Supplementary Table 1: Description of included studies ordered alphabetically by first author.

| **Author and year** | **Study design\*** | **Population** | **Definition of primary outcomes\*** | **Time period** | **Age in years** | **Follow-up** | **Primary results\*\*** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Ahirwar et al. - 2008[1] | Case-control | 136 patients with NMIBC/MIBC | Recurrence: Newly found bladder tumor following a previous negative follow-up cystoscopy. | 2004-2007 | Mean/median NR | 13 months (median) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis |
| Ahn et al. - 2016[2] | Retrospective cohort | 645 patients with NMIBC | Recurrence: First tumor recurrence (regardless of grade or stage).  Progression: Any increase in grade (G1/2 to G3) or stage (Ta to T1 or T2, T1 to T2) after repeat transurethral resection for recurrence. | 2004-2015 | 64.6 (median) | 46 months (median) | **BMI**  *Ref. = <25*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  **DMII**  *Ref. = No DMII*  Recurrence: OR 1.22 (0.89-1.30)  Progression: OR 1.54 (0.95-2.50) |
| Ajili et al. - 2013[3] | Retrospective cohort | 81 patients with NMIBC | Recurrence: Reappearance of tumor after the initial treatment with at least one tumor-free cystoscopy interval. | 2000-2005 | 60 (median) | 30 months (max.) | **Smoking**  *Ref. = ≤60 pack-years*  *>60 pack-years*  Recurrence: 0.264 (0.110-0.631) |
| Alfthan et al. - 1983[4] | Randomized controlled trial | 30 patients with NMIBC | Prevention: No tumors during the last 12 months of treatment or during the whole treatment period if it was less. Partial prevention was described as disappearance of ≥50% of tumors.  Progression: Increase in number and/or grade of tumors. | NR | 64.1-68.6 (mean) | 17.6 months (mean) | **Etretinate**  *Ref. = Placebo*  Prevention/partial prevention: 11 intervention participants versus 4 control participants (p<0.01)  Progression: 0 intervention participants versus 2 control participants (p<0.01) |
| Allard et al. - 1995[5] | Prospective cohort | 368 patients with NMIBC | Recurrence: Tumor detected on cystoscopy. | 1990-1992 | 65.1 (mean) | 23.7 (mean) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis |
| Aso et al. - 1992[6] | Randomized controlled trial | 48 patients with NMIBC | Recurrence: ND | 1988-1989 | Mean/median NR | 427-428 days (mean) | ***Lactobacillus casei* probiotic**  *Ref. = No use or placebo*  Recurrence at 12 months: 57% (intervention) versus 83% (control) (p<0.01) |
| Aso et al. - 1995[7] | Randomized controlled trial | 125 patients with NMIBC | Recurrence: Cytologic examination, cystoscopy, and/or biopsy.  Progression: Upgrading or upstaging of tumors. | 1990-1991 | Mean/median NR | NR | ***Lactobacillus casei* probiotic**  *Ref. = Placebo*  Recurrence: 2.58 (p=0.013) (HR of being recurrence free)  Progression: 1 intervention participant versus 7 control participants (p<0.01) |
| Bachir et al. – 2014[8] | Retrospective cohort | 847 patients with NMIBC/MIBC | Recurrence: ND  CSM: ND  ACM: ND | 1998-2008 | 63.6-66.3 (mean) | 39 months (mean), 23.4 months (median) | **BMI**  *Continuous*  Recurrence: 0.978 (0.955-1.003)  CSM: 0.989 (0.960-1.019)  ACM: 0.984 (0.958-1.010) |
| Berglund et al. - 2008[9] | Retrospective cohort | 952 patients with NMIBC/MIBC | Recurrence: Visual and/or biopsy proven evidence of recurrence at cystoscopy or a positive repeat cytology.  Progression: Progression to surgery. | 1978-2006 | 65-69 (mean) | 4.3 years (mean of those without recurren-ce) | **Statins**  *Ref. = No use*  Recurrence: 1.04 (0.81-1.34)  Progression: 0.77 (0.52-1.13) |
| Boorjian et al. - 2009[10] | Retrospective cohort | 907 patients with NMIBC/MIBC | Recurrence: Visual and/or biopsy proven evidence of tumor at cystoscopy, or by positive urine cytology.  Progression:  Progression to surgery. | 1990-2006 | 65-71 (median) | 4.2 years (mean of those without recurrence) | **FCI**  *Ref. = No use*  *Any FCI (aspirin, clopidogrel, warfarin)*  Recurrence: 1.01 (0.85-1.19)  Progression: 0.91 (0.71-1.18)  *Aspirin*  Recurrence: 0.91 (0.75-1.10)  Progression: 0.71 (0.52-0.96)  *Clopidogrel*  Recurrence: 1.35 (0.94-1.94)  Progression: 0.70 (0.36-1.35)  *Warfarin*  Recurrence: 1.19 (0.89-1.59)  Progression: 1.89 (1.31-2.74) |
| Bostrom et al. - 2009[11] | Retrospective cohort | 248 patients with NMIBC/MIBC | CSM/ACM: ND | 1986-2005 | 64 (median) | 75 months (mean) | **Smoking**  *Ref. = Non-smoker*  CSM: NS on univariable analysis  ACM: MVNA |
| Byar et al. - 1977[12] | Randomized controlled trial | 118 patients with NMIBC | Recurrence: A visit at which one or more tumors have reappeared in the bladder after having been removed previously by transurethral resection.  Progression:  Increase in number of tumors. Increase in tumor grade. | 1971-1976 | NR | 31 months (mean) | **Pyridoxine**  *Ref. = Placebo*  Recurrence: NS on univariable analysis.  Progression: 22% (intervention) versus 46% (control) had an increase in number of tumors (p=0.026) |
| Cao et al. - 2016[13] | Retrospective cohort | 242 patients with NMIBC | Recurrence: Tumor recurrence after transurethral resection, with or without pathological upstaging or upgrading. | 2008-2013 | 64.2 (mean) | 21 months (mean) | **Areca nut chewing**  *Ref. = None*  *Light (<10/day)*  Recurrence: NS on univariable analysis  *Heavy (>10/day)*  Recurrence: 2.18 (1.37-3.47)  **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  *Current* Recurrence: 3.09 (1.99-4.80)  **DMII**  *Ref. = No DMII*  *DMII*  Recurrence: NS on univariable analysis |
| Carpenter et al. - 1989[14] | ND | 100 patients with NMIBC/MIBC | Recurrence: ND  Progression: Progression to cystectomy or partial cystectomy  CSM/ACM: ND | 1982-1986 | 64 (years) | 4.3 years (mean) | **Smoking**  *Ref. = Non-smoker*  Recurrence: MVNA  Progression: NS on univariable analysis  CSM/ACM: NS on univariable analysis |
| Carta et al. - 2018[15] | Retrospective cohort | 160 patients with NMIBC | Recurrence: Histological confirmation of a newly found bladder or prostatic urethra tumor following at least one tumor-negative follow-up cystoscopy or two surgical resection sessions for the primary tumor.  Progression: Transition from low- to high-grade, increase in TNM staging, progression to cystectomy, or “uncontrollable” disease. | 1997-2000 | Mean/median NR | 4.63 years (mean) | **Aromatic amines**  *Ref. = No exposure*  *Exposure*  Recurrence: 1.129 (0.743-1.743)  Progression: 0.719 (0.382-1.351)  **PAH**  *Ref. = No exposure*  *Exposure*  Recurrence: 1.077 (0.701-1.654)  Progression: 0.690 (0.358-1.327) |
| Chade et al. - 2010[16] | Retrospective cohort | 155 patients with NMIBC | Recurrence: ND  Progression: Progression to invasive bladder cancer, defined as cT1 or higher (≥cT1) and progression to MIBC, defined as cT2 or higher (≥cT2), or radical cystectomy. | 1990-2008 | 69 (median) | 3.3-4.0 years (median) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis |
| Chen et al. - 2007[17] | NR | 265 patients with NMIBC | Recurrence: Histologically confirmed recurrent bladder cancer detected >8 weeks after the initial TUR.  Progression:  Recurrent cancer that invaded into the muscle layer. | 1997-2005 | 65-69 (median) | 38 months (median) | **Smoking - categorical**  *Ref. = Quitters (quit within 1 year before and 3 months after diagnosis)*  *Never*  Recurrence:2.2 (1.1-4.5)  Progression: NS on univariable analysis  *Former*  Recurrence: 1.4 (0.7-2.7)  Progression: NS on univariable analysis  *Current*  Recurrence: 2.2 (1.2-4.0)  Progression: MVNA  **Smoking – cumulative**  *Ref. = 1-19 pack-years*  *20-39 pack-years*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis    *40-59 pack-years*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  ≥*60 pack-years*  Recurrence: MVNA  Progression: MVNA |
| Cheng et al. - 1999[18] | Retrospective cohort | 83 patients with NMIBC | Progression: The development of muscle-invasive or more advanced stage carcinoma, distant metastasis, or death from bladder cancer.  CSM: Included in definition of progression. | 1987-1992 | 71 (mean) | 5.2 years (mean) | **Alcohol**  Progression: Never, former, and current NS different on univariable analysis.  CSM: Never, former, and current NS different on univariable analysis.  **Smoking\*\*\***  *Ref. = Non-smoker*  Progression: Never, former, and current NS different on univariable analysis.  CSM: Never, former, and current NS different on univariable analysis. |
| Chromecki et al. - 2013[19] | Retrospective cohort | 4,118 patients with NMIBC/MIBC | Recurrence: ND  CSM: ND  ACM: ND | 1979-2008 | 67 (median) | 44 months (median) | **BMI**  *Ref. = <25*  *25.9-29.9*  Recurrence: 0.91 (0.76-1.06)  CSM: 0.80 (0.68-0.95)  ACM: 1.40 (1.23-1.57)  *>30*  Recurrence: 1.67 (1.46-1.91)  CSM: 1.43 (1.24-1.66)  ACM: 1.81 (1.60-2.05) |
| Crivelli et al. - 2013[20] | Retrospective cohort | 1,117 patients with NIMBC | Recurrence: Defined as the first tumor relapse in the bladder regardless of stage.  Progression: A muscle-invasive relapse in the bladder.  CSM/ACM: Cause of death was determined by the treating physicians, chart review corroborated by death certificates or death certificates alone. | 1996-2007 | 65 (mean), 67 (median) | 62.7 months (median) | **Statins**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis |
| da Silva et al. - 2013[21] | Retrospective cohort | 1,502 patients with NMIBC/MIBC | Recurrence: Tumor relapse in the operative field, regional lymph nodes and/or distant metastasis.  CSM: Cause of death was determined by treating physicians by chart review corroborated by death certificates or by death certificates alone. | 1992-2008 | 65.5 (mean), 66 (median) | 34 months (median) | **BMI**  *Continuous*  Recurrence: 1.05 (1.03-1.07)  CSM: 1.05 (1.02-1.07)  **Smoking**  *Ref. = Never*  *Former*  Recurrence: 1.27 (0.98-1.65)  CSM: 1.24 (0.98-1.66)  *Current*  Recurrence: 1.47 (1.12-1.92)  CSM: 1.43 (1.06-1.93)  **Statins**  *Ref. = No use*  Recurrence: 1.04 (0.86-1.24)  CSM: 1.04 (0.84-1.28) |
| Dabi et al. - 2017[22] | Retrospective cohort | 701 patients with NMIBC/MIBC | Recurrence: Tumor relapse in the operative field, regional lymph nodes and/ or distant metastases.  CSM: Death cause was determined using patient’s death certificate. | 1995-2011 | 65.2 – 66.8 (mean) | 45 months (median) | **BMI**  *Ref. = 18-25*  *>25 - 30*  Recurrence: 1.14 (0.78–1.66)  CSM: 1.13 (0.74–1.74)  *>30*  Recurrence: 1.58 (1.06-2.34)  CSM: 1.58 (1.01–2.48) |
| Decensi et al. - 2000[23] | Randomized controlled trial | 99 patients with NMIBC | Recurrence: Presence of a papillary tumor or an infiltrating cancer at the time of cystoscopy. | 1993-1994 | 61.6-63.8 (mean) | NR | **Fenretinide**  *Ref. = Placebo*  Recurrence: 27 participants in the intervention group versus 21 participants in the control group (p=0.36) |
| Donat et al. - 2003[24] | Prospective cohort | 267 patients with NMIBC | Recurrence: ND | 1998-2001 | 69.1 (median) | 2.6 years (median) | **Fluid intake**  *Continuous*  Recurrence: NS on univariable analysis  **Smoking**  *Ref. = Never*  *Former*  Recurrence: 0.94 (0.65-1.35)  *Current*  Recurrence: 1.10 (0.67-1.82) |
| Ferro et al. - 2018[25] | Retrospective cohort | 1,115 patients with NMBIC | Recurrence: The appearance of any tumor.  Progression: Muscle-invasive disease during follow up.  CSM: ND  ACM: ND | 2002-2012 | 71 (median) | 26 months (median) | **BMI**  *Ref. = 18.5-<25*  *<18.5*  Recurrence: 0.27 (0.06-1.11)  Progression: 0.64 (0.15-2.66)  CSM: NS  ACM: NS  *25-29.99*  Recurrence: 4.00 (3.18-5.01)  Progression: 2.52 (1.85-3.42)  CSM: NS  ACM: NS  ≥*30*  Recurrence: 5.33 (4.16-6.83)  Progression: 2.51 (1.76-3.57)  CSM: NS  ACM: NS |
| Fleshner et al. - 1999[26] | Retrospective cohort | 286 patients with NMIBC | Recurrence: A recurrent lesion in the bladder at least 3 months after the initial transurethral resection.  Progression: The development of MIBC, the development of metastases, or the development of uncontrollable NMIBC that was unamenable to conservative therapy. | 1985-1995 | 58.7-63.7 (mean) | 55.2-59.1 months (mean) | **Smoking**  *Ref. = Former*  *Quitter (pa tients with 20 pack-years of exposure and who quit smoking between 1 year prior to and up to 3 months following the diagnosis)*  Recurrence: 0.99 (0.77-1.25)  Progression: NS on univariable analysis  *Current*  Recurrence: 1.40 (1.03-1.91)  Progression: MVNA |
| Gee et al. – 2008[27] | Retrospective cohort | 43 patients with NMIBC | Recurrence: First tumor recurrence.  Progression: Progression in stage to lamina propria invasion or more advanced stages. | 1991-2003 | 63-72 (mean) | NR | **Aspirin**  *Ref. = No use*  Recurrence: 0.179 (0.062-0.516)  Progression: NS on univariable analysis  **Smoking**  *Ref. = Never*  *Former*  Recurrence: 3.199 (0.981-10.433)  *Current*  Recurrence: 0.270 (0.082-0.889) |
| Gierth et al. - 2018[28] | Prospective cohort | 678 patients with NMIBC/MIBC | CSM/ACM: The cause of death was determined by the treating physician, by chart review corroborated by death certificates, or by death certificates alone. | 2011 | 70 (median) | At least 21 months | **BMI**  *Ref. = <25*  *25-29.9*  CSM: 1.12 (0.73-1.71)  ACM: 0.80 (0.56-1.13)  *>30*  CSM: 0.71 (0.42-1.19)  ACM: 0.60 (0.39-0.92) |
| Goossens et al. - 2016[29] | Randomized controlled trial | 292 patients with NMIBC | Recurrence: The new occurrence of tumor at the same or at a different site as the index cancer.  Progression: Recurrence with an increase in tumor grade, or an increase in TNM stage, or a new occurrence of carcinoma in situ in the bladder previously free from such lesions, or a new occurrence of multiple tumors following resection of a solitary tumor, or the need for a cystectomy because of refractory disease. | 2009-2013 | 68 (median) | 17.93 months (median) | **Selenium**  *Ref. = Placebo*  Recurrence: 0.85 (0.56-1.29)  Progression: 1.48 (0.65-3.38) |
| Grotenhuis et al. - 2014[30] | Retrospective cohort | 963 patients with NMIBC | Recurrence: New, histologically confirmed bladder or prostatic urethra tumor following at least 1 tumor-negative follow-up cystoscopy result or 2 surgical resection sessions for the primary tumor.  Progression: First occurrence of grade progression, stage progression, occurrence of local metastasis or distant metastasis or both, and  cystectomy for therapy-resistant disease. | 1995-2010 | 61-66 (mean) | 3.7 years (median) | **Smoking**  *Ref. = Never*  *Ever*  Recurrence: 1.06 (0.80-1.41)  Progression: 1.15 (0.72-1.84)  *Former*  Recurrence: 1.14 (0.85-1.53)  Progression: 1.36 (0.84-2.21)  *Current*  Recurrence: 0.93 (0.67-1.29)  Progression: 0.80 (0.45-1.42) |
| Hoffman et al. - 2006[31] | Retrospective cohort | 84 patients with NMIBC | Recurrence: Number of total recurrences.  Progression: Tumor progression, the time to cystectomy, and the time to the development of distant metastases. | NR | 65 (median) | 46 months (median) | **Statins**  *Ref. = No use*  Recurrence: NS on UV analysis  Progression: MVNA |
| Holz et al. - 2017[32] | Retrospective cohort | 123 patients with NMIBC | Recurrence: Reappearance of tumor (any grade and any stage) during follow-up.  Progression: Progression to MIBC, development of lymph node (N+) disease or distant metastasis (M1). | 1998-2012 | 68 (mean), 69 (median) | 49 months (median) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: MVNA  Progression: NS on univariable analysis  *Current*  Recurrence: MVNA  Progression: NS on univariable analysis |
| Hou et al. - 2017[33] | Meta-analysis | 10,192 patients with NMIBC/MIBC | Recurrence: ND  Progression: ND  CSM: ND | 1995-2015 | 61.6-75.0 (mean) | 23.7-80.9 months (mean) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: SSRE 1.22 (1.09-1.37)  Progression: SSRE 1.16 (0.92-1.46)  CSM: SSRE 1.20 (1.03-1.41)  *Current*  Recurrence: SSRE 1.23 (1.05-1.45)  Progression: SSRE 1.11 (0.70-1.75)  CSM: SSRE 1.28 (1.07-1.52) |
| Hudson et al. – 1990[34] | Retrospective cohort | 149 patients with NMIBC | Recurrence: Recurrence following BCG  Progression: Invasive or metastatic disease. | 1981-1989 | NR | 29.8 months (median) | **FCIs (Aspirin, aspirin plus dipyramidole, indomethacin, ibuprofen, warfarin)**  *Ref. = No use*  Recurrence: MVNA  Progression: NS on univariable analysis |
| Hwang et al. - 2011[35] | Retrospective cohort | 251 patients with NMIBC | Recurrence: First tumor recurrence (regardless of grade or stage).  Progression: Any increase in grade (G1/2 to G3) or stage (Ta to T1 or T2, T1 to T2). | 2000-2010 | 67 (median) | 34 months (median) | **Smoking**  *Ref. = Non-smoker*  Recurrence: 1.63 (1.1-2.5)  Progression: NS on univariable analysis  **DMII**  *Ref. = No DMII*  Recurrence: 2.11 (1.4-3.2)  Progression: 9.35 (3.1-28.6) |
| Jochems et al. - 2018[36] | Prospective cohort | 716 patients with NMIBC | Recurrence: The new occurrence of NMIBC (stage Ta, T1, or pTis) at the same or at a different site as the initial primary bladder tumor and excluding recurrence identified at the first check cystoscopy. | 2005-2011 | 71 (median) | 3.7 years (mean) | **Alcohol**  *Ref. = No use*  *25-125mL/day*  Recurrence: 0.90 (0.63-1.27)  *>125mL/day*  Recurrence: 0.97 (0.70-1.36)  **Fluid intake**  *Ref. = 250-850mL/day*  *850-1200mL/day*  Recurrence: 1.17 (0.85-1.62)  *>1200mL/day*  Recurrence: 0.98 (0.70-1.38) |
| Jochems et al. - 2018[37] | Prospective cohort | 728 patients with NMIBC | Recurrence: The new occurrence of a NMIBC (stage Ta, T1, or pTis) at the same or at a different site as the initial pri- mary bladder tumor and excluding recurrence identified at the first check cystoscopy. | 2005-2011 | 69 (mean) | 3.7 years (median) | **Fruits and vegetables**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 1.09 (0.79-1.50)  *Tertile 3* Recurrence: 1.07 (0.78-1.47)  **Total fruits**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 1.22 (0.89-1.69)  *Tertile 3* Recurrence: 0.85 (0.63-1.14)  **Total vegetables**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 0.97 (0.70-1.33)  *Tertile 3* Recurrence: 1.02 (0.74-1.41) |
| Kamat et al. - 2007[38] | ND | 156 patients with NMIBC | Recurrence: ND  Progression: ND  ACM: ND | NR | NR | 56 months (median) | **Statins**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  ACM: NS on univariable analysis |
| Kashif Khan et al. - 2014[39] | Retrospective cohort | 64 patients with NMIBC | Recurrence: Tumors of the same initial stage at cystoscopy.  Progression: Tumor involved the detrusor muscle, had nodal or distant metastasis. | 2008-2012 | 59.86 (mean) | 28.36 months (mean) | **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis  Progression: OR 4.02 (1.01-15.88) |
| Kelly et al. - 2019[40] | Randomized controlled trial | 427 patients with NMIBC | Recurrence: Confirmation of cancer recurrence by cystoscopy. | 2007-2012 | 67 (median) | 44 months (median) | **Celecoxib**  *Ref. = Placebo*  Recurrence: 0.82 (0.60-1.12)  Progression: 10% versus 9.7% (log-rank p=0.8)  ACM: 1.21 (0.68-2.15) |
| Kluth et al. - 2013[41] | Retrospective cohort | 892 patients with NMIBC | Recurrence: First tumor relapse in bladder or prostatic urethra regardless of tumor stage.  Progression: Tumor relapse at tumor stage T2 or higher in the bladder or prostate.  CSM/ACM: The cause of death was determined by treating physicians, by chart review corroborated by death certificates or by death certificates alone. | 1996-2007 | 68 (median) | 42.8 months (median) | **BMI**  *Continuous*  Recurrence: 1.07 (1.04-1.09)  Progression: 1.08 (1.04-1.12)  CSM: 1.29 (1.20-1.37)  ACM: 1.06 (1.04-1.09)  *Ref. = <30*  ≥*30*  Recurrence: 2.66 (2.12-3.32)  Progression: 1.49 (1.00-2.21)  CSM: 3.15 (1.74-5.67)  ACM: 1.42 (1.06-1.92) |
| Koch et al. - 1986[42] | Prospective cohort | 761 patients with NMIBC | Recurrence: Histologically-proven diagnosis. | 1977-1983 | Mean/median NR | 59 months (median) | **Artificial sweeteners**  *Ref. = No use*  Recurrence: NS (hazard ratio NA)  **Chemical exposure**  *Ref. = No exposure*  Recurrence: NS (hazard ratio NR)  **Coffee**  *Ref. = No use*  Recurrence: NS (hazard ratio NR)  **Smoking**  *Ref. = Non-smoker*  Recurrence: NS (hazard ratio NR) |
| Korkes et al. - 2010[43] | Retrospective cohort | 99 patients with NMIBC | Recurrence: ND  Progression: Progression to MIBC  CSM: ND | 1994-2000 | 67 (mean) | 49.3 months (median) | **Smoking - categorical**  *Ref. = Never*  *Current*  Progression: NS on univariable analysis  NS on Chi-square between former smokers, Early-quitters (quit *≤*1 year after diagnosis), Late-quitters (quit >1 year after diagnosis), and current smokers  ***Smoking – cumulative***  *Ref. = <60 pack years*  *>60 pack years*  Progression: MVNA  CSM: NS on univariable analysis |
| Koshiaris et al. - 2017[44] | Retrospective cohort | 1,733 patients with bladder cancer (stage unspecified) | CSM/ACM: Clinical Practice Research Datalink record and also from the UK national system of recording death provided by the Office for National Statistics. | 1999-2013 | 65.39-67.49 (mean) | NR | **Smoking**  *Ref. = Quitters*  *Current*  CSM: 1.14 (0.71-1.83)  ACM: 0.86 (0.44-1.65) |
| Lacombe et al. - 2016[45] | Retrospective cohort | 189 patients with NMIBC | Recurrence: a pathologically confirmed (at re-TURBT) new tumor(s) identified during cystoscopy follow-up after TURBT. | 1990-1992, 1997-2002 | 62.8 (mean) | 5.6 years (mean) | **Smoking**  *Ref. = Never*  *Former*  Recurrence:  2.76 (1.03-7.40)  *Current*  Recurrence: 2.93 (1.08-7.94) |
| Lamm et al. - 1994[46] | Randomized controlled trial | 65 patients with bladder cancer (stage unspecified) | Recurrence: Presence of recurrent tumors resected transurethrally and confirmed by microscopic examination.  ACM: ND | 1985-1992 | 65.9-68.1 (mean) | 45 months (mean) | **Megadose multivitamins**  *Ref. = Recommended daily allowance*  Recurrence (5-year estimates): 80% (intervention) versus 40% (control) (p=0.0014)  ACM (survival rate): 76% (intervention) versus 74% (control) (NS) |
| Lammers et al. - 2011[47] | Prospective cohort | 718 patients with NMIBC | Recurrence: Recurrence during treatment period, recurrence after treatment period, and occurrence of CIS. | 1998-2004 | 66.2-66.6 (mean) | 2.5 years (mean) | **Smoking**  *Ref. = Never*  *Current/former*  Recurrence (European Organization for Research and Treatment of Cancer risk factors included in multivariable analysis): 1.47 (1.00-2.15)  Recurrence (Club Urologico Espanol de Tratamiento Oncologico risk factors included in multivariable analysis): 1.57 (1.06-2.31) |
| Lee et al. - 2011[48]\*\*\*\* | Retrospective cohort | 602 patients with NMIBC/MIBC | Recurrence/progression: Local recurrence at or below the common iliac bifurcation or distant metastasis documented by imaging and biopsy, if indicated. | 1989-2008 | 60.5-64.3 (mean) | 56 months (median) | **Smoking - binary**  *Ref. = Non-smoker*  Recurrence/progression: 0.94 (p=0.697)  CSS: 1.10 (p=0.587)  ACM: 1.01 (p=0.930)  **Smoking – categorical**  *Ref. = Never*  *Former*  Recurrence/progression: 0.93 (0.66-1.29)  CSS: 1.21 (0.86-1.70)  *Current*  Recurrence/progression: 0.91 (0.63-1.31)  CSS: 0.94 (0.64-1.37)  **Smoking – cumulative**  *Ref. = Never*  *<10 pack-years*  Recurrence/progression: 1.55 (0.74-3.27)  CSS: 1.38 (0.58-3.28)  *<20 pack-years*  Recurrence/progression: 0.59 (0.30-1.16)  CSS: 0.68 (0.34-1.39)  *<30 pack-years*  Recurrence/progression: 0.91 (0.50-1.65)  CSS: 1.02 (0.56-1.85)  *<40 pack-years*  Recurrence/progression: 0.98 (0.55-1.74)  CSS: 1.15 (0.65-2.02)  ≥*40 pack-years*  Recurrence/progression: 0.86 (0.56-1.31)  CSS: 0.95 (0.61-1.48) |
| Leibovici et al. – 2015[49] | Case-control | 519 patients with NMIBC and 505 healthy control participants | Recurrence: Newly found bladder tumor following a previous negative follow-up cystoscopy.  Progression: The transition from NMIBC to MIBC or metastatic disease. | 1995-2003 | 62.3-65.7 (mean) | 20.8 months (median) | **Smoking - categorical**  *Ref. = Never*  *Former*  Recurrence: 1.11 (0.73-1.70)  Progression: 1.30 (0.53-3.16)  *Current/recent quitter*  Recurrence: 0.81 (0.47-1.37)  Progression: 0.59 (0.17-2.03)  **Smoking – cumulative**  Recurrence: 1.00 (0.99-1.00)  Progression: 1.01 (1.00-1.02) |
| Lenis et al. – 2018[50] | Retrospective cohort | 90 patients with NMIBC | Recurrence: The presence of urothelial carcinoma on biopsy or repeat resection.  Progression: Any increase in grade or stage of disease. | 2012-2015 | 69.7 (mean) | 20 months (median) | **BMI**  *Ref. = <30*  ≥*30*  Recurrence or progression: 3.42 (1.55-7.52)  **DMII**  *Ref. = No DMII*  Recurrence or progression: 1.09 (0.46–2.59) |
| Li et al. - 2017[51] | Retrospective cohort | 484 patients with NMIBC | Recurrence: Histologically-confirmed tumor recurrence.  Progression: Pathological stage ≥T2 or disease metastasis. | 2007-2015 | 64 (median) | 25 months (median) | **Smoking - categorical**  *Ref. = Never*  *Former*  Recurrence: 0.970 (0.639-1.471)  Progression: NS on univariable analysis  *Current*  Recurrence: 1.487 (0.948-2.331)  Progression: NS on univariable analysis  **Smoking – categorical**  *Ref. = Current*  *Quit <10 years prior to diagnosis*  Recurrence: 0.937 (0.620-1.415)  *Quit* ≥*10 years prior to diagnosis*  Recurrence: 0.456 (0.257-0.809)  **Smoking – cumulative**  *Ref. = cigarette index <400*  *Cigarette index* ≥*400*  Recurrence: 2.409 (1.487-3.903) |
| Lipsky et al. - 2013[52] | Retrospective cohort | 224 patients with NMIBC | Recurrence: Biopsy-proven recurrence within the bladder.  Progression: Stage increase at the time of recurrence.  CSM/ACM: ND | 2001-2011 | 68-78 (mean) | 44.1 months (median) | **Aspirin**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM/ACM: NS on univariable analysis  **Clopidogrel**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM/ACM: NS on univariable analysis  **Warfarin**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM/ACM: NS on univariable analysis |
| Lopez-Beltran et al. – 1992[53] | Retrospective cohort | 36 patients with NMIBC/MIBC | CSM: ND | NR | 64.4 (mean) | 56.75 months (mean) | **Smoking**  *Ref. = Non-smoker*  CSM: NS on univariable analysis |
| Lukas et al. - 2017[54]\*\*\*\* | Case-control | 143 patients with NMIBC/MIBC and 337 controls | Recurrence: ND | NR | 60.36-70.4 (median), 59.94-69.24 (mean) | NR | **Aromatic amine**  *Ref. = Not exposed*  *Exposed*  Recurrence: 1.58 (0.66-3.74)  **Azo dyes**  *Ref. = Not exposed*  *Exposed*  Recurrence: 0.92 (0.51-1.65)  **PAH**  *Ref. = Not exposed*  *Exposed*  Recurrence: 0.75 (0.42-1.33) |
| Maurer et al. - 2009[55] | Retrospective cohort | 390 patients with NMIBC/MIBC | ACM: ND | 1986-2004 | 68 (median) | NR | **BMI**  *Ref. = Normal weight*  ACM: MVNA |
| Mazdak et al. - 2012[56] | Randomized controlled trial | 46 patients with NMIBC | Recurrence: ND | 2006-2010 | 59.16-60.62 (mean) | 17.8-24.57 (mean) | **Vitamin E**  *Ref. = No use*  Recurrence: RR 0.53 (0.19-0.92) |
| Michalek et al. - 1985[57] | NR | 302 patients with NMIBC/MIBC | Recurrence: Determined from patient’s medical record.  ACM: Review of medical records. | 1063-1975 | 66 (mean) | NR | **Smoking**  *Ref. = Never*  *Former/Current*  Recurrence: NS on univariable analysis  ACM: Regression coefficient=0.012, SE=0.092, p=0.89 |
| Michalek et al. - 1987[58] | Prospective cohort | 102 patients with NMIBC | Recurrence: ND | 1960-1965 | NR | NR | **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis  **Vitamin A**  *Ref. = Low intake (lesser half of cohort)*  *High intake*  Recurrence: MNVA |
| Mitra et al. - 2013[59] | Prospective cohort | 212 patients with NMIBC/MIBC | ACM: ND | 1987-1996 | 58.9 (median) | 13.2 years (median) | **Smoking**  *Ref. = Never or ≤20 cigarettes/day for ≤30 years*  *Smoking for 31-40 years or >20 cigarettes/day for ≤30 years*  ACM: 2.59 (1.29-5.21)  *Smoking for >40 years*  ACM: 6.11 (3.02-  12.37) |
| Naito et al. - 2008[60] | Randomized controlled trial | 202 patients with NMIBC | Recurrence: Positive findings on cystoscopy or consecutive positive findings on urine cytology.  Progression: MIBC or metastasis.  CSM/ACM: ND | 1999-2002 | Mean/median NR | 26.9-43.6 months (median) | ***Lactobacillus casei* probiotic**  *Ref. = No use*  Recurrence: 0.5654 (0.3450-0.9265)  Progression: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis  **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis |
| Nayan et al. - 2015[61] | Retrospective cohort | 85 patients with NMIBC/MIBC | Recurrence: Imaging, cystoscopic, or physical examination evidence of disease recurrence.  CSM/ACM: Obtained through electronic medical record review and the Princess Margaret Hospital Cancer Registry. | 1997-2013 | 71 (mean) | 50 months (median) | **Metformin**  *Ref. = No use*  Recurrence: 0.38 (0.20-0.72)  CSM: 0.57 (0.35-0.91)  ACM: 1.05 (0.49-2.26)  **Other oral hypoglycemics**  *Ref. = No use*  Recurrence: 1.00 (0.57-1.76)  CSM: 0.65 (0.42-1.02)  ACM: 0.96 (0.46-1.98)  **Insulin**  *Ref. = No use*  Recurrence: 0.96 (0.22-4.10)  CSM: 0.56 (0.12-2.60)  ACM: 0.60 (0.21-1.72) |
| Nepple et al. - 2010[62] | Randomized controlled trial | 670 patients with NMIBC | Recurrence: Confirmed by biopsy or cytology. | 1999-2003 | 68.4 (mean) | 24 months (median) | **Megadose multivitamins**  *Ref. = Recommended daily allowance*  Recurrence: 1.07 (0.83-1.39) |
| Nerli et al. - 2018[63] | Retrospective cohort | 42 patients with NMIBC | Recurrence: Occurrence of a new tumor in the bladder. | 2007-2016 | 57.3 (mean) | 57.38 (median) | **Smoking\*\*\***  *Ref. = Tobacco non-users*  *Tobacco users*  Recurrence: Significantly higher. HR for multivariable analysis NR. |
| Newling et al. - 1995[64] | Randomized controlled trial | 252 patients with NMIBC | Recurrence: Identification on cystoscopy.  Progression: ND  ACM: ND | 1979-1981 | 65 (median) | 3.4 years (mean) | **Pyridoxine**  *Ref. = Placebo*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  ACM: NS on univariable analysis |
| Ogihara et al. - 2016[65] | Retrospective cohort | 634 patients with NMIBC | Recurrence: ND | 1995-2012 | 68.5 (mean) | 68.1 months (median) | **Smoking**  *Ref. = Non-smoker*  Recurrence: 2.55 (1.70-3.83)  **Smoking – cumulative**  *Ref. = <1 pack/day*  ≥*1 pack/day*  Recurrence: NS on univariable analysis  **Smoking – cumulative**  *Ref. = <30 years*  ≥*30 years*  Recurrence: NS on univariable analysis  **Smoking – cumulative**  *Ref. = Quit* ≥*15 years prior to initial consultation*  *Quit <15 years prior to initial consutlation*  Recurrence: 2.20 (1.31-3.70) |
| P’ng et al. - 1993[66] | Retrospective cohort | 45 patients with NMIBC | Therapeutic failure: persistent or recurrent tumor(s), or positive cytology at the first follow-up cystoscopy at 3 months. | 1985-1990 | 69 (mean), 70 (median) | 20.3 months (median) | **FCI (aspirin, NSAIDs, warfarin)**  *Ref. = No use*  Therapeutic failure (including recurrence): MVNA |
| Pastore et al. - 2015[67] | Retrospective cohort | 574 patients with NMIBC | Recurrence: According to the American Cancer Society as the return of cancer after treatment and after a period of time during which the cancer could be detected, and at the site where it began (somewhere else in the bladder or at distant sites). | 2008-2013 | 62.24 (mean) | 45.06 months (mean) | **Aspirin**  *Ref. = No use*  Recurrence: 0.749 (0.452-1.239)  **Aspirin and statins**  *Ref. = No use*  Recurrence: 1.394 (0.852-2.279)  **Smoking**  *Ref. = Never*  *Former*  Recurrence: 2.191 (1.382-3.478)  *Current*  Recurrence: 3.202 (1.983-5.171)  **Statins**  *Ref. No use*  Recurrence: 1.886 (1.095-3.247) |
| Pedersen et al. - 1984[68] | Randomized controlled trial | 73 patients with NMIBC | Recurrence: ND | NR | NR | 8 months (study period) | **Etretinate**  *Ref. = Placebo*  Recurrence: NS on univariable analysis |
| Psutka et al. - 2014[69] | Retrospective cohort | 205 patients with NMIBC/MIBC | CSM/ACM: Cause of death is confirmed via death certificate. | 2000-2007 | 71 (median) | 6.7 years (median) | **BMI**  *Continuous*  CSM: 1.00 (0.97-1.05)  ACM: 1.00 (0.96-1.03) |
| Psutka et al. - 2015[70] | Retrospective cohort | 262 patients with NMIBC/MIBC | ACM: Verified via death certificate. | 2000-2008 | 71 (median) | 6.3 years (median) | **BMI**  *Ref. = <30*  ≥*30*  ACM: 0.79 (0.50-1.26)  **Smoking**  *Ref. = Non-smoker*  ACM: 1.24 (0.81-1.92) |
| Raitanen et al. - 1995[71] | ND | 169 patients NMIBC/MIBC | Recurrence: ND | 1978-1986 | 65-67 (mean) | 7.5 years (mean) | **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis |
| Raitanen et al. - 1995[72] | ND | 252 patients with NMIBC/MIBC | CSM: ND | 1978-1986 | 63-66 (mean) | 6.7 years (mean) | **Smoking**  *Ref. = Non-smoker*  *Smoker*  CSM: 1.4 (0.9-2.3) |
| Rausch et al. - 2014[73] | Retrospective cohort | 192 patients with NMIBC | Recurrence: Tumor recurrence with or without pathological upstaging or upgrading.  Progression: Pathological progression by either upstaging or upgrading. Occurrence of a staging of greater or equal to pT2. | 1996-2006 | 68.31 (median) | 80 months (median) | **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  **DMII**  *Ref. = No DMII*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis |
| Richard et al. - 2017[74] | Retrospective cohort | 13,811 patients with NMIBC | CSM/ACM: As indicated in databases. | 1992-2002 | 76 (median) | 7.1 years (median) | **Statins**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 0.99 (0.97-1.01)  ACM: 1.01 (0.99-1.03)  *Cumulative use after diagnosis*  CSM: 1.04 (0.99-1.09)  ACM: 0.93 (0.91-0.96)  **DMII**  *Ref. = No DMII*  CSM: 0.99 (0.97-1.01)  ACM: 1.04 (1.03-1.05) |
| Richard et al. - 2018[75] | Retrospective  cohort | 1,742 patients with NMIBC | CSM/ACM: As indicated in databases. | 1992-2012 | 78 (median) | 5.2 years (median) | **DMII**  *Cumulative time between DMII and NMIBC diagnosis*  CSM: 1.0 (0.96-1.1)  ACM: 1.01 (0.99-1.03)  **Glyburide**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 0.97 (0.88-1.1)  ACM: 1.06 (1.02-1.1)  *Cumulative use after diagnosis*  CSM: 1.17 (1.02-1.3)  ACM: 1.01 (0.97-1.1)  **Insulin**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 1.1 (0.65-1.9)  ACM: 1.3 (1.11-1.5)  *Cumulative use after diagnosis*  CSM: 1.17 (0.76-1.8)  ACM: 1.09 (0.87-1.2)  **Metformin**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 1.0 (0.90-1.1)  ACM: 1.0 (0.97-1.1)  *Cumulative use after diagnosis*  CSM: 1.1 (0.92-1.2)  ACM: 0.96 (0.92-1.01)  **Other oral anti-diabetic agents**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 0.99 (0.70-1.4)  ACM: 0.97 (0.86-1.1)  *Cumulative use after diagnosis*  CSM: 0.86 (0.53-1.4)  ACM: 1.06 (0.85-1.2)  **Thiazolidinedione**  *Ref. = No use*  *Cumulative use before diagnosis*  CSM: 0.85 (0.36-2.0)  ACM: 0.1 (0.83-1.1)  *Cumulative use after diagnosis*  CSM: 0.85 (0.30-1.3)  ACM: 0.91 (0.77-1.1) |
| Rieken et al. - 2013[76] | Retrospective cohort | 1,117 patients with NIMBC | Recurrence: First tumor relapse in the bladder or prostatic urethra, regardless of tumor stage.  Progression: Tumor relapse at tumor stage T2 or higher in the bladder or prostatic urethra.  CSM/ACM: The cause of death was determined by the treating physicians, by chart review corroborated by death certificates, or by death certificates alone. | 1996-2007 | 65 (mean), 67 (median) | 64 months (median) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis  Progression: MVNA  CSM: NS on univariable analysis  ACM: NS on univariable analysis  **DMII**  *Ref. = No DMII*  *DMII, no metformin*  Recurrence: 1.39 (1.04-1.86)  Progression: 2.21 (1.29-3.77)  CSM: NS on univariable analysis  ACM: 1.19 (0.81-1.73)  *DMII, metformin*  Recurrence: 0.48 (0.26-0.89)  Progression: 0.34 (0.05-2.42)  CSM: NS on univariable analysis  ACM: 1.49 (0.88-2.53) |
| Rieken et al. - 2014[77] | Retrospective cohort | 1,502 patients with NMIBC/MIBC | Recurrence: Tumor relapse in the operative field, regional lymph nodes, and distant metastases.  CSM/ACM: Cause of death was determined by treating physicians by chart review corroborated by death certificates or by death certificates alone. | 1992-2008 | 65.5 (mean), 66 (median) | 34 months (median) | **BMI**  *Continuous*  Recurrence: 1.05 (1.03-1.07)  CSM: 1.05 (1.03-1.07)  ACM: 1.01 (0.99-1.03)  **DMII**  *Ref. = No DMII*  *DMII, no metformin*  Recurrence: 1.29 (0.97-1.73)  CSM: 1.53 (1.12-2.09)  ACM: 1.52 (1.16-2.00)  *DMII, metformin*  Recurrence: 0.96 (0.63-1.46)  CSM: 1.01 (0.62-1.63)  ACM: 0.99 (0.65-1.50)  **Smoking**  *Ref. = Non-smoker*  Recurrence: 1.19 (1.05-1.35)  CSM: 1.17 (1.02-1.35)  ACM: 1.10 (0.98-1.24) |
| Rink et al. - 2012[78] | Retrospective cohort | 390 patients with NMIBC | Recurrence: First tumor relapse in the bladder regardless of stage.  Progression: Tumor relapse with an increase to disease stage T2 or higher in the bladder.  ACM: ND | 1987-2007 | 67 (median) | 66 months (median) | **Smoking (categorical)**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis Progression: NS on univariable analysis  ACM: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis Progression: NS on univariable analysis  ACM: NS on univariable analysis  **Smoking (cessation)**  *Ref. = Current*  *Cessation* ≥*10 years*  Recurrence: 0.403 (0.241-0.671)  Progression: 0.509 (0.223-1.161)  *Cessation <10 years*  Recurrence: 1.438 (0.995-2.079)  Progression: 1.263 (0.666-2.393)  **Smoking (cumulative)**  *Ref. = Light short-term*  *Moderate*  Recurrence: 2.075 (1.231-3.496)  *Heavy long-term*  Recurrence: 4.307 (2.434-7.622) |
| Rink et al. - 2012[79] | Retrospective cohort | 1,987 patients with NMIBC | Recurrence: First tumor relapse in the bladder regardless of tumor stage. | 1987-2007 | 68 (median) | NR | **Smoking**  *Risk of recurrence greater among BCG treated smokers (HR 1.44, 95% CI 1.01-2.04). NS risk of recurrence between those who did versus did not receive BCG among former and never smokers.* |
| Rink et al. - 2013[80] | Retrospective cohort | 2,043 patients with NMIBC | Recurrence: First tumor relapse in the bladder regardless of tumor stage.  Progression: Tumor relapse at tumor stage T2 or higher in the bladder.  ACM: ND | 1987-2007 | 67 (median) | 49 months (median) | **Smoking (categorical)**  *Ref. = Never*  *Former*  Recurrence: 1.12 (0.94-1.34)  Progression: 1.29 (0.79-2.09)  ACM: 1.10 (0.86-1.41)  *Current*  Recurrence: 1.22 (1.01-1.48)  Progression: 2.09 (1.29-3.39)  ACM: 1.12 (0.85-1.47)  **Smoking (cessation)**  *Ref. = Current*  *Former <10 years*  Recurrence: 1.30 (1.09-1.53)  Progression: 0.99 (0.65-1.50)  ACM: 1.02 (0.79-1.30)  *Former* ≥*10 years*  Recurrence: 0.66 (0.52-0.84)  Progression: 0.42 (0.22-0.83)  ACM: 0.98 (0.72-1.34)  **Smoking (cumulative)**  *Ref. = Heavy long*  *Light long*  Recurrence: 0.91 (0.77-1.07)  Progression: 0.43 (0.29-0.63)  ACM: 0.67 (0.52-0.85)  *Heavy short*  Recurrence: 0.43 (0.30-0.60)  Progression: 0.12 (0.03-0.44)  ACM: 0.81 (0.51-1.27)  *Light short*  Recurrence: 0.35 (0.26-0.47)  Progression: 0.05 (0.01-0.19)  ACM: 0.54 (0.37-0.80) |
| Sabichi et al. - 2008[81] | Randomized controlled trial | 137 patients with NMIBC | Recurrence: Cystoscopy, biopsy confirmation. | 1998-2003 | 64.5-69.2 (mean), 64.0-70.9 (median) | NR | **Fenretinide**  *Ref. = Placebo*  Recurrence: NS on univariable analysis |
| Sabichi et al. - 2011[82] | Randomized controlled trial | 146 patients with NMIBC | Recurrence: A biopsy that yielded a histologically confirmed recurrence. | 2000-2005 | NR | 2.49 years (median) | **Celecoxib**  *Ref. = Placebo*  Recurrence: 0.69 (0.37-1.29) |
| Segal et al. - 2014[83] | Retrospective cohort | 278 patients with NMIBC | Recurrence: ND  Worsening: Includes evidence of disease stage progression, need for radical cystectomy or disease-specific mortality. | 1995-2005 | 72.8 (median) | 3 years (median) | **Statins**  *Ref. = No use*  Recurrence: NS on univariable analysis  Worsening (includes progression and CSM): 0.784 (0.453-1.341)  **Smoking**  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis Worsening (includes progression and CSM): NS on univariable analysis |
| Selinksi et al. - 2016[84]\*\*\*\* | Case-control | 795 patients with NMIBC | Recurrence: ND | 2008-2014 | 70.27 (median) | NR | **Aromatic amines**  *Ref. = No exposure*  *Exposure*  Recurrence: 1.13 (0.77-1.68)  **Chemical industry**  *Ref. = No exposure*  *Exposure*  Recurrence: 1.29 (0.86-1.94)  **Painter/varnisher**  *Ref. = No exposure*  *Exposure*  Recurrence: 0.70 (0.36-1.37) |
| Serretta et al. - 2013[85] | Retrospective cohort | 395 patients with NMIBC | Recurrence: Pathologically confirmed | 2002-2003 | 68 (median) | 48 months (median) | **Smoking (binary)**  *Ref. = Non-smoker*  Recurrence: 1.60 (1.02-2.50)  **Smoking (categorical)**  *Ref. = Never*  *Former*  Recurrence: 1.94 (1.18-3.18)  *Current*  Recurrence: 1.39 (0.40-2.24)  ***Smoking (categorical)***  *Ref. = Former*  *Current*  Recurrence: NS on univariable analysis |
| Sfakianos et al. - 2011[86] | Retrospective cohort | 623 patients with NMIBC | Recurrence: Visual and/or biopsy-confirmed evidence of tumor at cystoscopy or positive urine cytology.  Progression: The development of an invasive tumor of higher stage or by the presence of metastatic disease.  CSM/ACM: The cause of death was determined by  the treating physicians or by chart review corroborated by death certificates. | 1994-2008 | 75 (mean), 76 (median) | 80.9 months (median) | **Smoking (binary)**  *Ref. = Never*  *Smoker*  Recurrence: 1.05 (0.84-1.31)  Progression: 1.02 (0.66-1.59) CSM: 1.15 (0.68-1.96)  ACM: 1.14 (0.79-1.64)  **Smoking (categorical)**  *Ref. = Never*  *Former*  Recurrence: 1.05 (0.84-1.32)  Progression: 1.00 (0.64-1.58)  CSM: 1.14 (0.66-1.97)  ACM: 1.20 (0.82-1.74)  *Current*  Recurrence: 1.04 (0.77-1.40)  Progression: 1.16 (0.65-2.10)  CSM: 1.27 (0.64-2.53)  ACM: 1.03 (0.63-1.68)  **Smoking (categorical)**  *Ref. = Never*  *Stopped >10 years*  Recurrence: 1.06 (0.83-1.35)  Progression: 1.06 (0.65-1.72)  CSM: 1.29 (0.72-2.29)  ACM: 1.34 (0.90-1.98)  *Stopped 0.1-10 years*  Recurrence: 1.22 (0.90-1.66)  Progression: 0.95 (0.51-1.77)  CSM: 0.96 (0.45-2.06)  ACM: 1.16 (0.71-1.90)  *Stopped at diagnosis*  Recurrence: 0.75 (0.49-1.16)  Progression: 0.81 (0.35-1.88)  CSM: 0.80 (0.30-2.18)  ACM: 0.64 (0.31-1.34)  *Current*  Recurrence: 1.04 (0.77-1.40)  Progression: 1.16 (0.65-2.08)  CSM: 1.27 (0.64-2.52)  ACM: 1.03 (0.63-1.68) |
| Singla et al. – 2017[87] | Prospective cohort | 99 patients with NMIBC | Recurrence: ND  Progression: Stage, including development of muscle-invasive (≥pT2) or metastatic disease. Progression to radical cystectomy was also evaluated.  CSM/ACM: ND | 2006-2012 | 73 (median) | 31.4 months (median) | **BMI**  *Continuous*  Recurrence: NS on univariable analysis  Stage progression: NS on univariable analysis  Progression to cystectomy: NS on univariable analysis  CSM: NS on univariable analysis  ACM: 0.86 (0.76–0.96)  **Smoking**\*\*\*  *Ref. = Non-smoker*  Recurrence: NS on univariable analysis  Stage progression: NS on univariable analysis  Progression to cystectomy: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis  **Aspirin use**  *Ref. = No use*  Recurrence: NS on univariable analysis  Stage progression: NS on univariable analysis  Progression to cystectomy: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis  **NSAID or COX inhibitor use**  *Ref. = No use*  Recurrence: NS on univariable analysis  Stage progression: NS on univariable analysis  Progression to cystectomy: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis  **Statin**  *Ref. = No use*  Recurrence: NS on univariable analysis  Stage progression: NS on univariable analysis  Progression to cystectomy: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis |
| Skolarus et al. - 2009[88] | Retrospective cohort | 90 patients with NMIBC | Recurrence: Total recurrences.  Progression: Local tumor progression; undergoing cystectomy, chemotherapy or radiation therapy; or development of metastatic disease.  CSM/ACM: ND | 1997-2007 | 68.1-68.9 (mean) | 5.1 years (median) | **Statins**  *Ref. = No use*  Recurrence: NS on univariable analysis  Progression: NS on univariable analysis  CSM: NS on univariable analysis  ACM: NS on univariable analysis |
| Studer et al. - 1995[89] | Randomized controlled trial | 79 patients with NMIBC | Recurrence: First recurrence on cystoscopy. | NR | 59.5 (mean) | 30-33 months (median) | **Etretinate:**  *Ref. = Placebo*  Recurrence: NS on univariable analysis |
| Takashi et al. - 1987[90] | ND | 264 patients with NMIBC/MIBC | ACM: ND | 1973-1984 | Mean/median NR | NR | **Smoking**  *Ref. = Non-smoker*  ACM: NS on univariable analysis |
| Thompson et al. - 1987[91] | Retrospective cohort | 368 patients with NMIBC/MIBC | Recurrence: ND | 1980-1985 | 57.3-60.7 (mean) | NR | **Smoking**  *Ref. = Non-smoker*  Recurrence: MVNA |
| Tang et al. - 2010[92]\*\*\*\* | Retrospective cohort | 239 patients with NMIBC/MIBC | CSM: Death attributable to bladder cancer as a primary or underlying cause on the death certificate.  ACM: Death from any cause including bladder cancer. | 1980-1998 | Mean/median NR | 96 months (mean) | **Broccoli, cooked**  *Ref. = <1 serving/month*  ≥*1 serving/month*  CSM: 0.68 (0.45-1.01)  ACM: 0.67 (0.49-0.91)  **Broccoli, raw**  *Ref. = <1 serving/month*  *1 serving/month*  CSM: 0.43 (0.25-0.74)  ACM: 0.57 (0.39-0.83)  **Fruit**  *Ref. = <27.5 servings/month*  *27.5-51 servings/month*  CSM: 0.94 (0.57-1.55)  ACM: 0.86 (0.59-1.24)  *>51 servings/month*  CSM: 1.09 (0.66-1.81)  ACM: 0.91 (0.62-1.33)  **Raw Cruciferous**  *Ref. = <1 servings/month*  *1-3 servings/month*  CSM: 0.67 (0.41-1.10)  ACM: 0.67 (0.46-0.97)  *>3 servings/month*  CSM: 0.73 (0.44-1.21)  ACM: 0.73 (0.50-1.06)  **Vegetables**  *Ref. = <52 servings/month*  *52-85.5 servings/month*  CSM: 0.95 (0.59-1.55)  ACM: 0.90 (0.62-1.30)  *>85.5 servings/month*  CSM: 1.06 (0.63-1.78)  ACM: 0.91 (0.62-1.36) |
| Tu et al. - 2018[93] | Prospective cohort | 619 patients with NMIBC | Recurrence: Newly found bladder tumor.  Progression: The transition from NMIBC to MIBC or metastatic disease. | 1995-2003 | 61.7-64.8 (mean) | 62 months (median) | **Folate (natural)**  *Ref. = Low (tertile 1)*  *Medium (tertile 2)*  Recurrence: 0.96 (0.71-1.30)  Progression: 0.67 (0.40-1.11)  *High (tertile 3)*  Recurrence: 0.82 (0.60-1.13)  Progression: 0.69 (0.41-1.15)  **Folate (synthetic)**  *Ref. = Low (tertile 1)*  *Medium (tertile 2)*  Recurrence: 1.72 (1.20-2.48)  Progression: 1.17 (0.65-2.12)  *High (tertile 3)*  Recurrence: 1.80 (1.14-2.84)  Progression: 1.33 (0.63-2.81)  **Folate (total)**  *Ref. = Low (tertile 1)*  *Medium (tertile 2)*  Recurrence: 1.67 (1.16-2.38)  Progression: 1.83 (1.02-3.26)  *High (tertile 3)*  Recurrence: 1.23 (0.78-1.95)  Progression: 1.20 (0.57-2.53) |
| Van Osch et al. - 2016[94] | Meta-analysis | 6908 patients with NMIBC from 11 studies | Recurrence: Local recurrence.  Progression: ND  CSM: ND | 1995-2014 | Mean/median NR | 14-81 months (median) | **Smoking**  *Ref. = Never*  *Former (5382 patients)*  Recurrence: 1.13 (1.00-1.25)  Progression: 1.13 (0.81-1.45)  *Current*  Recurrence: 1.27 (1.09-1.46)  Progression: 1.21 (0.81-1.61)  CSM (925 patients): 1.01 (0.93-1.10) |
| Van Osch et al. - 2018[95]\*\*\*\* | Prospective cohort | 722 patients with NMIBC | Recurrence: A new tumor that was at the same stage as the primary tumor (Ta or T1) but also when a primary Ta patient had a T1 recurrence. | 2005-2011 | 71 (median) | 4.21 years (median) | **Smoking (categorical)**  *Ref. = Never*  *Former*  Recurrence: 0.78 (0.48-1.24)  *Current*  Recurrence: 1.04 (0.65-1.66)  *Former who started again*  Recurrence: 0.87 (0.53-1.41)  *Current who quit*  Recurrence: 1.47 (0.63-3.41)  **Smoking (cessation)**  *Ref. = Current*  *<20 years*  Recurrence: 0.82 (0.46-1.46)  *21-40 years*  Recurrence: 0.74 (0.51-1.08)  *>40 years*  Recurrence: 0.71 (0.46-1.09) |
| Wakai et al. - 1993[96]\*\*\*\* | Prospective cohort | 258 patients with NMIBC/MIBC | ACM: ND | 1976-1978 | Mean/median NR | 29.8 months (median) | **Alcohol (Males only)**  *Ref. = Never*  *Ex-drinker*  ACM: 0.60 (0.23-1.59)  *Current (<2 gou/day)*  ACM: 0.41 (0.22-0.77)  *Current (2-4 gou/day)*  ACM: 0.43 (0.16-1.14)  *Current (*≥*4 gou/day)*  ACM: 0.82 (0.22-3.13)  **Hair dye**  *Ref. = No exposure*  *Exposure*  ACM: 0.65 (0.28-1.79)  **Smoking**  *Ref. = Non-smoker*  ACM: 0.88 (0.45-1.72) |
| Westhoff et al. - 2018[97]\*\*\*\* | Prospective cohort | 595 patients with NMIBC | Recurrence: New bladder tumor following a previous negative follow-up cystoscopy.  Progression: The transition from NMIBC to muscle-invasive or metastatic tumors. | 1995 “onward” | 62.5-66.0 (mean) | 65.7 months (median) | **Fruits and vegetables**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 1.08 (0.79-1.47)  Progression: 1.16 (0.70-1.92)  *Tertile 3*  Recurrence: 0.90 (0.64-1.26)  Progression: 1.05 (0.61-1.82)  **Low-fat pattern**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 0.96 (0.71-1.31)  Progression: 0.78 (0.47-1.28)  *Tertile 3*  Recurrence: 0.86 (0.63-1.18)  Progression: 0.74 (0.44-1.23)  **Tex-Mex pattern**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 1.08 (0.79-1.48)  Progression: 1.27 (0.79-2.06)  *Tertile 3*  Recurrence: 0.92 (0.66-1.27)  Progression: 0.70 (0.40-1.24)  **Western diet pattern**  *Ref. = Tertile 1*  *Tertile 2*  Recurrence: 1.03 (0.75-1.42)  Progression: 1.23 (0.73-2.06)  *Tertile 3*  Recurrence: 1.48 (1.06-2.06)  Progression: 1.56 (0.91-2.65) |
| Westhoff et al. - 2018[98] | Meta-analysis | 1,633 patients with NMIBC from three studies and 5,533 patients with NMIBC/MIBC from three studies | Recurrence: ND  Progression: ND  CSM/ACM: ND | Up to 2017 | Mean/median NR | NR | **BMI – NMIBC**  *Ref. = Normal weight*  *Overweight*  Recurrence: 1.29 (1.05-1.58)  Progression (2 studies, 1,294 patients): 1.03 (0.63-1.70)  *Obese*  Recurrence: 1.82 (1.12-2.95)  Progression (2 studies, 1,294 patients): 1.90 (0.93-3.88)  **BMI – NMIBC**  *Ref. = Normal weight*  *Overweight*  Recurrence: 0.87 (0.67-1.14)  CSM: 0.82 (0.65-1.02)  *Obese*  Recurrence: 1.12 (0.54-2.31)  CSM: 0.98 (0.46-2.10) |
| Witjes et al. - 1993[99] | Prospective cohort | 183 patients with NMIBC | Recurrence: Positive cystoscopy, cytology, or biopsy. | 1987-1991 | Mean/median NR | 20.8-22.5 months (median) | **FCIs (aspirin, dipyramidole, ibuprofen, indomethacin, naproxen, warfarin)**  *Ref. = No use*  Recurrence: NS on univariable analysis. |
| Wyszynski et al. - 2014[100] | ND | 726 patients with NMIBC | Recurrence: Any tumor identified after a disease-free remission period, more than 90 days after the date of initial primary bladder tumor diagnosis.  Progression: The diagnosis of a tumor with a greater stage or grade than the initial primary bladder tumor.  ACM: Life status (alive or deceased) was determined as of January 2011 using the Social Security and the National Death Indices (NDI). | 1994-2001 | Mean/median NR | 6 years (median) | **BMI**  *Ref. = ≤24.9*  *24.9-29.9*  Recurrence: 1.39 (0.96-2.01)  ≥*30*  Recurrence: 1.22 (0.80-1.87)  ≥*24.9*  Recurrence: 1.33 (0.94-1.89)  **Smoking**  *Ref. = Never*  *Former*  Recurrence: 1.61 (1.17-2.20)  Progression: NS  ACM: 1.69 (0.70-4.10)  *Current*  Recurrence: 1.51 (1.08–2.13)  Progression: NS  ACM: 3.42 (1.29-9.07)  *Quit* ≥*29 years prior*  Recurrence: 1.37 (0.89-2.10)  *Quit 19-28 years prior*  Recurrence: 1.44 (0.94–2.21)  *Quit 1-8 years prior*  Recurrence: 1.83 (1.30-2.59) |
| Xu et al. - 2015[101] | Retrospective cohort | 403 patients with NMIBC | Recurrence: The first tumor relapse in the bladder.  Progression: An increase to pathologic T2 stage or higher in the bladder. | 2006-2014 | 67.1 (mean) | 53 months (median) | **BMI**  *Ref. = <24*  *24-<28*  Recurrence: 1.435 (1.029-2.002)  Progression: 1.362 (0.571-3.249)  *>28*  Recurrence: 1.707 (1.120-2.602)  Progression: 3.037 (1.243-7.420)  **DMII**  *Ref. = No DMII*  Recurrence: 1.803 (1.141-2.850)  Progression: 3.111 (1.113-8.696) |
| Yafi et al. - 2011[102] | Retrospective cohort | 2287 patients with NMIBC/MIBC | Recurrence/progression: Local (pelvic) and/or distant (metastasis).  CSM/ACM: Cause of death was determined by the treating physician, based on chart review and/or the death certificate. | 1998-2008 | 68 (median) | 35 months (mean), 29 months (median) | **Smoking**  Recurrence/progression: MVNA  CSM: 1.304 (1.005-1.691)  ACM: 1.307 (1.049-1.628) |
| Yonekura et al. - 2018[103] | Retrospective cohort | 50 patients with NMIBC | Recurrence: Histologically verified urothelial carcinoma involving any site within the bladder. | 2011-2016 | 73 years (median) | 38.55 months (median) | **BMI**  *Continuous*  Recurrence: 1.138 (1.021-1.268)  **Smoking**  *Ref. = Never*  *Current/former*  Recurrence: NS on univariable analysis |
| Yu et al. - 1997[104] | Retrospective cohort | 870 patients with NMIBC/MIBC | ACM: ND | 1990-1995 | Bladder cancer-specific NR | Bladder cancer-specific NR | **Smoking**  ACM: RR 1.18 (Statistically insignificant, no p-value or confidence interval available) |
| Yuruk et al. - 2017[105] | Retrospective cohort | 187 patients with NMIBC | Recurrence: ND | 2013-2014 | 64.68 (mean) | 32.28 months (mean) | **Smoking**  *Ref. = Never*  *Former*  Recurrence: NS on univariable analysis  *Current*  Recurrence: NS on univariable analysis |

ACM = All-cause mortality, BMI = Body mass index, CIS = Carcinoma in-situ, CSM = Cancer-specific mortality, CSS = Cancer-specific survival, DMII = Diabetes Mellitus Type 2, FCI = Fibrin Clot Inhibitor, MVNA = Multivariable analysis not available, MIBC = Muscle invasive bladder cancer, ND = Not defined, NMIBC = Non-muscle invasive bladder cancer, NR = Not reported, NS = No significance, OS = Overall survival, RFS = Recurrence-free survival, RR = Relative risk, SE = Standard error, SSRE = Summary relative risk estimate, UK = United Kingdom, US = United States

\*Directly from Methods section of text or assessed to best ability. ND indicates insufficient information in text for certainty of designation/definition.

\*\*Presented as Hazard Ratio (95% confidence interval) unless otherwise specified. For cohort studies, only results from multivariable analyses are shown.

\*\*\*Smoking included in general variable of “tobacco use.”

\*\*\*\*Only select items of interest are shown. See study for full list of evaluated factors.

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