Can we cure cancer?

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Cancer as a genetic disease

What does it mean?
Are all cancers hereditary?

Why some cancers are hereditary and some not?
--Hereditary breast/ovarian cancer syndrome caused by mutation of BRCA1 or BRCA2.

--Hereditary colorectal cancer syndrome

--Hereditary non-poliposis colorectal cancer (HNPCC), caused mutation of a set of genes called mismatched DNA repair genes.

--Familiar adenomatous poliposis (FAP), caused by mutation of a gene called APC.
Cancer as a chronic disease

--12 million cancer survivors in the US
--Aging population makes cancer a risk in later years of life
--One out of three Americans will get cancer in lifetime
Cancer mortality is decreasing
Five year survival over the last several decades

5-Year Survival of Patients with Cancer by Era, SEER, 1975-1998

Peak to Valley Transformation

Year of Diagnosis
- 2004 Projected
- 1993-98
- 1987-92
- 1981-86
- 1975-80

Survival (%) vs. Age at Diagnosis (Years)
Five year survival has improved significantly in many cancers

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<thead>
<tr>
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<tbody>
<tr>
<td>All sites</td>
<td>50</td>
<td>54</td>
<td>66</td>
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<tr>
<td>Breast (female)</td>
<td>75</td>
<td>79</td>
<td>89</td>
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<tr>
<td>Colon</td>
<td>51</td>
<td>59</td>
<td>65</td>
</tr>
<tr>
<td>Leukemia</td>
<td>35</td>
<td>42</td>
<td>50</td>
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<tr>
<td>Lung and bronchus</td>
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<tr>
<td>Melanoma</td>
<td>82</td>
<td>87</td>
<td>92</td>
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<tr>
<td>Non-Hodgkin lymphoma</td>
<td>48</td>
<td>53</td>
<td>64</td>
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<tr>
<td>Ovary</td>
<td>37</td>
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<tr>
<td>Pancreas</td>
<td>2</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Prostate</td>
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<td>76</td>
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<tr>
<td>Rectum</td>
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<td>57</td>
<td>66</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>74</td>
<td>78</td>
<td>81</td>
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*5-year relative survival rates based on follow up of patients through 2004.
Newer drugs coming to medicine

Biological drugs:
Rituxan (Rituximab), Herceptin (Trastuzumab)

Small molecules:
Gleevec (Imatinib), Sutent (sunitinib), Dasatinib, erlotinib, ect.
--More Targeted therapeutic drugs.
--Cancer vaccine: Provenge
--Immunotherapy: Chimeric Antigen Receptor (CAR)
--RNA interference:
Immunotherapy using Chimeric Antigen Receptor

Some drugs work for some patients, but not the others, why?

Gene mutation in cancer:

--KRAS mutation in colorectal cancer and lung cancer

--BRAF mutation in melanoma

--ALK mutation in lung cancer

--EGFR mutation in lung cancer
Managing other medical problems

Diabetes
Cholesterol
Obesity
Food and diet
Vitamins
Life style changes can have positive impact on your quality of life and chance of surviving cancer
Cancer survivorship website

kp.org/santaclara/cancercare/survivorship