CDK4 gene

Associated Syndrome Name: Melanoma cancer syndrome (MCS)

CDK4 Summary Cancer Risk Table

CANCER	GENETIC CANCER RISK
Skin	High Risk
Pancreatic	Elevated Risk

CDK4 gene Overview

Melanoma cancer syndrome (MCS) [1, 2, 3, 4, 5]

- Individuals with *CDK4* mutations have melanoma cancer syndrome (MCS).
- Patients with MCS have a high risk of developing melanoma. There are currently no exact estimates of the risk associated with *CDK4* mutations, but it is believed that melanoma risks are similar to those for patients with a similar condition due to mutations in the *CDKN2A* (p16INK4a) gene. Those risks are provided below. It is possible that these estimates will change over time as we learn more about the exact risks associated with mutations in *CDK4*.
- Patients with MCS due to mutations in *CDK4* may also have a high risk for pancreatic cancer, as a high risk for pancreatic cancer has been observed in some families with mutations in the related gene *CDKN2A* (p16INK4a). Concern about pancreatic cancer risk should be higher for patients who have a family history of this cancer.
- Although there is a high risk for melanoma, and possibly pancreatic cancer, in patients with MCS, it may be possible to reduce this risk with appropriate medical management, including increased attention to surveillance and lifestyle modifications. Guidelines from expert groups for the management of patients with increased risks for these cancers are listed below. Since information about the cancer risks associated with *CDK4* mutations is relatively new, and there is uncertainty about the best ways to reduce these risks, it may be appropriate to interpret these results in consultation with cancer genetics professionals who have expertise in this emerging area of knowledge.

CDK4 gene Cancer Risk Table

CANCER TYPE	AGE RANGE	CANCER RISK	RISK FOR GENERAL POPULATION
Melanoma	To age 50 [1, 4, 6, 7]	14%-50%	0.3%
	To age 80 [1, 4, 7]	28%-76%	1.6%
Pancreatic	To age 75 [2, 3, 7]	Elevated risk	0.8%

CDK4 Cancer Risk Management Table

The overview of medical management options provided is a summary of professional society guidelines. The most recent version of each guideline should be consulted for more detailed and up-to-date information before developing a treatment plan for a particular patient.

This overview is provided for informational purposes only and does not constitute a recommendation. While the medical society guidelines summarized herein provide important and useful information, medical management decisions for any particular patient should be made in consultation between that patient and his or her healthcare provider and may differ from society guidelines based on a complete understanding of the patient's personal medical history, surgeries and other treatments.

CANCER TYPE	PROCEDURE	AGE TO BEGIN	FREQUENCY (UNLESS OTHERWISE INDICATED BY FINDINGS)
Melanoma	Education about the importance of skin protection, such as sun avoidance, protective clothing and sunscreen. [8, 9]	Individualized	Ongoing
	Whole-body skin examinations conducted by the patient or family member. [10, 11]	10 years	Monthly

CANCER TYPE	PROCEDURE	AGE TO BEGIN	FREQUENCY (UNLESS OTHERWISE INDICATED BY FINDINGS)
	Clinical skin examinations by an appropriately trained provider, with consideration of whole-body photography and close-up photography of atypical nevi for ongoing comparison.[10, 11]	10 years	Every 6 to 12 months
Pancreatic	Currently there are no specific medical management guidelines for pancreatic cancer risk in mutation carriers.	NA	NA

Information for Family Members

The following information for Family Members will appear as part of the MMT for a patient found to have a mutation in the CDK4 gene.

This patient's relatives are at risk for carrying the same mutation(s) and associated cancer risks as this patient. Cancer risks for females and males who have this/these mutation(s) are provided below.

Family members should talk to a healthcare provider about genetic testing. Close relatives such as parents, children, brothers and sisters have the highest chance of having the same mutation(s) as this patient. Other more distant relatives such as cousins, aunts, uncles, and grandparents also have a chance of carrying the same mutation(s). Testing of at-risk relatives can identify those family members with the same mutation(s) who may benefit from surveillance and early intervention.

Since there are screening and preventative measures recommended to begin in infancy or early childhood for individuals with *CDK4* mutations, consideration should be given to the possibility of mutation testing at young ages.

References

1. Begg CB, et al. Genes Environment and Melanoma Study Group. Lifetime risk of melanoma in *CDKN2A* mutation carriers in a population-based sample. J Natl Cancer Inst. 2005 97:1507-15. PMID: 16234564.
2. Goldstein AM, et al. Melanoma Genetics Consortium (GenoMEL). High-risk melanoma susceptibility genes and pancreatic cancer, neural system tumors, and uveal melanoma across GenoMEL. Cancer Res. 2006 66:9818-28. PMID: 17047042.
3. Vasen HF, et al. Risk of developing pancreatic cancer in families with familial atypical multiple mole melanoma associated with a specific 19 deletion of p16 (p16-Leiden). Int J Cancer. 2000 87:809-11. PMID: 10956390.
4. Bishop DT, et al. Geographical variation in the penetrance of *CDKN2A* mutations for melanoma. J Natl Cancer Inst. 2002 94:894-903. PMID: 12072543.
5. Goldstein AM, et al. Genotype-phenotype relationships in U.S. melanoma-prone families with *CDKN2A* and *CDK4* mutations. J Natl Cancer Inst. 2000 92:1006-10. PMID: 10861313.
6. Puntervoll HE, et al. Melanoma prone families with *CDK4* germline mutation: phenotypic profile and associations with *MC1R* variants. J Med Genet. 2013 Apr;50(4):264-70. PMID: 23384855.
7. SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2026 May 5]. Available from https://seer.cancer.gov/explorer/.
8. National Cancer Institute. Skin Cancer (Including Melanoma)-Patient Version. Accessed 2025 Apr 1. Available at https://www.cancer.gov/types/skin.
9. American Cancer Society. Risk Factors for Melanoma Skin Cancer. Updated 2023 Oct 27. Available at https://www.cancer.org/cancer/types/melanoma-skin-cancer/causes-risks-prevention/risk-factors.html.
10. Kefford RF et al. Counseling and DNA testing for individuals perceived to be genetically predisposed to melanoma: A consensus statement of the Melanoma Genetics Consortium. J Clin Oncol. 1999 17:3245-51. PMID: 10506626.
11. Swetter SM, et al. NCCN Clinical Practice Guidelines in Oncology®: Melanoma: Cutaneous. V 2.2026 Apr 17. Available at https://www.nccn.org.

Last Updated on 15-Sep-2026