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## Prevalence of CTX-M-Type Extended-Spectrum $\beta$ -Lactamase-Producing *Escherichia coli* B2-O25-ST131 H30R Among Residents in Nonacute Care Facilities in Japan

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We investigated the prevalence and characteristics of extended-spectrum  $\beta$ -lactamase (ESBL)-producing *Escherichia coli* among 258 residents of long-term care facilities (LTCFs) in Japan. Out of 258 fecal samples collected from nine LTCFs between November 2015 and March 2017, we recovered 59 ESBL-producing *E. coli* isolates. All isolates carried *bla*<sub>CTX-M</sub> genes, mainly *bla*<sub>CTX-M-27</sub> (42.4%), *bla*<sub>CTX-M-14</sub> (23.7%), and *bla*<sub>CTX-M-15</sub> (18.6%). The isolates showed 7 serotypes (STs), including ST131 ( $n=49$ , 83.1%) and ST38 ( $n=4$ , 6.8%), and 47 (79.7%) out of 49 isolates belonging to ST131 were identified as H30R. The 59 ESBL producers were divided into four groups, B2 (86.4%), D (8.5%), A (3.4%), and C (1.7%); 44 (74.6%) were epidemic clone B2-O25-ST131 H30R, of which 21, 11, and 6 harbored *bla*<sub>CTX-M-27</sub>, *bla*<sub>CTX-M-15</sub>, and *bla*<sub>CTX-M-14</sub>, respectively. Most plasmids were of IncF replicon types ( $n=33$ ), and 22 *bla*<sub>CTX-M-27</sub>-carrying plasmids showed multiple replicon types, including IncFII, FIA, and FIB. The ESBL producers were susceptible to imipenem, amikacin, and fosfomycin, but resistant to ceftazidime (49.2%), and ciprofloxacin (88.1%); in particular, the isolates harboring the *bla*<sub>CTX-M-15</sub> gene showed significantly high resistance rate to ceftazidime ( $p<0.01$ ). Our findings indicate that a considerable proportion of the examined LTCF residents carried ESBL-producing *E. coli* isolates in feces and had high prevalence of epidemic clone B2-O25-ST131. Furthermore, continuous investigations would be very necessary to monitor actual carriage states of ESBL-producers among the LTCF residents from the viewpoint of both public health and healthcare viewpoints.

**Keywords:** extended-spectrum  $\beta$ -lactamase, *Escherichia coli*, B2-O25-ST131 H30R, long-term care facility

### Introduction

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THERE IS A global increase in antimicrobial-resistant *Enterobacteriaceae* species secreting extended-spectrum  $\beta$ -lactamases (ESBLs), which presents a serious public health threat.<sup>1</sup> Of particular concern is rapid rise of a specific *E. coli* lineage that produces CTX-M-type  $\beta$ -lactamases and belongs to phylogenetic group B2, serotype O25:H4, and sequence type 131 (ST131) and possesses the type 1 fimbrial adhesion (*fimH30*) gene.<sup>2</sup> ESBL-producing *E. coli* isolates have been recovered not only from various specimens of hospitalized

patients but also from fecal samples of healthy people worldwide.<sup>3–5</sup> Consistent with these data, in our previous study, we detected intestinal carriage and long-term colonization by CTX-M-type  $\beta$ -lactamase-producing *E. coli* isolates among healthy Japanese people.<sup>6</sup> However, children, pregnant women, and elderly individuals, who differ not only in terms of lifestyle but also in terms of biological functions such as metabolism, homeostatic function, susceptibility to infections, and pharmacokinetics, also live in the community. Therefore, it is important to monitor the intestinal carriage of ESBL-producing *E. coli*

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