Positronemisjonstomografi (PET) i behandling og oppfølgning av kreft

Notat fra Kunnskapssenteret
Systematisk litteratursøk med sortering
April 2012

kunnskapssenteret

(fortsetter på baksiden)

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Nasjonalt kunnskapssenter for helsetjenesten fremskaffer og formidler kunnskap om effekt av metoder, virkemidler og tiltak og om kvalitet innen alle deler av helsetjenesten. Målet er å bidra til gode beslutninger slik at brukerne får best mulig helsetjenester. Kunnskapsenteret er formelt et forvaltningsorgan under Helsedirektoratet, men har ingen myndighetsfunksjoner og kan ikke instrueres i faglige spørsmål.

Nasjonalt kunnskapssenter for helsetjenesten
Oslo, april 2012

Hovedfunn

Positron emisjonstomografi er en billeddiagnostisk teknologi i rask utvikling. Kunnskapssenteret har vurdert denne teknologien en rekke ganger for å informere beslutningstagere om kunnskapsstatus om den kliniske nytten av PET. Siste rapport ble publisert i 2009, denne estimerte behovet for PET-undersøkelser frem til år 2020.

I forbindelse med bestillerprosessen 2012, fikk Kunnskapssenteret på nytt spørsmål om PET. Begrunnelsen var den raske utviklingen og behovet for å planlegge investeringer og kompetanseutviklingen.

Dette er bakgrunnen for at vi har søkt etter nye HTA-rapporter (metodevurderinger), systematiske oversikter og kliniske studier om PET som er publisert i perioden 2009 til februar 2012.

Det er publisert en rekke nye HTA-rapporter, systematiske oversikter og kliniske studier om bruk av PET innen utredning og oppfølgning av kreft i perioden 2009-12. Til sammen fant vi 100 mulig relevante systematiske oversikter publisert og 111 mulig relevante kliniske studier.

Kunnskapssenterets notat fra 2009 viste at et av scenarioene som ville gi en kraftig økning i behovet for PET undersøkelser, var bruk av PET ved planlegging av behandling. Det kan se ut som det foreligger mer dokumentasjon for dette anvendelsesområdet nå enn i 2009. I tillegg er det publisert nye studier og systematiske oversikter om bruk av PET ved diagnostisering av sykdommer i sentral-nervesystemet og hjerte- og karsystemet.

Tittel:

Positronemisjonstomografi (PET) i behandling og oppfølgning av kreft – et systematisk litteratursøk ---------- ----------

Publikasjonstype:

Systematisk litteraturliste

En systematisk litteraturliste er resultatet av å

- søke etter relevant litteratur ifølge en søkestrategi og
- eventuelt sortere denne litteraturen i grupper presentert med referanser og vanligvis sammendrag

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Svarer ikke på alt:

- Ingen kritisk vurdering av studienes kvalitet
- Ingen analyse eller sammenfatning av studiene
- Ingen anbefalinger

Hvem står bak denne publikasjonen?

Kunnskapssenteret har gjennomført oppdraget etter forespørsel fra Helsedirektoratet

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Når ble litteratursøket utført?

Søk etter studier ble avsluttet Februar 2012.

Sammendrag

Bakgrunn

Nasjonalt kunnskapssenter for helsetjenesten fikk i oppdrag fra Helsedirektoratet om å utføre et oppdatert systematisk litteratursøk om PET i utredning og oppfølgning av pasienter med kreft. Begrunnelsen er den raske utviklingen på feltet og behovet for en langsiktig planlegging av utstyrinvesteringer og kompetanseutvikling.

Metode

Systematisk søk i aktuelle databaser etter systematiske oversikter og kliniske studier om PET publisert i perioden 2009 til februar 2012.

Resultat

Søket ga til sammen 1179 treff, hvorav 233 er mulig relevante publikasjoner om PET ved utredning og oppfølgning av pasienter med kreft. 100 av disse fremstiller seg som systematiske oversikter i tittel eller sammendrag, og 111 er mulig relevante kliniske studier. De fleste synes å omhandle bruk av PET i primærutredning av kreft. For enkelte diagnoser foreligger også systematiske oversikter og studier om bruk av PET ved behandlingsplanlegging. Det er færre publikasjoner om vurdering av behandlingsrespons og ved diagnostisering av tilbakefall. Det er publisert få randomiserte kontrollerte studier som sammenligner PET med annen billeddiagnostisk teknologi.

Kommentar

Som ventet er det publisert en rekke nye systematiske oversikter og kliniske studier om bruk av PET ved utredning av kreft siden 2008. I tilegg ser vi at det også publiseres nye studier og systematiske oversikter om bruk av PET ved diagnostisering av sykdommer i sentralnervesystemet og hjerte- og karsystemet. Kunnskapssenterets behovsfremskrivning for PET fra 2009, tok utgangspunkt i at de fleste PET-undersøkelser omfattet pasienter med kreft og at ca 15 % av undersøkelsene var for andre formål. Dersom utviklingen nå endrer seg for andre diagnosegrupper, vil det kunne ha betydning for behovsanslagene som ble utarbeidet i 2009.

Key messages (English)

Positron emission tomography is a fast developing imaging technology, and NOKC has assessed PET several times over the years. Last time was in 2009 when we modeled the future need for PET in Norway in 2020.

Due to the need for long-term planning of PET investments and education of qualified personnel, we were once again asked to update the literature search, without assessing the studies.

The systematic search revieled publication of 100 potentially relevant systematic reveiws and 111 potentially relevant new clinical studies in the period 2009-20012 on the use of PET in cancer.

NOKC 2009 report on the future need for PET concluded one of the main drivers for increased need for PET was the use of PET for treatment planning. The documentation however was scarce. From the updated search we found both systematic reviews and new clincial studies on the use of PET in treatment planning for a number of cancer indications.

In addition the number of publication of PET in the diagnosis of neurological and cardiac diseases appears to be increasing.

Title:
Positronemissiontomography (PET) in the diagnosis and follow up of cancer – a systematic literatur search

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Type of publication:

Systematic reference list

A systematic reference list is the result of a search for relevant literature according to a specific search strategy. The references resulting from the search are then grouped and presented with their abstracts.

Doesn't answer everything:

- No critical evaluation of study quality
- No analysis or synthesis of the studies
- No recommendations

Publisher:

Norwegian Knowledge Centre for the Health Services

Updated:

Last search for studies: February 2012.

Innhold

Forord

Nasjonalt kunnskapssenter for helsetjenesten fikk i 15.11.2011 i oppdrag fra Helsedirektoratet å oppdatere litteratursøket fra tidligere rapporter om Positronemisjonstomografi (PET) i utredning og oppfølgning av pasienter med kreft.
Begrunnelsen var den raske utviklingen på feltet og behovet for en langsiktig planlegging av utstyrinvesteringer og kompetanseutvikling.

Bestillingen ble vurdert i Kunnskapssenterets bestillerforum januar 2012 og gitt prioritet.

Gro Jamtvedt	Brynjar Fure	Inger Natvig Norderhaug
Avdelingsdirektør	*Seksjonsleder*	*Prosjektleder*

Innledning

Positronemisjonstomografi (PET) tar bilde av opptak og fordelingen av radioaktivt merkede forbindelser i kroppen. Slike PET-bilder viser metabolsk aktivitet i cellene, og gir informasjon om celler er levende, i vekst eller dødende. PET alene gir dårlig anatomisk informasjon, og er derfor integrert med annen billeddiagnostikk som gir gode anatomiske bilder, oftest PET-CT, men PET-MR er nå mulig å kombinere. I dette notatet bruker vi betegnelsen PET om undersøkelser som involverer PET alene (dette er relativt sjelden), PET-CT eller PET-MR. PET kan være nyttig informasjon ved utredning av kreft eller for å vurdere effekt av behandling. PET kan også brukes ved utredning av sykdommer i sentralnervesystemet (epilepsi, alzheimers sykdom og parkinsonisme) og hjerte- og karsykdommer.

Den diagnostiske og kliniske nytten ved PET-undersøkelser har vært utredet seks ganger siden den første HTA-rapporten (metodevurderingen) ble publisert i 2000 (1-6). Kunnskapssenteret fikk våren 2009 i oppdrag fra Nasjonalt råd for kvalitet og prioritering i helse- og omsorgstjenesten om å estimere behovet for PET-CT–undersøkelser frem til 2020 i Norge. Disse estimatene skulle så brukes i diskusjoner om hvilken kapasitet Norge bør ha for PET-CT undersøkelser. Kunnskapssenteret utarbeidet et notat i 2009 (5)som estimerte behovet for PET gitt følgende scenario-er:

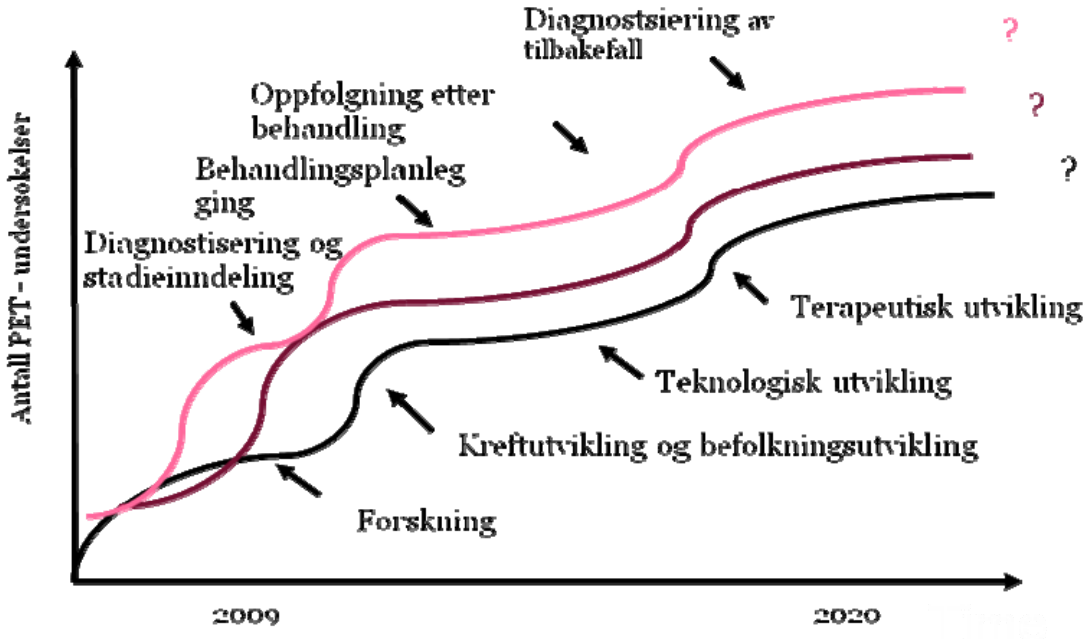
- Scenario 1. Behovet for PET-CT i 2020 basert på fagmiljøenes vurdering av ved hvilke indikasjoner PET-CT bør benyttes i dag.
- Scenario 2. Behovet for PET-CT i 2020 ved bruk på indikasjoner hvor dagens forskningsdokumentasjon tyder på at PET(-CT) har en bedre diagnostisk nøyaktighet enn alternative diagnostiseringsverktøy.
- Scenario 3: Behovet for PET-CT i 2020 gitt fagmiljøenes vurdering av fremtidige indikasjoner for PET-CT, forutsatt at det ikke foregår noen teknologisk utvikling.
- Scenario 4: Behovet for PET-CT i 2020 gitt fagmiljøenes vurdering av fremtidige indikasjoner for PET-CT.
- Scenario 5: Behovet for PET-CT i 2020 dersom PET-CT benyttes til planlegging av all strålebehandling i tillegg indikasjonene i scenario 4.

Notatet ble utarbeidet i tett samarbeid med de onkologiske og nukleærmedisinske fagmiljøene.

Tabell 1. Konklusjonen i rapporten fra 2009 for de ulike anvendelsesområdene for PET

	Initial diagnostisering og stadieinndeling	Behandlingsplanlegging og vurdering av behandlingsrespons	Oppfølging etter behandling	Diagnostisering ved tilbakefall
Scenario 1	Barnekreft Bukspyttkjertel Hode-hals kreft Livmorhalskreft Lungekreft Lymfom Malignt melanom Øsofagus	Barnekreft Brystkreft Hode-hals kreft Livmorhalskreft Lymfom Malignt melanom Sarkom	Hjernekreft Hode-hals kreft Kolorektal Lymfom	Brystkreft Hode-hals kreft Lymfom Sarkom
Scenario 2	Bukspyttkjertel Hode-hals kreft Livmorhalskreft Lungekreft Lymfom Malignt melanom Kreft i magesekken	Kolorektal Lymfom (inkl GIST) Øsofagus	Eggstokkkreft Hode-hals kreft Kolorektal Lymfom	Lymfom Malignt melanom
Scenario 3	Barnekreft Bukspyttkjertel Hjernekreft Hode-hals kreft Lungekreft Lymfom Malignt melanom Øsofagus	Barnekreft Brystkreft Hjernekreft Hode-hals kreft Lymfom Malignt melanom Sarkom Øsofagus	Hode-hals kreft Kolorektal Lymfom	Hode-hals kreft Kolorektal Lymfom Sarkom
Scenario 4	Barnekreft Bukspyttkjertel Eggstokkkreft Hjernekreft Hode-hals kreft Livmorhalskreft Lungekreft Lymfom Øsofagus	Barnekreft Brystkreft Hjernekreft Hode-hals kreft Lungekreft Lymfom Øsofagus	Bukspyttkjertel Hode-hals kreft Kolorektal Lymfom	Eggstokkkreft Hode-hals kreft Kolorektal Livmorhalskreft Lymfom
Scenario 5	Barnekreft Bukspyttkjertel Eggstokkkreft Hjernekreft Hode-hals kreft Livmorhalskreft Lungekreft Lymfom Øsofagus	Brystkreft Hjernekreft Hode-hals kreft Kolorektal Livmorhalskreft Lungekreft Lymfom Kreft i magesekken Prostata Øsofagus	Bukspyttkjertel Hode-hals kreft Kolorektal Lymfom	Eggstokkkreft Hode-hals kreft Kolorektal Livmorhalskreft Lymfom

Det ble understreket at estimatene er beheftet med usikkerhet, og at flere faktorer kan øke behovet for PET i tiden fremover. Det var særlig bruk av PET i behandlingsplanlegging som syntes å øke behovet for PET-undersøkelser fremover, men også den teknologiske utviklingen med nye radioaktive forbindelser og befolkningsutviklingen (Figur 1).



Figur 1. Ulike faktorer som kan påvirke fremtidig behov for PET-undersøkelser.

På bakgrunn av denne informasjonen diskuterte Nasjonalt råd for kvalitet og prioritering i helse- og omsorgstjenesten hvilket behov Norge bør ha for PET-undersøkelser fremover mot 2020, med følgende konklusjon (7):

Rådet anbefaler at man i Norge tar sikte på en oppbygging av PET slik at man har de syklotroner med det antall scannere som betraktes nødvendig lokalt/ regionalt. De faglige retningslinjene for kreftutredning og behandling som beskrives i handlingsprogrammene for kreftomsorgen vil gi føringen for det antallet undersøkelser per år som helseforetakene skal legge til grunn.

Rådet forutsetter at handlingsprogrammene beskriver en bruk av PET på områder der teknologien har dokumentert og god nytte, og at nytten står i et rimelig forhold til kostnadene.

Dersom en videre utbredelse av teknologien skal foregå på en kontrollert måte, er rammebetingelsene i forhold til kompetansebehov like viktige som det tekniske utstyret. Rådet ber RHFene utarbeide en beskrivelse av hva dette vil kreve av personell opp mot 2020.

Anbefalinger om bruk av PET i krefthandlingsplanene

Helsedirektoratet har publisert 10 retningslinjer for diagnostikk og behandling av ulike kreftformer. Fire av disse anbefaler bruk av PET for utredning av lymfom, spiserørskreft, tarmkreft og testikkelkreft (8-11). Retningslinjer for diagnostikk og behandling av lungekreft er under utarbeidelse og det forventes at disse vil anbefale bruk av PET i utredning av lungekreft.

PET 2012

Kunnskapssenteret fikk november 2011 en ny bestilling fra Helsedirektoratet, om å oppdatere litteratursøkene fra 2009-notatet. Begrunnelsen var at Helse- og omsorgsdepartementet ønsker en oppdatert vurdering av indikasjon og behov for PET-CT i et 5-10 års perspektiv. Dette med utgangspunkt i Kunnskapssenterets notat fra 2009, den raske utvikling på feltet, behov for langsiktig planlegging av utstyrsinvesteringer og kompetanseutvikling og retningslinjer i krefthandlingsplanene.

Metode

Litteratursøking

Vi søkte systematisk etter litteratur publisert i perioden 2009 til februar 2012 i følgende databaser:

- Medline
- Embase
- DARE og HTA databasen via Cochrane Library
- Cochrane Library

Søkestrategiene ble bygget opp rundt følgende termer:
Mesh: exp Positron-Emission Tomography/
Emtree: positron emission tomography/ AND computer assisted emission tomography/
Tekstord.: PET , FDGPET, FDG PET, PETCT, PET CT, Positron Emission Tomography, Positron-Emission Tomography

Søkene ble utført av forskningsbibliotekar Marlene Gundersen februar 2012. Fullstendig søkestrategi er beskrevet i vedlegg 1.

Inklusjonskriterier

Studiedesign:

1. Systematiske oversikter
2. Kliniske studier

Populasjon:	Pasienter med kreft
Tiltak:	PET, PET-CT, PET-MR
Sammenlikning:	Annen billeddiagnostikk
Utfall:	Diagnostiske utfall, behandlingsplanlegging, vurdering av behandlingsrespons, vurdering av tilbakefall
Språk:	Ingen avgrensning

Eksklusjonskriterier

Studiedesign:	Ingen
Populasjon:	Pasienter med andre indikasjoner enn kreft
Tiltak:	Studier som har benyttet PET som ledd i utprøvning av ny behandling, der formålet er å evaluere behandlingsrespons og ikke PET.
Utfall:	Reliabilitet

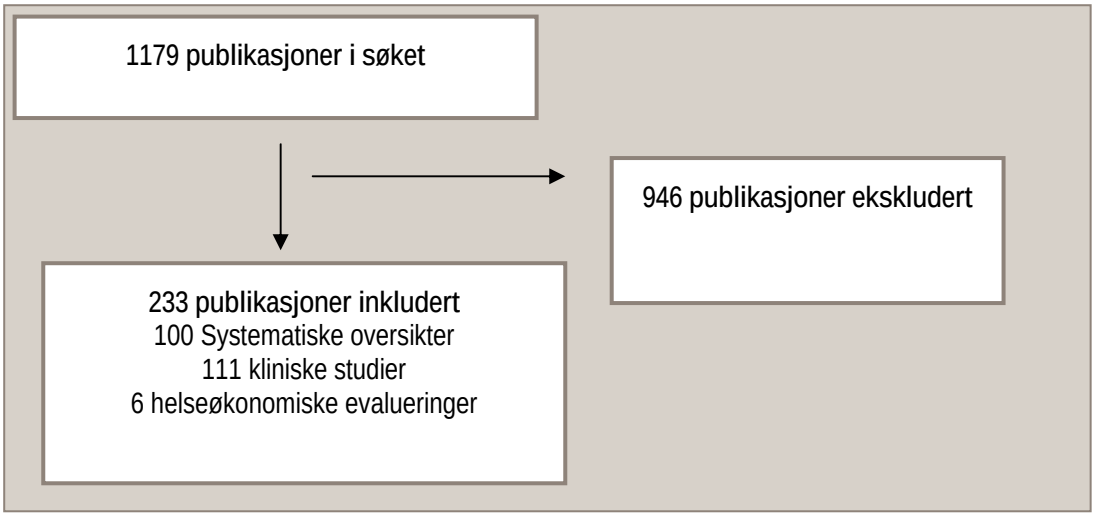
Artikkelutvelging

To personer (INN, EJ) leste alle abstrakt og valgte ut mulig relevante publikasjoner. Klassifisering ble utført av en person (INN).

Resultat

Vi søkte etter nye systematiske oversikter og kliniske studier som omhandler PET og er publisert i perioden 2009 til februar 2012. Søkestrategi og de databaser det ble søkt i er redegjort for i vedlegg 1. Søkestrategien er utformet med ulike termer for PET og med filter for å identifisere systematiske oversikter og kliniske studier. Søkene omfatter også konferansepresentasjoner.
Søket ga til sammen 1179 treff, etter gjennomgang og vurdering av abstrakt var det 233 mulig relevante publikasjoner om bruk av PET eller PET-CT i utredning og oppfølgning av pasienter med kreft (Figur 1).

Figur 1: Prosess for utvelgelse av publikasjoner



Vi har sortert nye publikasjoner om bruk av PET i utredning og oppfølgning av pasienter med kreft i to hovedgrupper: nye systematiske oversikter (tabell 2), og nye kliniske studier (tabell 3). I tillegg beskrives noen spesielle anvendelsesområder for PET, og spesielle type publikasjoner.

Nye systematiske oversikter

Tabell 2 er en oversikt av mulig nye relevante systematiske oversikter for ulike kreftdiagnoser og bruksområder. Noen av publikasjonene dekker flere bruksområder. Totalt er det 100 mulig relevante publikasjoner som i tittel eller abstrakt fremstiller seg som systematisk oversikt. De fleste synes å omhandle bruk av PET i primærutredning av kreft, relativt mange omfatter også bruk av PET ved behandlingsplanlegging. Det synes å være færre systematiske oversikter om PET for vurdering av behandlingsrespons og ved diagnostisering av tilbakefall. Vi har ikke vurdert den metodiske kvaliteten for disse systematiske oversiktene, og heller ikke hvilke konklusjoner de trekker om nytten av PET.

Nye kliniske studier

Tabell 3 er en oversikt over mulig relevante nye kliniske studier, til sammen 107. I tillegg kommer kliniske studier for noen spesielle indikasjoner som er beskrevet under. I dette litteratursøket har vi brukt et søkefilter som identifiserer randomiserte kliniske studier og andre kliniske studier. Vi har valgt denne avgrensningen for å kunne finne mulig relevante kontrollerte studier om klinisk anvendelse av PET, og ikke rene diagnostiske studier.

Det er publisert få randomiserte kontrollerte studier som sammenligner nytten av PET med annen billeddiagnostisk teknologi, men flere kontrollerte studier. De fleste studier omhandler bruk av PET ved diagnostisering og behandlingsplanlegging. Det synes å være færre kliniske studier som har vurdert bruk av PET ved vurdering av behandlingsrespons og tilbakefall av sykdom.

Det er også verdt å merke seg at vi har ekskludert randomiserte kontrollerte studier som har benyttet PET som ledd i utprøvning av ny behandling, der formålet er å evaluere behandlingsrespons og ikke PET.

PET ved screening for kreft

En metaanalyse Chien (12;13) og en studie Ashraf (14) har evaluert bruk av PET ved screening for lungekreft.

Fire studier omhandler bruk av PET i diagnostisering eller oppfølgning av barn med kreft

To studier har sammenlignet bruk av MRI med PET for oppfølgning av barn med kreft Krohmer 2010 (15) og barn med lymfom Kwee 2009 (16). En studie sammenlignet MRI med PET i utredning og initial diagnostisering av lymfom hos barn Vermoolen 2010 (17). En studie har vurdert bruk av PET ved sarkom hos barn Mody 2010 (18).

Helseøkonomiske evalueringer:

Vi har ikke søkt spesifikt i databaser for helseøkonomiske evalueringer, men søket identifiserte følgende helseøkonomiske publikasjoner som kan være relevant å vurdere:
Langer 2010 (19) sammenfattet økonomiske evalueringer om PET innen onkologi. Megn 2010 (20) sammenlignet kost-nytte vurdering ved å erstatte vaktpostlymfeknutebiopsi hos brystkreftpasienter med PET eller MRI. Poulou 2009 (21) vurderte kost-nytte forholdet for PET med eller uten CT ved utredning av Hodgkins lymfom. Ruben 2011 (22) utarbeidet en systematisk oversikt med kostnadsvurdering for bruk av PET i utredning av lungekreft. Sogaard 2011 (23) publiserte kostnadsdata for PET i tilknytning til en RCT som vurderte PET vs CT i utredning av pasienter med lungekreft. Wiering 2010 (24) har rapportert kostnadsdata for PET i tilknytning til en RCT som vurderte PET som tillegg til eksisterende diagnostisk utredning for pasienter med levermetastaser.

***Tabell 2*. Nye systematiske oversikter**

	Diagnostisering og stadieinndeling	Behandlingsplan-legging	Behandlingsrespons	Diagnostisering av tilbakefall
Brystkreft	Asensio 2009 (25), Cooper 2011 (26;27), Escalona 2010 (28), Liu 2011 (29), Mankoff 2011 (30), Peare 2010 (31), Warning 2011 (32)		John 2009 (33), Wang 2012 (34)	Auguste 2011(35), Escalona 2010 (28), Liu 2011 (29), Pan 2010 (36), Pennant 2010 (37)
CNS	Dunet 2012 (38), IQWiG 2010 (39),		van Ufford (40)	
Gynekologisk kreft	Baalbergen 2010 (41), Kang 2010 (42), Musto 2011 (43), Shie 2011 (44)	D`Souza 2011 (45) Salem 2011 (46)		Choi 2010 (47), Gu 2009 (48)
Hode –hals kreft	IQWiG 2011 (49), Liu 2011 (50), Wu 2012 (51), Xu 2011 (52;53)	Xie 2011 (54)	Gupta 2011 (55)	
Levermetastaser	Patel 2011 (56)			
Lungekreft	Barger 2012 (57), Jeppesen 2010 (6), Lv 2011 (58), Ruben 2011 (22)	deCabanyes 2010 (59), Nair 2009 (60), Ung 2011 (61)	Meniawy 2010 (62) Paesmans 2010 (63) Rebello-Aguirre 2010 (64), Van Loon 2010	Chang 2012 (65), Liu 2011 (50)
Lymfomer	Chen 2011 (66), IQWiG 2009 (67), Poulou 2010 (68), Wu 2012 (69)		Ramos-Font 2009 (70), Terasawa 2009 og 2010 (71;72),	
Mage	Shimada (74), Wang (75)	Kwee 2009 (76), Shimada (74)	Shimada (74) Verma 2009 (73)	Shimada (74)
Malignt melanom	Jimenez-Requena 2010 (77), Xing 2011 (78;79)		Xing 2011 (78;79)	
Nyre	Arabi 2011(80), Boland 2011 (81;82)			
Pancreas	Alle 2011 (83), Tang 2011 (84)			
Sarkom	Treglia 2012 (85)		Ji 2011 (86)	
Skjoldbruskkjertel kreft	Ma 2010 (87), Shie 2009 (88), Urhan 2009 (89), Vriens 2011 (90)		Miller 2011 (91)	Dong 2009 (92), Urhan 2009 (89)
Spiserørskreft	Marzola 2012 (93) Sgourakis 2011 (94)	Muijs 2010 (95)	Chen 2011 (96), Kwee 2010 (97),	

			Ngamruengphong 2010 (98), Pan 2009 (99), Rebello-Aguirre (100), Vallbohmer 2009 (101), Wong 2012 (102)	
Tarmkreft	Brush 2011(103), Niekel 2010 (104;105), Vriens 2009 (106)	Gwynne 2012 (107)	De Geus-Oei 2009 (108)	Floriani 2010 (109), Georgiou 2009 (110), Maas 2011 (111), Vriens 2009 (106), Zhang 2009 (112)
Urologisk kreft	Bauman 2010 (113) Marconnet 2010 (114) Zengerling 2012 (115)		Bauman 2010(113) Beresford 2010 (116), Heidenreich 2010 (117) Muller 2011 (118)	Bauman 2010 (113)
Flere kreftformer	Kwee 2009 (119) Hovi 2010 (120)		Rebello-Aguirre 2009 (121)	Cheng 2011 (122), Tateishi 2010 (123), Xie 2011 (124) Yang 2011 (125)

***Tabell 3*. Nye publiserte kliniske studier**

	Initial diagnostisering og stadieinndeling	Behandlingsplan-legging	Vurdering av be-handlingsrespons	Diagnostisering av tilbake-fall
Brystkreft	Gorgulu 2010 (126), Groheux 2011 (127), Morris 2010 (128), Moy 2010 (129)	Berg 2011 (130), Schilling 2011 (131)	Dose-Schwartz 2010 (132), Jung 2010 (133)	Carcia 2010 (134)
CNS	Hofman 2010 (135), Kunz 2011 (136)			
Gynekologisk kreft	Klar 2010 (137), Tatsu-mi 2009 (138)	Tsai 2010 (139) Yeshchina 2009 (140)		Bhosale 2010 (141)
Hode- og hals	Dhull 2011 (142), Keller 2011 (143), Krabbe 2010 (144), Nakamoto 2009 (145), O`Niel 2010 (146), Rudmik 2011 (147),	Chatterjee 2011 (148), Castao 2010 (149), Delouya 2011 (150), , Ruiz Alonso 2011 (152), Thiagara-jan 2010 (153)	Due 2011, Nakagami 2011 (154)	Chaukar 2011 (155), O`Niel 2010 (146) Pantvaidya 2009 (151)
Leverkreft	Sorensen 2010 (156)			
Levermetastase	D`Souza 2011 (157), Mainenti 2010 (158)	Andratchke 2011(159) Grassetto 2010 (160) Ruers 2009 (161)		
Lunge	Chen 2010 (162), Dar-ling 2011 (163), Fisher 2011 (164), Kubota 2011 (165;166), Liu 2010(167), Pauls 2012 (168), Teo 2011 (169), Ung 2009 (170) Yang 2009 (171), Yi 2011 (172)	Fisher 2011 (164), MacManus 2010 (173), Moller 2011 (174), Pommier 2011 (175), Zsiray 2011(176)	Nair 2009 (177)	
Lymfom	Fuster 2010 (178), Ka-rantanis 2010 (179), Von Ufford (180)	Pommier 2011 (181) Terezakis 2011 (182)	Fuster 2010 (178) Gallamini 2011 (183) __Huic 2009 (184)	Smeltzer 2011 (185)
Melanom	Dellestable 2011 (186) Laurent 2010 (187)			
Kreft i pancreas	Kauhanen 2009 (188) Park 2009 (189) Takanami 2011			

	(190;191)			
Sarkom	Lahat 2009 (192)			
Skjoldbrusk-kjertel	Attia 2011(193), D`Souza 2010(194) Giovanella 2011 (195) Luster 2010 (196)	Capoccetti 2009 (197)	Leboulleux 2009 (198), Van 2010 (199)	
Spiserørskreft	Okada 2009 (200) Williams 2009 (201)		Sergeant 2010 (202;203) Van 2011 (204;205)	Teyton 2009 (206)
Tarmkreft	Georgiou 2010 (207) Liberale 2009 (208) Wiering 2010 (24)	Chua 2011 (209) Engledow 2011 (210;211) Paskeviciute 2009 (212)	Bystrom 2009 (213) Kalff 2009 (214)	Chua 2011 (209), Potter 2009 (215)
Urologisk kreft	Graafland 2009 (216) Haseebuddin 2009 (217), Katz 2009 (218), Luster 2010 (219) Petersen 2011 (220) Poulsen 2011 (221;222) Schlenker 2011 (223-225)	Karl 2010 (226)	Graafland 2010 (216;227)	
Flere kreftformer	Pfannenberg 2009 (228), Stecco 2009 (229)	Castao 2010 (230) Igdem 2010 (231) Kruser 2009 (232)	Kumar 2011 (233)	

Kommentar

Vi har søkt etter nye studier om bruk av PET innenfor kreftområdet, og har rapportert om nye systematiske oversikter og kliniske studier som er publisert i perioden 2009 til februar 2012.
Både nye systematiske oversikter og nye kliniske studier vil kunne ha betydning for behovsanslagene for PET som Kunnskapssenteret utarbeidet i 2009 (5). Et av de områdene det var knyttet mye usikkerhet til var om og eventuelt når PET vil kunne få en anvendelse i behandlingsplanlegging, og da særlig dersom PET blir aktuell i planlegging av strålebehandling. Dersom dette skulle vise seg å bli et viktig bruksområde, ville det i følge modellen fra 2009 kunne gi det høyeste behovet for PET-undersøkelser. Dette oppdaterte søket viser at det kan foreligge betydelig mer dokumentasjon om bruken av PET i behandlingsplanlegging for flere kreftdiagnoser (tabell 4).

Tabell 4. Mulige indikasjoner for PET gitt to av scenarioene beskrevet i notatet fra 2009 (5), samt oversikt over nye systematiske oversikter og kliniske studier

	Scenario 5: PET i stråleplan-legging	Nye systematiske oversikter: PET i behand-lingsplanlegging	Nye kliniske studi-er PET i behand-lingsplanlegging
Indikasjon for PET	Brystkreft Hjernekreft Hode-hals kreft Kolorektalkreft Livmorhalskreft Lungekreft Lymfom Prostatakreft Spiserørskreft Ventrikkelkreft	Gynekologisk kreft Hode-hals kreft Lungekreft Lymfom Spiserørskreft Tramkreft	Brystkreft Gynekologisk kreft Hode-hals kreft Levermetastaser Lungekreft Lymfom Spiserørskreft Tarmkreft Urologisk kreft

Andre indikasjoner enn kreft

I tråd med oppfatningen fra fagmiljø ble det i modellen for 2009 estimert at ca 15 % av PET-undersøkelsene var for andre formål enn kreft (5). Det er viktig å merke seg at modellen ikke skisserte mulige utviklingstrekk for bruk av PET på andre indikasjoner enn kreft. Vi ser fra det oppdaterte litteratursøket at det er en flere nye systematiske oversikter og en rekke nye studier på PET ved diagnostikk av sykdommer i sentralnervesystemet, samt noe innen utredning av hjerte-og karsykdom.

Vedlegg 1: søkestrategier

Bestiller: Inger Norderhaug
Bibliotekar: Malene W. Gundersen
Dato: 16.02.2012

Intervensjon: PET (positron emission tomography)
Studietype: Systematiske oversikter og RCT
Databaser: MEDLINE, Embase, Cochrane, HTA, DARE, CENTRAL

Totalt antall treff før dublettkontroll: 1619
Totalt antall etter før dublettkontroll: 1178

	MeSH	**Emtree**	**Tekstord**
PET	exp Positron-Emission Tomography/	positron emission tomography/ AND computer assisted emission tomography/	PET FDGPET FDG PET PETCT PET CT Positron Emission Tomography Positron-Emission Tomography

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present

1	exp Positron-Emission Tomography/	21631
2	(PET or FDGPET or PETCT or PETscan? or (Positron adj Emission adj Tomograph*)).tw.	52304
3	1 or 2	56631
4	limit 3 to "reviews (maximizes specificity)"	455
5	limit 3 to "therapy (maximizes specificity)"	671
6	4 or 5	1125
7	limit 6 to yr="2009 -Current"	383

Database: Ovid Embase 1974 to 2012 February 15

1	positron emission tomography/	63663
2	computer assisted emission tomography/	11021
3	(PET or FDGPET or PETCT or PETscan? or (Positron adj Emission adj Tomograph*)).tw.	69933
4	1 or 2 or 3	95338
5	limit 4 to "reviews (maximizes specificity)"	535
6	limit 4 to "therapy (maximizes specificity)"	1703
7	5 or 6	2223
8	limit 7 to yr="2009 -Current"	955

Database: The Cochrane Library:
Cochrane Database of Systematic Reviews - Issue 2, Feb 2012
Other Reviews (DARE) – Issue 1, Jan 2012
Technology Assessments – Issue 1, Jan 2012

#1	MeSH descriptor Positron-Emission Tomography explode all trees	677
#2	(PET or FDGPET or PETCT or PETscan* or (Positron NEXT Emission NEXT Tomograph*)):ti,ab,kw	1985
#3	(#1 OR #2)	1985
#4	(#3), from 2009	281

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