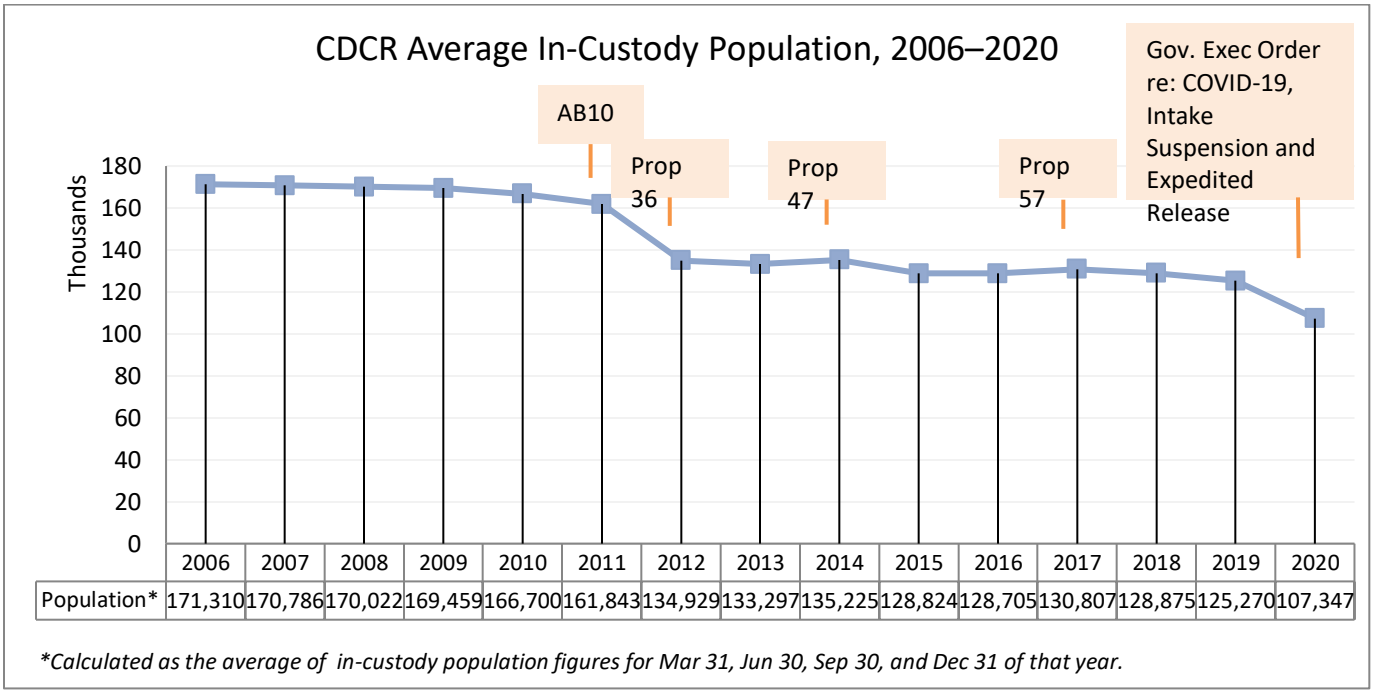


Figure 1. California State Prison Population 2006-2020.

The following demographic statistics are sourced from the Offender Data Points report published in October 2020 by the CDCR Office of Research. (https://www.cdcr.ca.gov/research/wp-content/uploads/sites/174/2021/06/201906_DataPoints.pdf)

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. Individuals under 45 represent nearly two thirds (66.2%) of the total prison population.

The prison population has been increasing in average age, with prisoners older than 55 comprising 16% of the CCHCS population in 2019 (Offender Data Points, Table 1.19), compared with 12.5% in 2015.

Sex – In June 2019, there were an average of 119,781 males (95.5%) and 5,691 females (4.5%) in custody (Offender Data Points, Table 13.1.)

Ethnicity – The In-custody population in June 2019 was 28.3% Black, 44.2% Hispanic, 20.9% White, with all other ethnicities making up the remaining 6.6%. (Offender Data Points, Table 1.17)

The California Department of Finance estimated the 2019 California general population to be 5.7% Black Non-Hispanic, 39.3% Hispanic Any Race, 38.3% White Non-Hispanic, 13.1% Asian Non-Hispanic, 0.8% Other Races Non-Hispanic, and 2.7% Multiracial Non-Hispanic.

Figure 2 shows the overrepresentation of California's Black and Hispanic populations in its prison system. Black overrepresentation is the most significant, comprising 6.5% of the general population and 28.2% of inmates. Hispanics are also disproportionately represented, comprising 39.4% of the general population and 44.2% of inmates.

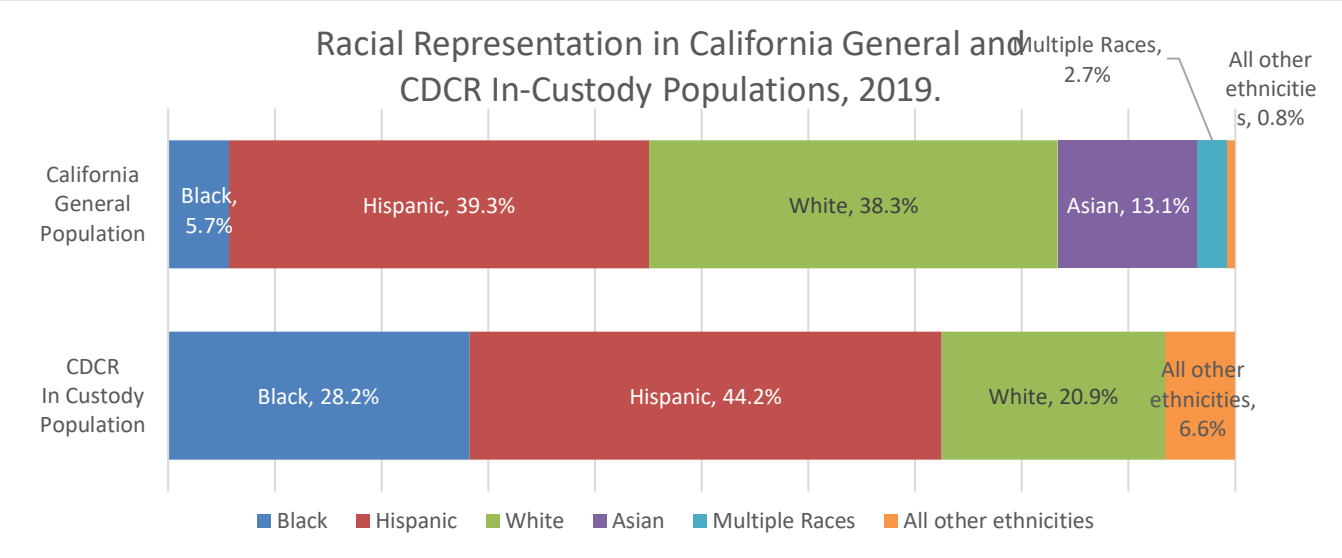


Figure 2. Racial Representation in California General Population and CDCR In-Custody Populations

II. 2020 Study Findings

A. Causes of Inmate Death

There were 492 inmate deaths in calendar year 2020, 486 in males (98.8%) and 6 in females (1.2%). Table 1 shows the number and causes of all inmate deaths.

Number of Cases	Category and Causes of Death
141	Infectious Disease (COVID-19)
83	Cancer (CA) CA-lung (17); CA-colorectal (8); CA-pancreas (8); CA-prostate (7); CA-esophagus (6); CA-bladder (5); CA-brain (5); CA-unknown primary (4); CA-kidney (3); CA-bile duct (2); CA-tongue (2); CA-larynx (2); CA-lymphoma (2); CA-stomach (1); CA-ureter (1); CA-acute myelogenous leukemia (1); CA-acute lymphoblastic leukemia (1); CA-gall bladder (1); CA-malignant thymoma (1); CA-melanoma (1); CA-liposarcoma (1); CA-multiple myeloma (1); CA-nasopharynx (1); CA-parotid gland (1); CA-thumb (1)
54	Cardiovascular Disease sudden cardiac arrest (38); congestive heart failure (11); acute myocardial infarction (4); post-operative cardiac arrest (1)
46	Infectious Disease (non-COVID-19) sepsis (16); pneumonia (11); endocarditis-infectious (10); pneumonia-aspiration (3); disseminated coccidioidomycosis (2); abscess, intracranial (1); disseminated histoplasmosis (1); influenza A (1); necrotizing fasciitis (1)
32	Advanced (End Stage) Liver Disease (ESLD) ESLD with hepatocellular carcinoma (HCC) (18); ESLD without HCC (14)
32	Homicide
31	Suicide
23	Drug Overdose fentanyl (6); non-specified opioid (6); heroin (4); cannabinoid (1); fentanyl + heroin (1); fentanyl + methamphetamine (1); methamphetamine (1); methamphetamine + morphine (1); morphine (1): other (1)
11	Neurological Disease dementia (5); Parkinson disease (2); amyotrophic lateral sclerosis (1); central cord syndrome (1); myasthenia gravis (1); seizure disorder (1)

Number of Cases	Category and Causes of Death
10	Pulmonary chronic obstructive pulmonary disease (7); pulmonary fibrosis (2); pneumonia-aspiration (1)
6	Gastrointestinal Disease pancreatic abscess with sepsis (1); acute intestinal obstruction (1); intestinal perforation (1); intestinal perforation with sepsis (1); ischemic bowel (1); upper GI hemorrhage (1)
4	Auto Immune autoimmune hemolytic anemia (1); autoimmune hepatitis (1); rheumatoid arthritis (1); sarcoidosis (1)
4	Accidental Injury duodenal perforation (1); drug overdose-venlafaxine (1); asphyxiation (1); cardiac tamponade due to iatrogenic perforation of superior vena cava (1)
4	Cerebrovascular Disease stroke (3); stroke-hemorrhagic (1)
4	Renal Disease end stage renal disease (4)
4	Endocrine/Metabolic/Nutrition/Immunity hypoglycemia (1); diabetic ketoacidosis (1); diabetes mellitus (1); dehydration (1)
2	Circulatory System pulmonary embolus (1); sudden cardiac arrest with pulmonary embolism (1)
1	Unknown sudden cardiac arrest (1)
492	Grand Total

Table 1. Causes of Death Among All California Inmates, 2020.

The SARS-CoV-2 virus (COVID-19) was the number one cause of mortality in 2020, accounting for 141 or 29% of all deaths in the CCHCS. Four of these patients experienced sudden cardiac deaths and initially were not suspected to have had COVID-19 infection but review by the MRC concluded that each had died from COVID-19-related complications. An additional 4 patients were infected with COVID-19 at the time of death, but COVID-19 was not thought to be causal in these patients' deaths.

Cancer, with 83 cases, was the second leading cause of death in 2020. Cancer of the lung (17 cases) was the most common, followed by colorectal (8), pancreatic (8), and prostate (7) cancers. Cancer of the liver (hepatocellular carcinoma) is not included in this total. The liver cancer deaths are included in the category of advanced liver disease (as a well-known complication accompanying that disease).

Cardiovascular disease, with 54 deaths, was the third leading cause. Sudden death or sudden cardiac arrest (38 cases), congestive heart failure (11 cases), and acute myocardial infarction (4 cases), together accounted for 53 of these. The majority of these are attributed to underlying coronary artery disease.

Infectious diseases excluding COVID-19 caused 46 deaths. Sepsis (16), pneumonia (11) and infectious endocarditis (10) were the top three causes in this category.

Advanced liver disease, including liver cancer, caused 32 deaths. Homicide also caused 32 deaths in 2020. These two causes of death tied for fifth in 2020.

Suicide (31 deaths), and drug overdose (23 deaths) were the seventh and eighth leading causes.

Neurologic disease caused 11 deaths and noninfectious pulmonary diseases caused 10 deaths.

Table 2 shows the top causes of death in the California prisons from 2006 through 2020.

Top Causes of Death in California State Prisons

YEAR	RANK								
	1	2	3	4	5	6	7	8	9
2020	Infectious Disease - COVID-19	Cancer	Cardiovascular Disease	Infectious Disease (not COVID-19)**	(tied) Advanced Liver Disease; Homicide		Suicide	Drug Overdose	Neurological Disease
2019	Cancer	Drug Overdose	Cardiovascular Disease	Advanced Liver Disease*	Suicide	Infectious Disease**	Homicide	Pulmonary	Neurological Disease
2018	Cancer	Cardiovascular Disease	Drug Overdose	End Stage Liver Disease*	Infectious Disease**	(tied) Suicide, Homicide		Pulmonary	Circulatory System
2017	Cancer	Cardiovascular Disease	End Stage Liver Disease*	Drug Overdose	Infectious Disease**	Suicide	Homicide	Cerebrovascular Disease	Pulmonary
2016	Cancer	Cardiovascular Disease	End Stage Liver Disease*	Infectious Disease**	Drug Overdose	(tied) Suicide, Homicide		Cerebrovascular Disease	Pulmonary
2015	Cancer	Cardiovascular Disease	End Stage Liver Disease*	Infectious Disease**	Suicide	Drug Overdose	Homicide	Cerebrovascular Disease	Pulmonary
2014	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	Drug Overdose	Pneumonia **	Homicide	Pulmonary	(tied) Infectious; Stroke-Hemorrhagic
2013	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	Drug Overdose	Homicide	Sepsis**	(tied) Pulmonary; Pneumonia**	
2012	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	Homicide	Drug Overdose	(tied) Sepsis; Infectious**		Stroke
2011	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	Pneumonia **	Homicide	Sepsis**	Drug Overdose	Stroke
2010	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	(tied) Drug Overdose; Homicide		Pneumonia **	Congestive Heart Failure	(tied) Coccidioido-mycosis; End Stage Renal Disease; Stroke
2009	Cancer	End Stage Liver Disease*	Cardiovascular Disease	Suicide	Drug Overdose	Pneumonia **	Congestive Heart Failure	Homicide	
2008	Cancer	Suicide	End Stage Liver Disease*	Cardiovascular Disease	Drug Overdose	Pneumonia **	HIV/AIDS	Congestive Heart Failure	Sepsis**
2007	Cancer*	End Stage Liver Disease	Cardiovascular Disease	Suicide	Homicide	HIV/AIDS	Stroke	Drug Overdose	Pneumonia**
2006	Cancer*	Cardiovascular 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. COVID-19 is its own category.*

Table 2. Top Causes of Death Among California Inmates, 2006–2020.

Figure 3 compares the causes of death in California inmates in 2019 and 2020.

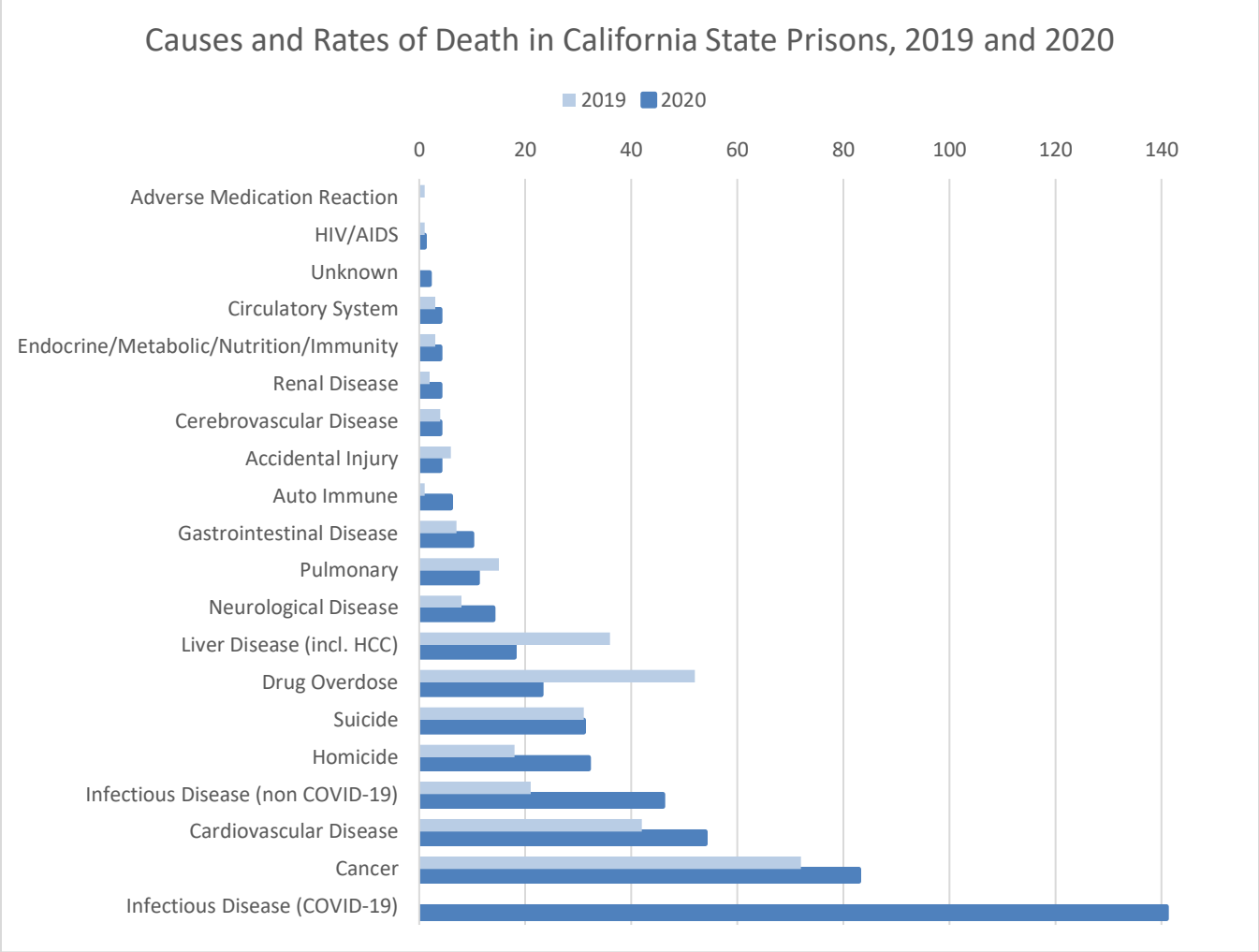


Figure 3. Causes of Death in California State Prisons, 2019 and 2020.

Aside from COVID-19, the death rates for cancer and cardiovascular disease appear much the same as in prior years, whereas the death rates from homicides and infectious diseases other than COVID-19 were higher and the death rates from suicide and advanced liver disease were lower in 2020. The death rate from drug overdose was strikingly lower in 2020, with 41 fewer deaths than in 2019.

B. Average Age at Time of Death in the CCHCS, 2020

The average age of all male inmates who died in 2020 was 60 years; the average age of deceased female inmates was 58 years.

In the prison population, the youngest inmate death was at age 21, the oldest at age 90.

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 2020, drug overdoses, suicides, and homicides caused death at an average age of 42, while the average age of death by all other causes, including COVID-19, was 64.

	Age Range	Average Age
Age of all 486 male decedents	21 – 90	60
Age of all 6 female decedents	44 – 72	58
Age of suicides, drug overdoses, and homicides	21 – 75	42
Suicide	21 – 70	40
Drug overdose	21 – 74	41
Homicide	21 – 75	41
Age excluding suicide, drug overdose, and homicide	28 – 90	64

Table 3. Ranges and Average Ages at Death Among All California Inmates, 2020.

C. Expected and Unexpected Deaths in 2020

1. Expected Deaths

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

The 200 expected deaths in 2020 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 292 cases of unexpected death in 2020. Drug overdoses, accidents (unintentional injuries), suicides, and homicides together accounted for 90 (38%) of these. Sudden cardiac arrests were an additional 37 (12.7%).

Figure 4 compares unexpected and expected deaths in each causation category. COVID-19 appears in both categories, probably due to its variable natural history.

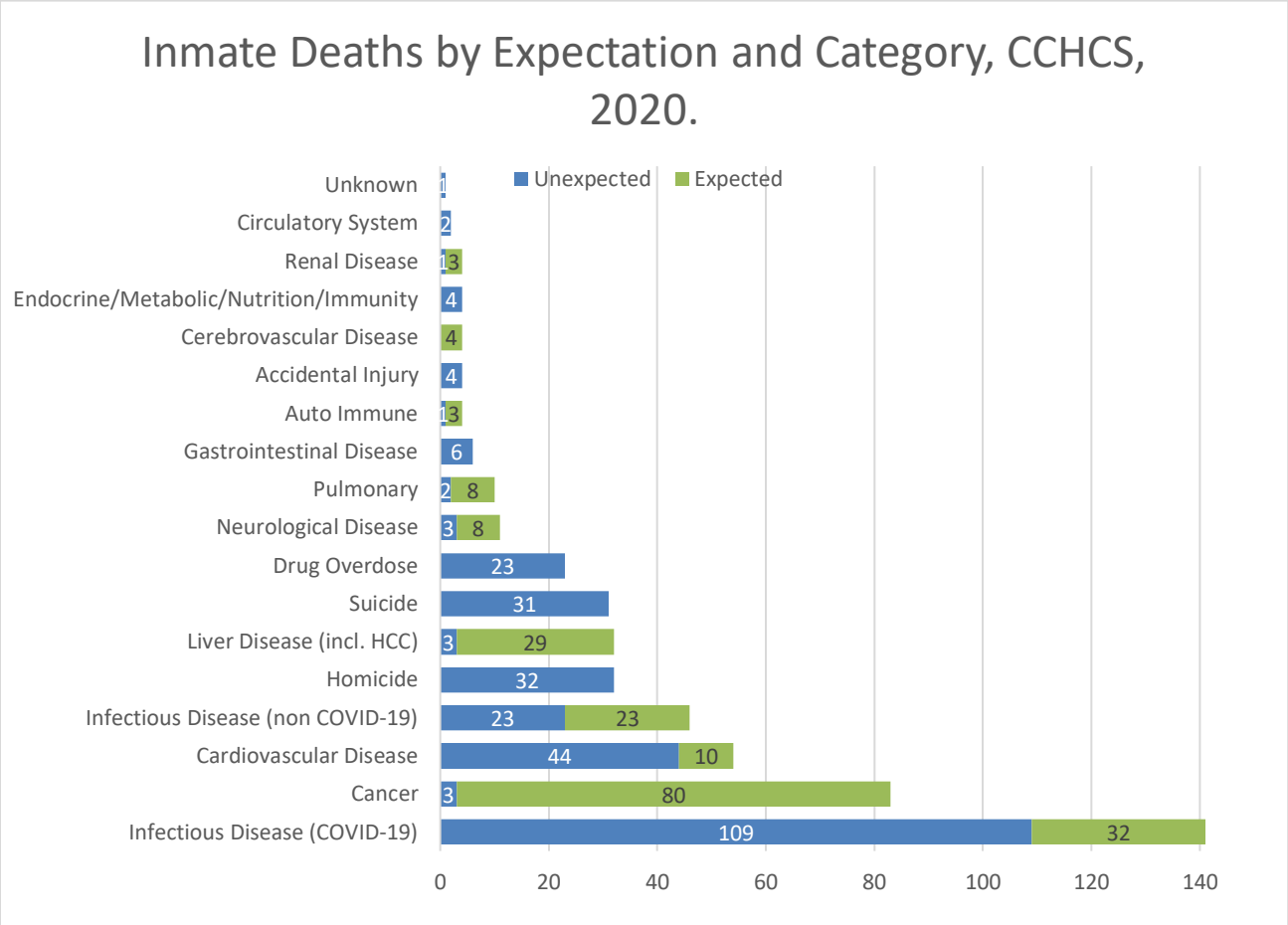


Figure 4. Inmate Deaths by Expectation and Category, CCHCS 2020.

D. Opportunities for Improvement, 2020

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 (MRC) identifies opportunities for improvement and forwards those findings to the appropriate prison and region for further review.

An OFI cited in a Mortality Review can be relatively minor (documentation inconsistency) or potentially serious (an important specialist recommendation lost during a patient transfer, resulting in a significant delay in the diagnosis of a treatable condition).

In 2020, a total of 959 OFI findings were identified, including Potential Quality Issues (PQI). Of these, 571 occurred in unexpected deaths and 388 occurred in expected deaths. This difference of 183 more OFI in unexpected deaths is almost entirely accounted for by a difference of 88 OFI cited in emergency responses (since there are usually no emergency protocols initiated in patients whose deaths are

expected), and by an additional difference of 104 in the OFI for covid protocols in unexpected vs. expected deaths.

The average number of OFIs per death was 0.9 in 2018, 1.1 in 2019 and 1.9 in 2020. The emergence of the COVID-19 pandemic created disruptions in standard procedures and processes, added uncertainty and required a learning curve for staff and for patients. The increased number of OFI findings does not necessarily correlate with a poorer quality of health care, but may be due to increased awareness of the importance of identifying opportunities for quality improvement reflected in the activity of the MRC.

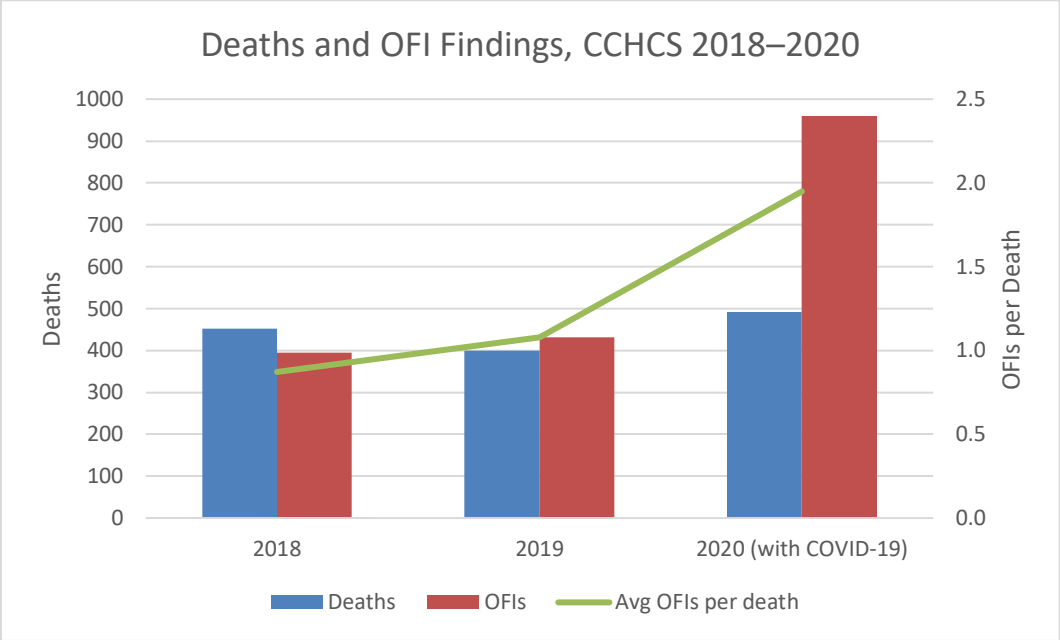


Figure 5. Deaths and OFI Findings, CCHCS 2018–2020.

Additionally, as seen in Table 4 below, there were 230 OFI specifically related to findings regarding adherence to new and changing COVID-19 policies and processes. The MRC recorded 392 OFI findings in 2018 and 431 OFI findings in 2019.

The classification system for OFI used in this annual report was devised in 2018 and refined in 2019 and 2020.

Table 4 shows the categories of OFI, the number of OFI findings in unexpected and expected deaths, and total findings in each category.

Opportunities for Improvement	Unexpected Deaths	Expected Deaths	Total
1. Opportunities to improve application of the "Model of Care" as described in the CCHCS Complete Care Model			
a. Meeting access timeframes for routine and urgent care	14	19	33
b. Applying complex care management for improved coordination or continuity	17	19	36
c. Transferring a patient to a more appropriate level of care	20	8	28
d. Optimizing care near the end of life…			
i. Applying Physician's Orders for Life Sustaining treatment (POLSTs) and Do Not Resuscitate (DNR) orders	32	19	51
ii. Honoring POLST and DNR orders	6	14	20
iii. Improving pain and other symptom management, especially in cancer care	-	4	4
iv. Offering hospice care to terminally ill patients	6	9	15
e. Improving counseling of non-adherent or non-compliant patients	4	1	5
f. Substance Abuse Disorder Program referral indicated but not made	9	1	10
2. Opportunities to improve clinical decision making by improved recognition and management of important clinical signs and symptoms	58	55	113
3. Opportunities to improve recognition and action in response to abnormal laboratory, imaging and other diagnostic test results	17	21	38
4. Opportunities to improve adherence to policies and procedures, and care guides for specific diseases, conditions, or risk factors			
a. COVID-19 Interim Guidance	167	63	230
b. Care Guides			
i. Fall risk	6	14	20
ii. Pressure ulcer (injury) avoidance	4	17	21
iii. Medication management	10	8	18

Opportunities for Improvement	Unexpected Deaths	Expected Deaths	Total
iv. Other Care Guides	25	13	38
5. Opportunities to improve communication between providers in primary care teams and care transitions.			
a. Specialty care	1	5	6
b. Hospital	6	6	12
c. Emergency Department	2	3	5
d. Mental Health	8	-	8
e. Custody	-	-	-
f. Primary Care Physicians	-	-	-
g. Primary Care Physician and Nursing	2	2	4
h. Other	-	2	2
6. Opportunities to improve medical record documentation			
a. Inadequate or inaccurate record	8	11	19
b. Missing Report	5	3	8
c. Missing Physician or Nurse notes	6	2	8
d. Legacy Charting	14	8	22
e. Incomplete Problem List	9	9	18
7. Opportunities to prevent delays in diagnosis and/or treatment	6	25	31
8. Opportunities to improve the practice and documentation of CCHCS Emergency Protocols			
a. Delay calling 9-1-1	30	3	33
b. Documentation lapse	33	1	34
c. Other	32	3	35
9. Potential Quality Issue (PQI) referral	14	20	34
TOTAL	571	388	959

Table 4: Opportunities for Improvement – Interim Classification for 2020 Mortality Reviews and Frequency in Unexpected and Expected Deaths

1. Opportunities to improve the application of the "Model of Care" as described in the CCHCS Complete Care Model

The Complete Care Model (CCM) is the foundation for delivery of all care in the CCHCS. Adopted in 2015, the CCM was based on the industry standard "Patient Centered Medical Home". In the CCM every patient is assigned to one of several Interdisciplinary Care Teams at an institution. Each Care Team has the responsibility for promoting and providing continuous, comprehensive, coordinated, and patient centered care for its panel of assigned patients. Care teams follow standards for access to primary prevention, wellness services, episodic care, chronic disease management, urgent and emergent needs, and end-of-life care. The CCM uses processes such as daily care team huddles, panel management strategies, performance dashboards, master patient registries, patient problem lists, and decision support tools such as the Care Guides for clinical support.

a) Meeting access timeframes for routine and urgent care.

33 Total (22 Routine; 11 Urgent):

11 Routine, 3 Urgent in unexpected deaths; 11 Routine, 8 Urgent in expected deaths

The 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

In 2020, examples of cases not meeting these standards included a request for an abdominal CT scan in a patient who was being evaluated for abdominal pain, whose request was denied "due to covid", and many instances of delays in routine requests for care for a variety of symptoms.

b) Applying complex care management to improve care coordination

36 Total: 17 in cases of unexpected death; 19 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 and maximize outcomes. Patients with complex care needs often need coordination of visits to specialists, appointments for special diagnostic tests or procedures, pre and post-operative instructions, and other special education and counseling. Candidates for complex case management include patients with concurrent mental illness, complex conditions such as cancer, dementia or chronic debilitating conditions like Parkinson disease, patients on multiple

medications, 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. Special populations such as those with Substance Use Disorder or patients with chronic nonadherence also apply. Risk stratification tools and criteria can be found in the Health Care Department Operations Manual.

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

28 Total: 20 in cases of unexpected death; 8 in cases of expected death

These are missed opportunities to timely transfer patients to levels of care more appropriate to their clinical status. Several patients had "red flag symptoms or signs" such as abnormal vital signs, shortness of breath, and/or abnormally low oxygen saturation levels but were not sent to an emergency room for possible hospitalization. There were 7 patients who had oxygen saturation levels in the low 90's or high 80's who were subsequently diagnosed with COVID-19 pneumonia. (Not all patients with COVID-19 pneumonia and low oxygen saturations are severely symptomatic and some even deny shortness of breath despite low oxygenation, only to rapidly decompensate.)

d) Optimizing care at the end of life

90 Total: 44 in cases of unexpected death; 46 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 are "elderly, frail, burdened with serious chronic medical conditions, or have less than six months' life expectancy". These patients 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. During these discussions, a patient might forego resuscitation in the event of a terminal emergency. Such a decision would generate a "do not resuscitate/do not intubate" (DNR/DNI) order.

i. POLST/DNR discussions in appropriate patients not initiated

51 Total: 32 in cases of unexpected death; 19 in cases of expected death

These 51 patients were appropriate for POLST discussions, but care teams did not initiate them.

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

20 Total: 6 in cases of unexpected death; 14 in cases of expected death

These patients had specific orders written for modifications in their 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 against their previously expressed or written desires.

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

15 Total: 6 in cases of unexpected death; 9 in cases of expected death

The optimal management of pain in cancer patients or patients who have other reasons for severe or intractable pain is the goal for all primary care teams. The Care Guide for Pain Management emphasizes a comprehensive approach to diagnosis and management of all types of pain including the importance of chronic pain as a red flag symptom of underlying malignancy and other occult conditions. The importance of screening for and making concurrent depression and the judicious use of non-narcotic and narcotic strategies are covered in detail.

In 2020, there were 15 OFIs for cases in which patients might have experienced better management of pain. Ten of these patients had cancer.

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

113 Total: 58 in cases of unexpected death; 55 in cases of expected death

Previous reviews have discussed the concept of "red flag" symptoms or signs as indicators of potential serious diseases. The term "red flag" was originally associated with back pain, but now lists of red flag symptoms exist for many other conditions. Examples cited in prior years in the CCHCS have included chest pain or shortness of breath as indicators of acute coronary syndromes, unexplained weight loss or prolonged abdominal pain as the first indicator of an underlying malignancy, and atypical headache or an alteration in mental status as a harbinger of brain tumor or stroke. In prior years, unsuspected bowel perforation was heralded by hypotension or altered level of consciousness. Other important red flags included unilateral leg swelling in deep vein leg thrombus, and a new heart murmur in endocarditis. Specific red flags such as jaundice, hematemesis or melena are definitely abnormal and should always be quickly investigated. An extensive medical literature on "red flags" can be accessed in this review article:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060920/

In 2020, there were 113 OFI for symptoms or signs that were thought to have been incomplete evaluated or evaluated more slowly than was indicated.

Table 5 shows the most common of these OFI and (if known) the eventual diagnoses.

Clinical Sign or Symptom	Number of Findings	Eventual Diagnoses
abnormal vital signs (fever, tachycardia)	23	COVID 19 (12), sepsis (3), malnutrition (2), abscess (1)
weight loss	14	CA pancreas (3), esophagus (2) liver (2), unknown site, stomach, kidney (1each)
abdominal pain	13	CA - bladder (2), CA - unknown primary (2), CA - pancreas (1), bowel obstruction (2), advanced liver disease (2)
low oxygen saturation (85-92%)	9	COVID-19 (7), aspiration pneumonia (1)
altered mental status or change in behavior	9	dementia (2), CA - brain (2), stroke (2)
shortness of breath	7	COVID-19 (4 cases)
pain, miscellaneous - back, groin, throat, neck	7	CA testis, CA - parotid, CA -esophagus (1 each)
high blood pressure	6	none known
nausea, vomiting, diarrhea	6	drug withdrawal (1)
cough	5	COVID-19 (5)
dysphagia	4	CA larynx (2), aspiration pneumonia (1)
hematemesis	3	CA - esophagus (1 case)
dizziness	3	no diagnoses
chills, malaise	2	drug withdrawal (1)
headache, chronic	2	CA brain (2)
localized edema	2	abscess, substance abuse disorder
generalized edema	2	none known
suicidal ideation	2	suicide (2)
other: hematochezia (2), reported falls (2), hemoptysis, thirst, anorexia, dysphagia, reported “low blood sugar”	9	none known

Table 5. Signs and Symptoms Incompletely or Belatedly Evaluated and Eventual Diagnoses, CCHCS, 2020.

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

38 Total: 17 in cases of unexpected death; 21 in cases of expected death

Just as there are "red flags" for signs and symptoms, any abnormality in a diagnostic test should be treated as an indicator of potentially serious disease and needs appropriate followup. All abnormal test results should be flagged, noted, and explained. There should be a system which accounts for abnormal results logged in after hours, on weekends and during shift changes. Communication with specialists, at times of admission and discharge to hospitals and other tertiary care locations, and at times of interfacility transfers or discharges to parole are important care transitions during which test results can be lost. Some of the OFI cited in this category led to significant delays in diagnosis or treatment, as will be discussed in a later section.

In 2020, there were 38 OFI in this category. They included tests indicative of underlying malignancy in 15 cases: 7 abnormal CT scans, 2 abnormal ultrasounds, 2 anemias, one abnormal urinalysis, one abnormal liver function, one positive test for fecal occult blood, and one abnormal skin biopsy. An abnormal white blood cell count, a positive blood culture, and ketones in the urine were abnormalities in three cases of sepsis. An abnormal chest x-ray was missed early in a case of COVID-19.

4. Opportunities to improve adherence to policies and procedures and care guides for specific diseases, conditions, or risk factors

328 Total: 212 in cases of unexpected death; 116 in cases of expected death

a) COVID-19 Interim Guidance

230 Total: 167 in cases of unexpected death; 63 in cases of expected death

In 2020 the CCHCS developed extensive COVID-19 guidance for all staff in California prisons. Based on prevailing standards from the Centers for Disease Control and Prevention (CDC) and the California Department of Public Health (CDPH), it is a frequently updated guide. It includes information on pharmaceutical and non-pharmaceutical prevention strategies, infection control, use of personal protective equipment, respiratory protection, and vaccination; testing and treatment; and outbreak management strategies including early identification of infection, isolation of infected patients, identification and quarantine of all contacts, monitoring and treating infected patients and containing local outbreaks. There are sections governing movement of patients within and between housing units, hospitals, and other prison facilities, and safe discharge and follow up of patients to the community.

The *COVID-19 and Seasonal Influenza: Interim Guidance for Health Care and Public Health Providers* included over 100 revisions and updates in calendar year 2020. It can be accessed at https://cchcs.ca.gov/covid-19-interim-guidance/

In 2020, there were 230 OFI addressing improved adherence to COVID-19 policies and procedures. This represents 24% of all the OFI noted by the MRC. There was a significant additional workload imposed on CCHCS staff by all the new COVID-19 containment strategies, from universal screening to twice daily quarantine rounding, to daily detailed clinical assessments and treatments of all infected patients, and proper documentation of all of the foregoing. The burden of documentation, in particular, created an unusual number of "legacy charting" citations, in which templated rounding was often placed in patients charts for dates during which the patient was no longer in the institution. (Some templates were revised in response to these findings.)

b) Care Guides

98 Total: 45 in cases of unexpected death; 53 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. In 2020, the following 30 Care Guides were available, and they can be accessed on the CCHCS website - cchcs.ca.gov/clinical-resources. with the following diseases or conditions:

- Advanced Liver Disease*
- Anticoagulation
- Asthma
- Chest Pain
- Chronic Wound Management
- Clozapine
- Coccidioidomycosis (Valley Fever) Chronic Obstructive Pulmonary Disease
- Cognitive Impairment/Dementia
- Diabetes (Type 2)*
- Dyslipidemia (high or abnormal cholesterol)
- Foreign body ingestion/insertion
- Hepatitis C*
- HIV*
- Hunger Strike
- Hypertension*
- Intoxication and Withdrawal*
- Major Depressive Disorder
- Medication Assisted Treatment for Opioid Use disorder in Pregnancy
- Pain Management
- Palliative Care
- Post Renal Transplant*
- Primary Care Guide to Foot Care*

- Schizophrenia
- Seizure Disorders
- Skin and Soft Tissue Infections
- Substance Use Disorder*
- Transgender*
- Tuberculosis
- Weight Management

Care Guides new or revised in 2020 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
- Wound Care

i. Opportunities to mitigate fall risk

20 Total: 6 in cases of unexpected death; 14 in cases of expected death

Patients at risk for falls are expected to be identified by their care teams. All patients are screened for risk for falling, including any history of falls, current ambulation, vision and balance

status, measuring of blood pressures supine and upright, presence of chronic disease, and medications that might increase fall risk. 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, beds placed in a lower and safer position, call devices available within easy reach, handrail safety, mobility support items, non-slip footwear, and traffic paths free of clutter.

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.

ii. Pressure Ulcer (Injury) Avoidance

21 Total: 4 in cases of unexpected death; 17 in cases of expected death

Pressure injuries are a major source of patient morbidity at hospitals and long-term care institutions. Risk factors for pressure injury are immobilization, malnutrition, sensory loss and decreased circulatory perfusion. Patients with stroke, severe arthritis, paralysis or weakness, advanced age, and patients in restraints are all at risk for developing pressure injury. The development of a pressure injury or ulcer (known as a decubitus ulcer) increases the risk for local and systemic infection which can lead to sepsis and death. All CCHCS patients with risk factors are expected to be screened for pressure injury risk and any patient at risk is given a prevention and treatment plan to mitigate the risk of further injury, infection, and sepsis.

Of the OFI cited for pressure injury in 2020, 6 cases were acquired during inpatient stays at contracted hospitals, and 15 were acquired by severely ill and bedridden patients at CCHCS institutions.

iii. Medication Management

18 Total: 10 in cases of unexpected death; 8 in cases of expected death

In 2020 there were 18 OFI in which the management of prescribed medication could have been improved. Diabetes management was cited in 4 cases: one patient had recurrent hypoglycemia which was not well managed, one patient received no medication for persistent increases in blood glucose, one patient had suboptimal insulin management, and one patient did not have oral medications adjusted for poor kidney function. There were 2 cases in which anticoagulation could have been better managed - one in which prophylactic anticoagulation

for the prevention of post-operative deep vein thrombosis was prolonged past the two week recommendation, and one in which prescribed anticoagulant may not have been indicated in a patient with a terminal prognosis. There were 2 cases each involving suboptimal use of antibiotics, nonsteroidal anti-inflammatory agents, and proton pump inhibitors. And there was one case each of the following: inappropriate use of an anti-fungal agent, cholesterol lowering agents indicated but not prescribed, a corticosteroid not tapered as recommended, acetaminophen ordered despite a history of allergy, serum sodium not being monitored as indicated in patient with hyponatremia induced by oxcarbazepine, and the hoarding of a narcotic ordered by directly observed therapy, later to be used in an overdose attempt.

iv. Other

38 Total: 25 in cases of unexpected death; 13 in cases of expected death

There were 38 additional OFI in the area of adherence to recommended practices in care guides or deviations from standard nursing protocols. These included 6 references to the Advanced Liver Disease Care Guide, 4 references each to the Anticoagulation and Wound Care Guides; 3 references each to Suicide prevention and monitoring, the use of cardiac risk profiling in patients with dyslipidemia, and recommendations in the Chronic Obstructive Pulmonary Disease Guide; 2 references each to the Hunger Strike and Diabetes Care Guides; 2 references each to Nursing documentation and sexual assault protocols; and one OFI in each of the following cases: lung cancer screening in a high risk patient, aortic aneurysm screening in an older smoker, improper use of respiratory therapy equipment, a lapsed developmental disability evaluation, and physical therapy not given to a non-ambulatory patient recently discharged from the hospital.

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

37 Total: 18 in cases of unexpected death; 19 in cases of expected death

The accurate transfer of clinical information between care teams at transitions of medical care is important for high quality patient care. Lost 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 when the patient is transferred to the ED or hospital. Poor communication between specialists and primary care teams can lead to critical tests being delayed or not done. Information missing or lost when patients are transferred can lead to missed diagnoses or delayed treatment. Within care teams there is also potential for missed communication. There were 37 OFI in this general category. Of these, 12 cited care team – hospital communication, eight cited poor primary care – mental health interaction, six cited miscommunication between the primary care team and the specialist, five cited care team – emergency room, four cited care team – nursing, and two cited other

communications issues. No cases cited OFI related to primary care – primary care, or primary care – custody communications.

6. Opportunities to improve medical record documentation

75 Total: 42 in cases of unexpected death; 33 in cases of expected death

The adoption of the electronic medical record (EMR) was completed in 2017. It has resulted in more complete documentation of visits and improved systems for storing and sharing information. There are several areas in which opportunities for improvement exist.

a) Inadequate or inaccurate documentation of care which occurs inside the CCHCS.

19 Total: 8 in cases of unexpected death; 11 in cases of expected death

b) Incomplete or missing documentation

8 Total: 5 in cases of unexpected death; 3 in cases of expected death

This can occur when, for example, care is provided outside of the CCHCS, and information may not be transferred from one EMR system to another. A record of a patient encounter in an outside emergency room, hospital, or specialist's office may be unavailable or missing for a time

c) Missing physician or registered nurse notes

8 Total: 6 in cases of unexpected death; 2 in cases of expected death

Examples include a lack of progress notes or shift entries, a missing note for pain medication, or no order written for a given medication.

d) Legacy charting

22 Total: 14 in cases of unexpected death; 8 in cases of expected death

"Legacy charting" is a term used to describe a workaround by some providers who "cut and paste" sections of patient encounters in order to save time.

e) Incomplete "problem list"

18 Total: 9 in cases of unexpected death; 9 in cases of expected death

The problem list captures a patient's known medical and psychiatric conditions and is to be always kept current. Examples include an acute overdose, an abnormal chest x-ray, obstructive sleep apnea, and multiple surgeries for colostomy that were not documented on the patients' problem lists.

The 75 OFI captured in this category do not include the documentation lapses cited during an Emergency Medical Response, the documentation of POLST and DNI/DNR orders or the numerous documentation lapses cited for the new COVID-19 procedures. These are all counted in their respective sections.

7. Opportunities to prevent delays in diagnosis or treatment

31 Total: 6 in cases of unexpected death; 25 in cases of expected death

In 2020, there were 31 cases in which delays were noted, the same number of cases as in 2019. Table 6 describes the reason for delay, the approximate duration of delay, and the eventual diagnosis.

Delay	Duration	Eventual Diagnosis
"Red flag" symptoms or signs: 8 cases		
1. Weight loss (20#)	3 months	Cancer - pancreas
2. Swelling in groin	6 months	Cancer - testis
3. Weight loss, hematuria	7 months	Cancer - prostate
4. Weight loss (56#)	9 months	Cancer - gastrointestinal
5. Chest pain, recurrent	9 months	Cancer - gastric
6. Vertigo, recurrent	18 months	Cancer - brain
7. Weight loss (10#), hematuria	30 months	Cancer - renal cell
8. Dysphagia, heartburn	36 months	Cancer - esophageal
Abnormal laboratory or other diagnostic test results: 4 cases		
1. Blood glucose (labile 56-600)	9 days	Diabetic ketoacidosis
2. Fecal occult blood	4 months	Cancer - colon
3. Abdominal CT	11 months	Cancer - liver
4. Elevated calcium	30 months	Hyperparathyroidism
Delayed referral to specialist: 4 cases		
1. Oncology	2 months	Cancer - recurrent brain
2. Surgery	4 months	Cancer - squamous cell (thumb)
3. Diagnostic imaging (PET scan)	8 months	Cancer - recurrent laryngeal
4. Surgery	13 months	Cancer - squamous cell (eyelid)
Other - Interfacility transfer while evaluation ongoing: 2 cases		
1. Oncology	1 month	Cancer -melanoma
2. Pulmonary	12 months	Usual interstitial pneumonia
Multifactorial: 13 cases		
1. Abdominal pain, delayed referrals	3 months	Cancer - unknown primary source
2. Interfacility transfer, denial CT request	4 months	Cancer - pancreas
3. Multiple referrals, delayed	5 months	Cancer - esophagus
4. Abnormal physical exam, abnormal bone scan, abnormal CT scan, abnormal biopsy	5 months	Cancer -recurrent- tongue

Delay	Duration	Eventual Diagnosis
5. History of "throat cancer", routine ENT referral, patient refusal of referral, abnormal CT, biopsy positive for cancer,	6 months	Cancer - recurrent - esophagus
6. Abnormal abdominal CT, patient refusal	7 months	Cancer - pancreas
7. Abnormal abdominal CT, delay referral	7 months	Cancer - liver
8. Abnormal chest x-ray, abnormal CT chest, abnormal PET, biopsy positive, delay repeat PET	14 months	Cancer - lung
9. Dysuria, recurrent abdominal pain, denied prostate ultrasound, interfacility transfer, delay surgery	15 months	Cancer - urinary bladder
10. Hoarseness, delayed ENT referral	15 months	Cancer - laryngeal
11. No recommended screening for liver cancer, abnormal CT chest	17 months	cancer - liver
12. Hoarseness, weight loss (13#), dysphagia, abnormal CT, patient refusal	21 months	cancer - esophagus
13. Recurrent pain of neck, jaw, ear, abnormal MRI	30 months	cancer - parotid gland

Table 6. Significant Delays in Diagnosis or Treatment, CCHCS, 2020.

A delay in diagnosis may occur when clinical "red flags" are not pursued. Unexplained weight loss, symptoms indicating blood loss, any persistent or recurrent pain, hoarseness, or difficulty swallowing (dysphagia) or urinating (dysuria) were red flags signifying potential cancers.

The proper recognition and management of abnormal laboratory or diagnostic imaging results is dependent on an integrated care team process. Workflows involve the ordering of tests, processing of orders, recording test results, tagging abnormal results, and appropriate and timely clinician response. Each of these steps carries potential for delay. Patients with abnormal imaging tests suggesting malignancy might benefit from special attention with care coordination strategies, involving individual case managers. Ten cases had abnormal test results suggesting malignancy.

A delay in access to specialists contributed to delays in 8 cases.

Patient non-adherence to recommendations for follow-up testing or referral to specialists can also be a significant factor contributing to delays. Case management aimed at counseling of patients can help with this problem.

Patients with a history of prior cancers should be worked up expeditiously to rule out recurrences. There were three such cases in 2020.

Untimely interfacility transfers delayed case evaluations in 3 cases.

In all, 27 of the 31 cases resulted in delayed diagnosis and/or treatment of cancers.

8. Opportunities for improving the practice and documentation of emergency medical responses.

102 Total: 95 in cases of unexpected death; 7 in cases of expected death

In 2019, there were 50 OFI in this category. A statewide quality initiative to redesign the Emergency Medical Response (EMR) Program began in 2018. The EMR Program was rewritten in March of 2019 and training commenced in 14 institutions by the end of 2019. The COVID-19 pandemic caused a temporary suspension of training in 2020, and training resumed in May of 2021.

Since there were many more emergency responses activated in cases of unexpected death, these accounted for 95 of the 102 OFI.

Delays in activation of a 9-1-1 call were noted in 33 cases. These delays ranged from 3 to 41 minutes.

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 improper use of emergency equipment.

9. Potential Quality Issues (PQI)

34 Total: 14 in cases of unexpected death; 20 in cases of expected death

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.

Primary health care is provided to California's inmate population in outpatient and inpatient units within the 35 CDCR institutions. For specialty care services, emergency department and hospital based care CCHCS has contracted with an independent outside contractor, Health Net. Mortality reviews which discover OFI involving contracted services will generate a PQI which is forwarded to the appropriate emergency department, hospital, or specialist for their further review and action.

In 2020, there were 34 PQIs, compared with 24 in 2019.

- Thirteen (13) PQI referrals involved pressure injuries/ulcers developing in hospitalized patients.
- Eight (8) patients were discharged prematurely from the hospital and readmitted within 24-48 hours of discharge.

- Six (6) patients had iatrogenic injuries: a neck hematoma developed following surgery; a pleural fluid infection followed a thoracentesis; a perforated superior vena cava complicated the removal of an implanted cardiac defibrillator; a neck fistula developed following placement of a central venous catheter; peritonitis complicated a partial colectomy for cancer; and a fall resulted in a fractured radius requiring surgical repair.

- Three (3) patients were discharged from the ED or hospital without having had an appropriate evaluation: one patient with multiple risk factors for acute myocardial infarction whose chest pain was not evaluated expeditiously; a patient with a penetrating facial injury could have been urgently referred to a higher level of care; and a patient with clinical evidence of sepsis who was discharged back to the institution rather than admitted to the hospital.

- Four (4) miscellaneous PQIs were as follows: a patient was intubated despite having a DNR/DNI order; a patient was discharged without the appropriate bottle for draining a pleural effusion; a patient did not have indicated COVID-19 testing performed; and a patient's chart had documentation inconsistencies.

All PQIs are managed by the entity to which the PQI was forwarded.

III. 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, 2001-2018 – Statistical Tables, Table 4 (NCJ 255970, April 2021).

A. Trends in Overall Prison Mortality Rates in California and the United States, 2006–2020

The following table shows the number of deaths and the corresponding mortality rates in California prisons from 2006–2020, compared to mortality rates at all U.S. state prisons.

			Death Rate per 100,000 Inmates	
YEAR	**CCHCS Number of Deaths**	**CCHCS Number of Inmates**	**CCHCS**	**U.S. State Prisons***
2006	424	171,310	248	249
2007	395	170,786	231	256
2008	369	170,022	217	261

YEAR	CCHCS Number of Deaths	CCHCS Number of Inmates	Death Rate per 100,000 Inmates	
			CCHCS	U.S. State Prisons*
2009	393	169,459	232	259
2010	415	166,700	249	246
2011	388	161,843	240	260
2012	362	134,929	268	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	323
2018	452	128,875	351	344
2019	399	125,270	319	not available
2020	(all) 492 (non-COVID-19) 351	107,347	458 327	not available

**May have been revised by BJS from previously published statistics.*

Table 7. Annual Mortality Rates Among California and U.S. State Prison Inmates, 2006–2020.

Figure 6 charts the trended death rates for the CCHCS from 2006–2020, and the trended death rates for all US prisons from 2006–2018 (most recent year available).

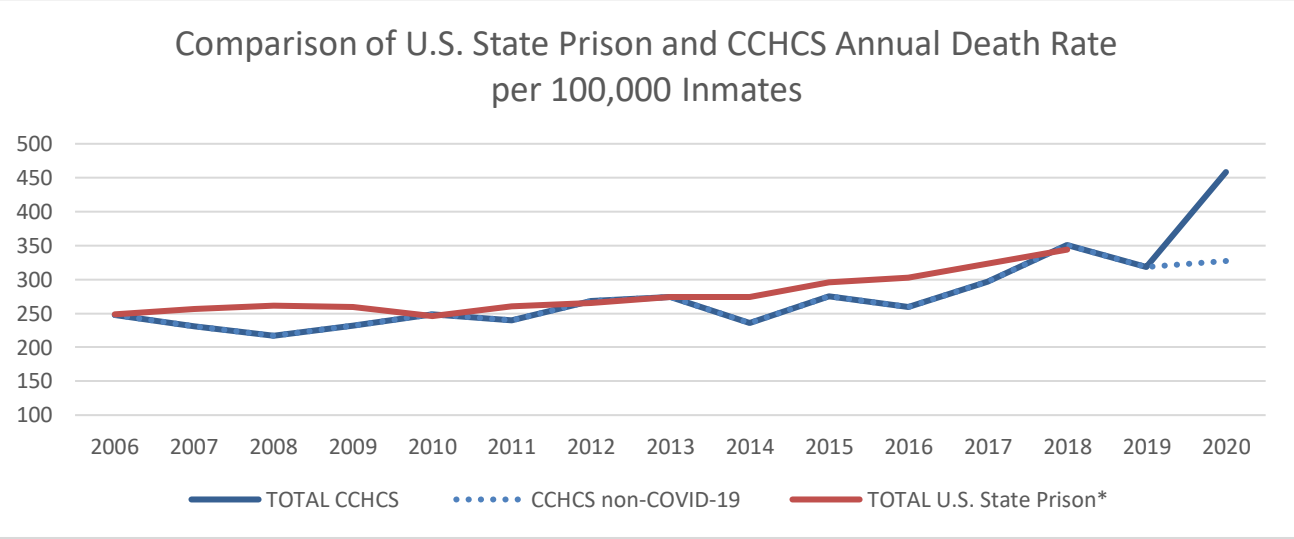


Figure 6. CCHCS Annual Death Rate per 100,000 Inmates, 2006–2020

The spike in mortality in 2020 was due almost exclusively to the coronavirus. The COVID-19 mortality rate for 2020 was 141/107,347 or 131/100,000. All non-COVID-19 causes were responsible for an annual mortality rate of 351/107,347 or 327/100,000. This non COVID-19 mortality rate in 2020 is still the second highest since 2006, exceeded only by 351 in 2018.

B. Selective Causes of Death Contributing to Increased Mortality Rates in 2020

1. COVID-19

The first COVID-19 death in the California prison system occurred on April 19, 2020. By the end of the year, the COVID-19 pandemic had caused 141 deaths.

Age – The age range of COVID-19 fatalities was 30 to 86, with a median age of 63 years.

Sex – 140 Male; 1 Female

Unlike what has been noted in the general population regarding the disproportionate burden of COVID-19 deaths among some racial and ethnic minority groups (https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/racial-ethnic-disparities/disparities-deaths.html#ref1), the ethnic composition of COVID-19 decedents is fairly consistent with that of the inmate population, suggesting that the social determinants of systemic health inequities are more responsible for the disparity than any genetic racial differences.

Ethnicity	COVID-19 Deaths Number	%	% Inmate Population
Hispanic	63	44.7%	44.2%
White	37	26.2%	20.9%
Black	31	22.0%	28.2%
All Others	10	7.0%	6.6%
Grand Total	**141**	**100.0%**	**99.9%**

Totals may not equal 100% due to rounding.

Table 8. Ethnic Representation in CCHCS COVID-19 Fatalities, 2020.

Individual Patient Risk factors – The CDC keeps an updated list of the risk factors for severe illness or death from COVID-19. The knowledge base continues to expand and is updated periodically https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/underlying-evidence-table.html

There is a high burden of chronic illness in CCHCS patients. COVID-19 high risk conditions and the number of CCHCS COVID-19 fatalities with each are listed in the table below. A total of 135 of

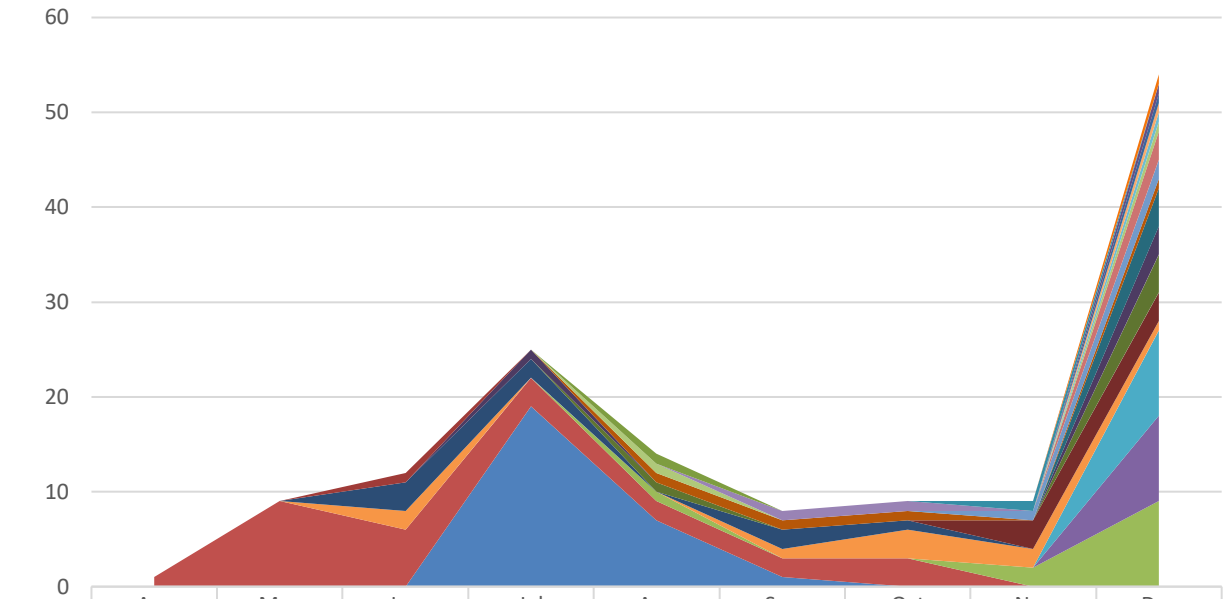
the CCHCS COVID-19 fatalities had one or more of these conditions. Only six of the 141 cases had no contributing conditions.

Most Common Associated Conditions	Number of cases
Essential (primary) hypertension	76
Overweight and obesity	50
Type 2 diabetes mellitus	50
Chronic obstructive pulmonary disease	25
Chronic ischemic heart disease	24
Disorders of lipoprotein metabolism and other lipidemias	23
Chronic kidney disease (CKD)	16
Fibrosis and cirrhosis of liver	16
Various cancers	12
Sleep disorders	12
Asthma	11
All others (less than 10 each)	91

Table 9. Associated Conditions in CCHCS COVID-19 Fatalities, 2020.

In addition to individual patient risk factors, there are other well known risk factors related to the prison environment itself. These include overcrowding, congregate living such as dormitories, lack of space for proper ventilation, isolation and quarantine, and the high disease prevalence in the prison population and their families.

The next chart shows the distribution of the COVID-19 deaths by specific prison, with CIM and SQ the top two prisons with 26 and 27 deaths respectively. The next five prisons accounted for 12, 9, 9, 9, and 8 deaths – a total of 47 deaths. These seven prisons had 71% (100 cases) of all CCHCS COVID-19 deaths. Seventeen prisons experienced from 1 to 6 deaths. Nine California prisons had no COVID-19 deaths.



	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CAL									1
HDSP								1	
SAC									1
SVSP					1				
CIW			1						
SOL									1
CEN									1
VSP									1
FSP						1	1		
MCSP					1				1
CCI									3
PVSP								1	2
CMC					1	1	1		1
KVSP									4
COR				1					3
CHCF					1				4
SATF								3	3
ASP			3	2		2	1		
CVSP			2			1	3	2	1
RJD									9
LAC									9
CTF					1			2	9
CIM	1	9	6	3	2	2	3		
SQ				19	7	1			

Figure 7. COVID-19 Deaths in California State Prisons, CCHCS 2020.

The chart shows a frequency distribution of the COVID-19 deaths by month. From April 19 to June 3, the California Institute for Men (CIM) experienced the first fifteen COVID-19 deaths accompanied by a very high rate of COVID-19 infection. Because of the high and rising prevalence of COVID-19 infection among inmates at CIM, a decision was made to transfer at risk patients from one particular dormitory at CIM to San Quentin (SQ) and one other prison. Unfortunately, pre-transfer testing results were delayed or unknown prior to transfer, and on arrival at SQ, it was found that 25 out of the 122 transferees were COVID-19 positive. The subsequent outbreak at SQ was associated with a toll of 27 deaths between June 24 and September 25. On June 12, 2020, the Receiver commissioned a team from UCSF and the Berkeley School of Public Health to conduct an on-site assessment. The team reported deficiencies in the physical plant, support staffing, and testing (see https://amend.us/wp-content/uploads/2020/06/COVID19-Outbreak-SQ-Prison-6.15.2020.pdf for the full report and recommendations).

At CTF, 11 of the 12 COVID-19 deaths occurred in the six weeks between November 19 and December 30. RJD and LAC each experienced nine COVID-19 deaths in the month of December.

The control of COVID-19 was the Receiver's highest priority during 2020. CCHCS began its COVID-19 policy development in late February 2020, when it became apparent that the virus had spread into the United States and was likely to pose a high risk to incarcerated populations and staff, where close contact, dense living situations, and high rates of inmate and prison staff movement were problematic.

Beginning in March 2020 an extensive mitigation and control strategy was launched. Communication with all staff and inmates was ongoing. The COVID-19 and Seasonal Influenza: Interim Guidance for Health Care and Public Health Providers provided an integrated approach to preventing, monitoring, and containing outbreaks of infection caused by SARS-CoV-2 (the virus that causes COVID-19). Based on standards and recommendations from the CDC and the CDPH, it includes sections on prevention strategies, including infection control, respiratory protection, and vaccination; testing and treatment; and outbreak management strategies including mass testing, quarantine, and isolation of select populations. These protocols were continuously monitored and revised based on the epidemiology and expanding knowledge base regarding COVID-19 infection. More than 100 revisions were published in calendar year 2020. Details of this comprehensive mitigation and control strategy are beyond the scope of this report but can be found on the CCHCS website: https://cchcs.ca.gov/covid-19-interim-guidance/

A summary of the policy development, testing strategies, early release programs, protocols addressing the movement of inmates between institutions, and lessons learned from local outbreaks can be found in the 44th, 45th and 46th Triannual Reports of the Federal Receiver, covering CY 2020. https://cchcs.ca.gov/archived_tri_annuals/

COVID-19 vaccination was not available in time to have any effect on 2020 mortality.

(Although not covered by this report, the effects of the COVID-19 pandemic on CCHCS and CDCR healthcare and custody staff was also very significant, with over 20 COVID-19 staff deaths occurring in 2020.)

2. Infectious Diseases Other Than COVID-19

The 47 deaths from non-COVID-19 infectious diseases were an increase from prior years, with a mortality rate of 44/100,000 compared to 21/100,000 in 2019. The number of deaths from three causes – sepsis (16), pneumonia (11), and infectious endocarditis (10) – were significantly higher in 2020 and contributed to the higher rate of death in this category.

The next table shows the non-COVID-19 infectious disease mortality rate for the years from 2012 to 2020. Prior to 2020, the total infectious diseases mortality rates ranged from 16/100,000 in 2014 to 29 in 2018, averaging 21.5. The rate of 44 in 2020 is significantly higher. The major contributors to infectious disease deaths in 2020 were sepsis (15/100,000), pneumonia (13/100,000) and infective endocarditis (9/100,000).

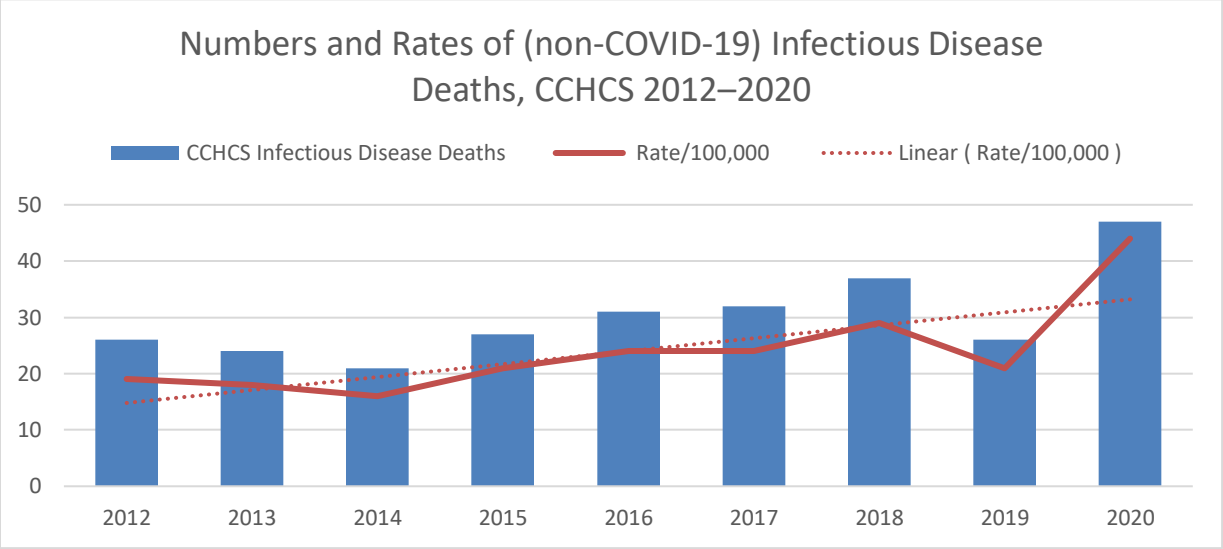
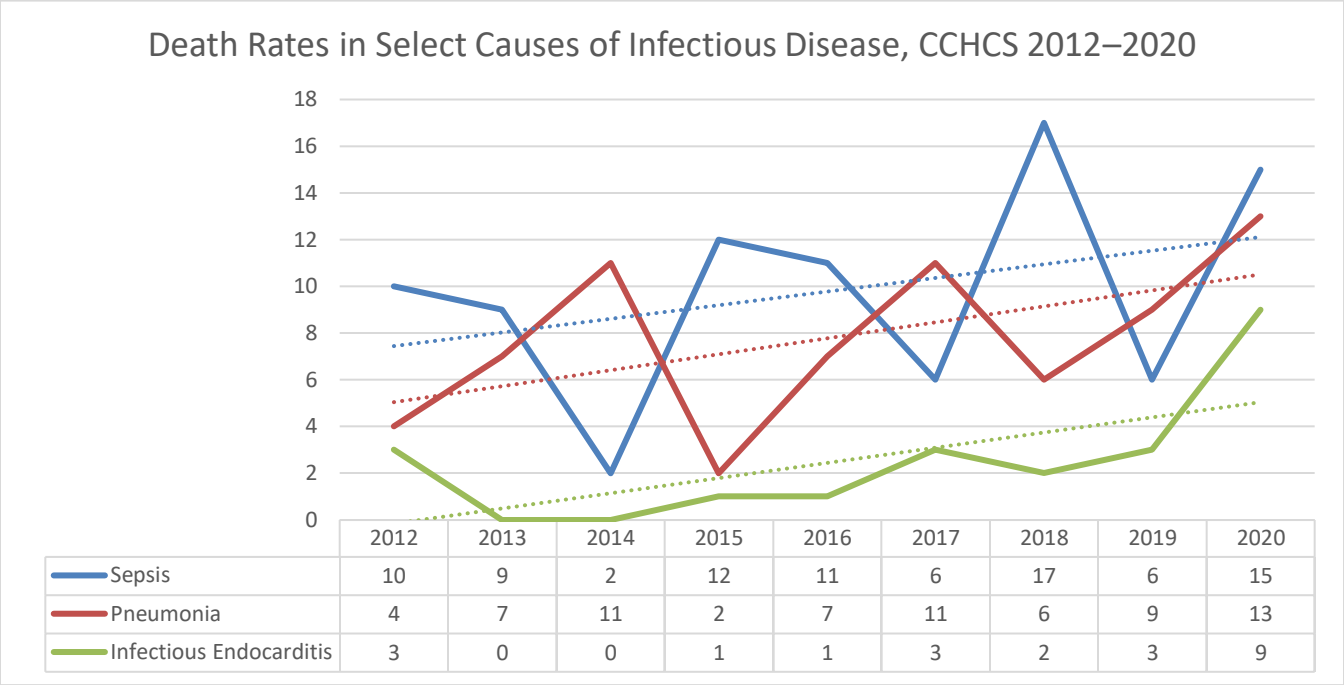


Figure 8. Numbers and Rates of (non-COVID-19) Infectious Disease Deaths, CCHCS 2012–2020

Figure 9 shows the sepsis, pneumonia, and infectious endocarditis mortality rates for each of the years from 2012 to 2020. Prior to 2020, the total infectious diseases mortality rates ranged from 16/100,000 in 2014 to 29 in 2018, averaging 21.5. The rate of 44 in 2020 is significantly higher. The major contributors to the higher infectious disease death rate in 2020 were sepsis (15/100,000), pneumonia (13/100,000) and infective endocarditis (9/100,000).



	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sepsis	10	9	2	12	11	6	17	6	15
Pneumonia	4	7	11	2	7	11	6	9	13
Infectious Endocarditis	3	0	0	1	1	3	2	3	9

Figure 9. Death Rates in Select Causes of Infectious Disease, CCHCS 2012–2020

Sepsis mortality rates for 2012-2020 ranged from a low of 2 in 2014 to a high of 17 in 2018. The 2020 rate of 15 is higher than the average and compatible with a rising death rate from sepsis. The source of systemic infection in the 16 cases of sepsis were known or suspected in nine cases – a diabetic foot ulcer, a shoulder abscess, a sacral pressure ulcer, ischemic bowel injury, a perforated bowel, a diseased gall bladder, osteomyelitis of the lumbar spine, and two cases of urinary tract infection – and unknown in seven.

Pneumonia mortality rates for 2019 ranged from 2 in 2015 to 13 in 2020. The 2020 rate of 13 contributed to a rising rate of death from pneumonia over the past nine years.

Infective endocarditis mortality rates ranged from 0 in 2013 and 2014 to 3 in 2019. The 2020 rate of 9 was much higher than in any previous year. The 10 patients who died of infective endocarditis in 2020 were all known to have had substance use disorder and five had known intravenous drug abuse. Seven of these patients were not referred for evaluation or treatment for substance use disorder. Three patients had been referred but had not been seen before their deaths from infective endocarditis. While not classified as drug overdose deaths, these ten represent a subset of death due to narcotic injection.

3. Homicide

Table 10 and Figure 10 show the numbers and mortality rates from homicides in the CCHCS from 2012-2020 and in all US prisons from 2012-2017.

Year	CCHCS Homicides	CCHCS Rate/100,000	U.S. State Prison Rate/100,000
2012	21	16	7
2013	20	15	7
2014	9	7	7
2015	16	12	7
2016	26	20	8
2017	19	15	9
2018	30	23	10
2019	22	18	NA
2020	32	30	NA

Table 10. Numbers and Rates of Homicides, CCHCS 2012–2020, and U.S State Prisons 2012–2018

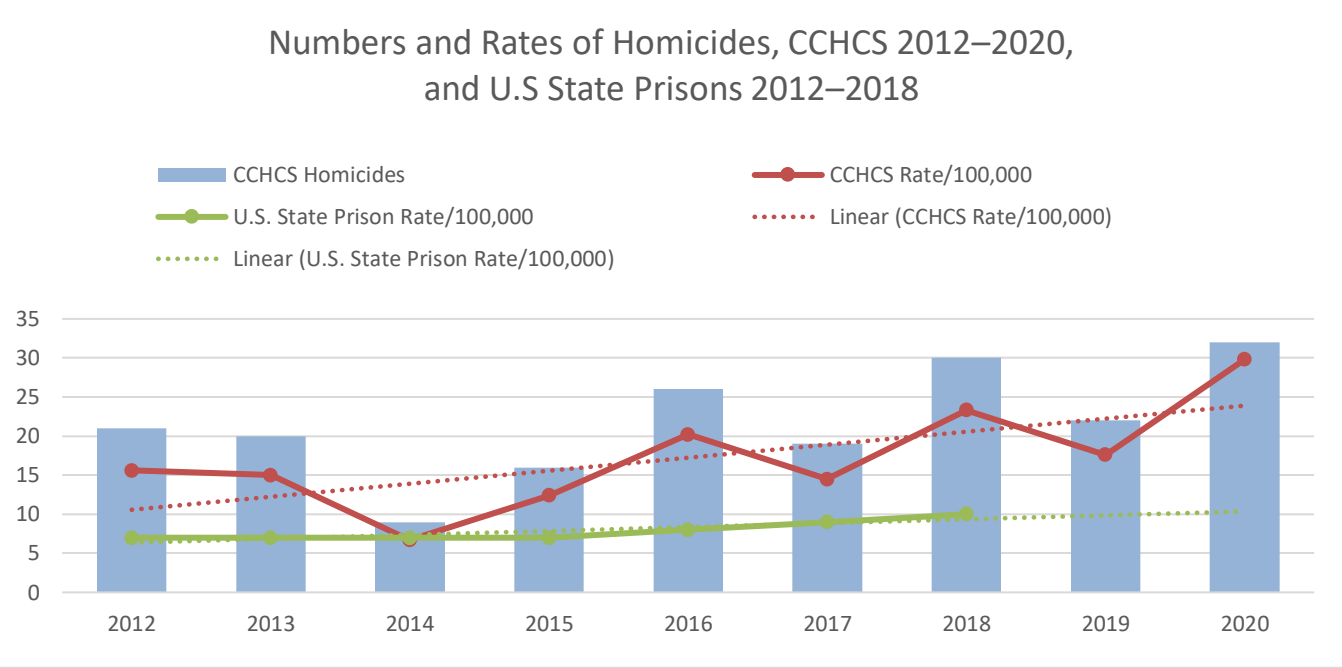


Figure 10. Numbers and Rates of Homicides, CCHCS 2012–2020, and U.S State Prisons 2012–2018

The 33 homicides in 2020, a death rate of 31/100,000, continues a trend that has been rising since 2014. The homicide rate in California State Prisons is now more than three times higher than the rate for other U.S. state prisons.

C. Selective Causes of Death Which Had Lower Mortality Rates in 2020

1. Drug overdose

Table 11 and Figure 11 show the numbers and mortality rates from drug overdose in the CCHCS from 2012-2020 and in all US prisons from 2012 -2017. (U.S. State Prison data also includes drug and alcohol intoxication.) As in prior years, none of these deaths were attributable to narcotics prescribed to the patients by physicians in the CCHCS.

Year	CCHCS drug overdoses	CCHCS Rate/100,000	U.S. State Prison Rate/100,000
2012	15	11	3
2013	24	18	4
2014	19	14	4
2015	19	15	7
2016	29	23	8
2017	40	31	17
2018	62	48	21
2019	64	51	NA
2020	23	21	NA

Table 11. Numbers and Rates of Overdose Deaths, CCHCS 2012–2020, and U.S State Prisons 2012–2018

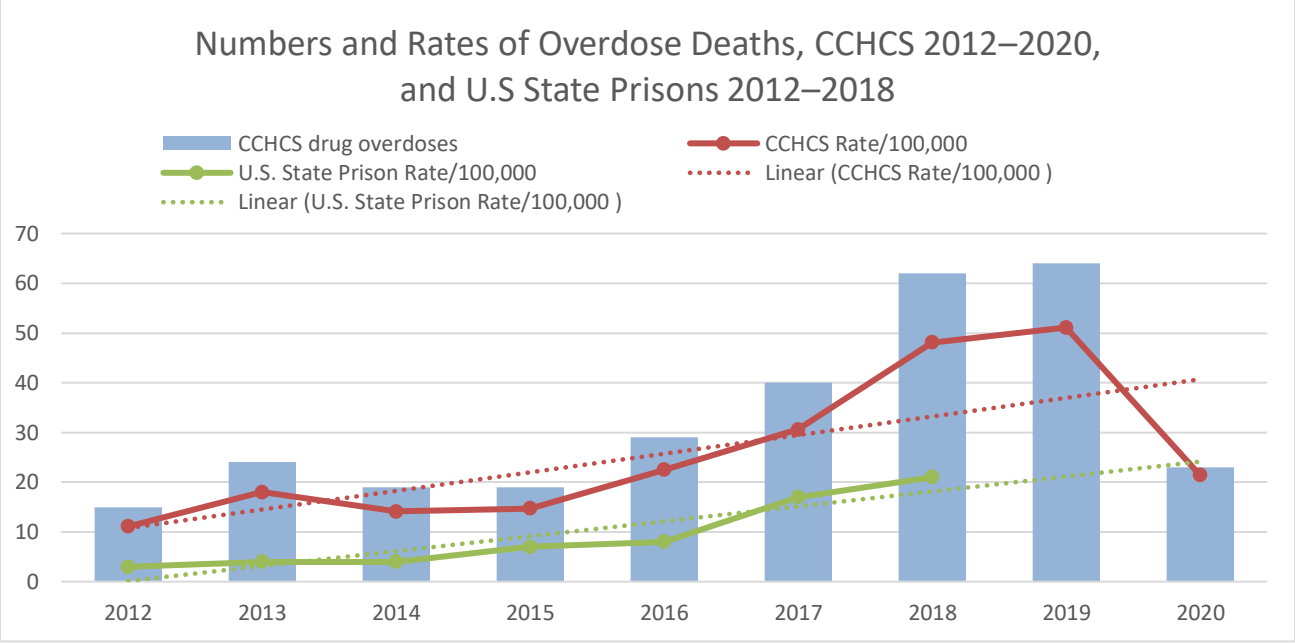


Figure 11. Numbers and Rates of Overdose Deaths, CCHCS 2012–2020, and U.S State Prisons 2012–2018

The year 2020 saw a very significant decrease in the drug overdose rate, reversing a trend that had begun in 2015. Reduction in overdose deaths was associated with an ongoing statewide initiative, the Integrated Substance Use Disorder Treatment Program (ISUDT). This evidence-based program frames drug addiction as a chronic disease, screens all patients for SUD, and offers treatment to all positive patients. The use of medication assisted treatment with suboxone, cognitive behavioral interventions, support in special housing units, and facilitated transition to community-based post release programs are key elements. The ISUDT program began implementation in late 2019, the Care Guide for SUD was released in May 2020 (https://cchcs.ca.gov/isudt/) and training was completed in all 35 facilities by the end of 2020.

As of December 31, 2020, there were 7,287 patients receiving Medication Assisted Treatment (MAT), and 6,679 patients awaiting an initial consultation for MAT.

Another association with this reduction in overdose deaths was a significant reduction in inmate movement, restricted internal programming for inmates, and reduced outside visitation during much of 2020, reducing the opportunities for illicit drug trafficking.

2. Advanced liver disease

Advanced liver disease including liver cancer, caused 32 deaths in 2020. Liver cancer accompanies cirrhosis. In the prison population, both are caused by the high prevalence of chronic hepatitis C infection. Table 12 and Figure 12 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 2012–2020.

YEAR	CCHCS Liver Cancer Deaths	CCHCS Cirrhosis Deaths	CCHCS Total Hepatitis C Deaths	Rate/ 100,000	CCHCS Number of Inmates
2012	25	47	72	53	134,929
2013	27	43	70	53	133,297
2014	21	47	68	50	135,225
2015	19	37	56	44	128,824
2016	23	18	41	32	128,705
2017	18	21	39	30	130,807
2018	28	29	57	44	128,875
2019	32	13	45	36	125,270
2020	18	14	32	30	107,347

Table 12. Numbers and Rates of Liver Disease Deaths, CCHCS 2012–2020.

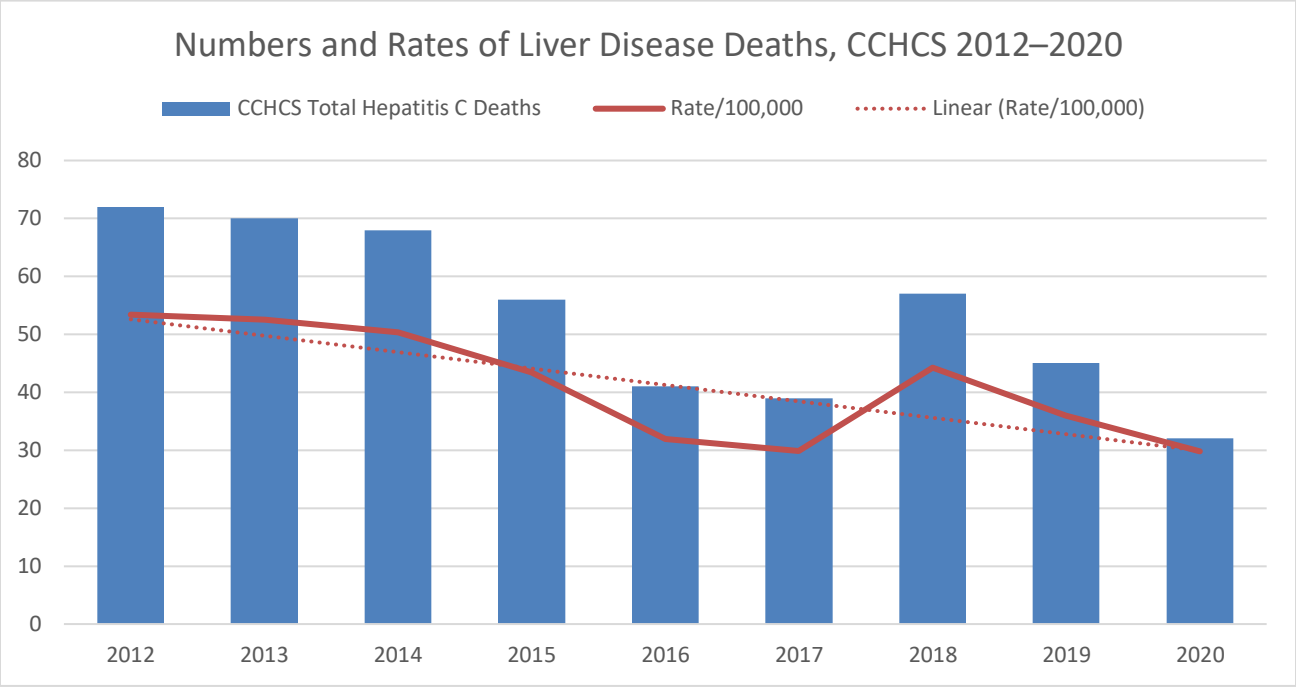


Figure 12. Numbers and Rates of Liver Disease Deaths, CCHCS 2012–2020.

The CCHCS has adopted a number of initiatives to improve screening and treatment of hepatitis C. These include the Care Guide for Advanced Liver Disease (revised in July 2020) which advocates staging of liver fibrosis to identify all candidates for biannual ultrasound screening for liver cancer, clinical strategies for addressing specific complications such as esophageal varices and spontaneous bacterial peritonitis, and the initiative for treatment of hepatitis C with safe and effective agents. Over 6,000 eligible patients were treated in 2018 and 2019, and an additional 4,559 (~380/month) were treated in 2020. All these initiatives may have contributed to a continuing reduction in advanced liver disease mortality.

3. Suicide

There were 31 suicides in 2020. While this was 7 fewer than in 2019, the rate dropped only slightly, from 30 in 2019 to 29 in 2020. Table 13 and Figure 13 show the numbers, rates, and trends of suicide from 2012 through 2020.

Year	CCHCS Suicides	CCHCS Rate/100,000	U.S. State Prison Rate/100,000
2012	32	24	16
2013	30	23	15
2014	23	17	20
2015	24	19	18

Year	CCHCS Suicides	CCHCS Rate/100,000	U.S. State Prison Rate/100,000
2016	26	20	21
2017	31	24	21
2018	30	23	26
2019	38	30	NA
2020	31	29	NA

Table 13. Numbers and Rates of Suicide, CCHCS 2012–2020 and U.S. State Prisons 2012–2018.

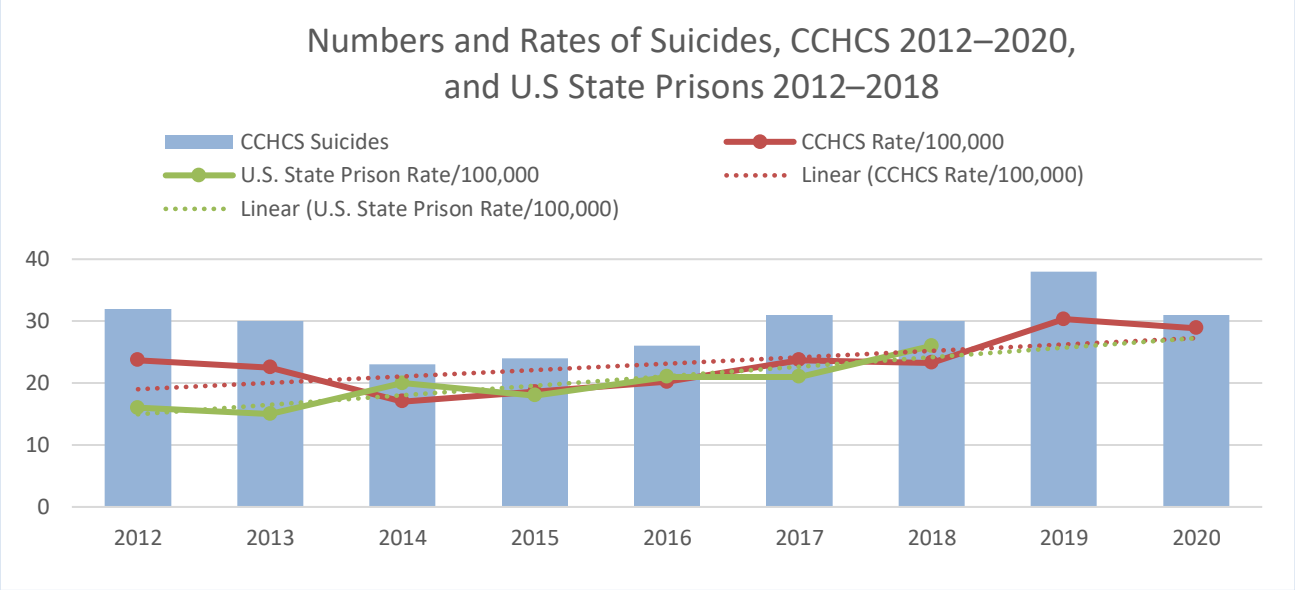


Figure 13. Numbers and Rates of Suicide, CCHCS 2012–2020 and U.S. State Prisons 2012–2018.

Apart from the years 2014–2016, numbers and rates of suicide for the period of 2012–2020 were statistically static. Almost all the suicide patients were being followed by mental health providers concurrently with medical providers. The recognition and treatment of severe depression and suicidal ideation and close communication between the mental health and medical departments of CCHCS are ongoing.

Since 1995, a federal court appointed a special master to oversee CDCR's mental health care system. The system of suicide risk evaluations, prevention and treatment is in place for all CDCR staff, all potential first responders to suicides, and all mental health clinicians. Videos, pamphlets, suicide prevention events and procedures for protecting inmates during vulnerable periods are also in place. The 2020 annual report to the California State legislature on Suicide Prevention and Response in CDCR is available at https://cchcs.ca.gov/wp-content/uploads/sites/60/MH/CDCR-2020-SB-960.pdf

D. Selected Causes of Death - Other

Trends in mortality for cardiovascular disease and lung cancer were discussed in previous years and are discussed again here.

1. Cardiovascular disease

Cardiovascular disease was the second most common cause of all deaths in 2020. Table 14 and Figure 14 show the numbers, rates, and trends of cardiovascular death from 2012 through 2020.

Year	CCHCS Cardiovascular Deaths	Rate/100,000	CCHCS Number of Inmates
2012	43	32	134,929
2013	50	38	133,297
2014	54	40	135,225
2015	62	48	128,824
2016	52	40	128,705
2017	68	52	130,807
2018	66	51	128,875
2019	52	42	125,270
2020	54	50	107,347

Table 14. Numbers and Rates of Cardiovascular Deaths, CCHCS 2012–2020.

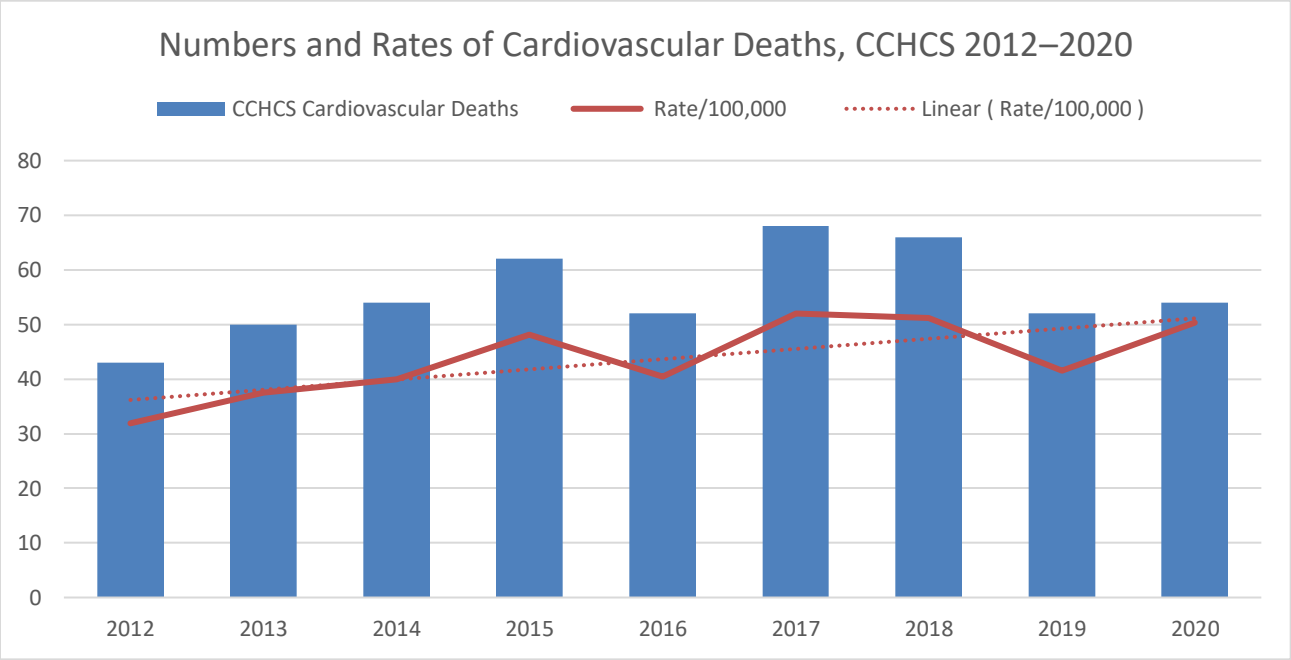


Figure 14. Numbers and Rates of Cardiovascular Deaths, CCHCS 2012–2020.

There was a slight increase in the number and rate of cardiovascular death in 2020. Of note, there was a large increase in the number of sudden cardiac arrests as a cause of sudden death in inmates in 2020. A number of these might have been missed acute myocardial infarctions (three fewer in 2020 than in 2019) or cardiac arrhythmias (2 in 2020, none in 2019). The CCHCS Care Guides for chest pain, diabetes, dyslipidemia, and hypertension, provide clinicians with advice for the management of the significant risk factors for coronary heart disease, the judicious use of statins to prevent coronary events, the importance of diabetes control, smoking cessation, and the importance of management of clinical red flag symptoms indicating acute coronary syndromes or exacerbations of congestive heart failure. Significantly, in 2020 there was only one OFI citation for failure to recognize and manage acute chest pain.

2. Lung cancer

Lung cancer has been the leading cause of cancer death, both in CCHCS and in the general population. But 2020 saw 17 deaths from lung cancer, fewer than the historic numbers and rates, as seen in the following Table 15 and Figure 15.

Year	CCHCS Lung Cancer Deaths	Rate/100,000	CCHCS Number of Inmates
2012	20	15	134,929
2013	21	16	133,297
2014	17	13	135,225
2015	27	21	128,824
2016	19	15	128,705
2017	13	10	130,807
2018	32	25	128,875
2019	27	22	125,270
2020	17	16	107,347

Table 15. Numbers and Rates of Lung Cancer Deaths, CCHCS 2012–2020.

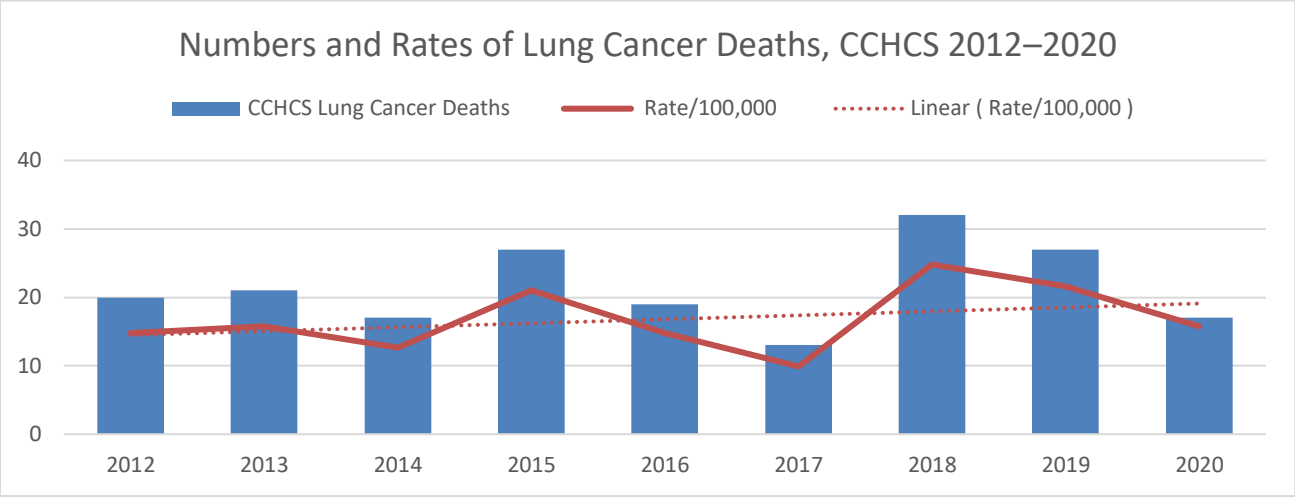


Figure 15. Numbers and Rates of Lung Cancer Deaths, CCHCS 2012–2020.

This one year experience my not signal a trend, but in 2014 the US Preventive Services Task Force published a Grade B recommendation to screen all heavy smokers over age 55 for lung cancer with annual low dose CT scanning. The CCHCS had not yet formally adopted this recommendation in 2020, but some individual patients may have undergone this screening.

IV. Quality Improvement Initiatives, 2020

Although the COVID-19 response dominated clinical quality improvement efforts in 2020, a number of initiatives were ongoing as a result of the 2019-2022 Performance Improvement Plan. These included:

- **Hepatitis C Treatment** – Chronic hepatitis C virus (HCV) infection is the cause of almost all cases of advanced liver disease among CCHCS patients. The use of direct-acting agents for the treatment of HCV has been associated with decreases in liver-related death, even among those patients with advanced liver fibrosis. Treatment of hepatitis C started in 2017, and in 2018 treatment was expanded to all HCV risk groups. This program is associated with a sustained decrease in advanced liver disease mortality.

- **Integrated Substance Use Disorder Treatment Program** – Substance use disorder screening is done for all new patients. Medication-assisted treatment (MAT) with buprenorphine, naltrexone, or methadone is 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, but the implementation of the ISUDT was associated with a dramatic decrease in drug overdose deaths in 2020.

- **Emergency Medical Response** – The statewide initiative for onsite hands on training with a standardized curriculum, crash carts and tools for resuscitation was deferred during 2020 and will be resumed in 2021.

- **Several Complex Care Initiatives**

V. Conclusions

The COVID-19 pandemic dominated the healthcare landscape in 2020 and was responsible for driving overall CCHCS mortality to the highest level since these reports began analyzing California prison mortality reviews in 2006. Mortality curves in the CCHCS mirrored those experienced by the rest of the U.S. and the world. The CCHCS responded by rapidly developing and implementing a comprehensive mitigation and control strategy for COVID-19 infection. This effort overshadowed all other activities in calendar year 2020. Positive results from this strategy as well as the availability of the COVID-19 vaccines and the development of effective treatment stratagems for early COVID-19 infection hold promise for 2021 and beyond.

The reduction in the population of the state's prison system found additional impetus from the governor's COVID-19 mandate and has now reached levels approaching the design capacity of the prison system.

Mortality rates from homicide continued an upward trend which began in 2014. The year also saw an unusually large number of deaths from infectious endocarditis resulting from intravenous drug abuse.

There were areas of significant progress in 2020.

Statewide initiatives contributed to sustained lower death rates from advanced liver disease.

There was a very significant lowering in the number of cases of drug overdose death, from 51/100,000 patients in 2019 to 21/100,000 in 2020, a 60% reduction. This lower rate of mortality from drug overdose was associated with system wide implementation of the Integrated Substance Use Disorder Treatment Program (ISUDT), and widespread availability of medication assisted therapy for patients with substance use disorder. Reduced opportunities for socialization among inmates, and between inmates and their visitors, may also have contributed to the decrease by limiting access to illicit drugs.

Mortality review continues to evolve, with attention to the identification of opportunities for system improvement. There was a near doubling in the number of OFI findings in 2020.

The success of the Receivership in transforming healthcare in the California state prisons resulted in a process of revocable delegation of 19 the 35 California prisons by the end of 2019. Although

temporarily stalled by the pandemic, there should now be a resumption of the detailed audits necessary to continue delegation of more prisons' healthcare to the control of the State of California.

A further evolution in the partnership of CCHCS and the CDCR resulted in the adoption of new vision and mission statements focusing on public safety through restorative justice and the successful community reintegration of all inmates.
