

**COR2ED**

**THE HEART OF MEDICAL EDUCATION**

# **LONG-TERM RESPONSE IN ADVANCED COLORECTAL CANCER**

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# DEVELOPED BY GI CONNECT

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# EDUCATIONAL OBJECTIVES

- Understand the considerations for achieving a long-term response in advanced colorectal cancer:
  - How to view CRC treatment as a continuum of care
  - What to consider when making treatment decisions
  - Which treatment options are available for CRC patients' 3rd line and beyond

# CLINICAL TAKEAWAYS

- Treatment of advanced colorectal cancer (CRC) should be considered as a continuum of care and patients should be offered as many life prolonging therapies as possible
- Decision-making at each stage of therapy should consider patients' suitability and tolerability, tumour biomarkers and prior exposure to chemotherapies and/or targeted agents
- There are a number of treatment options for CRC patients third-line and beyond that should be considered such as regorafenib, trifluridine/tipiracil as well as consideration of clinical trials and rechallenge with chemotherapy or anti-EGFR

# INTRODUCTION

- With the introduction of targeted therapy over the past two decades, the life expectancy of patients with metastatic CRC (mCRC) has improved significantly from 12 to 30-40 months in various studies<sup>1</sup>
- More than 50% of patients are now receiving treatment in the third-line setting<sup>2</sup>
- We cannot predict which patients will achieve a long-term response but there are some clinical factors that can help decision-making:
  - Left sided tumours even in the metastatic setting have a better prognosis than right sided<sup>3-5</sup>
  - Molecular markers, among them *BRAF* mutations as a worse prognostic marker but with specific treatment options for these patients<sup>6</sup>
  - Clinically useful predictive biomarkers aid clinical decision making, such as the presence of *KRAS* gene mutations predicting a lack of benefit from anti-EGFR therapy<sup>7</sup>

*BRAF*, proto-oncogene B-Raf; *EGFR*, epidermal growth factor receptor; *KRAS*, Kirsten rat sarcoma viral oncogene homologue

1. Novakova-Jiresova A, et al. *Cancer Manag Res*. 2020;12:5365-5372; 2. Tampellini M, et al. *Clin Colorectal Cancer*. 2017;16(4):372-376; 3. Loupakis F, et al. *J Natl Cancer Inst*. 2015;107(3):dju427; 4. Brule SY, et al. *J Clin Oncol* 2013; 31 (Suppl):3528; 5. Petrelli F, et al. *JAMA Oncol*. 2017;3(2):211-219; 6. Sahin IH, et al. *JCO Oncol Pract*2021;17(12):723-730; 7. Koncina E, et al. *Cancers*. 2020;12(2):319

# **PATIENT CHARACTERISTICS AND CONSIDERATIONS**

# KEY FACTORS FOR CONSIDERATION IN THE CRC TREATMENT STRATEGY

## Overall condition and emotional status of patients

- Fit versus unfit for a combination therapy (triplet vs doublet vs monotherapy)
- Eastern Cooperative Oncology Group performance status (ECOG PS)
- Patient age
- Established comorbidities
- Patient attitude
- Patient disease history (e.g. previous oxaliplatin-based adjuvant treatment)

## Tumour characteristics and clinical course

- Indolent versus aggressive tumour
- Disease presentation (synchronous vs metachronous)
- Tumour load
- Mutational status (e.g. *RAS* and *BRAF*)

## Treatment goal

- Tumour shrinkage to achieve a radical surgery of metastases or palliation of disease-related symptoms
- Disease control to delay progression and worsening of patient's general condition

# MOLECULAR ANALYSIS IN mCRC IS THE MAINSTAY OF TREATMENT DECISION-MAKING

- Several biomarkers are used to inform treatment selection and understand the prognosis for patients with mCRC<sup>1</sup>
- Around 70% of **RAS wild-type CRCs** simultaneously harbour heterogeneous genomic alterations involved in EGFR and other signalling pathways that confer **resistance to anti-EGFR monoclonal antibodies therapy**<sup>2</sup>
- **BRAF V600E** is a well-established oncogenic driver mutation **associated with highly aggressive behaviour in CRC**<sup>3</sup>
  - **BRAF V600E–mutant CRC is associated with resistance to chemotherapy and EGFR–directed therapies**, leading to shorter survival outcomes compared with wild-type *BRAF*
  - **BRAF inhibitors combined with EGFR blockade create a synergistic effect**, resulting in significant therapeutic efficacy in colon cancer with *BRAF* V600E mutation
  - The *BRAF* V600E mutation is also associated with MMR–deficient CRC, which is highly responsive to immune checkpoint inhibitor therapy
- **MMR enzyme deficiency** caused by mutations in MMR genes **is a predictive and prognostic factor, especially in the early stage of CRC**<sup>4</sup>
  - Patients with CRCs that are microsatellite instability (MSI) and high somatic tumour mutation burden (TMB) have shown encouraging outcomes after receiving immunotherapy<sup>5,6</sup>
- **HER2 is an emerging biomarker for CRC**<sup>7</sup>

BRAF, proto-oncogene B-Raf; EGFR, epidermal growth factor receptor; HER2, human epidermal growth factor receptor 2; (m)CRC, (metastatic) colorectal cancer; MMR, mismatch repair; RAS, rat sarcoma viral oncogene homologue

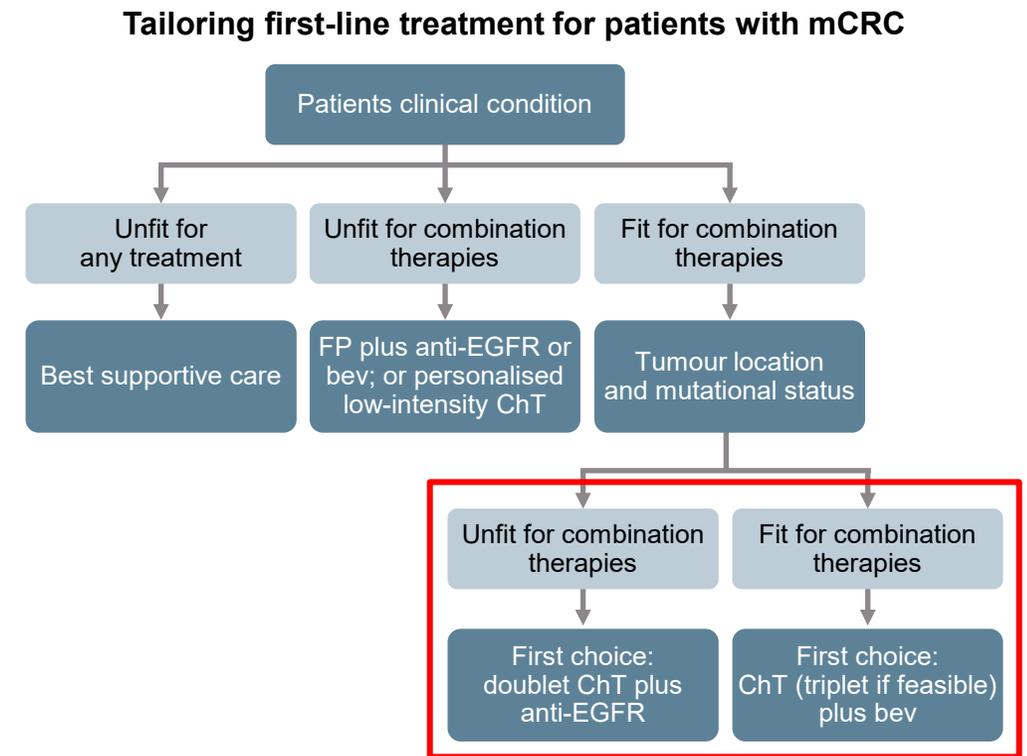
1. Yekeduz E, et al. *Cureus*. 2022;14(4):e24175; 2. Dienstmann R, et al. *Am Soc Clin Oncol Educ Book*. 2015;35:e149-156;

3. Sahin IH, et al. *JCO Oncol Pract* 2021;17(12):723-730; 4. Molinari C, et al. *Int J Mol Sci*. 2018;19:3733; 5. Le DT, et al. *N Engl J Med*. 2015;372:2509-2520;

6. Overman MJ, et al. *Lancet Oncol*. 2017;18:1182-1191; 7. Djaballah S, et al. *Am Soc Clin Oncol Educ Book*. 2022;42:219-232

# TUMOUR SIDEDNESS AND TREATMENT CONSIDERATIONS

- A retrospective analysis of data from the CALGB/SWOG 80405 trial found that patients whose cancer originated in the left side of the colon lived more than a year longer after initial treatment than patients whose disease originated in the right side of the colon<sup>1</sup>
- The study also linked tumour location to the likelihood of benefit from specific targeted therapies used to treat patients with colorectal cancer<sup>1</sup>
- Tumour sidedness may also be predictive of response to treatment; greater benefit from treatment with an anti-EGFR therapy was observed in patients with RAS wild-type disease who had left-sided tumours than in patients with right-sided tumours<sup>1,2</sup>
- Bevacizumab plus chemotherapy may provide greater clinical benefit than anti-EGFR therapies in patients with right-sided tumours<sup>2</sup>
- Anti-EGFR therapy when added to an irinotecan-based regimen has been shown to have significant activity in patients with irinotecan-refractory colorectal cancer<sup>3</sup>



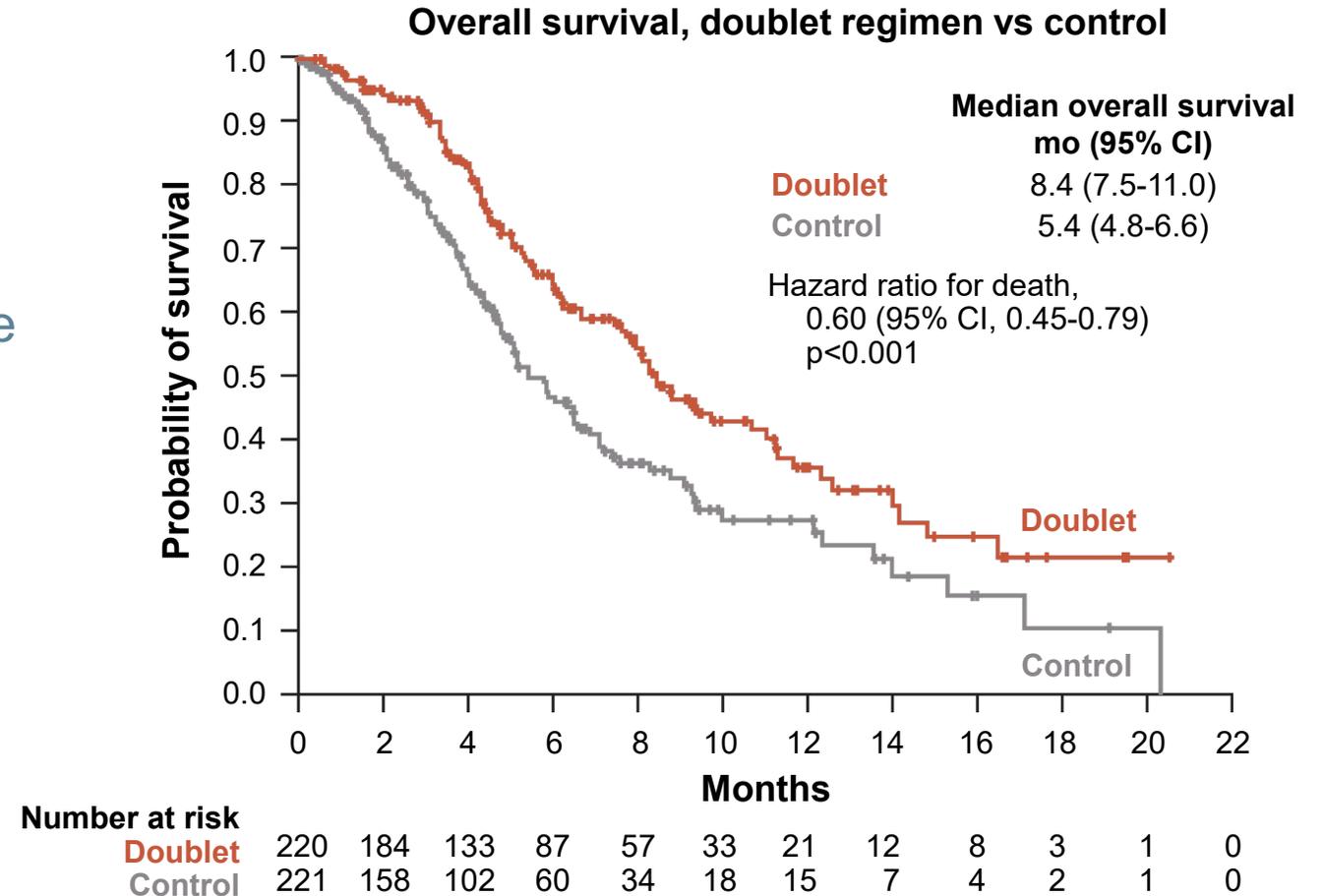
bev, bevacizumab; ChT, chemotherapy; EGFR, epidermal growth factor receptor; FP fluoropyrimidine; mCRC, metastatic colorectal cancer; RAS, rat sarcoma viral oncogene homologue

Figure adapted from: Cremolini C, et al. Gastrointestinal tumours, Essentials for Clinicians (2<sup>nd</sup> Edition, Chapter 7), ESMO Press 2021

1. Venook, AP, et al. J Clin Oncol. 2016;34 no. 15\_suppl:3504-3504; 2. Arnold D, et al. Ann Oncol. 2017;28(8):1713-1729; 3. Cunningham D, et al. New Engl J Med. 2004;351:337-345;

# ENCORAFENIB PLUS CETUXIMAB IMPROVES SURVIVAL IN PREVIOUSLY TREATED PATIENTS WITH *BRAF* V600E-MUTANT mCRC

- In the BEACON CRC study, treatment with doublet therapy (encorafenib plus cetuximab) improved OS, ORR, and PFS in previously treated patients in the metastatic setting compared with standard chemotherapy<sup>a</sup>



<sup>a</sup> Standard chemotherapy: cetuximab and irinotecan or cetuximab and FOLFIRI

BRAF, proto-oncogene B-Raf; CI, confidence interval; FOLFIRI, folinic acid, fluorouracil and irinotecan; (m)CRC, (metastatic) colorectal cancer; mo, months; ORR, objective response rate; OS, overall survival; PFS, progression-free survival

Kopetz S, et al. N Engl J Med. 2019;381:1632-1643; Tabernero J, et al. J Clin Oncol. 2021;39(4):273-284

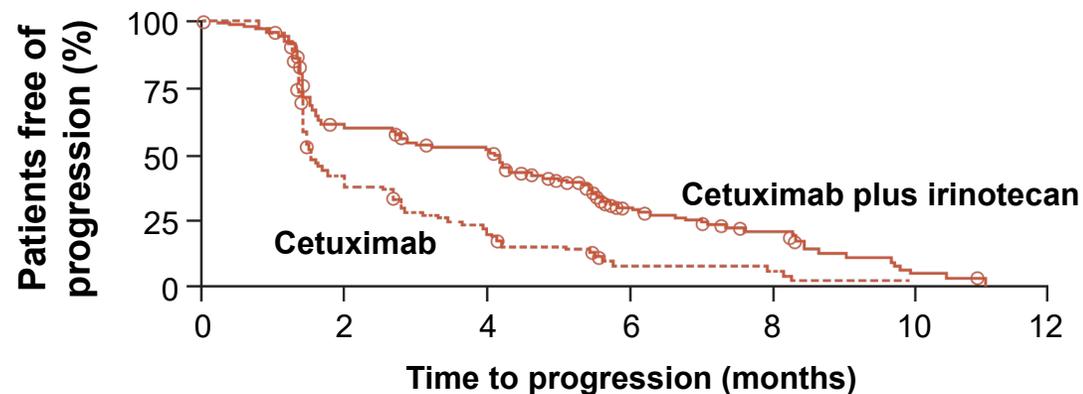
# ANTI-EGFR PLUS IRINOTECAN BASED CHEMOTHERAPY HAS BENEFIT IN IRINOTECAN-REFRACTORY CRC

- Cetuximab has clinically significant activity when given alone or in combination with irinotecan in patients with irinotecan-refractory colorectal cancer

## RATES OF RADIOLOGIC RESPONSE\*

Subgroup and variable	Cetuximab plus irinotecan n=218	Cetuximab n=111
<b>Response – n (%)</b>		
Complete response	0	0
Partial response	50 (22.9)	12 (10.8)
Stable disease	71 (32.6)	24 (21.6)
Progressive disease	68 (31.2)	59 (53.2)
Could not be evaluated	29 (13.3)	16 (14.4)

## TIME TO DISEASE PROGRESSION IN THE TWO STUDY GROUPS



The hazard ratio for disease progression in the combination-therapy group as compared with the monotherapy group was 0.54 (95 percent confidence interval, 0.42 to 0.71) ( $p < 0.001$  by the log-rank test). The points on the curves represent the dates on which a patient's data were censored

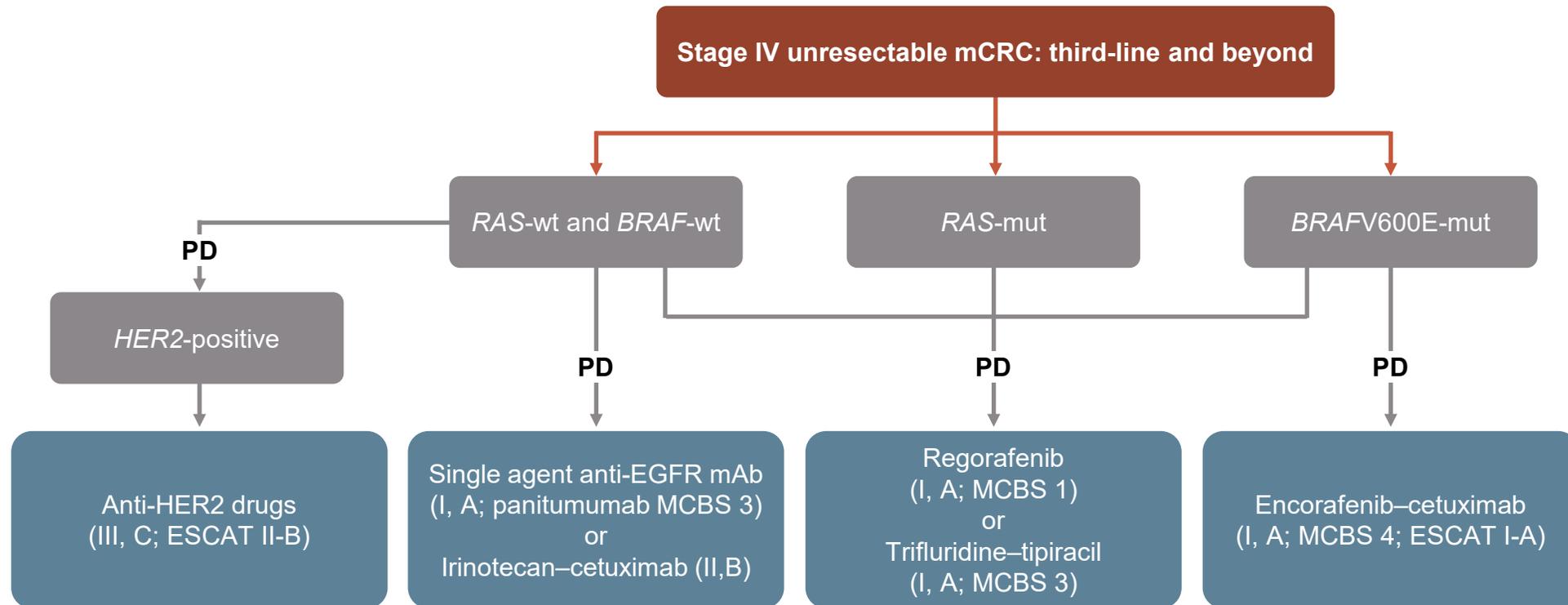
Patients treated with cetuximab plus irinotecan vs cetuximab, achieved:

- Overall response: 22.9% vs 10.8%,  $p = 0.007$
- Disease control rate: 55.5% vs 32.4%,  $p < 0.001$

# THIRD LINE TREATMENT OPTIONS

# MANAGEMENT OF STAGE IV UNRESECTABLE mCRC IN THIRD-LINE THERAPY AND BEYOND

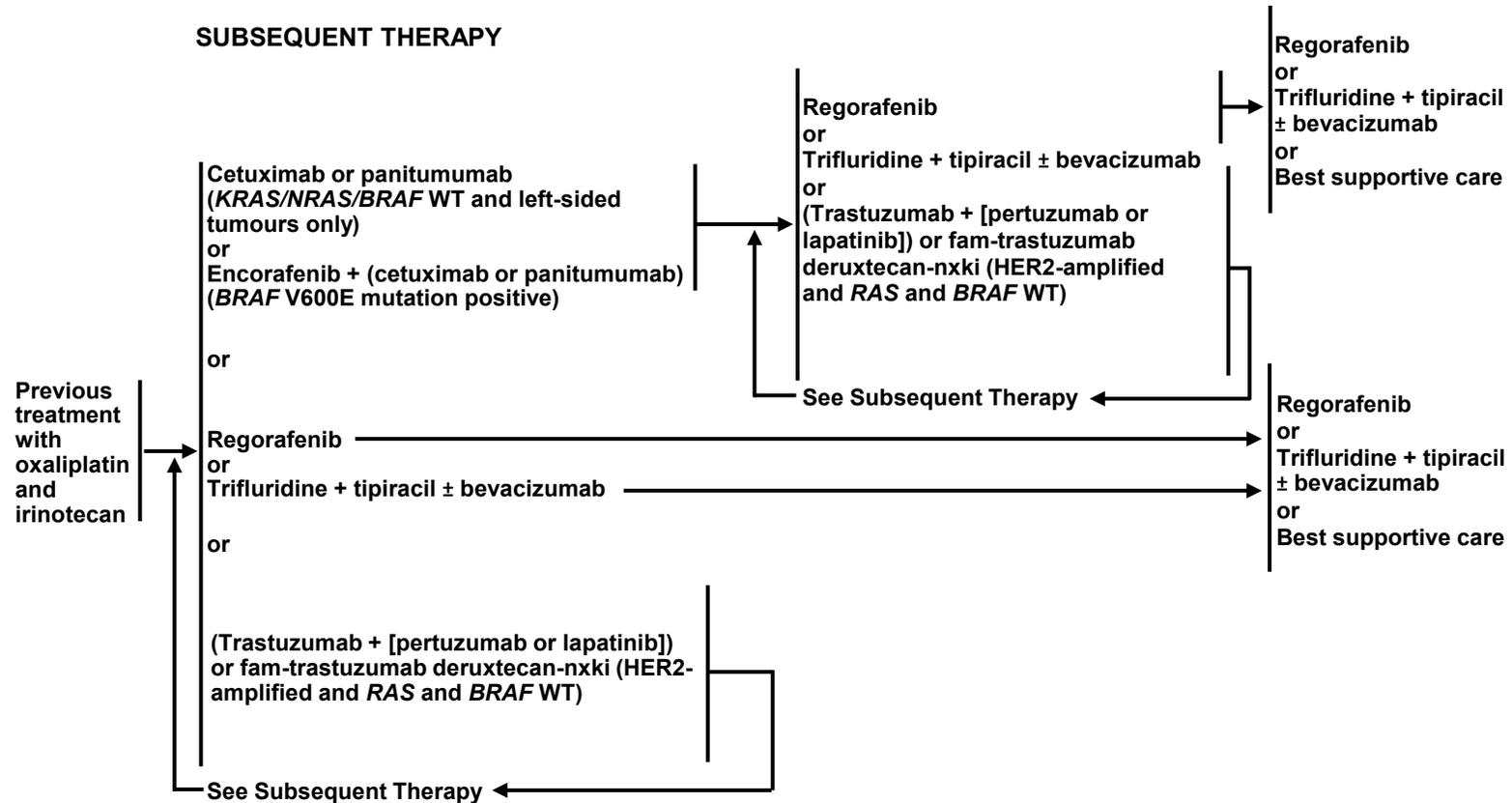
## ESMO CLINICAL PRACTICE GUIDELINES



BRAF, proto-oncogene B-Raf; ESCAT, ESMO Scale for Clinical Actionability of Molecular Targets; EGFR, epidermal growth factor receptor; ESMO, European Society for Medical Oncology; HER2, human epidermal growth factor receptor 2; mAb, monoclonal antibody; MCBS, ESMO Magnitude of Clinical Benefit Scale; mCRC, metastatic colorectal cancer; mut, mutant; PD, progressive disease; RAS, rat sarcoma viral oncogene homologue; ; wt, wild-type

# SYSTEMIC THERAPY FOR ADVANCED OR METASTATIC CRC

## NCCN CLINICAL PRACTICE GUIDELINES

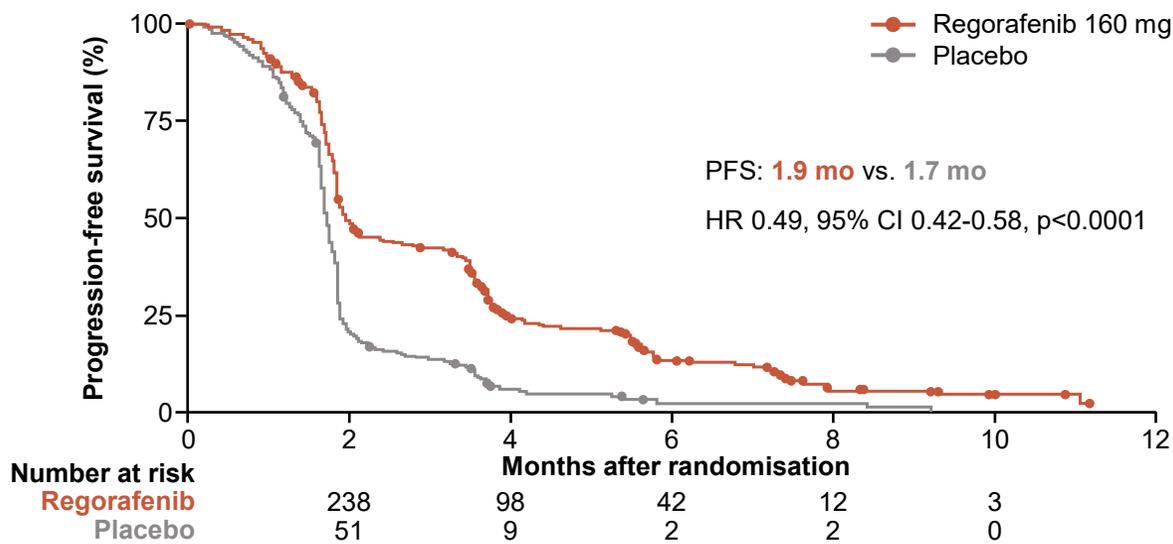


BRAF, proto-oncogene B-Raf; CRC, colorectal cancer; dMMR, deficient mismatch repair; HER2, human epidermal growth factor receptor 2; KRAS, Kirsten rat sarcoma virus; MSI-H, microsatellite instability-high; NCCN, National Comprehensive Cancer Network; NRAS, neuroblastoma ras viral oncogene homolog; RAS, rat sarcoma viral oncogene homologue; WT, wild-type

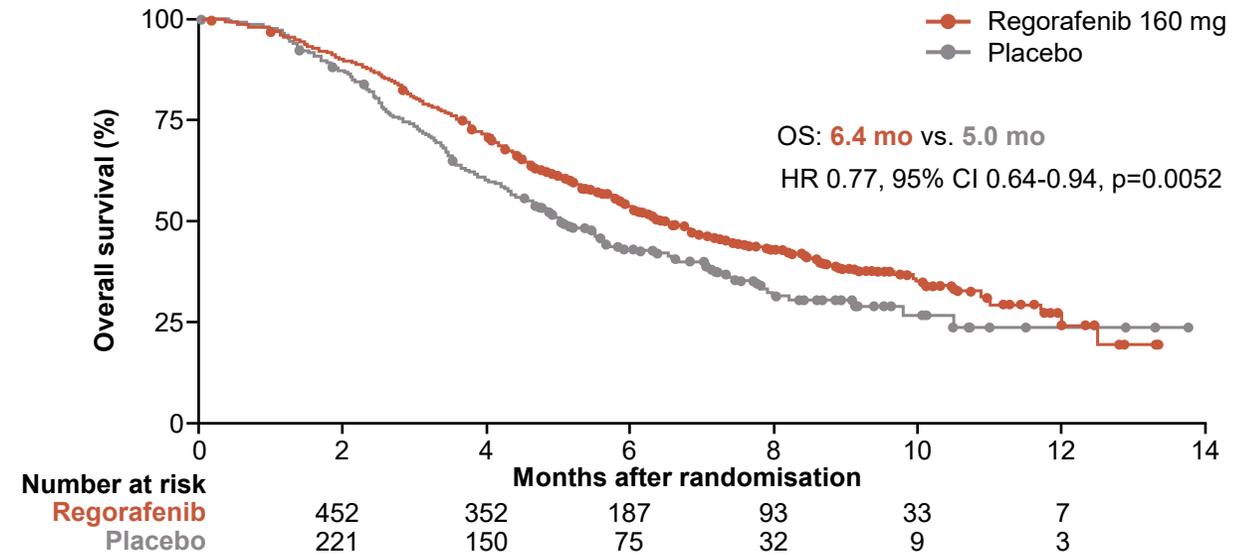
NCCN guidelines, Version 2.2023. [https://www.nccn.org/professionals/physician\\_gls/pdf/colon.pdf](https://www.nccn.org/professionals/physician_gls/pdf/colon.pdf). Accessed July 2023

# CORRECT STUDY: REGORAFENIB VS PLACEBO PROLONGED PFS AND OS IN REFRACTORY mCRC PATIENTS

## PROGRESSION-FREE SURVIVAL



## OVERALL SURVIVAL



### Tumour response:

ORR: 1.0% vs. 0.4% (p=0.19)

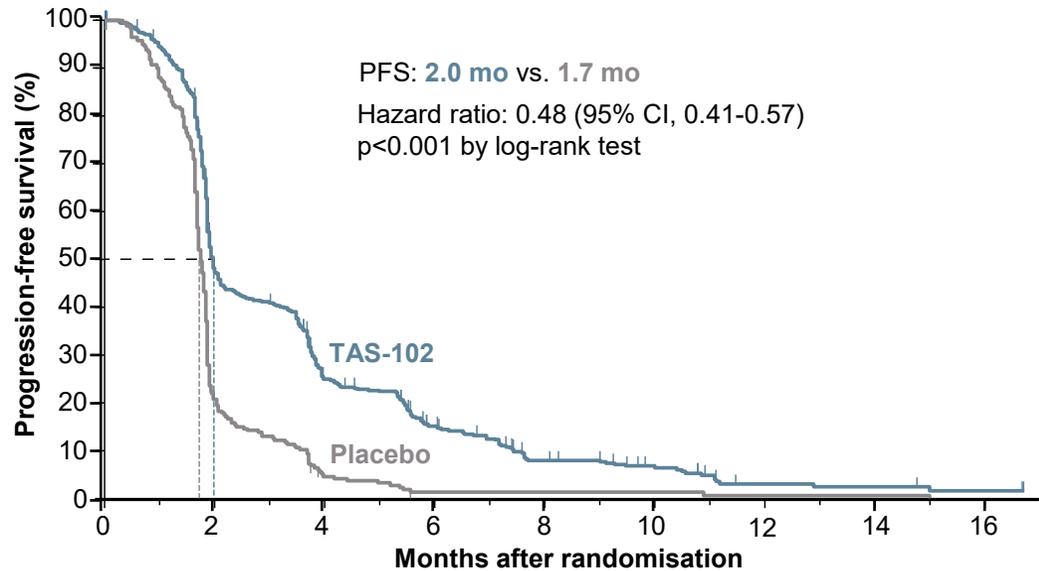
DCR: 41% vs. 15% (p<0.0001)

CI, confidence interval; DCR, disease control rate; HR, hazard ratio; mCRC, metastatic colorectal cancer; mo, months; ORR, objective response rate; OS, overall survival; PFS, progression-free survival

Grothey A, et al. Lancet. 2013;381:303-312

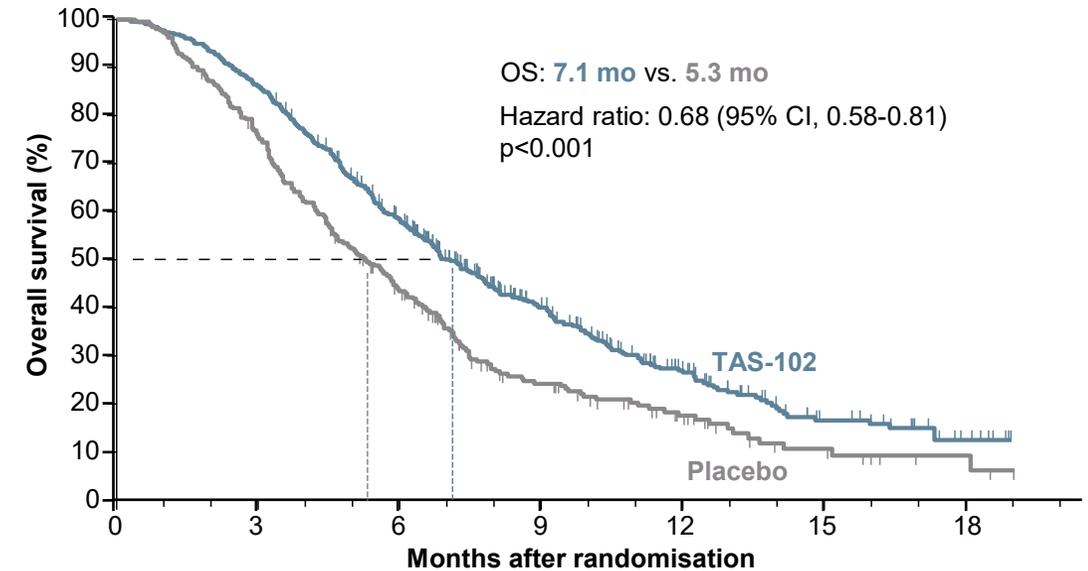
# RECOURSE STUDY: TAS-102 PROLONGED PFS AND OS IN REFRACTORY mCRC PATIENTS

## PROGRESSION-FREE SURVIVAL



Number at risk		0	2	4	6	8	10	12	14	16
TAS-102	534	238	121	66	30	18	5	4	2	
Placebo	266	51	10	2	2	2	1	1	0	

## OVERALL SURVIVAL



Number at risk		0	3	6	9	12	15	18
TAS-102	534	459	294	137	64	23	7	
Placebo	266	198	107	47	24	9	3	

### Tumour response:

ORR: 1.6% vs. 0.4% (p=0.29)

DCR: 44% vs. 16% (p<0.001)

CI, confidence interval; DCR, disease control rate; HR, hazard ratio; mCRC, metastatic colorectal cancer; mo, months; ORR, objective response rate; OS, overall survival; PFS, progression-free survival; TAS-102, trifluridine/tipiracil

Mayer RJ, et al N Engl J Med. 2015;372:1909-1919

# SAFETY PROFILE IN PATIENTS BEYOND THE SECOND LINE

## MOST COMMONLY REPORTED ( $\geq 25\%$ ) ADVERSE EVENTS FOR TAS-102 AND REGORAFENIB IN PHASE 3 CLINICAL STUDIES<sup>1,2</sup>

TAS-102 (N=533) <sup>1</sup>			Regorafenib (N=500) <sup>2,a</sup>		
	Overall (%)	Grade $\geq 3$ (%)		Overall (%)	Grade $\geq 3$ (%)
Leucopenia	77	21	Hand-foot skin reaction	47	17
Anaemia	77	18	Fatigue	47	10
Neutropenia	67	38	Diarrhoea	34	7
Nausea	48	2	Anorexia	30	3
Thrombocytopenia	42	5	Voice changes	29	<1
Decreased appetite	39	4	Hypertension	28	7
Fatigue	35	4	Oral mucositis	27	3
Diarrhoea	32	3	Rash/desquamation	26	6
Vomiting	28	2			

<sup>a</sup> Treatment-related adverse events from start of treatment to 30 days after end of treatment

Please note that these drugs have not been compared in head-to-head studies. The information is presented for information purposes only

Adapted from Argiles G, et al. ESMO Open 2019;4:e000495. doi:10.1136/esmooopen-2019-000495

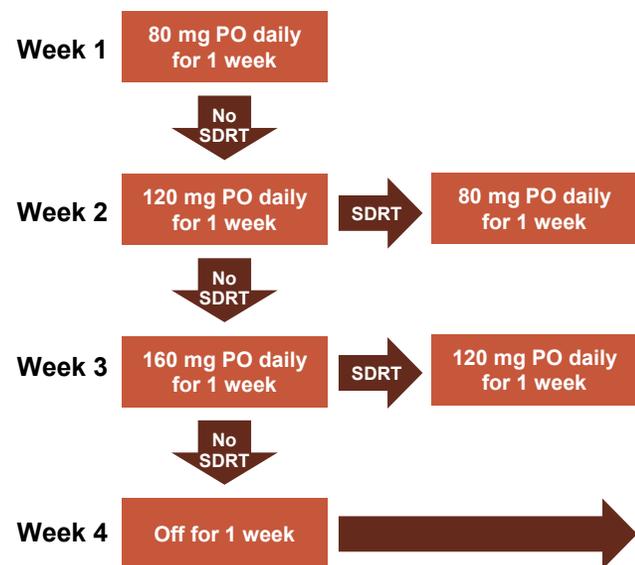
TAS-102, trifluridine/ tipiracil

1. Mayer RJ, et al. N Engl J Med. 2015;372:1909-1919; 2. Grothey A, et al. Lancet. 2013;381:303-312

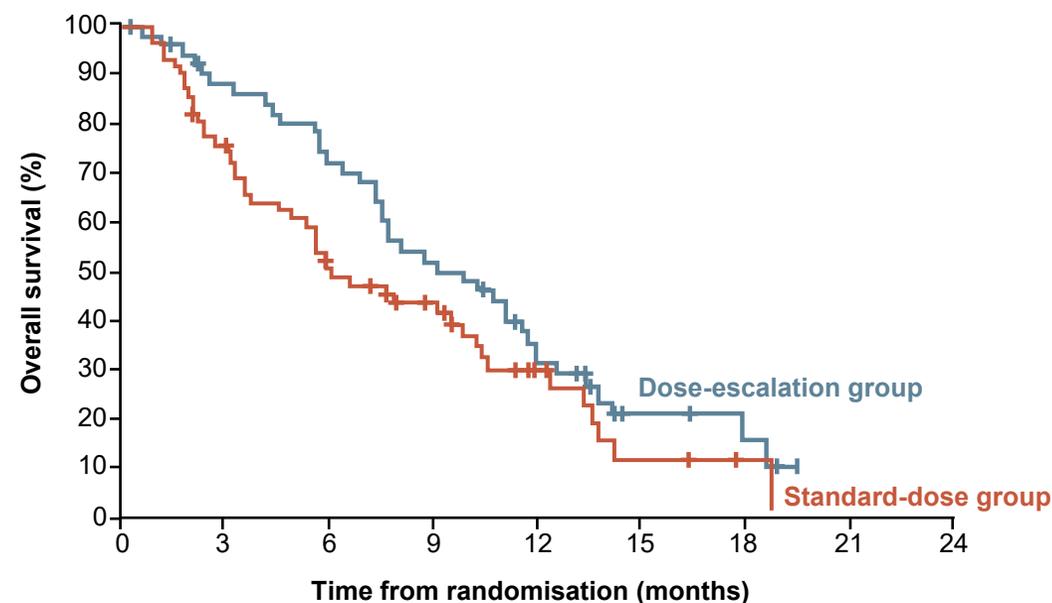
# DOSE-ESCALATED STRATEGY FOR MANAGEMENT OF ADVERSE EVENTS WITH REGORAFENIB

- ReDOS study: no significant difference in overall survival between dose escalation and standard dosing

## A DOSE-ESCALATION SCHEDULE FOR REGORAFENIB TO MINIMISE TOXICITIES<sup>1</sup>



## PHASE 2 ReDOS STUDY<sup>2</sup>



Number at risk (number censored)

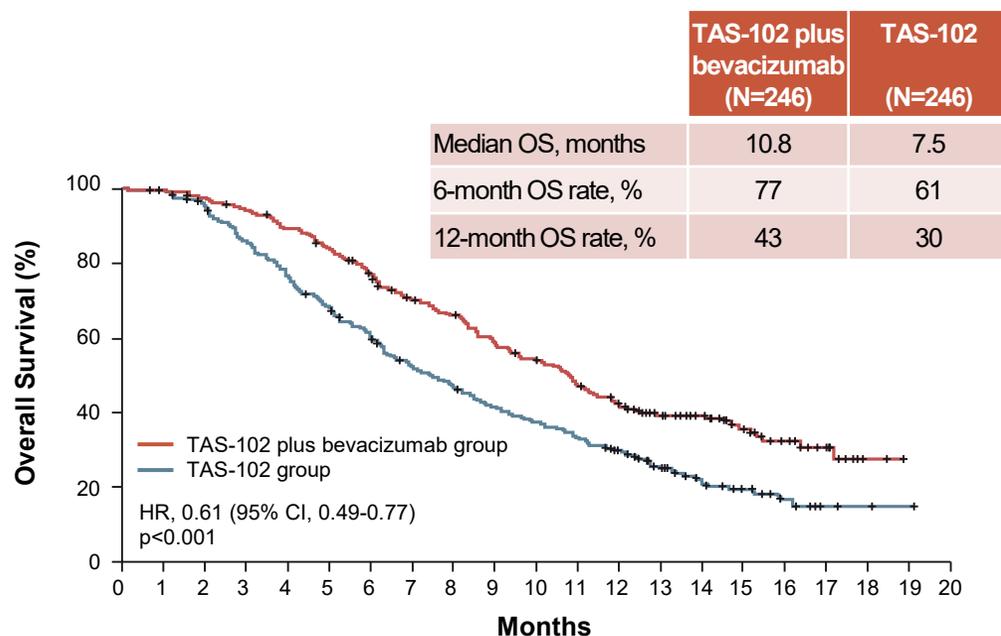
	0	3	6	9	12	15	18	21	24
Dose escalation	54 (0)	44 (4)	36 (4)	26 (4)	14 (4)	5 (11)	3 (12)	0 (14)	–
Standard dose	62 (0)	45 (2)	28 (3)	21 (7)	10 (12)	3 (14)	1 (16)	0 (16)	–

Dose-escalated arm: regorafenib initiated at 80 mg/day, increased weekly up to 160 mg/day if no significant drug-related toxicities; Standard-dose arm: regorafenib 160 mg/day PO, by mouth; SDRT, significant drug-related toxicities

# SUNLIGHT: TAS-102 PLUS BEVACIZUMAB IMPROVES OUTCOMES IN REFRACTORY mCRC

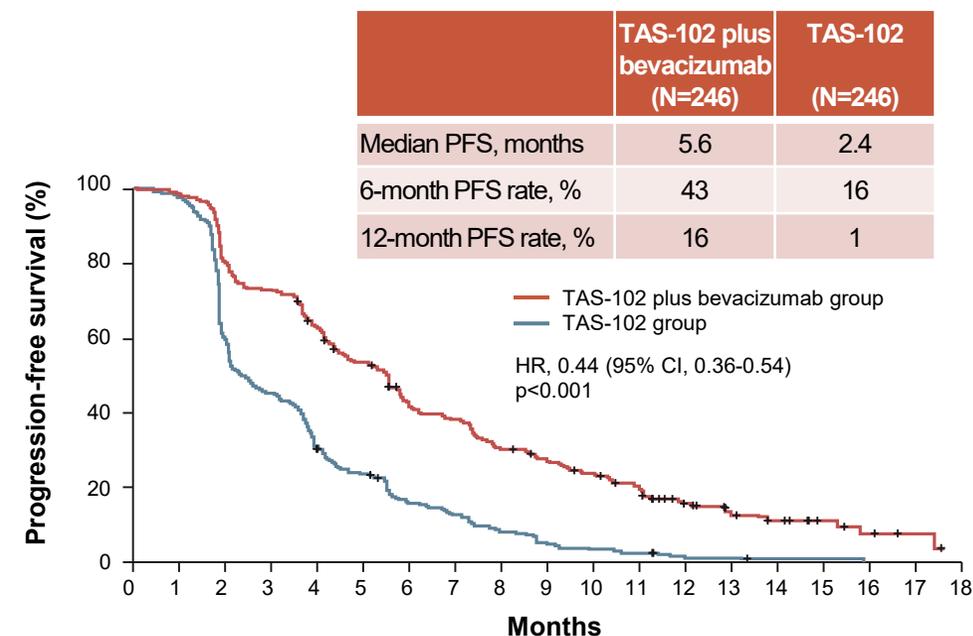
- TAS-102 plus bevacizumab improved OS and PFS in refractory CRC patients

## OVERALL SURVIVAL (PRIMARY ENDPOINT)



No. at risk	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TAS-102 plus bevacizumab group	246	244	239	230	217	203	183	160	149	131	119	104	88	69	52	37	24	13	2	0	0
TAS-102 group	246	242	230	205	184	163	143	120	108	95	85	76	63	44	24	16	10	5	2	1	0

## PROGRESSION-FREE SURVIVAL



No. at risk	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
TAS-102 plus bevacizumab group	246	242	198	179	153	128	99	89	70	61	52	43	25	18	13	7	4	2	0
TAS-102 group	246	236	147	109	74	56	36	29	19	12	8	6	2	2	1	1	0	0	0

# SUNLIGHT: SAFETY RESULTS

## OVERALL SAFETY

Event (any cause), n (%)	TAS-102 plus bevacizumab (N=246)	TAS-102 (N=246)
Overall AEs	241 (98)	241 (98)
TAS-102-related AEs	221 (90)	200 (81)
Bevacizumab-related AEs	119 (48)	NA
Severe (grade ≥3) AEs	178 (72)	171 (70)
Serious AEs	61 (25)	77 (31)
Treatment-related deaths	0	0
AEs leading to withdrawal from the study	31 (13)	31 (13)

Dose modification, n (%)	TAS-102 plus bevacizumab (N=246)	TAS-102 (N=246)
Dose reductions	40 (16)	30 (12)
Dose delays	171 (70)	131 (53)

## TEAEs IN ≥20% OF ALL PATIENTS

TEAE, n (%)	TAS-102 plus bevacizumab (N=246)		TAS-102 (N=246)	
	Any grade	Grade 3 or 4	Any grade	Grade 3 or 4
Neutropenia	153 (62)	106 (43)	126 (51)	79 (32)
Nausea	91 (37)	4 (2)	67 (27)	4 (2)
Anemia	71 (29)	15 (6)	78 (32)	27 (11)
Asthenia	60 (24)	10 (4)	55 (22)	10 (4)
Fatigue	53 (22)	3 (1)	40 (16)	9 (4)
Diarrhea	51 (21)	2 (1)	46 (19)	6 (2)
Decreased appetite	50 (20)	2 (1)	38 (15)	3 (1)

- Hypertension (10% vs 2%), nausea and neutropenia occurred more frequently in the combination group
  - One case of febrile neutropenia with TAS-102 plus bevacizumab versus six with TAS-102

AE, adverse event; TAS-102, trifluridine/tipiracil; TEAE, treatment emergent adverse event

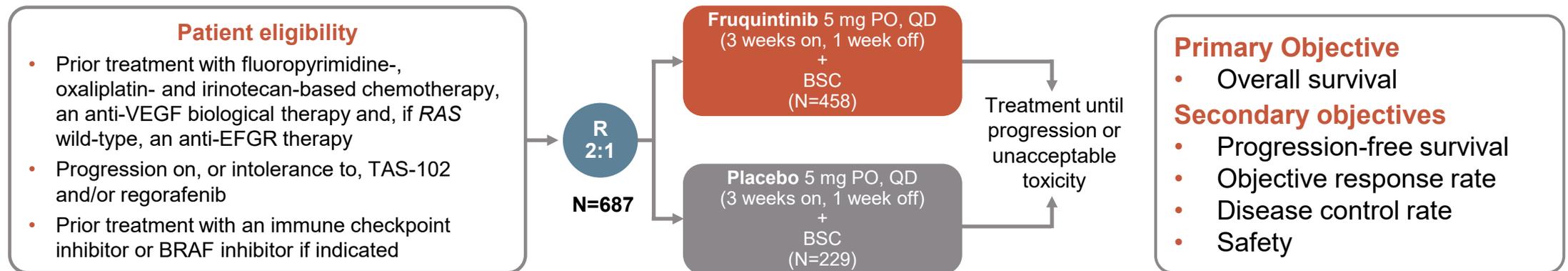
Tabernero J, et al. J Clin Oncol. 2023;41(suppl 4; abstr 4) (ASCO GI 2023, oral presentation); Prager G, et al. N Engl J Med. 2023; 388:1657-1667

# AFTER REGORAFENIB AND TAS-102 ± BEV WHAT NEXT?

# FRESCO-2: BACKGROUND AND STUDY DESIGN

## AFTER REGORAFENIB AND/OR TAS-102

- Effective treatment options are limited for patients with refractory metastatic colorectal cancer
- Fruquintinib is a highly selective and potent oral tyrosine kinase inhibitor of VEGFR-1, -2 and -3 and was approved in China in the 3L+ mCRC setting based on results from the FRESCO trial
- FRESCO-2 evaluated fruquintinib in more heavily pre-treated patients reflecting current global practices



### Stratification factors

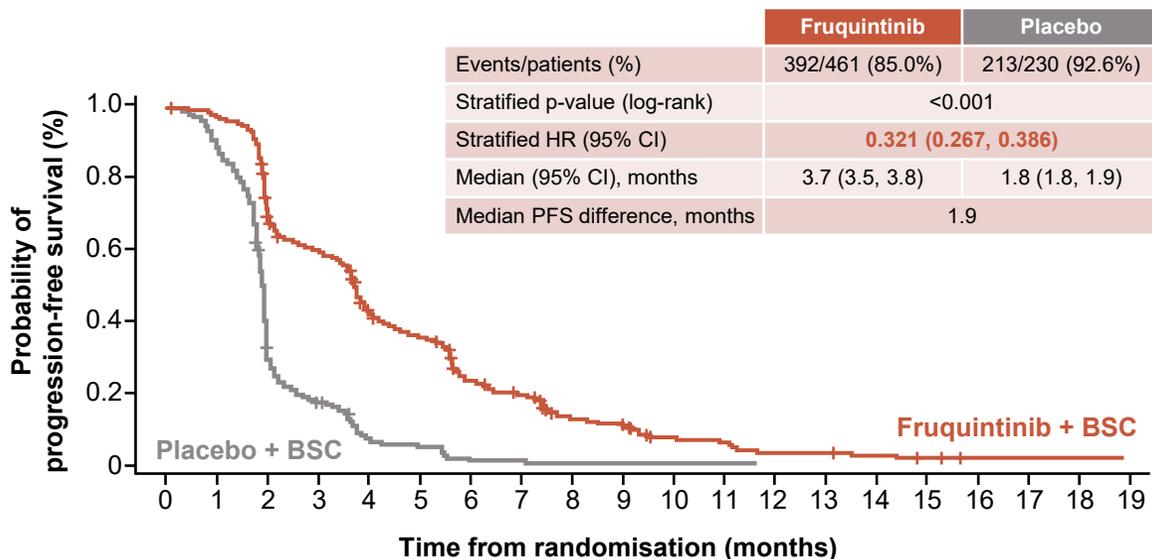
- Prior therapy (TAS-102 vs regorafenib vs TAS-102 and regorafenib)
- RAS mutational status (wild-type vs mutant)
- Duration of metastatic disease ( $\leq 18$  months vs  $> 18$  months)

Note: to ensure the patient population is reflective of clinical practice, the number of patients with prior regorafenib was limited to 344 patients (50%); TAS-102, trifluridine and tipiracil hydrochloride

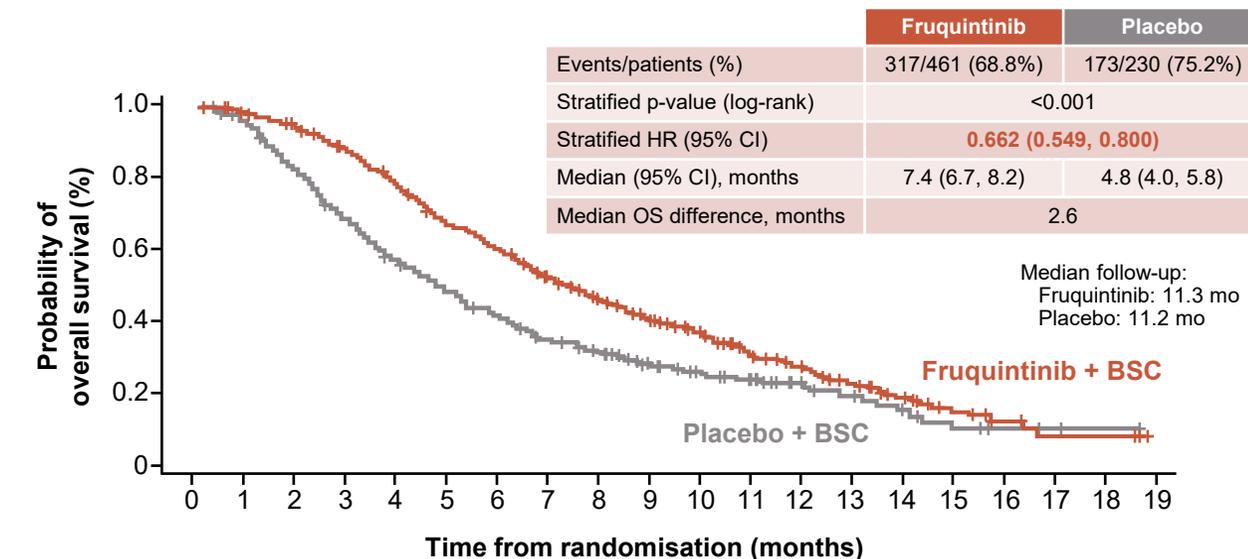
3L, third line; BRAF, proto-oncogene B-Raf; BSC, best supportive care; EFGR, endothelial growth factor; mCRC, metastatic prostate cancer; PO, orally; QD, once a day; R, randomisation; RAS, rat sarcoma viral oncogene homologue; VEGF(R), vascular endothelial growth factor (receptor); TAS-102, trifluridine/tipiracil

# FRESCO-2: FRUQUINTINIB PROLONGED OS AND PFS IN PATIENTS WITH REFRACTORY mCRC

## PROGRESSION-FREE SURVIVAL



## OVERALL SURVIVAL



Patients at risk

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Fruquintinib	461	430	291	256	170	146	89	71	43	36	21	17	10	9	6	4	2	2	2	2
Placebo	230	194	60	36	12	10	2	2	1	1	1	1	0							

Patients at risk

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Fruquintinib	461	449	429	395	349	297	266	224	184	143	113	79	58	41	23	14	7	4	4	0
Placebo	230	216	184	153	125	105	89	73	63	45	37	31	20	15	10	6	3	2	1	0

PFS: 3.7 mo vs. 1.8 mo (HR 0.32; p<0.001)

OS: 7.4 mo vs. 4.8 mo (HR 0.66; p<0.001)

### Tumour response:

ORR: 1.5% vs. 0.0% (p=0.059)

DCR: 55.5% vs. 16.1% (p<0.001)

BSC, best supportive care; CI, confidence interval; DCR, disease control rate; HR, hazard ratio; mCRC, metastatic colorectal cancer; mo, months; ORR, objective response rate; OS, overall survival; PFS, progression-free survival

Dasari NA, et al. Ann Oncol. 2022;33(suppl\_7):S808-S869 (ESMO 2022 oral presentation)

# FRESCO-2: SAFETY RESULTS

Category, n (%)	Fruquintinib (N=456)	Placebo (N=230)
Any TEAE	<b>451 (98.9)</b>	<b>213 (92.6)</b>
Grade ≥3	286 (62.7)	116 (50.4)
Treatment-related Grade ≥3	164 (36.0)	26 (11.3)
Leading to death	48 (10.5)	45 (19.6)
Any serious TEAE	<b>171 (37.5)</b>	<b>88 (38.3)</b>
Grade ≥3	162 (35.5)	85 (37.0)
TEAEs leading to dose modifications		
Dose interruption	247 (54.2)	70 (30.4)
Dose reduction	110 (24.1) <sup>a</sup>	9 (3.9)
Dose discontinuation	93 (20.4) <sup>b</sup>	49 (21.3)

<sup>a</sup> Most common TEAEs leading to dose reduction in fruquintinib arm: hand-foot syndrome (5.3%), hypertension (3.7%), and asthenia (3.5%)

<sup>b</sup> Most common TEAE leading to dose discontinuation in the fruquintinib arm: asthenia (1.5%)

# SUMMARY

# SUMMARY

## SEQUENTIAL TREATMENT CONSIDERATIONS FOR ADVANCED COLON CANCER

Treatment of advanced CRC should be considered as a continuum of care. Decision-making at each stage of therapy should account for patient suitability and tolerability, tumour biomarkers, and prior exposure to chemotherapies and/or targeted agents.

**Initial systemic therapy:**  
**Is the patient considered appropriate for intensive therapy?**

**Consider the patient's prior treatments. Have they received a previous:**  
Oxaliplatin-based chemotherapy?  
Irinotecan-based chemotherapy?  
Oxaliplatin- and irinotecan-based regimen?  
FP without oxaliplatin/irinotecan?

**Consider the results of molecular testing. Is the patient's tumour:**  
KRAS/NRAS/BRAF wild-type?  
BRAF V600E-positive?  
dMMR/MSI-H?  
HER2-amplified, RAS wild-type?

**Consider the location of the patient's tumour:**  
Left- or right sided?

Please refer to relevant treatment guidelines for the full details of the decision-making pathway and treatment options at each stage

BRAF, proto-oncogene B-Raf; CRC, colorectal cancer; FP, fluoropyrimidine; HER2, human epidermal growth factor receptor 2; KRAS, Kirsten rat sarcoma viral oncogene homologue; dMMR, deficient mismatch repair; MSI-H, microsatellite instability-high; NRAS, neuroblastoma RAS viral oncogene homolog; RAS, rat sarcoma viral oncogene homologue

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